The Concept of Attitude in Behavior Analysis

A Teaching Manual for Beginning Researchers



Márcio Moreira

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Márcio Borges Moreira

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About the Author

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Márcio Borges Moreira holds a doctorate in Behavioral Sciences from the Universidade de Brasília, and a master's degree in Psychology and a degree in Psychology from the Pontifícia Universidade Católica de Goiás. He teaches in the undergraduate program and in the Master's program in Psychology at the Centro Universitário de Brasília (UniCEUB), where he supervises clinical internships at the Centro de Formação de Psicólogos (CENFOR). He is also the director of the Instituto Walden4, a clinic specializing in ABA-based services for children and adolescents with autism spectrum disorder (ASD).

Coauthor of the book *Princípios Básicos de Análise do Comportamento* [Basic Principles of Behavior Analysis], he has published book chapters and scientific articles in Brazilian and international journals, with a focus on applied behavior analysis, verbal behavior, and evidence-based interventions. His current research projects investigate the automation of training for professionals and paraprofessionals who work with people diagnosed with autism, the use of technology and artificial intelligence in teaching psychological concepts, the formation and change of prejudiced attitudes, and the measurement of behavior in the delivery of psychological services.

How to Read This Book

Each type of box has its own color and icon, and they always mean the same thing, in every chapter. After a few pages, the color alone tells you what to do with the passage: memorize it, compare, stop and think, or answer.

KEY CONCEPT
The definition the rest of the chapter relies on. Worth memorizing and being able to state in your own words.

EXAMPLE
A case that fits the definition. Before reading the explanation, try to say why it fits.

NON-EXAMPLE
A case that seems to fit but does not. The dashed border marks the mistake to avoid.

CAUTION
A frequent mistake or a delicate point. Stop and reread what comes before.

TEST YOURSELF
A question to answer before moving on. The answer, in green, comes right below.

AUTHOR NOTE
A comment from the author about a choice made in the book.

The four parts of the book each have their own band color, from warm (what is lived and said) to cool (what is measured and researched). The part color appears only on the margin tab, which carries the chapter number, on the large number at the chapter opening, on the page number, and on the rules of tables and figures.

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AUTHOR NOTE

How This Book Was Written

I started writing this book a year after the publication of the first book with the study by Elisa de Pennafort Rabelo, *Atitudes: Histórias em quadrinhos, análises semânticas em mídias sociais e o paradigma de relações de equivalência de estímulos* [Attitudes: Comics, semantic analyses on social media, and the stimulus equivalence paradigm], released by the Instituto Walden4 in 2022. The idea grew out of a classroom need: my students were conducting the research in our line on stimulus equivalence and on comics and attitudes, and they needed teaching material that would take them from the concept all the way to the research.

There was also an older reason: over years of research on attitudes and stimulus equivalence, I missed a text that presented the field in a systematic, progressive way that beginning researchers could follow. The existing literature is rich, but it is scattered across specialized articles that assume familiarity both with behavior analysis and with the specific methodological paradigms. This book is an attempt to fill that gap: not to exhaust the subject, which is far from exhaustible, but to offer a solid, well-grounded point of entry.

Over about two years, several versions and parts of the text were written and rewritten. With the first versions of ChatGPT, I tried out different formats, styles of language, and structures, and each of them was written and evaluated by me.

Finally, with Claude Code, Anthropic's assistant based on the Claude language model, the large body of material gathered over that time could be organized and completed in the form I had imagined from the start: progressive teaching material, both in its concepts and in the knowledge of how to research the subject. Because that help was substantial, and because this is a book about science, I owe readers an honest account of what artificial intelligence did in this final version and of what remained with me.

What remained with me were the idea and the scope of the book, the line of research it comes from, the order of the four parts, from the everyday to the technical, the definitions of attitude discussed here, and the decisions about what goes in and what stays out. The starting texts are also mine, written and rewritten over those two years, some of them in dialogue with ChatGPT.

On that material, artificial intelligence worked on several fronts. The first was structure: the manuscript, which came as a single file, was divided into chapters, and each chapter was rewritten in the teaching format I wanted, with objectives,

prerequisites, examples and non-examples, questions to answer while reading, common mistakes, exercises with an annotated answer key, and a criterion for deciding when to move on. The Glossary was assembled from the terms defined in the chapters, and the studies cited were described so that they can be understood without reading the original article.

The second front was checking the sources. Every literal quotation and every page number was searched for in the full text of the articles and books, including scanned ones, read by optical character recognition. Whatever could not be confirmed in a source was removed from the text or marked as pending. This checking is done by programs written for the purpose, and it is redone whenever the text changes.

The third was language. Here the help was in revision: grammar, spelling, and punctuation, standardization of technical terms, splitting of long sentences, explanation of statistics at first use, and rewording of cross-references, so that readers do not need to go back many pages to recall a case or a table. At my request, an adversarial review searched for contradictions and for terms used in more than one sense from one chapter to another, and the points found were corrected.

The fourth was the images and the form of the book. The diagrams and graphs were drawn by program, in the colors of each part. The scenes illustrating the experimental situations and the cover art were generated with Runway, an image-generation tool, and the figure notes say that they are illustrations, not records of the studies. The images from the original articles were cropped from the articles themselves, with the source indicated; where an article showed photographs of people, these were replaced by silhouettes. The layout, the visual identity, the pages about the Instituto Walden4, and the preparation of the ISBN application were done in the same way.

On all these fronts, artificial intelligence worked from what I wrote, from what I asked for, and from the sources I gathered, and the choices it made on its own were recorded so that I could review them. Responsibility for the content, for what is right and for any errors that remain, is mine. I record this help because it was real, and because those who study science have the right to know how the text in their hands was produced.

The English edition. This edition was translated from the Brazilian Portuguese edition (ISBN 978-85-65721-75-2) with the same tools. Quotations from works written in English were restored to their authors' own words wherever the source could be consulted. The figures drawn for this book were redrawn with English labels, and the text in the comics, research screens, and graphs reproduced from the Instituto Walden4 series was translated with an image-editing artificial intel-

ligence. Another instance of artificial intelligence then compared the translation, sentence by sentence, with the original (adversarial review), and the errors it found were corrected.

Márcio Borges Moreira

PART I

I

Foundations

What attitudes are

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CHAPTER

1 Introduction

attitudes in everyday life and in science

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Recognize** attitudes in everyday situations, in people's words and gestures.
2. **Explain** why attitudes deserve scientific study, without assuming that an attitude determines what a person does.
3. **Identify** prejudice as a special case of attitude and say why it will be the book's recurring example.
4. **Describe**, in one sentence, this book's proposal, grounded in behavior analysis, for the study of attitudes.
5. **Find your way** through the book's four parts and **plan** how to study with it.

PREREQUISITES

None. The chapter starts from what you already know from your own experience and uses no technical vocabulary without explaining it.

OPENING

Saturday afternoon, coffee with friends. Someone mentions having watched a documentary about veganism, and the conversation branches off in several directions. One friend finds the subject interesting but says she can't give up meat. Another claims that veganism is a passing fad. A third replies, with energy, that it is the only ethical position possible. And a fourth person says nothing: she just frowns, slightly.

How many attitudes happened in that scene? If you counted four, you got it right: three in words and one on a face. All about the same subject, all different, none out of the ordinary. This kind of event, so commonplace that it goes unnoticed, is what we are going to deal with: what it is, how behavior analysis explains it, and how research on it is done.

1.1 Attitudes in everyday life

Stop for a moment and think about the last few hours. How many times did you say, or hear, things like "this traffic is outrageous," "I love this artist," "I can't stand this topic anymore," "this series is really good," "my boss is clueless"? These are evaluations: the speaker takes a position, for or against, about someone or something. They come up so naturally that we rarely notice them. They are part of the flow of conversation, like saying hello or commenting on the weather.

This phenomenon is what the whole book is about. To begin, a working definition is enough:

KEY CONCEPT

An **attitude** is a favorable or unfavorable evaluation that someone makes of a person, a thing, a group, an idea, or a situation.

In Chapter 2 we will refine this definition. For now, notice what it does not require. It does not require the evaluation to be carefully thought out: it can be a "how boring!" said in passing. And it does not require the subject to be serious: a taste for coffee and an opinion about a soccer team count just as much as politics.

EXAMPLE

"This traffic is outrageous." There is an object (the traffic) and a position against it ("outrageous"). It is an attitude, said in passing, without any solemnity.

NON-EXAMPLE

"The meeting starts at 9 a.m." The sentence gives a time and takes no position, neither for nor against. Describing is not evaluating, and so the sentence is not an attitude.

> ⚠ **CAUTION**
>
> In everyday English, "attitude" often means a bold, assertive, or defiant manner: "she's got attitude," "this team needs more attitude," "lose the attitude." That is not the sense used in this book. Here, an attitude is a position taken for or against something. Whenever the word appears, ask yourself: is someone evaluating something? If so, it is our subject.

The coffee scene shows two more things. The first is that an attitude does not have to be spoken. The fourth person's frown was just as evaluative as the other three people's sentences, and Chapter 6 shows the variety of forms an attitude can take. The second is that the same object receives different attitudes: the four reactions were all about veganism, and no two of them matched.

Figure 1.1 carries the same idea into a comic-strip scene. Lisa and Davi are talking about the same job candidate. Lisa evaluates her favorably: "a great résumé," "an excellent candidate." Davi evaluates her with reservations: "I'm not sure someone like her would be the best choice," "we need to think about team harmony." There is a single object, the candidate, and two positions. Each line is an evaluation, said to someone, at that moment.

Figure 1.1

Two people, one candidate, two positions



Note. Panels from a comic strip set in a job interview (Moreira, Martins et al., 2024, p. 45), created by the authors of the study. Section 1.5 introduces the series it belongs to.

TEST YOURSELF

Looking at the restaurant bill, someone says: "This is highway robbery." (a) Is it an attitude? (b) About what?

ANSWER: (a) Yes. (b) About the price charged for the meal. The evaluation is unfavorable, even though nobody was robbed: the word "robbery" takes a position against the price.

1.2 Why study attitudes

There are three reasons to take attitudes seriously. The first two apply to anyone, not only to researchers.

The first is that evaluations are part of the conditions in which people live. What a group says about vaccines, candidates, studying, or who deserves a job makes up the environment in which each person acts: what they choose, what they say, what they dare to say. It is no accident that social psychology studies attitudes in fields as different as marketing, advertising, political behavior, and health (Albarracín & Shavitt, 2018).

The second is historical. The study of attitudes has been part of social psychology since the field's beginnings, with Thomas and Znaniecki's *The Polish Peasant in Europe and America* (1918–1920, as cited in Albarracín & Shavitt, 2018). There is, therefore, a long research tradition, and what is offered here is a way of looking at it from the standpoint of behavior analysis.

The third reason is the subtlest, and it is worth flagging right away. Saying what you think of something and doing something about it are not the same thing, and the relation between the two is itself a research question. There is no guarantee that liking a candidate leads to voting for that candidate. That is why overt behavior, the person's actions toward the object, was dropped from the definition of attitude, and the link between attitude and behavior came to be handled as a matter for empirical study (Albarracín & Shavitt, 2018, p. 300). Saying that attitudes matter, then, is not assuming that they "cause" what people do. What people say and what they do go together in some situations and come apart in others, and finding out when and why is part of the work.

TEST YOURSELF

Why is "attitudes cause behavior" not a safe starting point for research?

ANSWER: because the relation between what someone says about an object and what they do with it is an empirical question: liking a candidate does not guarantee voting for that candidate. Assuming the relation at the outset prevents us from investigating it.

1.3 Prejudice as a special case of attitude

Among the subjects to which the concept of attitude applies, one receives special attention in this book: prejudice.

KEY CONCEPT

Prejudice is an unfavorable attitude directed at someone for belonging to a group (defined, for example, by race, gender, sexual orientation, religion, age, social class, or disability), and not for what that person has done or said.

Notice that there is nothing new in the structure. "I don't like politicians. They're all the same" already has three ingredients: a group as the object, an unfavorable evaluation, and the extension of the evaluation to the whole group ("they're all the same"). Two things make prejudice a special case. One is the type of group: it is defined by characteristics such as race, gender, sexual orientation, or religion, and not by something each member of the group has done, as happens with "politicians." The other is what the evaluation usually entails for those who are its target. That is why we say that prejudice is a special case of attitude, and not a separate phenomenon: the tools used to analyze "cats are cute" work, unchanged, for analyzing it.

EXAMPLE

"Women aren't cut out for leadership." The object is a group (women), and the evaluation is unfavorable and applies to all of them because they belong to the group. It is prejudice.

NON-EXAMPLE

"That driver is reckless: he ran the red light." The evaluation is unfavorable, but it is about what one person did, not about the group he belongs to. It is an attitude, and it is not prejudice.

There are two reasons for giving prejudice this place. The first is practical: racism, for example, endures around the world and harms education, mental health, community relations, and economic development (Matsuda et al., 2020). The second is scientific: explaining how an unfavorable evaluation of a group is formed and maintained is a good test for the concept of attitude.

The topic is not new in behavior analysis, but research is still scarce. Matsuda et al. (2020) note that there is little behavior-analytic research to guide efforts against racism, and they propose that behavior analysts learn about it, broaden the experimental analyses of prejudice, and intervene to reduce it. In Brazil, Mizael and de Rose (2017) brought together experimental research and theoretical reflections. They concluded that few studies analyze racial prejudice experimentally with the field's paradigms, but that the theoretical apparatus of behavior analysis does help to analyze it. Fazzano and Gallo (2015) described homophobia as a set of complex behaviors involving several kinds of aggression (physical, psychological, or sexual) against gay people. And they suggested that, for the aggressor, the presence of these people may have acquired an aversive (unpleasant) character, learned over the course of their life history.

AUTHOR NOTE

This book treats prejudice as an object of scientific analysis, which requires conceptual precision and analytical distance. That does not mean moral neutrality. On the contrary: the central motivation of this work is the conviction that understanding prejudiced attitudes is a necessary step toward combating them effectively. Rigorous analysis and a commitment to social justice are not opposites: they are complementary.

Behavior analysis occupies an unusual position here, because it avoids two shortcuts. One is vague moralism: "prejudice is wrong, people need to change." The other is fatalism: "prejudice is natural, it has always existed and always will." Instead of either one, it asks which conditions produce and maintain these behaviors and which conditions can change them. That question has answers. They are neither perfect nor

final, but they make it possible to plan interventions and check whether they worked, which good intentions alone cannot do. Chapter 18 is devoted entirely to the topic, and it returns in many other chapters as an application of the concepts as they are built.

TEST YOURSELF

The sentence "People of that religion can't be trusted" is a case of prejudice. What is the object, and what makes it prejudiced, in the chapter's sense?

ANSWER: the object is a group of people, defined by religion. It is prejudice because the unfavorable evaluation ("can't be trusted") is directed at everyone in the group for belonging to it, and not for something each person has done.

1.4 The proposal of behavior analysis

If you have studied attitudes in social psychology, you probably learned that an attitude is something a person *has*: a stored disposition, a kept evaluation that shows itself when the person speaks. Guerin (1994, p. 155) describes this picture: across most of the social psychology literature, attitudes are handled as an internal store of genuine knowledge, and what people say simply discloses what has been kept inside.

This view has a strong intuition in its favor. When we say that "Maria has a positive attitude toward exercise," we seem to be saying something about Maria herself, something that persists even when she is not talking about exercise. This book's proposal is a different one:

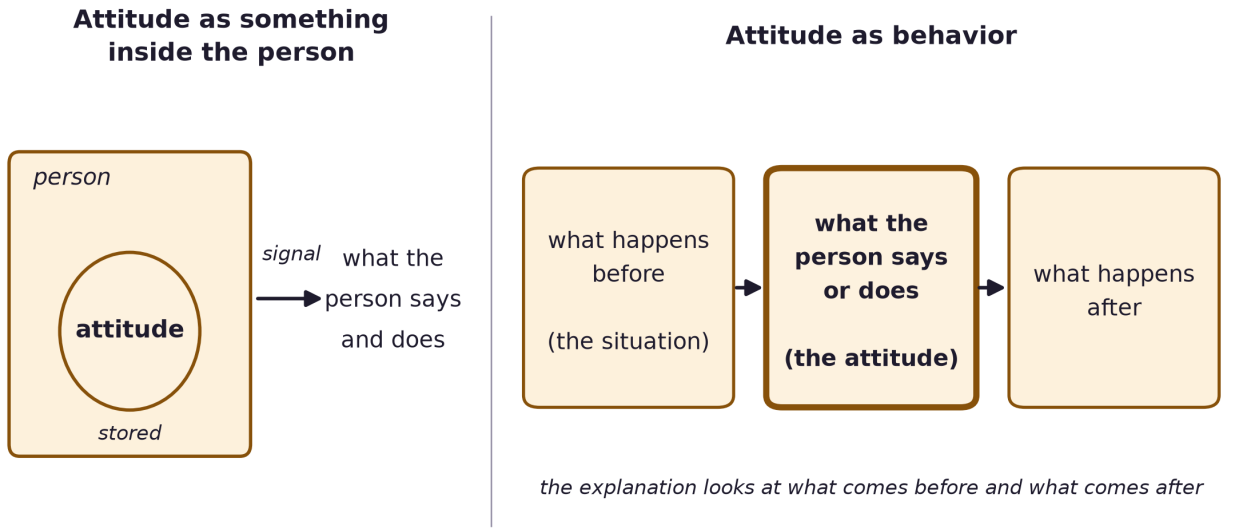
KEY CONCEPT

In this book, following behavior analysis, **attitudes are behavior**: what people say and do when they evaluate, and not internal causes or stored representations that produce what they say and do.

Behavior analysis is the science that studies behavior (what people and other animals do) in relation to the environment: the conditions in which it occurs and what happens afterward.

Guerin (1994, p. 155) put the idea into words when he proposed that attitudes and beliefs "can be studied as social behavior rather than as private, cognitive processes." Figure 1.2 compares the two ways of looking.

Figure 1.2
Two ways of looking at an attitude



Note. Diagram prepared for this book. On the left, the attitude is a stored thing, and what we observe is only its signal. On the right, the attitude is what we observe, and the explanation looks for the conditions in which it occurs and what comes after.

EXAMPLE

(Hypothetical case.) With his friends, Rafael says his team plays "like no other," buys the season jersey, and argues about every match. Under the book's proposal, these sayings and doings, in the situations in which they occur, are his attitude toward the team.

NON-EXAMPLE

"Rafael has a positive attitude stored inside him, and that is what makes him talk about the team and buy the jersey." Here the attitude has become a hidden cause, and the sentence only repeats, in another word, what Rafael says and does. It explains nothing.

This may sound strange on first reading, and the natural objection is: "But when Maria is not talking about exercise, does her attitude stop existing?" Answering it rigorously is one of the book's tasks, and the answer is built up over Part II. For now, hold on to two ideas. Like all behavior, attitudes have a **history**: they were shaped by what the per-

son has lived through. And they have **sensitivity to the present**: they depend on the situation in which they occur. Table 1.1 shows how the definition is built, layer by layer.

Table 1.1

The five layers of the behavioral perspective (Part II)

Chapter	Attitude is...	In plain words
10	a natural phenomenon	something that happens in the world and can be observed and measured
11	behavior	an activity of the person, and not a mental entity
12	operant behavior	an activity maintained and changed by what happens after it
13	discriminated operant behavior	an activity that occurs in certain situations and not in others
14	verbal behavior	an activity learned in a community that teaches what to evaluate, and how and when to say it

Note. The terms "operant," "discriminated," and "verbal" will be defined in the chapters indicated; for now, the right-hand column is enough.

TEST YOURSELF

According to the book's proposal, what would change in the question "What is Maria's attitude toward exercise?"

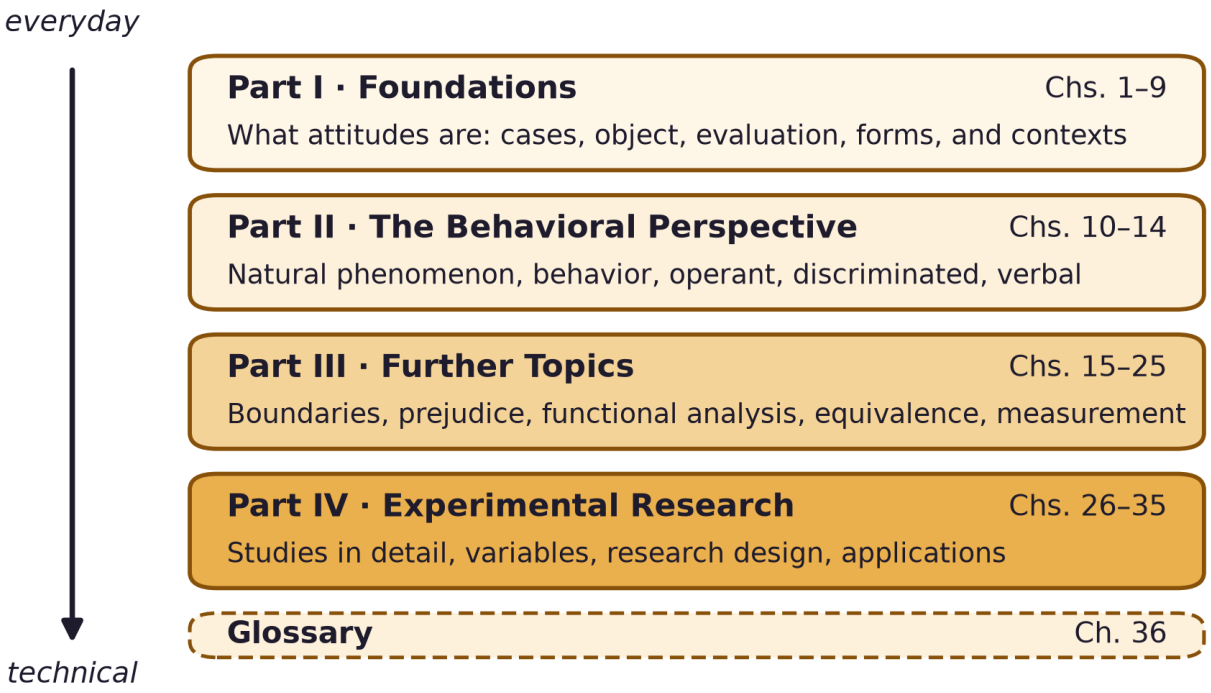
ANSWER: the question would stop looking for something stored inside Maria and would instead ask what she says and does about exercise, in which situations, and with what results.

1.5 How the book is organized

The book has four parts, and the progression is deliberate: from the most concrete and everyday to the most technical. Figure 1.3 summarizes the route.

Figure 1.3

Map of the book: from the everyday to the technical



Note. Diagram prepared for this book. Chapters 36 and 37 are the Glossary and the Figure Credits.

Part I, Foundations (Chapters 1–9). Starts from everyday life. You learn to identify attitudes, to distinguish them from other statements, to analyze their pieces (object and evaluation), and to recognize the diversity of the objects, forms, and contexts in which they appear. By the end of this part, you will have a first definition of attitude, the minimal definition, which Part III will take up again.

Part II, The Behavioral Perspective (Chapters 10–14). Builds the behavior-analytic definition, one layer per chapter, as in Table 1.1. It is the theoretical heart of the book.

Part III, Further Topics (Chapters 15–25). With the definition established, it goes deeper: the ways of defining attitude, the boundaries with opinion, belief, perception, and value, the conceptual questions, prejudice, functional analysis, the stimulus equivalence and relational frame paradigms, measurement, and the processes of formation and change.

Part IV, Experimental Research (Chapters 26–35). It is the closest to research practice: studies read in detail, variables classified, a step-by-step guide to designing a study, the use of comics, and behavioral engineering. The **Glossary** (Chapter 36) gathers all the technical terms, each with the chapter in which it appears.

You will notice that the first chapters hardly cite any authors. That is on purpose. The starting point is what you already know from experience, without the weight of vocabulary and literature, and the text becomes technical little by little. Sources come in as technical concepts come in, and from Part III onward the scholarly apparatus is complete.

The comic-strip scenes that accompany some chapters, especially the early ones, come from a line of research that the author supervises at the Centro Universitário de Brasília. They are studies by undergraduate psychology students, carried out in the courses Basic Internship II, Article Writing, and Debate Forum III and collected in books from the Instituto Walden4 Press (Moreira, Lemos et al., 2024, p. 13; Moreira, Rocha et al., 2022, p. 30). In several of them, participants rate the characters of a comic strip on a scale and rate them again after reading it (Moreira, Lemos et al., 2024, pp. 17 and 61). Here, the panels appear as everyday scenes, so that you can recognize attitudes before learning to analyze them. Chapter 34 reads these studies as research, and the source and page of each panel are given in the Figure Credits, at the end of the book.

TEST YOURSELF

In which part would you look for the answer to "how is an attitude measured?" And to "how was a specific experiment conducted?"

ANSWER: measurement is in Part III (Chapters 22–24); the detailed reading of experiments, in Part IV (Chapters 27–29).

1.6 Who this book is for and how to study with it

The book was written for those who have a genuine interest in attitudes, have or are building a basic background in psychology, and want to understand the topic through behavior analysis: to do research, to ground an intervention, or to better understand a phenomenon present throughout social life. Concretely, it is addressed to undergraduate psychology students, preferably with some exposure to the basic principles of behavior analysis; to graduate students and beginning re-

searchers who intend to study attitudes, prejudice, or social behavior; and to professionals from other fields who want to get to know the approach. Every necessary concept is defined here, and no advanced statistics is assumed.

Reading it calls for a certain disposition: a willingness to meet new ideas and work with them patiently. Some concepts may seem counterintuitive at first, especially that of treating attitudes as behavior rather than as a mental state. The strangeness, tolerated with curiosity, usually gives way to a more precise and more useful understanding.

The book was designed to be read in sequence, and each chapter follows the same route, designed so that you learn by doing. It opens with the **objectives**, which state what you will be able to do by the end, and with the **prerequisites**. Then come the short sections, each with a **Test Yourself** box: answer before reading the answer. Next come the **common mistakes**, the **summary**, the **exercises**, and the **annotated answer key**. Finally, the **mastery criterion** tells you whether you are ready to move on or whether it is worth reviewing something first. Resist the temptation to read the exercises with the answers alongside: what makes the repertoire stick is answering first and checking afterward.

One convention before we begin. Quotations from works written in English appear in their original wording, and quotations from works in other languages were translated by the author; the page given is always that of the original.

TEST YOURSELF

You reach a Test Yourself box, and the answer is right below the question. What is the recommended order, and why?

ANSWER: answer first, in writing or out loud, and only then check. Answering before seeing the answer is what makes the repertoire stick, and that is why the answer comes below the question rather than beside it.

Common learner mistakes

1 **Reading "attitude" in the sense of boldness or swagger.** "He's got attitude" is not a sentence about evaluation. The mistake happens because this is one of the most common senses of the word in everyday speech. *How to spot the mistake:* you are trying to decide whether someone "has or doesn't have" attitude, the way someone has or doesn't have courage. In this book, everyone has attitudes, and the question is about what, and whether for or against.

2 **Thinking that an attitude is always about a controversial subject.** A taste for coffee, for a team, or for a type of movie is as much an attitude as an opinion about a public policy. The mistake happens because the examples that come to mind first are those from heated arguments, in which the evaluation is strong and draws attention. *How to spot the mistake:* you only look for attitudes in heated arguments.

3 **Assuming that an attitude determines what a person does.** The relation between what someone says and what they do is a research question, not a starting point. The mistake happens because everyday language treats an attitude as something a person has and that explains what they do. *How to spot the mistake:* you write "she did X because she has a negative attitude" as if that explained something.

4 **Taking "attitude is behavior" to mean "nobody feels or thinks anything."** No one denies that people feel and think. What is proposed is that what we call an attitude be studied through what the person says and does and the conditions under which they say and do it. The mistake happens because "behavior," in common usage, brings to mind only visible movements. *How to spot the mistake:* you dismiss the proposal because you think it "ignores the person."

SUMMARY

Recognizing attitudes (objective 1). Attitudes are evaluations, favorable or unfavorable, of someone or something, and they appear all the time, in words and in gestures, about serious or trivial subjects. Do not confuse them with the "attitude" of everyday usage, which means boldness or assertiveness.

Why study them (objective 2). Evaluations make up the conditions in which people live, and their study has been part of social psychology from its origins. The relation between what is said and what is done is a research question, not a premise.

Prejudice (objective 3). It is an unfavorable attitude directed at someone for belonging to a group. It has the same structure as any attitude and can be analyzed with the same tools, and that is why it will be the book's recurring example.

The proposal (objective 4). It is proposed here, on the basis of behavior analysis, that attitudes be treated as behavior, and not as entities stored inside the person. This shifts the question from "what does she have?" to "what does she say and do, in which situations, with what results?"

The book (objective 5). Four parts, from the everyday to the technical: foundations, the behavioral perspective, further topics, and experimental research, plus a glossary. Each chapter asks you to answer before checking.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. In the coffee scene, one of the people said nothing, and still there was an attitude. What in the scene supports this?

a. The silence itself.
b. The facial expression, which took a position on the subject.
c. The fact that she was present in the conversation.
d. The fact that she is vegan.

2. Which of the sentences contains an attitude, in this book's sense?

a. "That young man has attitude: he doesn't wait for anyone to tell him what to do."
b. "My aunt is against using cell phones at the table."
c. "She decided to show some attitude and quit her job."
d. "People with attitude don't waste time."

3. Mark the sentences that are attitudes: (i) "This restaurant is wonderful." (ii) "The restaurant opens at 11 a.m." (iii) "I hate waiting for a table." (iv) "I booked a table for 8 p.m."

4. Explain, in two sentences, why the study of attitudes does not start from the idea that an attitude "causes" behavior.

5. Which sentence is a case of prejudice, in the chapter's sense?

a. "I don't like rain."

b. "I don't hire people from that region: they're all lazy."

c. "That politician let me down: he made promises and didn't keep them."

d. "I prefer traveling by train."

6. Rewrite "Luísa has a very positive attitude toward reading" by saying what Luísa does and says, in two or three sentences.

7. In which part of the book would you look for the answer to each question? (a) "What makes a sentence an attitude?" (b) "How is an attitude measured?" (c) "How was this experiment done?"

8. Write, in three lines, how you plan to study the next chapters: when, where, and how you will use the exercises.

9. Give two reasons why prejudice is this book's recurring example.

10. Which option describes the book's proposal for the study of attitudes?

a. Attitudes are mental states stored in the person, which show themselves when the person speaks.

b. Attitudes are behavior: what the person says and does when evaluating, in certain situations and with certain results.

c. Attitudes do not exist, because nobody feels or thinks anything.

d. Attitudes are causes of what a person does, and therefore they must be measured before anything else.

ANNOTATED ANSWER KEY

1. b. The attitude lies in the evaluation, which can be spoken or shown in some other way; here, the frown took a position. Option **a** is wrong because silence, by itself, is no evaluation at all (Section 2.5 returns to this). Options **c** and **d** have nothing to do with the criterion: being present and being vegan are not evaluations.

2. b. "Being against" is a position on an object (using cell phones at the table). In the others, "attitude" means boldness or assertiveness, the everyday sense flagged in Section 1.1 (common mistake 1).

3. (i) and (iii). In (i) and (iii) the speaker takes a position, for and against. In (ii) and (iv) a time is given and an action is reported, with no position taken.

4. Model answer: "Because the relation between what a person says about an object and what they do with it is an empirical question: liking a candidate does not guarantee voting for that candidate. Assuming the relation from the start would prevent us from investigating it." Any answer that includes both elements counts: the relation is a question, and assuming it makes research impossible.

5. b. There is a group as the object ("people from that region") and an unfavorable evaluation, extended to people because they belong to the group. Option **a** has rain as its object. Option **c** evaluates a person for what he did, which is an attitude but not prejudice. Option **d** is a preference.

6. Model answer: "Luísa reads often, speaks well of books when the subject comes up, recommends books to her friends, and says reading is one of the best moments of her day." The answer is good if it describes what she does and says in concrete situations, instead of pointing to something she "has inside her."

7. (a) Part I (Chapters 2–4 and 9). (b) Part III (Chapters 22–24). (c) Part IV (Chapters 27–29).

8. The answer is yours. It is complete if it includes: (1) a time and a place; (2) answering the exercises before looking at the answer key; (3) reviewing the sections indicated by the mastery criterion when you get something wrong.

9. Model answer: one reason is practical, because racism, for example, endures around the world and harms education, mental health, community relations, and economic development (Matsuda et al., 2020); the other is scientific, because explaining how an unfavorable evaluation of a group is formed and maintained is a good test for the concept of attitude (Section 1.3). It is worth recalling what makes the second possible: the structure of prejudice is that of any attitude, and the same tools apply.

10. b. This is the proposal of Section 1.4: attitudes as behavior, and not as stored entities. Option **a** is the view challenged here (Guerin, 1994, p. 155). Option **c** is common mistake 4: no one denies that people feel and think. Option **d** is common mistake 3: the relation between what is said and what is done is a research question, not a starting point.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 2. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2, 3	1.1 (attitudes in everyday life and the caution about the word)
4	1.2 (why study attitudes) and common mistake 3
5, 9	1.3 (prejudice)
6, 10	1.4 (the proposal of behavior analysis) and common mistakes 3 and 4
7, 8	1.5 and 1.6 (how the book is organized and how to study)

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CHAPTER

2 Attitudes

two paradigmatic cases

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Identify**, in an everyday sentence, the attitude object and the evaluation made of it.
2. **Classify** an evaluation as having positive, negative, or neutral valence.
3. **Distinguish** an evaluative sentence from a descriptive sentence that has the same grammatical form.
4. **Explain** why we begin defining attitude with paradigmatic cases rather than with an abstract definition.
5. **Formulate** the minimal definition of attitude and apply it to a new example.

PREREQUISITES

Only Chapter 1: the idea that attitudes show up all the time, at the dinner table, on the news, in the line at the coffee shop, and that they will be treated here as something that can be observed and studied. You do not need any technical vocabulary.

OPENING

In a single morning, you hear three sentences.

> *"Cats have fur."*
>
> *"Cats are so cute!"*
>
> *"I don't like politicians. They're all the same."*

All three are statements, and the first two even have the same form: subject, verb, complement. Even so, you sense that the first is of a different nature. It informs. The other two take sides. What exactly do the second and third have that the first lacks?

In this chapter you will answer that question precisely. To do so, we will take the last two sentences apart until we can see the pieces they are made of. They will be our two starting cases, and they will stay with us throughout the book.

2.1 Where to begin a definition

Try explaining to someone what a chair is. Does it have four legs? Not always. Does it have a backrest? There are chairs without one. Is it for sitting? A park bench is too, and nobody calls it a chair. The harder you try for a definition that covers every case at once, the more it slips away.

There is an easier path: start with the clearest example. The dining room chair, with four legs, a seat, and a backrest, is a chair beyond dispute. Looking at it, you can say what makes it a chair and use that as a yardstick to judge the ottoman, the bench, and the stool.

KEY CONCEPT

A **paradigmatic case** is an example of a concept so clear and typical that hardly anyone hesitates to recognize it. It serves as an anchor: what we discover in it becomes the criterion for judging the doubtful cases.

EXAMPLE

The sparrow is a paradigmatic case of a bird: it flies, has feathers and a beak, lays eggs, builds a nest, sings. Nobody hesitates to call it a bird, and what we discover in it (feathers, beak, eggs) serves as a yardstick for judging the others.

NON-EXAMPLE

The penguin is a bird, but it is not a paradigmatic case: it has feathers and a beak, but it does not fly and spends much of its life in the water. Whoever sees it hesitates. A case like this serves to test a ready-made definition, not to build one.

We will do the same with attitudes. Instead of opening with an abstract definition, which you would not yet know how to apply, we will start from two cases in which nobody would hesitate to say "that's an attitude." For now, the word "attitude" is being used in its ordinary sense. The careful definition comes in Section 2.4.

TEST YOURSELF

To define “fruit,” which is the better starting point: the orange or the tomato? Why?

ANSWER: the orange. It is a fruit beyond dispute. The tomato sparks debate (in the kitchen it is treated as a vegetable), and a case that sparks debate serves to test the definition, not to build it.

2.2 First case: “Cats are so cute”

A friend shows you a photo of a cat on her phone. Smiling, she says:

> *“Oh, cats are so cute!”*

You would recognize an attitude in this sentence without a second thought. But why? To find out, ask it two questions.

First question: what is she talking about? Cats. That is the **attitude object**: what the sentence points to, the target of the position taken.

KEY CONCEPT

The **attitude object** is whatever someone takes a position on. It can be an animal, a person, a group, an idea, an event, a practice, or even the speaker. Every attitude is *about* something.

Second question: what does she say about cats? That they are “cute.” Notice that “cute” is not measured with a ruler or a scale. You do not check how cute a cat is by looking at it, the way you check whether it has fur. In saying “cute,” your friend is not describing a property of cats that you could check: she is taking a position in their favor. That is an **evaluation**.

KEY CONCEPT

An **evaluation** is what is said about an object when one takes a position on it: for or against, with liking or dislike. Words such as “cute,” “boring,” “unfair,” “delicious,” and “torture” usually carry evaluations.

EXAMPLE

"This series is really good." *Attitude object:* the series. *Evaluation:* "really good," a position in favor that cannot be checked with a ruler or a scale.

Now go back to the first sentence of the opening. "Cats have fur" has the same form as "cats are so cute": the object comes first, then a verb, then a complement. But the complement does something else. "Have fur" describes a property that anyone can check by looking. There is no position taken at all.

NON-EXAMPLE

"Cats have fur." It has an object ("cats") and it has a complement, but the complement describes instead of evaluating. Whoever says this is informing, not taking sides. That is why the sentence is *not* an attitude.

Table 2.1 brings together three such pairs. In each pair, the form is the same and the nature is different.

Table 2.1

Pairs of sentences with the same grammatical form

Sentence	What the sentence does	Is it an attitude?
Cats have fur.	Describes a property that can be checked by looking.	No
Cats are so cute!	Places the speaker in favor of the object.	Yes
The room has twelve chairs.	Describes something that can be counted.	No
This room is cozy.	Places the speaker in favor of the object.	Yes
The coffee is at 70 degrees.	Describes something that can be measured.	No
This coffee is delicious.	Places the speaker in favor of the object.	Yes

Note. Examples prepared for this book.

TEST YOURSELF

1. In "This cake is delicious," what is the attitude object? And what is the evaluation?
2. Is "This cake has three layers" an attitude?

ANSWERS: (1) The object is "this cake"; the evaluation is "delicious." (2) No. The sentence describes something that can be checked by looking at the cake.

2.3 Second case: "I don't like politicians. They're all the same."

Now a family dinner. The news is on, and, looking at the screen, your uncle sighs:

> *"I don't like politicians. They're all the same."*

Once again you would recognize an attitude. Let us ask the same two questions.

What is he talking about? Politicians. The object is a category of people, which differs from the case of the cats, where the object is a category of animals. This is very common: many of the attitudes circulating in society are directed at groups, such as politicians, doctors, teachers, fans of another team. When the group is defined by characteristics such as skin color, religion, or sexual orientation, the attitudes are directly related to prejudice, the subject of Chapter 18.

What does he say about politicians? "I don't like" is one of the most direct ways, in English, of expressing an unfavorable evaluation. It is a position against the object.

Here the evaluation points in the opposite direction from the first case, and that calls for a name. The direction of an evaluation, favorable or unfavorable, is called **valence**.

KEY CONCEPT

Valence is the direction of an evaluation. It is **positive** when the evaluation is favorable to the object (approval, liking, preference), **negative** when it is unfavorable (disapproval, dislike, rejection), and **neutral** when it leans to neither side (indifference or a middle ground).

In “cats are so cute,” the valence is positive. In “I don’t like politicians,” it is negative.

EXAMPLE

Three sentences about the same coffee: “It’s delicious” (positive valence), “It’s awful” (negative), and “It’s fine, nothing special” (neutral). The object is the same, and the valence changes with the evaluation.

NON-EXAMPLE

“Love” and “like” do not differ in valence: both are positive. The difference between them is one of intensity, the subject of Chapter 4. Valence is only the direction of the evaluation.

The uncle’s second sentence remains: “They’re all the same.” It does not introduce a new object, because it is still about politicians. What it does is move from experience with some of them to the whole category: the uncle is not saying that he had a bad experience with one particular politician, but extending the evaluation to all of them. Extensions like this appear in many attitudes, and Chapter 5 returns to them.

TEST YOURSELF

In the uncle’s sentence, is “They’re all the same” a second evaluation, about another object? Or does it do something else?

ANSWER: there is no other object: it is still “politicians.” The second sentence extends the negative evaluation to the whole category, without exception.

2.4 What the two cases have in common

Figure 2.1 places the two cases side by side, with their pieces marked.

Figure 2.1

Anatomy of two attitudes: the object and the evaluation in each sentence



Note. Diagram prepared for this book. The solid bracket marks the attitude object; the dashed one, the evaluation. The order of the parts changes from one sentence to the other, but both pieces are present in both.

The objects are very different (an animal, a group of people), and the valences are opposite (one positive, the other negative). Even so, the structure is the same: *an object* and *an evaluation of it*. This is what makes the two sentences paradigmatic cases, and it is what the sentence "Cats have fur" lacks: there is an object there, but no evaluation.

We can now formulate what we were looking for:

KEY CONCEPT

An **attitude** is an evaluation directed at an identifiable object, with positive, negative, or neutral valence.

In other words: it is a favorable or unfavorable position on something or someone.

Example: "I prefer working in a team." The object is working in a team; the evaluation is the preference, with positive valence.

We call this statement the **minimal definition** because it is deliberately lean: it says what lies at the core of an attitude and leaves the rest open. Does any evaluation, even the most fleeting, count as an attitude? What

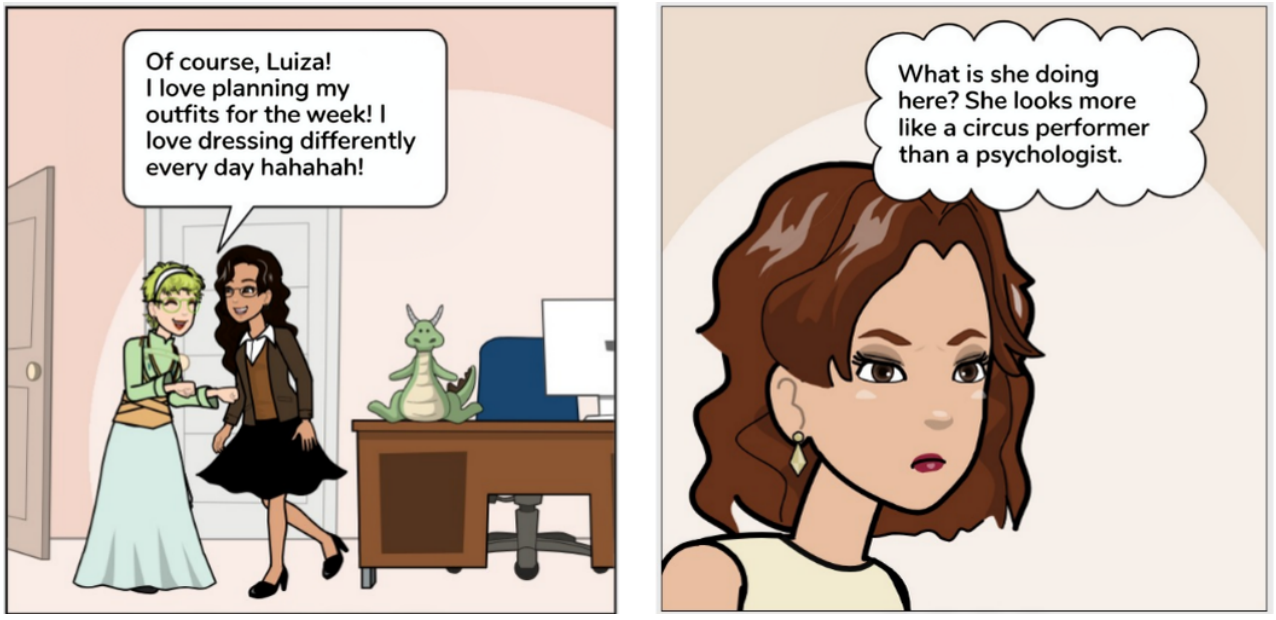
makes an evaluation positive or negative, and who decides? Does the evaluation have to be put into words, or does a gesture, a facial expression, or a choice also count? How does someone come to evaluate in this way, and what keeps the evaluation going over time? Each of these questions has its own chapter further on. For now, the minimal definition is enough for you to know what to look for when we say we are studying attitudes.

It is worth seeing the definition at work on other material. The two panels in Figure 2.2 come from a comic strip set in a psychology clinic.

On the left, the psychologist Isabela tells a colleague that she loves planning her outfits for the week. On the right, Camila, a client waiting to be seen, looks at Isabela and thinks that she looks more like a circus performer than a psychologist. In both panels there is an object, the way Isabela dresses, and there is an evaluation directed at it. The valence is positive in the speech on the left and negative in the thought on the right. The second evaluation, unlike the sentences we have seen so far, was not said to anyone, and Chapter 6 returns to this point.

Figure 2.2

The same way of dressing, two evaluations



Note. Panels from a comic strip in the series of comics studies carried out by undergraduates and published by the Instituto Walden4 (Section 1.5) and analyzed in Chapter 34; source and page in the Figure Credits. The reproduction has the resolution of the source material.

TEST YOURSELF

Why is the definition called "minimal"?

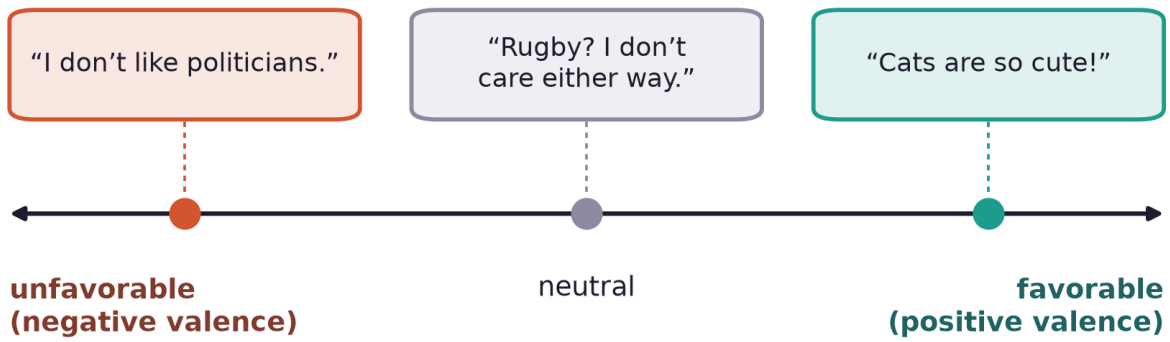
ANSWER: because it is limited to the core (object plus evaluation). It does not say how attitudes are formed, why they are maintained, how they are measured, or how they are changed. That comes later.

2.5 Neutral valence: "I don't care either way"

Someone asks what you think of rugby, a sport you have never played or followed. You answer: "Rugby? I don't care either way."

There is an object (rugby) and there is an evaluation, one of indifference: neither for nor against. It is an attitude with **neutral valence**. A middle ground counts in the same way: saying the meeting was "so-so" is evaluating it without leaning to either side. Figure 2.3 shows that valence works like a direction, with neutral halfway along.

Figure 2.3
Valence as direction



Note. Diagram prepared for this book. The line shows the direction of the evaluation; it does not measure how strong the evaluation is, a question left for Chapter 4.

Attitudes with neutral valence are among the hardest to study. In practice, it is difficult to tell apart someone who is truly indifferent from someone who has an evaluation and does not say it, out of shyness or to avoid friction. Attitude researchers deal with this difficulty all the time, and we will return to it when we talk about measurement.

TEST YOURSELF

Someone asks what you think of rugby, and you remain silent. Is that the same as answering "I don't care either way"?

ANSWER: no. "I don't care either way" is a position (indifference) and has neutral valence. Silence expresses no evaluation at all: we do not know what the person evaluates, or whether they evaluate at all.

Common learner mistakes

1 **Taking the form of the sentence as the criterion.** "Cats have fur" and "cats are so cute" have the same grammatical structure. What decides whether there is an attitude is not grammar but what the complement does: describe or take sides. The mistake happens because we learn to analyze sentences by their grammar, and grammar does not distinguish describing from evaluating. *How to spot the mistake:* you classified two sentences as the same just because they "sound alike."

2 **Confusing the object with the evaluation.** In "cats are so cute," "cute" is not the object; the object is "cats." The mistake happens because the evaluative word is the one that draws the most attention in the sentence. *How to spot the mistake:* your answer to the question "what is the person talking about?" is a word that expresses liking or dislike. Ask "about what?" first, and only then "what is said about it?"

3 **Treating silence as neutrality.** Neutral valence is an evaluation of indifference ("I don't care either way"). Saying nothing is not a neutral evaluation: it is the absence of an expressed evaluation. The mistake happens because, in both cases, the person leans to neither side, and the difference between not leaning and not speaking up goes unnoticed. *How to spot the mistake:* you wrote down "neutral" in a case where the person simply did not speak up.

SUMMARY

Object and evaluation (objective 1). In the two starting cases, "cats are so cute" and "I don't like politicians," two pieces always appear: the **attitude object** (what the person is talking about) and the **evaluation** (what they say about it). Identifying them is the first step in recognizing an attitude, and the order of the questions matters: first "about what?", then "what is said about it?"

Valence (objective 2). Valence is the direction of the evaluation: positive, negative, or neutral. Neutral is an evaluation of indifference or a middle ground ("I don't care either way," "so-so"), and not the absence of evaluation: silence says nothing about what the person evaluates.

Describing or evaluating (objective 3). Sentences with the same grammatical form can be of different natures: "have fur" describes; "are so cute" takes sides. What decides is what the complement does, not grammar.

Paradigmatic cases (objective 4). To define a concept, it helps to start with examples so clear that hardly anyone hesitates. What is discovered in them becomes the criterion for doubtful cases, and that is why we start from two cases rather than from an abstract definition.

The minimal definition (objective 5). An attitude is an evaluation directed at an identifiable object, with positive, negative, or neutral valence. The definition is deliberately lean: it is the book's starting point and will be refined chapter by chapter.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. In "My neighbor is a pain," what is the attitude object?

a. a pain
b. my neighbor
c. is
d. the whole sentence

2. Which of the sentences below expresses an evaluation with negative valence?

a. "The movie runs two hours."
b. "This movie is a waste of time."
c. "I saw the movie yesterday."
d. "Who directed the movie?"

3. Classify each sentence as descriptive (D) or evaluative (E):

a. "The meeting starts at 2 p.m."

b. "This meeting is going to be torture."

c. "My brother lives in Goiânia."

d. "My brother is an admirable person."

4. Why is the dining room chair, with four legs, a seat, and a backrest, a good starting point for defining "chair"?

a. Because it is the only chair that exists.

b. Because hardly anyone hesitates to recognize it as a chair.

c. Because every chair, without exception, has four legs.

d. Because it has the most beautiful design.

5. In "I can't stand people who cut in line," indicate the attitude object and the valence.

6. What is the valence of "I don't care whether it rains or not"?

a. positive

b. negative

c. neutral

d. none, because the sentence does not express an attitude

7. Complete the minimal definition: "An attitude is an _____ directed at an identifiable _____, with _____, _____, or _____ valence."

8. At the condo association meeting, Marta says: "I hate these meetings. Nobody ever gets anything done." (a) What is the attitude object? (b) What is the evaluation, and what is its valence? (c) What does the second sentence add to the first?

9. Compare "My boss is 45 years old" and "My boss is unfair." Both have the same grammatical structure. Explain, in two sentences, why only one of them is an attitude.

10. Choose an object from your daily life (your city's public transportation, the coffee at the bakery, your team). Write two sentences about it, one with positive valence and one with negative valence, and mark the object and the evaluation in each.

1. b. "My neighbor" is what is being talked about. Option **a** is the evaluation, not the object (common mistake 2: confusing the object with the evaluation). Option **c** is only the verb that links the two parts. Option **d** is the whole sentence, in which object and evaluation appear together; it is not one of the pieces.

2. b. "A waste of time" is a position against the movie. Option **a** describes a duration that can be measured. Option **c** reports a fact. Option **d** is a question, and asking is not taking sides.

3. a = D; b = E; c = D; d = E. In **a** and **c**, what is stated can be checked by observation (a time, an address). In **b** and **d**, the complement ("torture," "admirable") positions the speaker: against the meeting, in favor of the brother.

4. b. A paradigmatic case is valuable because it is clearly recognized. Option **a** is false. Option **c** makes the mistake of turning features of a clear case into requirements for all cases: there are chairs of other shapes. Option **d** has nothing to do with the criterion.

5. Object: people who cut in line (an attitude directed at a group defined by a behavior; "cutting in line" is also accepted as the object). Valence: negative, because "can't stand" is unfavorable.

6. c. There is an object (the rain) and an evaluation of indifference: neutral valence. Options **a** and **b** point in directions the sentence does not have. Option **d** is common mistake 3: treating neutrality as the absence of an attitude. "I don't care" is a position.

7. evaluation; (attitude) object; positive, negative, neutral.

8. (a) "These meetings" (the condo association meetings). (b) The evaluation is "hate," with negative valence. (c) "Nobody ever gets anything done" intensifies and extends the evaluation: it presents as total ("nobody," "anything") the problem that justifies the "hate." It does not introduce a new object.

9. Model answer: "The first describes a property that can be checked (age) and does not take sides. The second evaluates the boss unfavorably, with negative valence, and that is why it is an attitude: it has an object and an evaluation." Any answer that says only the second positions the speaker counts.

10. Your answer is right if: (1) both sentences are about the same object; (2) each one contains an explicit evaluation, not a mere description; (3) the valences are opposite; (4) you marked object and evaluation without swapping them. Example: "The bakery's coffee is delicious" (positive) and "The bakery's coffee is a waste of money" (negative). Object, in both: the bakery's coffee.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 3, which puts the definition to the test with examples and non-examples. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 5, 8	2.2 and 2.3 (object and evaluation)
2, 6	2.3 and 2.5 (valence)
3, 9	2.2 (the "describes × evaluates" pair) and the common mistakes
4	2.1 (paradigmatic cases)
7, 10	2.4 (the minimal definition)

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CHAPTER

3 Examples and Non-Examples of Attitude

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Recognize** examples of attitude whose objects are of different types (things, ideas, behaviors) and whose valences also differ.
2. **Distinguish** attitudes from four types of statement that resemble them: statement of fact, instruction, question, and report of what one did.
3. **Identify** borderline cases (rhetorical question, exclamation, euphemism, irony, preference, intention) and explain why grammatical form alone does not decide the classification.
4. **Apply** the chapter's three questions (is there an object? is there an evaluation? what is the valence?) to new statements.
5. **Justify** in writing the classification of a statement, saying which criterion decided it.

PREREQUISITES

Chapter 2: attitude object, evaluation, valence, and the minimal definition of attitude (an evaluation directed at an identifiable object, with positive, negative, or neutral valence).

OPENING

Your building manager asks you a favor. He wants to know whether the mood among the residents is turning sour and suggests that you read the messages in the building's group chat from the past month and mark which ones express an attitude. You open the chat and, among hundreds of messages, you find these:

> *"The meeting is Thursday at 7 p.m."*
>
> *"Has anyone seen the cat from 302?"*
>
> *"Close the gate, people, for God's sake!"*
>
> *"This extra fee is a rip-off."*

> *"Great. Another renovation. I was really missing the noise."*
>
> *"I prefer the old building manager a thousand times over."*

Some you classify without thinking. Others make you stop. That hesitation is not a lack of preparation: it is information about where the boundaries of the concept run. In this chapter you will learn criteria for deciding, and an honest way of dealing with the cases that fall in between. At the end, go back to the six messages and classify them: you will have a reason for each one.

3.1 Examples: what we recognize without hesitation

We begin on solid ground. There are statements in which the object and the evaluation are clear and do not depend on the situation to be recognized. These are the cases nobody argues about.

KEY CONCEPT

An **example** of attitude is a statement in which the object is identifiable and the evaluation is clear, so that recognizing it as an attitude does not depend on the situation in which it was said.

Table 3.1 brings together examples with objects of quite different types.

Table 3.1
Examples of attitude, with object and valence

Statement	Object	Type of object	Valence
"Justice is fundamental."	justice	idea	positive
"Lying is wrong."	lying	behavior	negative
"I hate Monday mornings."	Monday mornings	moment	negative
"I love barbecue."	barbecue	food	positive
"Samba is Brazil's greatest cultural expression."	samba	cultural genre	positive
"Reality TV is a waste of time."	reality TV	type of show	negative
"I don't care which team wins."	which team wins	event	neutral
"I thought the meeting was reasonable."	the meeting	event	neutral (middle ground)

Note. Examples prepared for this book.

Notice two things. First, objects do not have to be things you can touch: an idea (justice) and a behavior (lying) are objects just as good as a barbecue. Chapter 5 explores this variety. Second, the valence does not have to be in an adjective. In "hate," it is in a verb; in "waste of time," in a noun; in "I don't care which team wins," in a whole expression of indifference.

EXAMPLE

Of the six messages in the opening, "This extra fee is a rip-off." is an example. The object is the extra fee, identifiable from the sentence itself; the evaluation lies in "is a rip-off," which attributes value; the valence is negative. Nothing depends on knowing who spoke or in what tone: recognizing it as an attitude does not require the situation.

CAUTION

Not every evaluation comes with a word like "good," "bad," or "great." "This policy will save many lives" contains no evaluative adjective and, even so, evaluates the policy favorably: it attributes a highly valued effect to it. Look for the speaker's position, not just the evaluative word.

TEST YOURSELF

Identify the object and the valence: (a) "I can't stand people who cut in line." (b) "This guy is a genius."

ANSWERS: (a) object: people who cut in line (or cutting in line, a behavior); negative valence, expressed by the verb "can't stand." (b) object: "this guy"; positive valence, expressed by the noun "genius."

One caveat, to avoid surprises later on. Saying that recognizing an example does not depend on the situation is saying that the form is enough to recognize the attitude. To know what maintains that evaluation, and why the person said it there, we will need to look at the situation and at what came afterward, in Chapters 13 and 14; Section 17.2 brings the two together: form delimits, and function explains.

3.2 Non-examples: statements that look like attitudes but are not

Knowing what an attitude is becomes easier when you know what it is not. There are four types of statement that are often confused with attitudes and that, analyzed carefully, do not qualify. All of them lack the same thing: someone taking a position on the object.

KEY CONCEPT

A **non-example** of attitude is a statement that mentions an object and looks like a position being taken, but in which nobody takes a position on the object.

Statement of fact. "Water boils at 100 degrees." "Brazil has more than two hundred million inhabitants." There is an object, but what is said about it can be true or false, and it is neither positive nor negative. The speaker is informing.

Instruction. "Close the door." "Hand in the report by Friday." They mention an object, but they serve to get someone to act. An instruction may have arisen from an evaluation (someone who asks you to close the door may hate drafts), but the sentence itself does not express it.

Question. "Do you like music?" "What did you think of the proposal?" They mention an evaluable object, but they ask for information: they want to know what the other person evaluates. In that sentence, the person asking has not expressed their own evaluation.

Report of what one did. "Today I had rice, beans, and chicken for lunch." "I voted in the last election." They describe something the speaker did, without evaluating it. Compare with "I hate going to the doctor": here there is a position; in the report "I went to the doctor last week," there is not.

Table 3.2

Four types of statement that are not attitudes

Type	Example	What the statement does	Why it is not an attitude
Statement of fact	"Paris is the capital of France."	informs	there is an object, but no position
Instruction	"Open the window."	asks someone to act	mentions an object without evaluating it

Type	Example	What the statement does	Why it is not an attitude
Question	"How would you rate this product?"	asks for information	the person asking does not express their own evaluation
Report of what one did	"I went to the movies yesterday."	narrates an event	describes without taking a position

Note. Examples prepared for this book.

NON-EXAMPLE

"Close the door." There is an object (the door) and there is a command, but no evaluation. The speaker asks for an action; they do not say what they think of the door. If they said "close it, this door is a hazard," then yes: the second part evaluates.

CAUTION

For researchers. A questionnaire item such as "Have you ever stopped buying from a company because of a news story?" asks about what the person *did*, not about what they *evaluate*. For each item, ask yourself: does it ask for an evaluation or describe an event? Mixing the two and calling it all an "attitude measure" produces conclusions the measure does not support.

TEST YOURSELF

Classify: (a) "I have three siblings." (b) "Lock the door when you leave." (c) "Have you tried this dessert?" (d) "This dessert is divine."

ANSWERS: (a) report or statement of fact; (b) instruction; (c) question; (d) attitude (positive).

3.3 Borderline cases: when form is misleading

Between the examples and the non-examples there is a gray zone. We call **borderline cases** the statements whose classification depends on the situation, the tone, or the listener. They are not a flaw in the definition: they reveal something central. The same sequence of words can be a fact in one situation and an evaluation in another.

Consider a case. "Brazil has more than two hundred million inhabitants" is, in general, a statement of fact. If someone gives this reply to a proposal to bring the country into a regional bloc, in a heavy voice and with a pause, the same sentence may be doing something else: pointing

to a problem or showing pride. The words are the same. What the sentence does is different. That is why the final criterion is not the form of the sentence but what it does in the situation in which it was said.

The comic panels in Figure 3.1 show the same principle. On the left, the psychologist Luiza greets her colleague Isabela with a question: "Ready for another day?" It is a courtesy question, which evaluates nothing. On the right, Camila, a client, thinks about Isabela: "After all, who would pick the weirdo?" It also has the form of a question, but it works as a statement, and the statement is negative. The two sentences have the same form and do different things. Camila's is a rhetorical question, the first of the cases below.

Figure 3.1
Two questions: one greets and the other evaluates



Note. Panels from a comic strip in the series of comics studies carried out by undergraduates and published by the Instituto Walden4 (Section 1.5) and analyzed in Chapter 34; source and page in the Figure Credits. The reproduction has the resolution of the source material.

Let us go through the most common cases.

Rhetorical question. "Is there anything more boring than a condo association meeting?" It has the form of a question, but nobody expects an answer. What it does is evaluate condo association meetings negatively. Here, the form is that of a question; what the sentence does is express an attitude.

Exclamation about the surroundings. "What unbearable heat!" The word "unbearable" evaluates. By the minimal definition, it is an attitude: it has an object (the heat) and negative valence. What it does not allow is the conclusion, from a single exclamation, that the person always evaluates heat this way. To speak of a pattern, we need to see the same evaluation of the same object on different occasions. Chapter 9 returns to this.

Euphemism or softening. "It's not really my kind of music." "He has his quirks." The evaluation is there, softened: the valence is negative, expressed in a socially comfortable way. Whoever looks only for strong words concludes, mistakenly, that the speaker did not evaluate.

Irony. "Great. Another renovation. I was really missing the noise." The words are favorable ("great," "missing"); the evaluation is unfavorable. Recognizing irony requires the situation: the tone, what happened before, who is speaking. Whoever classifies only the written text, without access to tone and situation, has trouble with it.

Preference. "I prefer coffee to tea." "I prefer the old building manager a thousand times over." To prefer is to evaluate one object as better than another: there is an object, there is an evaluation, and the valence is relative (favorable to coffee, compared with tea). Some reserve the term "attitude" for absolute evaluations, and researchers need to say which reading they have adopted. Here we adopt the inclusive one, which is consistent with the minimal definition.

Intention. "I plan to study medicine." The sentence announces a plan. It does not say what the person evaluates: it may come from a very favorable evaluation, but it may come from family pressure or a calculation about salary. As long as it only announces what the person intends to do, it is not an attitude. It becomes an attitude when it carries an evaluation: "I plan to study medicine because I think it's a beautiful profession."

Not knowing what one thinks. "I'm not really sure what I think about that yet." It may be that the person really has no settled evaluation; it may be that they have one and do not want to say it. Do not automatically record it as a "neutral attitude": it is a borderline case, and the situation helps decide.

Table 3.3

Borderline cases and the decision made in each

Case	Example	The form suggests	What the statement does	Decision
Rhetorical question	"Is there anything more boring than a meeting?"	question	evaluates negatively	attitude (negative)
Exclamation	"What unbearable heat!"	observation	evaluates the heat	attitude; recurrence to be checked
Euphemism	"It's not really my style."	description	evaluates, softening	attitude (negative, softened)
Irony	"Great, another renovation."	praise	evaluates negatively	attitude (negative)
Preference	"I prefer coffee to tea."	choice	evaluates by comparing	attitude (relative valence)
Intention	"I plan to study medicine."	plan	announces what one will do	not an attitude, unless there is an evaluation
Not knowing what one thinks	"I'm not really sure what I think."	uncertainty	unknown	borderline; do not record as neutral

Note. The decisions apply to this book; researchers should state their own.

Together, these cases suggest a simple procedure, in three questions.

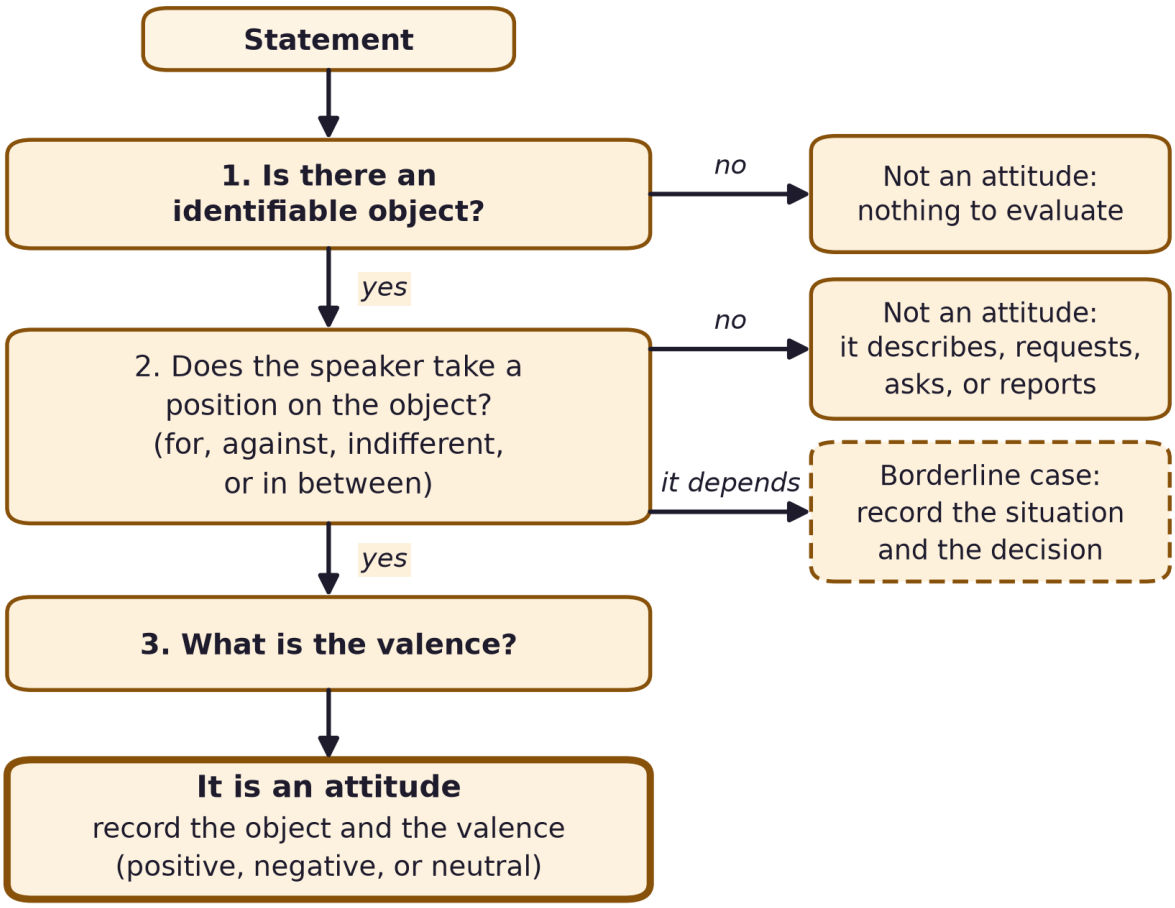
KEY CONCEPT

To classify a statement, ask three questions, in this order: (1) **Is there an identifiable object?** (2) **Does the speaker take a position on it**, whether for, against, indifferent, or in between? (3) **What is the valence?** If the first two answers are "yes," it is an attitude, and the third tells you what kind. If the answer depends on the situation, it is a **borderline case**: record the situation and the decision made.

Figure 3.2 summarizes the procedure.

Figure 3.2

Decision flowchart: is the statement an attitude?



Note. Diagram prepared for this book.

TEST YOURSELF

Apply the three questions to "Close the gate, people, for God's sake!" What is the classification?

ANSWER: it is an instruction (it asks for an action), and the expression "for God's sake" suggests irritation. There is no clear evaluation of an object, so the sentence is, at most, a borderline case: the speaker may be evaluating the open gate or the neighbors' carelessness negatively. Without the situation, it cannot be decided, and the procedure says what to do: record the doubt.

3.4 Why borderline cases matter for researchers

It would be more convenient to ignore borderline cases and work only with the examples. It does not work, for reasons that belong to the craft.

The first is that the instrument is itself a situation. A scale question creates a context that prompts a response, and the quality of the instrument depends on its prompting evaluations, and not evasions, courtesies, or irony. The second is that observing natural conversations requires explicit criteria. Without them, each researcher classifies "in their own way," and the results are no longer comparable. The third is that forcing every sentence into two drawers, attitude and non-attitude, throws information away. Recognizing ambiguity and recording it as such is part of rigor.

TEST YOURSELF

Two researchers classify the same conversations from the building's group chat, each "in her own way," and arrive at different numbers. Which of the section's three reasons explains the problem?

ANSWER: the second: without explicit criteria, each researcher classifies in her own way, and the results are no longer comparable. The way out is to write down the criteria (object, evaluation, valence) and record as borderline what they do not decide.

Common learner mistakes

1 **Looking only for evaluative adjectives.** The evaluation may be in a verb ("I detest"), in a noun ("sham"), in a prediction ("will save lives"), or in the tone. The mistake happens because textbook examples of evaluation almost always use adjectives. *How to spot the mistake:* you classified a statement as "not an attitude" just because you did not find "good" or "bad."

2 **Taking the presence of an object as sufficient.** Every sentence is about something. "Water boils at 100 degrees" has an object and is not an attitude. The mistake happens because the object is the first piece you look for, and finding it gives the impression that the job is done. *How to spot the mistake:* your justification was "it has an object," without saying what the speaker's position is.

3 **Letting grammar decide.** A rhetorical question has the form of a question and evaluates; irony uses words of praise and criticizes. The mistake happens because grammatical form is the most visible part of the sentence. *How to spot the mistake:* you classified two sentences differently just because one is a question and the other a statement.

4 **Forcing a classification where the situation does not allow one.** Some sentences cannot be decided without knowing who is speaking, to whom, and at what moment. The mistake happens because giving an answer seems more rigorous than admitting that one is missing. *How to spot the mistake:* you picked a drawer for no reason other than haste. Mark it as borderline and note what you needed to know.

SUMMARY

Examples (objective 1). An example of attitude has an identifiable object and a clear evaluation. The object can be a thing, an idea, a person, a moment, or a behavior, and the valence can lie in a verb, a noun, a predication, or an expression of indifference, not only in adjectives.

Non-examples (objective 2). Statements of fact, instructions, questions, and reports of what one did can mention objects without the speaker taking a position on them. They may come from an attitude, but they are not the attitude.

Borderline cases (objective 3). Rhetorical question, exclamation, euphemism, irony, preference, and intention show that grammatical form does not decide. What decides is what the statement does in the situation in which it is said.

The three questions (objective 4). Is there an object? Does the speaker take a position? What is the valence? Answered in order, they classify most statements; when the answer depends on the situation, the statement is a borderline case.

Justifying (objective 5). Classifying is only half the job. The other half is saying which criterion decided, so that someone else can reach the same classification or disagree on some basis.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. Which of the statements has a behavior as its object?

a. "Justice is fundamental."

b. "Lying is wrong."

c. "I hate Monday mornings."

d. "I love barbecue."

2. "Have you been to the city's new museum?" is:

a. an attitude with positive valence, because it mentions the museum;

b. an attitude with neutral valence;

c. a question, which does not express the evaluation of the person asking;

d. a report of what one did.

3. Classify each of the six messages from the building's group chat, from the opening, as attitude (A), non-attitude (N), or borderline case (B), stating the criterion in one sentence: (1) "The meeting is Thursday at 7 p.m." (2) "Has anyone seen the cat from 302?" (3) "Close the gate, people, for God's sake!" (4) "This extra fee is a rip-off." (5) "Great. Another renovation. I was really missing the noise." (6) "I prefer the old building manager a thousand times over."

4. Identify the object and the valence: (a) "I hate waiting in line at the bank." (b) "A dog is man's best friend." (c) "I don't care if it rains tomorrow."

5. "Is there anything more boring than waiting for the elevator?" Why is this sentence an attitude, even though it has the form of a question?

a. Because every question is an attitude.

b. Because nobody expects an answer, and it evaluates waiting for the elevator negatively.

c. Because the word "elevator" appears in it.

d. Because the sentence is in the present tense.

6. Rewrite "Close the window." as an attitude about the same subject (the open window, the air, the cold), keeping the object clear.

7. Someone says about a coworker: "He has his quirks." Classify and justify.

8. Why does "I prefer the old building manager a thousand times over" count as an attitude? Answer in two sentences.

9. Give one situation in which "Brazil has more than two hundred million inhabitants" is a statement of fact and another in which it is an evaluation.

10. A researcher wants to measure attitudes toward public transportation and includes the item "Have you taken a bus this month?" Does this item measure attitude? Justify your answer and propose an item that measures an evaluation.

ANNOTATED ANSWER KEY

1. b. "Lying" is a behavior; it is the object of the evaluation "wrong." Option **a** has an idea as its object; **c**, a moment; **d**, a food.

2. c. It is a question: it asks for information. Option **a** is wrong because mentioning an object is not enough (common mistake 2). Option **b** is wrong because there is no evaluation, not even a neutral one. Option **d** is wrong because it reports nothing the speaker has done.

3. (1) "The meeting is Thursday at 7 p.m." **N**: statement of fact (it informs). (2) "Has anyone seen the cat from 302?" **N**: question. (3) "Close the gate, people, for God's sake!" **B**: it is an instruction, but "for God's sake" suggests irritation; without the situation, it cannot be decided. (4) "This extra fee is a rip-off." **A**: clear object, clear evaluation, negative valence. (5) "Great. Another renovation. I was really missing the noise." **A**, by irony: the words praise and the evaluation is negative. For someone classifying only the written text, without the situation, it would be a borderline case. (6) "I prefer the old building manager a thousand times over." **A**: comparative preference, with valence favorable to the old building manager and, by contrast, unfavorable to the current one.

4. (a) Object: waiting in line at the bank (a behavior); negative valence ("hate"). (b) Object: dogs; positive valence ("best friend"). (c) Object: whether it rains tomorrow (an event); neutral valence, of indifference.

5. b. It is a rhetorical question: the form is that of a question, but what it does is evaluate. Option **a** is false and is common mistake 3 in reverse: it is not the form that decides. Option **c** repeats common mistake 2. Option **d** is not a criterion.

6. Any sentence that evaluates the subject works. Examples: "This draft is horrible." (object: the draft; negative), "An open window in winter is torture." (object: an open window in winter; negative). It is right if there is a clear object and a position, and not just an order.

7. Borderline case, leaning toward attitude. The sentence avoids saying "he's difficult" and, for that very reason, suggests a softened negative evaluation (euphemism). Without knowing who is speaking and to whom, we cannot be sure: it may be just a neutral observation by someone who recognizes that the coworker is different. The most correct thing is to record the doubt (common mistake 4).

8. Model answer: "Because to prefer is to evaluate one object as better than another: there is an object, there is an evaluation, and there is a valence, even if a relative one. This is consistent with the minimal definition, which does not require the evaluation to be absolute." Any answer that includes the three elements (object, evaluation, relative valence) counts.

9. Model answer: "Statement of fact: in a geography class, someone gives the country's population. Evaluation: faced with a proposal for a plan that requires everyone's agreement, someone says the sentence in a heavy voice, pointing to the size of the problem." Any pair of situations in which the words are the same and what is done with them changes counts.

10. It does not measure attitude: the item asks what the person *did*, not what they *evaluate*. An item that measures evaluation asks for a position on the object, for example "Public transportation in my city is good" (with an agreement scale) or "How would you rate public transportation in your city?" (with a scale from very bad to very good). In an instrument, the question itself is not the attitude of whoever asks it; what matters is that the response requested be a position.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 4, which takes a close look at evaluation. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 4	3.1 (examples) and Table 3.1
2, 10	3.2 (non-examples) and the "For researchers" caution
3, 5, 7, 8, 9	3.3 (borderline cases) and Table 3.3
6	3.1 and 3.2 (what makes a sentence an evaluation)

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CHAPTER

4 Attitude Is an Evaluation

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Describe** what it means to evaluate and distinguish an evaluation from a description of the same object.
2. **Distinguish** evaluations that rest on the usefulness of the object, on the value it has in itself, and on the place it occupies in social life.
3. **Separate**, in an evaluation, its direction (valence) from its intensity.
4. **Identify**, in a given case, by which of three routes the person learned to evaluate: direct experience, observation of others, or what they were told.
5. **Recognize** that saying something directly, saying it indirectly, and acting are all ways of expressing an evaluation, and that all of them are behavior.

PREREQUISITES

Chapters 2 and 3: attitude object, evaluation, valence, the minimal definition, and the three questions for classifying a statement.

OPENING

Two colleagues walk out of the same lecture. One says: “It was great, I learned a lot.” The other: “It was a waste of time.” Both heard the same words, saw the same slides, spent the same hour in the same room. If someone asked them how long the lecture lasted, how many slides were used, or who spoke first, they would give the same answers.

Who is right? The question is badly posed, and understanding why is the goal of this chapter. The two colleagues do not disagree about what the lecture *was*. They disagree about what they say *about it*, and that is what we call evaluating. Let us look more carefully at this move: what it is, what it rests on, in what direction and with what intensity it happens, where it comes from, and how it shows up.

4.1 To evaluate is to take a position

The difference between the two colleagues at the lecture shows what matters most. There are things about the lecture that any observer can check: its length, the number of slides, the order of the speakers. Two competent people arrive at the same answer. But "it was great" and "it was a waste of time" cannot be checked with a stopwatch or by counting. Two observers can agree on everything the lecture was and disagree on what they say about it. This is the **checking test**: what any observer can check describes the object; what cannot be checked, and allows the opposite position without any error of observation, evaluates it.

KEY CONCEPT

To **evaluate** is to take a position on an object in a way that cannot be checked by direct observation of its properties: it is to place the object closer to the favorable or to the unfavorable side. The **evaluation** is what one says, or does, in taking that position.

EXAMPLE

"It was a waste of time." This cannot be checked with a stopwatch or by counting: it is a position on the lecture, and another person can take the opposite one.

NON-EXAMPLE

"The lecture lasted one hour." Any observer can check it with a clock. The sentence describes a property of the object and takes no position, so it is not an evaluation.

Something important follows from this. An evaluation is not a property of the object, like weight or duration. It is part of the relation between the one who evaluates and the object evaluated, and that is why the same object receives opposite evaluations. This does not make evaluation arbitrary. Evaluations have origins, and Section 4.4 shows where they come from.

There is also a background to almost every evaluation. "This beach is beautiful": beautiful next to what? "This movie is long": long compared to what? Even when only one object is mentioned, the evaluation usually rests on others the person knows. So, when recording an attitude, it is worth asking what the background of comparison is.

TEST YOURSELF

Of the following sentences, which describe and which evaluate? (a) "The room has thirty seats." (b) "The room is cozy." (c) "The movie is two hours long." (d) "The movie drags."

ANSWERS: (a) and (c) describe; any observer can check them. (b) and (d) evaluate; even if they agree on (a) and (c), two observers can disagree about them.

4.2 What an evaluation rests on

When we evaluate, we single out something about the object. Three supports appear often, and recognizing them helps us understand what the person is saying.

Usefulness. The evaluation highlights what the object produces or makes possible: "technology is useful," "exercise is good for your health," "planning is necessary to reach your goals." The value assigned comes from what one gains from the object, often weighed against the effort it requires: "it's worth it," "it doesn't pay off."

Intrinsic value. The evaluation treats the object as valuable in itself, without pointing to what it produces: "art is beautiful," "freedom is precious," "nature is wonderful." No one asks "what for?"

Social context. The evaluation follows from the object's place in a network of relations: "family is fundamental," "respecting your elders is essential." The value lies less in the properties of the object and more in what it means within a group, and that is why it varies across groups, cultures, and eras: a tradition highly valued in one community may be met with indifference in another.

Table 4.1

Three supports of an evaluation

Support	What the evaluation highlights	Example	A question that helps recognize it
Usefulness	what the object produces or makes possible	"This car is economical."	What is it for? What does one gain?
Intrinsic value	the object in itself, with no reference to what it produces	"This painting is beautiful."	Does the person evaluate without pointing to a use?
Social context	the object's place in a group	"Respecting your elders is essential."	Does the value depend on the group one belongs to?

Note. Examples created for this book.

The same object can be evaluated with all three supports. "School is important for getting a good job" highlights usefulness. "Learning is one of the most beautiful things there is" highlights intrinsic value. "In my family, everybody studies" highlights social context. When a researcher records a "positive attitude toward school," they are recording only the direction, and the three sentences say quite different things.

⚠ CAUTION

In many social psychology texts you will see evaluations described as having an "affective" side (how the object makes the person feel) and a "cognitive" side (what the person thinks of it). Here this division is only vocabulary for saying what an evaluation highlights, not a classification of types of attitude. "Classical music is relaxing," "smoking is harmful," and "animals should be protected" are equally evaluations: in all of them, someone takes a position.

✓ TEST YOURSELF

What does the evaluation rest on? (a) "This app saves me an hour a day." (b) "That landscape is breathtaking." (c) "In my family, marriage is sacred."

ANSWERS: (a) usefulness; (b) intrinsic value; (c) social context.

4.3 Direction and intensity

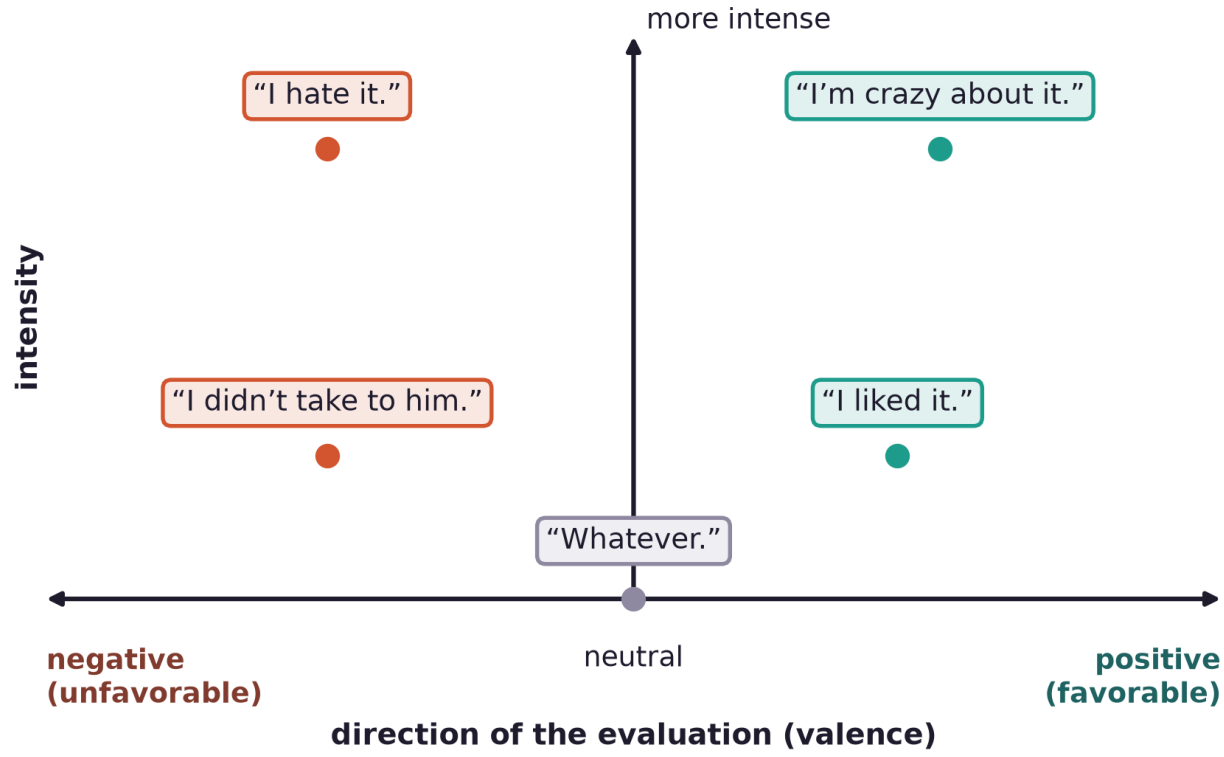
In Chapter 2, valence was defined as the direction of an evaluation, from unfavorable to favorable. A second question remains, one that direction alone does not answer: *how much?* Liking something and adoring it point the same way, but they are not the same thing. We call **intensity** how pronounced the evaluation is, within the same direction.

KEY CONCEPT

The **intensity** of an evaluation is how pronounced it is: "I liked it" and "I'm crazy about it" have the same valence (positive) and different intensities. Direction and intensity are two independent questions about the same evaluation.

Intensity shows up in language in several ways: in words that grade it ("very," "extremely," "slightly"), in superlatives ("the best," "the worst"), in repetition, in tone of voice, and in what the person does (how much time, effort, or money they devote to the object or avoid devoting to it). None of these is a measure: "I love it" said in a joking tone may be less intense than a quiet "I like it" said seriously. How to measure intensity is the topic of Chapters 22 to 24. Figure 4.1 shows the two questions together.

Figure 4.1
Direction and intensity of an evaluation

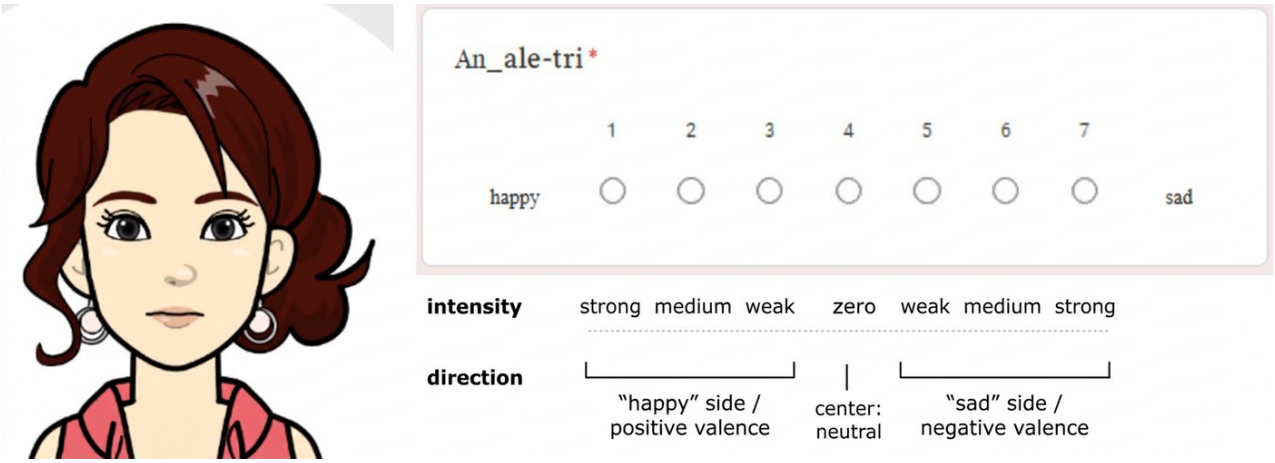


Note. Diagram created for this book. The sentences are placed to illustrate the distinction; the figure is not a measure.

A research screen gives the two questions a concrete form. In several studies with comics, the person sees a character and marks a point, from 1 to 7, between two opposite adjectives, such as "happy" and "sad." Figure 4.2 shows one of these screens. The side on which the person marks answers the first question, that of direction; the distance from the center point answers the second, that of intensity. Someone who marks 1 and someone who marks 3 point to the same side, and only the first does so strongly.

Figure 4.2

A seven-point scale, read as direction and intensity

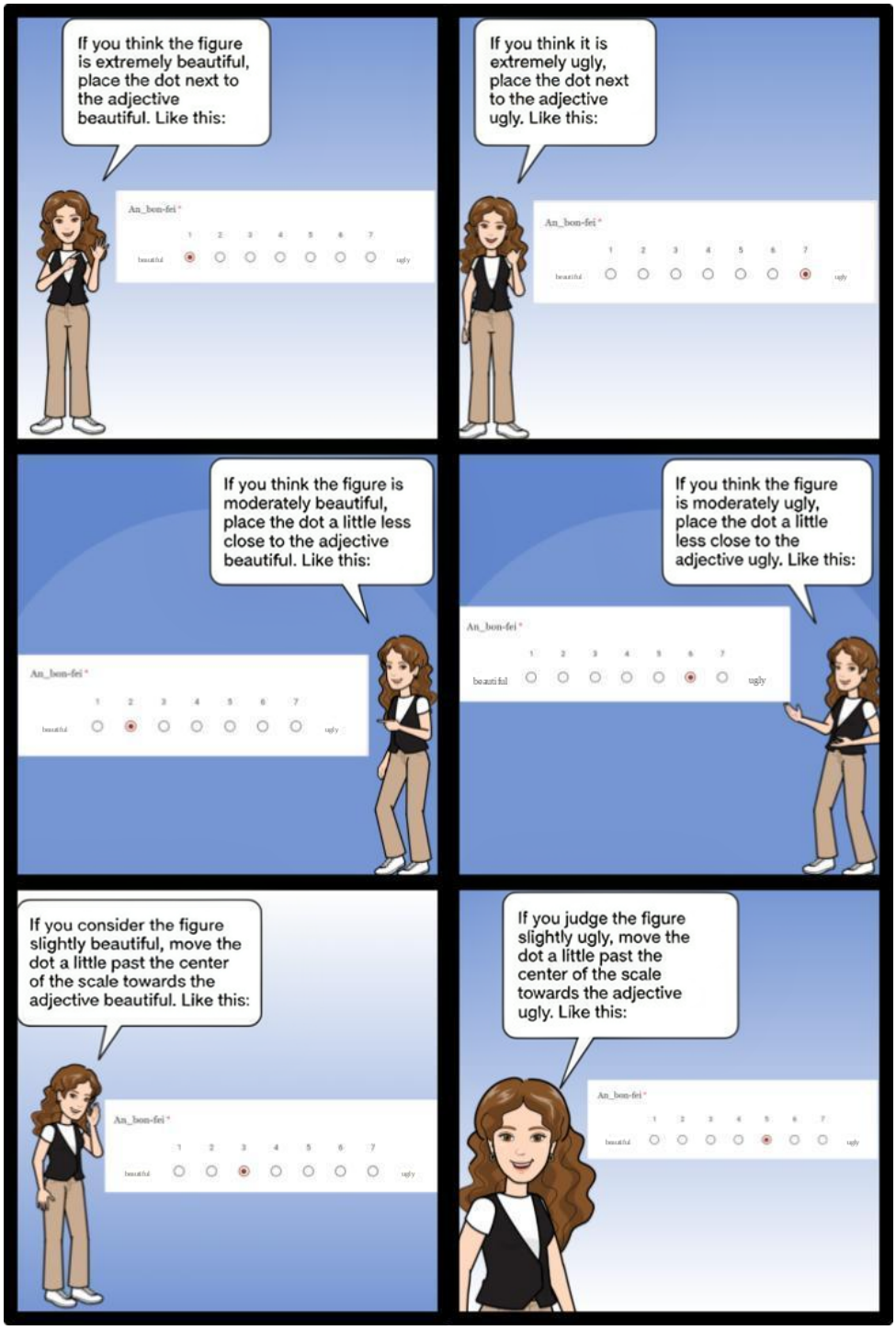


Note. Screen reproduced from a comic in the series of comics-based studies carried out by undergraduates and published by the Instituto Walden4 (Section 1.5); source and page in the Figure Credits. The legend below the scale was added for this book: the screen shows only the numbers 1 to 7. Chapter 23 returns to this type of scale.

The scale usually comes with instructions, and it is the instructions that link words to marks. In one of the comics in the series, the research assistant teaches the person to translate what they think into a dot (Figure 4.3). Whoever judges the figure "extremely" beautiful or ugly marks the point closest to the adjective, 1 or 7; whoever judges it "moderately" beautiful or ugly marks the second point, 2 or 6; and whoever judges it "slightly" beautiful or ugly marks a point just past the center, toward the adjective, 3 or 5. The three degrees correspond to the strong, medium, and weak intensity in the legend of Figure 4.2. The side of the mark tells the direction, and the point chosen, the intensity: two pieces of information that everyday speech usually packs into a single word, such as "gorgeous" or "awful."

Figure 4.3

How words that grade intensity become marks on the scale



Note. Panels reproduced from a comic in the series of comics-based studies carried out by undergraduates and published by the Instituto Walden4 (Section 1.5), in the order in which they appear on the page; source and page in the Figure Credits.

NON-EXAMPLE

"I hate it" and "I adore it" do not differ in intensity: both are strong. They differ in direction, one negative and the other positive. Intensity compares "I liked it" with "I'm crazy about it," where the direction is the same.

TEST YOURSELF

"I didn't really like the movie" and "I hated the movie": what do they have in common, and how do they differ?

ANSWER: they have the same direction (negative valence) and differ in intensity (weak in the first, strong in the second).

4.4 How people learn to evaluate

No one is born evaluating things like "justice is fundamental" or "reality shows are a waste of time." Evaluations have origins, and the origin is the person's life. Three routes appear often.

Direct experience. The person deals with the object and something happens. Someone who exercises and feels good, gains energy, and sees their health improve comes to say that "exercise is good." Someone who was bitten by a dog comes to say that dogs are dangerous.

Observation of others. The person sees how others deal with the object and what happens to them. A child sees her father turn up his nose at a food and soon says that "this is yucky," without ever having tasted it.

What they are told. The person hears recommendations, warnings, and descriptions of what usually happens: "don't touch that, it's bad for you," "that teacher is demanding, but he teaches well." Especially where they have little experience, other people's words are the main source.

In each case, culture works as a background: what a group values and devalues is in its conversations, its stories, its institutions, and in what people do in the face of each thing. That is why different groups evaluate the same objects differently.

Table 4.2

Three routes to the same evaluation

Route	What happened	The evaluation the person comes to express
Direct experience	Was bitten by a dog	"Loose dogs are dangerous."
Observation of others	Saw their brother run from a dog	"Loose dogs are dangerous."
What they were told	Heard from their parents, many times, "loose dogs are dangerous"	"Loose dogs are dangerous."

Note. Examples created for this book.

The table carries a lesson: the same sentence can come from very different histories. Someone who only hears "loose dogs are dangerous" does not know by which route the person came to say it, and this matters for anyone who wants to understand, and perhaps change, an attitude. Chapter 25 returns to these routes in technical terms.

TEST YOURSELF

Marina has never tasted jiló and says that "jiló is horrible." At home, everyone makes a face when jiló shows up on the table. By which route did she most likely arrive at this evaluation?

ANSWER: observation of others (and, possibly, what she was told). She had no direct experience: she has never tasted it.

4.5 How an evaluation shows up

An evaluation can be stated directly ("I consider education fundamental") or indirectly, through metaphor, irony, or insinuation ("that politician is a sly old fox," "it's a storm in a teacup"). And it can show up in what the person does. Approaching the object, investing time and money in it, or defending it in an argument are usually ways of evaluating it favorably; refusing it, avoiding the places where it is, or resisting proposals connected to it are usually ways of evaluating it unfavorably. Chapter 6 describes these forms in detail, and Chapter 7, the sentence structures.

KEY CONCEPT

All these forms are behavior. Saying "I love it," making a joke, or staying away from the object are things the person does, even the indirect ones. And, like much of what we do, they were gradually shaped by what happened after them: what made the other person laugh, what earned approval, what caused trouble. When what happens afterward gradually favors forms that come closer and closer to a certain way of evaluating, the process is called **shaping**, and Chapter 12 defines it precisely.

TEST YOURSELF

Classify the form of the evaluation: (a) "That restaurant is sensational." (b) "That restaurant? If you like waiting an hour for a cold dish, go." (c) Maria started going to the restaurant every week and bringing her friends.

ANSWERS: (a) stated directly; (b) stated indirectly (irony); (c) shows up in what she does.

4

Common learner mistakes

1 **Treating the evaluation as a property of the object.** "The movie is good" is not like "the movie is two hours long." The mistake happens because the grammar of the two sentences is the same: "is good" sounds like "is green." *How to spot the mistake:* you are trying to decide "who is right" about the value of an object, as if it were a measurement.

2 **Confusing direction with intensity.** "Negative" does not mean "strong": "I didn't really like it" is negative and weak. The mistake happens because, in speech, direction and strength usually arrive together in the same word ("horrible," "wonderful"). *How to spot the mistake:* you used "valence" to say how much someone likes or dislikes something.

3 **Treating the three supports as types of person or of attitude.** The same person evaluates school, at different moments, by its usefulness, by its value, and by the group. The mistake happens because it is tempting to explain a sentence by a trait of the person. *How to spot the mistake:* you wrote "he is a utilitarian person" on the basis of one sentence.

4 **Thinking that what the person does reveals the "true" evaluation and what they say is just a front.** Saying and doing are behaviors that occur under different conditions, and they can diverge. The question is not "which one is true?" but "under what conditions does each occur?" The mistake happens because, in everyday life, what people do is usually treated as more sincere than what they say. *How to spot the mistake:* you dismissed what the person said because they "acted differently."

SUMMARY

Evaluating (objective 1). To evaluate is to take a position on an object in a way that cannot be checked by direct observation of its properties. The evaluation is part of the relation between the one who evaluates and the object, not a property of the object, which explains opposite evaluations of the same object.

Supports (objective 2). An evaluation can rest on the usefulness of the object (what it produces), on the value it has in itself, or on the place it occupies in a group. Recognizing the support tells us more than recording only the direction.

Direction and intensity (objective 3). Valence says which side the evaluation is on; intensity says how pronounced it is. They are independent questions, and neither can be read from the words alone.

Origin (objective 4). People learn to evaluate through direct experience, through observing others, and through what they are told, against a cultural background. The same sentence can come from different histories.

Forms (objective 5). An evaluation can be stated directly, stated indirectly, or show up in what the person does. All of these are behavior, and they were shaped by what happened after them.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. Which of these sentences evaluates rather than describes?

a. "The bus comes at 7:10."

b. "The bus is way too crowded."

c. "The bus has 40 seats."

d. "The bus comes down the avenue."

2. What does each evaluation rest on (usefulness, intrinsic value, or social context)? (i) "This laptop is fast." (ii) "Music is the most beautiful of the arts." (iii) "At our church, nobody misses Sunday service." (iv) "This course will give me a profession."

3. Order from lowest to highest intensity, keeping the same positive valence: "I loved the book." / "I liked the book a little." / "This book changed my life." / "I liked the book."

4. Do "I don't really like feijoada" and "I hate feijoada" have the same valence? And the same intensity? Answer in one sentence.

5. Pedro has never flown and says that "planes are dangerous." What he reports: "On the news all I see is crashes, and my mother always said it's risky." By which routes did he probably arrive at this evaluation?

6. Classify the form in which the evaluation is expressed: (a) "I hate the gym." (b) Ana canceled her membership and began avoiding the neighborhood where the gym is. (c) "The gym? Oh, sure, my favorite part of the day," she said, rolling her eyes.

7. Does the sentence "João said he loves his new job, but he arrives late every day and has already looked for another one" show that what he says is false? Answer in three sentences.

8. A researcher plans to use a questionnaire item: "The lecture lasted more than an hour." Does it serve to measure evaluation? Justify your answer and propose an evaluation item.

9. Write three sentences about the same object (for example, public transportation in your city), one resting on usefulness, one on intrinsic value, and one on social context.

10. Go back to the two colleagues in the opening: one left the lecture saying "it was great, I learned a lot," and the other, "it was a waste of time." In two sentences, explain why both colleagues can be "right" about the lecture.

ANNOTATED ANSWER KEY

1. b. "Way too crowded" takes a position. The others give a time, a capacity, and a route, and any observer can check them (common mistake 1).

2. (i) usefulness ("fast" highlights what the laptop makes possible); (ii) intrinsic value (music is evaluated in itself, not for what it produces); (iii) social context (the value lies in the group); (iv) usefulness (the course is worth what it provides).

3. "I liked the book a little." < "I liked the book." < "I loved the book." < "This book changed my life." Notice that all four have the same valence; only the intensity changes. In real situations, the ordering also depends on tone and on what the person does, not only on the words.

4. They have the same valence (negative) and different intensities (weak in the first, strong in the second). Anyone who answered "different valences" made common mistake 2.

5. Observation of others and what he was told: he had no direct experience (he has never flown), he saw crashes on the news (observation of others), and he heard from his mother that it is risky (what he was told).

6. (a) stated directly; (b) shows up in what she does (canceling and avoiding); (c) stated indirectly (irony): the words praise and the gesture suggests the opposite.

7. Model answer: "Not necessarily. Saying and doing are two behaviors, which occur under different conditions, and they can diverge: he may say this to whoever asks him and act differently in his day-to-day work. The useful question is under what conditions each one occurs." The answer is correct if it does not conclude that what was said is false and what was done is true (common mistake 4).

8. It does not: it describes a duration, which any observer can check. An evaluation item: "The lecture was worthwhile" or "How would you rate the lecture?" (with a scale from very bad to very good). In both, the answer requested is a position.

9. Sample answer: "The bus saves me two hours a day." (usefulness); "Crossing the city by bus is, for me, a pleasure in itself." (intrinsic value); "In my neighborhood, everybody left their car at home after the new line opened." (social context). The answer is correct if each sentence highlights something different about the same object.

10. Model answer: "Both describe the lecture the same way: length, slides, order of speakers. They diverge in what they say about it, and evaluations cannot be checked by direct observation; they can differ because each of them has lived through different things with similar subjects." Any answer that brings in the difference between describing and evaluating and the idea that the evaluation is not a property of the object is acceptable.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 5, which deals with the objects attitudes are directed at. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 8, 10	4.1 (to evaluate is to take a position)

If you missed exercise	Review
2, 9	4.2 (what an evaluation rests on) and Table 4.1
3, 4	4.3 (direction and intensity) and Figure 4.1
5	4.4 (how people learn to evaluate) and Table 4.2
6, 7	4.5 (how an evaluation shows up) and common mistake 4

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CHAPTER

5 The Diversity of Evaluable Objects

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Classify** the object of an attitude into one of five families: things, ideas and institutions, people and groups, moments and events, behaviors and practices.
2. **Distinguish** the topic of a conversation from the attitude object and **delimit**, in a statement, the exact object of the evaluation.
3. **Differentiate** an individual object from a category and **explain** what happens when an evaluation moves from the individual to the category.
4. **Relate** the type and scope of the object to three research decisions: defining it, asking about it, and extending results.
5. **Separate**, in a case of prejudice, the evaluation of the group from the evaluation of practices and concepts connected to it.

PREREQUISITES

Chapters 2 to 4: attitude object, evaluation, valence, intensity, and the three questions for deciding whether a statement is an attitude (Chapter 3).

OPENING

You are putting together a questionnaire to find out what the residents of a neighborhood think. The first question seems simple: “What do you think of politics in our city?” But what is “politics”? City hall? The mayor? Politicians in general? The act of voting? Taxes? The future of the city?

Each of these is a different attitude object. A person can praise the mayor, distrust politicians in general, and find voting a tedious obligation, all in the same afternoon, without contradicting themselves. If the questionnaire does not choose the object, the answer does not say what it refers to, and adding up the answers lumps together what should not

be lumped together. This chapter shows the variety of objects that attitudes are directed at and teaches you to do what the questionnaire did not: say, precisely, what the object is.

5.1 Anything that can be pointed to or named

In Chapter 2, the attitude object was defined as that about which someone takes a position. How broad is the list of what can fill that place? Very broad. It can be something you can touch (a car), a person (the neighbor), a group (the residents of the building), an idea (freedom), an event (last night's party), a period (childhood), or a way of acting (lying). What they all have in common is that someone can point to them or name them, that is, say *what* they are talking about.

This includes things that do not exist as things. No one touches "justice" or "the future," and both are attitude objects just as legitimate as a car. Being an object does not require physical existence. It requires that the person be able to name it and that another person understand what it is. In practice, the test is the first of the three questions in Chapter 3: is there an identifiable object?

TEST YOURSELF

Write an attitude sentence whose object no one can touch or see. What is the object?

ANSWER: any sentence will do, as long as the object can be named. Example: "Honesty is the foundation of any friendship." The object is honesty.

5.2 Five families of objects

To organize this variety, five families are used. They serve to ask "what kind of thing is being evaluated?", not to file each object away in a permanent drawer.

KEY CONCEPT

The **families of objects** are five practical groupings of attitude objects: things, ideas and institutions, people and groups, moments and events, behaviors and practices. They serve to guide the question "what is being evaluated?" Many objects fit in more than one family, and that is not a problem.

Things. Everything perceived through the senses: "this car is excellent," "that food is delicious." They can be individual (this car) or categories (sports cars, Italian food). The evaluation usually rests on properties that can be checked, such as appearance, taste, and how something works, and so it is easier for people to agree on *what* is being evaluated, even though the evaluation itself varies a great deal from one person to another.

Ideas and institutions. Objects that cannot be reduced to any physical component: "democracy is valuable," "the health system is deficient," "the government is effective." Institutions have concrete manifestations (buildings, people, documents), but the attitude object is the whole. That is why the same institution receives different evaluations depending on the aspect in focus: someone who praises the doctors may criticize the system.

People and groups. A specific person ("Maria is trustworthy") or a category defined by something people have in common, such as profession, age, nationality, or gender ("doctors are competent," "young people are creative"). This is the family in which the move from the individual to the group weighs most heavily on those being evaluated, and it is the family of prejudice, which Chapter 1 defined as the unfavorable attitude directed at someone for belonging to a group, and not for what that person did or said.

Moments and events. Objects with a place in time: an event ("the meeting was productive"), a future occasion ("the elections are important"), a period ("the '90s were wonderful"), or a stage of life ("adolescence is hard"). The evaluation of an event may change when one sees what it later brought, and the evaluation of a period depends, in part, on when and by whom it is made: different generations may evaluate the same period differently.

Behaviors and practices. What people do, evaluated independently of who does it ("smoking is harmful," "lying is wrong"), and established social practices ("marriage is important," "holidays are necessary"). The object is the action or the custom, not the person: "lying is wrong" applies to anyone who lies, including the speaker. The evaluation usually points to norms, moral values, and what usually results from what one does.

Table 5.1
The five families of attitude objects

Family	Example	The object is	Typical difficulty
Things	"This car is excellent."	something perceived through the senses	confusing the specific product with the category
Ideas and institutions	"The health system is deficient."	a whole with no single physical component	each person thinks of a different aspect
People and groups	"Doctors are competent."	an individual or a category of people	extending to the group what was seen in a few individuals
Moments and events	"The '90s were wonderful."	a point or a period in time	the evaluation changes depending on when it is made
Behaviors and practices	"Smoking is harmful."	an action or a custom	mixing the evaluation of the action with that of the person who does it

Note. Examples created for this book. The families are not mutually exclusive: "marriage" can be evaluated as a practice (what people do) or as an institution (the role it plays in society).

TEST YOURSELF

Which family does the object belong to? (a) "The '80s were a happy time." (b) "Immigrants enrich the culture." (c) "Apologizing is a sign of strength." (d) "The judiciary is slow."

ANSWERS: (a) moments and events (a period); (b) people and groups; (c) behaviors and practices; (d) ideas and institutions.

5.3 What, exactly, is the object?

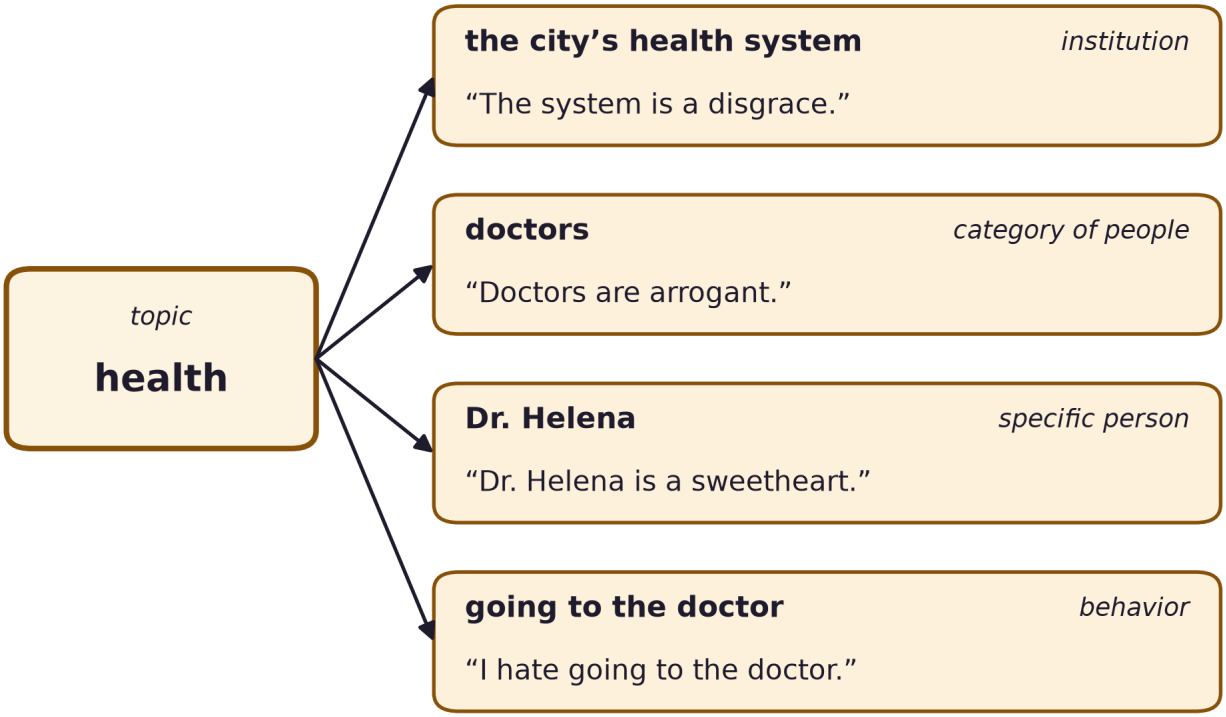
Classifying the family is only half the job. The other half is delimiting the object: saying exactly what the person is talking about. The sentence "I don't like politics" shows the problem. "Politics" is the topic of the conversation, but what the person rejects may be politicians, the act of voting, family arguments, or corruption. Each of these is a different object.

KEY CONCEPT

The **topic** is the general theme a conversation deals with (health, politics, traffic). The attitude object is what, within the topic, the person evaluates. To **delimit the object** is to say exactly what it is and whether it is an individual, a category, or a behavior.

Think of the topic "health" and of four sentences the same person might say in the same week: "The health system in my city is a disgrace." "Doctors are arrogant." "Dr. Helena is a sweetheart." "I hate going to the doctor." These are four objects: an institution, a category of people, a specific person, and a behavior. The person does not contradict themselves by saying all four, and anyone who recorded an "attitude toward health" would merge, into a single data point, evaluations that are not about the same thing. Figure 5.1 shows how the topic breaks down.

Figure 5.1
One topic, several objects



Note. Diagram created for this book. Each box on the right is a different attitude object within the same topic, with the type of object shown in italics.

Three questions help delimit the object of a statement. What, exactly, is being evaluated? Is this object an individual, a category, or a behavior? Does the statement already say so, or does it leave open who, when, and what situation is being talked about? When it leaves this open, the honest record is "object not delimited" and, if possible, a clarifying question.

EXAMPLE

Statement: "I don't like politics."

What is being evaluated? "Politics," which is the topic, and not yet the object. *Is it an individual, a category, or a behavior?* The sentence does not allow us to say: it could be a category (politicians), a behavior (voting, discussing politics), or an institution (the political system). *Does the statement delimit the object?* No. Record: negative valence; object not delimited, within the topic "politics." If it is possible to ask: "When you say 'politics,' what are you talking about?" If the person answers "politicians, who only think of themselves," the object becomes a category of people, and the attitude recorded is about politicians, not about "politics."

NON-EXAMPLE

"Attitude toward health: negative." It looks like a complete record, but it delimits no object at all. It merges an institution, a category, a person, and a behavior, and it hides the fact that one of the four sentences (the one about Dr. Helena) was positive. A correct version records each evaluation separately, for example: "Object: doctors (category of people); valence: negative; statement: 'Doctors are arrogant.'"

TEST YOURSELF

What is the object of each sentence, in a few words? (a) "City hall is a disaster." (b) "The manager of my building is unfair." (c) "Condo meetings are a punishment."

ANSWERS: (a) city hall (an institution); (b) the manager of the person's building (an individual); (c) condo meetings (a category of events).

5.4 From the individual to the category

Among the possible ways of delimiting the object, one deserves special attention: the difference between an individual object (this restaurant, that neighbor) and a category of objects (Japanese restaurants, neighbors in the building).

KEY CONCEPT

An object is **individual** when it is a single one (this car, Dr. Helena) and it is a **category** when it brings together several that have something in common (sports cars, doctors). Moving from the evaluation of individuals to the evaluation of the category is **extending** the evaluation. (Chapter 13 will give this process, as it occurs in the person, the technical name of generalization and will reserve "extending" for the researcher's decision about how far a result reaches.)

Someone who has had good experiences with several Japanese restaurants tends to say that "Japanese food is great" and to expect the same from the next Japanese restaurant they come across. This move is useful: it spares the person from starting from scratch at each new restaurant. But it is the same move that, applied to groups of people, produces sentences like "they're all the same." The move is one and the same, and the effect on those being evaluated is very different.

Two precautions always apply. The first is to ask how many cases, and which cases, the evaluation started from: two rude neighbors say little about an entire city. The second is not to confuse the two evaluations: "I like my French neighbor" and "I like the French" have different objects, and one does not follow from the other. A researcher needs to record which of the two the person expressed.

TEST YOURSELF

Say whether the object is an individual, a category, or a behavior: (a) "I hate waiting in line at the bank." (b) "Banks are all the same." (c) "My account manager is attentive."

ANSWERS: (a) behavior (waiting in line); (b) category (banks); (c) individual (the person's account manager).

5.5 Why the object matters to the researcher

The family of the object and the way it is delimited affect three decisions in a study.

The first is **defining the object**. Concrete objects can be pointed to; ideas such as "justice" or "inclusion" require saying what one means by the word, because each participant may be thinking of something dif-

ferent. Without this definition, two people with "the same" evaluation may be evaluating different things, and comparing their answers makes no sense.

The second is **choosing how to ask**. There are objects about which it is easy to say what one thinks and others about which people are more careful about what they say, especially when the object is a group of people and there is a socially expected answer. The same question, applied to objects from different families, may get different degrees of frankness. Chapters 22 to 24 deal with how to measure attitudes and how to handle this caution.

The third is **extending results with caution**. What is discovered about attitudes toward things may not hold for attitudes toward institutions, and what holds for a specific person may not hold for the group that person belongs to. A result holds, at first, for the type of object and the scope in which it was obtained; extending it to other objects is a hypothesis to be tested.

Prejudice shows all three points at once. By the definition in Chapter 1, the object of prejudice is a person taken as part of a group. But around it appear evaluations of objects from other families: practices connected to the group (a religious tradition, the use of a chosen name) and concepts (diversity, inclusion). Someone may accept the people and reject the practice; may reject the practice and, along with it, the people; may praise "diversity" in the abstract and, in everyday life, avoid people from certain groups. These are different evaluations, with different objects.

In real cases they often go together, and precisely for that reason it is best to record them separately. The question to ask is whether what is being evaluated unfavorably is the practice or the people, because they belong to the group that follows it. Chapter 18 returns to prejudice in detail.

TEST YOURSELF

A survey asks: "What is your opinion about immigration?" Name two different objects that may be hidden in the word "immigration."

ANSWER: for example, "immigrants" (a category of people) and "the country's policy on admitting immigrants" (an institution, or a policy). "More people arriving in the neighborhood" (an event) also works.

Common learner mistakes

1 **Confusing topic with object.** "Health," "politics," and "immigration" are topics; attitudes are directed at objects delimited within them. The mistake happens because, in conversation, the topic is what gets named, and the object is left implicit. *How to spot the mistake:* you wrote "attitude toward politics" without being able to say what, exactly, the person was talking about.

2 **Thinking that only what exists physically can be an object.** Ideas, periods, and behaviors are objects as legitimate as a chair. The mistake happens because "object," in everyday use, suggests a material thing. *How to spot the mistake:* you dismissed "justice is fundamental" because "justice doesn't exist."

3 **Moving from the individual to the category without noticing.** "I like my French neighbor" and "I like the French" are evaluations of different objects. The mistake happens because the move usually comes without warning, in the same sentence or the next one. *How to spot the mistake:* you used a sentence about one person to record the attitude toward that person's group.

4 **Treating the families as mutually exclusive drawers.** Many objects fit in more than one, and the classification serves to ask questions ("what stands out here?"). The mistake happens because classifying gives the feeling that the work is done. *How to spot the mistake:* you spent too much time deciding which family the object "really" belongs to.

5 **Merging the evaluation of the group with that of a practice or concept connected to it.** They may go together, but they are different objects, and only the first is an object of prejudice by the definition in Chapter 1. The mistake happens because, in real cases, the two evaluations usually appear together, in the same conversation. *How to spot the mistake:* you recorded a single object ("group X") for a sentence that talks about a practice of the group.

SUMMARY

Families (objective 1). For purposes of analysis, attitude objects are grouped into things, ideas and institutions, people and groups, moments and events, behaviors and practices. To be an object, it is enough to be able to be pointed to or named; physical existence is not required.

Topic and object (objective 2). The topic is the general theme of a conversation; the object is what, within it, is evaluated. To delimit the object is to say exactly what it is, and the same topic contains many objects that the same person can evaluate in opposite ways without contradicting themselves.

Individual and category (objective 3). The evaluation of an individual and that of the category they belong to are different evaluations. Moving from one to the other is extending the evaluation, which is useful for objects and delicate for groups of people.

Research (objective 4). The type and scope of the object affect three decisions: how to define it, how to ask about it, and how far to extend the result obtained.

Prejudice (objective 5). The object of prejudice is the person taken as part of a group. Practices and concepts connected to the group are other objects, with evaluations of their own, which in real cases may accompany prejudice and which are recorded separately.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. Which family does the object of each sentence belong to? (i) “Yesterday’s meeting was a waste of time.” (ii) “The public university is a national treasure.” (iii) “Older people are wise.” (iv) “My phone is great.” (v) “Splitting the bill evenly is unfair.”

2. Say what the object of each sentence is and whether it is an individual, a category, or a behavior: (i) “I hate going to the dentist.” (ii) “Dentists are attentive.” (iii) “My dentist is kind.”

3. Which pair of sentences has the same topic but different objects?

a. “I like coffee.” / “I adore coffee.”

b. “The bus on my route is punctual.” / “Bus drivers are patient.”

c. “I like my math teacher.” / “I like my math teacher.”

d. “The government is effective.” / “The government is efficient.”

4. Write three sentences on the topic "public transportation," each with an object of a different type: a system, a category of people, and a behavior.

5. A survey includes the item "What do you think of the internet?" List three distinct objects that may lie under the word "internet" and rewrite the item for one of them.

6. Marta had bad experiences with two neighbors from a nearby town and concluded: "The people from that town are all rude." What shift of object took place? Why does it call for caution?

7. Why is "justice" harder to define as a research object than "this car"? Answer in two sentences.

8. Which families do these objects belong to? (i) "trans people" (ii) "the use of a chosen name" (iii) "diversity in companies." Which of them is the object of prejudice, according to the definition in Chapter 1 (an unfavorable attitude directed at someone for belonging to a group)?

9. Two people say "I like soccer." One means watching games on television; the other, playing with friends on Sundays. What does this show about the object? What decision does the study need to make?

10. Mr. Álvaro says: "I have nothing against older people, but this priority line is going too far." (a) What two objects appear, and from which families? (b) According to the definition in Chapter 1, is the sentence, by itself, prejudice? (c) What additional information would you ask for before concluding anything about his attitude toward older people?

ANNOTATED ANSWER KEY

1. (i) moments and events (a meeting); (ii) ideas and institutions; (iii) people and groups (a category); (iv) things; (v) behaviors and practices (splitting the bill is something people do).

2. (i) going to the dentist: behavior. (ii) dentists: category of people. (iii) the person's dentist: individual. The topic is the same in all three sentences, and the objects are not (common mistake 1).

3. b. The topic is the bus in both sentences, but the first object is a bus route (a service) and the second, a group of people (drivers). Option **a** has the same object (coffee) with different intensities ("like" and "adore"); **c** repeats the same sentence; **d** has the same object (the government) with two nearly synonymous words.

4. Sample answer: "Public transportation in my city is inefficient." (system); "Bus drivers are patient." (category of people); "Taking a packed bus wears me out." (behavior). The answer is correct if each sentence has an object of a different type and all are on the topic.

5. Sample answer: (a) the internet as a whole (a system); (b) social media (a category of things); (c) people who spend all day online (a category of people); (d) using one's phone during meals (a behavior). Item rewritten for (d): "What do you think of using your phone during meals?" What matters is that the new item names a single object.

6. A shift from the individual to the category: from two neighbors to "all the people from the town." It calls for caution because it starts from few cases, which may not be representative, and applies the evaluation to everyone, including people she has never met (common mistake 3).

7. Model answer: "'This car' can be pointed to and is the same for anyone. 'Justice' requires saying what it refers to (laws? equal treatment? holding wrongdoers accountable?), and each participant may be thinking of something different." Any answer that brings in the need to define the object before measuring is acceptable.

8. (i) people and groups; (ii) behaviors and practices; (iii) ideas and institutions. The object of prejudice is (i): by the definition in Chapter 1, prejudice is directed at people for belonging to a group. The evaluations of (ii) and (iii) may accompany it, but they are other objects (common mistake 5).

9. It shows that "soccer" is the topic and that the objects are different (watching × playing), and the attitudes may differ. The study needs to decide which one it wants to measure and name it in the item (common mistake 1).

10. (a) "Older people" (people and groups, a category) and "the priority line" (a social practice). (b) Not by itself: the unfavorable evaluation falls on the practice, not on the people for belonging to the group; the sentence itself declares "nothing against" the group. (c) Other occasions and other statements of his about older people, and what he does when dealing with them. Sentences of the "I have nothing against them, but" type may or may not precede an unfavorable evaluation of the group; a single sentence does not settle it (common mistake 5).

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 6, which deals with the forms in which attitudes appear. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 8	5.1 and 5.2 (the five families) and Table 5.1
2, 3, 4, 9	5.3 (topic and object, delimiting) and Figure 5.1

If you missed exercise	Review
6	5.4 (from the individual to the category)
5, 7	5.5 (the object in research)
10	5.5 (prejudice) and Section 1.3 of Chapter 1

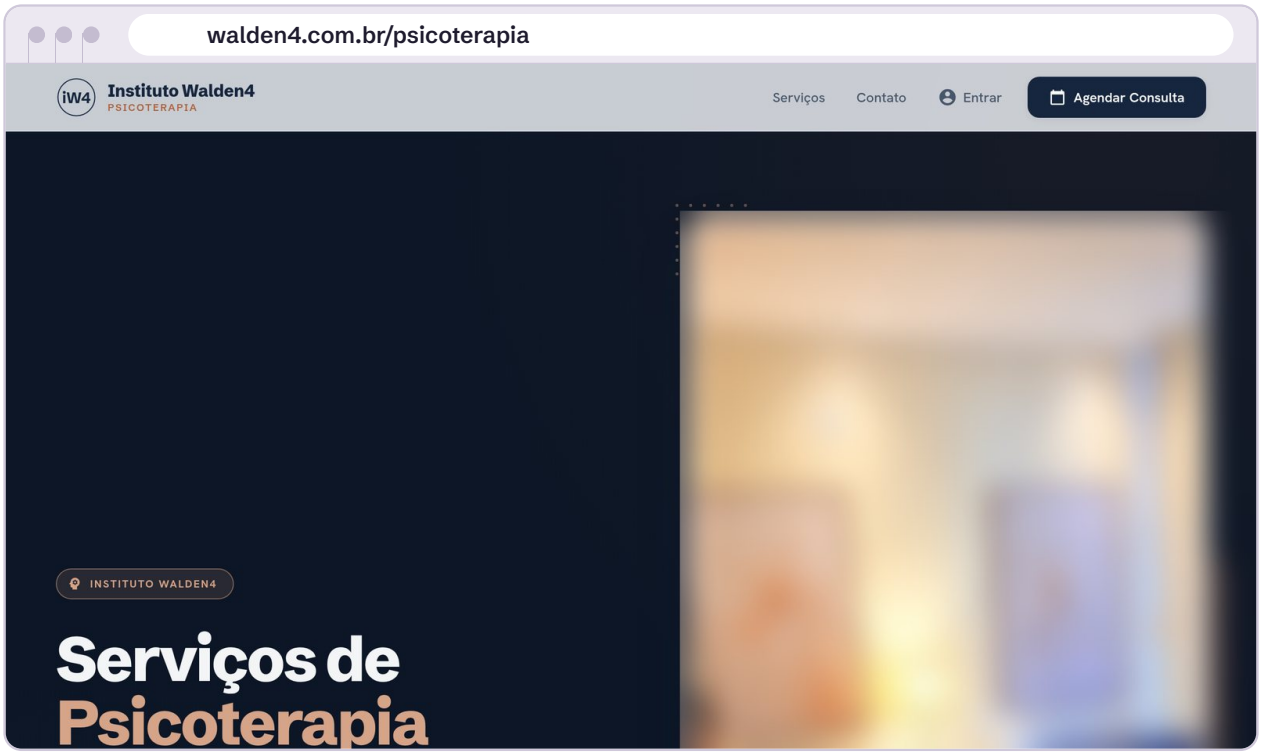
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CHAPTER

6 The Topography of Attitudes

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** the topography of an evaluation and **describe** it without interpreting, separating what the person did from what is assumed about them.
2. **Recognize** the same evaluation (same object, same valence) in different topographies: speech, writing, face and body, image and symbol, number, action.
3. **Distinguish** the cases in which the same topography serves different evaluations, or no evaluation at all.
4. **Read** a nonverbal topography with caution, saying what it allows one to conclude on its own and what depends on the situation and the group.
5. **Choose**, given a research question, which topographies to observe and point out the limit of each one.

PREREQUISITES

Chapters 2 to 5: object, evaluation, and valence. From Chapter 4, the idea that an evaluation can be stated directly, stated indirectly, or show up in what the person does (Section 4.5).

OPENING

At the meeting where the new director presented the plan for the year, Mariana did not say a word. But she rolled her eyes when he talked about "bolder targets," closed her laptop before the end, and, that evening, sent the team group chat a sticker of a sleeping animal. In the hallway, one colleague remarked: "Mariana hates the plan." Another disagreed: "She was just tired. She doesn't even work on that."

The two saw the same movements and drew different conclusions. Neither conclusion is foolish, and neither is ready to be recorded as data. To decide who is right, or whether anyone is, we first need to separate two things: what Mariana *did* and what that *means*. This

chapter gives a name to the first (topography), shows the variety of forms an evaluation can take, and teaches you to read each one without overstating what it allows you to conclude.

6.1 What topography is

Every evaluation happens in some way: in words, in a gesture, in a rating, in a drawing, in a choice. The form it has when it happens is its topography.

KEY CONCEPT

The **topography** of an evaluation is the form it takes: what the person says, writes, draws, or does, described the way an observer would describe it, without interpreting. The same evaluation (the same object, with the same valence) can have many topographies.

The word comes from geography, where topography is the relief of a terrain: its shape, what you see when you look at it. Here, it is the shape of what the person does.

Describing topography is a skill that has to be learned, because the habit is to interpret on the spot. "She got annoyed" is an interpretation. "She sighed and said: 'This again?'" is a topography. The second sentence allows another person to check what happened; the first does not. Table 6.1 gives four pairs.

Table 6.1

Interpretation and topography: the same episode described in two ways

Interpretation	Topography (what is seen or heard)
"She got annoyed with the project."	She sighed, closed her laptop, and said: "This again?"
"He liked the restaurant."	He gave the restaurant five stars and went back the following week.
"The class rejected the idea."	No one answered when the teacher asked for opinions, and three students looked at their phones.
"She is against the reform."	She signed the petition against the reform and said, in a group conversation: "This is a step backward."

Note. Examples created for this book. Each sentence in the right-hand column describes something another person could have observed.

NON-EXAMPLE

"She showed contempt for the proposal." It looks like a description, but "contempt" is a conclusion about what the person feels. The topography would be: "She gave a half-smile, looked away, and moved on to the next item without answering."

TEST YOURSELF

Which sentences describe topography and which interpret? (a) "He crossed his arms and turned his face away." (b) "He was bothered." (c) "She gave the service a 2." (d) "She was disappointed with the service."

ANSWERS: (a) and (c) describe; (b) and (d) interpret.

6.2 Speech and writing

The most familiar topography is that of words. In **speech**, the evaluation appears in direct sentences ("I consider education fundamental," "that movie is extraordinary"), in comparisons ("I prefer coffee to tea," "democracy is better than dictatorship"), and in gradations ("it's fairly interesting," "it's absolutely unacceptable"), which say not only which side the person is on but how much. Speech comes with what is not words: tone, rhythm, pauses. "Oh, great" can be enthusiasm or the end of someone's patience, and the listener decides by the voice.

In **writing**, what changes is permanence. A text can be revised before it is sent, and it is still there afterward: a letter, a review, a comment on social media. That is why writing is usually more elaborate than spontaneous speech, and also more exposed to being read far from the context in which it was written. The evaluation appears in the author's choices (which aspects they highlight, what tone they use) and in devices of the written medium: punctuation ("Excellent proposal!!!"), ellipses ("Interesting... very interesting indeed"), emojis. Irony lives here too: "What a brilliant idea, one more fee to 'improve' services" is an unfavorable evaluation written with favorable words.

Speech and writing are topographies of words, and they have a lot in common. Both allow direct and indirect forms, comparisons, and gradations, and both follow the conventions of the group in which they oc-

cur. The main difference is time: speech happens in real time, and the listener reacts while it is happening; writing stays and can be reread. Chapter 7 looks more carefully at the structure of sentences.

TEST YOURSELF

In a review, someone writes: "What an unforgettable class... I've never looked at the clock so many times." What is the topography? And the valence?

ANSWER: the topography is written, an apparent compliment followed by a detail that contradicts it. The valence is negative; the evaluation is indirect (irony).

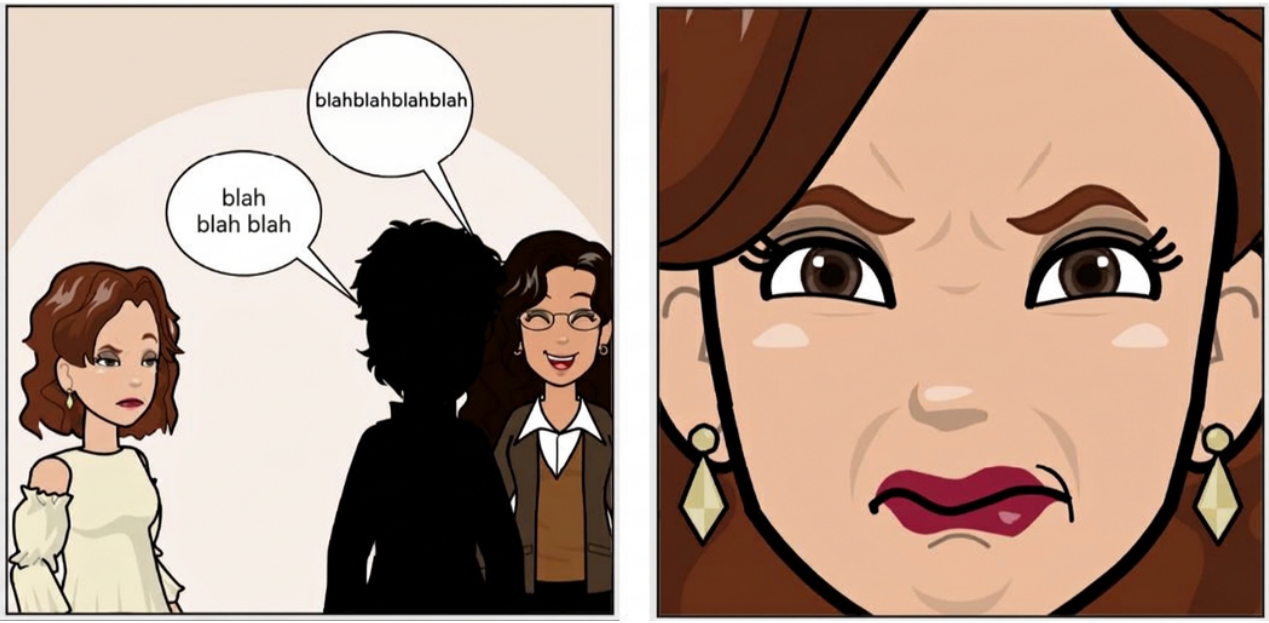
6.3 Face, body, and gestures

The face and the body also evaluate. Smiling, frowning, rolling one's eyes; moving closer or moving away; leaning toward the speaker or crossing one's arms; a thumbs-up, a shrug. Some of these movements are deliberate and conventional, like the thumbs-up. Others happen without the person noticing, like the direction of their gaze or the distance they keep from someone.

Two cautions apply from the start. The first is that these topographies rarely say on their own *what* the evaluation is about. A smile may accompany a favorable evaluation of what is being said, but it may also be about the joke from a minute earlier, or come from politeness or nervousness. The second is that the meaning of many gestures is conventional and varies across groups and places: the same movement may indicate approval in one place and something else in another. What a gesture "means" is, in large part, what the people of that group do with it.

Figure 6.1 shows the first caution in a comic. On the left, two people are talking, one of them in silhouette, and Camila, a client, is watching them. On the right, Camila's face: eyebrows drawn together and lowered, eyes wide open, lips pressed tight, with the corners turned down. Saying that she felt disgust, irritation, or contempt is already interpreting. Besides, nothing in the panel says what the face is directed at: the conversation, the speaker, the wait? The comic answers in the next panel, with the thought balloon that Chapter 2 showed in Figure 2.2: "What is she doing here? She looks more like a circus performer than a psychologist." The face was about a psychologist in the conversation and the way she was dressed. In life, no one has that balloon.

Figure 6.1
A face and what it does not say



Note. Panels from a comic in the series of comics-based studies carried out by undergraduates and published by the Instituto Walden4 (Section 1.5) and analyzed in Chapter 34; source and page in the Figure Credits. The reproduction has the resolution of the source material.

TEST YOURSELF

A colleague smiles while you present your report. Why does the smile, on its own, not allow you to say that he evaluates the report favorably?

ANSWER: Because these topographies rarely say *what* the evaluation is about: the smile may be about the joke from a minute earlier, out of politeness, or out of nervousness. The object is missing.

6.4 Images and symbols

Drawings, paintings, cartoons, photographs, and graphics can evaluate. A political cartoon is almost always an evaluation in image form, and whoever drew it chose what to show, what to exaggerate, and what to leave out. A symbol is a condensed topography: a heart, a star, a thumb, a flag, a sticker. It works because the group has agreed on what it indicates, and that is why it is fast: it communicates at a glance what would take a sentence.

The same convention that makes a symbol efficient makes it fragile. Color is a good example. Black is mourning in one context and elegance in another; red can be passion, danger, or a political party. An image rarely says on its own what the object is and what the valence is. Whoever reads it needs what came with it: the caption, the author, the place where it was published, the group it was made for.

TEST YOURSELF

A heart sticker appears, with no caption, as a reply to a notice from the building manager. What would you need to know to treat it as an evaluation?

ANSWER: The caption, the author, the place where it was published, and the group it was made for. An image rarely says on its own what the object is and what the valence is, and a symbol counts for what the group has agreed it indicates.

6.5 Numbers and ratings

Stars, grades from 0 to 10, percentages, and counts of "likes" are numerical topographies. They are compact, easy to add up and compare, and that is why shopping, service, and content platforms use them. But a number is poor. It says something about direction and intensity, and nothing about the exact object or the reasons. Four stars for a restaurant can mean "great, only the wait was annoying" or "good, nothing special." And different people use the scale in different ways: one gives five stars to everything they don't complain about; another saves five stars for the exceptional. The same number, coming from two people, is not always the same evaluation. Chapters 22 and 23 return to scales as a research instrument.

TEST YOURSELF

Two people gave the same restaurant four stars. Did they make the same evaluation?

ANSWER: Not necessarily. The number says something about direction and intensity, and nothing about the exact object or the reasons; in addition, different people use the scale in different ways (one gives five stars to everything they don't complain about, another saves five stars for the exceptional).

6.6 Memes and digital interactions

A meme brings together an image, text, and a reference the group knows, and it usually evaluates through humor or irony: a meme about Monday traffic says in one picture what would take a paragraph. It only works, however, for those who know the reference. Outside the group, it is a picture with no meaning, or with a different one.

On digital platforms, liking, sharing, commenting, following, muting, or simply not reacting are actions with their own topography, and they leave a record. They offer abundant data that is, at the same time, misleading. A "like" can mean "I liked it," "I saw it," "I support you," or "just being polite." Sharing a news story can be approval, irony, or denunciation ("look at this outrage"). Each digital gesture is a topography that may or may not be an evaluation, and it almost never says what the object is on its own.

TEST YOURSELF

Someone shared a news story about the increase in the condo fee. Does sharing mean the person approves of the increase?

ANSWER: Not necessarily: sharing can be approval, irony, or denunciation ("look at this outrage"). Each digital gesture is a topography that may or may not be an evaluation, and it almost never says what the object is on its own.

6.7 Actions and choices

Finally, the evaluation can lie in what the person does: approaching, buying, going back, devoting time or money, recommending; or avoiding, canceling, changing route, postponing. These are topographies of action. They have the advantage of not depending on words and of being countable: how many times, for how long, with how much money.

They also have a difference that weighs on how they are read. In "this restaurant is great," the value is in the form itself: whoever says the sentence places the restaurant on the favorable side, and whoever hears it does not need to assume anything to know which side it ended up on. Going back to the restaurant every Saturday does not place the restaurant on any side. In this case, the one who assigns the value is the observer, who concludes, from what the person did, that the person

evaluates the restaurant favorably. Reading an action as an evaluation is therefore making an estimate: the observer proposes the object and the valence that the form does not carry. The record should say so, with the degree of confidence, as in Mariana's record in Section 6.10. Estimating, here, is not guessing what the person "really" feels behind what they do; it is deciding whether what they do counts as an evaluation, of what object, and in what direction. Face and gestures lie halfway: rolling one's eyes has, within the group, an agreed-upon meaning (Section 6.3); going back to a restaurant has none.

The estimate can fail because actions have reasons that have nothing to do with the evaluation: the person buys the cheapest product because they cannot afford the one they prefer; they go to the event because the boss went. For the same reason, actions are not the place where the "real" evaluation appears, as if words were a front (this is common mistake 4 in Chapter 4: taking what the person does for the "true" evaluation and what they say for a front). Words and actions are different topographies, they happen under different conditions, and they can diverge. Divergence is not lying: it is information about the conditions under which each one occurs.

Some things make the estimate safer. The action is repeated on different occasions, not just once. It follows the object, and not everything else: the person goes back to the restaurant even when there is another one just like it, closer and cheaper, and with different companions. And it agrees with what the person says when asked. None of these things turns the estimate into certainty; together, they leave fewer alternatives standing. Later on, the same idea gets a name and a procedure. Section 15.2 separates topographies that *are* an assignment of value from those that *imply* it, and Section 17.3 calls the latter the implied form. Chapter 18 makes the comparison between situations that differ in a single element into the variation test.

EXAMPLE

Vicente and the bakery, record.

Topography: bought bread at the same bakery on 9 of the 10 mornings observed.

Estimate: favorable evaluation of the bakery. Confidence: low.

Alternatives: it is the only bakery on his way to work; it opens earlier than the others.

To increase confidence: observe what he does on days when he takes another route, or when another bakery starts opening at the same time, and ask him what he thinks of it.

TEST YOURSELF

A person says they love the restaurant on the corner and never goes there. Which of the two topographies, speech or action, shows the "real" evaluation?

ANSWER: Neither is the "real" one: words and actions are different topographies, they happen under different conditions, and they can diverge. The action may have reasons unrelated to the evaluation, such as price or distance. Divergence is not lying: it is information about the conditions under which each one occurs.

6.8 The arts

Music, painting, dance, theater, literature, and film are, among other things, topographies of evaluation. A cartoon or a protest song evaluates explicitly; a painted landscape or a piece of choreography may evaluate indirectly, through what it chooses to show and how. Because the arts combine many channels at once (sound, image, movement, word), they can express complex evaluations, including ambivalent ones: a novel can admire and criticize the same character.

This richness has a cost for researchers. The work rarely says on its own what the object is and what the valence is, and attributing them to the author requires something more: what the author said about it, the period, the context in which it was made. And we must separate the evaluation of the maker from the evaluation of the viewer: a viewer who is moved by a work makes a different evaluation, with a different object (the work), and does not repeat the author's.

TEST YOURSELF

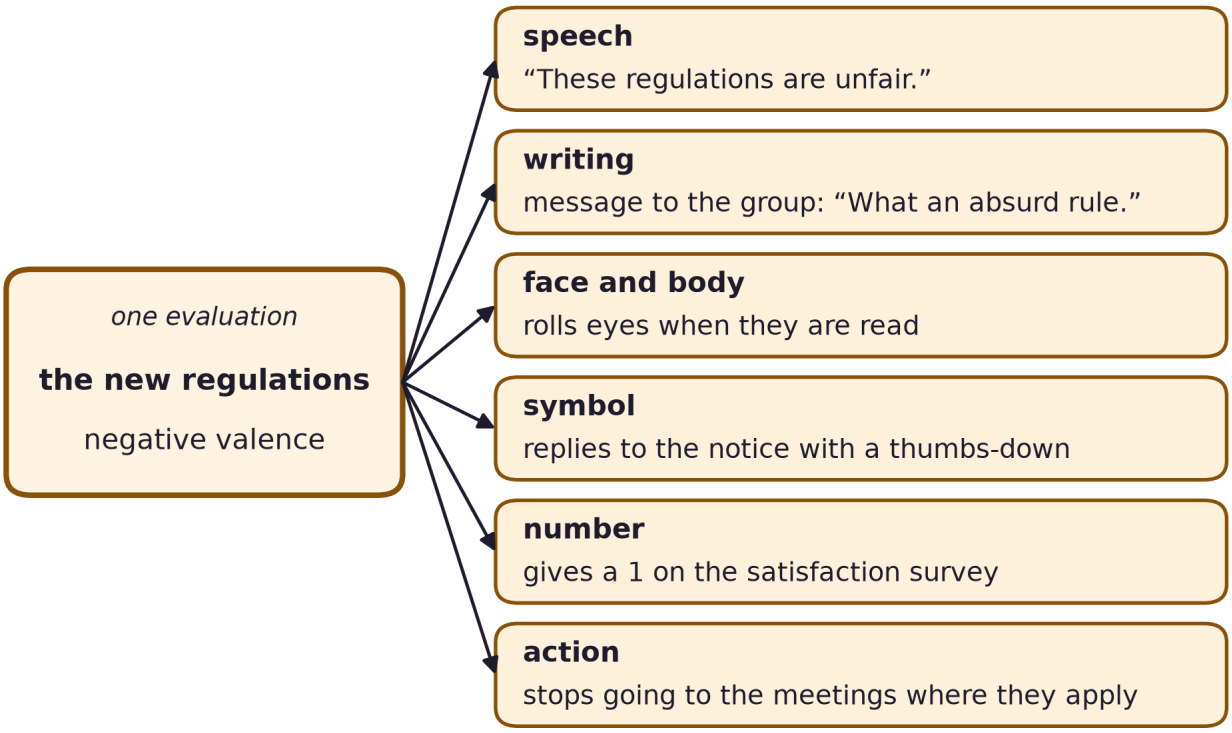
A reader is moved by a novel. Does the reader make the same evaluation that the author made in writing it?

ANSWER: No: the reader makes a different evaluation, with a different object (the work), and does not repeat the author's. Attributing an evaluation to the author requires something more, such as what the author said about the work, the period, and the context in which it was made.

6.9 The same evaluation, many topographies

Figure 6.2 brings together what we have seen: a single evaluation (the new regulations, with negative valence) in six different topographies. What unites the six is not the form but the object and the valence: each one is an occurrence of the same evaluation. Anyone who records attitudes needs to be alert to this variety. An instrument that collects only words, for example, leaves out what the person does not say but does.

Figure 6.2
One evaluation, six topographies



Note. Diagram created for this book. The box on the left says what the six occurrences have in common (object and valence); those on the right show the form of each one.

TEST YOURSELF

How many topographies does Figure 6.2 show for a single evaluation, and what does an instrument that collects only words leave out?

ANSWER: Six: speech, writing, face and body, symbol, number, and action. An instrument that collects only words leaves out what the person does not say but does (rolling the eyes, the thumbs-down, the rating of 1, no longer going to the meetings).

6.10 Reading a topography with caution

Let us go back to Mariana. There are three topographies (rolling her eyes, closing her laptop, sending a sleepy sticker) and two opposite conclusions. What can be stated? That, together, they are compatible with an unfavorable evaluation. And that they do not say *what* the object is: the plan, the director, the hour, the day. What cannot be stated is that Mariana hates the plan.

Three cautions sum up what the chapter has shown.

The first: **a topography does not identify the object or the valence on its own.** An eye roll may be about the plan, about the speaker, or about the message Mariana had just read on her phone.

The second: **the same topography can serve different things, and different topographies can serve the same thing.** A smile can be one of approval, courtesy, or nervousness; a thumbs-up on a message can mean "I liked it," "got it," or "okay, enough." Conversely, "I hate it," a rating of 1, and a cancellation can be the same evaluation. That is why, when reading a topography, it is worth asking "what is the person doing this for, here and now?" and not only "what does this look like?"

The third: **the meaning of many topographies is conventional and local.** Gestures, symbols, colors, memes, and even punctuation change meaning across groups, generations, and platforms. Anyone who reads the topographies of a group they do not know runs the risk of reading their own vocabulary into other people's behavior.

Hence a simple procedure: describe first (what the person did, without interpreting); then situate (who, to whom, where, what came before); only then assign object and valence, saying with how much confidence. And, when possible, ask.

EXAMPLE

Mariana, research record.

Topography: rolled her eyes when the director talked about "bolder targets"; closed her laptop before the end of the meeting; that evening, sent the team group chat a sticker of a sleeping animal.

Situation: meeting at which the director presented the plan for the year; Mariana did not speak.

Hypothesis: unfavorable evaluation; probable object, the plan (or the "bolder targets"). Confidence: low to moderate. Alternatives: tiredness, time of day, another matter.

To confirm: ask her "what did you think of the plan?" and observe what she does when faced with similar proposals.

The direct question does not settle everything: it adds one more topography (what Mariana says when asked), which also has its own conditions. But it is one more piece of information, and it is usually the one that is missing. Notice, in the record, that what was observed and the hypothesis are on separate lines.

TEST YOURSELF

Joana replies to her boss's message ("Meeting tomorrow at 6 p.m.") with a thumbs-up. What does the topography allow us to conclude about her evaluation of the meeting?

ANSWER: almost nothing. In this context, the thumbs-up is usually a "got it" or "okay"; assigning a valence would require other information (what she says, what she does, how she usually uses the symbol).

Common learner mistakes

1 **Interpreting instead of describing.** "He was frustrated" is a conclusion; "he slapped his hand on the table and walked out" is topography. The mistake happens because, in everyday life, we interpret on the spot and rarely describe. *How to spot the mistake:* your record has adjectives about what the person "was feeling" and no verbs about what they did.

2 **Treating one topography as the "true" one.** Saying and doing are different forms of an evaluation, and they can diverge. The mistake happens because everyday speech opposes what people say to what they do as if they were front and truth. *How to spot the mistake:* you dismissed what the person said because "what counts is what they do" (or the reverse).

3 **Giving gestures, colors, and symbols a universal meaning.** The meaning belongs to the group, the period, and the platform. The mistake happens because the meaning a gesture has in our group seems obvious, and the obvious is rarely questioned. *How to spot the mistake:* you read a symbol from a group you do not know with the meaning it has for your own.

4 **Inferring object and valence from an isolated topography.** A like, a laugh, or an eye roll may or may not be an evaluation, and they rarely say what it is about. The mistake happens because a striking topography seems to speak for itself. *How to spot the mistake:* your record has an object and a valence, but no information about the situation.

SUMMARY

Topography (objective 1). It is the form the evaluation takes, described as an observer would describe it, without interpreting. Separating what the person did from what is assumed about them is the first skill of anyone who records attitudes.

Variety (objective 2). The same evaluation, with the same object and the same valence, appears in speech, writing, face and body, image and symbol, number, action, and art. What unites these occurrences is not the form but the object and the valence.

Same form, something else (objective 3). The same topography can serve different evaluations, or none, and different topographies can serve the same one. Asking "what is the person doing this for, here and now?" helps read the form.

Cautious reading (objective 4). Describe, situate, and only then assign object and valence, with the degree of confidence the record allows. Gestures, colors, symbols, and memes have conventional and local meanings, and asking, when possible, adds information (and one more topography to read).

Research (objective 5). Each topography has advantages and limits: words bring the object and are subject to what is socially expected; numbers are easy to compare and poor in content; actions are countable, do not carry the value in their form (reading them as evaluation is an estimate made by the observer), and have reasons unrelated to the evaluation. In general, it is worth combining more than one.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. Which sentences describe topography and which interpret? (a) "She smiled and said: 'I loved it.'" (b) "She was happy." (c) "He gave the restaurant five stars." (d) "He was satisfied with the restaurant." (e) "She crossed her arms and turned her face away."

2. Rewrite as topography: "The customer was furious about the delay."

3. In which item does the same person express the same evaluation in two different topographies?

a. Says "I love this singer" and buys a ticket to his concert.
b. Says "I love this singer" and, the following week, "I hate this singer."
c. Says "I love this singer" and "I love this book."
d. Two different people say "I love this singer."

4. Name four different topographies through which someone could express the evaluation "these regulations are unfair."

5. Pedro replies to his boss's message ("Meeting tomorrow at 6 p.m.") with a thumbs-up. Did he evaluate the meeting favorably? Justify your answer in two sentences.

6. Two people give the same movie four stars. The first gives five stars to almost everything she likes; the second rarely goes above three. What can, and what cannot, be said about these two people's evaluations?

7. A researcher analyzes the messages of a group of teenagers and interprets a sticker as a sign of contempt, based on what she and her colleagues would understand. Which caution from the chapter did she fail to take? What could she do?

8. You want to know students' attitude toward cell phone use in the classroom. Choose two topographies you would observe and point out one limit of each.

9. Go back to Mariana, from the opening: at the meeting where the new director presented the plan for the year, she said nothing, rolled her eyes when he talked about "bolder targets," closed her laptop before the end, and, that evening, sent the team group chat a sticker of a sleeping animal. Write a record with topography, situation, hypothesis, and a question to confirm.

10. True or false: "When what a person says and what they do diverge, what they do shows the true evaluation." Justify your answer.

ANNOTATED ANSWER KEY

1. (a), (c), and (e) describe; (b) and (d) interpret. "Was happy" and "was satisfied" are conclusions about what the person feels; whereas "smiled and said 'I loved it,'" "gave five stars," and "crossed her arms and turned her face away" are things an observer can check (common mistake 1).

2. Sample answer: "The customer raised his voice, slapped his card down on the counter, and said: 'This is the third time I've waited this long.'" The answer is correct if it contains only what is seen and heard, without "furious," "annoyed," or "upset."

3. **a.** The statement and the ticket purchase are two topographies (words and action) of a single favorable evaluation of the same object, assuming the person buys the ticket because they like the singer (in a real case, it is worth checking). Option **b** has two evaluations with opposite valences, at different moments; **c**, two different objects; **d**, two people, and therefore two evaluations.

4. Sample answer: saying "this is unfair" (speech); writing "what an absurd rule" in the group chat (writing); rolling one's eyes on reading them (face and body); giving a 1 on a satisfaction survey (number); no longer following the rule or going to the meetings where it applies (action). Any set of four with topographies of different types is acceptable.

5. Not necessarily. In this context, the thumbs-up is usually a "got it" or "okay," not an evaluation of the meeting. Assigning a valence would require other information: what Pedro says about meetings and how he usually uses the symbol (common mistake 4).

6. One can say that the number is the same, and that each person uses it on a scale of their own. One cannot say that the two evaluate the movie the same way: for the first, four stars may be a middling evaluation; for the second, a high one. To compare them, one needs to know how each usually uses the scale.

7. The caution about conventional and local reading (common mistake 3): she read the sticker with the meaning it has for her own group. She could ask members of the group what the sticker usually means, observe in which situations it appears, and compare it with other topographies of the same people.

8. Sample answer: (a) what students say in an interview; limit: it may reflect what is expected in front of the person asking. (b) how many times each student picks up their phone during class, observed by a colleague; limit: having the phone in hand may have reasons unrelated to the evaluation (checking the time, letting family know something). Any justified pair is acceptable.

9. Sample answer: *Topography:* rolled her eyes when the director talked about "bolder targets," closed her laptop before the end, and that evening sent a sleepy sticker to the group chat. *Situation:* meeting presenting the plan; she did not speak. *Hypothesis:* unfavorable evaluation of the plan or of the targets, with low to moderate confidence; alternatives: tiredness, time of day. *Question:* "What did you think of the plan?" The answer is correct if it separates what was observed from the hypothesis and does not use "hates" or "felt."

10. False. Saying and doing are different topographies of an evaluation, they occur under different conditions, and they can diverge: action has reasons that have nothing to do with the evaluation (price, obligation), just as speech can respond to what is expected of it in front of the listener. The useful question is under what conditions each one occurs (common mistake 2).

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 7, which deals with the structure of the sentences in which attitudes are stated. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2, 9	6.1 (what topography is) and Table 6.1
3, 4	6.2 to 6.8 (the topographies) and Figure 6.2
5, 6	6.5, 6.6, and 6.10 (the same form, something else)
7, 10	6.3, 6.7, and 6.10 (cautious and conventional reading)
8	6.2 to 6.7 (advantages and limits of each topography)

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CHAPTER

7 The Linguistic Structures of Attitudes

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Identify**, in a sentence of the "X is Y" type, the object (X), the evaluative word (Y), and the valence.
2. **Explain** why the sentence "X is Y" makes an evaluation sound like a description and **rewrite** it with a marker of authorship and firmness ("I think that," "I'm sure that").
3. **Compare** variants of the same evaluation (with an explicit "I," with a null subject, exclamatory, comparative), saying what each one brings to the foreground.
4. **Recognize** indirect evaluations (irony, metaphor, hyperbole, euphemism) and **explain** why the form of the sentence, on its own, does not decide the valence.
5. **Record**, in a small observation, what happens when the same evaluation is said to listeners in different forms.

PREREQUISITES

Chapter 3 (the three questions for deciding whether a statement is an attitude), Chapter 4 (evaluating × describing; the forms of expression), and Chapter 6 (topography).

OPENING

At Sunday dinner, the aunt declares: "This restaurant is horrible." The cousin, who had liked it, replies: "No, it isn't. The dish was great." An argument follows about whether or not the restaurant is horrible, as if the answer could be checked. At the next table, a friend says: "I didn't really like this place." Her companion replies: "Oh, I liked it." And the conversation goes on, with no argument.

These are two unfavorable evaluations of restaurants, and two different outcomes for the conversation. One has the form of a statement of fact ("it is horrible"); the other, that of the speaker's own position ("I didn't

like it”). This chapter looks at that form: the structure of the sentences with which people evaluate, what each structure brings to the foreground, and what it does not decide on its own.

7.1 The “X is Y” structure

A very common way of evaluating in English fits a simple pattern: a noun that names the object (X), the verb to be (is, are, was), and a word that evaluates (Y). “Cats are cute.” “The government is corrupt.” “This song is irritating.”

KEY CONCEPT

The **“X is Y”** structure links an object (X) to an **evaluative word** (Y) through the verb to be. The evaluative word is the one that carries the valence: “cute” is positive, “corrupt” is negative, “okay” is neutral (a middle ground).

It is Y that decides the valence; X and the verb do not. “Cats are cute” and “cats are treacherous” have the same structure and opposite valences. What is curious about the “X is Y” structure is the appearance it gives the sentence.

Compare “cats are mammals” with “cats are cute.” The grammar is the same, and what the sentences do is different. The first can be checked: any biologist arrives at the same result. The second cannot be checked, and this is the test from Section 4.1: what any observer can check describes the object; what cannot be checked, and allows the opposite position without any error of observation, evaluates it. But “cats are cute” sounds as if it said something *about cats*, like “cats are mammals,” and not something *about the speaker*. The “X is Y” structure dresses the evaluation in the clothes of a description. That is what happened at the restaurant: the argument turned into a dispute about the restaurant, not about who had liked it.

EXAMPLE

“Cats are cute.” *X:* cats (the object, a category). *Link:* are. *Y:* cute (the evaluative word). *Valence:* positive. *What the sentence leaves unsaid:* who is evaluating and how firmly.

NON-EXAMPLE

"The cat is black." Same structure: X is "the cat," Y is "black." But "black" can be checked, and any observer arrives at the same result. It is a description. Having the "X is Y" structure is not enough to evaluate: what decides is the word Y.

TEST YOURSELF

Which sentences evaluate? (a) "Meetings are necessary." (b) "The meeting is in room 3." (c) "The movie is okay." (d) "The movie is two hours long."

ANSWERS: (a) evaluates (positive valence); (b) describes; (c) evaluates (neutral valence, a middle ground); (d) describes.

7.2 Anatomy of an evaluative sentence

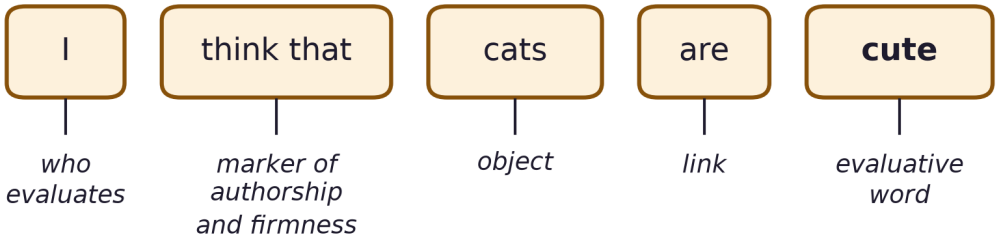
When someone says "I think that cats are cute," the "X is Y" structure is still there, inside the sentence, and it gains two pieces: the subject ("I") and an opening ("think that"). Figure 7.1 shows the pieces and what is left when they are removed.

KEY CONCEPT

The **marker of authorship and firmness** is the part of the sentence that says whose evaluation it is and how firmly it is held: "I think that," "I'm sure that," "I suspect that." Without it, the evaluation appears on its own, as in "cats are cute."

Markers vary in firmness. "I'm sure that the change is necessary" says more than "I think that the change is necessary," and the latter says more than "I suspect that the change is necessary." "I consider," "I believe," and "it seems to me that" fall between these extremes.

Figure 7.1
Anatomy of an evaluative sentence



removing the "I" and the marker:



"Cats are cute." The evaluation now sounds like a statement of fact about cats.

also removing the object and the link:



"Cute!" The object is left to what is in view or to the topic of the conversation.

Note. Diagram created for this book. Dashed boxes are pieces that the sentence left unsaid but that the evaluation still has.

EXAMPLE

"I suspect that the deadline is too short." Marker: "I suspect that" (the evaluation belongs to the speaker, held with little firmness). Object: the deadline. Evaluative word: "too short" (negative valence).

NON-EXAMPLE

"The deadline is too short." Without a marker, the evaluation appears on its own: the sentence does not say whose it is or how firmly it is held, and it sounds like a statement of fact about the deadline.

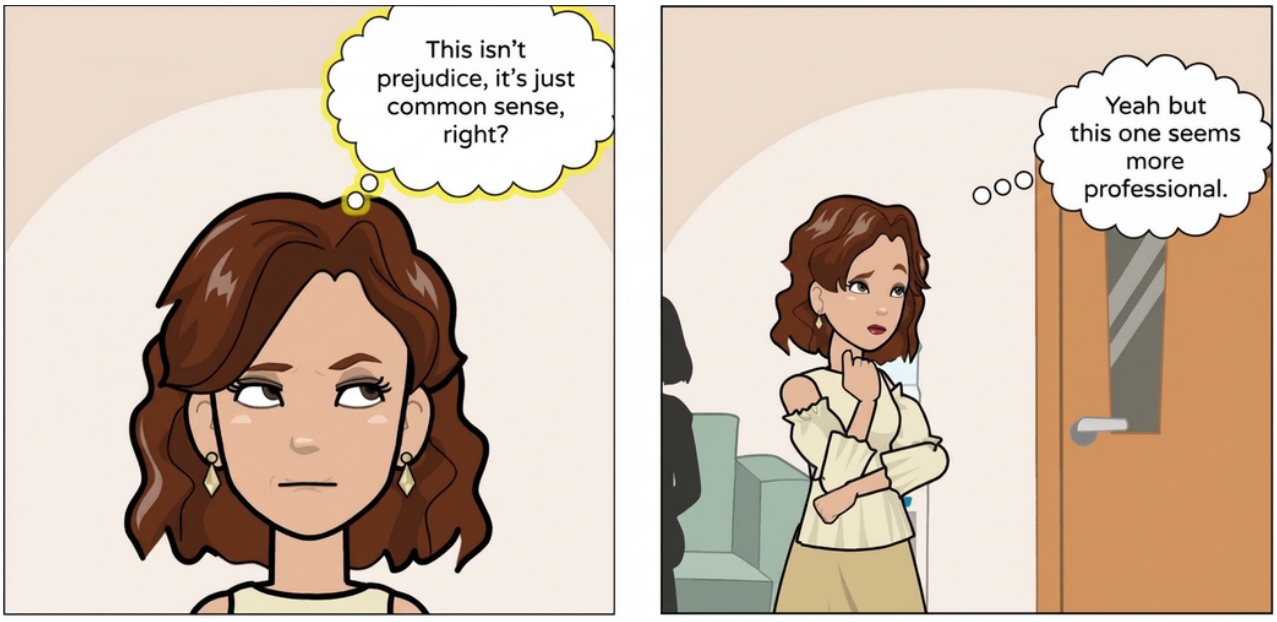
Two cautions. The first is that the marker makes it clear that the sentence is the speaker's position, and so the conversation usually takes a different course: instead of "it is, it isn't," we get "me too" or "not me." That is what we saw at the next table in the restaurant. "Usually" is not "always": said in a curt tone, "I think you're wrong" may sound harsher than "you're wrong."

The second caution is not to read into the verbs what the person "goes through inside." "I think," "I reckon," "I feel," and "I believe" are choices of words. What the observer has is the sentence and what it does to the listener. Saying that "I think that" is "rational" and "I feel that" is "emotional" is attributing to the sentence a process that no one has observed.

The marker does not always open the sentence with "I." In Camila's two thoughts in Figure 7.2, it appears in other ways. On the left, in "This isn't prejudice, it's just common sense, right?", the "right?" at the end makes the sentence ask for confirmation instead of asserting. On the right, in "this one seems more professional," the "seems" presents the evaluation as what is seen from where she stands, and not as a fact about the psychologist. Without the marker, what would be left in both cases is an "X is Y" ("this is common sense," "this one is more professional"), said more firmly.

Figure 7.2

Two markers of low firmness



Note. Panels from a comic in the series of comics-based studies carried out by undergraduates and published by the Instituto Walden4 (Section 1.5) and analyzed in Chapter 34; source and page in the Figure Credits. The reproduction has the resolution of the source material.

TEST YOURSELF

Break down “I’m sure that the change is necessary”: marker, object, evaluative word, and valence.

ANSWER: marker, “I’m sure that” (first-person authorship, high firmness); object, the change; evaluative word, “necessary”; valence, positive.

7.3 The null subject: “gosto de gatos” and “eu gosto de gatos”

In Portuguese, the subject can be left out because the verb ending already shows who it is: “gosto” (“[I] like”) means “eu gosto” (“I like”). Both forms are in common use. “Eu gosto de gatos” (“I like cats”) puts the evaluator in the foreground, and it is the natural form for drawing a contrast: “eu gosto de gatos, mas minha irmã não” (“I like cats, but my sister doesn’t”). “Gosto de gatos” (“[I] like cats”) is the ordinary way of saying it, with no emphasis on the “I.”

There is no need to exaggerate the difference. The presence or absence of the pronoun changes the emphasis, and what that does to the listener depends on the tone, the group, and the situation. For researchers, observing is worth more than presuming: reading the two versions aloud, with the same tone and then with emphasis on the “I,” already shows that the effect does not lie in the form alone.

TEST YOURSELF

In “discordo dessa proposta” (“[I] disagree with this proposal”) and “eu discordo dessa proposta” (“I disagree with this proposal”), what changes in the structure? And in the valence?

ANSWER: what changes is the presence of the pronoun (explicit or null subject). The object (the proposal) and the valence (negative) are the same.

7.4 One evaluation, many forms

The same evaluation can appear in several structures. Table 7.1 brings together six forms for "cats are cute," with what each one brings to the foreground. It is not a list of degrees of truth: it is a list of parts of the sentence.

Table 7.1
Six forms of the same evaluation

Form	Example	What the sentence brings to the foreground
Statement of fact ("X is Y")	"Cats are cute."	the object and the quality, as if they were a fact
With a marker	"I think that cats are cute."	who is evaluating and how firmly
Evaluative verb, with "I"	"I like cats."	who is evaluating, with the "I" emphasized
Evaluative verb, null subject	"Gosto de gatos." ("[I] like cats.")	the speaker's position, with no emphasis on the "I"
Exclamation	"Cute!"	only the evaluation; the object comes from the context
Comparison	"I prefer cats to dogs."	the relative position: the background of comparison, the other objects this one is compared with (Section 4.1), comes into view

Note. Examples created for this book. The right-hand column describes the parts of the sentence, not the effect the form has on the listener.

In all six sentences the object is cats and the valence is positive. The forms may also differ in intensity ("adore" instead of "like"), which is another question, the one from Chapter 4: direction says which side the evaluation is on, and intensity, how pronounced it is. And there are two caveats. "Cute!" only has an object for someone who can see which ones are being talked about. And "I prefer cats to dogs" has two objects, and the valence is relative: favorable to cats *compared with* dogs, which does not say how the person evaluates each one separately. For those who record attitudes, the rule from Chapter 3 applies to all the forms: look for the object, the position, and the valence, whatever the structure.

TEST YOURSELF

In "I prefer cats to dogs," how many objects are there, and what valence does the sentence have?

ANSWER: Two objects, cats and dogs, and the valence is relative: favorable to cats *compared with* dogs, which does not say how the person evaluates each one separately.

7.5 When the evaluation is not in the words

Not every evaluation appears in the "X is Y" structure, and a sentence with favorable words is not always favorable. The devices in Table 7.2 send the evaluation along another path.

Table 7.2
Indirect evaluations

Device	Example	Valence	What supports the reading
Irony	"What a brilliant idea, one more fee."	negative	favorable words in an unfavorable context
Metaphor	"This office is a prison."	negative	the image of a prison
Hyperbole	"This traffic kills me every day."	negative, intense	the exaggeration
Euphemism	"He's not exactly punctual."	negative, mild	the softening
Intonation and expression	"João always arrives on his own schedule."	negative (veiled criticism)	the tone, the face, and what is known about the speaker

Note. Examples created for this book, with the most likely reading in a typical context.

In these cases, the valence is not in the word but in the relation between the word and what surrounds it: the tone, what came before, what is known about the speaker. The same sentence, "what a brilliant idea!", can praise or criticize. The Chapter 3 rule for borderline cases applies here: record the situation and the decision. The form of the sentence, on its own, does not decide the valence.

TEST YOURSELF

What is the valence of "Wonderful, another meeting at 7 a.m."? What device supports the reading?

ANSWER: negative. Irony: the word is favorable, and the context (another meeting, at 7 a.m.) is unfavorable.

7.6 Try it: what each form brings about in the listener

There is a way to see in practice that form matters: say the same evaluation in different forms to different people and write down what happens. The activity below is for practice, not for testing.

Observation activity. Choose a harmless evaluation, such as one about a movie or a restaurant you know. Say it to three people, one form for each, in separate conversations: (1) "X is Y" (for example, "That restaurant is expensive."); (2) "I think that X is Y" ("I think that restaurant is expensive."); (3) "I don't like X because of Z" ("I don't like that restaurant because I find it expensive."). For each person, write down *what they said and did* afterward, in their own words. Do not write down what they "felt" or what they "meant."

With three people, no rule is proven. What is being practiced is the way of looking: separating the form of the sentence from what it brought about, and seeing that the same content can be received in different ways by different people, in different situations.

TEST YOURSELF

In the observation activity, why write down what the person "said and did," in their own words, and not what they "felt" or "meant"?

ANSWER: Because what is being practiced is separating the form of the sentence from what it brought about: what the person said and did can be recorded and compared, while what they "felt" or "meant" is an inference. With three people no rule is proven; what is practiced is the way of looking.

Common learner mistakes

1 **Accepting the grammatical clothing.** "X is Y" is not necessarily a description, and a description does not need to have that structure. The mistake happens because this is the form in which we learned definitions and statements of fact. *How to spot the mistake:* you classified "the reform is necessary" as a fact because the sentence "looks like" a statement of fact.

2 **Reading inner states into verbs.** "I think" is not "rational," and "I feel" is not "emotional." The mistake happens because these verbs seem to name what goes on inside the person. *How to spot the mistake:* your record says "he used an emotional verb, so the attitude is affective."

3 **Presuming the effect of the form.** Saying that the sentence without "I" is "objective" or that the one with "I" is "weaker" is a hypothesis. The mistake happens because the presumed effect seems obvious to whoever presumes it. *How to spot the mistake:* you stated as a rule something you observed only once, or never observed.

4 **Deciding the valence by the word.** In irony, hyperbole, and euphemism, the word and the valence do not coincide. The mistake happens because the word is written in the sentence, and the situation is not. *How to spot the mistake:* you recorded "positive" for "what a brilliant idea" without looking at the situation.

SUMMARY

"X is Y" (objective 1). It is a very common structure for evaluating in English: an object (X) linked, by the verb to be, to an evaluative word (Y). It is Y that carries the valence, and not every Y evaluates: "black" describes, "cute" evaluates.

Sounding like a description (objective 2). The same grammar serves "cats are mammals" and "cats are cute," and that is why the evaluation wears the clothes of a description. With a marker of authorship and firmness ("I think that," "I'm sure that"), the sentence makes visible whose evaluation it is.

Variants (objective 3). With an explicit "I," with a null subject, exclamatory or comparative, the evaluation can be the same while what the sentence brings to the foreground changes. The difference describes parts of the sentence, not what happens in the listener.

Indirect evaluations (objective 4). Irony, metaphor, hyperbole, euphemism, and intonation send the valence along another path. The form of the sentence, on its own, does not decide: one has to situate it.

Observing (objective 5). Differences in effect between forms are observed, by writing down what the listener says and does, and not presumed. Three conversations train the way of looking and do not prove a rule.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. Which of these sentences are evaluations of the "X is Y" type? For those that are, indicate X, Y, and the valence. (a) "Politicians are corrupt." (b) "The cat is black." (c) "This song is irritating." (d) "The class is at 2 p.m."

2. Rewrite "The reform is necessary." with three different markers of firmness, from the firmest to the most cautious.

3. Which of the sentences is not an evaluation, even though it has the "X is Y" structure?

a. "The lecture was great."
b. "The lecture was on Wednesday."
c. "The lecture was a waste of time."
d. "The lecture was boring."

4. What changes in the structure between "gosto de gatos" ("[I] like cats") and "eu gosto de gatos" ("I like cats")? Answer in one sentence, without attributing any effect on the listener.

5. Match each sentence to an indirect device (irony, metaphor, hyperbole, or euphemism): (i) "This office is a prison." (ii) "What a wonderful day to get stuck in the elevator." (iii) "This traffic kills me every day." (iv) "He's not exactly punctual."

6. "What a lovely idea!" is said in two situations: one colleague proposes a travel itinerary everyone likes; another colleague proposes canceling the team's year-end party. How can the valence be different in the two? What helps decide?

7. Do the observation activity from Section 7.6 with three people. Write the record for one of them, with what that person said and did, without interpreting.

8. Marcos writes in a forum: "Horror movies are a waste of time." Joana writes: "I think that horror movies are a waste of time." Are both sentences attitudes? Is there a difference in object or valence? And in what the sentence brings to the foreground?

9. Why can "cats are cute" sound like a description, like "cats are mammals"? Answer in two sentences, using the test from Section 4.1 (what can be checked by observation describes; what cannot be checked evaluates).

10. A researcher decides to code as attitudes only the sentences that begin with "I think that." What is the problem with this rule? Give two examples of evaluations it would leave out.

ANNOTATED ANSWER KEY

1. (a) evaluates: X = politicians, Y = corrupt, negative valence. (b) describes ("black" can be checked). (c) evaluates: X = this song, Y = irritating, negative valence. (d) describes (a time). All four have the "X is Y" structure; what decides is the word Y (common mistake 1).

2. Sample answer: "I'm sure that the reform is necessary." / "I think that the reform is necessary." / "I suspect that the reform is necessary." The answer is correct if there are three markers in decreasing order of firmness.

3. **b.** "On Wednesday" can be checked, and the sentence describes. The others evaluate: "great" (positive), "a waste of time" (negative), and "boring" (negative). All four have the same structure.

4. Model answer: "In the first the subject is null (the verb ending shows who it is); in the second the pronoun 'eu' ('I') is explicit." The object and the valence do not change. Anyone who answered that the first is "less personal" attributed an effect without observing it (common mistake 3).

5. (i) metaphor; (ii) irony; (iii) hyperbole; (iv) euphemism.

6. In the first situation, the valence is positive (praise); in the second, it is negative (irony). What helps decide is the tone of voice, what came before ("everyone liked it" × "nobody wanted it"), what comes after (they accept the proposal or reject it), and what is known about the speaker (common mistake 4).

7. Sample answer (form 2): "I said 'I think that restaurant is expensive.' She replied: 'I think so too, but the food makes up for it.' Then she suggested we go there on Saturday." The answer is correct if it gives what she said and did, in her own words, and not "she agreed," "she felt at ease," or "she felt that."

8. Both are attitudes: the object is horror movies (a category), and the valence is negative. Nothing changes in object or valence. What changes is what the sentence brings to the foreground: Marcos's presents the evaluation as a statement of fact; Joana's makes visible whose it is and how firmly it is held.

9. Model answer: "Because the grammar is the same as in 'cats are mammals,' where the sentence describes a property of the object. But 'cute' cannot be checked by direct observation: two observers may disagree, and that is what shows it is an evaluation." Any answer that brings in the checking test (Section 4.1) is acceptable.

10. The rule leaves out every evaluation that does not have the marker. Examples: "Cats are cute." (X is Y without a marker), "Gosto de gatos." ("[I] like cats.") (null subject, without "I think that"), "Cute!" (exclamation), "What a brilliant idea, one more fee." (irony). Any two will do. The right criterion is that of the three questions in Chapter 3 (is there an identifiable object? does the speaker take a position on it? what is the valence?), regardless of the structure.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 8, which deals with the contexts in which attitudes appear. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 3, 9	7.1 ("X is Y"; evaluating × describing)
2, 8	7.2 (anatomy and the marker of authorship and firmness) and Figure 7.1
4	7.3 (null subject)
5, 6, 10	7.4 and 7.5 (variants and indirect evaluations) and Table 7.2
7	7.6 (observation)

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CHAPTER

8 Contexts in Which Attitudes Occur

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Describe** the context in which an evaluation appeared: where, with whom, after what, and with what at stake.
2. **Identify** six common contexts in which attitudes occur: direct question, comment about people, reaction to content, decision, service and feedback, casual conversation.
3. **Relate** the context to the form and content of an evaluation of the same object.
4. **Recognize** that evaluations of one object that differ from one context to another are not, in themselves, a contradiction or a falsehood.
5. **Record** the context together with the object, the valence, and the topography on an observation form.

PREREQUISITES

Chapters 2 to 7: object, evaluation, valence, intensity, topography, and the sentence structures people use to evaluate. From Chapter 4, the care not to take a single form of expression as "the true one" (common mistake 4).

OPENING

Letícia manages a store. On Monday, in a meeting with senior management, she says the new inventory system "has a few areas to improve." On Wednesday, at lunch with her team, she says "this system is torture." On Friday, in the company's anonymous satisfaction survey, she gives it a 3 out of 10 and writes: "Insufficient training."

The object is the same, and the valence is negative on all three occasions. The form and the content are not: a mild criticism, a strong complaint, a rating with a technical reason. Which is Letícia's "true" attitude? Did she lie on any of the three occasions? These questions start from an assumption, that one of the occasions hides the "real" evalu-

ation, and this chapter will examine it. To do so, we need to look at what differs across the three occasions and is not in the sentence: the context.

8.1 What context is

Every evaluation appears somewhere, in front of someone, after something. We call this the context.

KEY CONCEPT

The **context** of an evaluation is the situation in which it appears. Four questions help describe it: *where* (place and medium: in person, written, digital), *with whom* (who hears or reads it), *after what* (what came before: a question, a comment, an event), and *with what at stake* (what may happen afterward).

In a broad sense, a group's culture is also context, and Chapter 4 treated it as a background: what the group values and devalues is present in its conversations, stories, and institutions, and that is why different groups evaluate the same objects differently. Here the focus is the immediate situation, the one described by four questions and that an observer can check. Context is not a characteristic of the person (being shy, being in a bad mood) but of the situation.

EXAMPLE

"Good thing the meeting ended early." Said in a message to the team, right after the meeting finished ahead of time. *Where:* in writing, in the team's group chat. *With whom:* coworkers. *After what:* the meeting's early end. *With what at stake:* nothing formal, only the mood among coworkers.

NON-EXAMPLE

"She said that because she was in a bad mood." It looks like information about context, but it is a conclusion about what the person feels. The context would be: "She said that in front of her boss, right after he asked what she thought of the report."

TEST YOURSELF

Which of these pieces of information describes the context of the evaluation? (a) She is shy. (b) It was said in front of the boss, after he asked. (c) She thinks the project is bad.

ANSWER: (b). Option (a) is a characteristic attributed to the person; (c) is the evaluation itself, or a conclusion about it.

8.2 Six common contexts

There are many contexts, and six of them come up often. The list is not closed: it serves to train your eye.

Direct question. "What did you think of the new remote work policy?" The question brings the object and asks for a position, which makes it the most explicit context. The answer also depends on who asks: the same question, asked by a coworker, by the boss, or by a researcher, tends to get answers that differ in tone and content. The form of the question is part of the context too: "What did you think of the movie?" and "Didn't you think the movie was too long?" ask for the same evaluation, and the second already contains the expected answer.

Comment about people. Hiring ("excellent analytical skills, but lacks leadership experience"), talk about acquaintances ("Maria is reliable"), introductions ("I want you to meet Ana, she's brilliant"), and warnings ("watch out for Pedro in negotiations"). The object is a person, an individual object, not the category he or she belongs to (Chapter 5), and what is said about the person before a meeting becomes part of the situation in which the meeting takes place.

Reaction to content. News, movies, books, songs, series, posts. The evaluation often comes in parts: "the cinematography is stunning, but the script falls short" has two objects, the cinematography and the script, rather than a single one, "the movie" (this is the delimitation of the object from Chapter 5), with opposite valences. Recording "evaluation of the movie: positive" erases this.

Decision. Planning meetings, purchases, advice. Evaluations often come as comparisons between options: "proposal A is conservative, but it gives a guaranteed return; B is risky, but it promises more." Advice usually brings, along with it, a recommendation and an explicit evaluation: "you should accept, it's a unique opportunity." The recommenda-

tion guides an action, like instructions ("open the window"), which Chapter 3 set apart from attitudes because they mention an object without evaluating it; the evaluation is "it's a unique opportunity," and that is what an attitude record takes.

Service and feedback. Customer service, satisfaction surveys, online reviews ("wonderful hotel, exceeded all expectations"), performance feedback ("your work this quarter was exceptional"). In many of these contexts the format is set in advance (rating, comment), and the evaluation is requested. In professional feedback, pay attention to the object: "your work was exceptional" and "you are exceptional" are evaluations of different objects (the work, the person).

Casual conversation. "This heat is terrible!" "Traffic is impossible." "The trip was amazing, worth every penny." "It's going to be great when we move to the new office." Here evaluations tend to be about shared conditions, recent experiences, or plans, and they often open or keep up the conversation. Some are fleeting ("so hot!"), and Chapter 9 addresses when an evaluation like that counts as an attitude for research purposes.

Table 8.1

Six common contexts in which attitudes occur

Context	Example	What is usually at stake	Care when recording
Direct question	"What did you think of the plan?"	who asks and the form of the question	record the question together with the answer
Comment about people	"Ana is brilliant."	the relationship with the listener	separate the person from what they do: they are different objects (Ch. 5)
Reaction to content	"The cinematography is great, the script is weak."	several parts of the same object	one object per part, one valence per object
Decision	"A is safe; B is risky, but promises more."	comparison between options	the valence is relative: one option is good compared with the other (Ch. 7)
Service and feedback	"The service was flawless."	a set format (rating, comment)	the format limits what can be said
Casual conversation	"This traffic is impossible!"	keeping the conversation going; shared conditions	fleeting evaluations (Ch. 9)

Note. Examples created for this book. The column "what is usually at stake" describes the situation, not what the person "feels."

TEST YOURSELF

In which context does each sentence appear? (a) "When you look at the price, is it worth it? I'd say yes." (b) "The actress is great, but the story is weak." (c) "Beautiful day, huh?"

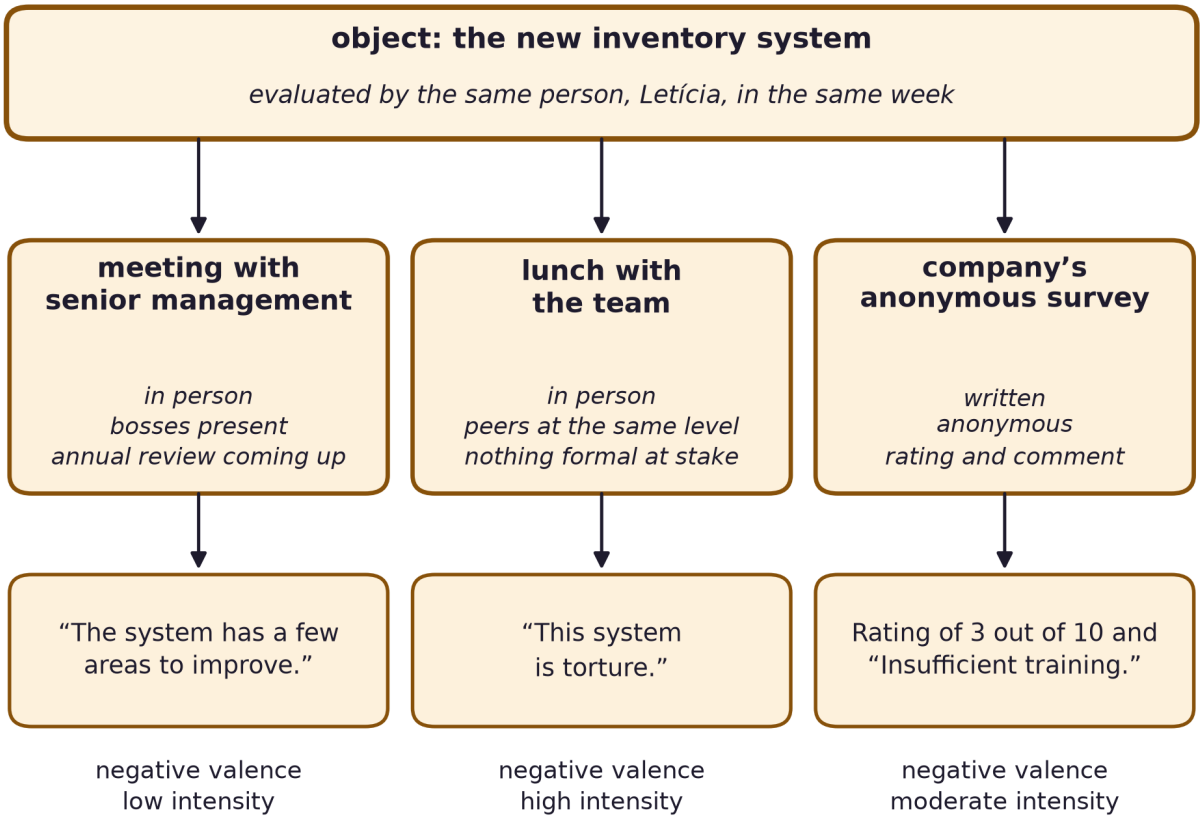
ANSWERS: (a) decision; (b) reaction to content; (c) casual conversation.

8.3 The same object, different contexts

Figure 8.1 brings together Letícia's three occasions. There is only one object, and only one person. What changes is the situation: who was present, what was at stake, what format was allowed.

Figure 8.1

The same object evaluated by the same person in three contexts

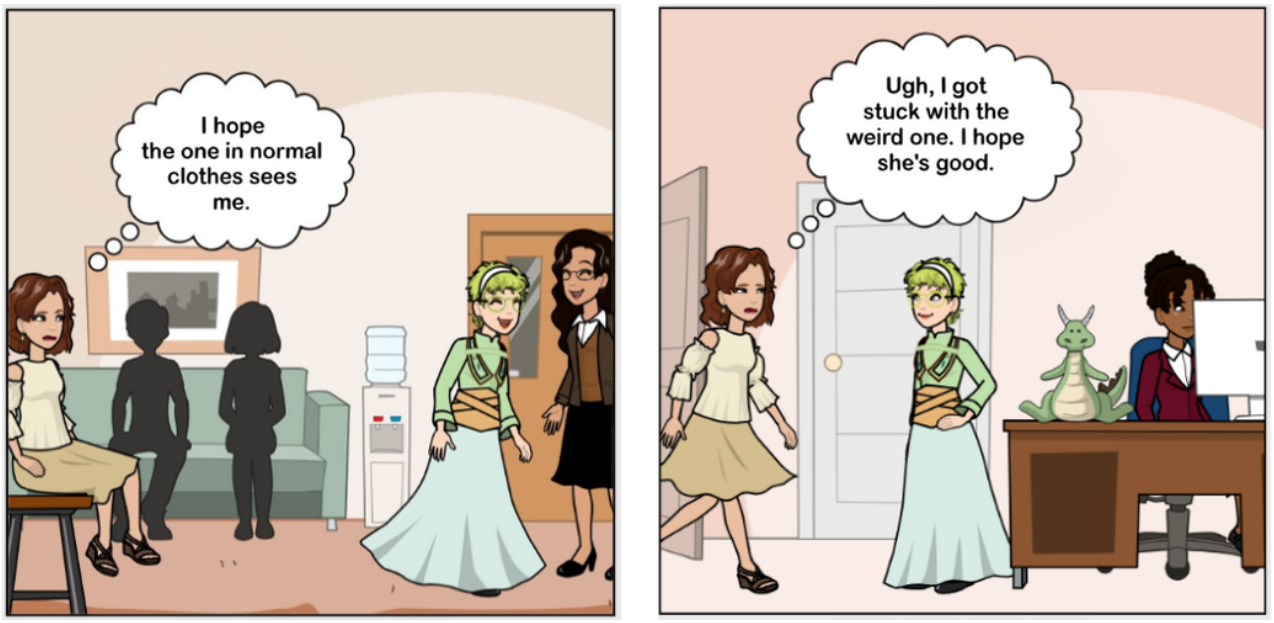


Note. Diagram created for this book. The reading of valence and intensity is that of the record, not a measurement.

What the data support is this: that week, in three situations, Letícia evaluated the system unfavorably, with different words, intensity, and format. They do not support that she "lied," nor that one of the three forms hides the "true" one (this is common mistake 4 from Chapter 4, taking one form as the "true" evaluation and the others as a front, now in a different setting). Each evaluation is an evaluation, made in a context. The figure shows where to look to understand the differences. In front of her bosses, with the annual review coming up, a mild criticism; among peers, with nothing formal at stake, a strong complaint; under anonymity, a rating and an objective explanation of the problem. Chapter 13 returns to this and gives a technical name to what is only described here.

A comic strip shows the same person in two situations. In Figure 8.2, Camila has two thoughts about the psychologists at a clinic. On the left, in the waiting room, she sees two of them laughing together and thinks: "I hope the one in normal clothes sees me." On the right, after the receptionist calls her for her session with Isabela, she thinks: "Ugh, I got stuck with the weird one. I hope she's good." At neither moment does anyone hear what she thinks. What changes is what came before and what is at stake: in the waiting room, the choice was still open and she could root for one of the two; at the door, the session would be with Isabela, and all that is left is to hope it goes well.

Figure 8.2
The same person, two situations



Note. Panels from a comic strip in the series of comics-based studies carried out by undergraduates and published by the Instituto Walden4 (Section 1.5) and analyzed in Chapter 34; source and page in the Figure Credits. The reproduction has the resolution of the source material.

But be careful: describing is not explaining. The figures suggest where to look; they do not prove that the situation *caused* each form. To claim that, you would need to observe more occasions and vary the context while keeping everything else the same.

TEST YOURSELF

In a meeting, Ana praises the new director; in the hallway, she says he is "very authoritarian." Is this a contradiction?

ANSWER: it cannot be claimed that it is. These are two evaluations, in two contexts, with different valences. What you can do is describe what changes (who was listening, what was at stake) and observe other occasions before concluding anything about a "true" opinion.

8.4 Recording the context

Anyone who records attitudes needs to record the context together with the evaluation. Without it, the sentence alone tells you little: "this system is torture" said at lunch and in the anonymous survey are different data. Table 8.2 proposes a form, with a filled-in example.

Table 8.2

Observation form for an evaluation

Field	Question	Example (Letícia's lunch)
Object	What is being talked about?	the new inventory system
Valence and intensity	Which side? How much?	negative; intense
Topography and structure	How did it appear?	speech; "X is Y": "this system is torture"
Where and with whom	In what place? Who was listening?	cafeteria; six coworkers from the team, no managers
What came before	Was there a question or comment?	a coworker complained about how slow the system was
What was at stake	What could happen afterward?	nothing formal; the coworkers' agreement

Note. Form created for this book; adapt the fields to your research.

There is one context that researchers easily forget: that of the data collection itself. The question they ask, the form, the person who hands out the questionnaire, and the place where it is answered are part of the situation. A satisfaction survey given by the clerk who served you, at the counter, is a different context from a survey answered at home, and the answers may differ for that reason.

TEST YOURSELF

A satisfaction survey is given by the clerk who served the customer, at the counter. Why does this need to go on the form, along with what the customer answered?

ANSWER: Because the context of the data collection (the question, the form, who hands out the questionnaire, and the place where it is answered) is part of the situation, and the same person may answer differently to the clerk, at the counter, and at home. On the form, this goes under "where and with whom."

Common learner mistakes

1 **Treating the evaluation collected in one context as "the" person's attitude.** It is the evaluation *in that* context. The mistake happens because everyday language speaks of someone's "attitude" as a single thing. *How to spot the mistake:* your record says "Letícia's attitude is negative" based on a single occasion.

2 **Concluding hypocrisy or inconsistency.** Different evaluations in different contexts are not, in themselves, a contradiction or a falsehood. The mistake happens because we expect a person to say the same thing in any situation, and the difference sounds like a flaw of character. *How to spot the mistake:* you wrote "he says one thing and thinks another" without describing what changed between the situations.

3 **Forgetting that data collection is a context.** Who asks, how they ask, and where are part of the situation. The mistake happens because researchers tend to see their own question as neutral rather than as part of the situation. *How to spot the mistake:* your form has the context of everything except your own research.

4 **Calling a characteristic of the person or an internal state "context."** "She was nervous" does not describe the situation. The mistake happens because explaining by what the person feels is an everyday habit. *How to spot the mistake:* your description of the context does not answer any of the four questions (where, with whom, after what, with what at stake).

SUMMARY

Context (objective 1). It is the situation in which the evaluation appears, described by where, with whom, after what, and with what at stake. It is not a characteristic of the person or a conclusion about what they feel.

Six contexts (objective 2). The direct question, the comment about people, the reaction to content, the decision, service and feedback, and casual conversation are common contexts, each with what is usually at stake and a point of care for whoever records.

Context, form, and content (objective 3). The same object, evaluated by the same person, appears with different words, intensity, and format depending on the situation. The figure suggests where to look; to claim that the situation causes the form, you need to observe and vary.

No automatic contradiction (objective 4). Different evaluations in different contexts are not, in themselves, falsehood or inconsistency. What you do is describe what changes and observe more occasions.

Recording (objective 5). The context goes on the form together with the object, the valence, the intensity, and the topography, and it includes the context of the data collection itself.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. During class, the professor asks: "What did you all think of the reading?" Júlia answers: "I found it dense, but good." Describe the context with the four questions (where, with whom, after what, with what at stake), without attributing anything to Júlia that cannot be observed.

2. In which of the six contexts does each sentence appear? (i) "This line is impossible!" (ii) "I want you to meet Rui, he's very competent." (iii) "The clerk was very attentive." (iv) "I prefer plan B: it's cheaper, even if it's slower." (v) "They asked me what I thought of the movie, and I said I liked it a lot." (vi) "The series is good, but the ending is disappointing."

3. Letícia said "the system has a few areas to improve" at the meeting and "this system is torture" at lunch. Which conclusion do the data support?

a. Letícia lies at the meeting.

b. Letícia's "real" attitude is the one at lunch.

c. Letícia evaluated the system unfavorably in both situations, in different forms.

d. Letícia changed her mind between Monday and Wednesday.

4. "The soundtrack is moving, but the movie is too long." How many objects appear, and what valence does each have?

5. "I think you should accept the offer, it's a unique opportunity." Which part of the sentence is a recommendation and which part is an evaluation? Which would you record as an attitude?

6. A store has the satisfaction survey given by the clerk who served the customer, at the counter, at the end of the service. What care with context does this require? What would you change?

7. Write three evaluations of the same restaurant, for three contexts: to a friend, in a public online review, and to the restaurant's manager.

8. Fill out the form in Table 8.2 for this case: at a condominium meeting, after the building manager asked "what did you think of the renovation?", Marta said: "It turned out great, but it ran way behind schedule."

9. João praises his boss in meetings and criticizes him in the hallway. Is this inconsistency? Answer in three sentences.

10. True or false: "If a person evaluates the same object in different ways in different contexts, one of the evaluations is false." Justify.

ANNOTATED ANSWER KEY

1. Sample answer: *Where:* classroom, in person. *With whom:* the professor and classmates. *After what:* a question from the professor about the reading. *With what at stake:* class participation (perhaps a grade or her image in front of her classmates, if participation counts). It is correct if it describes the situation and says nothing like "Júlia was shy" (common mistake 4).

2. (i) casual conversation; (ii) comment about people; (iii) service and feedback; (iv) decision; (v) direct question; (vi) reaction to content.

3. **c.** The data support that, in both situations, the valence is negative, and that the form and intensity vary. Options **a** and **b** assume that one of the forms is "false" or "true"; **d** assumes a change ("changed her mind") that the data do not show: nothing indicates that Monday's evaluation stopped holding; these are two occasions, in two contexts (common mistake 2).

4. Two objects: the soundtrack (positive valence) and the movie, or its length (negative valence). Anyone who recorded "evaluation of the movie: positive" or "negative" erased one of the two: there are two objects, and each has its own evaluation (Chapter 5).

5. The recommendation is "you should accept the offer"; the evaluation is "it's a unique opportunity" (object: the offer; positive valence). The evaluation is the part recorded as an attitude by the criterion of Chapter 3 (there is an identifiable object, the speaker takes a position, and there is a valence); the recommendation guides an action, like an instruction, and stays out of that record.

6. The clerk is part of the situation, and whoever answers in front of the clerk may have reasons other than the evaluation, such as not wanting to embarrass the person who served them. The care is to record this context and, if possible,

change it: a survey on paper or in an app, answered anonymously, with the clerk out of sight. Any proposal that changes who hears or what is at stake is acceptable.

7. Sample answer: to the friend, "that place is great, the pasta is the best in town"; online, "pleasant atmosphere, attentive service, fair price; only the wait was long"; to the manager, "the service was very good; it might be worth looking at the wait time on Saturdays." It is correct if the three evaluations differ in form or content and if the context of each one is different.

8. *Object:* the renovation (two parts: the result and the timeline). *Valence and intensity:* positive, strong, for the result ("great"); negative, moderate, for the timeline ("way behind schedule"). *Topography and structure:* speech; "X is Y" twice, joined by "but." *Where and with whom:* condominium meeting, in person, residents and building manager. *What came before:* the building manager asked "what did you think of the renovation?" *What was at stake:* perhaps the approval of the renovation's accounts; or nothing formal. It is correct if there are two objects and if the context comes from the situation.

9. Model answer: "Not necessarily. These are two evaluations in two contexts, with different valences. Before concluding anything, you need to describe what changes between the contexts (who is listening, what is at stake) and observe other occasions." It is correct if it does not conclude "hypocrisy" or "true opinion" (common mistake 2).

10. False. Each evaluation is an evaluation in a context, and it is not checked the way a measurement is checked. The useful question is what changes between the contexts, not which of the evaluations is the true one.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 9, which deals with when an evaluation counts as an attitude and when it does not. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 8	8.1 and 8.4 (what context is; the form)
2, 4, 5	8.2 (six contexts) and Table 8.1
3, 7	8.3 (the same object, different contexts) and Figure 8.1
9, 10	8.3 and common mistake 2
6	8.4 (the context of data collection)

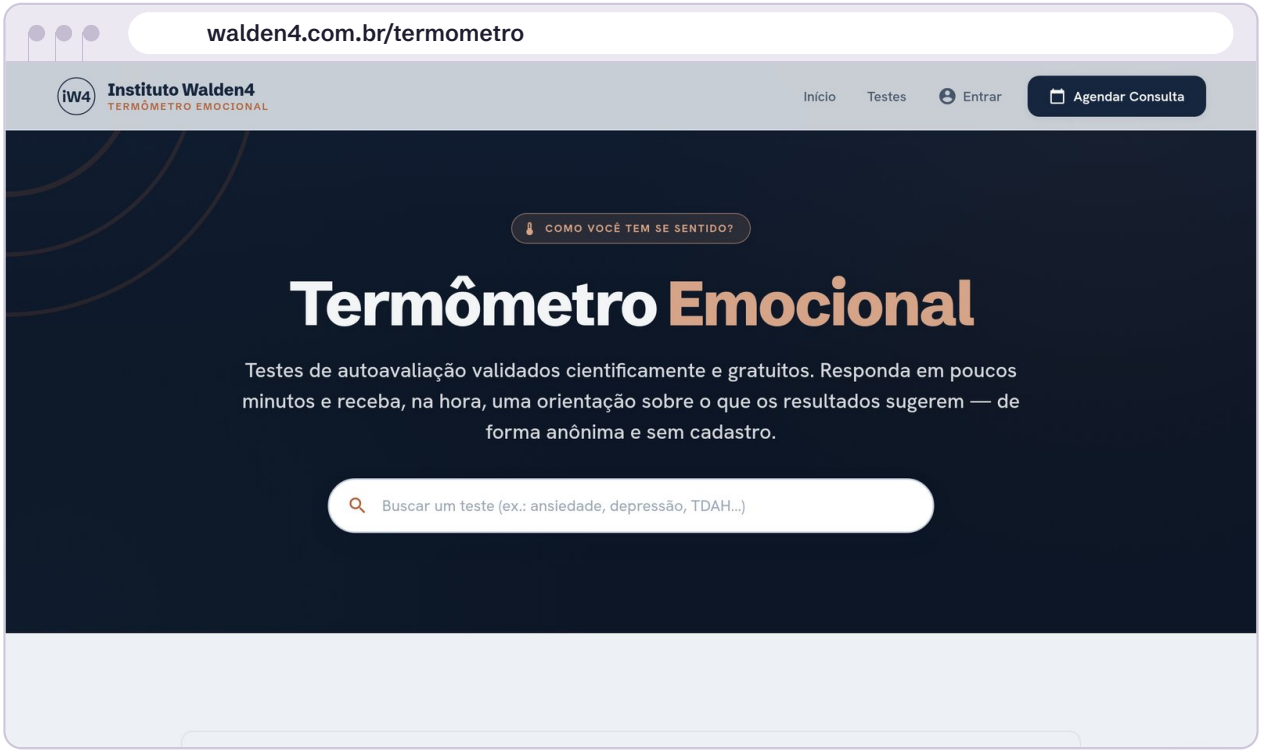
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CHAPTER 9

Not Every Qualification Is an Attitude

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Distinguish** a descriptive qualification (which places the object on a dimension, against a standard, or in a category) from an attitude (which places it between favorable and unfavorable).
2. **Recognize** five families of descriptive qualifications: sensory, dimensional, conformity, state, and type.
3. **Transform** a descriptive qualification into an attitude by adding a valence, and **state** what changed.
4. **Apply** the valence criterion to questionnaire items, deciding whether they measure attitude or description.
5. **Distinguish** a single occasion of evaluation from a recurrence, without treating it as a disposition stored inside the person.

PREREQUISITES

Chapter 3 (the three questions), Chapter 4 (describing × evaluating; valence and intensity), Chapter 7 (the "X is Y" structure), and Chapter 8 (context).

OPENING

A hallway eighty centimeters wide. Three people walk through it. Rafael says: "This hallway is narrow." Carla says: "This hallway is cozy." Davi says: "This hallway is claustrophobic."

All three sentences have the "X is Y" structure from Chapter 7, in which the verb "to be" links an object (X) to a word that qualifies it (Y), and all three qualify the hallway. But only two say that the hallway is good or bad for the speaker. Rafael's sentence places the hallway on a dimension (width) and leaves open whether that is good or bad; Carla's and Davi's take a position, on opposite sides.

In ordinary speech, we call both what Rafael did and what Carla and Davi did "evaluating": we evaluate the width of a hallway, the height of a building, whether an answer is right, and also whether we like the building. This chapter separates the two. Only the second is attitude.

9.1 Descriptive qualification and attitude

In Chapter 4, evaluating was defined as taking a position on an object, placing it closer to the favorable or to the unfavorable. In everyday use the word is broader, and that is why this chapter needs a name for what looks like evaluating but only describes.

KEY CONCEPT

A **descriptive qualification** uses a word that looks evaluative ("tall," "narrow," "correct," "late"), but it only places the object on a dimension, against a standard, or in a category. It does not place it between favorable and unfavorable, and so it is not an attitude. The attitude adds the valence.

The difference lies in the kind of scale. "Tall–short," "wide–narrow," "hot–cold," and "long–short" are dimensions on which objects are measured. "Good–bad," "pleasant–unpleasant," and "favorable–unfavorable" are the dimensions of valence. An object can be at any point on the first kind and have no point at all on the second, until someone places it there.

There is a practical test for deciding.

KEY CONCEPT

Agreement test. Can two observers who agree with the sentence disagree about liking what it says? If so, the sentence describes (it is a description of fact or a descriptive qualification), and the valence, if there is one, is in another sentence. If the sentence already carries the position (favorable or unfavorable), it is an attitude.

This test refines the checking test (Section 4.1): instead of asking whether the sentence can be checked by observation, it asks whether someone who agrees with it can still disagree about liking what it says.

Carla and Davi agree, underneath, that the hallway is narrow, and they disagree about whether its being narrow is good or bad: "cozy" and "claustrophobic" are the two positions. Because agreement about "narrow" leaves open whether it is good or bad, "narrow" describes.

Notice that the criterion does not ask you to look for emotion in the sentence. An attitude can be stated with complete calm ("I consider the plan inadequate"), and a description can be shouted ("this hallway is narrow!"). What decides is the position the sentence takes.

EXAMPLE

"The answer is correct." Two teachers who agree with the sentence can disagree about liking the answer or the student who gave it. The sentence places the answer relative to a standard and leaves the valence open: it is a descriptive qualification.

NON-EXAMPLE

"That answer is a beauty." Whoever agrees with the sentence also agrees with the position: it takes sides in favor of the answer. It is an attitude, not a descriptive qualification.

TEST YOURSELF

Two coworkers agree that the building is 40 meters high and that it is tall. One thinks the building is beautiful; the other, threatening. Which sentences are descriptions, which are descriptive qualifications, and which are attitudes?

ANSWERS: "is 40 meters high" is a description of fact; "is tall" is a descriptive qualification; "beautiful" and "threatening" are attitudes, of opposite valences.

9.2 Five families of descriptive qualifications

Descriptive qualifications are not all alike, and recognizing the family helps you see what the sentence does. Table 9.1 brings together five.

Table 9.1
Five families of descriptive qualifications and the attitude each can give rise to

Family	Example	What the sentence does	An attitudinal version
Sensory	"The wall is white." "The sound is high-pitched."	names what is perceived through the senses	"White walls are dull."

Family	Example	What the sentence does	An attitudinal version
Dimensional	"The hallway is narrow." "The process is slow."	places the object on a dimension, relative to an implicit standard	"Narrow hallways are claustrophobic."
Conformity	"The answer is correct." "The procedure is standard."	says whether something meets a criterion	"Standard procedures are boring."
State	"The coffee is hot." "The room is empty."	describes a verifiable condition	"Hot coffee is comforting."
Type	"The tool is manual." "The system is automated."	puts the object in a type, according to how it is made or how it works	"Automated systems are impersonal."

Note. Examples written for this book. The last column shows one of several possible attitudes; the same descriptive sentence supports attitudes of opposite valences.

The table carries a practical lesson. The right-hand column, which is attitude, has in each row a word that is not in the left-hand column: "dull," "claustrophobic," "boring," "comforting," "impersonal." These are the valence words. They are what you look for when you want to know whether a sentence is an attitude.

TEST YOURSELF

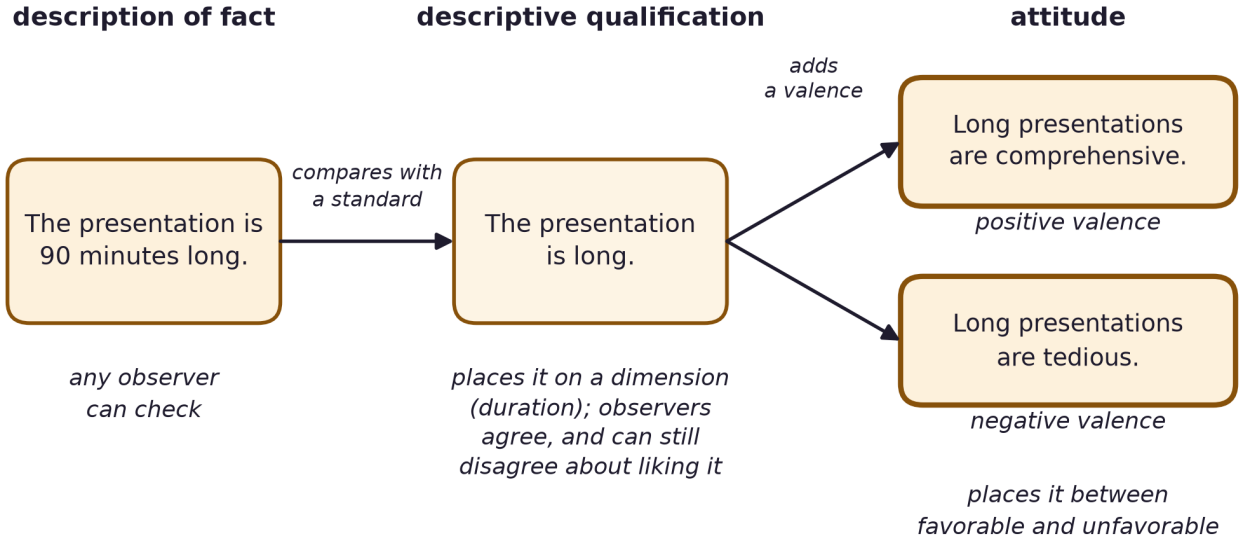
Which family do they belong to? (a) "The file is saved." (b) "The sound is low-pitched." (c) "The exam is multiple-choice."

ANSWERS: (a) state; (b) sensory; (c) type (a type of exam).

9.3 From description to attitude

What the transformation adds is the position, and Figure 9.1 shows this step by step. "The presentation is 90 minutes long" is a description of fact, which any observer can check. "The presentation is long" compares the duration with an implicit standard: those who start from the same standard agree and, even so, may disagree about liking it. "Long presentations are comprehensive" and "long presentations are tedious" add a valence, and they are, on opposite sides, attitudes.

Figure 9.1
From description to attitude



Note. Diagram created for this book. The step from fact to descriptive qualification compares with a standard; the step to attitude adds the valence.

Two things remain in the transformation, and one changes. What remains is the object (presentations) and the dimension the sentence started from (duration). What changes is what the sentence does: from saying what the object is like on a dimension to saying on which side of favorable and unfavorable it falls. The same description, in fact, supports both attitudes; that is why it settles neither.

TEST YOURSELF

Transform "the room is spacious" into two attitudes of opposite valences.

ANSWER: for example, "spacious rooms are comfortable" (positive) and "spacious rooms are impersonal" (negative). Any pair that keeps the object and adds words of opposite valences is acceptable.

9.4 Borderline cases

Some words carry valence by convention and make the boundary hard to draw. "Late," "packed," "noisy," and "spacious" usually describe and, at the same time, suggest a side. In these cases, the rule from Chapter 3

applies: what decides is whether the speaker takes a position, and this is read from the topography, the form the evaluation takes (Chapter 6), from the structure of the sentence (Chapter 7), and from the situation in which it appears (Chapter 8).

EXAMPLE

"The restaurant is packed." Said by the owner, at a quarterly review meeting, with a smile: the position is favorable (business is good). Said by a hungry customer, at the door, looking at the clock: the position is unfavorable (there will be a wait). Said by a waiter to a coworker, in a neutral voice, while passing on the table list: it probably describes. The same sentence, three decisions. Record the situation and the decision.

In comics, the same thing happens with "normal." In the left panel of Figure 9.2, Camila waits to be seen and thinks: "I still hope to be called by the normal psychologist." On its own, "normal" only says that the psychologist's manner is within a standard, a descriptive qualification of conformity. In Camila's balloon, however, the word comes with "I hope," and she takes sides: that is the psychologist she prefers. In the right panel, the receptionist says: "Ms. Camila, Isabela is waiting for you!" There is only information there, with no evaluated object and no position.

Figure 9.2
A word that describes and takes sides, and a call that only informs



Note. Panels from a comic strip in the series of comics studies carried out by undergraduates and published by Instituto Walden4 (Section 1.5) and analyzed in Chapter 34; source and page in the Figure Credits. The reproduction has the resolution of the source material.

TEST YOURSELF

"The project is behind schedule" appears in a progress report, in a neutral tone, and in a meeting, in an irritated tone. In which of them is it an attitude?

ANSWER: in the meeting, in an irritated tone, the sentence probably takes a position (unfavorable); in the report, it describes the state of the project. The decision depends on the situation and should be recorded with it.

9.5 Questionnaire items

The criterion has a direct application for those who build instruments. An item that asks about conformity with a standard may be measuring description rather than attitude.

Consider "public transportation in my city is efficient." Someone who agrees may be saying that the buses run on schedule and cover the city (a descriptive qualification of conformity) or that they like the system (an attitude). The item is ambiguous, and the answer, "agree," does not say which. Two items solve the problem, because each asks for one thing: "the bus line I use comes every fifteen minutes" asks for a description, which can be checked; "how do you rate public transportation in your city? (from very bad to very good)" asks for a position.

As a rule, to measure attitude the item needs to ask for a position ("good or bad," "like or dislike," "for or against"), not only for conformity with a standard. If the goal is to know whether public transportation runs on schedule, the description is what matters, and it is measured with operational data, not with opinion.

TEST YOURSELF

Does the item "public transportation in my city is efficient" measure attitude? How can it be made into an attitude item?

ANSWER: Not necessarily: someone who agrees may be describing (the buses run on schedule) or evaluating (they like the system), and "agree" does not say which. To measure attitude, the item needs to ask for a position, for example, "how do you rate public transportation in your city? (from very bad to very good)."

9.6 The fleeting evaluation and recurrence

One question remains, left open since the definition of attitude in Chapter 2 (an evaluation directed at an identifiable object, with positive, negative, or neutral valence) and promised by Chapter 3 for this chapter: does a fleeting evaluation count? "What unbearable heat!" has an object and negative valence: by the minimal definition, it is an attitude. But what interests researchers is usually something that repeats: the same person evaluating the same object in the same way on different occasions.

KEY CONCEPT

Recurrence is the repetition of the same evaluation (same object, same valence) by the same person on different occasions. One occasion is a datum; recurrence is a pattern.

EXAMPLE

(Hypothetical case.) In March, April, and May, in different meetings, Tiago says that "team meetings are a waste of time." It is the same evaluation, of the same object, repeated on different occasions: recurrence.

NON-EXAMPLE

In a single meeting, Tiago says four times that "this is a waste of time." These are four sentences on the same occasion, not recurrence: four times in the same conversation say less than four times across different weeks and places.

Three decisions follow from this. One occasion is enough for the minimal definition: the heat was evaluated unfavorably. To speak of a pattern, several occasions are needed, preferably in varied contexts, that is, in situations that differ in where, with whom, after what, and with what at stake (Chapter 8), as Tiago's non-example showed. And the pattern is not a "disposition" stored inside the person: what is observed are occasions, and the regularity among them is what is described. Why an evaluation repeats is a question for Chapter 12.

TEST YOURSELF

Júlia once said, "I really can't be bothered with this meeting." Can we say she has a negative attitude toward meetings?

ANSWER: she evaluated that meeting unfavorably, on that occasion, and that is an attitude by the minimal definition. Speaking of a pattern requires other occasions on which she evaluates meetings the same way.

Common learner mistakes

1 **Taking every word that sounds evaluative as an attitude.** "Tall," "narrow," and "correct" look evaluative and only describe. The mistake happens because, in ordinary speech, "evaluating" covers both things. *How to spot the mistake:* you recorded "attitude" for a sentence without being able to say whether the speaker is for or against.

2 **Deciding by the emotion the sentence seems to express.** Attitude is position, not emotion: "I consider the plan inadequate" is an attitude stated coolly. The mistake happens because the evaluations we notice most in everyday life are those said with emotion. *How to spot the mistake:* you justified the classification with "he seemed irritated" or "she spoke without emotion."

3 **Deciding by the word, without the situation.** "Packed" and "late" change valence with the speaker and the situation. The mistake happens because the word seems to carry the valence by itself. *How to spot the mistake:* you classified the sentence without recording who said it or where.

4 **Concluding a pattern from one occasion.** An evaluation said once is an attitude by the minimal definition, not a pattern. The mistake happens because a striking sentence seems to say who the person is. *How to spot the mistake:* you wrote "he is against meetings" based on one sentence.

SUMMARY

Descriptive and attitude (objective 1). The descriptive qualification places the object on a dimension, against a standard, or in a category; the attitude places it between favorable and unfavorable. The agreement test separates the two: someone who agrees with the description can still disagree about liking it.

Families (objective 2). Descriptive qualifications fall into sensory, dimensional, conformity, state, and type. The same description supports attitudes of opposite valences.

Transformation (objective 3). Adding a valence word turns the description into an attitude. The object and the dimension remain, and the sentence shifts from saying what the object is like to saying on which side, between favorable and unfavorable, the speaker places it.

Questionnaires (objective 4). To measure attitude, the item needs to ask for a position, not only for conformity with a standard. Ambiguous items mix description and attitude, and the result does not allow them to be separated.

Recurrence (objective 5). One occasion is an attitude by the minimal definition and is a datum. A pattern requires several occasions, in varied contexts, and it is not a disposition stored inside the person.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. Classify each sentence as a description of fact, a descriptive qualification, or an attitude: (a) “The building is 40 meters high.” (b) “The building is tall.” (c) “Tall buildings are oppressive.” (d) “The room is empty.” (e) “I like short meetings.”
2. Which family of descriptive qualification does each sentence belong to? (i) “The wall is white.” (ii) “The process is slow.” (iii) “The answer is correct.” (iv) “The coffee is cold.” (v) “The system is automated.”
3. Transform “the hallway is narrow” into two attitudes of opposite valences. Say what remains and what changes.
4. Two coworkers agree that the presentation was long. One says it was comprehensive; the other, that it was tedious. What does this show?

a. One of them describes the duration incorrectly.

b. There is agreement about the description and a difference in position between favorable and unfavorable.

c. They disagree about the duration.

d. Neither of them expresses an attitude.

5. Classify each questionnaire item and say which ones measure attitude: (a) "The bus line comes every fifteen minutes." (b) "Public transportation in my city is efficient." (c) "I like public transportation in my city." Rewrite item (b) so that it measures attitude.

6. "The restaurant is packed." Explain, with two situations, why this sentence can be an attitude or a description.

7. Apply the three questions from Chapter 3 (is there an identifiable object? does the speaker take a position? what is the valence?) to "what unbearable heat!" and say what can and cannot be concluded about the person who said it.

8. Tom said unfavorable things about remote work on four occasions: in a meeting, at a coffee shop, in an e-mail, and in an interview. What can be said? And what could be said if it had happened only once?

9. "I consider the plan inadequate," said calmly, and "this hallway is narrow!", shouted. Which is an attitude? Justify without using emotion as a criterion.

10. Explain in two sentences why "not every evaluation is an attitude," without using the words "emotion" or "feeling."

ANNOTATED ANSWER KEY

1. (a) description of fact (checked with a tape measure); (b) descriptive qualification (dimension: height); (c) attitude (negative: "oppressive"); (d) descriptive qualification (state); (e) attitude (positive: "I like").

2. (i) sensory; (ii) dimensional; (iii) conformity; (iv) state; (v) type.

3. Sample answer: "Narrow hallways are cozy." (positive) and "Narrow hallways are claustrophobic." (negative). What remains is the object (hallways) and the dimension (width); what changes is the valence word and, with it, the speaker's position.

4. b. "Long" is a descriptive qualification, on which both agree; "comprehensive" and "tedious" add opposite valences. Option **a** assumes an error that does not exist; **c** reverses what the item says (they agree); **d** ignores the two attitudes (common mistake 1).

5. (a) description of fact (does not measure attitude); (b) ambiguous: it may be a descriptive qualification of conformity or an attitude (it is not a reliable item for measuring attitude); (c) attitude (it measures). Rewrite of (b): "How do you

rate public transportation in your city? (from very bad to very good)" or "I like public transportation in my city (from strongly disagree to strongly agree)." It is correct if the item asks for a position.

6. Sample answer: said by the owner, smiling, at a quarterly review meeting, it takes a favorable position (attitude); said by a hungry customer looking at the clock, it takes an unfavorable position (attitude); said by a waiter in a neutral voice while passing on the table list, it describes. The valence is not in the word but in the situation (common mistake 3).

7. (1) There is an identifiable object: the heat. (2) The speaker takes a position: "unbearable" is unfavorable. (3) Negative valence. By the minimal definition, it is an attitude. You cannot conclude, from one sentence, that the person always evaluates heat this way or "is against heat": it is one occasion (common mistake 4).

8. On the four occasions, in varied contexts, there is recurrence: a pattern of unfavorable evaluations of the same object, which can be described. Had it happened only once, there would be one occasion: an attitude by the minimal definition, and insufficient data to speak of a pattern.

9. "I consider the plan inadequate" is an attitude (object: the plan; negative valence), even when said calmly. "This hallway is narrow!" describes; the shouting may indicate an unfavorable position (this is topography, the form the evaluation takes, from Chapter 6), and then it is a borderline case: it is decided by the situation, and the decision is recorded (common mistake 2).

10. Model answer: "In ordinary language, 'evaluating' includes placing an object on a dimension, such as height or width, and that only describes. Attitude requires a position between favorable and unfavorable." Any answer that brings in valence and does without emotion is acceptable.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? You have completed Part I and are ready for Chapter 10, which begins the behavioral perspective. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 4, 9, 10	9.1 (descriptive qualification and attitude) and the agreement test
2	9.2 (the five families) and Table 9.1
3	9.3 (from description to attitude) and Figure 9.1
5	9.5 (questionnaire items)
6	9.4 (borderline cases)

If you missed exercise	Review
7, 8	9.6 (the fleeting evaluation and recurrence)

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PART II

II

The Behavioral Perspective

How behavior analysis explains them

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CHAPTER

10 Attitude Is a Natural Phenomenon

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** phenomenon and natural phenomenon and **give** an example of each.
2. **Distinguish** a phenomenon from a thing using the questions "when?" and "where?", and **recognize** the sentence that treats an event as if it were a thing stored inside the person.
3. **Explain** what the adjective "natural" distinguishes and what it does not mean (innate, inevitable, acceptable).
4. **Apply** the four criteria (observable, measurable, delimited, and replicable) to an event and **rewrite** a description that fails any of them.
5. **Justify** why studying attitudes as natural phenomena changes the research question and the record that is made.

PREREQUISITES

Chapters 1 to 9, especially the definition of attitude as the evaluation of an object (Chapter 2), the two ways of looking at an attitude (Figure 1.2), and the context observation form (Table 8.2). No behavior-analytic terms are needed: the few the chapter requires are defined here.

OPENING

Monday, advising meeting. You present your project: you want to study the attitude of the teachers at your school toward the new grading system. Your advisor listens to the end and asks:

"And what, exactly, are you going to observe?"

"The teachers' attitude," you answer.

"Show me one. When and where did it happen?"

The question is disconcerting, and for a common reason. Everyday language talks about attitudes as if they were things: "he has a negative attitude," "her attitude changed," "this reveals the group's attitude." People who talk this way rarely ask themselves what, in fact, could be pointed to. This chapter teaches you how to answer your advisor: not with a new theory of attitudes, but with a way of pointing to them, as events in the world that are observed, measured, and studied like any other natural phenomenon.

10.1 Phenomenon: what happens

A heavy rain at 3 p.m., the wind shaking the leaves, a person smiling, someone saying "I love to travel": they all *happen*. They have a beginning and an end, and they can be seen or heard, directly or with the help of instruments, such as a rain gauge or a recorder.

KEY CONCEPT

A **phenomenon** is something that happens: an event, with a beginning and an end, that can be observed, directly or with the help of instruments.

What is not a phenomenon in this sense is a **thing**, which exists and endures: the chair, the table, the cell phone. The chair is a thing; sitting in it is a phenomenon. A practical test separates the two: asking *when* and asking *where*.

For events, the natural question is "when?": "When did it rain?" "Yesterday afternoon." For things, it is "where?": "Where is the chair?" "In the corner of the room." Swap the questions and the oddness shows: "Where is the rain?", "When did the chair happen?" The test is not foolproof (rain falls somewhere, and the chair was made on some day), but it usually gives away when an event is being treated as a thing.

Apply it to an attitude. "Where is Paulo's attitude toward open-book exams?" The answer that usually comes is "in his head," and an answer like that does not say where to look. By contrast, "when did Paulo's attitude happen?" has an answer that anyone can check.

EXAMPLE

Thursday, 2:20 p.m., room 305. During the discussion of the reading, Paulo tells the class: "Open-book exams are fairer." The event has a date, a place, and an audience. Two classmates who heard him agree that it occurred, and the professor could write it down.

NON-EXAMPLE

"Paulo said that because he has, stored away, a favorable attitude toward open-book exams." Here the attitude has become a thing that Paulo carries and that produces the sentence. The question "when?" does not apply to it, and the only evidence that it exists is the very sentence it was supposed to explain.

Saying that "Paulo has a favorable attitude toward open-book exams" is not forbidden: as a summary, it may be true (on the various occasions when the subject came up, he evaluated them favorably; this is the recurrence of Chapter 9). The problem begins when the summary becomes an explanation. We will call this step **reifying**: treating an event, or the summary of several, as if it were a thing stored inside the person.

And when Paulo is not talking about exams, does the attitude stop existing? This is the objection Chapter 1 left open, and the answer is built in Chapters 12 and 13. The first part is this: for an event to occur again, nothing needs to be stored away waiting for it. Between one rain and the next there is no "stored rain" in the sky; there are conditions that, when they come together, produce rain. In Paulo's case, part of them is the situation he is in; another part is what he has lived through up to that point.

TEST YOURSELF

Classify each item as a phenomenon or a thing and say which question ("when?" or "where?") helped: (a) the table in the meeting room; (b) yesterday's meeting; (c) the sentence "this system is torture," said by Letícia at lunch.

ANSWER: (a) thing: "where is it?" has an answer (in the meeting room). (b) phenomenon: "when was it?" has an answer (yesterday). (c) phenomenon: said at lunch, the sentence is an event, with a time and a place.

10.2 What the adjective “natural” adds

If every phenomenon is already something that happens, why say “*natural* phenomenon”? Is it redundant? The answer has two parts: what the adjective is opposed to and what it does not say.

KEY CONCEPT

A **natural phenomenon** is an event in the world that can be observed and measured and whose conditions are also events in the world, so that they can be studied and put to the test.

The first contrast is with the supernatural: explaining an event by forces or beings that, by definition, no one can observe or put to the test, such as fate, the evil eye, or a spirit. This is not a judgment about those who believe in such things; it is a boundary of method, because only what observation, measurement, and testing can reach can be studied with them.

The second point is how this adjective relates to the others that attach to “phenomenon”: meteorological, behavioral, social, cultural. Is “natural” on that list? Table 10.1 shows that it is not.

Table 10.1

What each adjective says about an event

Adjective	What it says	Example
meteorological	which part of the world it belongs to: the atmosphere	a heavy rain at 3 p.m.
behavioral	what kind it is: something an organism does	Paulo says “open-book exams are fairer”
social	that it takes place between people	two friends agree on a time to meet
cultural	that a group maintains and passes it on	the way a community greets people
natural	does not say what kind it is; it says *how we treat it*: as an event in the world, open to observation, measurement, and testing	any of the above

Note. Table created for this book. The first four adjectives classify the event; “natural” describes the stance of whoever studies it. Chapter 11 defines “behavioral.”

Hence the answer to the opening question. The adjective is not redundant, because it marks a stance; and it does not create a new category of events, because it does not compete with the others. Paulo's sentence is behavioral (something he does), social (it occurs in front of other people), and natural (it can be observed, measured, and put to the test), all at the same time.

This stance rejects the idea that human events, because they are social or cultural, lie beyond the reach of observation, measurement, and testing. The idea has its defenders, and the dispute belongs to psychology itself. Gergen (1985, as cited in Guerin, 1992, p. 1424) assumed a discontinuity between psychological processes and processes of social construction. On this reading, the study of these processes would be related not to the natural sciences but to "interpretive disciplines," whose task is to give an account of the systems of meaning that humans build. Guerin (1992) replies that his principles "are based in natural science and there is no need for an artificial distinction between nature and human society" (p. 1429), and that it can be shown that the study of society is grounded in the natural sciences without losing what is distinctive about it (p. 1430). This is the stance adopted here for attitudes.

⚠ CAUTION

In ordinary language, "natural" has other meanings, and none of them is this chapter's. **It is not "innate":** attitudes are not something one is born with; they are learned, through direct experience, by observing other people, and through what one hears from them (Chapter 4). **It is not "inevitable":** "it is natural for people to be prejudiced" treats prejudice as destiny, whereas a natural phenomenon, here, depends on conditions, so it can change when they change. **It is not "acceptable":** studying prejudice as a natural phenomenon is not approving of it, as Chapter 1 already warned. **It is not "nonsocial":** evaluating in front of other people, and having learned to evaluate from them, is natural and social.

✓ TEST YOURSELF

A friend says: "Prejudice is natural: it has always existed and always will." Which sense of "natural" is she using, and what would the chapter say?

ANSWER: she uses "natural" to mean "inevitable." In the chapter's sense, prejudice is an event that depends on conditions, and what depends on conditions can change when they change. This does not promise that it will be easy, but it removes the label of destiny from prejudice.

10.3 Four criteria for studying an event

Calling an event natural is a stance. What is missing is a way to check whether a concrete event can, in fact, be studied that way. Four working criteria are used here. They are not an official list of science: they are a tool for the beginning researcher to check whether what they have in hand is something they can study.

KEY CONCEPT

An event can be studied as a natural phenomenon when it is **observable** (someone other than the person who produces it, or an instrument, can record it), **measurable** (some aspect of it can be given a number), **delimited** (it is possible to say when and where it occurred and in front of whom), and **replicable** (the conditions under which it occurred can be described and re-created, and events of the same kind occur again when those conditions recur).

Observable. Observing is not only seeing: it is hearing, reading, filming, recording. What matters is that another person, or an instrument, can record that the event occurred, and that two observers agree. What only the person herself perceives, such as thoughts and sensations, is left for Chapter 11; for now, what serves as data are records that others can check.

Measurable. Some aspect of the event can be counted, timed, or rated: how many times someone evaluates the topic in a week, how long it takes to answer, what valence and intensity (Chapters 2 and 4) the evaluation has on a scale from 1 to 7. Chapters 22 to 24 systematize what is measured and with which instruments. Here it is enough to establish one idea: to measure is to assign a number to *an aspect of the event*, not to something stored inside the person.

Delimited. The event has a beginning, an end, and a place: it is possible to say when and where it occurred, and in front of whom (the observation form from Chapter 8, in Table 8.2, asks for exactly this: the place, who was listening, what came before, and what was at stake). Sentences with "always," "never," or "by nature" often hide an event that no one has delimited.

Replicable. Each occurrence is unique: Paulo's sentence, on Thursday at 2:20 p.m., does not repeat. What can repeat is the *kind* of event: evaluating the exam format in front of a class. Replicable means that the con-

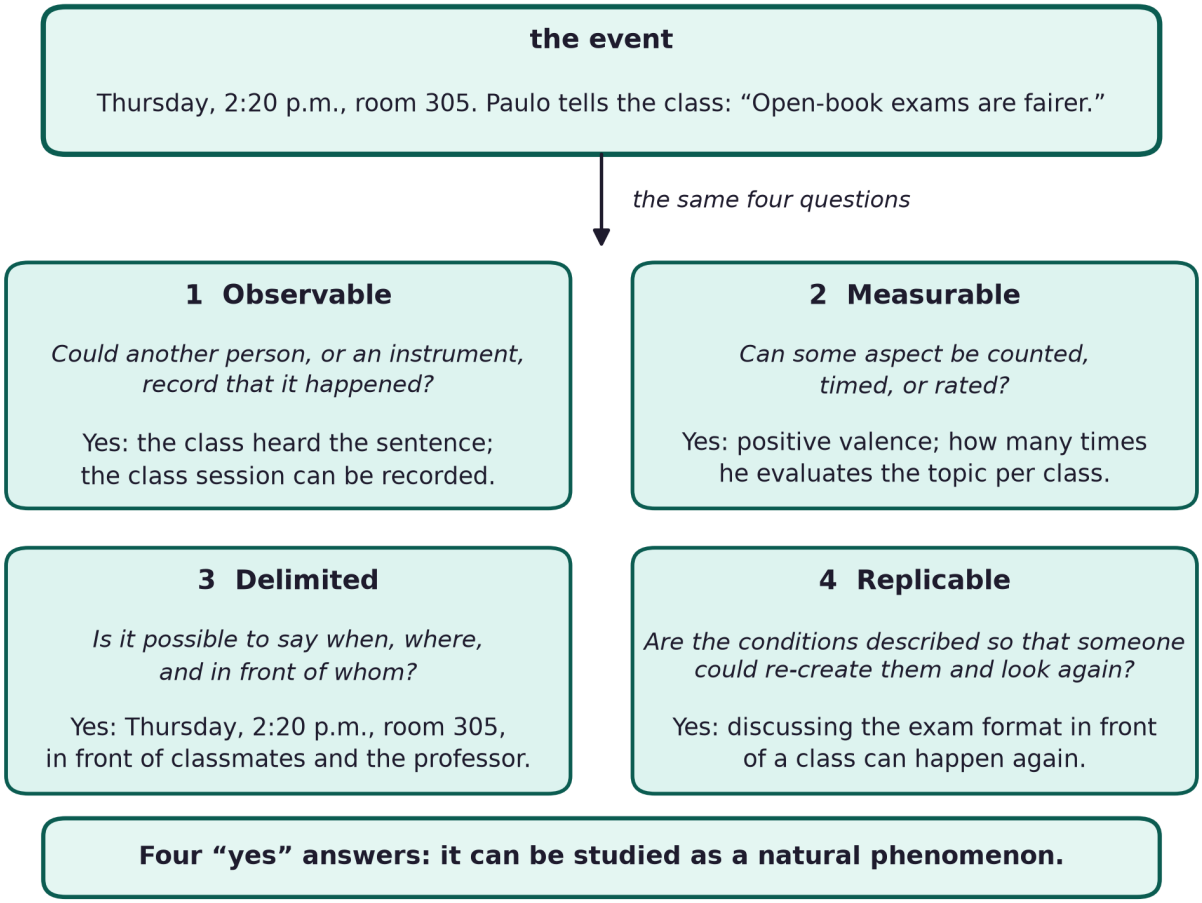
ditions are described in such a way that someone can re-create them and look again: with Paulo in another week, with other people in another class, or by another researcher at another school. This is what allows someone who did not see the event to check what was said about it.

The line of research from which this book's comic scenes come gives an example: the same single-subject design, with pretest and posttest, was used in 19 studies, with 83 participants, collected in the first three books of the series (Moreira, Lemos et al., 2024, pp. 13 and 18). Replicable does not mean identical or predictable in every detail. Catania (1999, p. 26) observes that, in this respect, the situation differs only in degree from that of other sciences. The principles of aerodynamics do not stop holding because no one explains every turn and swerve in the fall of one particular leaf; likewise, the principles of behavior do not stop holding if one cannot explain every detail of an organism's performance on one particular occasion.

Figure 10.1 applies the four questions to the event in room 305, which passes all four. Table 10.2 shows how each one typically fails and how to correct the description.

Figure 10.1

Four questions applied to the same event



Note. Diagram created for this book. The event is an illustration, a case invented for the example.

Table 10.2

The four questions, the typical failure of each, and the correction

Criterion	Typical failure	How to correct it
Observable	“Deep down, he’s against it, but he never shows it.”	Replace the interpretation with what he said or did and someone recorded.
Measurable	“There’s a dissatisfaction hanging over the team.”	Say what would be counted: complaints per week, ratings in a survey.
Delimited	“He’s always been in favor.”	Give the date, place, and audience of each occurrence.
Replicable	“There was a vibe and he spoke up.”	Describe the situation: who was there, what was asked, what was at stake.

Note. Table created for this book. The sentences in the second column are illustrations; the test questions are in Figure 10.1.

TEST YOURSELF

A report says: "The class has a very negative attitude toward reading." Write a record that makes this sentence observable, measurable, and delimited.

ANSWER: for example, "In the class on March 12, at 8:40 a.m., in room 5, 9 of the 24 students said 'how boring' when the teacher handed out the text." It is observable (the teacher and a colleague wrote it down), measurable (9 of 24), and delimited (date, time, room). Other answers are acceptable, as long as they include the three elements.

10.4 What changes for the researcher

The definition in Chapter 1 already said that attitude is an evaluation that someone *makes*, and "make" is a verb for events. Before seeing what this stance changes, it is worth placing it, because social psychology itself does not speak with a single voice about what an attitude is. Bohner and Dickel (2011, p. 392) note that the definitions collected in a special issue of the journal *Social Cognition* diverge as to whether they treat an attitude as a lasting entity kept in memory or as a passing judgment, assembled at the time out of whatever information is available. Conrey and Smith (2007, p. 718, as cited in Bohner & Dickel, 2011, p. 393), in a view that Bohner and Dickel classify as radical construction, say that attitudes are "time-dependent states of the system" rather than static "things" "stored" in memory. The idea that attitude is not a stored thing, therefore, is not foreign to the field.

What is done here is to start from another point: the phenomenon is what the person says and does, which is what can be recorded, and the explanation is sought in the conditions under which this occurs. It is not a discovery; it is a decision of method, and it has four practical consequences.

The question changes. "What is the teachers' attitude toward the new grading system?" looks for something they have. "In what situations, how many times, and with what valence and intensity do the teachers evaluate the new grading system?" looks for events and the conditions under which they occur. This is the question the advisor in the opening was asking for.

The record changes. Instead of a label ("negative attitude"), the record brings the occurrence with its context: who evaluated, what about, when, where, in front of whom: these are the fields of the observation form from Chapter 8 (Table 8.2).

Change becomes thinkable. If the event depends on conditions, the conditions can be altered, and with them what happens. Nothing in this promises ease; it only removes the idea that "it has always been this way."

The methods of science come to apply. Systematic observation, measurement, and experimentation, procedures that Part IV shows in use, apply to events: what is recorded and measured is what the person says and does, and it is on the conditions under which this occurs that one can intervene.

One question is deliberately left open: what *kind* of event is this? What Paulo said is something he did. Chapter 11 defines behavior and shows that it also includes what only the person herself perceives.

TEST YOURSELF

Rewrite the question "What is the students' attitude toward the new class schedule?" so that it looks for events and the conditions under which they occur.

ANSWER: For example: "In what situations, how many times, and with what valence and intensity do the students evaluate the new class schedule?" The question stops looking for something they have and starts looking for what they do and the conditions under which they do it.

Common learner mistakes

1 **Reading "natural" as "innate" or "instinctive."** In this chapter, "natural" means open to observation, measurement, and testing, and this is compatible with being learned. The mistake happens because, in common usage, "natural" is what comes from birth. *How to spot the mistake:* you think "if it's natural, people are born that way" or "so it can't be taught."

2 **Reading "natural" as "inevitable" or "acceptable."** A natural phenomenon depends on conditions, and so it can change; studying it is not approving of it. The mistake happens because "it's natural" often closes discussions in everyday life. *How to spot the mistake:* you write "it is natural for people to be prejudiced" as if the sentence settled the matter, or you fear that studying prejudice is excusing it.

3 **Asking "where is the attitude?" and accepting "inside the person" as an answer.** "Where?" is the question for things; for an event, the question is "when and where did it occur?" The mistake happens because the language talks about attitudes with verbs of possession, such as "have" and "hold." *How to spot the mistake:* your text says that the attitude "is," "resides," or "hides" in someone, and it does not say when it occurred.

4 **Taking an interpretation for an observation.** What someone else can check is what the person said or did, not what is assumed about her. The mistake happens because we interpret on the spot, without noticing. *How to spot the mistake:* your record says "she was insecure" or "he was hypocritical" without saying what the person did or said (this is the procedure from Chapter 6: first describe what the person did, without interpreting, then situate it, and only then assign object and valence).

5 **Requiring the event to repeat identically for it to be "replicable."** The mistake happens because "replicate," in ordinary speech, suggests an exact copy. *How to spot the mistake:* you discard a finding because "the person didn't say exactly the same thing." What repeats is the kind of event, under similar conditions.

SUMMARY

Phenomenon and natural phenomenon (objective 1). A phenomenon is something that happens, with a beginning and an end, and that can be observed. A natural phenomenon is an event in the world that can be observed and measured and whose conditions are also events in the world.

Phenomenon and thing (objective 2). Events answer to "when?", things answer to "where?" When attitude is described as something the person "has" and "holds," it has been reified: the summary of several occurrences has come to be taken as their cause.

The adjective (objective 3). "Natural" does not classify the event alongside "social" or "cultural": it marks how we treat it. It is opposed to the supernatural and does not mean innate, inevitable, or acceptable.

The four criteria (objective 4). To be studied as a natural phenomenon, the event needs to be observable, measurable, delimited, and replicable. The four questions serve to test the description of any attitude and indicate how to rewrite it.

The research question (objective 5). Treating attitudes as natural phenomena replaces "what does the person have?" with "under what conditions does she evaluate this way?", changes the record (occurrences with context), makes change thinkable, and opens the way to applying the methods of observation, measurement, and experimentation.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. Which option contains a phenomenon, in the chapter's sense?

a. The painting hanging in the meeting room.

b. The sentence "this boss is unfair," said by Rui to a coworker on the way out of work, at 6 p.m.

c. The opinion Rui holds about his boss.

d. Rui's desk.

2. Mark P (phenomenon) or T (thing): (i) Marta's cell phone; (ii) Marta voting in the app at 10 a.m.; (iii) room 305; (iv) Thursday's class in room 305. Then give your own example of a phenomenon and of a thing.

3. A classmate asks: "Where is Júlia's attitude toward the driving-restriction scheme?" and answers: "In her head." According to the chapter, what does this show?

a. That the attitude is not observable and therefore cannot be studied.

b. That the attitude is being treated as a stored thing, and that the more useful question would be "when and where did it occur?"

c. That the attitude is a thing and is therefore measurable.

d. That the question is well formulated and that science should look for the answer inside the person.

4. A classmate says: "If attitude is a natural phenomenon, then we're born with our attitudes." Explain, in two or three sentences, her mistake and in what sense the chapter uses "natural."

5. In which sentence does "natural" have this chapter's meaning?

a. "It is natural for a baby to be wary of strangers: it's instinct."

b. "I prefer natural juice, without preservatives."

c. "Treating someone's evaluation of a movie as a natural phenomenon is treating it as an event that can be observed, measured, and studied."

d. "In the interview, he was very natural."

6. For each sentence from a report, say which criterion it most obviously fails to meet (observable, measurable, delimited, or replicable): (i) "Carla, who has never said or done anything about it, disapproves of the new rule." (ii) "A general discouragement reigns among the employees." (iii) "The students have never liked to read." (iv) "It was one of those days when he decides to speak up."

7. Rewrite "The residents of the neighborhood have a settled opinion about the mayor" so that it meets the four criteria. Make up the data, but say where they would come from.

8. Apply the four criteria to the event below and justify each answer: "On March 12, at 3 p.m., in line at the bank, Ms. Neusa said to her neighbor: 'This bank just makes our lives harder.'"

9. An advisee proposes the question: "What is the teachers' attitude toward the new grading system?" Rewrite it so that it treats attitude as a natural phenomenon and say what she will then record.

10. A manager says: "The team has a negative attitude toward the change. That's why they complain in meetings." (a) What is circular about this explanation? (b) Rewrite the manager's observation so that it looks for conditions, not for a stored thing.

ANNOTATED ANSWER KEY

1. b. The sentence has a time and a place: "when was it?" has an answer, and another person can check it. Options **a** and **d** are things: we ask where they are. Option **c** describes the opinion as something Rui holds, a thing inside him, with no time or place to check; this is the reification from Section 10.1.

2. (i) T; (ii) P; (iii) T; (iv) P. For (i) and (iii), the question that has an answer is "where is it?"; for (ii) and (iv), "when was it?" Your own examples are yours: check each one with "when?" and "where?"

3. b. "Where is it?" is the question for a thing; for an event, the question is "when and where did it occur?" Option **a** concludes, without reason, that the attitude cannot be studied: what Júlia says and does about the driving-restriction scheme can be observed. Option **c** does not hold up: what makes an attitude measurable is not being a thing, but having aspects that can be counted, timed, or rated (Section 10.3). Option **d** accepts the question and settles for an answer that no one can check.

4. Model answer: "She read 'natural' as 'innate.' In the chapter, 'natural' means that the event can be observed, measured, and put to the test, and that its conditions are also events in the world. This is compatible with being learned, and attitudes are learned." It is good if it identifies the "innate" reading and gives the chapter's sense.

5. c. In (a), "natural" means "innate"; in (b), "without preservatives"; in (d), "spontaneous." Only in (c) does the term mean treating the evaluation as an event that is observed, measured, and studied.

6. (i) **Observable:** nothing Carla said or did was recorded. (ii) **Measurable:** it indicates nothing that could be counted, timed, or rated. (iii) **Delimited:** when? where? in front of whom? (iv) **Replicable:** "one of those days" does not describe conditions that someone could re-create. Some sentences fail more than one criterion ((ii) is not delimited either); any criterion that fails is acceptable, as long as it is justified.

7. Model answer: "In the poll of March 3 to 7, conducted by two interviewers in the main square, 62 of the 100 residents approached rated the mayor as 'bad' or 'terrible' on a five-point scale. The same poll, with the same questions, can be administered in another neighborhood." It is good if it has who, when, and where (delimited), a number (measurable), a record that someone else can check (observable), and described conditions (replicable). The data are made up: they serve as an illustration.

8. *Observable:* yes, the neighbor heard it and the remark could have been recorded. *Measurable:* yes; the valence is negative, the intensity is high ("just makes our lives harder"), and one could count how many times she talks about the bank in a week. *Delimited:* yes (March 12, 3 p.m., in line at the bank, in front of her neighbor). *Replicable:* yes, in the chapter's sense: evaluating the bank in front of someone, in line, is a kind of event that can occur again. A single occasion is enough for the record; speaking of a pattern requires several (Chapter 9).

9. Model answer: "In what situations (faculty meeting, teachers' lounge, anonymous survey), how many times, and with what valence and intensity do the teachers evaluate the new grading system?" She will then record, for each occurrence, who evaluated, what about, with what valence and intensity, when, where, and in front of whom (Table 8.2). It is good if the question asks for occurrences and conditions, not for what the teachers "have."

10. (a) The "negative attitude" is inferred from the complaints and then used to explain them: its only evidence is what it was meant to explain. (b) Model answer: "In the Monday meetings, when senior management presents new deadlines, three people complain out loud; at lunch, complaining is more frequent; in one-on-one conversations with the manager, no one complains. What is present in the situations in which they complain and absent in the others?" It is good if it describes occurrences with context and ends with a question about conditions.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 11. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2, 3	10.1 (phenomenon and thing) and common mistake 3
4, 5	10.2 (what "natural" adds) and common mistakes 1 and 2
6, 7, 8	10.3 (the four criteria) and common mistakes 4 and 5
9, 10	10.4 (what changes for the researcher) and common mistake 3

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ADVERTISEMENT

CHAPTER

11 Attitude Is Behavior

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** behavior as what an organism does and **recognize** as behavior what involves no visible movement, such as thinking and imagining.
2. **Distinguish** behavior from an internal state and **identify** the sentence that uses a state to explain what the person does.
3. **Classify** a behavior as overt or covert and **explain** how a study reaches what only the person perceives.
4. **Rewrite** "has an attitude" in terms of what the person says and does, and in what situations.
5. **Separate** topography and function in examples of attitude.

PREREQUISITES

Chapter 10 (phenomenon, reifying, and the four criteria), Chapter 6 (topography), and Figure 1.2. New technical terms are defined here.

OPENING

Thursday, study group. You have just summarized the book's proposal: attitude is behavior. A classmate reacts right away:

"So, for you, what a person thinks and feels doesn't count? I can be against something my whole life and never say anything to anyone."

The objection is a good one, and it is common mistake 4 from Chapter 1: understanding "attitude is behavior" as "no one feels or thinks anything." Answering it requires knowing what behavior analysis means by "behavior," a word that, in everyday life, usually means conduct ("behave yourself!", "good behavior") or, at most, what can be seen from the outside. This chapter defines the term, separates what the person does from what she is said to "have," shows where thoughts and feelings come in, and teaches you to rewrite sentences about attitudes in terms of what the person says and does.

11.1 Behavior: what an organism does

KEY CONCEPT

Behavior is "anything an organism does" (Catania, 1999, p. 390).

Catania himself admits that the definition "is very inclusive, but it cannot easily be made much narrower" (p. 390). It includes speaking, writing, smiling, walking away. It also includes what involves no visible movement: shifts in attention, for example, "need not involve eye movement, but they qualify as behavior" (p. 390). It further includes imagining and doing mental arithmetic, which Catania counts among the "so-called cognitive processes" and describes as "varieties of behavior that are not manifested as movements" (p. 390).

EXAMPLE

In five minutes of discussion, Paulo tells the class "open-book exams are fairer," glances away toward the window and turns his attention back to his classmate, and imagines Friday's exam with his notebook open. All three things are behavior: they are what Paulo did.

NON-EXAMPLE

"The meeting was rescheduled," "Paulo is 1.80 m tall," and "Paulo has a favorable attitude, stored somewhere." In the first, Paulo did nothing. The second is a characteristic he has. The third is what Chapter 10 called reifying: treating an event, or the summary of several, as a thing stored inside the person.

A practical test: if the sentence only works with "have" or "be" ("has an attitude," "is favorable"), it usually describes something the person has or is, not something she does. Swap in an action verb ("says," "chooses," "avoids," "imagines") and see whether there is still something to point to.

TEST YOURSELF

Which of the two is behavior: (a) Letícia imagines tomorrow's meeting; (b) the meeting was rescheduled for tomorrow?

ANSWER: (a). Imagining is something Letícia does, even if no one sees it. Option (b) is an event she did not produce.

11.2 What the person is said to "have": the internal state

"Maria has a positive attitude toward exercise" describes a condition. "Maria runs three times a week and speaks well of exercise" describes what she does. The first form is the more common one, and social psychology made it a standard way of talking about attitudes.

KEY CONCEPT

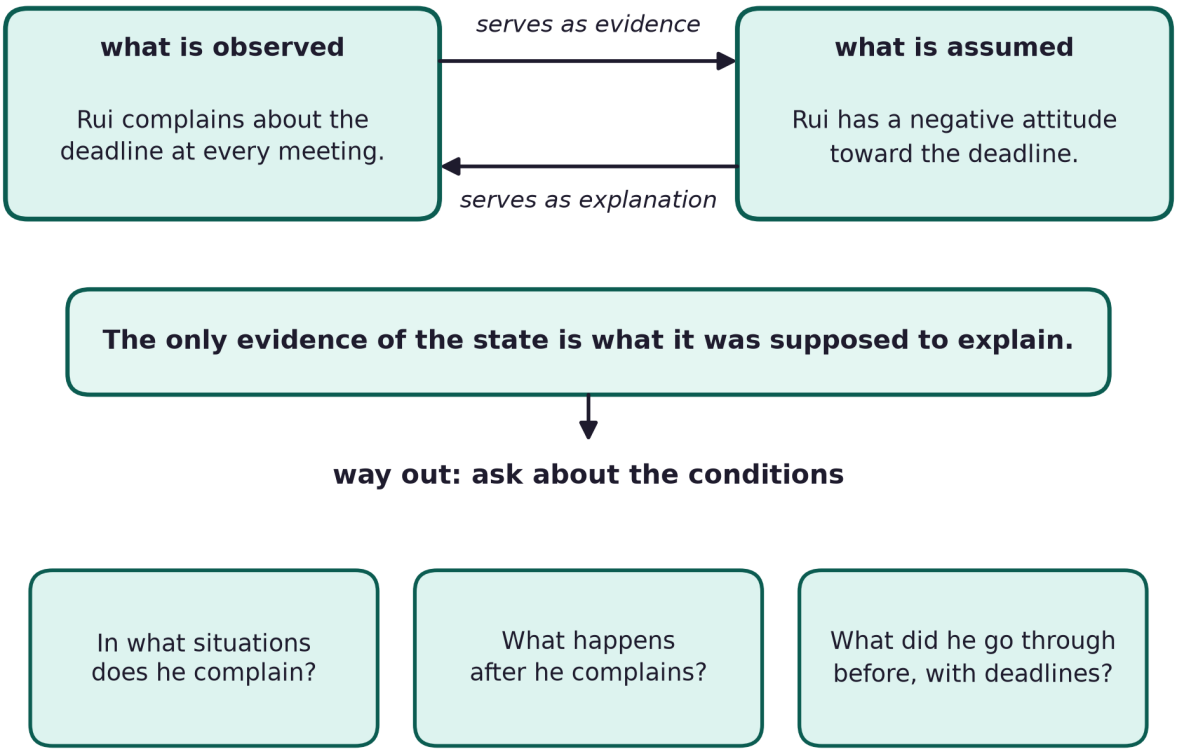
An **internal state** is a condition said to exist inside the person and invoked to explain what she says or does: "having a negative attitude," "being unmotivated," "being afraid."

This was the picture that Guerin (1994, p. 155) described and that Chapter 1 presented: in most of the social psychology literature, attitudes are treated as "an inner source of true knowledge," and attitude statements "merely reveal the state of stored attitudes."

Behavior analysis does not deny that people think and feel. Catania (1999, p. 24) notes that the behaviorist does not question the existence of ideas, feelings, and intuitions; what the behaviorist criticizes is invoking them as the cause of behavior. And he explains why: ideas and feelings are about the world and must therefore originate in our experiences with it. To explain what we do, "we must extend the search to those past experiences or, in other words, to past behavior" (p. 24).

The practical problem appears when the state is the only thing offered as an explanation. Figure 11.1 shows the loop the explanation makes: the state is inferred from what the person does and then used to explain what she does. The way out is to ask about the conditions.

Figure 11.1
Explanation by internal state and the way out



Note. Diagram created for this book. The case is an illustration.

TEST YOURSELF

Which of the two sentences uses an internal state as an explanation? (i) "He avoids the subject because he has an aversion to politics." (ii) "He changes the subject when politics comes up; he did this at three dinners in a row."

ANSWER: (i). "Has an aversion" is invoked to explain the avoiding, and the only evidence is the avoiding itself. Option (ii) describes what he does and in what situations, and it makes clear where to look for the explanation.

11.3 Overt and covert

Catania (1999) divides behavior into two groups, according to the access other people have to it.

KEY CONCEPT

Overt behavior is behavior that "is observed and observable, or that affects the organism's environment" (Catania, 1999, p. 390). **Covert behavior** is behavior that "is not observed or observable and is therefore only inferred," such as "thinking or counting to oneself" (p. 391).

"Not observable," in the definition, means not observable by another person: whoever thinks has access to their own thinking, and that is why they can report it. Catania also uses the pair public and private. Private events, according to Catania, are "accessible only to the speaker" and "have the same physical status as public events" (p. 404): being private does not make them different in nature, only accessible to a single person. Table 11.1 shows the same evaluation by Paulo in both forms.

Table 11.1

Overt and covert behavior in Paulo's evaluations

What Paulo does	Overt or covert	Who can record it	How a study reaches it
Tells the class "open-book exams are fairer"	overt	anyone present, or a recorder	direct observation or recording
Marks 6, on a scale from 1 to 7, for how much he agrees with open-book exams	overt	the researcher	response to the instrument
Thinks "this exam is fair" while his classmate is talking	covert	only Paulo	what he says later, if he says anything
Imagines the exam with his notebook open	covert	only Paulo	what he says later, if he says anything

Note. Table created for this book. The cases are illustrations.

The last two cases enter a study only through what Paulo says or does later. And what he says is, in turn, overt behavior: "a person can describe thoughts or feelings, but such descriptions are still behavior" (Catania, 1999, p. 24). It happens in a context (Chapter 8) and is influenced by it; Guerin (1994, p. 157) writes that "social context biases reported attitudes." A report is not a window into the person. It is something she says, to someone, in a situation.

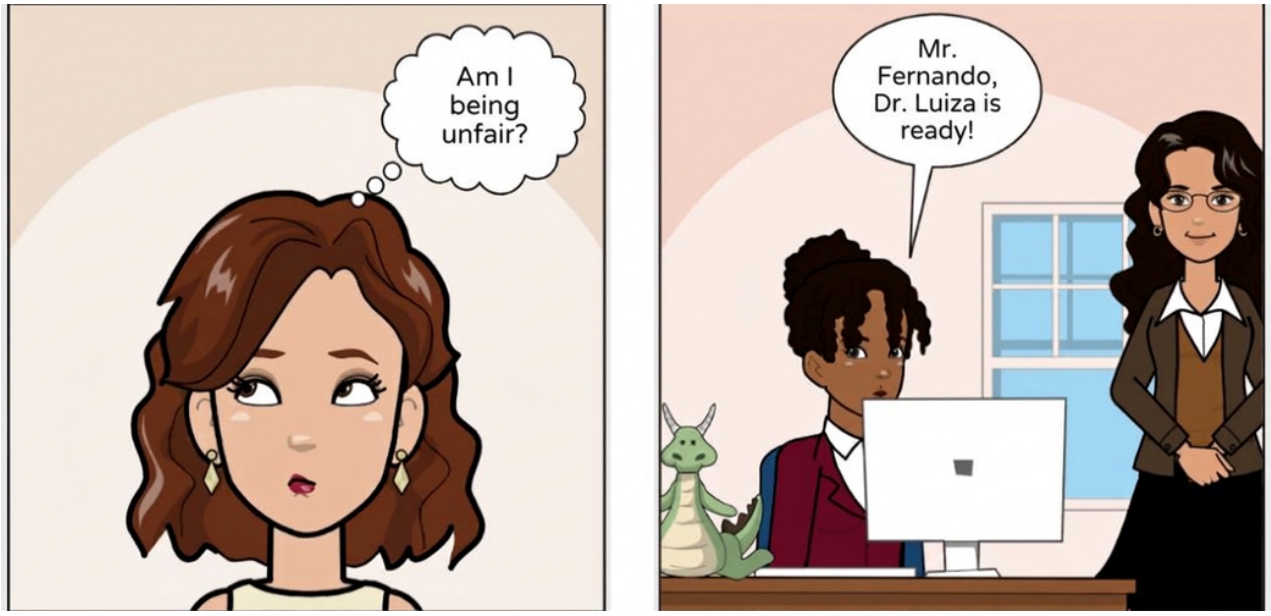
That is why Catania (1999, p. 265) warns, without denying private events, that talking about them can easily lead us away from the public causes of behavior. His example is someone who, on noticing that he is

eating ravenously, says "I must have been very hungry": the person did not report a sensation of hunger; he said about himself what he would say about someone else he saw eating that way.

Go back to the objection from your classmate in the opening: "I can be against something my whole life and never say anything to anyone." Evaluating in silence (thinking "this is absurd" every time the subject comes up) is covert behavior, and it counts. What changes is access: a study reaches it only through what the person says or does. That is why, as long as the person says and does nothing, research has no way to tell silent evaluation from indifference (this is common mistake 3 from Chapter 2: treating silence as neutrality). The book's proposal does not eliminate anyone's private life; it says how researchers can, and cannot, talk about it.

Comics have a convention for showing the covert: the thought balloon. In the stories from the studies that this book's scenes come from, the fictional assistant explains it to the participant: the thought balloon "means that I am thinking" (Moreira, Lemos et al., 2024, p. 118). In Figure 11.2, the receptionist calls the next patient out loud, and anyone in the room can hear: this is overt behavior. Camila's balloon shows what, in real life, only she would have access to, "Am I being unfair?": this is covert behavior, and the reader reaches it because the drawing gives access to it. A study does not have that balloon. It reaches Camila's thought only if she says or does something about it later.

Figure 11.2
Overt and covert behavior in two consecutive panels



Note. Panels 25 and 26 of the psychology clinic story (Moreira, Martins et al., 2024, p. 118). The reproduction has the resolution of the source material.

TEST YOURSELF

Marta thinks "what a good talk" on her way home and says nothing to anyone. Is this behavior? Overt or covert? How would a researcher reach it?

ANSWER: it is behavior (thinking is something she does) and it is covert. The researcher reaches it only if Marta says or writes something about it; that report is overt behavior, given in a context, and should be recorded as such.

11.4 Rewriting "has an attitude"

The rewriting has four steps.

1. Replace "have" or "be" with a verb that says what the person does: evaluates, says, writes, chooses, avoids, recommends. **2. State the object and the form:** about what and in what way (words, gesture, rating). **3. State in what situations:** when, where, in front of whom (Table 8.2). **4. If it is a summary, state on how many occasions and across what variety of situations:** this is the recurrence of Chapter 9.

EXAMPLE

Original: "Maria has a positive attitude toward physical exercise." Rewrite: "Maria runs in the park on Tuesday and Thursday mornings. When the subject comes up at family lunches, she says exercise 'changes your mood' and recommends the gym to anyone who complains of being tired. In the two weeks when she stopped, she told her coworkers that she missed it." Each sentence of the rewrite has an object, a form, and a situation, and can be checked.

The rewrite does not forbid the label. "Maria is in favor of exercise" is still useful as a summary, as long as what the rewrite shows exists behind it. What is avoided is the label on its own, which seems to say a lot and only points to what cannot be checked.

TEST YOURSELF

Rewrite "Júlia has a negative attitude toward the driving-restriction scheme" in two or three sentences.

ANSWER: for example, "When the subject comes up at lunch, Júlia says the driving restriction 'doesn't solve anything' and 'only gets in the way of people who work.' In her apartment building's poll, she marked 'strongly disagree' for the statement 'the driving restriction improves traffic.'" Any answer with action verbs, object, form, and situation is acceptable.

11.5 Topography and function

Chapter 6 defined topography as the form the evaluation takes. Catania (1999, p. 424) defines it in a similar way: "spatial configuration or form of responding." Form, however, does not tell the whole story. The other half asks *to what end* the person does what she does, and it has a name.

KEY CONCEPT

The **function** of a behavior is the relation among the circumstances in which it occurs, what the person does, and what this produces next (Catania, 1999, pp. 25–26).

The next chapters deal with each end of the relation: what happens afterward (Chapter 12) and the situation in which it occurs (Chapter 13). For now, the idea that function cannot be seen in the form is enough. Catania (1999, p. 137) illustrates this with a rat that presses a lever with its left paw, with its right paw, with both, with its snout, or by sitting on

it. The forms are quite different, but all of them count as lever presses because they share a common function: they produce the same consequences. And the reverse also holds: Catania describes self-injurious behaviors in 3 children that were very similar in topography and had completely different functions, which called for different treatments (p. 137).

Table 11.2 applies the distinction to an evaluation.

Table 11.2

Three records of Letícia: form, situation, and what followed

Record	Form	Situation	What followed	Probable function (hypothesis)
A	speech: "this system is torture"	lunch, with coworkers from the team	the coworkers laugh and agree	getting the coworkers' agreement
B	the same words	days later, conversation with the regional manager, who is visiting the store	the manager asks her to detail the problems	bringing the problem to management
C	rolls her eyes	lunch; the system freezes	the coworker next to her laughs	getting the coworkers' agreement

Note. Table created for this book. The cases and functions are hypotheses for illustration: only observation across several occasions would tell what the function of each record actually is.

A and B have the same form and different functions. A and C have different forms and the same function. Anyone who grouped the records by form alone would put A and B together and separate A from C. Grouping by function requires asking about the circumstances and what followed, which is the question that the advisor from the opening of Chapter 10, the one who asked the student to show her an attitude, would ask next: after "when and where?", "and what came before and what came after?"

TEST YOURSELF

Twice, Rui says "this deadline is impossible": the first time to a coworker, who agrees and offers help; the second time to the manager, who extends the deadline. Same form. Same function?

ANSWER: probably not: what followed is different (the coworker's agreement and the change in the deadline). Only observation across several occasions would confirm it.

Common learner mistakes

1 **Understanding "behavior" as "what can be seen" or as "conduct."** In Catania's definition, behavior is anything an organism does, including what involves no visible movement. The mistake happens because, in common usage, "behavior" is conduct or what can be seen from the outside. *How to spot the mistake:* you say that thinking "is not behavior" or that only what the camera films counts.

2 **Concluding that behavior analysis denies thoughts and feelings.** The mistake happens because the criticism of the internal state as a cause is often read as a denial of the state itself. *How to spot the mistake:* you write "for behaviorism, no one feels anything." What is criticized is invoking the state as a cause, not its existence.

3 **Using the internal state as an explanation.** The mistake happens because explanation by state sounds complete and is the everyday kind. *How to spot the mistake:* your sentence has the form "did this because she has a negative attitude," and the only evidence of the state is what it was supposed to explain.

4 **Taking the report as direct access to the inner self.** The report is overt behavior, given to someone in a situation. The mistake happens because the answer seems to speak of what the person has, not of what she did when answering. *How to spot the mistake:* you write "she revealed her true attitude" about a questionnaire answer, without saying who asked, where, and how.

5 **Grouping records by form alone.** The mistake happens because the form is in plain view, while function requires looking at what came before and what came after. *How to spot the mistake:* you conclude "it's the same attitude" because the sentence is the same, or "they are different attitudes" because the forms differ, without looking at the circumstances and what followed.

11

SUMMARY

Behavior (objective 1). Behavior is anything an organism does. It includes what can be seen and what involves no visible movement, such as shifting attention, imagining, and thinking.

Internal state (objective 2). An internal state is a condition said to exist inside the person and invoked to explain what she does. Behavior analysis does not deny that people think and feel; it criticizes the use of the state as a cause, because its only evidence is what it was supposed to explain. The explanation is sought in past experiences and in current situations.

Overt and covert (objective 3). Behavior is overt when others can observe it, and covert when only the person herself perceives it. A study reaches the covert through what the person says or does, and that report is overt behavior, given in a context.

Rewriting (objective 4). "Has an attitude" is rewritten with action verbs, object, form, situation, and, if it is a summary, the number and variety of occasions.

Topography and function (objective 5). Topography is the form; function is the relation among the circumstances, what the person does, and what follows. Different forms can have the same function, and the same form can have different functions.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. Which of the options is behavior, in the chapter's sense?

a. The meeting was rescheduled.

b. Rui is 1.80 m tall.

c. During the meeting, Rui imagined the look on his boss's face when reading the report.

d. Rui's disposition to criticize his boss.

2. Say whether or not each is behavior, and why: (i) Ana shifted her attention from her phone to the speaker; (ii) Ana has brown hair; (iii) Ana's bus was late; (iv) Ana counted in her head how much time was left until the end of class.

3. Which sentence uses an internal state as an explanation?

a. "Luís wrote on the bulletin board three times that the new rule is unfair."

b. "Luís wrote on the bulletin board because he has a negative attitude toward the rule."

c. "After the coordinators ignored the first notice, Luís started writing on the bulletin board."

d. "Luís always writes on the bulletin board on Mondays."

4. Explain, in two or three sentences, why "the team resists because it has a negative attitude" does not explain the resistance, and where the chapter proposes looking for the explanation.

5. Classify as overt or covert: (i) Marta says "I loved the talk" on her way out; (ii) Marta thinks "what a good talk" on her way home; (iii) Marta writes a rating of 9 on the form; (iv) Marta imagines how she will tell her coworkers about the talk.

6. A researcher wants to know what Marta thought during the talk. Which statement does the chapter support?

a. Since thinking is not behavior, it cannot be studied.

b. Only what can be seen is studied; therefore thinking is left out of any study.

c. What Marta says about what she thought is also behavior, occurs in a context, and should be recorded as such.

d. Marta's report directly reveals what she thought, without influence from the situation.

7. Rewrite "Pedro has a very negative attitude toward meetings" in three or four sentences that say what he does and says and in what situations.

8. What is the best rewrite of "Camila has a favorable attitude toward working from home"?

a. "Camila is in favor of working from home out of conviction."

b. "Camila asked for remote work three times this year, tells her coworkers she gets more done at home, and chose the position that included remote work."

c. "Camila shows a positive disposition toward working from home."

d. "Camila has favorable opinions about working from home."

9. Three records: (i) in the hallway, Bia says "this class puts me to sleep" and her classmates laugh; (ii) in the course evaluation, Bia writes "not very dynamic class" and the coordinators ask for examples; (iii) in the classroom, Bia yawns conspicuously and her classmates laugh. Say what is the same and what is different in form and in function (hypothesis) between (i) and (ii), and between (i) and (iii).

10. A coordinator says: "Ms. Elisa has a negative attitude toward the new material. That's why she badmouths it in the teachers' lounge." (a) Separate what the sentence says about what Elisa does from what it assumes about what she has. (b) Raise two questions about the circumstances and about what follows. (c) Say why the original sentence does not explain.

ANNOTATED ANSWER KEY

1. c. Imagining is something Rui does, even if no one sees it (Catania includes imagining among the varieties of behavior). Option **a** is an event Rui did not produce. Option **b** is a characteristic he has. Option **d** describes a stored disposition, the internal state of Section 11.2.

2. (i) It is behavior: shifting attention qualifies as behavior, even if there is no eye movement. (ii) It is not: it is a characteristic Ana has. (iii) It is not: it is an event Ana did not produce. (iv) It is behavior, and it is covert: counting in her head is something Ana does.

3. b. The "because he has a negative attitude" invokes a state to explain the writing. Option **a** describes what he did; **c** describes a circumstance and what it preceded; **d** describes a regularity. None of the three places anything inside Luís as a cause.

4. Model answer: "The only evidence of the 'negative attitude' is the resistance itself; it is inferred from what the team does and then used to explain what the team does, and the explanation goes in a circle. The chapter proposes looking for the conditions: in what situations the team resists, what happens afterward, and what it went through before (past experiences, Catania's 'past behavior')." It is good if it points out the circularity and indicates the conditions as the place to look.

5. (i) Overt. (ii) Covert. (iii) Overt: writing the rating is something others can record. (iv) Covert.

6. c. The report is behavior (what Marta says) and it is overt, given to someone in a situation. Options **a** and **b** assume that only what is visible is behavior, which Catania's definition refutes. Option **d** forgets that context influences what is reported (Guerin, 1994, p. 157; Chapter 8).

7. Model answer: "Pedro arrives late to the Monday meetings and, when the agenda is long, says 'here we go again' to the coworker next to him. In internal surveys, he marked 'disagree' for the statement 'meetings are useful.' When management proposes short meetings, he says 'that's better.'" It is good if it has action verbs, object, form, and situation, and if no sentence attributes anything stored to Pedro.

8. b. It has action verbs, situations (requests, remarks, a choice), and it can be checked. Option **a** says "out of conviction," which is a state. Option **c** swaps "attitude" for "disposition" and still says nothing she does. Option **d** repeats the label with another word.

9. Between (i) and (ii), the evaluation (the class, negative valence) is the same, but the form is different (speech in the hallway; text on the form) and so is the probable function: in the hallway, the classmates' agreement; on the form, bringing the problem to the coordinators. Between (i) and (iii), the forms are different (speech; yawn) and the probable function is the same, the classmates' agreement. The functions are hypotheses: only several occasions would confirm them.

10. (a) What Elisa does: she badmouths the material in the teachers' lounge. What she is assumed to have: a negative attitude toward it. (b) Model answer: "In what situations does she badmouth the material (meeting, break, only with certain colleagues)? What happens afterward (colleagues agree, the subject changes)? And before: what has she gone through with the material?" (c) The "negative attitude" is inferred from the badmouthing and then used to explain it: its only evidence is what one wants to explain. It is good if (a) separates the doing from the assuming, (b) asks about the circumstances and what follows, and (c) points out the circularity.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 12. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2	11.1 (behavior) and common mistake 1
3, 4	11.2 (internal state) and common mistakes 2 and 3
5, 6	11.3 (overt and covert) and common mistake 4
7, 8	11.4 (rewriting "has an attitude")
9, 10	11.5 (topography and function) and common mistake 5

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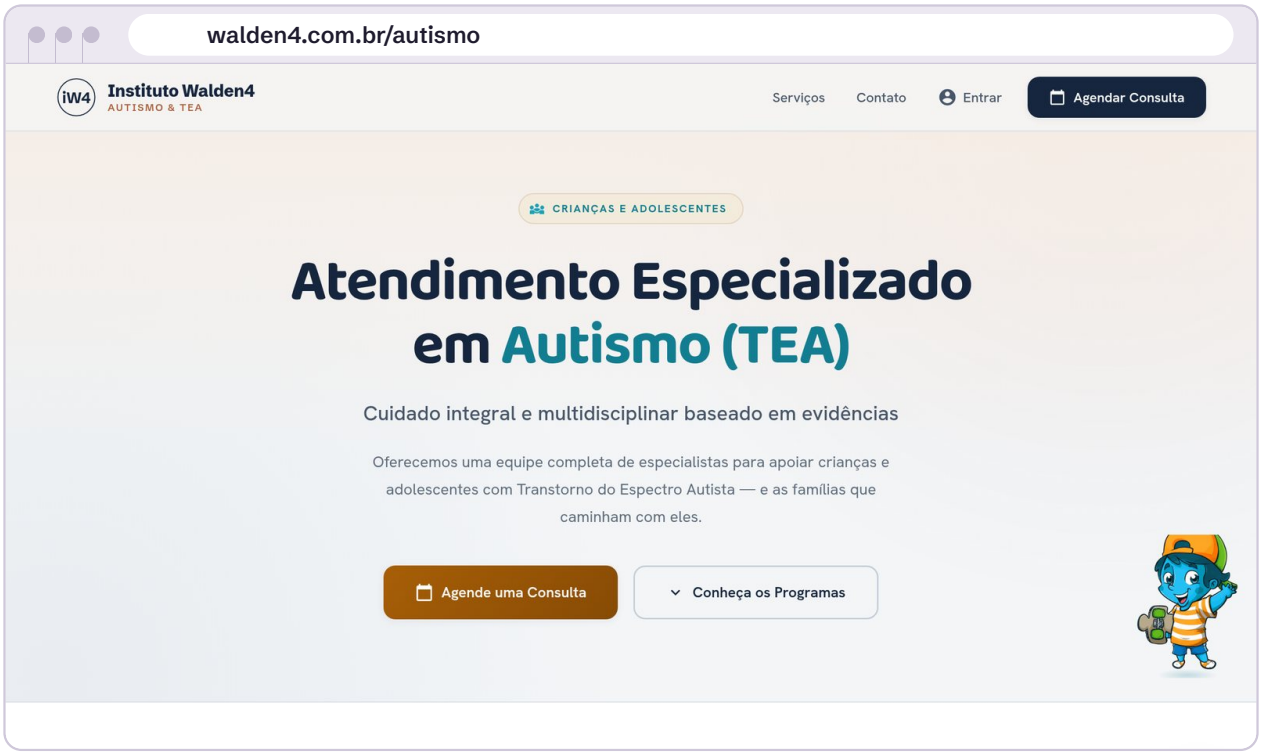
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CHAPTER

12 Attitude Is Operant Behavior

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** operant behavior and consequence, and **recognize** evaluation as a response class defined by what it produces.
2. **Identify** reinforcement, extinction, and punishment of an evaluation by what happens on subsequent occasions.
3. **Describe** shaping as differential reinforcement of successive approximations.
4. **Explain** why an evaluation recurs, persists, and changes without appealing to something stored inside the person.

PREREQUISITES

Chapter 11 (behavior, internal state, and function), Chapter 9 (recurrence), and Section 10.1 (the "stored rain"). New technical terms are defined here.

OPENING

On Monday, during the break, Paulo tells the classmate sitting next to him: "Open-book exams are fairer." She smiles: "I think so too. Say that at the meeting." On Wednesday, at the meeting, he repeats the sentence; two classmates agree and the coordinator asks him to elaborate. The following week, the sentence comes up again, in another room.

Chapter 10 left a question open: when Paulo is not talking about exams, does the attitude cease to exist? The first part of the answer was that nothing needs to be stored away, waiting; there are conditions that, taken together, produce the evaluation. One of them is the situation he is in, the subject of Chapter 13. Another is what he has gone through up to that point, in particular what happened after the earlier times he evaluated open-book exams. This chapter deals with that part: it introduces operant behavior, the concept behavior analysis uses to describe

how what comes after a behavior changes the chance that it will occur again, and shows what this tells us about maintaining and changing an evaluation.

12.1 Operant behavior and consequence

When a puff of air hits the eye, a blink follows right away: the stimulus produces the response. Paulo's sentence is not like that. No stimulus produces it the way the puff produces the blink; it occurs, and what happens after it alters the chance that it will occur again.

KEY CONCEPT

Operant behavior is behavior that can be modified by its consequences; it is said to be "emitted rather than elicited" (Catania, 1999, p. 392). A **consequence** is, in operant contexts, "an event produced by a response": the presentation or removal of a stimulus, or "any other environmental change" (p. 393).

Three remarks on the definition.

"Emitted." An emitted response occurs without a stimulus eliciting it, that is, producing it reliably (Catania, 1999, p. 398). That is all the term says: it does not say that the person planned the response, and it does not rule out emotional reactions while evaluating; those reactions, which are elicited, are the subject of Chapters 17 and 25.

"Class." Paulo never says the sentence with the same intonation or with the same words. That is why Catania (1999, p. 412) says that responses are assigned to classes "because no two responses can be exactly alike," and calls the class of responses that consequences modify an **operant**. "Open-book exams are fairer," "I prefer open-book exams," and a 7 on an agreement scale can belong to the same class if they produce the same consequences (this is the function of Chapter 11: the relation between the circumstances in which the response occurs, what the person does, and what that produces next). The recurrence of Chapter 9, the repetition of the same evaluation by the same person on different occasions, can now be put this way: occasions on which the same class occurred again.

"Consequence." It is not only what is pleasant. A smile, silence, a change of subject, a grade: any change the response produces is a consequence, and what it does to the class is an empirical question. The relation between the response and what it produces is called a **contin-**

gency (Catania, 1999, p. 94). In evaluations spoken to someone, the consequences are usually what that person does next: agrees, laughs, questions, ignores.

This affects how you write. Under the functional definition, "a class of responses is not an operant until its modifiability has been demonstrated" (Catania, 1999, p. 412). To say that an evaluation is operant is to claim that consequences modify it, and that claim has to be demonstrated; the studies in Section 12.5 are demonstrations of this kind.

The volumes of the Instituto Walden4 book series, the source of the comic scenes in this book, open with chapters on basic concepts written for undergraduate students. The one in Part II calls behavior a response, represented by the letter R, and what it produces a consequence, represented by the letter C; its examples are turning on the faucet, which produces water coming out of the faucet, and studying, which produces getting a good grade on the exam (Moreira, Ávila et al., 2023, p. 34). This is the relation this chapter deals with, written in two letters.

EXAMPLE

Paulo says "open-book exams are fairer" and his classmate replies "I think so too." The utterance is the response; the agreement is a consequence, because the utterance produced it. What matters now is what happens to the class on subsequent occasions.

NON-EXAMPLE

The coordinator walks into the room while Paulo is speaking. This happened close to the utterance, but it was not produced by it: the coordinator was already on her way. Coming afterward is not enough; a consequence is what the response produces.

TEST YOURSELF

Rui writes on the bulletin board: "this deadline is impossible." Two days later, the coordinators extend the deadline. What is the response, and what is the consequence? Can we already say that the extension reinforced the writing?

ANSWER: the response is writing on the board; the consequence is the extension. It is still too early to speak of reinforcement: we still need to see what happens to the class on subsequent occasions (Section 12.2).

12.2 Reinforcement

There are three possible answers to what a consequence does to the class: it increases its occurrence, decreases it, or changes nothing. The first one has a name.

KEY CONCEPT

A stimulus is a **positive reinforcer** if its presentation increases the occurrence of the responses that produce it, and a **negative reinforcer** if its removal increases the occurrence of the responses that terminate or postpone it (Catania, 1999, p. 418). **Reinforcement** is the response producing a reinforcer, together with the resulting increase or maintenance of the class.

"Reinforcer," therefore, is a conclusion about the *effect*, not a characteristic of the event. It would be a mistake to take reinforcers to be "rewards," says Catania (1999, p. 99): reinforcers "do not work because they make the organism 'feel good' or because the organism 'likes them.'" Catania's example applies to evaluations. A teacher tells jokes, the class laughs, and he tells more jokes: the laughter reinforced joke telling. On another occasion, he makes a pun, the class laughs *at him*, and he makes fewer puns: the same laughter *punished*. "Whether the laughter reinforced or punished depends on whether it was contingent on telling jokes or on making puns" (p. 99): on what produced it and on what happened to the class.

The first volume of the series uses a similar example, someone who tells a joke and gets laughs, and warns that people "do not tell jokes because others laugh," but because of something that happened in the recent past (Moreira, Sousa et al., 2022, p. 26). This is the caution of the next paragraph: the consequence acts on subsequent occasions, through the history it leaves behind, and not on the occasion on which the response occurs.

For researchers, this changes how they write. Before writing "was reinforced by praise," you need to show what happened on subsequent occasions. Until then, the praise is a consequence, and nothing more.

EXAMPLE

At lunch, João says that "rock is an extraordinary musical genre"; his friends agree and ask him to recommend some bands. Over the following weeks, he evaluates rock favorably more often and in more conversations. The agreement and the requests were positive reinforcers *for this class*, and we know this from the increase, not from their being pleasant.

NON-EXAMPLE

Luana's colleagues praise her every time she says that "the book is great," and how often she says it does not change; in weeks when no one comments, it stays the same. The praise is a "reward" in everyday usage, but it was not a reinforcer for this class: nothing about the class depends on it.

TEST YOURSELF

Débora has been arguing with her father-in-law about the condominium for forty minutes. When she says "the plan is great, you're right," the argument ends; in later arguments, she gets to "it's great" sooner. What kind of reinforcement is this, and what did the reinforcing?

ANSWER: negative reinforcement: what reinforced was the *removal* of the argument, and we know this from the increase in the class. This does not say that Débora "doesn't really think so"; it says what maintains this evaluation.

12.3 Extinction and punishment

KEY CONCEPT

Extinction is the discontinuation of the reinforcement of responses, or the decrease in responding that this procedure produces (Catania, 1999, p. 405). **Punishment** is the response producing a punisher, together with the resulting decrease in the class. A stimulus is a positive punisher if its presentation reduces the probability of the responses that produce it, and a negative punisher if its removal reduces the probability of the responses that terminate it (p. 416).

Extinction. The effect of reinforcement is not permanent: "responding is maintained only while reinforcement continues, not after it is discontinued" (Catania, 1999, p. 92). Ignoring, carrying on with the conversa-

tion as if nothing had been said, is the everyday way of extinguishing: nothing new is produced; what used to come stops coming, and the class gradually returns to the level it was at before.

When an evaluation stops occurring, it is tempting to ask whether it was erased or whether it is still there, hidden. In the laboratory, because an extinguished response often reappears in the next session, it was thought to be still there, merely inhibited. These explanations, Catania writes (1999, p. 93), appealed to "fictitious events or processes": the inhibited response could be measured, but not whatever supposedly inhibited it. This is the internal-state problem of Chapter 11 in another setting: a condition said to exist inside the person and invoked to explain what the person does, with no evidence other than the very behavior it is meant to explain. The question that can be investigated is a different one: under what conditions does the class come back? Resurgence is one of them: an old response, already extinguished, reappears when a more recent response stops being reinforced (p. 94).

Punishment. "The effect of punishment is simply the opposite of the effect of reinforcement" (Catania, 1999, p. 109), and the same cautions apply to it. Punishers, like reinforcers, "cannot be defined in absolute terms, nor specified in terms of common physical properties" (p. 113): a criticism, a reprimand, or a jeer punishes only if the class decreases. As with reinforcement, the effects last as long as the contingency lasts: both operations "have temporary effects," and "when they are discontinued, responding returns to its prior levels" (p. 112). This is not a failing of punishment, because the same holds for reinforcement (p. 111). Finally, reducing a response is easier when there is another response that produces the same reinforcer (p. 111): an evaluation that earns the group's attention decreases more easily if another response starts earning that same attention.

Table 12.1 brings the processes together, and Figure 12.1 shows how they unfold over time.

Table 12.1

Reinforcement, extinction, and punishment: what follows and what changes

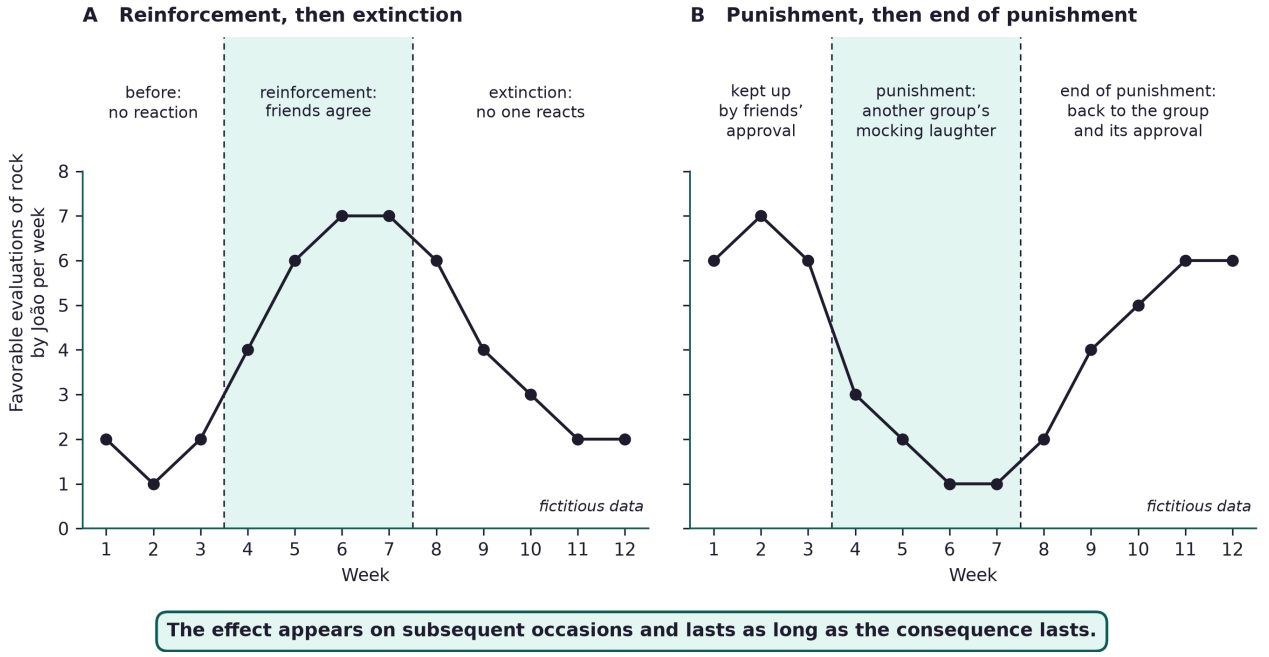
Process	What follows the evaluation	What happens to the class on subsequent occasions
Positive reinforcement	something is presented	increases or is maintained
Negative reinforcement	something is removed	increases or is maintained

Process	What follows the evaluation	What happens to the class on subsequent occasions
Extinction	what used to follow the evaluation stops coming	decreases, back to the previous level
Punishment	something is presented (or something is withdrawn)	decreases

Note. Table prepared for this book. In every case, the name of the process comes from the observed effect, not from the nature of the event.

Figure 12.1

The same behavior under reinforcement, extinction, and punishment (fictitious data)



Note. Diagram prepared for this book, modeled on the hypothetical graphs in Catania (1999, Figure 6.1). The numbers are illustrative and do not come from any study.

TEST YOURSELF

(a) After Lívia criticizes the system at a meeting, her boss reprimands her in front of her colleagues, and she starts criticizing less. (b) Her colleagues, who used to agree, stop reacting to Lívia's criticisms, and she starts criticizing less. Which is punishment and which is extinction?

ANSWER: (a) is punishment: the criticism produces the reprimand, and the class decreases. (b) is extinction: nothing new was produced; what maintained the class stopped coming.

12.4 Shaping

Reinforcement acts on responses that occur. What if the evaluation we want to establish hardly ever occurs, or occurs only in a timid form? Reinforcement, Catania reminds us (1999, p. 130), "cannot have any effect if the response to be reinforced is never emitted"; the alternative, instead of waiting, is to reinforce, one after another, responses that come closer and closer to it.

KEY CONCEPT

Shaping is the "gradual modification of some property of responding [...] by the differential reinforcement of successive approximations to a target operant class" (Catania, 1999, p. 411). **Differential reinforcement** is reinforcing some responses and not others, according to their properties (p. 418).

Chapter 4 introduced the word without technical vocabulary, as the gradual favoring of forms ever closer to a certain way of evaluating; this is the precise definition. It works because behavior varies: no two responses are the same, and reinforcing one produces a spectrum of responses, some of them closer to the one we want (Catania, 1999, pp. 131–132). And the criterion changes along with the response: what was reinforced at one stage is no longer reinforced at the next.

Table 12.2

Shaping an evaluation in four stages

Stage	What Carlos says	What the family reinforces (with attention and requests for recipes)	What is no longer reinforced
1	"It's not bad."	any evaluation that is not unfavorable	refusal and silence
2	"It's actually pretty tasty."	clearly favorable evaluations, even if timid	"it's not bad"
3	"It's one of the best things I've ever eaten."	high-intensity evaluations	"it's actually pretty tasty"
4	"I prefer vegetarian food; you should all try it."	the preference and the recommendation	moderate evaluations

Note. Table prepared for this book. The case is an illustration.

Shaping does not depend on anyone planning it: it "can be used for good or for ill, and many people use it without even knowing what they are doing" (Catania, 1999, p. 131). An evaluation may, therefore, have been shaped little by little by people who did not even know they were doing it. Chapters 18 and 35 return to this point.

TEST YOURSELF

Which of the two describes shaping? (i) Reinforcing every time Carlos says that vegetarian food is excellent. (ii) Reinforcing "it's not bad" first, then only "it's good," and finally only "it's excellent."

ANSWER: (ii). Reinforcing successive approximations, changing the criterion at each stage, is shaping. Option (i) is reinforcement of the target class, which works only if the response already occurs.

12.5 Why an evaluation recurs, persists, and changes

Let us return to Paulo. If evaluation is operant behavior, the question "why did he say that again?" has an answer that requires nothing stored: because, on earlier occasions, evaluations of this class were followed by consequences that made them more likely in situations like that one. Catania (1999, p. 57) calls this kind of selection, parallel to natural selection, the selection of behavior by its consequences (the idea goes back to Skinner, 1981, as cited in Catania). And he adds a caveat: saying that the response is selected by the environment is very different from saying that the organism itself selected a way of responding. It is not a matter of Paulo *calculating* that he will win approval, but of a history that makes the evaluation more likely, with or without calculation.

This is the second part of the answer promised in Chapter 10. Between one occasion and the next, what persists is not an evaluation waiting to be spoken; it is the fact that the person's behavior has been modified by what happened to them. "Paulo has a favorable attitude toward open-book exams" is still a legitimate summary (Chapter 9). What supports this summary is a history of occasions and consequences, plus the current situation (Chapter 13).

Maintenance. An evaluation is maintained as long as the consequences are maintained, and they rarely come every time. For Catania (1999, p. 177), reinforcing some responses and not others, **intermittent reinforcement**, "is a general characteristic of behavior," and reinforcing

every response in the class is "the exception rather than the rule." So it is with evaluations: not every time Paulo says the sentence does someone agree. In hypothetical laboratory records, after intermittent reinforcement, responses continue in substantial numbers when reinforcement stops (p. 182). If evaluations behave like other operant classes, it is not surprising that one of them persists for a while after approval stops coming, and there is no need to assume a stored "conviction" to explain it. A study that speaks of persistence must say how it measured it, because "the measure must be specified" (p. 420): time, number of occasions, or something else.

Change. An evaluation changes when its consequences change: through extinction, through punishment, or through reinforcement of another response that produces what the first one used to produce. And, because reinforcement and punishment have temporary effects, the change lasts as long as the new contingency lasts. Scott (1957, p. 74) makes the same assumption: lasting change in attitude would likely require altering the participants' social surroundings so that the new behavior kept on being reinforced.

A comic from one of the series' studies shows what follows two evaluations of the same musical genre (Figure 12.2). In a bar, a character tells his friend that, if he thinks funk deserves a place, he accepts "all the discord it causes in society," and hears back: "Careful you don't push people away with all that prejudice of yours." Later, a thought balloon shows what this did to him: "I'm afraid of ending up alone" (Moreira, Lemos et al., 2024, p. 253). At the party, he says he will give "funk a chance," and the friend he had offended replies, laughing: "Now you're talking." In the language of this chapter, the unfavorable evaluation was followed by a reproach, and the new one by approval. But the comic is fiction: it shows the before and the after because whoever created it wrote them. In a study, each occasion and what followed it would have to be recorded, as Section 12.2 required.

Figure 12.2

Two social consequences for evaluations of the same musical genre



Note. Panels 16 and 27 of the story "Música e Atitude" [Music and Attitude], created by João Pedro Nobre and Márcio Moreira (2023) for a study on musical genres (Moreira, Lemos et al., 2024, pp. 251 and 255). The strips under the panels were added for this book. The reproduction has the resolution of the source material.

What the studies show. Classic studies in social psychology manipulated what follows an evaluation and measured what came afterward. Scott (1957) studied group approval. Students who held a clear opinion on an issue, such as universal military training, debated in front of the class, arguing for the side opposite to their own. A vote, arranged in advance, gave the victory to one of them and the defeat to the other, and, no more than five minutes later, each student recorded their opinion again on a seven-point scale. The "winners" shifted, on average, 1.25 points toward the side they had argued for; the "losers," 0.17 in the opposite direction; the control group, 0.31. The difference between winners and losers was statistically significant ($t = 3.97$; $p < .001$), that is, it would be very unlikely to observe it if the vote had had no effect at all. Scott points out the limitations: few changes were large (only seven winners reversed their position), the interval was short, how long the change lasted was not assessed, and the design does not separate the effect of approval from that of contact with the other side's arguments (p. 74).

Hildum and Brown (1956) and Insko (1965) obtained a similar effect by saying "good" over the telephone after responses for or against an issue; Insko saw the effect, small though it was, show up a week later on a questionnaire answered in class. Chapter 26 examines these studies in detail. What matters here is that, in people, what follows an evaluation can alter what they evaluate later.

TEST YOURSELF

A colleague says: "Rui complains about the deadline at every meeting because he has a negative attitude toward deadlines." Rewrite the explanation using what the chapter has taught, in two or three sentences.

ANSWER: for example, "Rui complains about the deadline at team meetings; at some of them, the manager extended the deadline or his colleagues agreed." To claim that this maintains the complaining, one would need to record the occasions, what followed each one, and what happened on subsequent occasions. A good answer replaces "negative attitude" with occasions and consequences and says what would be observed.

Common learner mistakes

1 **Calling everything pleasant a reinforcer.** A reinforcer is whatever increases or maintains the class, and we know this only from the effect. The mistake happens because, in everyday usage, "reinforcement" and "reward" are synonyms. *How to spot the mistake:* you write "was reinforced by praise" without saying what happened on subsequent occasions, or you use "reward" as a synonym for reinforcer.

2 **Confusing negative reinforcement with punishment.** The mistake happens because "negative" sounds like "bad," and punishment is also bad for whoever receives it. *How to spot the mistake:* you call a criticism that *reduced* the evaluation "negative reinforcement." In negative reinforcement, the removal of something *increases* the class that produces that removal; punishment reduces the class.

3 **Confusing extinction with punishment.** The mistake happens because the class decreases in both cases. *How to spot the mistake:* you call it punishment when colleagues stop reacting. In extinction, nothing new is produced: what used to come stops coming.

4 **Saying that the person evaluates "just to please."** The mistake happens because, in everyday language, doing something for its consequences sounds like self-interest or pretense. *How to spot the mistake:* you use reinforcement as proof of calculation or insincerity. The environment selects the class; that says nothing about what the person calculated or about what they "really" feel.

5 **Treating change as permanent.** The mistake happens because a "before and after" that shows a difference seems to settle the question. *How to spot the mistake:* you write "the attitude was changed" after a single session, without saying what follows the new behavior or how long it was observed.

SUMMARY

Operant and consequence (objective 1). Operant behavior is behavior that consequences can modify; it is emitted, not elicited. The response is a member of a class, defined by what it produces, and a consequence is what the response produces. A class is called operant only after it has been shown that consequences modify it.

Reinforcement, extinction, and punishment (objective 2). In reinforcement, producing (or removing) something increases or maintains the class; in extinction, what maintained the class stops coming and the class decreases; in punishment, producing something reduces it. The names come from the effect on subsequent occasions, not from how pleasant the event is: the same laughter reinforces one class and punishes another.

Shaping (objective 3). Shaping is the gradual modification of a property of the response through differential reinforcement of successive approximations to a target class. The criterion changes at each stage, and the process depends on the variability of behavior.

Maintenance and change (objective 4). An evaluation recurs because, in the person's history, evaluations of this class were followed by consequences that made them more likely in situations like the present

one; nothing needs to be stored away, waiting. It is maintained as long as the consequences are maintained, usually intermittently, and it changes when they change. The effects last as long as the contingency lasts.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. Which of the options is a consequence, in the sense used in this chapter?

a. It started raining while Paulo was speaking.

b. After Paulo said the sentence, his classmate asked where he had read that.

c. Paulo has a favorable attitude toward open-book exams.

d. Paulo was tired at the meeting.

2. Letícia says "this system is torture," rolls her eyes when the system freezes, and marks 1 on the satisfaction survey. Under what condition do these three records belong to the same operant class? What would need to be observed?

3. Classify each case as positive reinforcement, negative reinforcement, extinction, or punishment, and justify your answer by the effect: (i) Bia criticizes the lesson, the coordinators ask for examples, and she starts criticizing more; (ii) the coordinators stop responding to Bia's criticisms, and she criticizes less; (iii) Bia is reprimanded in front of her classmates for criticizing the lesson, and she criticizes less; (iv) Bia says "I accept the format," the coordinators stop pressing her, and she starts saying it right away.

4. A school praises students who say they like reading. Three months later, how often they say so has not changed, not even in the weeks when the praise stopped. What does the chapter allow us to conclude about the praise?

a. It was a weak reinforcer, but it worked.

b. It did not function as a reinforcer for this class: the class does not depend on it.

c. The students have a stable attitude that praise is powerless against.

d. The praise punished the class.

5. When Tiago praises a movie, the group laughs with him, and he starts praising movies more often. When he praises the rival team, the group laughs at him, and he starts praising the rival team less. Is the laughter reinforcing or punishing? Justify your answer.

6. Which of the options describes shaping?

a. Reinforcing, every time it occurs, an evaluation that already occurs in the desired form.

b. Reinforcing evaluations that come ever closer to the desired form, changing the criterion at each stage.

c. Punishing the forms that are not wanted.

d. Describing the evaluation without interpreting it.

7. In college, Pedro was praised by classmates and professors when he criticized consumerism. Today, at his company, each of his criticisms is met with discomfort and a change of subject. (a) What process operated in college, and what process operates now? (b) What would you expect to observe in his criticisms?

8. In one month, at only two of nine meetings did someone agree with Rui's complaints about the deadline or extend it, and he keeps on complaining. Using the idea of intermittent reinforcement, explain why this does not require a stored negative attitude, and say what else would need to be recorded.

9. A report says: "The participants' attitude was changed: after a debate in which they won the group's approval, the mean rating went from 3.1 to 4.2." Point out three cautions the chapter would recommend before accepting this sentence.

10. The coordinator says: "Ms. Elisa criticizes the new material because she has a negative attitude toward it." (a) Rewrite the explanation in terms of occasions and consequences. (b) Say what data would support the hypothesis that the class is operant. (c) Say what would refute the hypothesis.

ANNOTATED ANSWER KEY

1. b. The classmate's question was produced by Paulo's utterance. Options **a** and **d** are events the utterance did not produce; option **c** is a label.

2. If they produce the same consequences, that is, if they have the same function (Chapter 11). One would need to observe, on several occasions, what follows each record and what happens to these records afterward: only observation tells whether there is one class or three.

3. (i) Positive reinforcement: the evaluation produced the request for examples, and the class increased. (ii) Extinction: what maintained the class stopped coming, and the class decreased; nothing new was produced. (iii) Punishment: the criticism produced the reprimand, and the class decreased. (iv) Negative reinforcement: saying "I accept" removed the pressure, and the class increased.

4. b. The class did not increase with the praise and did not decrease when the praise stopped: nothing about the class depends on it (as in Luana's case, in Section 12.2). Option **a** assumes an effect the case does not show; option **c** explains by what the person "has" (Chapter 11); option **d** would require a decrease in the class.

5. It depends on the relation to the class: the laughter reinforced the class "praising movies," because it increased, and punished the class "praising the rival team," because it decreased (Catania, 1999, p. 99). The name of the event does not decide; the effect does.

6. b. It is differential reinforcement of successive approximations, with a changing criterion. Option **a** is reinforcement of a class that already occurs. Option **c** is punishment. Option **d** is the descriptive record of Chapter 6: it describes what the person did, without saying what followed.

7. (a) In college, positive reinforcement (praise); at the company, extinction (the change of subject), possibly combined with punishment, if the discomfort is aversive. (b) That, if the consequences continue this way, his criticisms will gradually decrease at the company and be maintained wherever praise keeps coming. Only observation confirms this, and only observation confirms that the decrease is due to the change in consequences: the class is operant only after its modifiability has been demonstrated.

8. In intermittent reinforcement, not every occurrence is followed by a consequence, and this is the rule, not the exception (Catania, 1999, p. 177). Complaining even though not every complaint pays off is consistent with a history of intermittent reinforcement and does not call for a stored "attitude." One would need to record the occasions, what followed each one, and what happens to the frequency when the consequences stop coming.

9. Model answer: (1) the measurement was taken right after the session, and the effect of a consequence lasts as long as the consequence lasts (Catania, 1999, p. 112); nothing indicates that the change persisted; (2) without a comparison group, we do not know how much of the change is due to approval (in Scott's study, the control group also changed); (3) what was recorded was a rating on an instrument, on one occasion, and "the attitude was changed" goes beyond the data. Any set of three cautions well justified by the chapter is acceptable.

10. (a) Model answer: "Elisa speaks badly of the new material in the teachers' lounge and at the department meeting. When she does, colleagues laugh or agree and the coordinator asks for examples; when she speaks well of it, no one comments." (b) Records of several occasions, with what followed each one,

showing that the frequency of criticism varies with what follows. (c) If the frequency did not vary with the consequences, even when they were manipulated, the class would not prove to be operant. The hypothesis is testable: it can fail.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 13. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2	12.1 (operant and consequence)
3, 4, 5	12.2 (reinforcement), 12.3 (extinction and punishment), and common mistakes 1, 2, and 3
6	12.4 (shaping)
7, 8, 9, 10	12.5 (maintenance and change) and common mistakes 4 and 5

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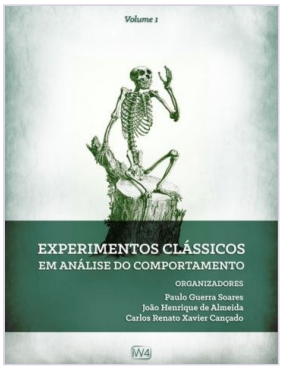
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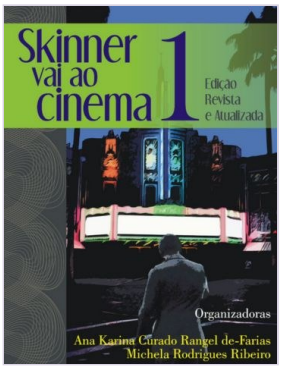
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CHAPTER

13 Attitude Is Discriminated Operant Behavior

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** discriminative stimulus and discriminated operant, and **write** the three-term contingency (situation, evaluation, and what follows) of an evaluation.
2. **Identify** what, in the situation, occasions an evaluation, and **say** how this is tested.
3. **Distinguish** discrimination from generalization, and **recognize** as generalization what earlier chapters called "extending" the evaluation.
4. **Explain** why evaluating the same object in different ways in different situations is not, in itself, inconsistency.

PREREQUISITES

Chapter 12 (operant, consequence, and contingency), Chapter 8 (context and the observation form), and Section 11.5 (function). New technical terms are defined here.

OPENING

Recall Letícia's case from Chapter 8 (Figure 8.1). She manages a store and, in the same week, evaluated the new inventory system three times: she said that it "has a few areas to improve" (meeting with the board), that it "is torture" (lunch with the team), and gave it a 3 with the comment "insufficient training" (anonymous survey). The object was the same and the valence was negative in all three; what changed were the form and the intensity: a mild criticism in front of her bosses, with her annual review coming up; a strong complaint among colleagues, with nothing formal at stake; a rating with a technical reason, under anonymity. Chapter 8 concluded that nothing entitles us to say that she lied in any of the three, or that one of them hides her "true" evaluation. It also concluded that comparing the three situations shows *where to look*, which is not the same as explaining: the meeting and the lunch

differ in many things at once (the place, the people, what was said before, what was at stake). To claim that the situation *causes* the form, the chapter warned, one would need to vary the context while keeping everything else the same. Vary what, exactly?

Chapter 12 dealt with one of the conditions that maintain an evaluation: what happens after it. This chapter deals with the other, the situation in which it occurs, and with the concept behavior analysis uses to describe it.

13.1 The situation as the third term

Chapter 12 described evaluation with two terms: the response and what it produces. But what it produces depends on where it is said. In Chapter 11, Table 11.2 brought together three records of Letícia, each with the form, the situation, and what followed. In them, the same words ("this system is torture") earn the agreement of her colleagues at lunch and, days later, a request for details from the regional manager (hypotheses for illustration). With two terms, the two occasions look like one; the third is missing, the situation in which the response occurs.

KEY CONCEPT

A **discriminative stimulus** is a stimulus in whose presence a response has certain consequences and which, for that reason, comes to *occasion* that response: discriminative stimuli "do not elicit responses"; they "set the occasion" (Catania, 1999, p. 146). A **discriminated operant** is an "operant defined in terms of the stimuli in whose presence it occurs, as well as its effects on the environment" (p. 412). The relation among stimulus, response, and consequence is the **three-term contingency** (p. 28).

A **stimulus** is, for Catania (1999, p. 402), "any physical event, combination of events, or relation among events": a sound, a place, a question; also the absence of something, such as the absence of the bosses at lunch (p. 402).

Occasioning is not eliciting. In the reflex of Chapter 12, the puff of air elicits the blink, and the response depends only on the stimulus. The board does not produce "a few areas to improve" in that way: it is the situation in which sentences like that, in Letícia's history, have had certain consequences. That is why Catania (1999, p. 412) uses "occasion" for responses emitted in the presence of a discriminative stimulus, and

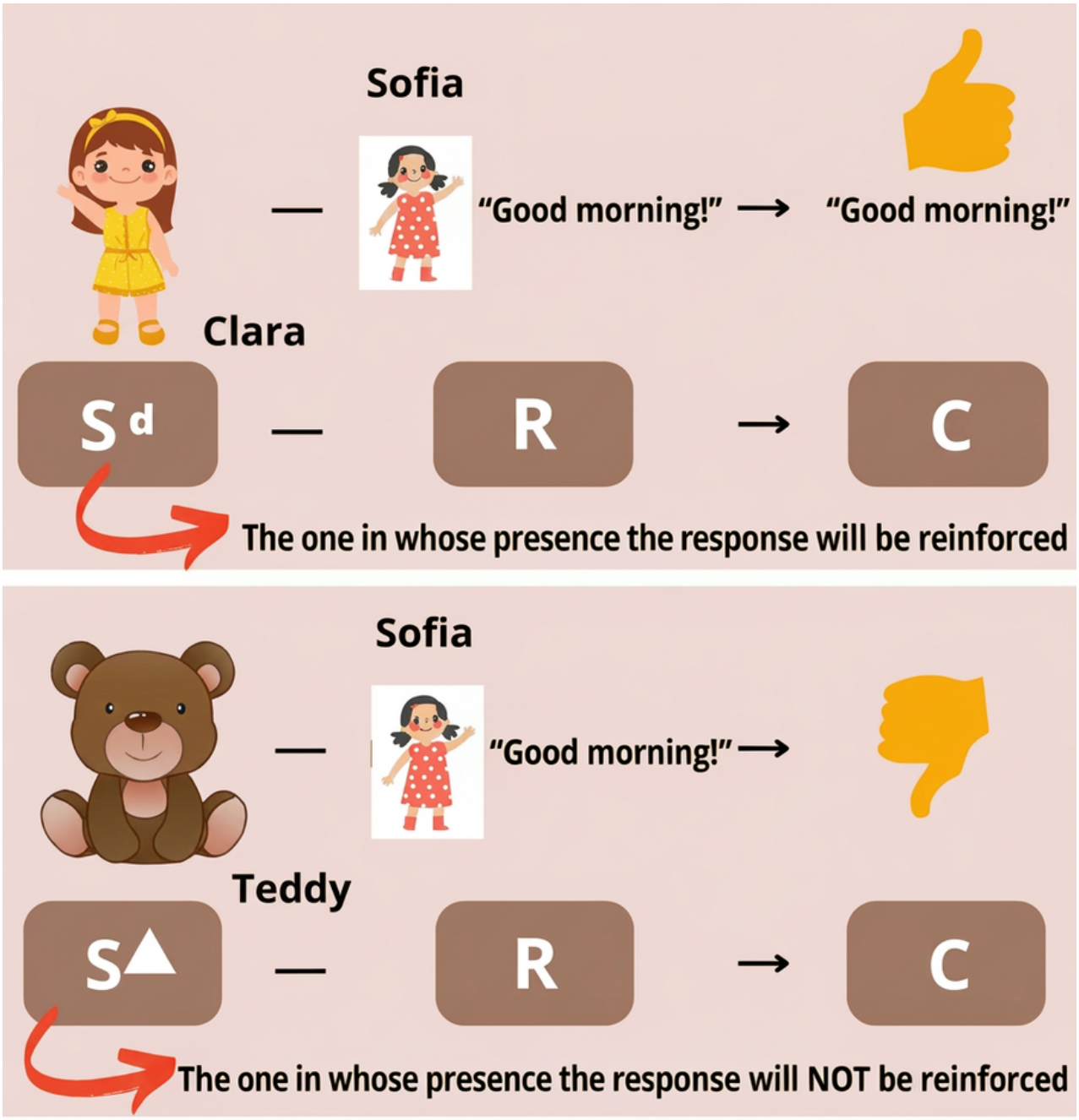
says that the dependence of the response on both the stimulus and the reinforcer is what distinguishes it from the reflex relation. Everyday language speaks of signals or cues (p. 146).

Discrimination is built through contrast. When a response is reinforced in the presence of one stimulus and not in the presence of another, the first is designated **SD** ("S-dee") and the second, correlated with extinction, **SΔ** ("S-delta") (Catania, 1999, pp. 146 and 403). As an illustration: with his friends from the rock group, João says that "rock is an extraordinary musical genre," and they agree and ask for recommendations (SD); with his coworkers, who do not care about music, the sentence is followed by silence (SΔ). SD and SΔ are defined in relation to a response and to what it produces: the same stimulus can be an SD for one evaluation and an SΔ for another.

The Part II volume of the series shows the contrast with greetings (Figure 13.1). Sofia says "Good morning!" to Clara, who replies "Good morning!": for this response, Clara is the discriminative stimulus, which the authors write as Sd. Sofia says "Good morning!" to Teddy, the teddy bear, and the consequence is not reinforcing: Teddy is the delta stimulus, S▲ in the volume (Moreira, Ávila et al., 2023, pp. 43–45). The response is the same in both cases; what changes is the stimulus in whose presence it occurs and what follows it.

Figure 13.1

The same greeting in the presence of a discriminative stimulus and of a delta stimulus



Note. Figures 3 and 4 from Moreira, Ávila et al. (2023, pp. 44 and 45). The volume writes Sd and S▲ where this book writes SD and SΔ. The reproduction has the resolution of the source material.

Chapter 12 could talk about the operant without mentioning the situation because it left the situation implicit. For Catania (1999, p. 146), "there is very probably no operant class without discriminative stim-

uli": pecks do not occur without a key, nor evaluations outside some situation. The situation moves out of the background and into the description.

A note on vocabulary: in this book, *context* remains the situation in which the evaluation appears (Chapter 8). In Catania (1999, p. 394) the word is narrower: "the constant features of a situation," which Catania also calls **contextual stimuli** (p. 146). And "occasion," as a noun, is each time the evaluation can occur ("on 4 of 6 occasions"); the verb "to occasion" is the technical term for what a discriminative stimulus does.

EXAMPLE

At lunch, Letícia says "this system is torture." Situation: six colleagues from the team, no bosses, after one of them complained about how slow the system is. Response: the evaluation, in this form. Consequence (hypothesis): her colleagues laugh and agree. Written this way, the evaluation is no longer "a sentence of Letícia's" and becomes a relation: in *this* situation, *this* form is usually followed by *that*.

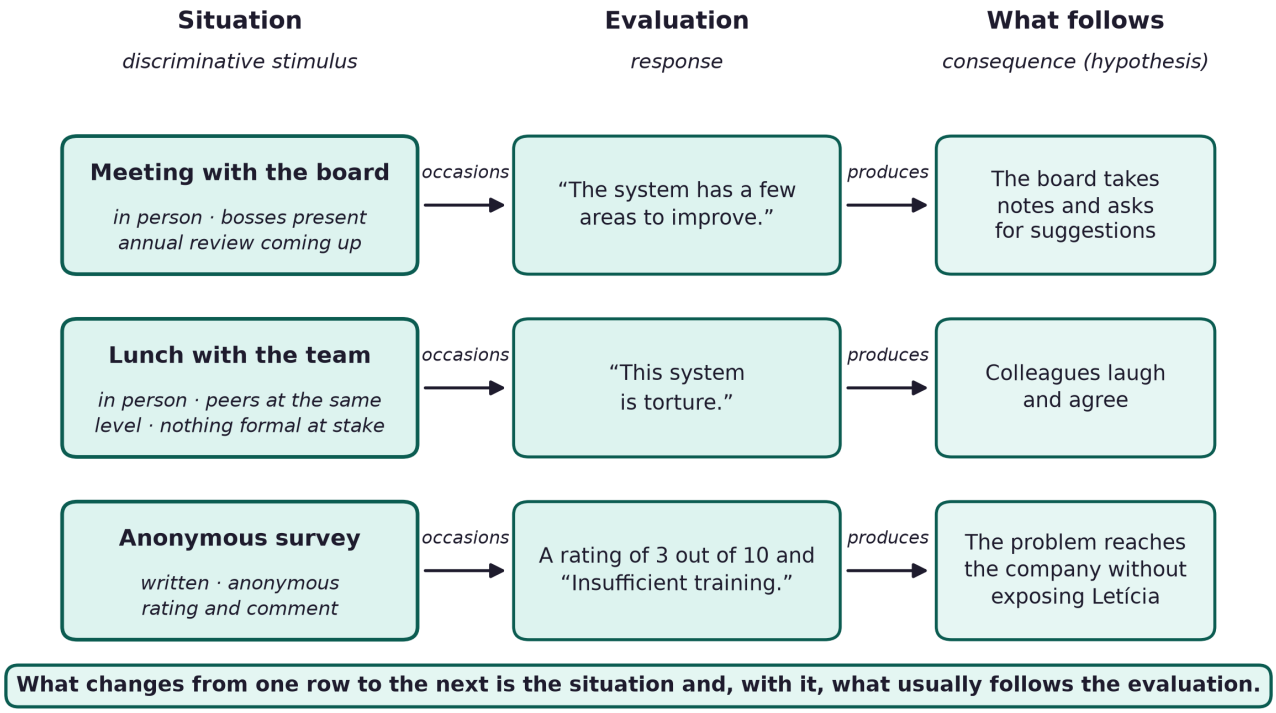
NON-EXAMPLE

The meeting room has a projector and a whiteboard. They are part of the situation, but if Letícia's sentence has the same consequences with or without them, they are not discriminative stimuli for it. Being present is not enough: a stimulus is discriminative only when the response has different consequences in its presence and in its absence.

Figure 13.2 writes Letícia's three situations this way: the meeting with the board, the lunch with the team, and the anonymous survey.

Figure 13.2

The three-term contingency in Letícia's three situations



Note. Diagram prepared for this book, based on the situations in Figure 8.1. The consequences are hypotheses for illustration, as in Table 11.2: only observing several occasions would tell what actually tends to follow each evaluation.

Each row is a three-term contingency. It is not that Letícia "has" three attitudes, nor a single one in disguise: there are three relations, and each one can be observed.

TEST YOURSELF

At the planning meeting, the coordinator asks: "What did you think of the new schedule?" Rui replies: "It doesn't work for people who live far away." The coordinator writes this down and asks how to adjust it. Identify the situation, the response, and the consequence. What still has to be shown before the question can be called a discriminative stimulus?

ANSWER: situation: the coordinator's question, at the meeting; response: the evaluation of the schedule; consequence: the note and the request for an adjustment. It still has to be shown that, without the question, the evaluation has other consequences or stops occurring. Only then is the question the occasion, and not just something that came before.

13.2 What, in the situation, makes a difference

Chapter 8 described context with four questions: where (the place and the medium), with whom (who is listening or reading), after what (what came before), and with what at stake (what may happen afterward). Table 13.1 shows where each of them fits into the three-term contingency.

Table 13.1
The four questions of Chapter 8 in the three-term contingency

Question	In technical terms	At Letícia's lunch (Table 8.2)
Where?	stimuli of the place and the medium (in person, written, digital); those that do not change across occasions are contextual stimuli	cafeteria; in person
With whom?	whoever is listening or reading, whose presence is correlated with certain consequences	six colleagues from the team, no bosses
After what?	what came immediately before: a question, a comment, an event	a colleague complained about how slow the system is
With what at stake?	the consequence that, in the person's history, usually follows evaluations like this in situations like this (the third term, not a stimulus)	nothing formal; the colleagues' agreement

Note. Table prepared for this book. The last row describes what the situation usually signals, and it is a hypothesis about the person's history.

Three of the four questions call for stimuli; the fourth calls for the third term. What is "at stake" cannot be seen in the room: it is what, in the evaluator's history, usually follows evaluations like this in situations like this. It is always a hypothesis, and whoever writes it on the form should say which observed occasions support it. A different matter is how much the consequence is worth to the person at that moment: operations such as deprivation and satiation change this without functioning as a signal (Catania, 1999, pp. 43–44 and 412), and Chapter 19 returns to them.

The form lists what is present. Catania (1999, p. 403) calls this the *nominal* stimulus and distinguishes it from the **functional stimulus**: "the properties of a stimulus that control behavior." In his example, for a pigeon that attends to the color, but not the shape, of a green circle, the

functional stimulus is only the green, even though the nominal stimulus is the green circle. What controls behavior can be discovered only by testing.

In the experiment Catania describes (Reynolds, 1961a, cited in Catania, 1999, pp. 149–150), pigeons' pecks were reinforced in the presence of a triangle on a red background and not in the presence of a circle on a green background; afterward, each component was presented alone, without reinforcement. One pigeon responded almost only to the triangle; the other, almost only to the red. "Only by examining the effects of the components separately was it possible to say what their discriminative functions were" (p. 150).

Like the two pigeons, two people can evaluate in the same way in the same situation under the control of different elements of it. The procedure is the one used in the experiment: change one element and keep the others, what Chapter 8 called "varying the context while keeping everything else the same." To find out whether anonymity makes a difference, the company could administer the same survey, with the same questions, on the same day and through the same medium, to two halves of the team, one identified and the other not. If only this changes and the responses differ systematically, there is evidence that anonymity is part of what occasions the evaluation. It is evidence, not proof, because the result would still need to be replicated and the halves could not differ in anything else (Chapters 31 and 32).

What does not vary across occasions does not show up as a difference, but it is still part of the situation. This is the case of the data-collection context, which Chapter 8 included in the situation (Section 8.4): the question, the form, who hands them out, and the place where people respond are also part of what the person has in front of them. If everyone responds to the same researcher, in the same place, no comparison within the study shows whether she makes a difference. It is worth describing, so that other studies can vary it.

TEST YOURSELF

The form for one of Letícia's evaluations reads: in-person meeting, director present, annual review coming up. A colleague says: "What makes Letícia soften her criticism is the director." What does the form allow us to conclude?

ANSWER: only a hypothesis. The director is present together with the annual review and the in-person format, and the form lists what is present, not what controls. To say that the director is a discriminative stimulus, one would need to vary one element at a time (for example, the same meeting, with the annual review coming up, without the director) and see whether the form of the evaluation changes.

13.3 Discrimination and generalization

Chapter 12 said that an evaluation becomes more likely "in situations like that one" in which it had consequences (Section 12.5). What remains to be said is what counts as "like that one" and what happens in situations that are not. There are two names, one for each side of the question.

KEY CONCEPT

Discrimination is "any difference in responding in the presence of different stimuli" (Catania, 1999, p. 396). **Generalization** is "the spread of the effects of reinforcement (or of other operations such as extinction or punishment) during one stimulus to other stimuli that differ from the original along one or more dimensions" (p. 406).

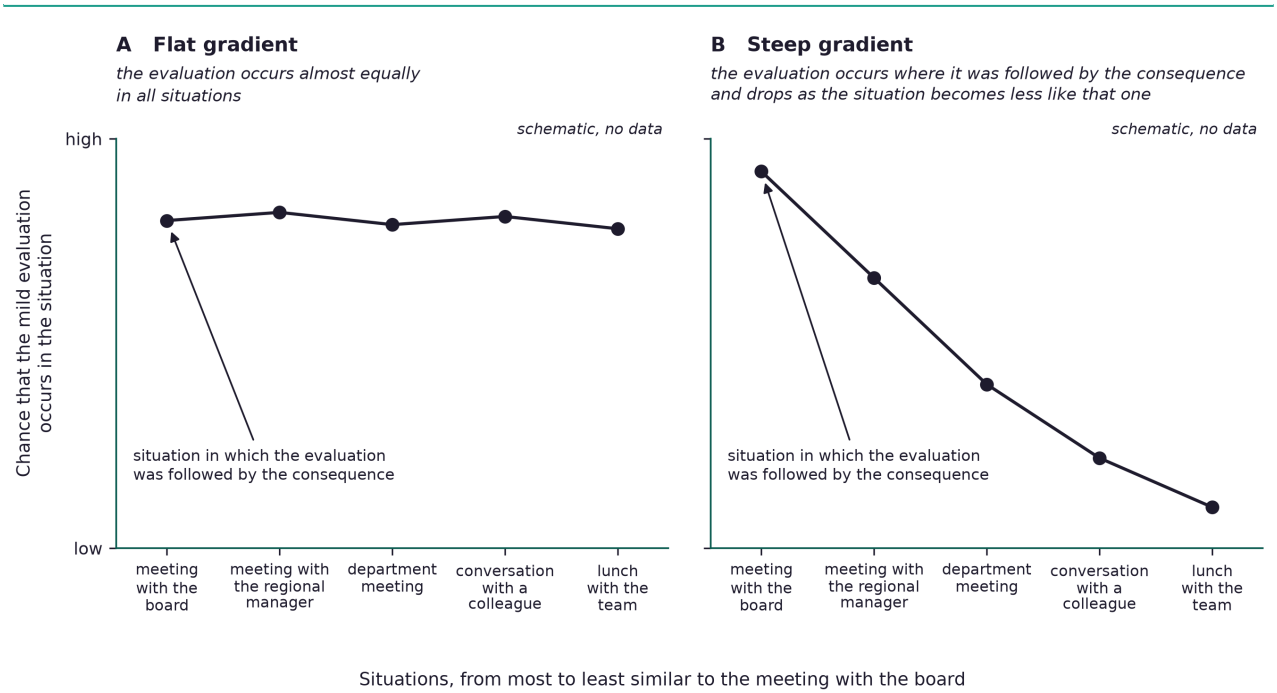
If the evaluation occurs where it was followed by the consequence and not where it was not, there is discrimination; if it also occurs in situations similar to that one, there is generalization. Catania (1999, p. 152) illustrates with a pigeon whose pecks were reinforced in yellow light. In the test, the pigeon generally pecks less and less as the light changes to orange, red, and violet, and "the effects of reinforcement in the presence of yellow extend to the other colors." The map of this extension, the rate of responding along a stimulus continuum, is the **gradient**: the greater the change in responding from one point to another, the steeper (or sharper) it is, and it is flat when responding does not change (p. 406).

The shape of the gradient depends on history. In an experiment with tones (Jenkins & Harrison, 1960, cited in Catania, 1999, pp. 152–153), pigeons reinforced in the presence of a tone that was always on pecked about equally to tones of other frequencies and in the absence of a tone. Those trained with the tone present on some trials and absent on others pecked more to the original tone and, in general, less the farther the frequency was from it. In the figure caption: "Without discrimination training the gradients were relatively flat; after presence-absence training, they were relatively sharp" (p. 153).

Figure 13.3 translates the two shapes into a mild evaluation by Letícia, across five situations ordered by their similarity to the meeting with the board.

Figure 13.3

Flat gradient and steep gradient of an evaluation (schematic)



Note. Diagram prepared for this book, modeled on Figure 8.3 in Catania (1999, p. 153), which presents data from pigeons. The values are illustrative; the shape of the gradient of a person's evaluation, in situations like these, is a research question.

In A, the evaluation appears the same wherever the person is, as expected when no situation has been correlated with different consequences for it. In B, it appears where it was followed by the consequence and drops with distance. Someone who records the evaluation in only one situation cannot tell A from B, because the two nearly coincide at the first point; Chapters 22 to 24 return to measurement.

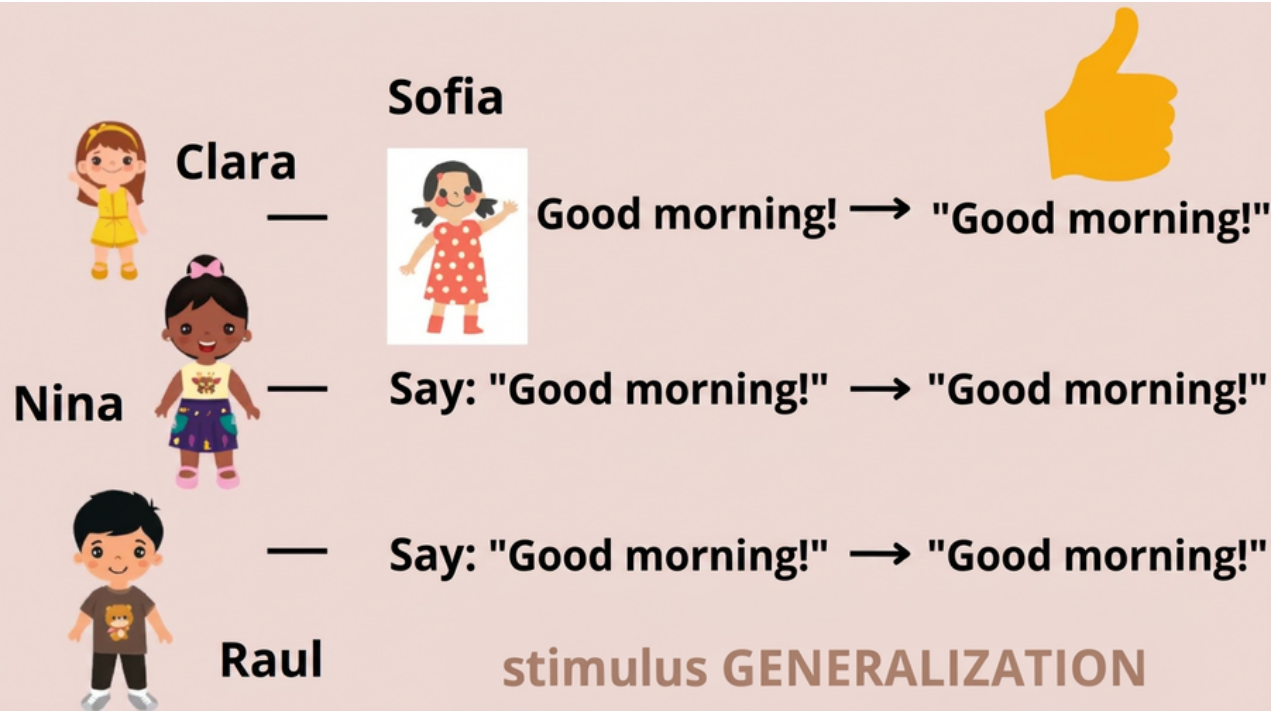
Generalization is, from here on, the technical name for what Chapters 2 and 5 called "extending" the evaluation from individuals to the category. The everyday word was already close: Catania (1999, p. 152) writes that the effects of reinforcement "extend." "Extending" keeps the other meaning it had in Chapter 5, that of the researcher who decides how far a result applies (Section 5.5): a decision about the scope of the study, not a process in the person.

Generalization also applies to situations. If Letícia's sentence is followed by the consequence in front of the board, it tends to occur also in front of the regional manager, who resembles the board along some dimension (degree of authority, for example), and less at the lunch with the team. This is how the effect of a consequence, including extinction and punishment, is not tied to the occasion on which it happened. What counts as "similar" is not decided in advance. Salience, Catania writes (1999, p. 149), "is not a property of a stimulus; it is a property of the organism's behavior with respect to that stimulus," and the two pigeons of Section 13.2 show two different similarities in the face of the same combination. When stimuli that do not resemble one another come to occasion the same evaluation, a different process is at work, and Chapter 20 deals with one of them, stimulus equivalence.

The same volume illustrates generalization with Sofia's greetings: after Clara answers her, she starts greeting the other children at the playground, and they answer back (Figure 13.4; Moreira, Ávila et al., 2023, pp. 45–46).

Figure 13.4

Generalization of the greeting to other children



Note. Figure 5 from Moreira, Ávila et al. (2023, p. 46). The reproduction has the resolution of the source material.

EXAMPLE

Rui had good experiences at three Japanese restaurants and, on hearing about a fourth one, which he has never visited, says: "It must be great, it's Japanese." The evaluation occurs in the presence of a new object that resembles the earlier ones along one dimension (being Japanese), without any contact with it. This is generalization.

NON-EXAMPLE

Rui eats at the fourth restaurant and likes it. Saying "it's great" after eating there is not generalization: the evaluation was followed by a consequence in the presence of the restaurant itself.

TEST YOURSELF

(a) After being reprimanded for criticizing her boss at a meeting, Bia starts criticizing less at meetings, but keeps criticizing at lunch with her friends. (b) After the same reprimand, Bia starts criticizing less at meetings, in the hallway, and in emails to the team. Which one describes discrimination and which one generalization?

ANSWER: (a) discrimination: the effect holds at the meeting and not at lunch, and responding differs between the situations. (b) generalization: the effect spread to situations that resemble the one in which the reprimand occurred.

13.4 Why varying with the situation is not, in itself, inconsistency

Chapter 8 called it a mistake to infer hypocrisy or inconsistency from different evaluations in different situations, but all it could do was tell you to describe what changes. Now there is a reason. If evaluation is a discriminated operant, it occurs in the situations in which evaluations like it have had certain consequences, and the form it takes in each one is the form that had them. Variation across situations is not an anomaly to be excused: it is what the concept predicts.

Guerin (1994, p. 157) draws the conclusion for attitudes: "audiences therefore function as discriminative stimuli for the reporting of specific attitudes" (an audience is whoever listens or reads, and Chapter 14 returns to the term). Guerin notes that, when filling in a 7-point scale, people often say or write "Well it depends on what this is for" or "But it all depends upon the context," and that this "problem" turns out to be "a fundamental property." In the terms of this chapter, the person is saying, accurately, that the response depends on the situation, and the scale question itself is a situation, with someone asking and something to be done with the answer.

Social psychology is aware of this finding and treats it in different ways. Ajzen (2001, p. 29) notes that, depending on one's standpoint, varying evaluations of one object across settings may be read either as several attitudes toward that single object or as attitudes toward distinct psychological objects. Bohner and Dickel (2011, p. 393) sum up the literature by saying that there is "abundant evidence" that evaluative judgments are sensitive to context, which favors a constructionist view, and also evidence of "high stability" in many attitudes even when situations change.

In the language of this chapter, sensitivity to context and stability do not compete: they are the two extremes of the shapes the gradient in Figure 13.3 can take. An evaluation is stable across situations when those situations have never been correlated with different consequences for it; it varies when they have. Which of the two shapes the evaluation under study has is a research question, not an assumption. This changes the question the finding raises, "one attitude or several?": it stops being a matter of definition and becomes a matter of observation. Do the evaluations in the two situations vary together when the consequences change? Do they have the same function (Chapter 11)?

If variation is to be expected, why does it look like a defect? Partly because the demand for consistency varies across cultures. Albarracín and Shavitt (2018, pp. 317–318) report that, in Western settings, attitudes that are stable and consistent with one another are seen as essential for guiding action, whereas East Asian philosophy emphasizes that "everything needs to be evaluated in its context." Calling someone inconsistent is an evaluation made under that demand, and Chapter 14 comes back to it. None of this makes every variation expected. If, in the same situation, with the same people and the same things at stake, the evaluation of the same object changes valence, something changed that the record did not capture, and that is what one looks for. And constancy also calls for an explanation: the same evaluation in every situation does not prove "conviction"; it may be the flat gradient of a history in which the situation never made a difference.

This completes the answer Chapter 10 promised. When Paulo is not talking about exams, no evaluation is taking place, and nothing needs to be stored away, waiting: there is a person whose history (Chapter 12) has made this evaluation likely in certain situations (Chapter 13). In the conversation about soccer, the occasion is missing; at the department meeting, it is there. "Paulo has a favorable attitude toward open-book exams" is still a legitimate summary (Chapter 9), as long as we know what lies behind it: in which situations and with which consequences.

TEST YOURSELF

Bia tells the coordinator that the new material "is good" and, in her colleagues' group chat, that it "is weak." A colleague concludes: "Bia is a hypocrite." Rewrite the conclusion using what the chapter has taught.

ANSWER: for example: "Bia evaluated the material differently in two situations: favorably, in front of the coordinator; unfavorably, among colleagues. If evaluation is a discriminated operant, the variation is to be expected. To find out whether it is the listener that makes the difference, one would need to record what followed each evaluation and vary one element at a time." "Hypocrite" is a conclusion about what she feels, and the data do not support it.

Common learner mistakes

1 **Calling everything present a discriminative stimulus.** The mistake happens because the observation form lists what is present, and the list seems to be the analysis already. *How to spot the mistake:* your list of discriminative stimuli is the list of what was in the room. A stimulus is discriminative only if, in its presence, the response has consequences different from those it has in its absence.

2 **Saying that the situation "makes" the person evaluate.** The mistake happens because everyday language uses "make" for any kind of influence. *How to spot the mistake:* you write "the board makes Letícia soften her criticism." A discriminative stimulus occasions; it does not elicit: the evaluation is emitted, and the situation matters only because of the history of consequences.

3 **Describing the situation and the evaluation and forgetting what follows.** The mistake happens because the third term is not in sight in the situation: it is what came afterward, and it requires continued observation. *How to spot the mistake:* your analysis has two of the three terms. The situation is discriminative only because, in it, the response has consequences.

4 **Inferring inconsistency from variation, or conviction from constancy.** The mistake happens because we expect a person to say the same thing everywhere. *How to spot the mistake:* you write "she says one thing and thinks another" without describing the situation and what followed, or "he has always said so, so he is convinced" without having seen the evaluation in more than one situation.

5 **Saying that two situations "are similar" without the behavior showing it.** The mistake happens because the similarity the observer sees seems to hold for the evaluator. *How to spot the mistake:* you claim that the evaluation "generalized" to the meeting with the client because both are "formal," without having recorded the evaluation in both.

SUMMARY

Three-term contingency (objective 1). A discriminative stimulus is a stimulus in whose presence the response has certain consequences; it occasions the response, rather than eliciting it. A discriminated operant is a response class defined also by the stimulus in whose presence it occurs. Writing the three-term contingency of an evaluation means saying in what situation it occurs, what is said, and what usually follows; SΔ is the stimulus in whose presence the response does not have that consequence.

What, in the situation, occasions the evaluation (objective 2). Three of the four questions of Chapter 8 (where, with whom, after what) call for stimuli; the fourth, what is at stake, calls for the consequence the situation signals. The observation form lists what is present; what controls can be discovered only by varying one element at a time. What does not vary across occasions, such as the data-collection context, does not show up as a difference.

Discrimination and generalization (objective 3). Discrimination is a difference in responding between situations; generalization is the spread of the effect to situations, or objects, that differ from the original along some dimension. The gradient tells how much: flat when responding does not change, steep when it drops with distance. What Chapters 2 and 5 called "extending" the evaluation is generalization.

Variation across situations (objective 4). If evaluation is a discriminated operant, varying with the situation is to be expected, not inconsistency; constancy, too, is a result to be explained. The question becomes empirical: what, in the situation, occasions each form, and with what consequences.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. Which of the options is a discriminative stimulus, in the sense used in this chapter?

a. The sentence "this system is torture."

b. The colleagues' agreement after the sentence.

c. The presence of the team colleagues, in which the sentence is usually followed by agreement.

d. The fact that the meeting room is always the same, with or without the board.

2. At a condominium meeting, the building manager asks: "What did you think of the renovation?" Marta replies: "It turned out great, but it took far too long." The manager writes down the delay and gives the floor to the next person. (a) Write the three-term contingency. (b) What would need to be observed to say that the manager's question is a discriminative stimulus for Marta's evaluation?

3. Lívia says "I really enjoyed the talk" to the speaker, who smiles and thanks her. The next day, she says the same thing to colleagues who hated the talk, and they change the subject. Over the following weeks, she says it to the speaker often and to her colleagues less and less. (a) Which is the SD and which is the SΔ? (b) What process from Chapter 12 operates in the second situation? (c) What is the end result called?

4. A company administers the same satisfaction survey, on the same day and through the same medium, to two groups of employees: one identified, the other not. The mean ratings differ. What does the result allow us to say? What would be missing to claim that anonymity is a discriminative stimulus for this evaluation?

5. (Hypothetical illustration, modeled on the experiment with two pigeons.) Ana and Bruno say "this class is great" whenever the teacher, who uses a projector and speaks enthusiastically, teaches. In one test, the teacher teaches enthusiastically without the projector;

in another, with the projector and without enthusiasm. Ana says the sentence in the first; Bruno, in the second. What does the test show, and why did observing the ordinary classes not show it?

6. Classify each case as discrimination or generalization, and justify your answer: (i) praised for saying he likes running, Tomás starts saying that he also likes walking and cycling, without ever having been praised for that; (ii) Tomás says he likes running to his friends at the club, who agree, and does not say it to his coworkers, who laugh; (iii) reprimanded for criticizing his boss at a meeting, Tomás also starts criticizing less in hallway conversations with the director.

7. Two employees, A and B, were observed in five situations, from most to least similar to the meeting at which their evaluations of the new system were well received. Favorable evaluations per week: A: 8, 8, 7, 8, 8; B: 9, 6, 3, 1, 1. (a) What gradient does each one have? (b) What does each suggest about the role of the situation? (c) What would someone who measured only the first situation conclude, and why is that a problem?

8. (a) Rui had good experiences at three Japanese restaurants and says, about a fourth one he has never visited: "It must be great, it's Japanese." What process is this, in the terms of the chapter? (b) How does it differ from a researcher who "extends" to a group of restaurants the results obtained with a sample? (c) What would make Rui's gradient steep?

9. In college, Pedro was praised when he criticized consumerism; at his company, each of his criticisms is met with discomfort (Exercise 7 in Chapter 12). If the effect of punishment generalizes, what changes would you expect in his criticisms (i) in meetings with clients, (ii) at lunches with his bosses, and (iii) among his college friends? What data would indicate that the effect remained restricted to the situation in which it occurred?

10. The director says: "Letícia is inconsistent: she says one thing to the board, another to the team, and another in the survey." (a) Rewrite the sentence as a description. (b) What questions would the chapter ask before accepting "inconsistent"? (c) What data would make the variation a problem to be explained, rather than what is expected?

1. c. It is the stimulus in whose presence the response has the consequence. Option **a** is the response; option **b** is the consequence; option **d** is a contextual stimulus: it does not change across occasions and, for that reason, does not distinguish those that have the consequence from those that do not.

2. (a) Situation: the building manager's question, at a condominium meeting. Response: the evaluation "great, but it took far too long." Consequence: writing down the delay and giving the floor to the next person. (b) One would need to observe Marta's evaluation when nobody asks, for example at meetings where the manager only makes announcements: whether it has other consequences or stops occurring. The question comes before the response, but it is the occasion only if the response has different consequences in its presence and in its absence.

3. (a) The speaker is the SD, and the colleagues are the SΔ, for this evaluation. (b) Extinction: nothing new is produced; what maintained the class (the listener's reaction) stops coming, and the class decreases. (c) Discrimination: responding differs depending on the situation.

4. The result allows us to say that, in this administration, the ratings varied with identification, which is a piece of evidence. To claim that anonymity is a discriminative stimulus, the groups would have to not differ in anything else (for example, because they were formed at random), the result would have to be replicated, and the difference would have to be linked to what follows the evaluation in each condition (what identification might produce).

5. Ana is under the control of the enthusiasm, and Bruno, of the projector: the functional stimulus is different for each of them. In the ordinary classes, the two elements came together, and observation did not separate them; only varying one at a time shows which one controls (Catania, 1999, p. 150).

6. (i) Generalization: the evaluation occurs in the presence of objects (walking, cycling) similar to the one in whose presence it was followed by the consequence. (ii) Discrimination: a difference in responding between two situations, with different consequences. (iii) Generalization: the effect of the reprimand spread to a situation that resembles the meeting.

7. (a) A has a flat gradient; B, a steep one. (b) For A, the evaluation hardly depends on the situation: none has been correlated with different consequences. For B, it does: the evaluation occurs where it was followed by the consequence and drops as the situation becomes less like that one. (c) That the two are alike (8 and 9), because in the first situation the values nearly coincide. It is a problem because the gradients can be told apart only with more than one situation (Section 13.3).

8. (a) Generalization: the evaluation occurs in the presence of a new object that resembles the earlier ones along one dimension. (b) In Rui's case, it is a process in the person; in the researcher's case, it is a decision about how far the study's result applies (Section 5.5). (c) If, in Rui's history, only one kind of Japanese restaurant had been good and the others disappointing, the evaluation would drop in the presence of those that differ most from that kind.

9. Model answer: (i) and (ii) a likely decrease, because these situations resemble the company, to an extent that the gradient determines; (iii) maintenance, because criticism continues to be followed by praise (discrimination). The effect would have remained restricted if his criticisms decreased only at company meetings and stayed the same in (i) and (ii). Only observation tells which is the case.

10. (a) Model answer: "Letícia evaluated the system unfavorably in all three situations: 'a few areas to improve' in front of the board; 'torture' with the team; a 3 and 'insufficient training' in the anonymous survey." (b) In what situations each evaluation occurred; what followed each one; what changes from one to the next (who is listening, what is at stake); whether the variation recurs on other occasions. (c) Opposite valences in the same situation, with the same people and the same consequences, with nothing having changed in the record.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 14. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2, 3	13.1 (three-term contingency) and common mistakes 2 and 3
4, 5	13.2 (what, in the situation, makes a difference) and common mistake 1
6, 7, 8, 9	13.3 (discrimination and generalization) and common mistake 5
10	13.4 (variation and inconsistency) and common mistake 4

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CHAPTER

14 Attitude Is Verbal Behavior

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** verbal behavior, speaker, listener, verbal community, and audience, and **explain** why "verbal" is defined by function, not by form.
2. **Classify** an evaluation as a tact, a mand, or an intraverbal by what occasions it and what maintains it, and **recognize** when the same sentence has more than one function.
3. **Describe** how the verbal community and the audience shape what the person evaluates, says, and leaves unsaid, and **identify** the marker of authorship and firmness as an autoclitic.
4. **Apply** this analysis to reading a questionnaire or interview response, saying what it allows us to conclude and what it does not.

PREREQUISITES

Chapter 13 (discriminative stimulus and three-term contingency), Chapter 12 (consequence and reinforcement), Section 11.3 (reporting covert events), and Section 7.2 (the marker of authorship and firmness). New technical terms are defined here.

OPENING

At Sunday lunch, Renata goes from plate to plate serving sautéed jiló (a small, bitter, eggplant-like vegetable). At three different moments, three people at the table say the same sentence: "I don't like jiló."

Sérgio has just tasted a piece and made a face. Vera saw the spoon approaching her plate and said the sentence so as not to be served; Renata moved on. Caio has never tasted jiló, like Marina in Chapter 4, who used to say "jiló is horrible" in a house where everyone made a face whenever it appeared on the table. The conversation had turned to "what each of us won't eat" and, when his turn came, he said the same sentence, which has always been said at home.

On a form, the three sentences would be the same record: object, jiló; valence, negative. According to the previous chapters, all three records would be correct. Even so, the sentences do not seem to do the same thing: Sérgio's tells what the dish did to the person who tasted it; Vera's asks something of the person serving; Caio's goes along with the conversation. Not a single word changes from one to the next. What does change?

Chapter 13 placed evaluation within the situation in which it occurs and left one term open, *audience*. This chapter deals with what is distinctive about evaluations spoken to someone: they produce effects only through the person who hears them, and that is what makes them verbal behavior.

14.1 What makes behavior verbal

In everyday language, "verbal" means having words. In behavior analysis, the term has a technical meaning, and the boundary is drawn by the path the consequence takes.

KEY CONCEPT

Verbal behavior is behavior whose consequences arrive through another person, the listener, whom the verbal community has trained to respond to those forms (Medeiros et al., 2021, p. 17). Skinner (1957, p. 14, cited in Medeiros et al., 2021, p. 19) defines it as "behavior reinforced through the mediation of other persons"; for Catania (1999, p. 271), "verbal behavior, in itself, does not do things. It is effective through the mediation of other people." The **speaker** is the one who emits the verbal response, and the **listener** is the one who responds to it and, in doing so, provides the consequence.

Vera has two ways of ending up with no jiló on her plate. After being served, she can remove it with her fork: the effect comes from what she does to the jiló. Or, beforehand, she can say "I don't like jiló": the jiló goes unserved only because of what Renata does after hearing her. The words move nothing; they are effective because there is a listener who, in the history of this community, has learned to respond to sentences like this one. Medeiros et al. (2021, p. 17), in their abstract, speak of a listener "specially trained in a verbal community." The basic-concepts chapters of the Instituto Walden4 book series draw the same boundary.

What sets verbal behavior apart from other operants is the source of its consequences, which "are influenced by another individual, the listener" (Moreira, Ávila et al., 2023, p. 36).

Mediation by other people, however, characterizes all social behavior, and Catania (1999, pp. 271–272) adds a condition: the social contingencies that shape verbal behavior create reciprocal repertoires, in which the speaker becomes a listener and the listener becomes a speaker. "Such reciprocities define verbal behavior" (p. 272). Speaker and listener are, therefore, roles, not people (p. 258). The reaction of whoever hears is the consequence that maintains or weakens what the speaker says: "we tend to stop talking when people do not react to what we say" (p. 272).

Nor is verbal the same as spoken. Catania (1999, p. 253) uses "verbal" as a generic term, which "applies to language in any modality," and reserves "vocal" for spoken language. Writing, gesturing, and marking a number on a scale can thus be verbal behavior, provided they are effective through someone who reads or sees them. There are borderline cases, such as the wordless gesture, on which the sources disagree (Catania, p. 392; Guerin, 1992, p. 1429); this chapter deals with the central case, in which someone evaluates something for someone.

A note on vocabulary: in the previous chapters, "verbal" and "nonverbal" were used in the everyday sense of "made of words" or not (Chapter 6 speaks of nonverbal topography), and they served to describe forms. Here "verbal" is a technical term and is defined by function, the lesson of Section 11.5 (responses of the same form can have different functions, and responses of different forms, the same function) applied to language: verbal responses are distinguished by the occasions on which they occur and by the consequences they produce (Catania, 1999, p. 252).

It follows directly that an evaluation someone says, writes, or marks for someone is verbal behavior, and from here on it will be analyzed as such.

EXAMPLE

Before being served, Vera says "I don't like jiló," and Renata moves the spoon along. The effect (having no jiló) occurred only because Renata, who heard her, responded to the sentence. The consequence arrived through the listener.

NON-EXAMPLE

Already served, Vera removes the jiló with her fork and leaves it on the rim of the plate. The jiló left the middle of the plate because of what she did with the fork; nobody had to respond to anything she said. The effect is similar, and the behavior is not verbal.

TEST YOURSELF

After a long meeting, Inês does two things: (a) she tells her coworker "that meeting was a waste," and the coworker agrees; (b) alone in the room, she takes off her shoes and lets out a sigh. Which of the two is verbal behavior, in the sense of this chapter? What decides it?

ANSWER: (a). The agreement came through a listener, and that is why the sentence is effective. In (b), nothing passes through anyone: the relief comes from what she did with her feet. What decides it is the path by which the consequence arrives, not the presence of words.

14.2 Verbal community and audience

Nobody invents on their own what to say, or how to respond to what they hear. What teaches and maintains this is the verbal community.

KEY CONCEPT

The **verbal community** is the set of people whose reinforcement practices establish under what conditions verbal responses are reinforced and which listener behaviors are reinforced in the presence of which verbal stimuli (definition proposed by Medeiros et al., 2021, p. 24). The **audience** consists of the discriminative stimuli that set the occasions on which verbal behavior has consequences; different audiences make different verbal classes likely (Catania, 1999, p. 387).

Skinner never quite defines the verbal community directly (Medeiros et al., 2021, p. 24); Catania (1999, p. 272) treats it by what it does: verbal behavior is "shaped and maintained by the practices of a verbal community." In the case of evaluations, these practices teach what is worth evaluating, how to say it, to whom and on what occasion, and what to do on hearing an evaluation: agree, ask for details, change the subject. The classic studies summarized in Section 12.5, which manipulated what followed an evaluation, already had this structure: what followed

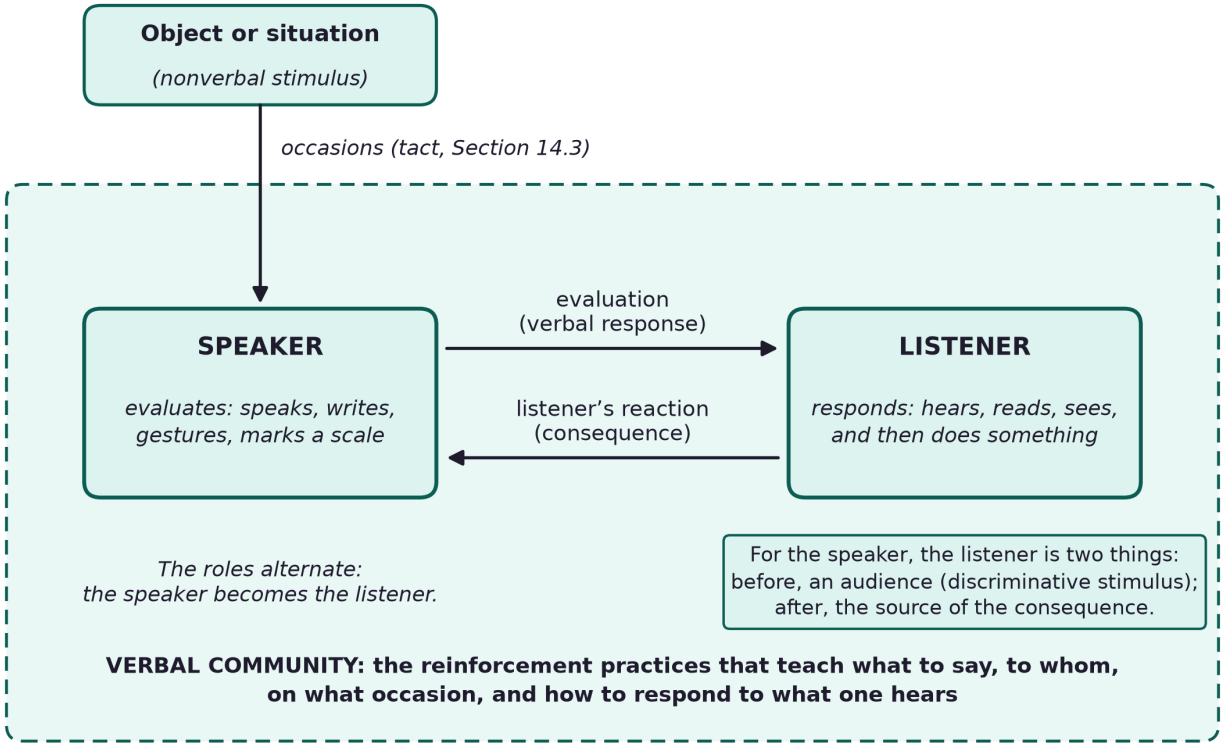
the evaluation was a listener's reaction (the classmates' vote, in Scott, 1957; the "good" said over the telephone, in Hildum & Brown, 1956, and in Insko, 1965).

Each person belongs to several communities at once: the family, the school, the work team, the group chat. Guerin (1992, p. 1426) notes that small subcommunities can change how people talk and write, and which words they use, even inside a much larger community that keeps the whole language going. At home, "I don't like jiló" has been said since Caio was little and is usually met with a "me neither"; among his schoolmates, the same sentence is met with teasing (illustration). The sentence is the same; the history of consequences, in each community, is not.

The community explains what Caio learned to say. The audience is what, on a given occasion, signals that saying it will have certain consequences: in the three-term contingency of Chapter 13, it is the discriminative stimulus. Chapter 13 already presented Guerin's conclusion (1994, p. 157): audiences serve as discriminative stimuli for reports of particular attitudes, which is why "audience bias" is likely when people report preferences. "Bias" here means only that the report depends on who is listening.

It helps to separate two roles of the same person. As an audience, whoever listens is a stimulus that comes before the evaluation and makes certain forms of it more likely. As a listener, that person is the one who responds afterward, and the response is the consequence. The audience, moreover, is not always a person: an effective audience "may or may not be a person," as when one talks to a pet (Catania, 1999, p. 274). Figure 14.1 brings the terms together.

Figure 14.1
Speaker, listener, audience, and verbal community



Note. Diagram prepared for this book, based on Catania (1999) and Medeiros et al. (2021).

TEST YOURSELF

At his grandmother's house, Caio says "I don't like jiló," and she replies: "Try it first." Identify the speaker, the listener, the audience, and the consequence of Caio's sentence. Is the grandmother's reply verbal behavior?

ANSWER: speaker, Caio; listener, his grandmother; audience, the grandmother and the table, which, in Caio's history, signal this kind of reaction; consequence, the "try it first." The grandmother's reply is also verbal behavior: she, who was the listener, has become the speaker, and her sentence specifies what Caio should do (Section 14.3).

14.3 Tact, mand, and intraverbal

Skinner (1957, cited in Medeiros et al., 2021, p. 26) described eight verbal operants. Three are of direct interest to anyone who studies evaluations: the tact, the mand, and the intraverbal. Guerin (1994, p. 156) argues that a sentence such as "My attitude towards fluoridation of wa-

ter supplies is one of disagreement" could serve any of the functions of verbal behavior. Treating it solely as the report of a private event, as most of the social psychology literature does, leaves the other functions out (pp. 155–156).

KEY CONCEPT

A **tact** is a verbal response occasioned by a discriminative stimulus (Catania, 1999, p. 260). In the tact, this stimulus is an object, an event, or a property of these, not words, which occasion another operant, the intraverbal (below). It is the point at which verbal behavior makes contact with the environment.

There is no new process here. The relation between a tact and what is tacted "is precisely the same relation as that between a stimulus and the response it occasions in a three-term contingency" (Catania, 1999, p. 260), the one from Chapter 13. What changes is that the response is verbal and that the consequence comes from a listener, usually in a generalized form: approval, attention, affection (Guerin, 1992, p. 1426). Even so, the tact depends on its consequences: we do not go around tacting everything we see (Catania, p. 260).

An evaluation can be a tact, and this is the function that traditional social psychology assumes to be the main one (Guerin, 1994, p. 156). Catania (1999, p. 262) observes that, when a painting, a piece of music, or a situation occasions the word "wonderful," this tact "presumably depends more on the responses generated in the speaker than on physical properties common to all these stimuli." This is the lesson of Chapter 4 in other terms: evaluation is not a property of the object, but part of the relation between the evaluator and the object.

EXAMPLE

Sérgio puts the jiló in his mouth and says "I don't like jiló." What is in contact with him, the taste, occasions the sentence; what maintains it, in general, is the diffuse reaction of whoever hears it ("it really is bitter," a laugh, the conversation that follows). The consequences are hypotheses for illustration.

NON-EXAMPLE

Days later, Sérgio's sister asks him over the phone whether he likes jiló, and he says the same sentence. The jiló is not in sight, nor was it tasted a moment ago. Catania (1999, p. 263) reserves the name tact for what occurs in the presence of the stimulus or shortly after it, and treats what comes long afterward as a separate case, which involves behavior other than tacting.

KEY CONCEPT

A **mand** is a verbal response that specifies its reinforcer (Catania, 1999, p. 410): "requests and commands, for example, specify the behavior the listener should engage in" (p. 273). Questions are mands too: they specify the listener's verbal behavior (p. 273).

An evaluation can function as a mand without having the form of a request. Guerin (1994, p. 159) gives the example of a boss who comments that she dislikes employees having coffee on the job: this is not "an innocent tact of her private attitude." The remark is likely to mold what the listener does and works as though she had manded "Do not drink coffee while you work or else!", whether or not she "intended" it. The function does not depend on intention. Whenever the typical consequence of stating the evaluation, on that occasion, is a specific action by the listener (serving or not serving, changing a deadline, giving up a seat), the evaluation functions there as a mand. What makes this consequence valuable at that moment (hunger, haste, discomfort) is the business of establishing operations, which Medeiros et al. (2021, p. 28) identify, together with the specific reinforcer, as what defines the mand, and which Chapter 19 takes up again.

EXAMPLE

Vera sees the spoon approaching and says "I don't like jiló." The sentence gets her what she wants: not being served. If Renata served her anyway, the sentence would have failed, and that is why it specifies the consequence. "Don't serve me jiló" would be the same mand, in the form of a command.

NON-EXAMPLE

Sérgio, after tasting it, says "I don't like jiló" to a table that has already moved on to dessert. Nobody has anything to do because of the sentence: it asks nothing of Renata or of anyone else. The form is Vera's; the function is not.

KEY CONCEPT

An **intraverbal** is a verbal response occasioned by a verbal stimulus (words spoken or read, by another person or by the speaker), in an arbitrary relation between stimulus and response, established by the verbal community (Catania, 1999, p. 408). Reciting the alphabet (p. 408) and saying "Lima" on hearing "Peru" (Guerin, 1994, p. 158) are examples.

Guerin (1994, p. 158) holds that many evaluations are intraverbal: they occur under the control of the words spoken, not of what is in front of the person, and behind them lies a history of being reinforced for stating attitudes when the topic comes up in conversation. Another clue, in Guerin's analysis, is that many attitudes concern things never experienced. Saying that one dislikes the use of nuclear energy, with no experience of it whatsoever and knowing only what one has read in the papers or heard from others, has to be intraverbal behavior. Catania (1999, p. 258) provides the basis: we generally do not learn historical facts by living through them; "given the names and the dates," we learn to say when and in what order events occurred. Much of what we evaluate reaches us this way, and it is the third route of Chapter 4, "what they are told."

EXAMPLE

Asked at a dinner "what do you think of reality shows?", Caio, who has never watched one, answers: "a waste of time." The question occasions the sentence; the object is not involved. What maintains it is the agreement of the people at the table, which, in Caio's history, usually comes when he says what his family says.

NON-EXAMPLE

Caio, with the television tuned to a reality show, sees two people arguing over nothing and says "what a waste of time." Now what he sees occasions the sentence. The history may be the same, what Caio heard at home, but the control, on this occasion, is different.

The shift from tact to intraverbal is gradual. Guerin (1994, p. 158) proposes a continuum along which verbal communities shape the move from "I like playing with this cat in this room," which is somewhat believable as a tact of a preference, to "I like cats" and "I like all cats," which are intraverbals. Guerin's point is that "I like all cats" cannot be controlled by a discriminative stimulus made up of every cat in the world. Guerin also acknowledges that the boundary between tacts and intraverbals is a gray zone that behavior analysis has yet to clear up (p. 158).

Be careful not to confuse this with the three routes of Chapter 4 by which people learn to evaluate: direct experience, observing other people, and what they are told. The routes say how the evaluation was learned; tact, mand, and intraverbal say what controls the sentence *on this occasion*. Someone who learned to evaluate through direct experience may state the evaluation today under the control of a question, with the object out of the picture, like Sérgio on the phone. History is one thing; current control is another. Table 14.1 summarizes the three functions with the people at the lunch.

Table 14.1

Tact, mand, and intraverbal applied to an evaluation

	Tact	Mand	Intraverbal
What occasions the sentence	An object, an event, or a property, in contact with the speaker	A specific consequence the person wants to obtain from the listener	Someone's words (a question, a statement, a topic), with the object not involved
What usually maintains it	Generalized social consequences: attention, agreement, the conversation going on	The specific consequence the sentence asks for (being served or not, changing a deadline)	Reinforcement for saying what is usually said there, when the topic comes up
Question for recognizing it	Would the sentence change if the object changed?	What should the listener do? Does the sentence fail if the listener does not do it?	Would the sentence come with these words, with the object out of sight?

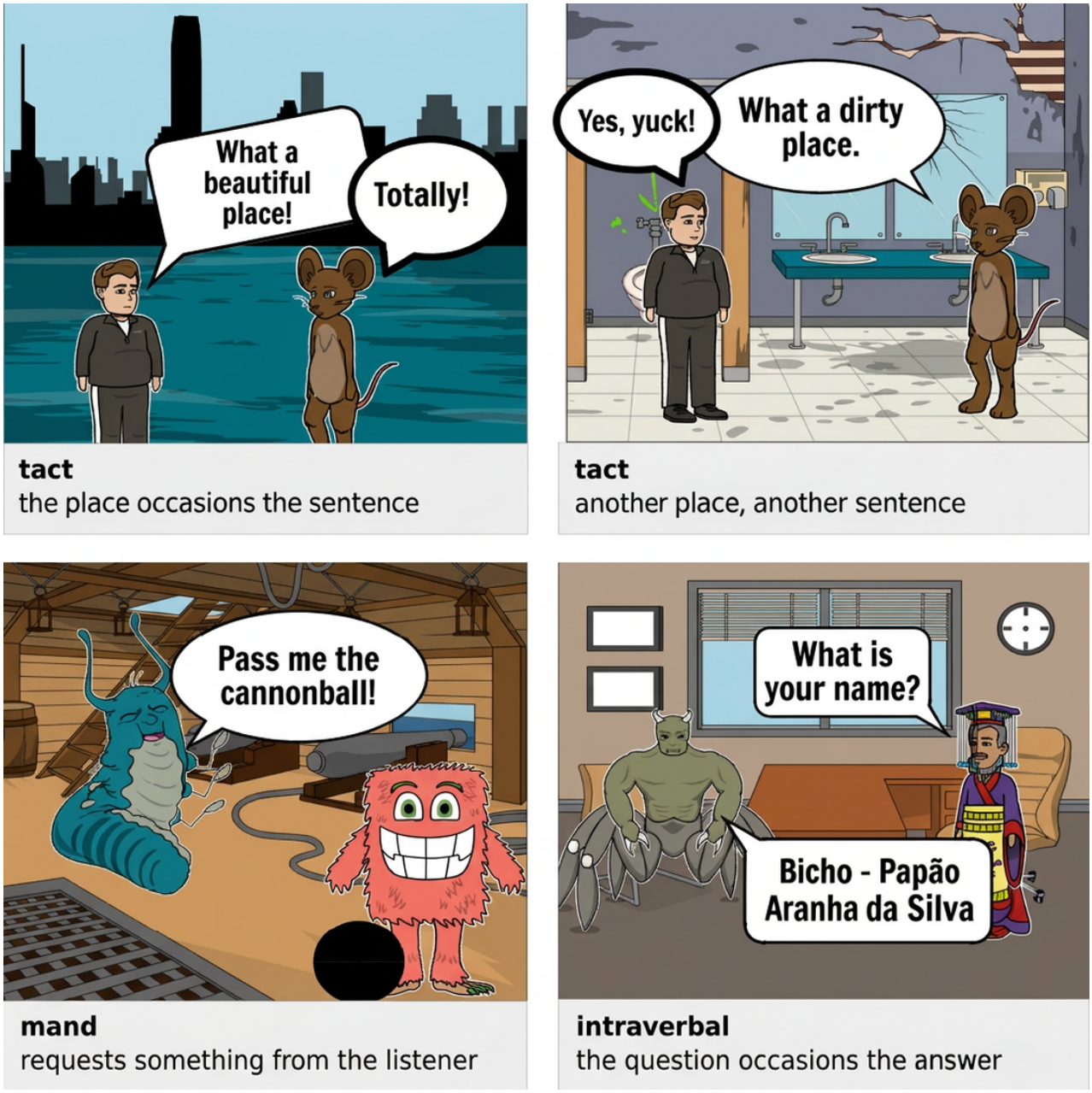
	Tact	Mand	Intraverbal
At the lunch	Sérgio, on tasting the jiló	Vera, so as not to be served	Caio, who has never tasted it

Note. Table prepared for this book, based on Catania (1999) and Guerin (1994). The consequences are those that usually maintain each operant; in a real case, only observing several occasions reveals them.

The first volume of the book series from which this book's scenes come presents the three operants in comics with fantasy characters, in its basic-concepts chapter (Moreira, Sousa et al., 2022, pp. 27–29). Figure 14.2 brings together four of those panels. In the top two, the same frame, "What a ... place," is said in front of a beautiful place and a dirty place: when the place changed, the sentence changed, which is the test for a tact (Table 14.1). The mand is a request that is fulfilled only if the listener does something: "Pass me the cannonball!" The intraverbal is the answer to a question, given with no object involved: on hearing "What is your name?", the character says his name. The Part III volume of the series diagrams the tact with an evaluation of the weather: inside an elevator, on a hot day, someone says "Wow, it's hot." and the other person replies "It sure is!" (Moreira, Lemos et al., 2024, p. 34).

Figure 14.2

A tact, a mand, and an intraverbal in comics



tact
the place occasions the sentence

tact
another place, another sentence

mand
requests something from the listener

intraverbal
the question occasions the answer

Note. Panels from Figures 1, 2, and 3 of the basic-concepts chapter of Moreira, Sousa et al. (2022, pp. 27, 28, and 29), created by its authors. The strips under the panels were added for this book. The reproduction has the resolution of the source material.

TEST YOURSELF

Classify each sentence by what probably occasions it and say what information would confirm the classification. (a) Leaving class, Clara says to a classmate: "what a good class." (b) At the budget meeting, the coordinator says: "this course is essential," and the funding is kept. (c) In a group, someone asks "what do you think of distance learning?", and Teo, who has never taken a distance course, answers: "it doesn't work."

ANSWER: (a) tact: the class, which has just taken place, occasions the sentence; it would be confirmed by knowing that she was not asking anything of her classmate. (b) probably a mand: the sentence specifies what is wanted from those who decide, and that was the observed consequence; it would be confirmed by seeing the coordinator say something else, or nothing, when no funding is at stake. (c) intraverbal: the question occasions the sentence, and Teo has no contact with the object; it would be confirmed by knowing what he has read or heard about it.

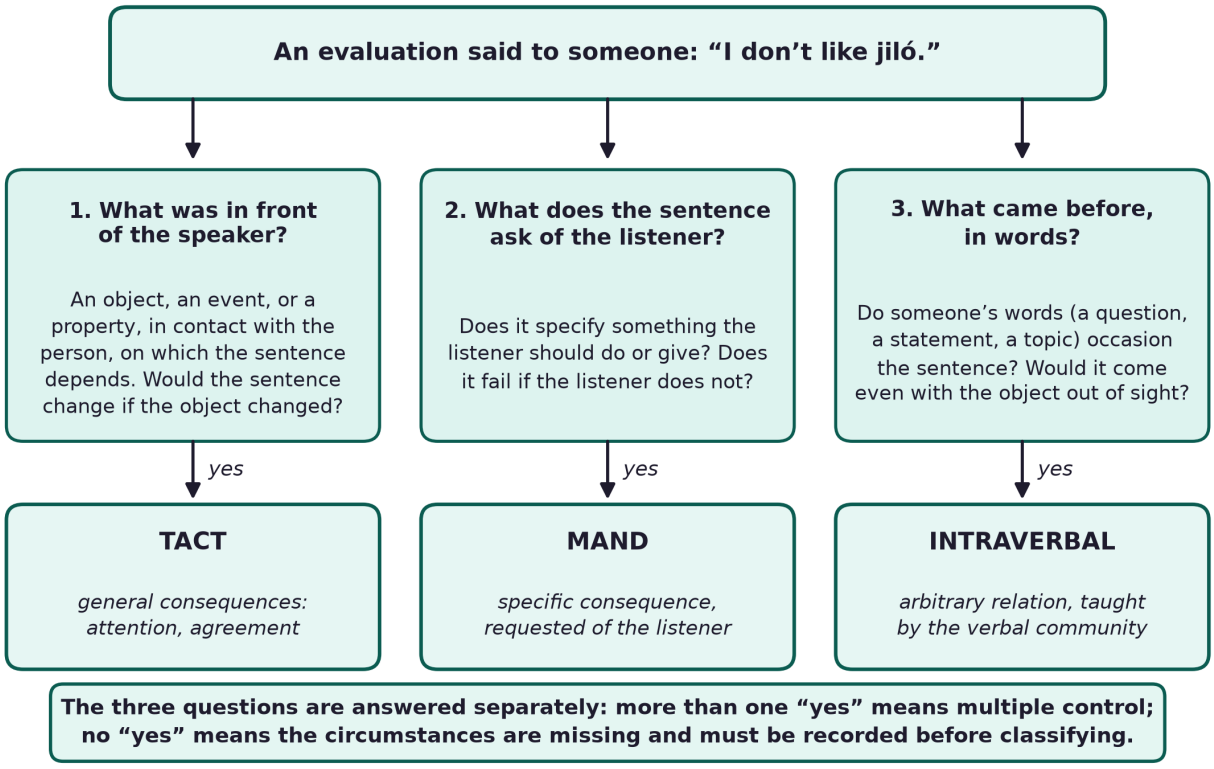
14.4 The function is not in the sentence

The same sentence was three different things at the lunch, and the difference lay in the circumstances, not in the words. Skinner (1957, p. 186, cited in Catania, 1999, p. 274) gives the example of the word "fire": it can be (1) a mand, said to a firing squad; (2) a tact, in the presence of a blaze; (3) an intraverbal response to the stimulus "ready, aim..."; or (4) an echoic response or (5) a textual response, given the appropriate verbal stimuli. Intonation may suggest the type of control, but "an analysis cannot be achieved from such internal evidence alone," and "in order to classify behavior effectively, we must know the circumstances under which it is emitted" (p. 186).

Hence the three questions of Figure 14.3: they ask about circumstances, not about features of the sentence. They are answered separately, because a sentence can get a "yes" on more than one. For Catania (1999, p. 274), "probably no instance of verbal behavior is exclusively determined by a single variable"; when two or more events act together, we speak of multiple causation. Sérgio may say "I don't like jiló" because the taste occasions the sentence (tact) and, at the same time, because Renata is holding the spoon (mand). The analysis describes each part of the control, instead of choosing a single label.

Figure 14.3

Three questions about the circumstances of an evaluation



Note. Diagram prepared for this book, based on the definitions in Catania (1999, pp. 258, 260, and 273) and on Skinner’s criterion (1957, p. 186, cited in Catania, 1999, p. 274).

There are cases in which the record does not allow a decision, and saying so is part of the analysis. Catania (1999, p. 265) recalls the case of someone who says “I have a headache” and leaves a social gathering: it is not clear whether the sentence tacted some private event or merely allowed escape from unwanted company. “I can’t stand this meeting anymore,” said while getting up from the table, is of the same kind: an evaluation, a report of tiredness, a request to be excused. What decides it is what follows sentences like this on other occasions. When the stimulus itself is verbal, the separation becomes even less clear: Medeiros et al. (2021, p. 26) observe that examples such as “what a beautiful poem,” said after reading a poem, give rise to disagreement over whether or not they are tacts. They also point out (p. 28) that the definitions of the verbal operants do not exhaust the network of functional relations a response takes part in: verbal operants are categories of patterns of contingencies.

One type of verbal behavior remains that has already appeared, without a name, in earlier chapters. The marker of authorship and firmness from Section 7.2 ("I think that," "I'm sure that") has a technical name: autoclitic.

KEY CONCEPT

An **autoclitic** is verbal behavior that depends on other verbal behavior and modifies its effects on the listener (Catania, 1999, p. 387). Descriptive autoclitics involve discrimination of the speaker's own behavior (p. 387), as in "I doubt that" and "I am sure that" (p. 269).

"I think that" does not speak about the evaluated object: it speaks about the sentence that follows. Catania (1999, p. 269) analyzes "I doubt that the coffee is ready" and "I am sure that the coffee is ready": each one modifies the probability that the listener will act on the statement that the coffee is ready. In the same way, "I'm sure the change is necessary" tends to lead the listener to act on the evaluation more than "I suspect the change is necessary" (illustration). Autoclitics also serve to avoid consequences. Guerin (1994, p. 159) observes that, in front of a society of cat lovers, someone who says "I like dogs" risks negative consequences, while someone who says "I like dogs somewhat" easily avoids them. Guerin adds that, when filling in questionnaires, people are often bothered at being unable to attach such qualifications to the ratings they give. Putting a number on one's attitude on a seven-point scale, he writes, can be baffling when attitudes function as mands, because there is no listener to negotiate with.

TEST YOURSELF

At a meeting, Inês tells the coordinator: "I think the deadline is tight." Describe the functions the sentence may have and what the "I think" does.

ANSWER: it may be a tact (the deadline, in front of her, occasions the evaluation) and a mand (it asks the coordinator to extend it); the record of other occasions would tell which predominates, or whether it is both. "I think" is an autoclitic: it modifies the effect of the sentence on the listener, making it less firm than "the deadline is tight" and than "I'm sure the deadline is tight," and perhaps reducing the risk of an adverse reaction.

14.5 What changes for researchers

If evaluation is verbal behavior, a response to a questionnaire or an interview is a verbal response, given to someone, in a situation. One of the series' studies describes the response it measures this way: the topography is "clicking on one of the options on a Likert-type scale in a form" (Moreira, Martins et al., 2024, p. 76). The click counts as an evaluation only because someone will read the form later, and whoever reads it, the researcher, occupies the place of the listener. Four practical consequences follow from this.

The first is that the question is part of the contingency. Questions are mands: they specify the listener's verbal behavior (Catania, 1999, p. 273). Guerin (1994, p. 157) notes that an attitude question asked by another person can "mand" a particular reply, as in "You don't prefer dogs to cats, do you?" He also notes that scales and survey questions will depend on who is asking, or on the entire verbal culture in which the survey takes place. Who asked, with what words, with what alternatives, and what the answer would be used for make up the data-collection context (Section 8.4); now we know that part of it is audience, and part is the mand the question itself contains.

The second is that the report of something the person "feels" is a tact of a private event. This tact has a peculiarity: the community that taught it had access only to public correlates, such as crying, facial expression, and what had happened (Catania, 1999, pp. 264–265). That is why, for Catania, the language of private events, like that of public ones, "depends on public practices of the verbal community" (p. 265), and what looks like the report of a private event may be something else, as in the headache of the previous section. Calling a response the report of an attitude is, therefore, one more hypothesis. What the researcher has is what the person said, to whom, and after what, as Section 11.3 had already said: a report is something the person says, to someone, in a situation.

The third is that form does not reveal control. Guerin (1994, p. 158) observes that saying "Nuclear reactors are unsafe" in the same grammatical form as "Those trees are tall" carries more weight than saying "I read somewhere that nuclear reactors are unsafe." Verbal communities, he adds, reinforce this way of presenting intraverbals as though they were tacts. Chapter 7 showed the grammatical side (the "X is Y" form makes an evaluation sound like a description); here we see the func-

tional side. Two people with the same response may have arrived at it by opposite routes (Chapter 4), and the sentence does not tell which. A follow-up question about contact with the object (did you see it, use it, read about it, hear about it?) helps tell the cases apart, with the caveat that the answer to it is also verbal behavior, given to someone.

The fourth is that what people say and what they do are not tied together by a thread. Guerin (1994, p. 161) states that there is no "automatic link" between attitudes and behavior. Since verbal behavior acts on the world solely by way of other people, the match between what one says and what one does tends to be looser than that of actions on the physical environment. The analyst is led to ask less why there is inconsistency and more how there comes to be so much consistency. Guerin's answer is that the verbal community demands and reinforces it: there are "mild forms of social punishment" for someone who does one thing on one day and the opposite on the next (p. 161).

Catania (1999, p. 280) points in the same direction: the verbal community sets up contingencies for correspondence between saying and doing, and if the saying and the correspondence are reinforced, the doing may follow. This is the demand for consistency that Chapter 13 discussed, stronger in Western settings, which take stable attitudes as a guide to action, than in the East Asian tradition, which calls for evaluating each thing in its context: calling someone "inconsistent" is an evaluation given under that demand. Correspondence between what a person says and what that person does is an empirical question, not an assumption (Guerin, 1994, p. 155).

None of this devalues the response. Saying that an evaluation is verbal behavior, given to someone, before a certain audience, does not make it false or "just talk": it makes it a datum together with the conditions that produced it, which the researcher needs to record alongside it. Chapter 18 applies this analysis to prejudice, along the path opened by Mizael and de Rose (2017, pp. 367–368), who carried Guerin's analysis over to racial prejudice, with examples of tacts, intraverbals, and mands.

TEST YOURSELF

At the end of an interview, the participant says: "I'm uncomfortable with these questions" and asks to stop. (a) What functions can the sentence have? (b) What does the researcher actually have? (c) What should be recorded?

ANSWER: (a) a tact of something private (the discomfort) and a mand (that the questions stop), possibly both at once, as in Catania's headache (1999, p. 265). (b) A verbal response given to her, in a situation, after certain questions, and what the participant did next. (c) The literal sentence, the question that preceded it, who was asking, and what followed. In any case, the request is granted: analyzing its function is no reason to doubt it.

Common learner mistakes

1 **Taking "verbal" to mean "spoken" or "with words."** The mistake happens because, in everyday language, "verbal" means "made of words." *How to spot the mistake:* you write that a gesture is not verbal "because there are no words," or that writing is not verbal "because it isn't speech." Verbal concerns the path by which the consequence arrives, not the form.

2 **Classifying by the form of the sentence, or demanding a single label per sentence.** The mistake happens because the form of the sentence is in plain sight, and the circumstances are not; and a single label seems more rigorous than two. *How to spot the mistake:* you call "I don't like jiló" a tact because it "looks like a description," or a mand because it "sounds like a request," without knowing what was in front of the person, what came before, and what followed. Or you refuse to accept that the sentence can be two things at once.

3 **Confusing the learning route with the function of the sentence.** The mistake happens because "what they are told" and "intraverbal" both have to do with other people's words. *How to spot the mistake:* you write "she learned it from what she was told, so it's intraverbal," without looking at what controls the sentence on that occasion. The routes of Chapter 4 tell the history; tact, mand, and intraverbal describe the present control.

4 **Confusing function with intention.** The mistake happens because, in daily life, we explain what someone says by what they meant. *How to spot the mistake:* you write "she said that to manipulate" or "he didn't mean to ask for anything, so it's not a mand." The function shows in what the sentence usually produces, whether or not the person "intended" it (Guerin, 1994, p. 159).

5 **Treating the verbal, or the intraverbal, as "just talk."** The mistake happens because everyday speech opposes talking to doing, as if talking were not doing. *How to spot the mistake:* you write "it was just intraverbal, so it's not a real attitude" or "it's only what she says, not what she does." "Intraverbal" says what controls the sentence, not whether it is sincere; and what is said is behavior, given to someone, which the researcher has in hand.

SUMMARY

Verbal behavior (objective 1). Verbal behavior is behavior that produces its consequences through another person, the listener, whom the verbal community has trained to respond; speaker and listener are roles that alternate. Verbal does not mean spoken, nor is it defined by form: writing and gesturing are included, and grammatical classification does not say what the sentence does. The verbal community is the set of people whose reinforcement practices establish what is said, to whom, and how one responds; the audience is the discriminative stimulus that signals the consequences of saying something to someone.

Tact, mand, and intraverbal (objective 2). A tact is a verbal response occasioned by an object, an event, or a property in contact with the speaker; a mand specifies its reinforcer and asks something of the listener; an intraverbal is occasioned by words, in an arbitrary relation established by the community. The same sentence can be any of them, and only the circumstances (what was there, what came before, and what followed) tell which; more than one source of control at the same time is to be expected.

Community, audience, and autoclitic (objective 3). The community teaches what is worth evaluating, how to say it, and to whom; each person belongs to several communities, and the audience makes one form or another of the same evaluation likely. The marker of authorship and firmness is an autoclitic: it modifies the effect of the sentence on the listener and can avoid adverse consequences.

Reading a response (objective 4). A questionnaire or interview response is a verbal response, given to someone, in a situation: the question is a mand, the report of something private is a tact whose control the community reaches only through public correlates, and the grammatical form does not show the control. What is said is not automatically linked to what is done; correspondence is an empirical question.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. Which of the options is verbal behavior, in the sense of this chapter?

a. On seeing the jiló on her plate, Vera feels disgust.

b. Already served, Vera removes the jiló from her plate with her fork.

c. Vera says "I don't like jiló" and Renata moves the spoon along.

d. Alone in the bathroom, Vera makes a face in the mirror.

2. On a questionnaire, Marcos marks 2 on a scale from 1 to 5 (1 = strongly disagree) for the item "the new regulations are fair." (a) Can this be verbal behavior? Why? (b) What is the difference between verbal and vocal?

3. At the condominium meeting, Bia says: "the roof work was poorly planned." The building manager writes this down and replies: "we'll ask for an expert opinion." Identify (a) the speaker, (b) the listener, (c) the consequence of Bia's sentence, (d) what the manager's sentence is in relation to Bia, and (e) what the verbal community is in this case.

4. Classify each case by what probably occasions and maintains the sentence: (a) when the presentation is over, Ana says to the person next to her: "that was a great presentation"; (b) before the vote, Ana tells the group: "I'm against the schedule proposal," and the group withdraws the proposal; (c) asked at a dinner "what do you think of reality shows?", Ana, who has never watched one, answers: "a waste of time."

5. Order these from closest to a tact to closest to an intraverbal and justify your answer: (i) "I like all cats"; (ii) "I like playing with this cat in this room"; (iii) "I like cats."

6. The boss tells the team: "I don't like people who show up late." Later, when questioned, she says she was only "commenting," without meaning to ask for anything. (a) Does this prevent the sentence from functioning as a mand? (b) What would need to be observed to support the classification?

7. Marta says to a coworker, looking at the open report: "this report is a mess," and the coworker replies: "do you want me to redo it?" What functions can the sentence have? What would you need to know to decide among them?

8. Teo tells a group of cyclists: "I like cars, but only now and then." (a) Which part is autoclitic? (b) What does it probably do to the group's reaction? (c) Why does a scale running from "like" to "dislike" leave little room for this?

9. A researcher asks, outside a movie theater: "You liked the movie, didn't you?", and the participant answers "I did." (a) What function does the question have? (b) What does the answer allow us to conclude, and what does it not? (c) Rewrite the question and say what the rewrite does not eliminate.

10. (Fictitious data.) In a condominium, 80% of residents say they approve of recycling; when the trash bins are observed, only 30% of the units separate their trash. The report concludes: "the residents are lying." (a) Rewrite the conclusion as a description. (b) What hypotheses does the analysis of verbal behavior offer, without assuming lying? (c) What would need to be recorded to choose among them?

ANNOTATED ANSWER KEY

1. c. The consequence arrives through the listener (Renata). Option **a** is a private reaction; option **b**, an action on the jiló; option **d**, a facial expression with no listener.

2. (a) Yes, if the mark is effective through whoever reads it: "verbal" applies to language in any modality (Catania, 1999, p. 253). (b) Verbal is the generic term; vocal is the term for spoken language.

3. (a) Bia. (b) The building manager. (c) The note and the "we'll ask for an expert opinion." (d) It is also verbal behavior: the roles are reversed, and Bia becomes the listener (Catania, 1999, p. 258). (e) The condominium's practices (meetings, minutes, requests for expert opinions), which teach what is said there and how one responds; the community is whoever maintains these practices, not the building.

4. (a) Tact: the presentation, which has just taken place, occasions the sentence. (b) Mand: the sentence specifies what is wanted from the group (withdrawing the proposal), and that was the consequence. (c) Intraverbal: the question occasions the sentence, and Ana has no contact with the object. The classification is provisional until other occasions are observed.

5. (ii), (iii), (i). Sentence (ii) is under the control of a cat that is present; (iii) evaluates a category, which no single cat present occasions on its own; (i) contains "all," which no experience covers (Guerin, 1994, p. 158). The boundary is a gray zone.

6. (a) No: the function shows in what the sentence usually produces, whether or not the boss "intended" to ask for anything (Guerin, 1994, p. 159). (b) What the team does afterward (do people start arriving earlier?) and what happens on other occasions with sentences of this kind.

7. Tact (the report, in front of her, occasions the evaluation) and mand (the coworker took it as a request for help, and the consequence was an offer). To decide: does Marta say the sentence when no one can help? Would she be satisfied with a "yeah, it sure is"? More than one source of control at the same time is to be expected (Catania, 1999, p. 274).

8. (a) "But only now and then": it depends on "I like cars" and modifies its effect. (b) It tends to reduce the chance of an adverse reaction from the group (hypothesis; Guerin, 1994, p. 159). (c) The scale collects a number, with no room for the qualification, and the respondent has no one with whom to negotiate the effect (Guerin, 1994, p. 159).

9. (a) Mand: the question specifies the expected answer (Catania, 1999, p. 273; Guerin, 1994, p. 157). (b) It allows us to say that, in this situation, faced with this question and this researcher, he said he liked it; it does not allow us to say that he would have liked the movie in any case, or that the answer would be the same with a neutral question. (c) "What did you think of the movie?" or "From 1 to 5, how much did you like the movie?", with a record of who asked. The rewrite is still a mand (it asks for an answer), but it no longer specifies which one.

10. (a) "Eighty percent of residents said they approve of recycling; 30% of the units separated their trash." (b) Saying is verbal behavior, maintained by whoever is listening (approving has an audience and rarely costs anything); separating trash depends on contingencies in the environment (the bin, the effort, what happens afterward). The community may or may not reinforce correspondence (Catania, 1999, p. 280; Guerin, 1994, p. 161). (c) Who asked and how; what approving costs or earns the respondent; what happens to those who separate their trash; and what the same resident says and does, on the same occasions.

Did you get 8 of the 10 exercises right? Move on to Chapter 15. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2, 3	14.1 and 14.2 (verbal behavior, community, and audience) and common mistake 1
4, 5	14.3 (tact, mand, and intraverbal) and common mistakes 2 and 3
6, 7	14.4 (the function is not in the sentence) and common mistakes 2 and 4
8	14.4 (autoclitic)
9, 10	14.5 (what changes for researchers) and common mistake 5

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PART III

III

Further Topics

Concepts and measures with rigor

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CHAPTER

15 Different Ways of Defining Attitude

OBJECTIVES

By the end of this chapter, you will be able to:

1. **State** the fundamental definition of attitude and **relate** each of its components to the chapter that built it.
2. **Compare** the fundamental, verbal, and minimal definitions, saying what each one adds and what it leaves open.
3. **Identify** the component that each complementary formulation brings to the foreground and **choose** a formulation for a given purpose.
4. **Separate**, in a long formulation, what is definition, what is property, and what is type.
5. **Apply** the rules of use to decide whether a sentence of the form "Attitude is..." defines attitude.

PREREQUISITES

The minimal definition (Chapter 2), topography (Chapter 6), the distinction between topography and function (Section 11.5), and the layers of Part II: behavior (Chapter 11), operant (Chapter 12), discriminated (Chapter 13), and verbal (Chapter 14). The new terms in this chapter are defined here.

OPENING

Lia, a master's student, is writing the introduction to her project and has opened three articles on attitudes. The first says that an attitude is "an evaluation of an object of thought" (Bohner & Dickel, 2011, p. 392). The second quotes Allport: "a mental and neural state of readiness" (Allport, 1935, p. 810, as cited in Mizael, dos Santos, & de Rose, 2016, p. 124). The third states that, understood as verbal behavior, attitudes "can be defined as behaviors maintained by the generalized social reinforcement of the verbal community to which the individual belongs" (Cameoka & Moreira, 2021, p. 94).

Lia needs to open her text with a definition, and what she measures later has to match it. Do the three sentences speak of the same phenomenon? If they do, why do they say such different things? If they do not, what does the word "attitude" refer to?

This chapter states the book's definition in full, compares it with neighboring formulations, and gives rules for deciding what counts as a definition of attitude and what only looks like one.

15.1 One word, several definitions

Lia's three sentences come from different traditions and answer different questions: the word has a long history and has carried many senses (Guerin, 1994, p. 155). Table 15.1 brings together five definitions, with the source of each.

Table 15.1

Where each definition places attitude

Definition	Source	Attitude is…
"a mental and neural state of readiness, organized through experience"	Allport (1935, p. 810), as cited in Mizael, dos Santos, and de Rose (2016, p. 124)	a state of the person, which directs what the person does
"a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor"	Eagly and Chaiken (1993, p. 1), as cited in Mizael, dos Santos, and de Rose (2016, p. 124)	a tendency of the person, which shows itself in evaluating
"an evaluation of an object of thought"	Bohner and Dickel (2011, p. 392)	the evaluation, leaving open what it is
"verbal statements that are maintained by generalized social reinforcement from a verbal community"	Guerin (1994, p. 157)	what the person says, maintained by what the community reinforces
"discriminated operant behavior whose topography is or implies the attribution of a value, ranging from positive to negative, to an object"	this book (Section 15.2)	what the person does, in certain situations, and what maintains it

Note. The first two rows are cited as quoted in Mizael, dos Santos, and de Rose (2016); in this edition, the quotations from Allport, Eagly and Chaiken, Bohner and Dickel, and Guerin are given in the authors' original English.

There is a common core, and it is short: the evaluation of an object along a continuum that runs from favorable to unfavorable (Albarracín & Shavitt, 2018, p. 300). Attitude objects include "anything a person may hold in mind, ranging from the mundane to the abstract, including

things, people, groups, and ideas"; most researchers accept this core, and it is the more elaborate models that differ a great deal (Bohner & Dickel, 2011, p. 392). It is, in essence, the minimal definition of Chapter 2.

What changes from one definition to another is where attitude is placed. Allport and Eagly and Chaiken place it in a disposition of the person, a state or a tendency, and what the person says and does is the expression of that disposition: this is the left panel of Figure 1.2, in Chapter 1, with attitude drawn as a circle inside the person, from which what the person says and does emerges as a sign. In the definitions of social psychology, Mizael, dos Santos, and de Rose (2016, pp. 124–125) note, the "stable and lasting character of attitudes" was present, "openly or covertly." Behavior analysis makes a different choice: for this field, "attitudes are not simply considered related to behaviors, but are behavior (overt or covert), emitted or evoked according to a prior learning history" (p. 125). Guerin (1994, p. 157) reaches a neighboring point by way of verbal behavior, and the last row of the table is this book's definition, developed in the next section.

KEY CONCEPT

A **definition** of attitude fixes what counts as attitude, so that two people apply the word to the same cases. The definitions in Table 15.1 agree about the evaluation and the object and differ about where they place attitude: in a state or tendency of the person, or in what the person does. The difference is not one of words: each choice leads to different questions and different measures (Chapter 11).

EXAMPLE

Lia's sentences, read through the table: Bohner and Dickel's asks only for an object and an evaluation and leaves open what the evaluation is; Allport's places attitude in a state of the person; Cameoka and Moreira's, in what the person says and in what the community maintains.

NON-EXAMPLE

"Attitude is when João says he doesn't like politics." This describes a case. A definition holds for all cases of attitude and only for them; a case, however typical, does not say what makes another case an attitude.

TEST YOURSELF

Of these two definitions, which one takes a position on what attitude is, and which one leaves that open? (a) "an evaluation of an object of thought"; (b) "a mental and neural state of readiness."

ANSWER: (b) takes a position: it says that attitude is a state. (a) leaves open what the evaluation is, and that is why it can serve as a starting point for people working in different traditions.

15.2 The fundamental definition and its components

Part II assembled the book's definition in layers, one per chapter, as Table 1.1 announced: attitude is a natural phenomenon (Chapter 10), behavior (Chapter 11), operant (Chapter 12), discriminated (Chapter 13), and, when said to someone, verbal (Chapter 14). Put together, the layers form one sentence.

KEY CONCEPT

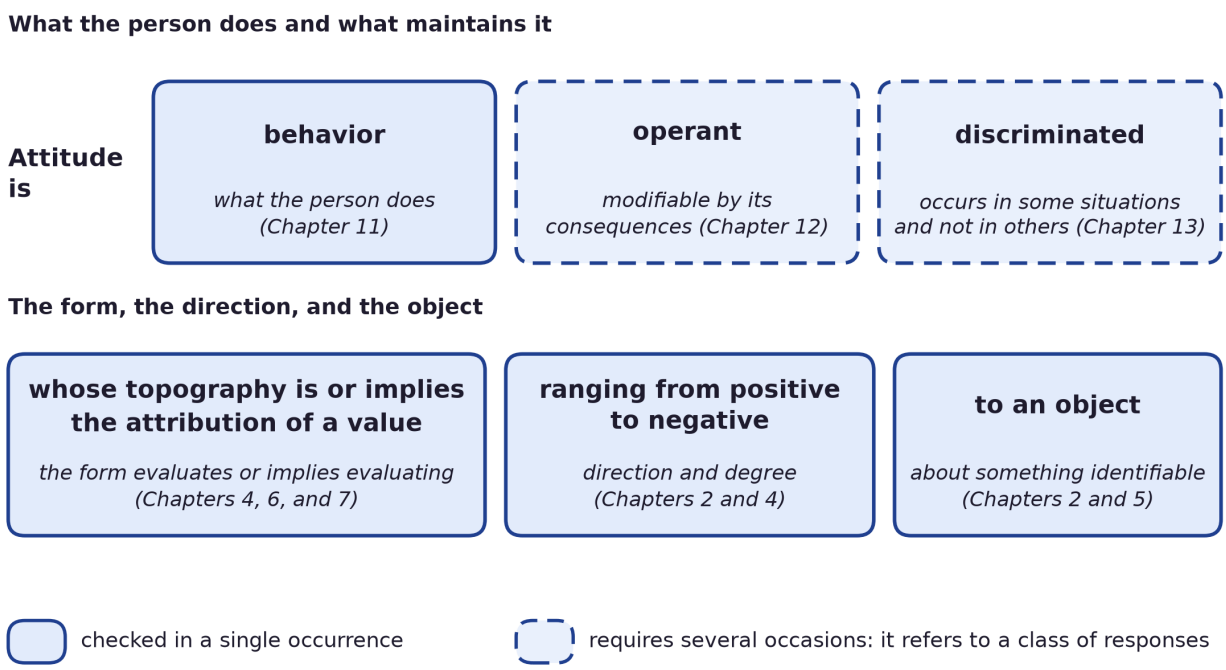
Attitude is discriminated operant behavior whose topography is or implies the attribution of a value, ranging from positive to negative, to an object.

This is the **fundamental definition**: the other formulations in the chapter start from it.

The sentence is long because each part rules something out. Figure 15.1 shows the parts and the chapter that built each one; Table 15.2 shows what each one asserts and what it leaves out.

Figure 15.1

The fundamental definition, part by part



Note. Diagram prepared for this book. Solid outline: the component can be checked in a single occurrence. Dashed: it requires several occasions, because it refers to a class of responses.

Table 15.2

What each component asserts and what it leaves out

Component	What it asserts	What it leaves out
behavior (Chapter 11)	what the person does, including what the person says: "anything an organism does" (Catania, 1999, p. 390)	a state stored in the person, taken as the attitude or as its cause
operant (Chapter 12)	a class of responses that can be modified by the consequences it produces (Catania, 1999, pp. 392 and 412)	the merely elicited reaction (Chapters 17 and 25)
discriminated (Chapter 13)	a class defined also by the situations in which it occurs (Catania, 1999, p. 412)	an evaluation that would hold the same in any situation
whose topography is or implies the attribution of a value (Chapters 4, 6, and 7)	the form evaluates ("it's awful") or implies evaluating (moving away, rolling one's eyes)	discriminated operants without an evaluative form: asking, informing, describing
ranging from positive to negative (Chapters 2 and 4)	direction and degree (degree is the intensity of Section 4.3); the middle, neither for nor against, also counts (Section 2.5)	descriptive qualification, with neither favor nor disfavor (Chapter 9)

Component	What it asserts	What it leaves out
to an object (Chapters 2 and 5)	it is about something that is pointed to or named	an evaluation with no identifiable object

Note. Table prepared for this book.

What can be checked at once and what requires several occasions. Four components can be checked in a single occurrence: someone did or said something, the form evaluates or implies evaluating, there is a direction, and there is an object. Operant and discriminated refer to a class of responses, and "a class of responses is not an operant until its modifiability has been demonstrated" (Catania, 1999, p. 412). A single sentence is therefore an evaluation with an object and a direction, and a candidate member of a discriminated operant class. Whether it really is a member of that class is what other occasions establish (Chapters 12 and 13). That is why, in Chapters 2 to 9, a sentence with an object and a valence already counted as attitude: the minimal definition was enough. The fundamental definition asks for more, and what it asks for can be seen only across several occasions. From here on, when a single-occasion case (Letícia, Nélson, Gilberto) is called an attitude, it is in the sense of the minimal definition; whatever is said about the class that maintains it is a hypothesis until other occasions reveal that class.

Form and function in the same sentence. "Discriminated operant" delimits the class by function; "whose topography is or implies the attribution of a value" delimits it by form. The class of attitudes is thus a subset: among a person's discriminated operants, those with an evaluative form. Ordering a coffee and saying that the coffee is great are discriminated operants of the same person; only the second is an attitude. And, since operants are defined by functions rather than forms (Catania, 1999, p. 137), different forms can belong to the same class: in Letícia's records in Chapter 11 (Table 11.2), saying "this system is torture" to her coworkers at lunch and rolling her eyes when the system freezes have different forms and, as a hypothesis, the same function, getting her coworkers to agree.

Four words. "Is or implies": saying "this system is torture" is attributing value; rolling one's eyes when the system freezes implies attributing it. The verb does not tell us to look for what the person "feels" behind the form, and reading nonverbal forms calls for the caution of Section 6.10: first describe what the person did, then situate it, and only then attribute an object and a valence, saying how confident you are. "Value": this is the worth attributed (the valence of Chapter 2), not the "intrinsic value" of Chapter 4, one of the supports of an evaluation, nor a person's

"values," such as honesty or justice, which Chapter 16 distinguishes from attitude. "Operant": it does not say that the person planned the evaluation, but that the class can be modified by its consequences; the elicited emotional reaction that accompanies evaluating falls outside the term, and Chapters 17 and 25 deal with it. "Discriminated": very likely every operant class has discriminative stimuli (Catania, 1999, p. 146); the word is in the definition so that the situations will be named.

The "or implies" responds to a limit that the studies in the series themselves ran into. The Part VI volume adopts the definition of Mizael, dos Santos, and de Rose (2016) and takes evaluating to mean attributing an adjective. By that criterion, "All atheists are untrustworthy" is a prejudiced attitude, and "I don't trust any atheist," with a verb in place of the adjective, would not be; the authors recommend that future studies revisit the concept of evaluation (Moreira, Cardoso et al., 2024, pp. 9–10). The second sentence falls under the fundamental definition because it implies evaluating the group.

Along these lines, Moreira et al. (2021, p. 44) characterize prejudice, "broadly understood as a negative attitude toward certain groups or people," as "a discriminated operant behavior": this is the special case of Chapter 18.

EXAMPLE

At the team lunch, Letícia says "this system is torture" (one of her three records that Chapter 11 gathered in Table 11.2: record A, in which her coworkers laugh and agree). In one occurrence, we can check the following: she said something; the form attributes value; the direction is negative; the object is the system. What is missing is what only several occasions would provide: whether sentences of this kind recur, whether they are maintained by her coworkers' agreement, and what changes when the same words are said to the regional manager, who asks her to spell out the problems (record B; Chapter 13).

NON-EXAMPLE

Letícia asks a coworker, "Can you pass me the report?" This is behavior, it depends on the situation (someone is next to her, with the report), and it is maintained by what follows, but the form asks for something and attributes value to nothing. It is a discriminated operant and it is not an attitude: the topography fails.

TEST YOURSELF

In the sentence "that meeting was a waste," said only once, which components can be checked, and which ones can the sentence alone not confirm?

ANSWER: behavior, topography (it attributes value), direction (negative), and object (the meeting) can be checked. Operant and discriminated require other occasions.

15.3 The verbal definition and the minimal definition

Two formulations close to the fundamental one come up often: one replaces "discriminated operant" with "verbal"; the other removes almost everything.

KEY CONCEPT

The **verbal definition**: **attitude is verbal behavior whose topography is or implies the attribution of a value, ranging from positive to negative, to an object.**

The **minimal definition**: **attitude is an evaluation of an object, ranging from positive to negative.**

Chapter 14 defined verbal behavior as operant behavior maintained by mediated reinforcement, provided by a listener trained in a verbal community (Medeiros et al., 2021, p. 17). Since verbal behavior is operant, and the audience is a discriminative stimulus (Catania, 1999, p. 387), the verbal formulation has the first two parts of the fundamental one built in and adds who mediates the consequences: the listener. Hence it brings with it, from the outset, the functions of Chapter 14 (tact, mand, intraverbal) and the community that maintains them; Cameoka and Moreira (2021, p. 94), drawing on Guerin (1994), say that this holds "regardless of their topography." The price is that whatever does not pass through anyone is left out: sitting far from someone may imply evaluating, but if the effect does not depend on someone reading or understanding the gesture, it is not verbal behavior. Only the fundamental definition, with its "is or implies," covers the case.

The minimal definition is the definition of Chapter 2, with the continuum in place of the three valences: neutral is a point in the middle (Section 2.5). It is very close to the one social psychology uses (Bohner & Dickel, 2011, p. 392; Albarracín & Shavitt, 2018, p. 300), and for that reason it serves mixed audiences: it says what is evaluated and in

which direction, without taking a position on what the evaluation is. Its limit comes from the same virtue: it says nothing about how the evaluation is formed, what maintains it, or why it varies with the situation. With readers from another tradition, it is worth saying, in one sentence, that "evaluation" is treated here as something the person does (Section 4.1); without that, it may be read as a stored judgment. Table 15.3 compares the three.

Table 15.3

Fundamental, verbal, and minimal

Formulation	Adds	Leaves open	Use when
Fundamental	what maintains the evaluation and where it occurs	who mediates the consequences	you want to analyze and explain, and you record verbal and nonverbal forms
Verbal	the listener, the audience, and the verbal community	whatever does not pass through anyone (actions, avoidance)	you record what people say, write, or mark for someone
Minimal	nothing beyond the object and the direction	what the evaluation is, what maintains it, where it occurs	the audience is mixed, or you only want to identify attitudes

Note. Table prepared for this book.

EXAMPLE

A researcher asks 40 students to mark, from 1 to 7, how favorably they evaluate cell phone use in class. What she records is what each student marked, for her. The verbal formulation covers the record entirely; so does the fundamental one.

NON-EXAMPLE

In the same study, an observer notes who sits next to the classmate who uses a cell phone. Sitting there or far away may imply evaluating, but one's position in the room is not said to anyone. The verbal formulation does not cover this record, and the fundamental one does.

TEST YOURSELF

Why can the minimal formulation be used by researchers from different traditions, and the fundamental one only after discussion?

ANSWER: the minimal one asks only for an object and a direction, and leaves open what the evaluation is. The fundamental one takes a position: it says that the evaluation is discriminated operant behavior, and that is what the traditions debate (Chapters 11 to 13).

15.4 Complementary formulations

There are five more formulations that keep the core of the fundamental definition and bring one of its parts to the foreground. They are not five concepts: they are five angles on the same one.

Table 15.4
Five complementary formulations

Emphasis	Formulation	What it brings to the foreground, and when to use it
Social	Attitude is verbal behavior whose topography refers to favor or disfavor toward an object.	The social consequence: what is said is maintained by the generalized social reinforcement of a verbal community (Guerin, 1994, p. 157). Use it when the focus is the audience and the community.
Antecedent control	Attitude is operant behavior under discriminative control whose topography involves expressing a value-laden evaluation, positive or negative, of a given object.	The situation in which the evaluation occurs (Chapter 13). Use it to explain why the same person evaluates differently in different situations.
Dimensional nature	Attitude consists of an operant response, discriminated by specific stimuli, whose form includes attributing values, varying along a positive–negative continuum, to a stimulus or object.	Direction and degree (Section 4.3). Use it when the measure is a scale.
Operant class	Attitude refers to a discriminated operant class, characterized topographically by behavioral manifestations that attribute evaluative values, positive or negative, to a specific object.	Function: different forms can be the same class (Section 11.5). Use it to group records of different forms.

Emphasis	Formulation	What it brings to the foreground, and when to use it
Multimodality	Attitude can be defined as verbal or nonverbal behavior, operant and discriminated, whose central element is the explicit or implicit attribution of a value, located between positive and negative extremes, to the object in question.	Verbal and nonverbal forms, explicit and implied (Chapter 6). Use it when you record choices, avoidance, or expressions, and not only speech.

Note. Formulations prepared for this book, based on the fundamental definition. "Favor or disfavor" is the pair in Eagly and Chaiken's definition (Table 15.1).

Each row brings one part to the foreground, and the others still hold. There are some trap words. In the third row, "stimulus" is what is evaluated, not the discriminative stimulus of Chapter 13. In the fourth, "specific" means identifiable, and the object can be an individual or a category (Section 5.4). In the fifth, "implicit" is the attribution implied by the form, the "implies" of the fundamental definition, and has nothing to do with the "implicit" of the implicit measures in Chapter 24. And a shortened formulation easily loses the object: "verbal behavior that refers to favor or disfavor" sounds like a definition and does not say toward what (rule 3 of Section 15.6).

EXAMPLE

A researcher will record, in a school, what students say about classmates from another group and how close they come to them. She needs a formulation that covers words and actions: the multimodal one (and, behind it, the fundamental one).

NON-EXAMPLE

"Attitude is what a person feels about something." It looks like one more complementary formulation, but it is not: it does not bring a part of the fundamental definition to the foreground; it replaces behavior with a state. It is a different definition, like the first two rows of Table 15.1.

TEST YOURSELF

Which formulation would you use to explain to a manager why the same person praises the project in the meeting and criticizes it in the hallway?

ANSWER: the antecedent control one: it brings the situation to the foreground, and varying with the situation is what is expected (Chapter 13), not inconsistency.

15.5 Definition, property, and type

A definition answers "what is attitude?" Two other questions easily get mixed up with it: "what characteristics can an attitude have?" and "what types of attitude are there?"

KEY CONCEPT

A **definition** is what makes something an attitude: it holds for all attitudes and only for them. A **property** is a characteristic that some attitudes have and others do not, or that they have to different degrees: persisting for weeks, varying across situations, resisting extinction. A **type** is a subset of attitudes marked off by an additional criterion, usually the object: political, racial, or food attitudes.

Keeping them apart prevents a research question from being answered by decree. If "stable" were part of the definition, an evaluation that varied across situations "would not be an attitude," and "are attitudes stable?" would be answered before any data came in. The history of the definitions illustrates the problem. The view of attitudes "as something durable and, above all, constant" began to change when studies suggested that they "were not as stable and lasting as traditionally assumed," and the close relation with behavior, "also assumed in the more traditional definitions," showed up only in specific contexts and under strict conditions (Mizael, dos Santos, & de Rose, 2016, p. 125). For this reason, as Chapter 1 noted, overt behavior was dropped from the definition, and the attitude–behavior relation is "an empirical question outside the definition of attitude" (Albarracín & Shavitt, 2018, p. 300).

A longer formulation tries to gather everything that Chapters 10 to 14 established:

> *Attitude is a pattern of evaluative verbal behavior, operant in nature, directed at a specific target (object, person, group, idea, or situation), emitted under the functional control of contextual discriminative stimuli and maintained by contingencies of reinforcement mediated by the verbal community. This behavior can take on different verbal functions (tact, intraverbal, mand) depending on the controlling variables in operation, shows some degree of consistency across similar contexts, is sensitive to changes in environmental contingencies, and does not require positing internal mental states or entities for its functional explanation. Attitudes are behaviors in themselves, not hypothetical causes of other behaviors.*

As a summary, it works. As a definition, it mixes the three things we have just separated, and Table 15.5 takes it apart.

Table 15.5

A long formulation, in parts

Passage	What it is	Why
"pattern of evaluative verbal behavior, operant in nature, directed at a specific target (…), emitted under the functional control of contextual discriminative stimuli and maintained by contingencies of reinforcement mediated by the verbal community"	Definition	It is the verbal formulation of Section 15.3, in more detail.
"can take on different verbal functions (tact, intraverbal, mand)"	Types, by function	It classifies occurrences by what controls them (Chapter 14); no attitude needs to have all three.
"shows some degree of consistency across similar contexts"	Property	It varies from one attitude to another and is measured (Chapters 9, 13, and 22).
"is sensitive to changes in environmental contingencies"	Follows from the definition	It is what "operant" already says (Catania, 1999, p. 412).
"does not require positing internal mental states or entities"; "attitudes are behaviors in themselves, not hypothetical causes"	Position on how to explain	It says how attitudes are explained here (Chapters 11 and 12), not what attitude is.

Note. Table prepared for this book.

Two terms deserve a word. "Pattern" refers to the class, not to a single occurrence (Section 15.2): it is the recurrence of Chapter 9, put in terms of a class (Chapter 12). "Consistency" is a property and stays out of the definition; if it were included, the variation across situations of Chapter 13 would go from expected to "not being an attitude." In a text, the first sentence can be the definition; the properties the research will measure and the theoretical position come afterward, as question and as assumption; the type goes into the scope of the study.

EXAMPLE

In Lia's project, the definition is the fundamental one; the property investigated is how far the evaluation holds across three occasions; the type is "attitudes toward vaccines."

NON-EXAMPLE

"Attitude is a stable disposition that predicts behavior." This puts a property ("stable") and an effect ("predicts") into the definition: if someone's evaluation varies, or predicts nothing, the definition says that it "was not an attitude," and the empirical questions are answered by decree.

TEST YOURSELF

Classify as definition, property, or type: (a) "a discriminated operant response whose topography attributes value to an object"; (b) "stays the same, without varying, for several weeks"; (c) "attitudes toward politicians."

ANSWER: (a) definition; (b) property (how long it persists, and that is measured); (c) type (a subset marked off by the object).

15.6 Rules of use

Many sentences begin with "attitude is...," and not every such sentence defines. Three rules separate the ones that define from the ones that only seem to.

KEY CONCEPT

A sentence of the form "Attitude is..." is a **definition of attitude** when it specifies, at the same time, (1) the **behavioral nature** of the phenomenon (behavior, response, class of responses, or an equivalent term), (2) the **evaluative content** (evaluating, valuing, judging, approving or disapproving), and (3) the **object** toward which the evaluation is directed.

The formulations in the previous sections meet all three rules (check them against Table 15.2). The minimal one passes the first rule only if "evaluation" is read as something the person does, as Section 4.1 defines it; hence the warning in Section 15.3. Four kinds of sentence, by contrast, imitate a definition without defining (Table 15.6).

Table 15.6

Sentences that begin with "Attitude is..." and do not define

Kind	Examples	Why it does not define
Importance	"Attitude is important." "Attitude is essential for success."	It praises the concept but does not say what it refers to.
Topic description	"Attitude is an interesting subject." "Attitude is a complex topic."	It speaks of the study of attitudes, not of the phenomenon.
Consequence	"Attitude is what determines success."	It confuses the phenomenon with a supposed effect; what attitude produces lies outside the definition (Section 15.5).
Metaphor	"Attitude is the key to success."	A figure of speech, with no criterion for saying what is and what is not an attitude.

Note. Sentences prepared for this book.

There is also a simple test, the substitution test: in a sentence that uses the word "attitude," replace it with the proposed definition. If the sentence still says the same thing, the word is being used in the defined sense; if it loses its meaning, the text is using the word in another sense. In "she's got attitude," the swap gives "she's got discriminated operant behavior whose topography attributes value to an object," and the sentence stops saying that she is bold or assertive, the everyday sense flagged in Section 1.1. And check the definition against what you are going to record: anyone who defines attitude as behavior and, in the results, writes that the score "reveals the attitude the person has" has switched definitions in the middle of the text.

EXAMPLE

"Attitude is behavior that attributes value, positive or negative, to an object." It has (1) the behavioral nature (behavior), (2) the evaluative content (attributes value, positive or negative), and (3) the object. It passes all three rules and can be refined with what the previous sections add.

NON-EXAMPLE

"Attitude is verbal behavior that refers to favor and disfavor." It passes rule 1 (verbal behavior) and rule 2 (favor and disfavor) and fails rule 3: favor and disfavor toward what? Without the object, the sentence does not say what the person is taking a stand on.

TEST YOURSELF

"Attitude is behavior directed at an object." Which rule fails?

ANSWER: rule 2. It says nothing about evaluating: asking for, describing, or eating the object are also behaviors directed at it.

Common learner mistakes

1 **Treating the definitions as rivals and looking for "the right one."** The mistake happens because, in an academic text, it seems mandatory to choose one definition and discard the others. *How to spot the mistake:* you write "the correct definition is the fundamental one, and the others are wrong." The verbal, minimal, and complementary definitions keep the core and bring one part to the foreground; you choose according to what you are going to record and say. Only the ones that place attitude in a state (Table 15.1) compete with the fundamental definition, and that dispute belongs to Chapter 11.

2 **Defining one way and measuring another.** The mistake happens because the language of the instruments ("measuring the attitude") belongs to the tradition that places attitude in a state. *How to spot the mistake:* you define attitude as discriminated operant behavior and, in the results, write that the score "reveals the attitude the person has." The score is a response given, to someone, in a situation (Section 14.5).

3 **Putting into the definition what is a property, a type, or an effect.** The mistake happens because these characteristics appear in the classic definitions, and copying them seems safe. *How to spot the mistake:* your definition includes "stable," "lasting," "that predicts behavior," or the name of a type ("racial attitudes"). Each of these is a research question or a way of narrowing the scope, not what makes something an attitude (Section 15.5).

4 **Forgetting the object.** The mistake happens because, in general sentences, the object seems to go without saying. *How to spot the mistake:* your sentence defines attitude as "favor and disfavor," "positive evaluation," or "taking a stand" without saying toward what. Every attitude is about something (Chapter 2).

5 **Reading "implies" and "implicit" as "hidden" or "internal."** The mistake happens because, in ordinary usage, "implicit" is what is concealed. *How to spot the mistake:* you write that the "implicit" topography shows "what the person really thinks." In the definition, "implies" says that the form amounts to evaluating in that community, by convention, or that the observer reads it that way, with a stated degree of confidence (Section 6.7); it does not tell us to look for something behind it (Section 6.10).

SUMMARY

Fundamental definition (objective 1). Attitude is discriminated operant behavior whose topography is or implies the attribution of a value, ranging from positive to negative, to an object. Behavior, operant, and discriminated come from Chapters 11 to 13; the evaluative topography, the direction, and the object, from Part I. Four components can be checked in one occurrence; operant and discriminated refer to a class and require several occasions.

Neighboring formulations (objective 2). The verbal one replaces "discriminated operant" with "verbal": it adds the listener, the audience, and the community, and leaves out whatever does not pass through anyone. The minimal one says only what is evaluated and in which direction, and that is why it serves mixed audiences; it says nothing about origin, maintenance, or variation.

Complementary formulations (objective 3). All five are the fundamental definition with one part in the foreground: the social consequence, the situation, direction and degree, function, and forms. They do not compete; you choose among them by purpose, checking what each one leaves in the shadows.

Definition, property, and type (objective 4). The definition holds for all attitudes and only for them; a property varies across attitudes and is measured; a type is a subset, usually marked off by the object. Mixing them answers research questions by decree.

Rules of use (objective 5). "Attitude is..." defines when it states the behavioral nature, the evaluative content, and the object. Importance, topic, consequence, and metaphor do not define; the substitution test and the check against what is recorded complete the verification.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. Complete the fundamental definition: "Attitude is _____ _____ behavior whose _____ is or implies the _____ of a value, ranging from _____ to _____, to a(n) _____."

2. Match each component of the fundamental definition to what it leaves out: (i) behavior; (ii) operant; (iii) discriminated; (iv) topography that is or implies the attribution of a value. (a) an evaluation that would hold the same in any situation; (b) requests and descriptions; (c) a state stored in the person, taken as the attitude itself; (d) the merely elicited reaction, which does not depend on consequences.

3. Rui says, in the meeting: "this deadline is impossible." Which statement can be made from this single occurrence?

a. The sentence belongs to an operant class maintained by his coworkers' agreement.

b. The sentence attributes a negative valence to the deadline.

c. The sentence occurs only in front of coworkers at the same level.

d. The sentence is an attitude because it produces consequences.

4. A study records (I) the number each participant marks, on a scale from 1 to 7, about "politicians" and (II) the distance at which each participant sits from a person from another group. (a) Does the verbal formulation cover (I)? (b) And (II)? (c) Which formulation in the chapter covers both records, and why?

5. Why can the minimal definition be used by researchers from different traditions, and the fundamental one not without discussion?

a. Because the minimal one is shorter and, therefore, truer.

b. Because the minimal one asks only for an object and a direction and leaves open what the evaluation is; the fundamental one takes a position.

c. Because the fundamental one does not apply to verbal evaluations.

d. Because the minimal one includes the stability of the attitude.

6. Choose the most suitable complementary formulation (social, antecedent control, dimensional, operant class, or multimodal) and justify your choice: (a) explaining to a manager why the same person praises the project in the meeting and criticizes it in the hallway; (b) showing that "saying the client is bad" and "no longer serving the client" can be the same attitude, despite their form; (c) justifying the use of a seven-point scale; (d) recording, in a school, what students say and how close they come to classmates from another group; (e) showing why what the group approves and disapproves of maintains what each member says.

7. A colleague proposes: "Attitude is verbal behavior that refers to favor and disfavor." Apply the three rules of Section 15.6 and say what is missing.

8. Which of these sentences defines attitude? For each of the others, say what kind of sentence it is. (a) "Attitude is what decides the success of a career." (b) "Attitude is a central topic in social psychology." (c) "Attitude is a person's response that attributes value, positive or negative, to an object, and that is modified by its consequences." (d) "Attitude is the soul of business."

9. Classify each passage from a project as definition, property, or type: (a) "residents' attitudes toward the neighborhood renovation"; (b) "discriminated operant behavior whose topography is or implies attributing value to an object"; (c) "evaluates the same object in the same way in different situations."

10. (Hypothetical case.) The abstract of an article says: "Attitude is a stable and lasting disposition that predicts behavior. The attitude of 60 students was measured with a seven-point scale, administered in class by a teacher." (a) Which parts of the first sentence are a property or an effect, rather than a definition? (b) What was actually recorded? (c) Rewrite the first sentence so that it is consistent with what was recorded.

ANNOTATED ANSWER KEY

1. discriminated operant; topography; attribution; positive; negative; object.

2. (i)–(c); (ii)–(d); (iii)–(a); (iv)–(b). "Behavior" leaves out the stored state taken as the attitude (Chapter 11); "operant," the merely elicited reaction (Chapters 17 and 25); "discriminated," the evaluation that would hold in any situation (Chapter 13); the evaluative topography leaves out discriminated operants without an evaluative form, such as asking or describing.

3. b. The form ("impossible") attributes value to the deadline, in a negative direction: this can be checked in one occurrence. Alternatives **a** and **c** speak of a class, of what maintains it, and of where it occurs, and require several occasions; **d** is wrong because producing consequences does not make a sentence an attitude: asking also produces consequences (Section 15.2).

4. (a) It does: marking a number on a scale is saying something to someone, and the effect passes through whoever reads it (Section 14.5). (b) It does not: sitting far away implies evaluating, but the effect does not depend, in itself, on a listener who interprets the gesture. (c) The fundamental one, and the multimodal one that develops it: the "is or implies" covers the scale and the distance, without requiring mediation by a listener.

5. b. The minimal one asks only for an object and a direction; the fundamental one says that the evaluation is discriminated operant behavior, and that is what the traditions debate. Length does not make a definition true (**a**); the fundamental one applies to verbal evaluations, because verbal behavior is operant (**c**); and the minimal one says nothing at all about stability (**d**).

6. (a) Antecedent control: the situation is what changes, and varying with it is what is expected (Chapter 13). (b) Operant class: different forms, same function. (c) Dimensional: the scale records direction and degree. (d) Multimodal: words and actions. (e) Social: what the community approves and disapproves of.

7. Rule 1 (behavioral nature): passes, "verbal behavior." Rule 2 (evaluative content): passes, "favor and disfavor." Rule 3 (object): fails, because it does not say favor and disfavor toward what. Correction: "...that refers to favor or disfavor toward an object."

8. (c) defines: it has the behavioral nature ("response"), the evaluative content ("attributes value, positive or negative"), and the object. (a) is a consequence (it confuses the phenomenon with a supposed effect); (b), a topic description (it speaks of the study, not of the phenomenon); (d), a metaphor (with no criterion for applying it).

9. (a) Type: a subset marked off by the object. (b) Definition: it is the fundamental one, which holds for all attitudes. (c) Property: how far the evaluation holds across situations varies from one attitude to another, and that is measured.

10. (a) "Stable and lasting" is a property and "predicts behavior" is an effect, and both stay out of the definition (Section 15.5; the attitude–behavior relation is "an empirical question outside the definition of attitude," according to Albarracín & Shavitt, 2018, p. 300); "disposition" places attitude in a state, which the scale does not record. (b) Numbers marked by students, in class, in front of a teacher who was administering the scale: verbal responses given to someone, in a situation. (c) For example: "Attitude is behavior whose topography attributes value, from positive to negative, to an object; in this study, it is the response marked on a seven-point scale, in class." Stability and the prediction of behavior remain questions for the study, not part of the definition.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 16. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2, 3	15.2 (the fundamental definition and its components)
4, 5	15.1 and 15.3 (where each definition places attitude; the verbal and the minimal definitions)
6	15.4 (complementary formulations) and common mistake 1
7, 8	15.6 (rules of use) and common mistakes 4 and 5
9	15.5 (definition, property, and type) and common mistake 3
10	15.5 and 15.6, and common mistakes 2 and 3

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CHAPTER

16 Conceptual Boundaries and Overlaps

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Separate**, in a sentence that opens with "in my opinion" or "I think," the frame from the content, and **decide** whether the content is an attitude.
2. **Distinguish** attitude from belief by what the statement does (takes a position, or says how things are, will be, or are related) and **explain** why the two appear together without being the same thing.
3. **Distinguish** attitude from perception (detecting or evaluating) and **take apart** a mixed sentence of the form "I perceive X as Y."
4. **Distinguish** attitude from value by the generality of the object and **say** what a value organizes.
5. **Classify** a statement as attitude, belief, perception, or value and **justify** the classification with the question that decides it.

PREREQUISITES

The fundamental definition and the rules of use (Chapter 15), the agreement test (Section 9.1), the marker of authorship and firmness (Section 7.2), the tact (Section 14.3), and the autoclitic (Section 14.4). Belief, perception, and value are defined here.

OPENING

Tiago, an undergraduate research fellow, received five answers to the question "What do you think about working from home?" and has to say which ones express an attitude toward working from home.

> 1. *"In my opinion, working from home is great."*
> 2. *"I think the company is going to require a return to the office."*
> 3. *"I think working from home increases productivity."*
> 4. *"I notice that, when working from home, the team talks less in meetings."*

> **5.** *"Freedom to decide where to work is what matters most."*

Four of the five open with an opinion formula ("in my opinion," "I think," "I notice"), and the fifth opens with none. Tiago already knows what attitude is: discriminated operant behavior whose topography is or implies the attribution of a value, ranging from positive to negative, to an object (Chapter 15), and he sees that all five deal with the same subject without saying the same thing. Which ones are attitudes? And what are the others?

This chapter names what lies on the other side of the boundary of attitude (opinion, belief, perception, value) and offers, for each neighbor, the question that decides. In Section 16.5, Tiago classifies the five answers.

16.1 Opinion: the frame and the content

In ordinary conversation, "opinion" is the name for what someone says when asked what they think. The word invites us to think of something one has and keeps, the reification Chapter 10 dealt with (Section 10.1). Here, an opinion is what the person says, writes, or marks when giving their opinion. The literature itself treats the term and its neighbors as a group. Albarracín and Shavitt (2018, p. 300) examined one issue of a social psychology journal every five years and counted the articles whose abstracts mention "attitude, persuasion, belief, opinion, or evaluative judgments." Over at least six decades, those articles add up to a fairly steady share of about 20% of the publications.

For anyone classifying, what matters is that "in my opinion," "I think," and "to me" are the marker of authorship and firmness of Section 7.2, the autoclitic of Chapter 14: they say whose sentence it is and how firmly it is said, and they do not speak about the object. That is why the same frame opens contents of different kinds. Table 16.1 shows four.

Table 16.1
The same frame, four contents

Content	Example	What the sentence does	Is it an attitude?
Evaluative	"I think this meeting is a waste."	takes a position on an object	yes
Descriptive	"In my opinion, this room is big."	places the object on a dimension (Chapter 9)	no

Content	Example	What the sentence does	Is it an attitude?
Predictive	"I think the meeting will last two hours."	says what is going to happen (Section 16.2)	no
Prescriptive	"I think the subway should reach more neighborhoods."	says what to do	usually, yes: it implies placing the change on the favorable side

Note. Examples prepared for this book.

To decide, there are two tests. The agreement test (Section 9.1): can two observers who agree with the content disagree about liking what it says? Someone who agrees that the room is big may think it good or bad that it is; someone who agrees that the meeting is a waste has already agreed to a position. The swap test: put "good" or "bad" in place of the qualifying word. "It's a waste" becomes "it's bad," and the meaning holds; "it's big" becomes "it's good," and the meaning changes. When the meaning holds, the sentence takes a position.

The prescriptive case is the borderline one. "The subway should reach more neighborhoods" says what to do and, in saying so, places the expansion on the favorable side: by the "is or implies" of Chapter 15, it is an attitude toward the expansion. By contrast, "to get there on time, you have to leave at seven" says what leads to what, and it is a belief used as a rule (Section 16.2). When the decision depends on the situation, you record the sentence, the situation, and the decision, as in Section 9.4.

KEY CONCEPT

An **opinion** is what someone says, writes, or marks when giving their opinion: a frame ("in my opinion," "I think," "to me") around a content. The frame says whose sentence it is and how firmly it is said. The content can be evaluative, descriptive, predictive, or prescriptive, and only what takes a position on an object is an attitude.

EXAMPLE

In Tiago's survey, "In my opinion, working from home is great" and "I think the company is going to require a return to the office" have frames of the same kind. The first takes a position on working from home. The second says what the company will do: someone who agrees with it may think the return is great or terrible.

NON-EXAMPLE

"I think it's raining outside." It has the opinion frame and takes a position on nothing: it describes the weather. The frame is not a criterion, either for including or for excluding.

TEST YOURSELF

Ignore the frame and classify the content: (a) "To me, this movie is a masterpiece." (b) "In my opinion, this movie is two and a half hours long." (c) "I think this movie is going to win the award."

ANSWER: (a) evaluative, it is an attitude; (b) descriptive (length), it is not; (c) predictive, it is not.

16.2 Belief: how things are or will be

A belief, in this book, is a kind of statement, not something one keeps: the statement that says how things are, how they will be, or how they are related (what leads to what), without taking a position on them. "The chance of a nuclear accident within ten years is high" (adapted from Guerin, 1994, p. 160) and "studying every day leads to passing" are beliefs; "I do not like the use of nuclear energy" and "studying every day is a sacrifice" are attitudes. Guerin (1994), who analyzes attitudes and beliefs as verbal behavior, observes that beliefs tend to be set apart from attitudes because they state no preference (p. 160). Catania (1999, p. 265) urges caution in the same direction: talking about one's own beliefs "may result more directly from our discrimination of our own public behavior than from anything private," without this denying private events.

The question that separates belief from attitude is the one that, in Chapter 9, separated description from attitude: two observers who agree with "studying every day leads to passing" can disagree about whether studying every day is good. A belief describes, and an attitude takes a position. Guerin (1994, p. 160) adds a difference that shows up in conversation: someone who asserts a belief ("nuclear reactors are unsafe") can be challenged with a request for evidence or with the opposite claim, whereas the corresponding attitude ("I do not like the use of nuclear energy") cannot be met in the same way.

Belief and attitude appear together in three ways. In the first, the belief serves as support for the attitude: "since studying every day leads to passing, I'm in favor of daily homework." For Guerin (1994, p. 160), offering a belief to back up an attitude is itself a social act of persuasion, and a report of the attitude is reinforced when it is accompanied by supporting beliefs, but only when the verbal community shares them. In the second, the belief works as a rule: the statement that says what will happen if someone acts in a certain way comes to control what the person does (Catania, 1999, p. 391). On the same page, Catania notes the variety of definitions of rule and calls "rule-governed behavior" one of the most problematic expressions in the field's terminology. In the third, which matters most to researchers, the two come apart: someone who knows that exercise prevents heart disease may find exercise unpleasant. For Guerin (1994, p. 160), whether the relation between belief and attitude is strong or weak depends on social contingencies.

According to Ajzen (2001, p. 30), the most popular conception of attitude, the expectancy-value model, gives belief the role of foundation. Evaluation emerges as beliefs about the object are formed, and the overall attitude results from how the person subjectively values the object's attributes, combined with how strongly each attribute is tied to the object. This chapter only separates the two kinds of statement; how each one is formed is the subject of Chapter 25.

There is one more caveat from Guerin that matters to anyone classifying. The same subject can be put as a belief or as an attitude, and what decides which one appears is the community of listeners, not some built-in difference between statements about how likely outcomes are and statements of preference (1994, p. 160). What gets classified, therefore, is what was said on that occasion, not the subject.

KEY CONCEPT

A **belief** is a statement that says how things are, will be, or are related, without taking a position on them. A belief describes, and an attitude takes a position. An attitude backed by a belief calls for two records, one for each.

EXAMPLE

Helena (hypothetical case) says: "Running prevents heart disease, but running is a drag." The first half is a belief (a relation between running and health); the second is an attitude (a position on running). Two records in one sentence, and the belief did not determine the attitude.

NON-EXAMPLE

"I believe the vaccine is wonderful." The verb "believe" does not make what the sentence says a belief: "wonderful" takes a position. It is an attitude, with the frame "I believe that."

TEST YOURSELF

Classify: (a) "The vaccine protects for six months." (b) "The vaccine is a relief." (c) "I think the vaccine is going to get more expensive."

ANSWER: (a) belief (it says what the vaccine produces); (b) attitude (position: "a relief"); (c) belief, of the predictive kind (it says what will happen).

16.3 Perception: detecting is not evaluating

Perception, in the book's vocabulary, is responding discriminatively to properties of the environment. Catania (1999, p. 396) defines discrimination as "any difference in responding in the presence of different stimuli." When the person says what they perceived ("this coffee is hot," "the song has a fast beat"), the response is a tact (Section 14.3), "a verbal response occasioned by a discriminative stimulus" (Catania, 1999, p. 260). Perception answers "what properties does the object have?", and attitude answers "on which side of favorable and unfavorable does it fall?"

The difference shows up in what controls each tact. "Hot" depends on physical properties of the coffee: anyone in front of it who knows the word says it. Catania (1999, p. 262) uses "wonderful" to show the other extreme: if a painting, a piece of music, or a situation occasions that word, the tact "depends more on the responses generated in the speaker than on the physical properties common to all these stimuli." This fits the agreement test: two people in front of the same coffee agree that it is hot and may disagree about whether it is good. Social psychology arrives at the separation by another route: Ajzen (2001, p. 28) reports neurological evidence, recent at the time, indicating that evaluative judgments differ in significant respects from nonevaluative ones.

Everyday language mixes the two, especially with "perceive … as." "I perceive the mayor as dishonest" sounds like a report of detection and carries a position. Taking it apart means separating what can be checked from what is a position: "he promised to lower the fare and

raised it" (can be checked) and "dishonest" (negative valence). Both parts go into the record sheet, and "I perceive" stays as a frame, alongside "I think."

KEY CONCEPT

Perception is responding discriminatively to properties of the environment; what one says about what one perceives is a tact of properties, which says what the object is like in some detectable respect. Attitude adds the position. "I perceive X as Y" may hide both.

EXAMPLE

"This coffee is hot" (perception: a thermal property) and "This coffee is just right" (attitude: a position on the temperature that was detected). Same object, same dimension: what changes is what the sentence does.

NON-EXAMPLE

"I perceive my boss as unfair." It begins with "I perceive" and looks like a report of detection, but "unfair" takes a position (negative valence) on the boss. It is an attitude, with the frame "I perceive ... as." What is detected (for example, that she gave the same task to two people and praised only one) is a separate record.

TEST YOURSELF

Rewrite "I perceive the service as rude" as two records, one of perception and one of attitude.

ANSWER: for example, (perception) "the clerk did not return my greeting and spoke without looking at me" (invented data), which can be checked; and (attitude) "the service was rude," with negative valence and the service as the object.

16.4 Value: evaluating in general

The word "value" has already appeared with another sense. In the definition of Chapter 15, "attribution of a value" is the worth attributed to an object, the valence. A person's or a group's "values" (honesty, justice, sustainability) are something else, and they are what this section deals with.

In the literature on attitudes, values are defined as "attitudes toward abstract entities" (Albarracín & Shavitt, 2018, p. 304). People who hold universalist values are likely to look favorably on policies that promote equality, and people who hold security values tend to support policies that ensure stability, although other considerations often weaken the pull of values (p. 304). In the book's terms, "freedom is what matters most" is an attitude, because it takes a position on an object, and the object is an idea, from one of the families of Chapter 5. What separates it from a specific attitude, such as "this regulation is unfair," is the generality of the object: on one side, an abstract entity, which reaches many situations; on the other, an item.

Generality is a matter of degree, as in the move from individual to category (Section 5.4): "lying is wrong" lies between a specific attitude and a value. The criterion puts things in order, and, when in doubt, you record the exact object (Section 5.3).

The relation between the two levels is treated as a hierarchy: from one value, many specific attitudes are expected (from "sustainability," "solar energy is worth the investment" and "wasting water is unacceptable"). The experiments in which tying a specific proposal to broad values moved people's attitudes toward it point in this direction (Wolsko et al., 2016, as cited in Albarracín & Shavitt, 2018, p. 304). Expecting is not guaranteeing: the relation is empirical and is verified case by case (Section 15.5).

What organizes this hierarchy? A hypothesis is proposed here. Behind a value there would be a broad class of consequences that function as generalized conditioned reinforcers. These are conditioned reinforcers based on several primary reinforcers and, for that reason, more likely to stay effective across different establishing operations; money is the classic example (Catania, 1999, pp. 98, 418). Among the generalized social consequences mediated by other people, Guerin (1992, p. 1426) lists approval, attention, and affection. If different evaluations (solar energy, recycling, waste) produce consequences of the same class, they can be expected to vary together, and that is what "organize" means here. It is a hypothesis to be tested, not a classification criterion: classification goes by the generality of the object. Whether values change less than specific attitudes is a question to be measured (Section 15.5), not part of the criterion.

KEY CONCEPT

A **value**, in the sense of "having values," is an attitude whose object is an abstract and general entity (justice, freedom, sustainability), and from which many specific attitudes are expected. It is set apart from a specific attitude by the generality of the object, not by the nature of the behavior.

EXAMPLE

A school coordinator (hypothetical case) says: "Sustainability is essential." This is a value: an abstract object. From it one expects, without any guarantee, "the solar panel pays off," "wasting water is unacceptable," and "recycling should be mandatory," which are specific attitudes.

NON-EXAMPLE

"This recycling policy is unjust." The notion of "justice" appears, but the object is a specific policy: it is a specific attitude, not a value.

TEST YOURSELF

Classify by the object: (a) "Honesty is the foundation of everything." (b) "The company's balance sheet was dishonest." (c) "That politician is a liar."

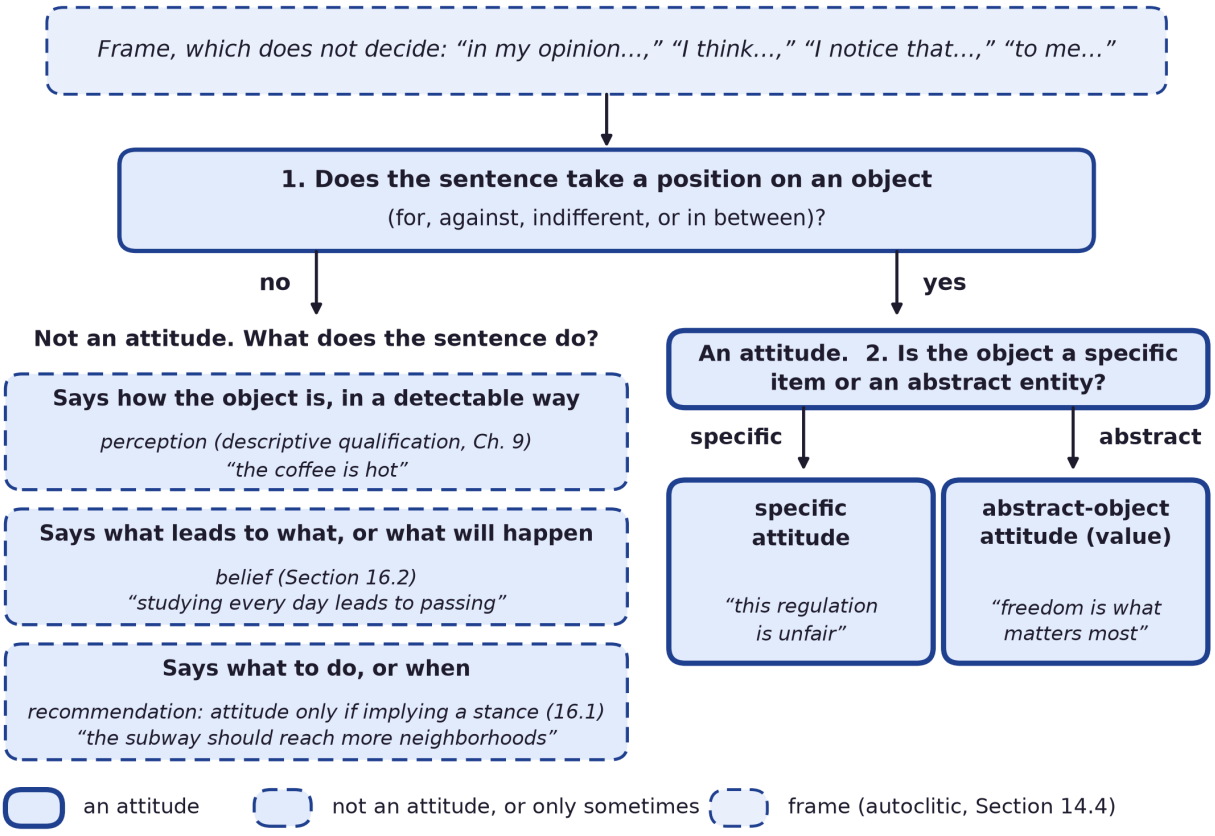
ANSWER: (a) value (abstract object: honesty); (b) specific attitude (object: the balance sheet); (c) specific attitude (object: a person).

16.5 Classifying a statement

Put together, the neighbors form a procedure that continues the flowchart of Chapter 3 (Figure 3.2). That flowchart asked three questions, in this order: is there an identifiable object? Does the speaker take a position on it? What is the valence? Figure 16.1 shows the path: the frame stays outside, the first question is the second one of Chapter 3 (does the sentence take a position on the object?), and the second question deals with the generality of the object.

Figure 16.1

Where each neighbor of attitude falls on the decision path



Note. Diagram prepared for this book. It continues Figure 3.2: question 1 is question 2 of that flowchart.

Table 16.2 brings together, for each neighbor, what the sentence does and the question that decides.

Table 16.2

The four neighbors and the question that decides

Neighbor	What the sentence does	Question that decides	Example	Is it an attitude?
Opinion	it is the frame; the content can be of any kind	What content comes after the frame?	"I think..."	depends on the content
Belief	says how things are, will be, or are related	Can someone who agrees with the sentence disagree about liking what it says, and does the sentence say what leads to what or what will happen?	"Studying every day leads to passing."	no

Neighbor	What the sentence does	Question that decides	Example	Is it an attitude?
Perception	says how the object is, in something detectable	Can someone who agrees with the sentence disagree about liking what it says, and does the sentence say how the object is, now?	"The coffee is hot."	no
Value	takes a position on an abstract and general entity	Is the object an abstract entity or a specific item?	"Freedom is what matters most."	yes, with an abstract object

Note. Examples prepared for this book.

Real sentences mix things, and one sentence may call for two records. "I think working from home is great because it increases productivity" contains an attitude ("is great") and a belief that backs it up ("increases productivity"). Both are recorded, with a note that the second was given as a reason for the first, the act of persuasion that Guerin (1994, p. 160) speaks of.

Tiago's answers come out like this. Answer 1 is an attitude toward working from home (position: "great"). Answer 2 is a belief, of the predictive kind (it says what the company will do). Answer 3 is a belief (it says what leads to what) and may back up answer 1. Answer 4 is a perception (it places the team on a dimension: how much it talks). Answer 5 is an attitude, and the object is a different one, the freedom to decide where to work, an abstract entity: a value, which is recorded separately and which may support answer 1. For the study on working from home, only answer 1 counts as an attitude toward it.

Three precautions for researchers. Belief items and attitude items are different items: agreement with "increases productivity" does not measure attitude (Section 9.5). The frame is recorded, but what is analyzed is the content. And the value is not inferred from a specific attitude, nor is the specific attitude inferred from the value: the relations between the levels are empirical questions.

TEST YOURSELF

Classify: (a) "I think the rent is going to go up." (b) "Living close to work is wonderful." (c) "The rent went up 8%."

ANSWER: (a) belief, of the predictive kind; (b) attitude (a position on living close to work, a practice); (c) perception, or description of a fact (it says how the object is, and someone who agrees may find the increase fair or excessive).

Common learner mistakes

1 **Classifying by the frame.** The mistake happens because the frame is the most visible part of the sentence and recurs in almost every answer to "what do you think?" *How to spot the mistake:* your spreadsheet has an "opinion" column that lumps everything together, or you mark as an attitude every sentence that begins with "I think" or "in my opinion." The frame says whose sentence it is; what gets classified is the content.

2 **Expecting belief to determine attitude, or the reverse.** The mistake happens because it seems logical that someone who knows something will evaluate in line with what they know. *How to spot the mistake:* you plan to "inform people of the facts" to change their evaluation and count on the change as a sure consequence, or you write that someone who thinks X must evaluate Y. Whether the relation is strong or weak depends on social contingencies (Guerin, 1994, p. 160); it is an empirical question.

3 **Taking "I perceive … as …" for pure detection.** The mistake happens because "perceive" sounds like registering what is there. *How to spot the mistake:* you record as perception a sentence that contains a valence word ("dishonest," "unfair," "arrogant"). Separate what can be checked from the position.

4 **Confusing the "value" of the definition with "values."** The mistake happens because the same word has both senses. *How to spot the mistake:* you read "attribution of a value" as "expresses the person's values" and start looking for values where there was an evaluation. In the definition, value is the worth attributed (the valence).

5 **Explaining attitude by value and value by attitude.** The mistake happens because a value, like an attitude, is easy to reify: it becomes something the person "has." *How to spot the mistake:* you write "she recycles because she holds the value of sustainability" and, when asked how you know she holds the value, answer "because she recycles." This is the circularity of Chapter 11, in which the state is inferred from behavior and then used to explain it: a value explains something only if it is identified by other data (the consequences, the situations, the evaluations of other objects).

SUMMARY

Opinion (objective 1). It is the frame ("in my opinion," "I think"), which says whose sentence it is and how firmly it is said, around an evaluative, descriptive, predictive, or prescriptive content. Only content that takes a position on an object is an attitude, which is checked with the agreement test and the swap for "good" or "bad."

Belief (objective 2). It says how things are, will be, or are related, without taking a position. It can back up an attitude, work as a rule, or come apart from it, and the relation between the two depends on social contingencies. What gets classified is what was said on the occasion, not the subject.

Perception (objective 3). It is responding discriminatively to properties of the environment, and what is said about them is a tact of properties. Attitude adds the position. In "I perceive X as Y," what can be checked is separated from what is a position.

Value (objective 4). It is the attitude with an abstract and general object, from which many specific attitudes are expected. It is distinguished by the generality of the object, which is a matter of degree. That what organizes it is a class of generalized reinforcers is a hypothesis of the book, not a criterion.

Classification (objective 5). The path has two questions: does the sentence take a position on an object? If so, is the object specific or abstract? If not, what does it do: say how the object is, what leads to what, or what to do. One sentence may call for two records.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. For each sentence, point out the frame and say whether the content is evaluative, descriptive, predictive, or prescriptive: (a) "To me, this neighborhood is dangerous." (b) "I think this neighborhood has a lot of new buildings." (c) "I believe the construction will be finished in March." (d) "In my opinion, the city should put more lights on the streets."

2. Apply the agreement test and the swap for "good" or "bad" to "In my opinion, this room is big" and to "In my opinion, this room is cozy." What changes from one to the other?

3. Which of these sentences is a belief, in the sense of the chapter?

a. "Recycling is a duty."

b. "Recycling reduces the trash that goes to the landfill."

c. "Recycling is too much work."

d. "I love recycling."

4. Camila says: "I know the vaccine protects, but I hate needles." (a) How many records does the sentence call for? (b) Classify each one. (c) Did the belief determine the attitude?

5. (Hypothetical case.) A student writes: "I perceive the principal as arrogant." (a) What can be checked? Invent two observable behaviors. (b) What is the position? (c) Rewrite the sentence as two records.

6. Which sentence expresses a value, in the sense of Section 16.4?

a. "The new time-clock system is unfair."

b. "Justice is what holds a society together."

c. "That sentence was fair."

d. "I think the judge is going to take a long time."

7. Why does the chapter separate value from specific attitude by the generality of the object, and not by stability?

8. (Hypothetical case.) Classify each answer from a survey about bike lanes as specific attitude, value, belief, or perception: (a) "Biking to work is a delight." (b) "The bike lane on the avenue is three kilometers long." (c) "I think bike lanes reduce accidents." (d) "Mobility for all is a priority." (e) "I think the city is going to expand the network next year."

9. A researcher wrote the item: "I agree that the vaccine is safe and that everyone should get it." What problems does it have? Rewrite it as separate items and say what each one measures.

10. (Hypothetical case.) A report says: "The attitude of 70% of residents toward the bike lane is favorable, since 70% agreed that 'the bike lane reduces accidents.'" (a) What did the item measure? (b) What correction does the report need?

ANNOTATED ANSWER KEY

1. (a) Frame "to me"; evaluative ("dangerous" takes a position, a negative one). (b) "I think"; descriptive (it says how the neighborhood is). (c) "I believe"; predictive (it says when the construction will end). (d) "In my opinion"; prescriptive ("should put more lights" places more lighting on the favorable side: it is usually an attitude toward more lighting, Section 16.1).

2. "Big": someone who agrees about the size may think it good or bad, and "it's good" in place of "it's big" changes the meaning: descriptive. "Cozy": the position is already in the word, and "it's good" in place of "it's cozy" keeps the meaning: evaluative, it is an attitude. The difference is what the sentence does with the same object.

3. b. It says what recycling produces, without taking a position. Option **a** takes a position ("duty"); so does **c** ("too much work" is unfavorable); **d** is a declared attitude.

4. (a) Two: "the vaccine protects" and "I hate needles." (b) The first is a belief (it says what the vaccine produces); the second is an attitude, and the object is needles, not the vaccine (Section 5.3). (c) No: the sentence shows the two coexisting, and the attitude toward needles does not depend on the belief about the vaccine; whether the relation is strong or weak depends on social contingencies (Guerin, 1994, p. 160).

5. (a) For example, "he interrupts people in meetings" and "he does not answer students' questions" (invented data). (b) "Arrogant" takes a position, with negative valence, on the principal. (c) Record 1: the behaviors that can be checked. Record 2: an attitude toward the principal, negative, with the frame "I perceive ... as."

6. b. The object is "justice," an abstract and general entity. Options **a** and **c** evaluate specific items (a system, a court sentence), and **d** is a prediction.

7. Because stability is a property to be measured (Section 15.5): if it were part of the criterion, the question "do values change less than specific attitudes?" would be answered by decree. The generality of the object can be checked in the sentence itself.

8. (a) Specific attitude (a position on biking to work). (b) Perception, or description of a fact. (c) Belief (a relation between bike lanes and accidents). (d) Value (abstract object: mobility for all). (e) Belief, of the predictive kind.

9. The item joins two statements, and one "I agree" does not say which one is meant. "The vaccine is safe" is a belief (it says how the vaccine is, or what it produces); "everyone should get it" is prescriptive and usually implies a posi-

tion. Separate items: "The vaccine is safe" (agreement, measures belief); "How do you evaluate getting the vaccine? (very bad to very good)" (measures attitude toward getting the vaccine, Section 9.5).

10. (a) The item measured a belief (a relation between bike lanes and accidents): 70% agreed with it. (b) Either the report says that 70% agreed with the belief, or it measures attitude with an item that asks for a position ("for or against") and reports the two measures separately. The relation between them is an empirical question, not a conclusion.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 17. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2	16.1 (opinion: the frame and the content) and common mistake 1
3, 4	16.2 (belief) and common mistake 2
5	16.3 (perception) and common mistake 3
6, 7	16.4 (value), Section 15.5, and common mistakes 4 and 5
8, 9, 10	16.5 (classifying a statement) and Section 9.5

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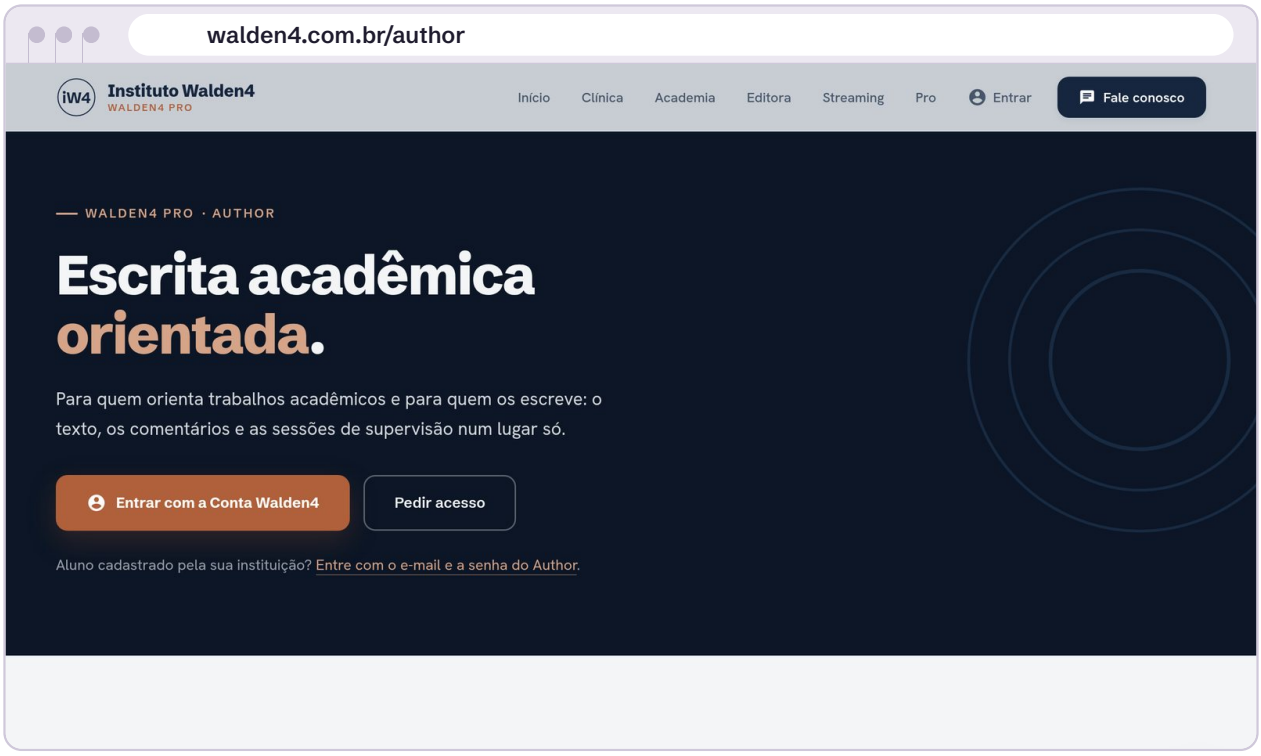
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CHAPTER

17 Conceptual Questions

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Distinguish** four readings of "attitude is expressed in…" (sign, occurrence, report, and summary) and **say** which ones are kept here.
2. **Justify** why the definition of attitude includes an evaluative form, even though the analysis is done by function.
3. **Decide** whether an evaluative thought that the person does not voice is an attitude and **separate** three senses of "hidden": covert, implicit, and implied.
4. **Distinguish** the reaction elicited in the presence of an object from the evaluation emitted about it and **say** where each one enters research.
5. **Respond** to an objection to the book's definition, pointing out the conceptual question it raises.

PREREQUISITES

The fundamental definition and the separation between definition, property, and type (Chapter 15), overt and covert behavior (Section 11.3), topography and function (Section 11.5), the operant (Chapter 12), and the reading of a survey response as a verbal response given to someone (Section 14.5). The new terms (respondent and respondent conditioning) are defined here.

OPENING

Lia, the master's student who, in Chapter 15, needed to open her project with a definition of attitude and found three incompatible ones in the articles she was reading, presents her project text, which opens with the fundamental definition, to her research group. Four colleagues ask questions.

1. *"When I say that Marta has a positive attitude toward working from home, I'm talking about her, not about what she said today. Does your definition throw away what we mean by that?"*
2. *"In behavior analysis, what counts is function. Why does your definition talk about form?"*
3. *"And what about what a person only thinks and doesn't say? Doesn't she have an attitude?"*
4. *"And the butterflies in the stomach of someone who sees a spider? Isn't that an attitude?"*

None of these questions asks for data. They are **conceptual questions**: questions about how to use a word, what it includes, what it excludes, and which senses of ordinary usage it keeps. Reasons settle them, not measurements; but the answer changes what is recorded, what is measured, and what can be concluded. Each section of this chapter takes up one of the four.

17.1 "Expresses" or "is"?

The first question catches an ambiguity in the language. We speak of "Marta's" attitude, of the attitude that "is expressed" in a sentence, of the scale that "measures attitude." Guerin (1994) describes the tradition behind this way of speaking: in most of the social psychology literature, attitudes are treated as "an inner source of true knowledge," and attitude statements "merely reveal the state of stored attitudes" (p. 155). His article proposes to analyze them "as verbal behavior, instead of treating them as inner sources of knowledge that are sometimes expressed as external behavior" (p. 155).

If attitude is behavior (Chapters 11 to 15), in what sense is it still "expressed"? The verb has four readings, and Table 17.1 separates them.

Table 17.1

Four readings of "attitude is expressed in..."

Reading	What it says	Example	Is it kept here?
Sign	what is said or done points to something stored, of which it would be an effect	"The scale reveals the attitude Marta holds."	No: this is attitude as something inside the person, of which what the person says and does would be a sign (left panel of Figure 1.2), and it falls into the circularity of Section 11.2: the state is known only through what it is supposed to explain.
Occurrence	what is said or done is an occurrence of the attitude, a member of the class	"'Working from home is great,' said by Marta, is an evaluation of hers."	Yes: this is the sense of the fundamental definition.
Report	what is said tells that the person evaluated, silently or on another occasion	"At the time, I thought the meeting was a waste."	Yes, as another behavior: a tact of a private event (Section 14.5).
Summary	"Marta's attitude" condenses what she usually says and does about the object	"Marta is in favor of working from home."	Yes, as a summary (Sections 9.6 and 10.1).

Note. Table prepared for this book. The examples are illustrations.

Only the first reading is discarded, and the reason is the one given in Section 11.2: a stored state, known only through what it supposedly produces, does not explain what it produces. The other three fit the definition. In the second, the sentence is an occurrence of the attitude, and nothing is "behind" it. In the third, the sentence is another behavior: it has the earlier evaluation as its topic and controls of its own, such as the listener's question. Guerin (1994, p. 156) notes that even when the tradition recasts the idea in more behavioral terms, treating attitudes as reports of private events, "a single function" is assumed for them. Analyzing them as verbal behavior, he writes, requires considering "all possible functions," which are those of Chapter 14. In the fourth, "Marta's attitude" is a legitimate summary, as long as one can say which occasions it summarizes, as Chapter 10 had already allowed.

What changes for researchers is the question asked of a response. Under the sign reading, one asks whether the response is sincere, that is, whether it matches what the person holds inside. Under the others, one

asks under what control the response occurred and whether it would recur on other occasions (Chapters 13 and 14). Guerin (1994, p. 161) goes a step further: the "truth" of attitudes does not lie in matching behavior or an inner truth; it lies in how they affect the person listening.

That leaves the single occurrence. "I liked that movie," said once, on leaving the theater, is an occurrence: it has an object and a direction, and it is enough for the minimal definition (Chapter 2); under the fundamental definition, it is a candidate member of a class, which only other occasions confirm (Section 15.2). "Rui likes horror movies" is a summary and calls for several occasions (Section 9.6). How long the evaluation holds is a property to be measured (Section 15.5), not a condition for the first occurrence to count.

KEY CONCEPT

"Expressing," in attitude research, has four readings: **sign**, **occurrence**, **report**, and **summary**. The first (the evaluation as a sign of a stored state) is discarded, and the other three are kept: what the person says or does is an occurrence of the attitude; telling that one evaluated is another behavior; "Marta's attitude" summarizes a class.

EXAMPLE

Marta says in the meeting: "working from home is great" (occurrence). Weeks later, she tells a coworker: "I always thought it was great" (report). The research report says: "Marta is in favor of working from home" (summary). None of the three is the stored state of which the others would be signs.

NON-EXAMPLE

"The score of 6 shows the attitude Marta carries." The sentence treats the score as a sign. The score is what Marta marked, for someone, in a situation (Section 14.5).

TEST YOURSELF

Which reading of "expresses" is in each sentence? (a) "By saying 'this regulation is unfair,' Rui expresses a negative attitude." (b) "The survey captured the students' hidden attitude." (c) "Rui's attitude toward the open-book exam is favorable."

ANSWER: (a) occurrence; (b) sign, because it assumes something hidden that the survey "captures"; (c) summary, and it is fair to ask how many occasions it is based on.

17.2 Form and function: what form does in the definition

The second question seems to set the definition against its own tradition. If, in behavior analysis, operants "are defined by their functions and not by their forms" (Catania, 1999, p. 137), why does the definition of attitude speak of topography?

The answer begins by separating three questions, each of which calls for a criterion. Table 17.2 brings them together.

Table 17.2

Three questions, three criteria

Question	What is done	Criterion	Example
What counts as attitude?	delimit what is recorded	form: it attributes or implies value to an object	"this deadline is impossible" is in; "can you pass me the report?" is not (Section 15.2)
Are two occurrences of the same class?	group	function: what maintains them and in what situations they occur	"this system is torture," said to her coworkers, and Letícia's eye-rolling when the system freezes, which gets a laugh from a coworker (Table 11.2)
Why does the person evaluate this way, here?	explain	the contingencies: situation, consequences, and history	her coworkers' agreement at lunch (Chapters 12 to 14)

Note. Table prepared for this book.

Form enters into the first question, and only there. Before explaining why someone evaluates, one must have gathered what is going to be analyzed, and that is done at the moment of recording, by a criterion the observer has at hand: does the sentence attribute value, or imply attributing it? Function alone would not be enough, and Guerin's analysis shows why. For him, attitudes are "verbal statements that are maintained by generalized social reinforcement from a verbal community" (1994, p. 157). But reporting on the environment ("there is a cat up that tree") also "is maintained by generalized social consequences from childhood," and saying "I like cats" is reinforced "as if it were a simple tact about the world" (p. 156). Generalized social consequences are therefore shared by evaluations and by reports that do not evaluate. What separates "there is a cat in the tree" from "I like cats" is not the kind of consequence, but the form, which attributes value.

This does not contradict Catania. The book's definition calls for an operant, and an operant is checked by function; what the definition adds is a subset marked off by form, as Section 15.2 showed. The category brings together, under the same form and the same object, occurrences that may belong to different operant classes (tact, mand, intraverbal; Chapter 14). Within the category, the analysis is functional.

Form and function therefore work at different times: form, when recording and deciding what goes in; function, when grouping and explaining. Forgetting form leaves the category without a boundary. Forgetting function turns attitude back into a list of sentences that "look like" evaluation (Chapters 3 and 9) and leaves unanswered what interests researchers: why the person evaluates this way, in this situation.

KEY CONCEPT

Form delimits and **function** explains. The definition of attitude uses form (the topography attributes or implies value) to say what goes into the record; the analysis uses function to group the occurrences and explain them. The two do not compete: they answer different questions.

EXAMPLE

(Hypothetical case.) Two children want their father's attention. One hands him a card and says: "I love you, Daddy." The other, in a tantrum, shouts: "You're mean, I don't like you!" The likely function is the same, getting attention, and the forms are evaluative, with opposite valences. Form says that both are evaluations, one positive and the other negative; function says why they occurred. Saying that the second child "has a negative attitude toward the father" goes beyond the occurrence: it is a summary, and it calls for other occasions (Section 17.1).

NON-EXAMPLE

A researcher decides to call "attitude" every response that "produces group approval," without looking at form. Praise gets in, but so do apologies, jokes, and correct answers in class. The criterion is one of function, and it does not single out what she wants to study.

TEST YOURSELF

Which question does each criterion answer? (a) "Does the sentence attribute value, or imply attributing it?" (b) "What maintains this sentence, and in what situations does it occur?"

ANSWER: (a) what counts as attitude: it delimits, by form; (b) why it occurs and which other occurrences it groups with: it explains, by function.

17.3 What the person thinks and does not say: three senses of "hidden"

The third question already has an answer in Section 11.3: thinking "this is absurd" every time the subject comes up is covert behavior, and it counts. The definition does not require that someone hear it. What Chapter 11 did not separate is that "hidden" is said of three things, which are best kept apart (Table 17.3).

Table 17.3
Three senses of "hidden"

Term	What it qualifies	What it refers to	Example	Where it is covered
Covert	the occurrence	what "is not observed or observable and, therefore, is only inferred" (Catania, 1999, p. 391)	thinking "what a good talk" on the way home	Section 11.3
Implicit	the measure	a response recorded in a task that does not ask the person to report what they evaluate	performance on an association task	Chapter 24
Implied	the form	a form that amounts to evaluating without saying so, by group convention or by the observer's stated estimate	rolling one's eyes (convention); sitting far from a coworker (estimate)	Sections 6.7, 6.10, and 15.2

Note. Table prepared for this book.

"Covert" concerns access. What changes is the route of the study, which passes through what the person says or does afterward, and Catania (1999, p. 265) reminds us that the verbal community has "inconsistent access to the events and to their public correlates," which makes these tacts hard to teach and maintain.

"Implicit" comes from the measures that social psychology calls by that name, designed to "assess automatic evaluations that may be dissociated from the explicit, self-report measures" (Albarracín & Shavitt, 2018, p. 300). What the word qualifies is the task, not a place where the attitude would be hidden. When the response to the scale and the response to that task diverge, what we have are two responses, given in two tasks and under different controls (the instructions, the type of response, the audience). The divergence is a datum to be explained (Chapter 24), not the discovery of a true attitude underneath a false one. "Implied" is the "implies" of the definition, and there are two cases. In one, the form amounts to evaluating by convention of the community: rolling one's eyes, a thumbs-down. In the other, there is no convention, and the observer reads the form as an evaluation, with a stated degree of confidence: returning to a place, buying, sitting far away (Section 6.7). In neither case does one look for what the person "really" thinks (Section 6.10).

There remains a question of history. If Rui stopped saying out loud what he used to say after his boss reprimanded him for it, what we know is that the overt sentence stopped occurring in front of that audience. That the evaluation began to occur silently is a hypothesis, one that the history of consequences (Chapter 12) makes it possible to formulate; what supports it, if anything does, is what Rui says or does afterward.

KEY CONCEPT

Covert, **implicit**, and **implied** are not synonyms. The first qualifies the occurrence (no one but the person observes it); the second, the measure (a task that does not ask for a report); the third, the form (it amounts to evaluating without saying so). None of them tells us to look for what the person "really" thinks.

EXAMPLE

(Hypothetical case.) Marta thinks "how unfair" during the meeting and says nothing: a covert evaluation. At lunch, she sits far from the coworker who proposed the rule: a form that, in her community, may imply evaluating (with the caution of Section 6.10: describe what she did, situate it, and only then attribute an object and a valence). Later, a study gives her an association task, which does not ask her for a report: the result is what the "implicit" measure records, a response on the task, not a window onto the silent evaluation.

NON-EXAMPLE

"Rui's implicit attitude is the one he won't admit." The sentence joins two things: what Rui does not say, which may be covert, and what a task without a report records, which is what "implicit" qualifies. Nothing guarantees that the two are the same evaluation.

TEST YOURSELF

Classify as covert, implicit, or implied: (a) Léa thinks "what an absurd price" in front of the shop window and keeps walking. (b) A study records Léa's response time on an association task about the brand. (c) Léa crosses the street so as not to walk past the store.

ANSWER: (a) covert; (b) implicit (measured by a task that does not ask for a report); (c) implied (a nonverbal form that implies evaluating, with the caution of Section 6.10).

17.4 What the body does in the presence of the object: elicited reactions

The fourth question is the one that takes the book's definition furthest from the multicomponent view. In the tradition Guerin (1994, p. 155) describes, social psychologists "commonly write that attitudes are generalized affective responses to stimuli and contexts." Ajzen (2001, p. 34), discussing affect and cognition as antecedents of evaluation, describes as the "by far more popular" alternative the position that rests on the multicomponent view of attitude and takes evaluations to be shaped by affect as well as by cognition. What place does the body's reaction to the object have in this picture? The answer calls for two terms that have not yet been defined.

KEY CONCEPT

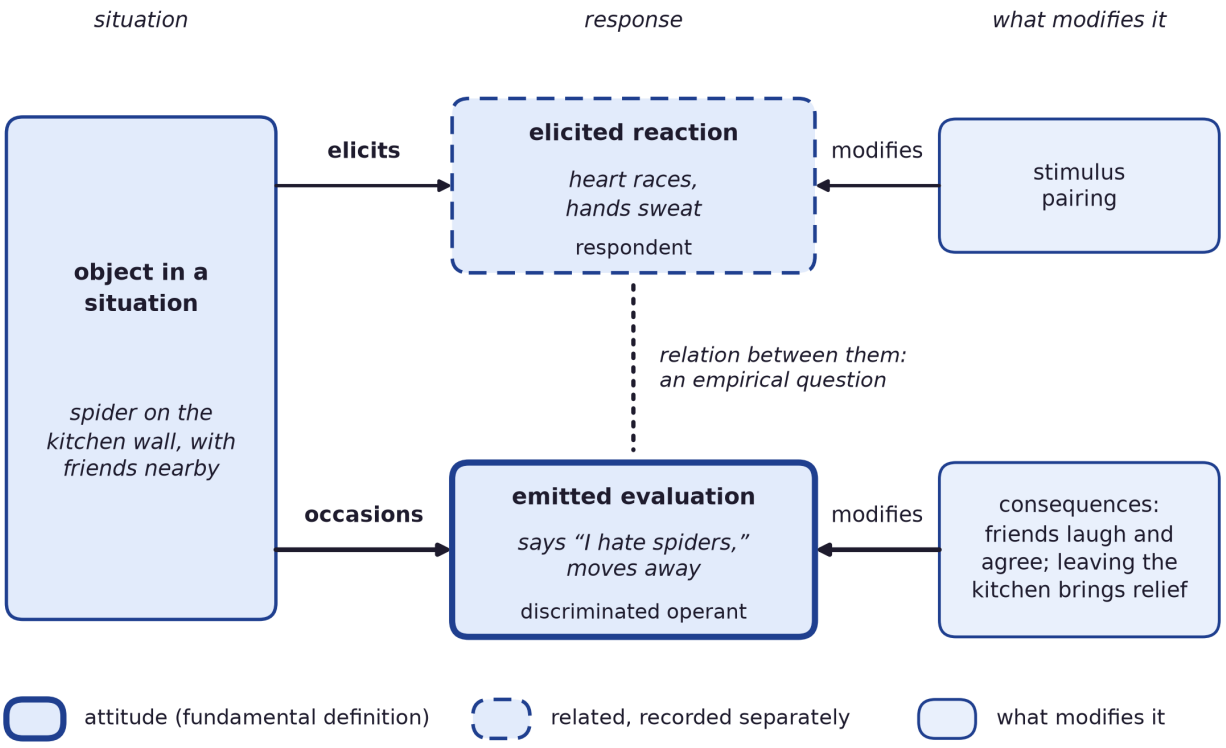
Respondent is the class of responses defined by the stimuli that reliably produce them (Catania, 1999, p. 420); to **elicit** is to produce them in this way, in unconditioned or conditioned reflexes (p. 398). **Respondent conditioning** is the modification of respondent behavior by stimulus–stimulus contingencies (p. 393): one stimulus comes to signal another and, with that, to elicit responses.

The difference from the operant lies in what modifies the response. In Chapter 12, the puff of air that produces a blink served as a contrast to Paulo's sentence: the evaluation is modified by what follows it, such as the group's approval. The elicited reaction is determined by the stimulus that produces it. Catania (1999, p. 211) observes that there is no "procedure analogous to shaping" for respondent behavior, and that what can be altered are the eliciting effects of stimuli, which is what respondent conditioning does. These effects can also pass from one stimulus to others without direct pairing, through derived relations, as Chapters 20 and 30 show.

EXAMPLE

(Hypothetical case.) Rafael sees a spider on the kitchen wall, with friends nearby. His heart races and his hands sweat. He says "I hate spiders!" and leaves the kitchen. Three responses in the presence of the same object, which Figure 17.1 separates into two relations.

Figure 17.1
One object, two relations



Note. Diagram prepared for this book. The case and the consequences are hypotheses for illustration.

By the book's definition, what Rafael says and his moving away are attitude: the first is a form that evaluates, the second implies evaluating and, as a hypothesis, both are maintained by what follows (his friends' agreement, the relief of leaving). The reaction is not an attitude: it attributes value to nothing, it is produced by the object, and it is not modified by what comes after it. That does not make it irrelevant, and the separation is not as clean as the boxes suggest. Few responses, Catania (1999, p. 392) observes, are "exclusively emitted or exclusively elicited," and operant and respondent classes "are best considered as extremes on a continuum along which the probability that a stimulus will produce a response varies." The figure shows the extremes. In research, the question is how each response is modified: by stimulus pairing or by what follows it.

The reaction enters research in four ways. First, it can be part of what controls the report. "I'm scared" is a tact of a private event (Section 14.5), and Catania (1999, p. 262) observes that tacts of emotions, such as love, hate, joy, and grief, "depend on visible manifestations such as laughter or tears and on the circumstances that generated the behavior we observe." Second, it interacts with the operant. A stimulus that signals a shock can, besides eliciting responses, interfere with behavior maintained by its consequences (p. 225): in the rat, the tone that precedes the shock reduces lever presses. We are "more likely to invoke the language of emotion when an event affects a wide range of different response classes" (p. 226), and that is when people speak of fear or anxiety. But, Catania warns, such terms "do not explain the rat's behavior" (p. 226).

Third, it serves as a model for pairing procedures. Evaluative conditioning is "an observed change in the liking of a stimulus that results from pairing this stimulus with another, liked or disliked stimulus" (De Houwer et al., 2005, p. 162, as cited in Bohner & Dickel, 2011, p. 400). According to Mizael, dos Santos, and de Rose (2016, p. 125), much research on attitudes is based on the principles of classical conditioning, with a focus on "the change in the evaluative response to a stimulus." What these studies measure, however, is an evaluative response. In a classic study, after the pairing, participants sorted the pictures into "like" and "dislike" and arranged them in order of preference (Levey & Martin, 1975, as cited in Mizael, dos Santos, & de Rose, 2016, p. 125). These are evaluative responses, given to someone, and they are where the book's definition applies. Whether the effect comes from an automatic associative process, from reasoning, or from both is debated in

the literature (Bohner & Dickel, 2011, p. 401), a debate Chapter 25 returns to. Fourth, it is a response to be recorded separately, when the question is about the reaction itself.

One could take the other path, the multicomponent one, and call the whole of what the person says, does, and feels an attitude. The narrow definition is kept for three reasons. The first is that the parts have different relations with the environment: the evaluation is modified by what the community does with it, and the reaction, by pairings; a single name would hide which of the two is being modified or measured. The second is that they can diverge: someone whose heart is racing tells the audience they love the subject, or someone says "I hate it" with no noticeable reaction (hypothetical cases). Calling both attitude would turn the divergence into a contradiction in the term, rather than a question. The third is that the field's literature has also narrowed the concept. Mizael, dos Santos, and de Rose (2016, p. 124) note that the initial conception, broad and made up of cognitive, affective, and behavioral components, "lost part of that breadth over the years," coming to be defined "basically in terms of its evaluative component." And Ajzen (2001, p. 29) notes that early theorists gave "affect" the meaning that "attitude" has today, the overall degree of favorability. Nowadays, he adds, the preference is to keep "affect" for general moods and specific emotions, states that carry varying degrees of both valence and arousal.

In practice, record the evaluation and the reaction under different names and treat the relation between them as a question. That the reaction indicates the intensity of the evaluation (Section 4.3) is a hypothesis to be tested with the measures of Chapters 22 to 24, not part of the definition.

NON-EXAMPLE

"Rafael avoids spiders because he is afraid." The "fear" was inferred from the avoidance and from what he says, and these two things are then used to explain themselves. This is the circularity of Section 11.2, which Catania (1999, p. 226) describes: if we are asked how we know someone is sad and we answer that it is "by the way the person acts," "we have done no more than say that the person is acting in a given way because the person is acting that way."

TEST YOURSELF

Classify as elicited reaction or emitted evaluation: (a) the pupil contracts when the light comes on; (b) "that noise is unbearable"; (c) the startle at hearing a loud bang.

ANSWER: (a) elicited reaction; (b) emitted evaluation, it is an attitude (the form attributes value); (c) elicited reaction, which evaluates no object at all.

Common learner mistakes

1 **Reading "expresses" as "is a sign of."** The mistake happens because the language of the instruments ("the scale measures attitude") presupposes the sign reading. *How to spot the mistake:* you write that the scale "reveals," "captures," or "measures" the attitude the person "has inside." What the scale records is a response, given to someone, in a situation (Section 14.5); the occurrence reading fits, the sign reading does not.

2 **Jumping from one occurrence to "someone's attitude."** The mistake happens because the language uses the same word, "attitude," for the occurrence and for the summary. *How to spot the mistake:* from one "I liked that movie," you write that the person "is in favor of cinema" or "has a positive attitude toward movies." An occurrence is an occurrence; the summary calls for several occasions (Section 17.1) and, if the question is about recurrence or duration, a measure (Sections 9.6 and 15.5).

3 **Setting form against function and keeping only one.** The mistake happens because "what matters is function" is a motto of the field, and mottos get applied in the wrong place. *How to spot the mistake:* you write "that's just topography" to dismiss an evaluative sentence, or "what matters is function" to call a request that obtained approval an attitude. Form delimits and function explains (Section 17.2).

4 **Treating "covert," "implicit," and "implied" as synonyms.** The mistake happens because all three terms suggest something hidden. *How to spot the mistake:* you write "implicit attitude" for the one the person does not voice. Ask what the word qualifies: the occurrence (covert), the measure (implicit), or the form (implied).

5 **Explaining the evaluation by the emotion, or the emotion by the evaluation.** The mistake happens because emotion seems the obvious cause of what the person does. *How to spot the mistake:* you write "he avoids spiders because he is afraid," and the only evidence of the "fear" is the avoidance and what he says. Record the reaction (what the body does) and the evaluation (what the person says or does) as different responses and ask how they are related.

SUMMARY

"Expresses" or "is" (objective 1). "Expresses" has four readings: sign, occurrence, report, and summary. The first, which places attitude in a stored state, is discarded, and the other three are kept: the sentence is an occurrence of the attitude, telling that one evaluated is another behavior, and "Marta's attitude" summarizes a class. One occurrence is enough for the minimal definition; the summary calls for several occasions.

Form and function (objective 2). Form delimits what counts as attitude, at the moment of recording; function groups the occurrences and explains them. Generalized social consequences do not separate an evaluation from a report about the weather, and that is why the definition needs form; within the category, the analysis is functional.

What is not said (objective 3). Evaluative thought is covert behavior and it counts; what changes is access. "Covert" qualifies the occurrence, "implicit" the measure, and "implied" the form, and none of them tells us to look for what the person "really" thinks.

Reaction and evaluation (objective 4). The elicited reaction is determined by the stimulus and is modified by pairing and, as Chapters 20 and 30 show, also by derived relations; the emitted evaluation is modified by what follows it. The book's definition covers the second. The reaction is recorded separately, and the relation between the two is an empirical question.

The objection (objective 5). Faced with an objection, name the question (what "expresses" means; what form is for; what can be said about what is not seen; where the body's reaction fits) and answer with the book's criterion, saying what the definition includes, what it leaves out, and what research records.

EXERCISES

Answer without looking back at the chapter. Then check the answer key.

1. Match each sentence to a reading of "expresses" (sign, occurrence, report, or summary): (a) "The scale reveals the attitude the student holds." (b) "By saying 'public transportation is terrible,' he expresses a negative attitude." (c) "He said that, at the time, he thought the meeting was a waste." (d) "Joana's attitude toward the open-book exam is favorable."

2. A researcher writes: "The mean score of 5.8 shows the attitude students have toward the open-book exam." (a) What reading of "expresses" does the sentence assume? (b) Rewrite the sentence so that it is consistent with the book's definition.

3. Which statement about "I liked that movie," said once, is correct?

a. It is not an attitude, because a single occurrence is not enough.
b. It is an occurrence with an object and a direction, and a candidate member of a class, which other occasions would confirm.
c. It is the person's stable attitude toward movies.
d. It is a sign of a stored attitude.

4. Two students ask the teacher for help: (I) "This exercise is impossible!" and (II) "Can you help me with the exercise?" Both get help. (a) Which of the sentences is an attitude, by the book's definition? (b) What might the two have in common in terms of function? (c) Why does function alone not separate the two sentences?

5. Why does the chapter say that generalized social reinforcement is not enough to define attitude?

a. Because attitudes are not maintained by social consequences.
b. Because reports about the environment, which are not attitudes, are also maintained by generalized social consequences; what separates an evaluation from them is form.
c. Because the form of attitudes is always the same.
d. Because Guerin (1994) rejects functional analysis.

6. (Hypothetical case.) Two children want the teacher to choose their drawing for the bulletin board. One says: "Mine turned out beautiful." The other says: "Bia's is awful, mine is better." (a) Which forms are evaluative, and with what valence and object? (b) What is the likely function of both? (c) What can be said, from this occurrence alone, about "the second child's attitude toward Bia's drawings"?

7. Classify each use as covert, implicit, or implied: (a) Léa thinks "what an absurd price" in front of the shop window and keeps walking. (b) A study records Léa's response time on an association task about the brand, which does not ask her for a report. (c) Léa crosses the street so as not to walk past the store.

8. (Hypothetical case.) A study records the heart rate of participants who view photos of two groups and concludes: "the attitude toward group B is more negative." (a) What was recorded? (b) What step is missing before the result can be called attitude, by the book's definition? (c) What empirical question remains?

9. In a study, a meaningless symbol is presented several times just before pleasant images, and afterward participants classify the symbol as "like" or "dislike." (a) What procedure is this, and what debate is there about the process involved? (b) What is measured? (c) Why does the book's definition apply to the classification, and what remains open?

10. A colleague says: "Your definition leaves out what the person feels and what she thinks; so it's not about attitude, it's only about what she says." Reply in four sentences, one for each question in the chapter.

ANNOTATED ANSWER KEY

1. (a) Sign. (b) Occurrence. (c) Report. (d) Summary.

2. (a) Sign: it assumes that the score points to something the students "have." (b) For example: "The mean score of 5.8 summarizes the responses students marked, in class, on a scale about the open-book exam." The scale is a response given to someone, in a situation (Section 14.5), and a summary calls for saying which occasions it comes from.

3. b. It has an object and a direction, which can be checked in one occurrence, and it is a candidate member of a class, which only other occasions confirm (Section 15.2). Option **a** is wrong because one occurrence is enough for the minimal definition; **c** is a summary, which calls for several occasions, and stability is a property to be measured (Section 15.5); **d** is the sign reading.

4. (a) (I): the form attributes value ("impossible") to an exercise. (II) asks for help and attributes no value: it is a discriminated operant, but the topography fails (Section 15.2). (b) They may have the same function, getting help (hypothesis), and work as mands. (c) Because getting help is a function of evaluations and of requests alike; without form, the category would bring together everything that gets help.

5. b. Guerin (1994, pp. 156–157) shows that reporting on the environment and saying "I like cats" are maintained by generalized social consequences, so that this consequence does not separate the two; form does. Option **a** is wrong: attitudes are maintained by social consequences (p. 157). Option **c** is wrong: forms vary (Chapter 6). Option **d** is wrong: the article is an analysis of the verbal functions of attitudes, in Guerin's sense (tact, intraverbal, and mand).

6. (a) "Mine turned out beautiful" (positive, one's own drawing), "Bia's is awful" (negative, Bia's drawing), and "mine is better" (positive, one's own drawing): all three are evaluative. (b) Getting the teacher to choose the drawing (hypothesis); the forms are evaluative and the function may be that of a mand. (c) Little: it is one occurrence with a negative form, addressed to the teacher, in a competition. "The child's attitude toward Bia's drawings" is a summary and calls for other occasions and other situations (Section 17.1).

7. (a) Covert: no one but Léa observes it. (b) Implicit: it is what a task without a report records. (c) Implied: a nonverbal form that implies evaluating, with the caution of Section 6.10.

8. (a) A reaction elicited by the photos. (b) What is missing is the record of an evaluative response (what the participants say or do about the group), which is what the definition calls attitude; the reaction, by itself, evaluates nothing. (c) Whether the reaction accompanies, precedes, or diverges from the evaluation, and in what situations.

9. (a) The pairing of a neutral stimulus with pleasant stimuli, which is the standard procedure of evaluative conditioning, based on the principles of classical conditioning (Mizael, dos Santos, & de Rose, 2016, p. 125). The literature debates whether the effect comes from an automatic associative process, from reasoning, or from both (Bohner & Dickel, 2011, p. 401). (b) The classification of the symbol as "like" or "dislike": an evaluative response, given to someone. (c) The classification has an evaluative form and is directed at an object, and that is where the definition applies (Section 15.2). What produced it remains open: association, reasoning, or transfer of function (Chapters 20 and 25).

10. Model answer: (1) The definition does not say that attitude is only what is said: "expresses" has four readings, and occurrence, report, and summary all fit it; only the sign of a stored state is left out. (2) The form that evaluates or implies evaluating delimits what is recorded, and function explains why it occurs. (3) What the person thinks and does not say is covert behavior and it counts; what changes is access, which passes through what the person says or

does afterward. (4) What the body does in the presence of the object is an elicited reaction: relevant and recorded separately, but with a different relation to the environment; its relation to the evaluation is an empirical question.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 18. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2, 3	17.1 and common mistakes 1 and 2
4, 5, 6	17.2 and common mistake 3
7	17.3 and common mistake 4
8, 9	17.4 and common mistake 5
10	all four sections and the Summary

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CHAPTER

18 Prejudice

a special case of attitude

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** prejudice as a special case of attitude and **state** what it adds to the fundamental definition.
2. **Apply** the variation test to a described situation and **state** what the result does and does not allow you to conclude.
3. **Separate** group, practice, and concept as objects of an unfavorable evaluation and **state** which of them the chapter calls prejudice.
4. **Analyze** a prejudiced statement through the book's five layers, from natural phenomenon to verbal behavior.
5. **Distinguish** prejudice, stereotype, and discrimination as response classes in the presence of the same cue and **treat** the relation among them as an empirical question.
6. **Place** the analysis of one person's prejudice among the levels of racism and **state** what it does not explain.

PREREQUISITES

The fundamental definition and the distinction among definition, property, and type (Chapter 15), the families of objects (Section 5.5), shaping (Section 12.4), the functional stimulus and generalization (Sections 13.2 and 13.3), the tact, the mand, and the intraverbal (Chapter 14), belief as a type of statement (Section 16.2), and the implied form (Section 17.3). The new terms (group cue, variation test, stereotype, discrimination, and the three levels of racism) are defined here.

OPENING

(Hypothetical case.) Nélson coordinates a software development team and is reading résumés for an opening. Late in the afternoon, he tells his colleague Cláudia, "Older people just get in the team's way." From then on, he sets aside, unread, the résumés of applicants over fifty. Cláudia agrees. Four questions organize the chapter.

1. *"Is this prejudice, or just an unfavorable evaluation? What sets it apart from 'this candidate doesn't know the system'?"*
2. *"What is he evaluating: the people, the way they work, or an idea, such as 'experience'?"*
3. *"Where does a statement like this come from? Can it be explained without saying that he 'has prejudice'?"*
4. *"Are thinking that 'anyone over fifty can't learn a new system,' saying 'older people just get in the way,' and skipping the résumés the same thing?"*

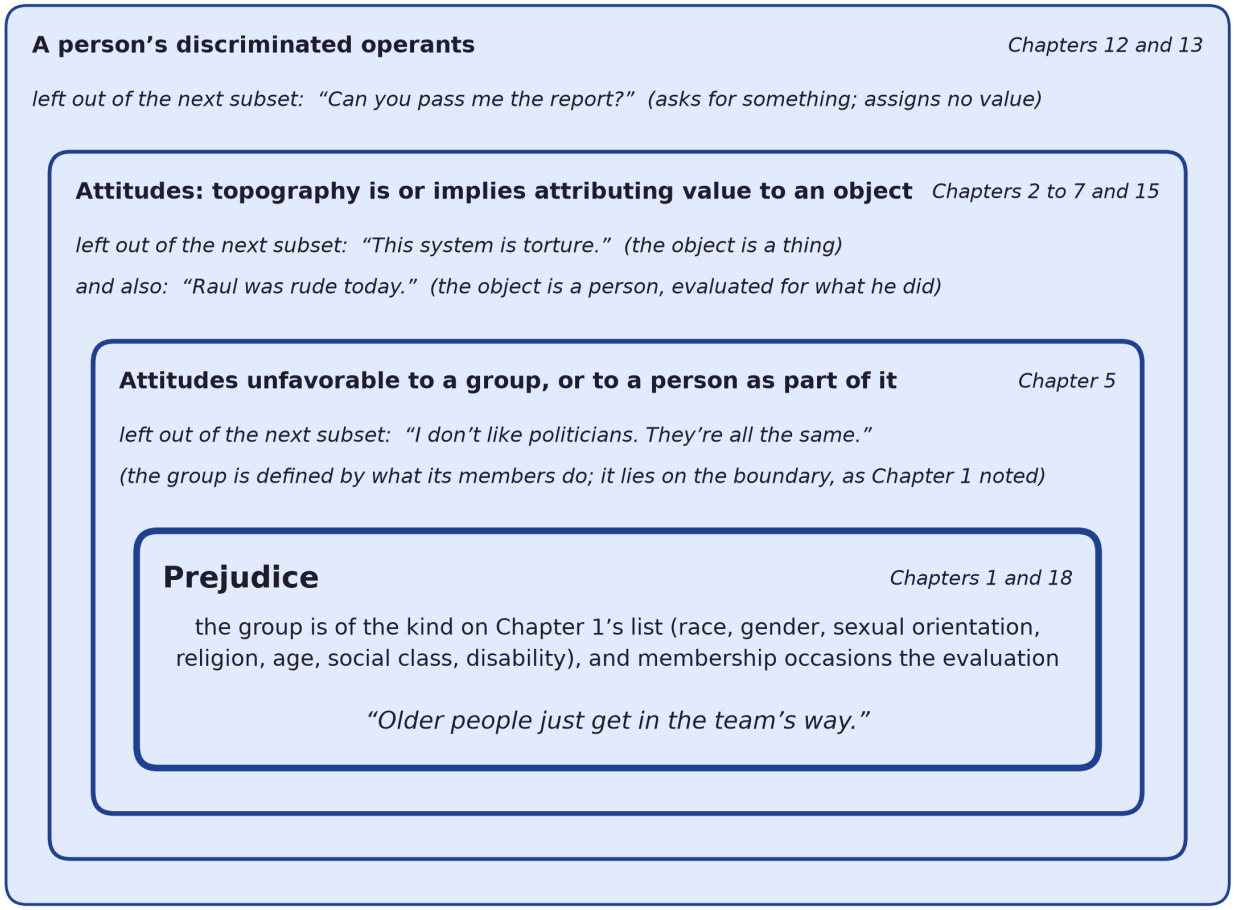
The first calls for a definition and a way to check it (Sections 18.1 and 18.2); the second, for the distinction among group, practice, and concept (18.3); the third, for the analysis in five layers (18.4); the fourth, for the separation among prejudice, stereotype, and discrimination (18.5). Section 18.6 states how far the analysis of one person can reach.

18.1 What prejudice adds to attitude

Chapter 1 defined prejudice, in everyday language, as an unfavorable attitude directed at someone because they belong to a group, and not because of what that person did or said, and it noted that the structure had nothing new about it. With the fundamental definition (Chapter 15), we can now say where the special case lies. Moreira et al. (2021, p. 44) characterize prejudice as "a discriminated operant behavior, that is, under the control of different properties of stimuli," "broadly understood as a negative attitude toward certain groups or people." Prejudice, then, is an attitude with additional conditions, and Figure 18.1 adds them one at a time, in four subsets, each inside the previous one.

Figure 18.1

From discriminated operant to prejudice: each subset adds a condition



Note. Diagram prepared for this book. The statements are illustrations; the one about politicians is on the boundary by a decision made in Section 18.1.

The first three subsets are already familiar. Among a person's discriminated operants (Chapters 12 and 13), only those with an evaluative form are attitudes (Chapter 15). Among attitudes, Chapter 5 set apart those whose object is a group, or a person taken as part of one, and the ones that matter here are the unfavorable ones. The statements left out of each subset show what that subset requires. The last subset is prejudice, and it adds two conditions to the third: that the group be of the kind exemplified by Chapter 1's list, defined by characteristics and not by an activity the person chose to pursue, such as a profession or a position, and that membership in it occasion the evaluation. Religion and social class, which Chapter 1's list includes, also involve what members do; by the book's criterion, they fall within the subset because member-

ship usually comes from one's family and personal history, not from choosing an occupation, and because the evaluation is aimed at the membership, not at an act.

KEY CONCEPT

Prejudice is an attitude (fundamental definition) with three additional conditions: the direction is unfavorable; the object is a group of the kind Chapter 1 exemplified, or a person taken as part of it; and the **group cue** occasions the evaluation, not what the person did or said. The last two make it a special case.

Three words often appear in definitions of prejudice and are left out of this one. "Unjustified" is a judgment by the observer: justified by what criterion, and for whom? The chapter analyzes what produces and maintains the evaluation; it does not judge it. "Systematic" is a property, measured across occasions (Section 15.5). "Resistant to contrary evidence" is also a property, and it varies. In laboratory studies that tried to teach relations opposed to those participants brought from their history, many participants did not form them; in one of the studies, however, all the children did (Mizael & de Rose, 2017, p. 370; Chapter 20).

Two boundaries call for comment. The first is direction. In social psychology, Mizael and de Rose (2017, p. 373) observe, prejudice is considered "a set of attitudes, positive or negative, toward individuals or groups of individuals." This book keeps the sense of Chapter 1, the unfavorable one, which is also the sense in the behavior-analytic literature cited here (Moreira et al., 2021, p. 44; Cameoka & Moreira, 2021, p. 94). That does not prevent recording a bias in favor of a group when the other conditions hold: Drake et al. (2015, as cited in Mizael & de Rose, 2017, p. 372) show that a person can display a pro-White bias without a concomitant anti-Black bias. The second is the kind of group. "I don't like politicians. They're all the same" (Section 2.3) has the structure of prejudice, but the group is defined by what its members do. The name "prejudice" is reserved for groups defined by characteristics, such as those on Chapter 1's list, and the case of other groups is called an attitude unfavorable to a group (Figure 18.1). The following sections apply to both.

EXAMPLE

"Older people just get in the team's way," said by Nélson, fits all four subsets: it has an evaluative form, an unfavorable direction, and a group defined by age as its object. Whether it is prejudice by the chapter's criterion still depends on the third condition, which the statement alone does not show (Section 18.2).

NON-EXAMPLE

"I don't trust Raul: he's already missed three deadlines." The evaluation is unfavorable and the object is a person, but the object is not a group, and the evaluation follows from what the person did. It is an attitude, not prejudice.

TEST YOURSELF

Which subset of Figure 18.1 is the innermost one each statement still fits? (a) "Could you revise this text by tomorrow?" (b) "This manual is a load of fluff." (c) "Irene was rude to the client." (d) "People with disabilities slow down the team."

ANSWER: (a) only the first: it is a discriminated operant, and it asks for something without assigning value; (b) the second: an attitude whose object is a thing; (c) the second: an attitude whose object is a person, evaluated for what she did; (d) all the way to the last, by its form (unfavorable direction, group defined by a characteristic); whether it is prejudice by the chapter's criterion is what the test in Section 18.2 checks.

18.2 The group cue and the variation test

The third condition requires care, because "belonging to a group" is not something the evaluated person displays the way one displays a statement. What the evaluator sees, hears, or reads is a cue: skin color, a name, an accent, the date of birth on a résumé. For De Houwer (2019, p. 835, as cited in Matsuda et al., 2020, p. 337), these are cues "that function as an indicator of the social group to which others belong." Here we use **group cue** for whatever, in the situation, works this way for the evaluator; in the vocabulary of Chapter 13, it plays the role of a discriminative stimulus, which everyday language calls a signal or a cue (Catania, 1999, p. 146).

A cue is not membership, and the difference matters. The news story that opens Fazzano and Gallo's article (2015, p. 536) reports that two twin brothers were allegedly attacked "for being mistaken for a homo-

sexual couple": if that is what happened, the response followed the cue the attackers saw, not a membership the victims did not have. What occasions the evaluation is the perceived cue.

Chapter 13 supplied the tool. Catania (1999, p. 403) separates the nominal stimulus, what is present, from the functional one, "the properties of a stimulus that control behavior": in Reynolds's experiment (1961a, as cited in Catania, 1999, pp. 149–150), facing the same triangle on a red background, one pigeon responded to the shape and another to the color. That the résumé reports age does not mean that age occasions the rejection. The procedure is the one in Section 13.2: change one element and hold the others constant. For prejudice, two elements matter: the group cue and what the person did or said. The **variation test** varies them one at a time and observes whether the evaluation changes. Table 18.1 shows what each result allows.

Table 18.1

The four results of the variation test

The evaluation changes when we vary...	What is functional	Reading
the group cue, but not what the person did or said	the group	prejudice, by the chapter's criterion
what the person did or said, but not the group cue	the act	attitude, but not prejudice: what is evaluated is what the person did
both	both (multiple control)	record both: the group is part of what occasions the evaluation
neither	nothing that was varied	keep varying other elements; nothing to conclude

Note. Table prepared for this book. Each reading is evidence, not proof (Section 18.2).

In everyday life, one element is rarely varied at a time: the older candidate also graduated in a different era and used different tools. In research, that is what the design does (Chapters 31 and 32), and even then each reading is evidence, not proof, for two reasons.

The first is that the cue is a bundle. Cameoka and Moreira (2021) asked participants to rate photographs of White men and Black men on a ten-point scale from "bad" to "good" (p. 97), with a neutral expression in Study 1 and a slight smile in Study 2. In both, the faces of Black men received, on average, higher ratings than those of White men (6.15 versus 5.45, and 7.30 versus 6.87; Table 4, p. 106). In Study 3, using the White faces rated highest and the Black faces rated lowest in the earlier stud-

ies, the difference was no longer significant (6.18 versus 6.02): "the deliberate selection of the faces (...) was able to produce a bias in the participants' evaluation" (p. 105). For the authors, race, "at least when materialized in the form of faces, is actually a set of variables," among them physiognomy, hair, skin tone, apparent age, and facial expression (p. 106). Whoever varies "race" varies all of this at once, and measuring the racial prejudice of a population was not, they caution, the primary aim of the study (p. 106).

The same limit appears, on a smaller scale, in Experiment 9 of Moreira, Rocha et al. (2022), on older people in the job market (p. 498). Five people aged 18 to 30 (p. 499) rated, before and after pairing with abstract figures, two photographs of older people at work, one doing work considered "light" and the other doing work considered "heavy" (p. 553). Among the limitations, the authors write that "it was not possible to evaluate whether what influenced the participants' evaluation was the fact that they were older people working in the images or simply the fact that they were older people, regardless of the context" (p. 554). The photograph combines age and work context, and the design did not separate them: varying one without the other, as the variation test requires, is what the study left undone.

The second is that the result holds for the situation in which it was obtained. The evaluation may follow the cue in front of one audience and not in front of another (Section 18.4), and what the test shows holds for those occasions: whether it holds for others is a question, the question of generalization (Section 13.3).

KEY CONCEPT

The **variation test** compares the evaluation in situations that differ in a single element: the group cue, or what the person did or said. If the evaluation changes with the cue and not with what the person did, the group cue is the functional stimulus and the attitude is prejudice, by the chapter's criterion. It is evidence, not proof: the cue is a set of variables, and the result holds for the situation in which it was obtained.

EXAMPLE

(Hypothetical case.) Nélson receives two résumés with the same education, the same experience, and the same courses, differing only in date of birth. He rejects the one from the fifty-three-year-old and moves the other one forward. In another round, with the same date on both, he rejects the one from the applicant who says they have not used the company's system. In the first round, the evaluation changed with the group cue and not with what the candidate did: prejudice, by the chapter's criterion. In the second, it changed with what the candidate did: an unfavorable evaluation, not prejudice.

NON-EXAMPLE

"Nélson rejected the résumé of a fifty-three-year-old candidate, so it was age that occasioned the rejection." The statement jumps from what is present (the age on the résumé) to what controls. The candidate may have a different education, or less time on the system, and the record sheet, like the one in Chapter 13, only lists what is present. Without varying one element at a time, it is a hypothesis.

TEST YOURSELF

Which result of the variation test does each situation represent? (a) The score a committee gives a project drops when the author has a foreign surname and does not change when the quality of the project varies. (b) The score drops with the quality of the project and does not change with the surname. (c) It drops with both. (d) It drops with neither.

ANSWER: (a) the group is functional: prejudice, by the criterion, as evidence; (b) the act is functional: attitude, not prejudice; (c) multiple control: record both; (d) nothing that controls the score was varied: keep varying, without concluding.

18.3 Group, practice, and concept: what is being evaluated

Chapter 5 separated three families of objects that prejudice tends to bring together: people and groups, behaviors and practices, ideas and institutions. Nélson's statement has a group as its object. Around a group, however, circulate practices (a religious tradition, the use of a chosen name) and ideas (inclusion, diversity, an affirmative-action

quota policy), and evaluating them is an attitude with a different object. Table 18.2 brings the three together, with the question each one calls for.

Table 18.2

Group, practice, and concept as objects of evaluation

Object	Example	Prejudice?	What to ask
Group (people and groups)	"People of that religion can't be trusted."	Yes, if membership occasions the evaluation	Does the evaluation change with membership or with what each person did?
Person taken as part of the group	"He's of that religion; I'd rather not close the deal."	Yes, by the same criterion	Is the person evaluated for what they did or for being in the group?
Practice (behaviors and practices)	"That ritual is a waste of time."	No: the object is the practice	Does the evaluation change with who performs it?
Concept (ideas and institutions)	"That quota policy is unfair."	No: the object is an idea or a policy	Does the evaluation change with the group the policy benefits?

Note. Table prepared for this book. The examples are illustrations; the last column gives the empirical question for each row.

Mr. Álvaro's statement, from Exercise 10 in Chapter 5, shows the mix: "I have nothing against older people, but this priority line is going too far." The object of the unfavorable evaluation is the line, a rule; the group appears in the disclaimer. On its own, the statement is not prejudice by the chapter's criterion. The variation test says what more to ask for: swapping who benefits (pregnant women, people with disabilities, older people) while keeping the rule shows whether "going too far" tracks the group or the rule.

The same applies to ideas and institutions. Mizael and de Rose (2017, p. 368) note that analyzing verbal operants can reveal functions even in "apparently non-prejudiced statements." They give the example of someone who says they are against racial quotas for Black students in universities, not because they believe in meritocracy, but because they do not want Black people in an environment attended mostly by White people. The example is conditional, and that is what matters: the statement alone does not show the function, and the chapter concludes nothing from the topic of the statement. What decides is what occasions and maintains the statement in that person, which is checked with the variation test and with analysis of the context (Section 18.4). The disclaimer "I have nothing against" does not decide either: it neither proves prejudice nor rules it out.

KEY CONCEPT

Unfavorably evaluating a **group**, a **practice**, or a **concept** are attitudes with different objects, and they are recorded separately. The chapter calls prejudice the evaluation of the group, or of the person as part of it, when the group cue occasions it. The other two may accompany it or serve it, and that is what the question in the last column checks.

EXAMPLE

(Hypothetical case.) A company is discussing chosen names on ID badges. Sílvia says, "This badge with a chosen name complicates registration" (practice: the evaluation falls on a procedure). Heitor says, "Trans people shouldn't work in customer service" (group). If Sílvia started saying the same about any name that differs from the official document, the evaluation would be following the procedure, not the group cue.

NON-EXAMPLE

"Anyone who thinks the priority line is going too far is prejudiced against older people." The statement jumps from the evaluation of the rule to that of the group. It may be that the group cue occasions the "going too far" judgment, and the variation test is what checks this; it cannot be concluded from the statement.

TEST YOURSELF

Which object does each statement evaluate: group, practice, or concept? (a) "This eight o'clock meeting is absurd." (b) "People from the countryside are slow." (c) "Inclusion has become a fad."

ANSWER: (a) practice (a schedule, a rule); (b) group; (c) concept (an idea).

18.4 Where a statement like this comes from: the five layers

The third question asks for an explanation that does not end in "he has prejudice." The explanation is built in five layers (Table 1.1), and Table 18.3 applies them to Nélson's statement.

Table 18.3

Nélson's statement in the five layers

Layer	The question	Applied to Nélson's statement
Natural phenomenon (Chapter 10)	What happened, when and where, and what can be recorded?	It happened in the office, late in the afternoon, in front of Cláudia, while he was reading résumés; what is recorded is what he said, to whom, after what, and how often it recurs.
Behavior (Chapter 11)	What did he do, in form and in function?	He said "older people just get in the team's way" (evaluative form, unfavorable direction, object: a group) and set the résumés aside (a form that implies evaluating, with the caution of Section 6.10).
Operant (Chapter 12)	What consequences maintain the statement?	Hypotheses: Cláudia's agreement, fewer résumés to read, nobody objects. Only a record of many occasions tells whether they maintain it.
Discriminated (Chapter 13)	In what situations does it occur, and what occasions it?	In the presence of the age stated on the résumé and of colleagues who agree; the variation test would say whether it is the cue or what each candidate did.
Verbal (Chapter 14)	What verbal operant is it, and for what audience?	Tact, intraverbal, or mand, depending on what controls it; the audience is his colleague.

Note. Table prepared for this book. The answers in the last column are illustrative hypotheses.

Three layers call for more. In the operant layer, the question is how the statement came to be said. Moreira et al. (2021, p. 49) describe the birth of a prejudiced behavior: a child, "perhaps because they saw an adult do the same thing," says "Hey, butterball" to an overweight classmate, and the others laugh. In the authors' analysis, "an overweight person is the discriminative stimulus, the behavior under analysis is saying 'butterball,' and the consequence, in this case reinforcing, is the classmates' laughter" (p. 49). In an adult, the statement may have arrived in steps. Table 18.4 shows, as an illustration, what Chapter 12's shaping, the differential reinforcement of successive approximations, would do with an evaluation of a group.

Table 18.4

Shaping an evaluation of a group, in four steps (illustration)

Step	What Nélson says or does	What the workplace reinforces (hypothesis)	What stops being reinforced
1	"Mr. Edson took forever to learn the system."	laughter and similar stories from colleagues	silence

Step	What Nélson says or does	What the workplace reinforces (hypothesis)	What stops being reinforced
2	"These older folks take forever to learn."	agreement and more examples	the statement about a single person
3	"Older people just get in the team's way."	agreement without qualifications; nobody asks for examples	"some," "sometimes"
4	Stops reading the résumés of applicants over fifty.	fewer résumés to read; nobody objects	reading everything before deciding

Note. Table prepared for this book, on the model of Table 12.2. The case and the consequences are illustrative hypotheses.

None of this assumes that anyone taught the prejudice on purpose: shaping "can be used for good or for ill, and many people use it without even knowing what they are doing" (Catania, 1999, p. 131), as Chapter 12 anticipated. Fazzano and Gallo (2015, p. 540), writing on homophobia, point to three acquisition processes (shaping, rule following, and imitation) and judge it more likely that "all three" are involved. Chapter 25 treats these processes in technical terms, and Chapter 35 uses the same logic in the opposite direction.

In the discriminated layer, the group cue plays the role of a discriminative stimulus, and the evaluation behaves like any other. It generalizes: a child who learned to say "butterball" to one person starts saying it to obese people in general (Moreira et al., 2021, p. 50). It can come under the control of "multiple stimuli," or of several features of a single stimulus (p. 50), like the face in the previous section. And it depends on the audience. Mizael and de Almeida (2019, as cited in Cameoka & Moreira, 2021, p. 107) point out that "being prejudiced" usually results in disapproval, and Cameoka and Moreira (p. 107) conclude that a person may behave in a prejudiced way only in the presence of people and situations that, in that person's reinforcement history, produced reinforcing consequences for such behavior. Saying that the cue occasions the evaluation describes where it occurs, not why: the presence of homosexual people, "as a discriminative stimulus, explains little to us about the 'causes' of the aggression" (Fazzano & Gallo, 2015, p. 539). The explanation is to be sought in history.

In the verbal layer, the question is which operant the statement is. Mizael and de Rose (2017, pp. 367–368), following the path opened by Guerin (1994), carried the tact, the intraverbal, and the mand over to racial prejudice. The tact is "I don't like so-and-so," said by a woman who was insulted by that person, who is Black. The intraverbal is saying one dislikes all Black people without having had experience with all of them.

And the mand, "I don't like defenders of racial minorities." The first example evaluates a person for what that person did; by the chapter's criterion, it would be prejudice only if the evaluation extended to people who did not insult her. It serves here to illustrate the tact, not to delimit prejudice. Moreira et al. (2021, pp. 49–50) give the pair: "butterball," said in the presence of an obese person, is a tact, because control "is exerted by a nonverbal discriminative stimulus (i.e., the shape of a person's body)." By contrast, "Indigenous people are lazy," said when someone is talking about Indigenous people, is an intraverbal, "because discriminative control is exerted by a verbal stimulus (e.g., the word 'Indigenous')." An intraverbal can take the form of a tact: the verbal community "reinforces intraverbals when they are presented topographically as tacts" (Mizael & de Rose, 2017, p. 367; the idea comes from Guerin, 1992, p. 1427). This is what happens when someone repeats discourse without having had contact with the events it reports (Mizael & de Rose, 2017, p. 374).

Function also calls for analysis of the context. Telling jokes, for example, may have the "intent" of gaining social status rather than hurting Black people, where "intent" means "consequences that maintain the behavior" (Mizael & de Rose, 2017, p. 374). For this reason, Guerin (2005, as cited in Mizael & de Rose, 2017, p. 374) recommends a contextual analysis before planning interventions. This is where the formulas that modify the effect of what was said on the listener come in, the autoclitics of Chapter 14: Mizael, Coelho et al. (2021) describe as autoclitics "It was a joke" and "I did not mean to say that," uttered after comments linking underrepresented racial groups to negative attributes.

There remains the temptation to close the analysis with "Nélson has prejudice." This is the circularity of Section 11.2: the only evidence of the prejudice he "has" is the statement we wanted to explain. Explaining discriminatory practices "as being caused by racist individuals or by racism does not help overcome such acts, since these terms are general and do not make clear what should be changed, in behavioral terms" (Mizael & de Rose, 2017, p. 373).

KEY CONCEPT

Analyzing a prejudiced statement means going through the **five layers**: what happened and can be recorded (natural phenomenon), what the person did (behavior), what maintains it (operant), in what situation and under what cue (discriminated), and what verbal operant it is, for what audience (verbal). "Has prejudice" is not a layer: it names the statement; it does not explain it.

EXAMPLE

Moreira et al. (2021, pp. 49–50): the child says "hey, butterball" to an overweight classmate, and the others laugh (operant layer: the laughter is the consequence, as a hypothesis); the overweight person is the discriminative stimulus (discriminated layer); the statement is a tact, because control comes from a nonverbal stimulus (verbal layer); and it starts to occur in the presence of obese people in general (generalization). The group is not on Chapter 1's list, which gives examples rather than a closed set, and the analysis is the same.

NON-EXAMPLE

"Nélson says that because he has prejudice, and he has prejudice because he was raised that way." The first part repeats the statement as its own cause; the second assumes a history nobody recorded. No layer was gone through.

TEST YOURSELF

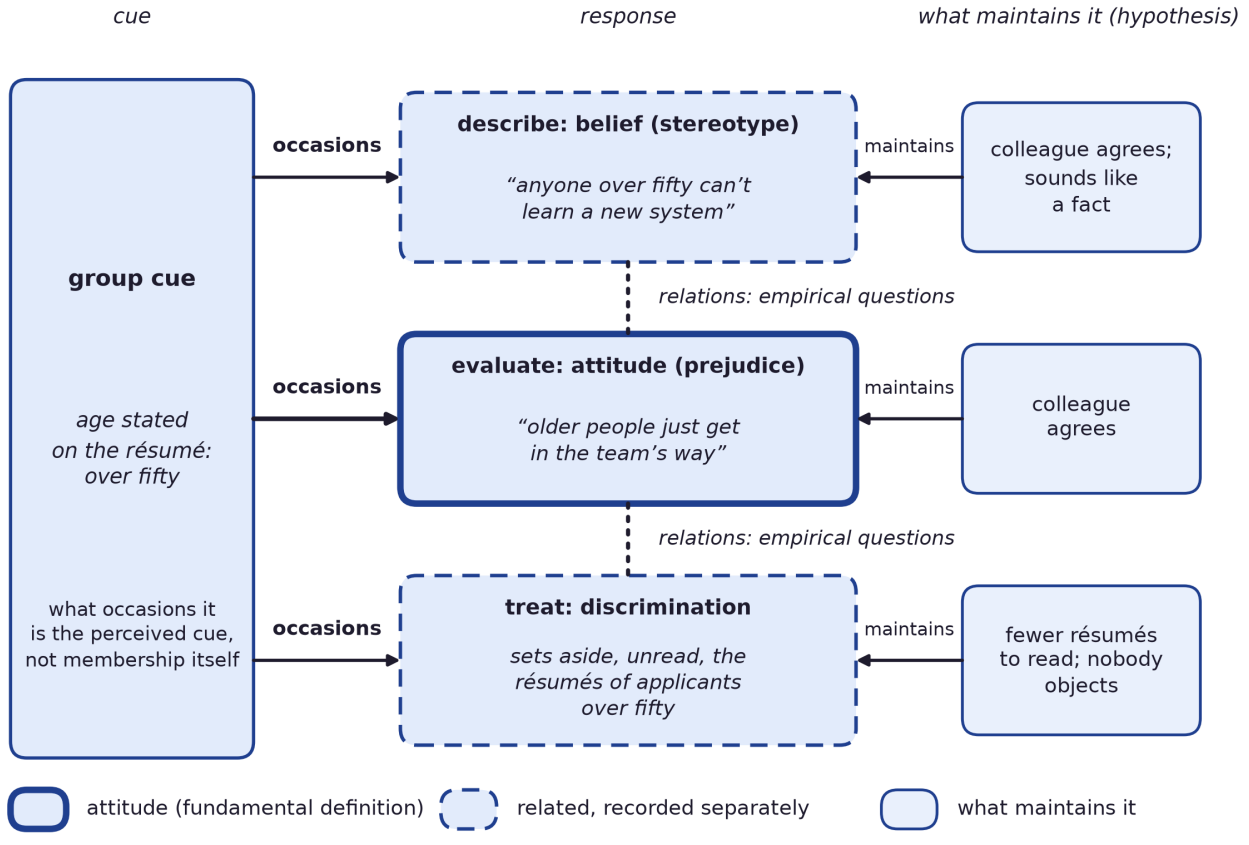
Which verbal operant is the statement "older people just get in the team's way" in these situations? (a) Raul has never worked with anyone over fifty and says it because he heard it from colleagues. (b) Raul worked with a fifty-five-year-old colleague who handed him work late, and he says it to everyone who asks about older people. (c) Raul says it to his boss, so that she will agree to stop reading the résumés.

ANSWER: (a) intraverbal, in the form of a tact; (b) a tact of what he saw, extended to the group (generalization); (c) mand: it asks the listener to accept the cut.

18.5 Prejudice, stereotype, and discrimination: one cue, three classes

The fourth question asks us to separate what common usage lumps together. In the presence of the same group cue, a person can do at least three kinds of things: describe the group, evaluate it, and treat it (Figure 18.2). The word "prejudice" serves, in daily life and in part of the literature, for all three. Matsuda et al. (2020, p. 337) note that behavior science lacks technical definitions for "racism," "prejudice," and "racial bias," and that the three terms are used as if they meant the same thing in everyday speech. The separation made in the chapter is therefore a choice, not a consensus in the literature.

Figure 18.2
One cue, three response classes



Note. Diagram prepared for this book. The case and what maintains each response are illustrative hypotheses.

Table 18.5 brings the three classes together.

Table 18.5

Stereotype, prejudice, and discrimination

Class	What the person does	Example (Nélson)	By the book's definition
Stereotype	describes the group: attributes characteristics to it	"Anyone over fifty can't learn a new system."	Belief (Section 16.2): describes and takes no position; not an attitude
Prejudice	evaluates the group, or the person as part of it	"Older people just get in the team's way."	Attitude, with the three conditions of Section 18.1
Discrimination	treats the group, or the person as part of it, unfavorably	Stops reading the résumés of applicants over fifty.	Operant that neither describes nor evaluates: recorded separately; if the form implies evaluating, it also counts as an attitude (Section 6.10)

Note. Table prepared for this book. The examples are illustrations.

A **stereotype**, for Ashmore and Del Boca (1981, as cited in Mizael & de Rose, 2017, p. 366), is "a set of beliefs about the personal attributes of a group of individuals." It is often used to justify attitudes, behaviors, and differences among social groups (Schneider, 2004, as cited in Mizael & de Rose, 2017, p. 366). It is Chapter 16's belief supporting an attitude, and what separates them is what the chapter has already used: a belief describes, and an attitude takes a position.

Discrimination, in the social sense, is treating someone unfavorably for belonging to a group. It is recorded as rates, without anyone having to say what they think: Knochel et al. (2019, as cited in Matsuda et al., 2020, pp. 338–339) recorded how often teachers gave behavior-specific praise and reprimands to children from different demographic categories, and found that White students got more praise and Black students more reprimands. An intervention combining self-monitoring, performance feedback, and instruction on equalizing praise brought praise and reprimands to similar rates across the categories (Matsuda et al., 2020, p. 343). The treatment can be recorded in its own right, as rates, and it can be the target of the intervention.

⚠ **CAUTION**

"Discriminated" and "discriminatory" are not synonyms. "Discriminated operant" is a technical term: one that occurs in some situations and not in others (Chapter 13). Treating someone in a discriminatory way is, technically, a discriminated operant whose cue is the group; but ordering a coffee at the snack bar counter, and not in the library, is a discriminated operant and is not discriminatory.

The literature tends to link the classes. Mizael and de Rose (2017, p. 367) cite research showing that racial prejudice "can predict discriminatory behaviors." Saini and Vance (2020, p. 55, as cited in Passarelli et al., 2023, p. 38) describe individual racism as "a form of discrimination that stems from personal racial prejudice." And Cameoka and Moreira (2021, p. 94) write that racial prejudice normally "manifests itself in the form of discrimination and stereotypes." The chapter keeps these associations as what one expects to find, and separates the classes so as to be able to ask, in each case, how closely they go together.

The relation is an empirical question, like that between attitude and behavior (Section 15.5), and there are at least three arrangements in which the classes come apart. In the first, a belief functions as a rule and controls treatment without any evaluation: this is the young police officer "trained to think that Black individuals are more prone to criminality," a rule that "will probably be reflected in police stops" (Passarelli et al., 2023, pp. 38–39). In the second, there is evaluation without treatment: the manager says the statement and reads all the résumés, because the procedure requires it. In the third, there is treatment without evaluation: the filter that rejects applicants by year of birth was set up by someone else.

A scene from the series' comics (Part VII) shows the first of these arrangements, with a particular twist: the person is evaluated favorably. In the job-selection story from the study by Oliveira and Moreira (2025), the two interviewers prefer the female candidate, and the plot ends with the other candidate being chosen, "due to her condition as the mother of a young child" (p. 167). During the deliberation (Figure 18.3), one of them says, "I admit I also liked her profile better, but I'm worried she'll need to be away a lot because of her child" (p. 184), and soon afterward announces, "Joana, we've decided on Lucas" (p. 184). The evaluation of her profile is favorable; what is said about the candidate is a prediction ("need to be away"), which describes what is expected of her and does not assign her value; the treatment, choosing the other can-

didate, is unfavorable. There is a single cue, the child, and the three classes do not go together. The authors present the scene as a situation of sexism (p. 160); in the chapter's vocabulary, the lines contain belief and unfavorable treatment, and no unfavorable evaluation of the candidate. The story is fiction created for the study: it illustrates the arrangement, but it does not tell how often it occurs.

Figure 18.3

Evaluating, describing, and treating in the same selection scene



Note. Panels from a comic about a job interview, created by Oliveira and Moreira (2025, pp. 174 and 175) for a study of attitudes toward discrimination against mothers. The strips under the panels were added for this book. The reproduction has the resolution of the source material.

The same topography can, moreover, go into two records. Sitting far from a coworker of another religion, every day, is a form that implies evaluating (Section 17.3) and is treatment. Two records, one occurrence: there are not two responses; there are two questions.

KEY CONCEPT

In the presence of the same group cue, there are three response classes: **describing** the group (stereotype, a belief), **evaluating** it (prejudice, an attitude), and **treating** it (discrimination). Only the second is an attitude by the fundamental definition. The other two are recorded separately, and the relation among the three is an empirical question.

EXAMPLE

(Hypothetical case.) On the same afternoon, Cláudia says "anyone over fifty can't learn a new system" (describes), Nélson says "older people just get in the team's way" (evaluates), and a filter in the screening system, set up by someone else, excludes applicants by year of birth (treats, without anyone saying anything). Three classes, one cue; only one is an attitude of Nélson's, and the third is not even his.

NON-EXAMPLE

"He doesn't hire women, so he is prejudiced against women." The statement infers an evaluation (attitude) from a treatment (discrimination). It may be so, and it is a hypothesis: the treatment may be under the control of a rule ("that's how it's always been done here"), with no evaluation at all.

TEST YOURSELF

Classify as describing (belief), evaluating (attitude), or treating (discrimination): (a) "People from that region are lazy." (b) "People from that region tend to arrive late." (c) Not offering the job to people who live in that region.

ANSWER: (a) evaluating: "lazy" takes a position and has an unfavorable direction; (b) describing: a belief, which takes no position (though it may serve as support for (a)); (c) treating: discrimination.

18.6 How far the analysis reaches: the levels of racism

The analysis in the previous sections is that of one person: what that person says, which cue they respond to, what maintains it. It is a slice, and the chapter needs to say where it sits. Passarelli et al. (2023, p. 35) identify racism at three levels: structural, "a large-scale hierarchical system marked by the concentration of power and wealth"; institutional, made up of "segregating institutional practices"; and individual, "based on prejudice and racial discrimination." What this chapter does is the individual level: "individual racism is a matter of stimulus control, in which race is a discriminative stimulus for discriminatory behaviors" (p. 38). The forms the authors list, "racial slurs, negative evaluations of Black people, escape and avoidance behaviors in the presence of Black people, physical violence, and social exclusion" (p. 38), include

evaluations and treatments, two of the three classes in the previous section. The authors are writing about racism against Black people (note 5, p. 35); applying the three levels to other groups, as this chapter does, is the book's own extension.

The authors warn that the separation "is didactic" and that "it is not a hierarchy," because "to combat racism, it is necessary to intervene at all its levels" (p. 40). For anyone researching prejudice, three cautions follow. The first is that the individual level does not explain the others: "the institution defines how the service is regulated, and individuals carry out the actions" (p. 39), and the police officer trained to think that Black people are more prone to crime carries the institution's rule into the police stop. The second is that interventions on individuals tend to be ineffective or not to last, because "individuals return to the same cultural environment, where racist contingencies operate" (p. 40); punishment, in particular, may reduce prejudiced behavior "only in the context in which the individual was punished" (note 8, p. 39). For this reason, the authors call for monitoring the maintenance of effects and for tests of generalization (p. 40; Chapters 26 and 31). The third is that the analysis of how discriminatory practices are "selected and maintained, based on the relations established among different social groups" belongs to the cultural level of selection by consequences. Mizael and de Rose (2017, p. 375) leave it out of their article because, they say, it "deserves a work of its own." This chapter leaves it out as well.

One objection remains. Saying that prejudice is learned, and that Nélson's statement has a history of consequences, does not make it any less his or any less harmful to those on the receiving end: explaining is not approving. This is what the note in Chapter 1 said: analytical rigor without moral neutrality. The analysis says what occasions and maintains the statement and, therefore, what would need to change.

KEY CONCEPT

The **three levels of racism** (structural, institutional, and individual) are a didactic separation, not a hierarchy (Passarelli et al., 2023, p. 40). This chapter's analysis is at the individual level: what a person says and does in the presence of the group cue and what maintains it. On its own, it does not explain what the institution and the structure do with people.

EXAMPLE

(Hypothetical case.) Nélson's company starts sending résumés to managers without the date of birth. The institution's procedure changed, and the treatment changed with it. If the statement "older people just get in the way" stopped showing up in meetings, the record says it stopped showing up there; what Nélson says elsewhere is a question, not a conclusion.

NON-EXAMPLE

"If we train every manager not to be prejudiced, the company's racism will end." It treats the individual level as if it were the only one: it ignores what the institution regulates and the cultural environment people return to (Passarelli et al., 2023, pp. 39–40).

TEST YOURSELF

Structural, institutional, or individual level? (a) A manager interrupts and disagrees with a colleague's racist remark. (b) A company decides that applicants from certain neighborhoods only go through the second screening. (c) The concentration of power and wealth among racial groups across the whole of society.

ANSWER: (a) individual: it is an intervention on one person's speech (Passarelli et al., 2023, p. 39); (b) institutional: it is an organizational practice; (c) structural: it is a large-scale arrangement.

Common learner mistakes

1 **Explaining the statement by "has prejudice."** The mistake happens because "having prejudice" is the everyday explanation and seems sufficient. *How to spot the mistake:* you write that Nélson "says that because he has prejudice," and the only evidence of the prejudice is what he says and does. Replace the explanation with cue, occasions, and consequences, and say what would be observed (Section 18.4).

2 **Calling every unfavorable evaluation of a person prejudice.** The mistake happens because, in common usage, "prejudice" has become the name for any negative judgment. *How to spot the mistake:* you write "prejudice" for "Raul misses deadlines." Ask what occasions the evaluation: what the person did, or membership in a group (Section 18.2).

3 **Merging group, practice, and concept.** The mistake happens because, in public debates, criticism of a policy and evaluation of the group it benefits show up together. *How to spot the mistake:* you record "prejudice against older people" for "the priority line is going too far," or "prejudice" for any criticism of a quota policy. Ask what the object is and, then, what occasions it (Section 18.3).

4 **Merging belief, attitude, and treatment.** The mistake happens because the word "prejudice" covers all three classes in common usage and in part of the literature. *How to spot the mistake:* you call "prejudice" what the manager thinks, says, and does, without separating what describes, what evaluates, and what treats. Record the three classes and ask how they relate (Section 18.5).

5 **Taking the individual level for the whole of racism.** The mistake happens because what one person says and does is in plain sight, and what the institution and the structure do is not. *How to spot the mistake:* you conclude that changing what each person says will end an organization's racism. The analysis of one person does not explain what the institution regulates or the cultural environment the person returns to (Section 18.6).

SUMMARY

What prejudice adds (objective 1). Prejudice is an attitude, that is, a discriminated operant with an evaluative form, with three additional conditions: unfavorable direction, an object that is a group of the kind on Chapter 1's list (or a person as part of it), and the group cue as what occasions the evaluation. "Unjustified," "systematic," and "resistant to evidence" are left out: the first is a judgment, and the other two are properties to be measured.

The variation test (objective 2). The test changes the group cue while holding constant what the person did, or the reverse, and observes the evaluation. There are four results: the group is functional (prejudice, by

the chapter's criterion), the act is functional (attitude, not prejudice), both are (multiple control), and neither is (keep going). Each is evidence, because the cue is a bundle and the result holds for the situation in which it was obtained.

Group, practice, and concept (objective 3). Evaluating a group, a practice, or a concept are attitudes with different objects. Prejudice is the evaluation of the group, or of the person as part of it, when the group cue occasions it. The other two may accompany it, and the statement alone does not show the function.

The five layers (objective 4). The analysis goes through what happened, what the person did, what maintains it, in what situation and under what cue, and what verbal operant it is, for what audience. Shaping may have produced the evaluation without anyone planning it, and "has prejudice" is not a layer: it names the statement.

One cue, three classes (objective 5). In the presence of the same cue, a person may describe the group (stereotype, belief), evaluate it (prejudice, attitude), and treat it (discrimination). Only the evaluation is an attitude by the fundamental definition; the others are recorded separately, and the relation among the three is an empirical question.

The levels of racism (objective 6). The analysis of one person is the individual level. The structural and institutional levels have their own variables, and the cultural environment people return to limits what an individual intervention can sustain. Explaining is not approving.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. Which subset of Figure 18.1 is the innermost one each statement still fits (discriminated operant, attitude, attitude unfavorable to a group, or prejudice)? (a) "Can you send the spreadsheet today?" (b) "This app is nothing but lag." (c) "Vânia was rude to the client." (d) "Ride-share drivers are all slackers." (e) "People with disabilities slow down the team."

2. (Wording constructed for this exercise.) "Prejudice is a systematically negative, unjustified evaluation, resistant to contrary evidence, directed at people because they belong to a group." Classify each part as a condition of the book's definition, a property to be measured, or a judgment by the observer: (a) "negative"; (b) "systematically"; (c) "unjustified"; (d) "resistant to contrary evidence"; (e) "directed at people because they belong to a group."

3. (Hypothetical case.) Two résumés are identical except for age. Nélson rejects the one from the fifty-three-year-old and reads the one from the twenty-eight-year-old. Which conclusion does the variation test support?

a. Nélson is prejudiced against older people, as a trait of his.

b. In this situation, the evaluation changed with the group cue and not with what the candidate did: it is prejudice by the chapter's criterion, as evidence.

c. Nothing can be said, because one occurrence is not enough for any conclusion.

d. What occasions the rejection is the person's age, not the information on the résumé.

4. (Hypothetical case.) A researcher shows thirty participants pairs of résumés. When only age varies, the rejection rate is 60% and 58%. When only the described performance varies, with the same age, it is 20% and 70%. (a) Which result of the variation test does this represent? (b) What can be concluded? (c) What cannot be concluded?

5. Mr. Álvaro says, "I have nothing against older people, but this priority line is going too far." (a) Which objects appear, and from which families? (b) Is the statement alone prejudice by the chapter's criterion? (c) Which two variations of the variation test would you run?

6. Match each question to its layer (natural phenomenon, behavior, operant, discriminated, or verbal): (a) "In which situations does the statement appear, and in which does it not?" (b) "What follows it, such that it occurs again?" (c) "Does it report what the person saw, repeat what people say, or ask the listener for something?" (d) "What form does it have, and what function?" (e) "What can be recorded, measured, and repeated?"

7. (Hypothetical case.) Nélson says "older people just get in the team's way" at lunch, with Cláudia, and says "we need people who can adapt" in the meeting with the HR director. A colleague concludes, "He's a hypocrite: his prejudice only shows when it suits him." (a) Rewrite the conclusion in terms of a discriminated operant. (b) What data would be missing to call the second statement prejudice? (c) What does the difference between the two audiences not allow us to conclude?

8. Classify each item as stereotype, prejudice, discrimination, or two records: (a) "Women don't like fieldwork." (b) "A woman in the field just gets in the way." (c) Scheduling only men for field visits. (d) Sitting far from a coworker of another religion, every day. (e) An automatic filter that rejects addresses in a certain neighborhood.

9. (Hypothetical case.) A study finds that managers who say things like "a woman in the field just gets in the way" assign fewer women to fieldwork. What does the study support?

a. That the evaluation causes the treatment.

b. That there is a relation between evaluating and treating in this sample; whether the evaluation maintains the treatment, or the reverse, or both depend on a third variable, is a question the study does not answer.

c. That the treatment is a consequence of the stereotype.

d. That there is no relation, because evaluating and treating are different classes.

10. A colleague says, "If prejudice is learned, nobody is to blame, and training people solves it." (a) Which part of the objection is answered by the idea that explaining is not approving? (b) Which part is answered by the levels of racism? (c) Answer the objection in three sentences.

ANNOTATED ANSWER KEY

1. (a) Only the first: a discriminated operant that asks for something and assigns no value. (b) Attitude: the object is a thing. (c) Attitude: the object is a person, evaluated for what she did. (d) Attitude unfavorable to a group: the group is defined by what its members do, and it lies on the boundary (Section 18.1). (e) It fits the last one, by its form (unfavorable direction, group defined by a characteristic); whether it is prejudice depends on the test in Section 18.2.

2. (a) "Negative" is the condition of unfavorable direction. (b) "Systematically" is a property: it is measured across occasions (Section 15.5). (c) "Unjustified" is a judgment by the observer: justified by what criterion? (d) "Resistant to contrary evidence" is a property to be measured, and it varies across studies (Mizael & de Rose, 2017, p. 370). (e) It is a condition: the object is a group and membership occasions the evaluation, which the variation test checks.

3. **b.** The evaluation changed with the cue and not with what the candidate did, and it is evidence, because the cue is a bundle and the result holds for that situation. Option **a** is wrong because it turns the result into a trait: an attitude is a discriminated operant, not a stored state (Chapter 11). Option **c** errs by excessive caution: the test supports a reading, even if only as evidence. Option **d** is wrong because it slides from the information on the résumé to the person's age: what was varied was the cue.

4. (a) The act is functional: rejection did not vary with the age cue (60% and 58%) and did vary with performance (20% and 70%). (b) That, in this situation and with these participants, what occasioned the rejection was what the candidate did, not the stated age: an unfavorable evaluation, not prejudice, by the criterion. (c) That the participants do not discriminate by age in other situations: the result holds for the study situation, and the task was done in front of a researcher, where "being prejudiced" tends to have disapproval as its consequence (Cameoka & Moreira, 2021, pp. 106–107).

5. (a) Older people (people and groups) and the priority line (behaviors and practices, or institutions). (b) No: the object of the unfavorable evaluation is the rule, and the group appears in the disclaimer. (c) For example: swap who benefits from the line (pregnant women, people with disabilities, older people) while keeping the rule, and see whether "going too far" tracks the group or the rule; and keep the beneficiary while changing the rule (first-come, first-served priority, service at a different counter), to see whether the evaluation falls on the practice or on the group.

6. (a) Discriminated (Chapter 13). (b) Operant (Chapter 12). (c) Verbal (Chapter 14). (d) Behavior (Chapter 11). (e) Natural phenomenon (Chapter 10).

7. (a) As a hypothesis, the same class of evaluations, with different forms under different audiences: in front of Cláudia, who agrees, the open form; in front of someone who may disapprove, a more cautious form (Chapter 14). This is what the discriminated operant predicts, not an inconsistency. (b) The variation test on the second statement: is "adapting" evaluated the same way in older and younger candidates who did the same thing? (c) That the first statement is the "real" prejudice and the second a mask: that is the sign reading of Section 17.1, which takes what the person says as a sign of something stored inside them.

8. (a) Stereotype: it describes the group's preferences, without a position. (b) Prejudice: "just gets in the way" evaluates. (c) Discrimination: it is treatment, which neither describes nor evaluates. (d) Two records: a form that implies evaluating (with the caution of Section 6.10) and treatment; one occurrence. (e) Discrimination at the institutional level: treatment without anyone, there, evaluating or describing.

9. b. The study shows a relation, and the direction and mediation depend on other evidence. Option **a** is wrong because it takes the relation for a cause. Option **c** is wrong because it assumes another class (the stereotype) that the study did not record. Option **d** is wrong because it infers the absence of a relation from a difference in class: different classes can be related.

10. (a) The "nobody is to blame" part: the analysis says that the statement has a history of consequences, not that the person is not answerable for what they say and do; explaining is not approving. (b) The "training people solves it" part: the individual level does not explain the institution or the environment people return to, and individual interventions tend not to last (Passarelli et al., 2023, pp. 39–40). (c) Model answer: "Learned does not mean no one is responsible: the history explains the statement and points to what to change. But train-

ing each person is not enough: the institution regulates what is done, and people who return to the same environment tend to return to the same behavior. That is why intervention happens at all three levels."

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 19. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2	18.1 and common mistake 2
3, 4	18.2
5	18.3 and common mistake 3
6, 7	18.4 and common mistake 1
8, 9	18.5 and common mistake 4
10	18.6 and common mistake 5

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CHAPTER

19 Functional Analysis of Attitudes

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Distinguish** the three senses of "function" found in the literature on attitudes and **state** which one is used here.
2. **Classify** what is known about an evaluation as report, observation, or manipulation and **state** what each allows you to conclude.
3. **Fill out** an occasion record, separating what was observed from what is assumed.
4. **Write** a functional hypothesis, with occasion, consequence, and establishing operation, and **state** what would contradict it.
5. **Plan** a variation test and **read** its result without going beyond what it allows.
6. **Propose** an intervention consistent with the hypothesized function and **state** what the analysis does not guarantee.

PREREQUISITES

Function as a relation among circumstance, response, and consequence (Section 11.5), positive and negative reinforcement (Chapter 12), the observation form (Section 8.4), the discriminative stimulus and what is "at stake" (Chapter 13), the tact, the mand, and the intraverbal (Chapter 14), the hypothesis that a value organizes consequences (Section 16.4), and the variation test (Section 18.2). The new terms (functional analysis, functional hypothesis, descriptive analysis, test and control conditions, multielement design, establishing operation, escape, avoidance, and the families of consequences) are defined here.

OPENING

(Hypothetical case.) Heloísa teaches eighth-grade math. Over two weeks, three students say the same thing: "Math is boring." Gustavo says it in the schoolyard, to a group of classmates, and they laugh. Simone says it in class, when Heloísa announces that the problem set will be worked through at the board, and Heloísa usually answers "fine,

hand it in tomorrow" or calls on another student instead. Otávio says it anywhere, to anyone, and nothing seems to follow it consistently. The school coordinators suggest a talk on "the beauty of mathematics" for the whole class. Four questions organize the chapter.

1. *"Are the three statements the same attitude? What are we asking when we ask what each one is for?"*
2. *"Should Heloísa ask the students why they say it, observe them, or change something and see what happens to the statement? What does each path allow her to conclude?"*
3. *"How can she write down what sustains Simone's statement without saying that Simone 'has an aversion' to math?"*
4. *"How can she know whether the hypothesis is right, and what should she do with it? Will the talk help?"*

The first calls for the senses of "function" (Section 19.1); the second, for the difference among report, observation, and manipulation (19.2); the third, for the record and the hypothesis (19.3 and 19.4); the fourth, for the test and the intervention (19.5 and 19.6). Section 19.7 states what the analysis does not provide.

19.1 Three senses of "function"

Chapter 11 defined the function of a behavior as the relation among the circumstances in which it occurs, what the person does, and what that produces next. It also took from Catania (1999, p. 137) three boys whose self-injurious behavior was very similar in form and had "completely different" functions, which called for "very different treatment programs." The first boy's behavior increased when people were around who did not give him attention; the second's, when he was asked to do a task; the third's, regardless of the social context (p. 137). Gustavo, Simone, and Otávio repeat the picture with an evaluation. What remains is to say how one arrives at a claim of this kind, and the first difficulty is that "function" is used in at least three senses.

In the first, that of social psychology, asking about the function of an attitude means asking what it does for the person. Ajzen (2001, pp. 40–41) sums up that, in the broadest sense, attitudes help people adapt to their environment, and he lists the functions most theorists accept: value-expressive, knowledge, ego-defensive, social-adjustive, and utilitarian. In a study on lifting the ban on homosexuals in the U.S. military, respondents endorsed or rejected "ego-defensive" and "value-express-

ive" reasons (Wyman & Snyder, 1997, as cited in Ajzen, 2001, p. 41). Here the function is what the person endorses as a reason: a piece of report data.

In the second, that of behavior analysis, the word has two uses (Hanley et al., 2003, p. 148). One is the effect of the behavior on the surroundings or, put informally, the purpose it serves for the individual (ending an ongoing event, for example). The other is the relation between two variables, in which one varies depending on whether the other is present or absent. Catania (1999, p. 385) records both: "analysis in terms of behavioral functions (effects of responses)" or, alternatively, "in terms of functional relations." This is the sense of the three boys.

In the third, Guerin (1994, p. 156) takes another path: to analyze attitudes as verbal behavior, one must consider "all possible functions" of attitudes, beyond reporting a private event. The functions Guerin lists are those of verbal behavior: the tact, the intraverbal, and the mand (Chapter 14). Guerin says this yields a functional analysis of attitudes "very different" from those carried out by social psychologists (p. 156). Here the function is the type of verbal operant, defined by what controls it.

The second sense is the one used here. The function of an evaluation is what maintains it: the relation between the evaluation, the occasions on which it occurs, and the consequences that follow it. The third sense enters as one of the questions of the second, because the type of operant depends on the variables that control it. The first sense enters as a report to be examined: what the person says the attitude does for them is another verbal response, with its own history.

KEY CONCEPT

Functional analysis is the empirical demonstration of a cause-and-effect relation between environmental variables and behavior (Hanley et al., 2003, p. 148; Schlinger & Normand, 2013, p. 287): an occasion, an operation, or a consequence is varied, and the behavior is observed. What is obtained without manipulation, through report or observation, is a functional hypothesis.

Skinner (1953, as cited in Hanley et al., 2003, p. 148) used the term for showing that changes in the environment cause changes in behavior. In the applied field, the term came to refer mainly to pretreatment assessments in which antecedents and reinforcers are manipulated (Schlinger & Normand, 2013, p. 287). For Schlinger and Normand (p. 287), what matters for understanding a verbal response is not its ap-

pearance (its topography) but the reason it occurs (its function), and finding the causes requires manipulating the variables, that is, running an experiment.

EXAMPLE

"Simone says 'math is boring' when Heloísa announces the board work, and Heloísa usually calls on another student instead." The statement relates occasion, response, and consequence: it is a functional formulation, still a hypothesis.

NON-EXAMPLE

"Simone says that because she has an aversion to math." The statement names a state and takes it as the cause. It does not say in what situations the evaluation occurs or what follows it: it is common mistake 1 from Chapter 18, explaining by "has."

TEST YOURSELF

Which sense of "function" appears in each statement? (a) "Gustavo's attitude serves to make him feel part of the group." (b) "Simone's statement appears when a task has been announced and does not appear when none has." (c) "By saying it, Simone is asking Heloísa to postpone the task."

ANSWER: (a) what the attitude does for the person, the social psychology sense, which here is treated as a report to be examined; (b) the relation between variables; (c) the type of verbal operant, in this case a mand (Chapter 14).

19.2 Report, observation, and manipulation

Heloísa has three paths to finding out why the statement appears. She can ask students and colleagues, she can observe and record what happens, and she can change one thing at a time and see what happens to the statement. The applied field distinguishes these approaches by the kind of data they gather and by how far environmental events are merely watched or actually manipulated, and all of them try to pin down the antecedents that occasion the behavior and the consequences that reinforce it (Iwata & Worsdell, 2005, pp. 26–27). Table 19.1 compares them.

Table 19.1

Three ways of finding out what maintains an evaluation

Way	What is done	What it provides	What it does not provide
Report (indirect method)	asks the person and those around them; uses interview guides and rating scales	clues about what to observe and what to test	the function: the report is another verbal response, with its own listener and consequences
Observation (descriptive analysis)	records, across occasions, where, with whom, after what, and what followed	a checkable description and regularities	that the consequence maintains the evaluation: the elements appear together
Manipulation (functional analysis, in the strict sense)	varies one element (occasion, operation, or consequence) and holds the others constant, in test and control conditions	a demonstration of the relation, if the pattern repeats and the conditions are controlled	that the relation holds outside the arranged conditions; not always feasible or ethical

Note. Table prepared for this book, based on Iwata and Worsdell (2005, pp. 26–28) and Iwata and Dozier (2008, pp. 3–4), who deal with problem behavior. The application to evaluations is a proposal of this book.

Report is the simplest path and the weakest. Because the data are purely verbal, and what people say can be inaccurate for many reasons, these methods have turned out to be unreliable and are useful only as preliminary information, never as the basis for an intervention plan (Iwata & Worsdell, 2005, p. 27). With evaluations there is one more reason: Simone's answer to "why do you say that?" is also verbal behavior, said to a particular listener. Guerin (1994, p. 157) points out that what a person reports as an attitude nearly always answers to the contingencies of the verbal community in whose presence the report was given. It answers to the contingencies of the conversation with the teacher, which may not be those of the schoolyard.

The observation form used since Chapter 8 is a **descriptive analysis**: direct observation of the behavior and of the situations in which it occurs. Its most common form is the A–B–C record (antecedent, behavior, consequence), in which the observer writes down, each time the behavior occurs, the time and place, the response, and what came just before and just after. The data are summarized as conditional probabilities, and inferences about what maintains the behavior rest on the correlations observed (Iwata & Worsdell, 2005, p. 27). It is far better than report, and it has a limit: it gives no control over the situations in which the behavior occurs, so several events show up together (such as escape from a task accompanied by the teacher's attention), and any one of

them could account for maintenance (p. 27). Iwata and Dozier (2008, p. 4) add that descriptive analysis may point to attention as the source of maintenance merely because attention is a frequently observed consequence, even when it may not be a reinforcer. They also note that descriptive and functional analyses conducted independently tend to agree poorly.

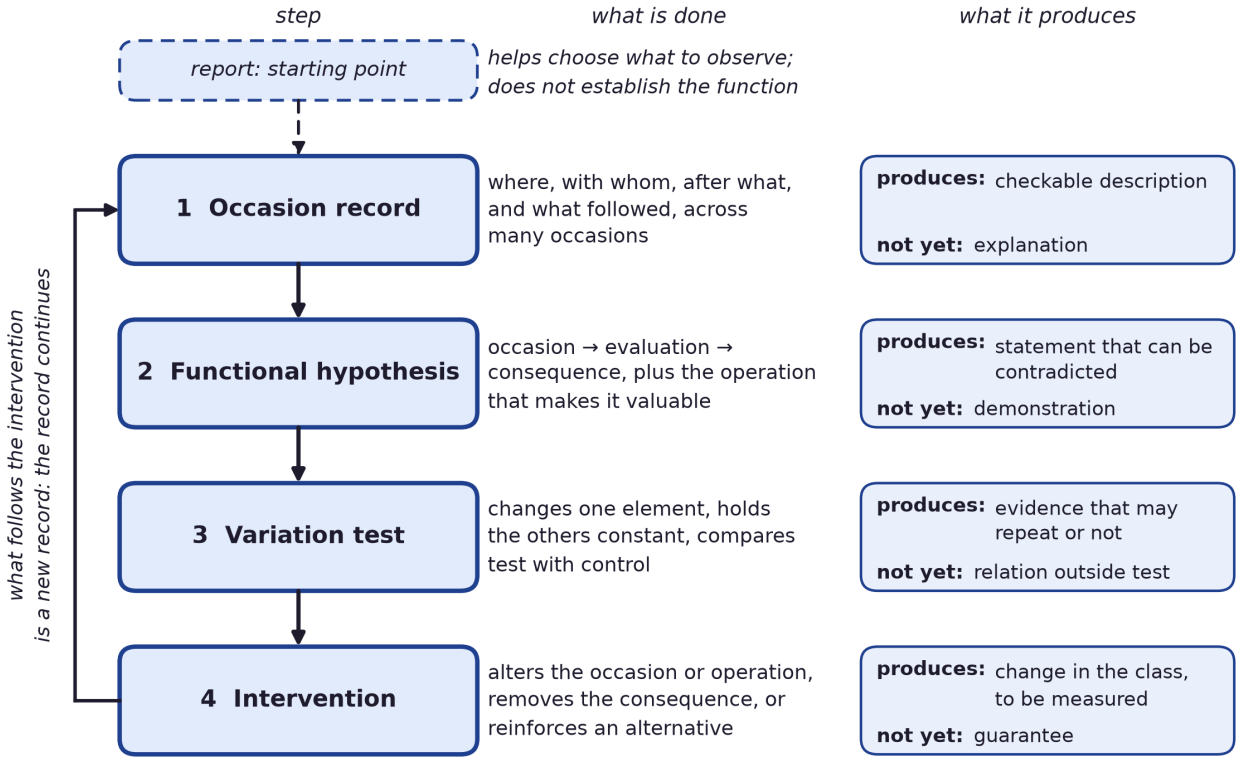
Only manipulation "identifies cause–effect relations" (Iwata & Worsdell, 2005, p. 28). What functional analysis methods have in common is observing behavior under well-defined test and control conditions: the **test condition** contains the variable whose influence is being assessed, and the **control condition** serves to rule out that the behavior would have occurred anyway (Iwata & Dozier, 2008, p. 4). This was the model of Iwata et al. (1982/1994, pp. 201–205): 9 children with self-injury went through conditions of social disapproval, academic demand, being alone, and unstructured play, alternated in short sessions (the multielement design, Section 19.5; Hanley et al., 2003, p. 149), and for six of them self-injury was consistently higher in one specific condition. The result shows that the variation within each person is not "merely a random process" (p. 205).

With attitudes, direct manipulation is rare. The group studies in Section 12.5 manipulated what follows an evaluation and measured what came afterward. In the sense of "any empirical demonstration of a cause-effect relation" (Baer et al., 1968, as cited in Iwata & Dozier, 2008, p. 3), they are functional analyses of evaluations, of groups rather than of one person. For one person, what is usually available is report and observation, and the Brazilian literature is explicit about the limit. Fazzano and Gallo (2015, p. 538) write that "carrying out a functional analysis requires experimentation (manipulation of variables)" and that, "due to ethical considerations," the article "will address the establishment of a functional hypothesis." Schlinger and Normand (2013, p. 288) point out that functional analysis also underlies the interpretations behavior analysts offer of what cannot be studied experimentally.

Hence the chapter's convention. "Functional analysis of attitudes," in the title, names the whole path, from the record to the test (Figure 19.1), which the applied literature calls functional assessment; in the strict sense of the box in Section 19.1, only the manipulation step is functional analysis, and its product remains a functional hypothesis until a manipulation supports it.

Figure 19.1

From record to intervention: what each step produces and what it is not yet



Note. Diagram prepared for this book.

TEST YOURSELF

Heloísa asks Simone, "Why do you say math is boring?" Simone answers, "Because I don't understand the exercises." Which way does this information belong to, and what does it allow her to conclude?

ANSWER: report. It tells her what Simone says when asked by a teacher, and it is a starting point: it suggests observing what happens when the problem set is announced. It does not show that the statement in class is maintained by this.

19.3 The occasion record: observe before assuming

The observation form from Chapter 8 (Table 8.2) logs an evaluation: the object, the valence and intensity, the form, where and with whom, what came before, and what was at stake. For the analysis, it now has one row per occasion, with what came before and *what followed*, and with what was "at stake" in a separate column, because that is a hypothesis:

Chapter 13 read it as the consequence that, in the evaluator's history, usually follows evaluations like this in situations like this (Table 13.1). Four precautions make a difference. The first is to record what follows in the next few moments and could be checked by another observer (the laughter, the "fine, hand it in tomorrow," the change of subject), not what the person is assumed to have felt. The second is to record also the occasions on which the evaluation could have occurred and did not; without them there is no way to know whether the laughter follows it more than it follows any remark (Section 13.1). The third is to note what may alter the value of the consequence (is the problem set new material or review?). The fourth is to remember that who observes, and how, is part of the situation (Section 8.4).

Over two weeks, Heloísa and the schoolyard monitor recorded six occasions for each student. Table 19.2 summarizes them.

Table 19.2

Occasion records for three students (six occasions each)

Student	Where and with whom	After what	What followed
Gustavo	schoolyard and hallway, with three to five classmates; never in the classroom	a classmate mentions the homework or the test	laughter or "yeah, right" in 5; nothing in 1
Simone	classroom, heard by Heloísa and the class	Heloísa announces the board work or calls on someone to solve a problem	Heloísa postpones the due date or calls on another student in 4; insists on the task in 2
Otávio	schoolyard, hallway, and classroom, with classmates or with Heloísa	homework, recess, conversation about something else	laughter in 2; reprimand in 2; nothing in 2

Note. Fictitious data, for illustration.

The table shows regularities that a report would not. Gustavo says the statement where there is an audience of classmates, and what follows is laughter. Simone says it when the board work is announced, and what follows is the task being postponed or passed to someone else. With Otávio, nothing repeats. Heloísa also noted that the problem set was announced ten times during the period and that Simone made the statement on six of them: on all three sets with new exercises and on three of the seven review sets. The occasion, therefore, does not produce the statement every time, and the difference between the sets is what the hypothesis needs to take into account (Section 19.4).

TEST YOURSELF

Rewrite in terms of occasion, response, and what followed: "Simone made a scene to get out of the problem set, and Heloísa, being soft, gave in."

ANSWER: "When Heloísa announced the board work, Simone said 'math is boring'; Heloísa answered 'hand it in tomorrow.'" "Made a scene," "get out of," and "soft" are interpretations; the escape hypothesis can come in later, in a separate column.

19.4 From record to hypothesis

With the record in hand, Heloísa writes down what it supports, and the form matters. A **functional hypothesis** states, for a class of evaluations by one person, on what occasions they occur, what consequence maintains them, and what operation makes that consequence valuable; it also states which observations it rests on and what result would contradict it. The last point is what separates it from a label: a statement that no result can contradict is not a hypothesis.

KEY CONCEPT

An **establishing operation** is any operation that changes the status of a stimulus as a reinforcer or punisher (Catania, 1999, p. 412), such as deprivation and satiation. It changes the value of the consequence and evokes the response that produces it; the discriminative stimulus, by contrast, occasions (p. 44). For Iwata and Worsdell (2005, p. 29), any antecedent that changes how effective a reinforcer is, that is, its value, counts as an establishing operation.

Chapter 13 anticipated the distinction between what occasions the evaluation (the discriminative stimulus, present in the situation) and how much the consequence is worth to the person at that moment, and Chapter 14 pointed to establishing operations, together with the specific reinforcer, as what defines the mand (Medeiros et al., 2021, p. 28). With attitudes, the question is how much the consequence is worth right now. For attention, the typical operation is deprivation: in the applied field's attention test condition, the therapist holds attention back or gives it to someone else, and this can make it more valuable as a reinforcer (Iwata & Dozier, 2008, p. 4). Catania (1999, p. 137) speaks of placing the boy who seeks attention in situations where he is "less deprived" of it. For negative reinforcement, the typical operation is avers-

ive stimulation (Iwata & Worsdell, 2005, p. 29): a set of new exercises makes postponing it more valuable than a review set does, and that is what Simone's record suggests.

The applied literature treats positive and negative reinforcement as the two basic contingencies responsible for keeping behavior going, and it sorts them by whether the consequence is delivered by other people (social) or results directly from the behavior itself (automatic) (Iwata & Worsdell, 2005, p. 26). For evaluations, three **families of consequences** are proposed here, based on that classification. Table 19.3 brings them together.

Table 19.3

Three families of hypothesized consequences for an evaluation

Family	Consequence	What the record would show	Typical operation
Getting something from the listener (positive reinforcement, social)	attention, laughter, agreement, approval, a favor, or an advantage	the evaluation occurs in front of certain audiences, and the consequence comes right after; it becomes rare without them	deprivation of what the audience provides
Removing, postponing, or avoiding something (negative reinforcement, social)	ending, postponement, or excusal from a task, a request, an argument, or contact with someone	the evaluation occurs when the demand is present or announced, and the demand is withdrawn; it becomes rare without it	aversive stimulation (a hard, long, or exposed task)
Unmediated consequence (automatic)	something the response itself produces and that no one delivers	persists without a listener and with any audience; the record does not show the consequence	not directly observable

Note. Table prepared for this book, based on the classification in Iwata and Worsdell (2005, p. 26) and the test conditions in Iwata and Dozier (2008, pp. 3–4). The application to evaluations is a proposal of this book.

The second family is the negative reinforcement of Chapter 12, by **escape**, in which the response ends something already present (Catania, 1999, p. 406), or by **avoidance**, in which the response prevents or postpones something that would come (p. 402). The third is the one most easily turned into a name for what was not observed: the reinforcers produced by the response itself "usually cannot be seen or controlled" (Iwata & Worsdell, 2005, p. 30). "A sense of consistency" and "relief" are not events the record captures, and they enter, if they enter at all, as a flagged hypothesis. When the record shows no pattern, as with Otávio's, that is what gets written, and not a hypothesis.

EXAMPLE

For Simone: "When Heloísa announces the board work, Simone says 'math is boring,' and Heloísa usually postpones the due date or calls on someone else (4 of 6 occasions); the statement occurred on 3 of the 3 sets with new exercises and on 3 of the 7 review sets. The hypothesis would be contradicted if the statement occurred just as often with no task announced, or if, with the task kept in place after the statement, the statement continued unchanged." In the vocabulary of Chapter 14, the statement behaves like a mand: the specific consequence is an action by the listener. The label summarizes the hypothesis; it does not replace it.

NON-EXAMPLE

"Simone says math is boring because it relieves the anxiety the problem set causes." The consequence is a state, which the record does not capture and which no variation test can isolate. The anxiety, if it exists, is an elicited reaction, and it is recorded separately (Section 17.4); the consequence the record shows is the postponed task, and that is what the hypothesis rests on.

A hypothesis is about a class, not about a single occurrence. Gustavo may say "math is boring," write "math = torture" on his desk, and roll his eyes when Heloísa opens her notebook; if all three occur in front of the same classmates and are followed by the same laughter, they are different topographies serving the same function, and the hypothesis applies to the class (Sections 6.9 and 12.1). The same holds for what Chapter 16 proposed about values: if evaluations of different objects produce consequences of the same class, they should vary together, and the test is to vary that consequence and see whether the evaluations change together (Section 16.4).

The literature on prejudice offers hypotheses in this format. Fazzano and Gallo (2015, p. 539) observe that the presence of homosexual people, as a discriminative stimulus, "explains little to us about the 'causes' of the aggression" (as Chapter 18 already noted) and propose understanding it through negative reinforcement, as "a way of removing, reducing the stimulus." Mizael (2018, p. 22) reads the proposal as a functional hypothesis in which the person's presence would be "a motivating operation" (a broader term that includes the establishing operation) for the aggressor's actions. Passarelli et al. (2023, p. 38) list reinforcers that may be involved in learning individual racism: social approval, tangible reinforcers, privileges, opportunities, and escape from or avoidance of aversive environments. The list fits the first two

families of Table 19.3, and it says what may be involved, not what is involved in a given case. For Mizael (2018, pp. 24–25), who reviews the behavior-analytic literature on homosexuality, functionally analyzing behaviors that may be considered prejudiced, especially those taken as "jokes," is a gap in the field, because it would allow intervention proposals that are "more directive and even distinct, depending on the functions." The review cites Guerin (2005), who reportedly showed contexts in which functions other than "being racist" (being accepted, raising the status of one's own group, avoidance, thoughtless use of stereotypes) would control the behavior (Guerin, 2005, as cited in Mizael, 2018, p. 25).

TEST YOURSELF

In Simone's case, what would contradict the hypothesis that the statement "math is boring" is maintained by the postponed task?

ANSWER: That the statement occurred just as often with no task announced, or that, with the task kept in place after the statement, the statement continued unchanged. A hypothesis says what result would contradict it; a statement that no result can contradict is a label.

19.5 Testing the hypothesis

The hypothesis says what the record supports, and the test puts it at risk. This is what Chapter 13 did with anonymity, by proposing the same survey with and without identification for two halves of the team, and what Chapter 18 did with the group cue, by swapping it while keeping what the candidate did: vary one element and hold the others constant. What remains is to say how this is organized when the element is a consequence.

In an applied-field functional analysis, each test condition contains the operation, the discriminative stimulus, and the source of reinforcement for one contingency, and the control condition contains none of them (Hanley et al., 2003, p. 149). The conditions alternate in short sessions, in the **multielement design**, which is the most efficient for making several comparisons (Iwata & Dozier, 2008, p. 4). Heloísa, who does not need to test everything, chooses what the record suggests: three conditions, in twelve ten-minute sessions, in alternating order.

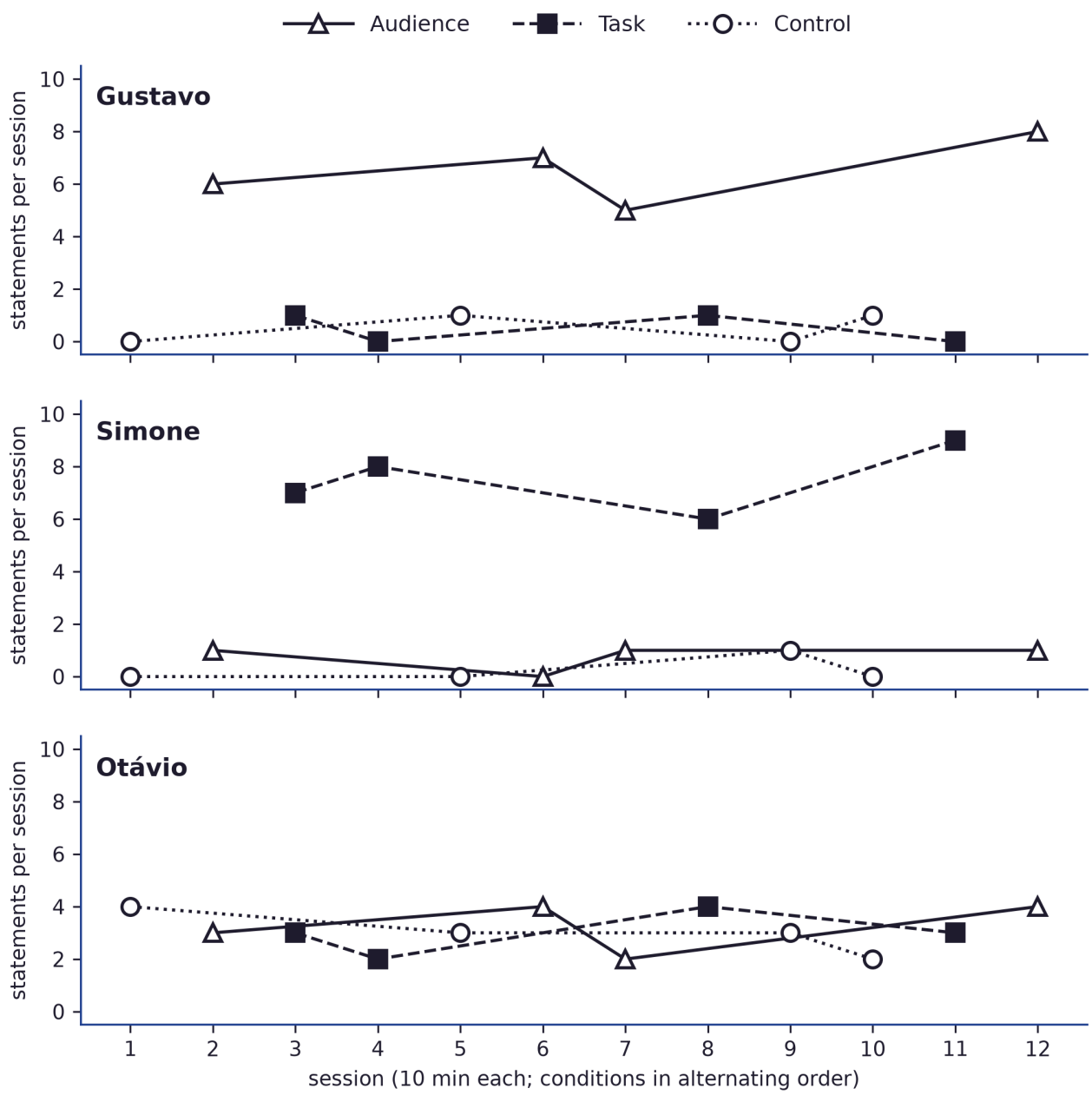
In the *Audience* condition, the student is with two classmates who have been briefed, with no task, while the teacher attends to another student; the classmates laugh or comment only when the student makes

the statement. In the *Task* condition, the student and the teacher are alone, she presents exercises, and if the student makes the statement she stops the task for thirty seconds. In the *Control* condition, the student and the teacher are alone, with no task, in free conversation, and the teacher gives attention at regular intervals, regardless of the statement. In the original model, these correspond to social disapproval, academic demand, and unstructured play (Iwata et al., 1982/1994, pp. 201–203), translated to the classroom.

Figure 19.2 shows a fictitious result. What is read is the pattern for each student: Gustavo's statements are more frequent in Audience than in the other two conditions, and Simone's in Task. Each result is consistent with the hypothesis the record suggested and contradicts the other student's. Otávio's pattern is undifferentiated, and that result is information too, though of a different kind. Iwata et al. (1982/1994, p. 206) list three possibilities for results like this: the conditions may not have been discriminable for the participant; the behavior may depend on variables the study did not control; or the response may serve several functions. Catania (1999, p. 137) says of the third boy that the source of his behavior "is unknown" and that other possibilities should be considered. That is what is said about Otávio: the variables tested do not separate his conditions, and the next step is another set of variables, not an invented function.

Figure 19.2

Fictitious result of a variation test with three students: statements per session in three conditions



Note. Fictitious data, constructed for this book: they do not come from any study. Multielement design, like that of functional analyses in the applied field (Iwata & Dozier, 2008, p. 4); the conditions alternate in an irregular order.

A result like Gustavo's or Simone's is evidence, and it calls for care. When the alternating conditions are not discriminated, the field turns to other designs, such as reversal or a paired test–control comparison (Iwata & Dozier, 2008, p. 4). When the record already suggests a single function, one test condition against the control is enough, and only a negative result calls for further analysis (p. 6). The test, moreover, ar-

ranges conditions in which the evaluation may increase. That is why the authors of the model checked whether self-injury grew over the sessions, which would suggest acquisition, that is, that the procedure was teaching it (Iwata et al., 1982/1994, p. 206, note 2). And the field recommends documenting the risks and obtaining informed consent when the behavior causes injury, because the therapist is deliberately arranging conditions in which it may increase (Iwata & Dozier, 2008, p. 7). With evaluations unfavorable to a group, "increasing" the evaluation is a possible harm to third parties. The precaution is the book's own: in these cases, the test is limited to variations that already occur (comparing occasions) or to arrangements approved by a research ethics committee, and, with children, each step is agreed on with the school coordinators and the families.

TEST YOURSELF

In a series organized the same way, a student makes the statement 4, 5, 3, and 4 times per session in the Audience condition; 4, 3, 5, and 4 in Task; and 0, 1, 0, and 0 in Control. What conclusion does the result allow?

ANSWER: that, under the arranged conditions, the statement is more frequent with an audience and with a task than in the control, and that the two test conditions do not separate. There may be two functions, or an element common to both test conditions that the control lacks (the presence of someone). It does not allow us to say what "the" function is; it calls for another series that separates the elements.

19.6 From hypothesis to intervention

The practical value of the analysis lies in choosing what to do. Iwata and Worsdell (2005, pp. 28–29) show that most reinforcement-based interventions reduce behavior in three ways: by changing the antecedent conditions so that the behavior becomes less sensitive to reinforcement, by eliminating the reinforcement, and by reinforcing the absence of the behavior or an alternative to it. The task then becomes deciding which antecedent to change, how to limit reinforcement, and how to strengthen the alternative, and functional analysis informs these decisions; it even makes it possible to tell in advance which interventions are likely to fail (p. 29). Mace (1994, p. 386) sums this up in two strategies: weaken the link between the response and the reinforcer that maintains it, and establish or strengthen that link for an adaptive response class that takes over the function of the first. Table 19.4 applies the three paths to Gustavo and Simone.

Table 19.4

Three intervention paths for two hypothesized functions

Hypothesized function	Alter the occasion or the operation	Remove the consequence	Reinforce an alternative
Gustavo: the audience's laughter	offer the group's attention through another route, unrelated to the statement (pair work, a short presentation)	the group stops laughing at the statement (this depends on the group, and Heloísa does not control it)	reinforce, in front of the same group, a specific criticism of the problem set ("that's too many exercises for one day")
Simone: postponement of the task	make the task less aversive (a shorter set, exercises that build step by step, the first problem solved together)	the statement stops postponing anything: the task goes on, with help	teach and reinforce a request for help ("I didn't get step 3"), which produces help or a short break

Note. Table prepared for this book, based on Iwata and Worsdell (2005, pp. 28–32) and Mace (1994, p. 386). The interventions are proposals, not results.

The same move has opposite effects depending on the function. "Ignoring" the statement is extinction for Gustavo's laughter. For Simone's task, stopping the interaction and calling on someone else is precisely the negative reinforcement that maintains the statement, and extinction of escape means continuing to present the task, without removing it after the statement (Iwata & Worsdell, 2005, p. 31). Iwata et al. (1982/1994, p. 206), for their part, observe that for behavior that serves to end demands, the typical extinction technique, contingent withdrawal of attention, would tend to strengthen it. Hence the principle stated by Iwata and Worsdell (2005, p. 32), grounded in the fact that most problem behaviors are learned and kept going by reinforcement contingencies: what a behavior looks like, its structure, tells us less about treatment than what maintains it. An intervention that does not address the function may fail for that very reason: the failure of some nonintrusive treatments may be due to a mismatch between function and treatment, or to a change in function over time, rather than to a need for more intrusive procedures (Mace, 1994, p. 386).

The talk on the beauty of mathematics is an intervention blind to function: it addresses everyone about the object and does not touch Gustavo's audience, Simone's task, or anyone's operation. From the hypothesis, the prediction is that it will not touch what maintains the statements: in the schoolyard, the laughter continues; during board work on the problem set, the postponement continues. It is a prediction, and

what would verify it is measuring on the occasions in the record, before and after. Chapter 25 deals with change techniques, and Chapter 35 with behavioral engineering.

⚠ CAUTION

The reasoning in this section comes from a literature on problem behavior (self-injury, aggression, property destruction; Iwata & Worsdell, 2005, p. 26). That literature comprises 435 functional analysis studies published from 1961 to 2012, most of them with people with intellectual disabilities (87.8%; Beavers et al., 2013, pp. 1 and 3). Applying it to evaluations is a proposal of this book, not an established result. Even in its field of origin, identifying the function does not guarantee treatment success, although over ten years of research have made the model more trustworthy (Mace, 1994, p. 386). For racism, Matsuda et al. (2020, p. 343) describe what practitioners can do: gather data on the behaviors, identify their functions, and design an intervention, among other actions.

✓ TEST YOURSELF

Why is "ignoring" the statement extinction for Gustavo's laughter but not for Simone's task?

ANSWER: Because the effect of the move depends on the function. For Gustavo, ignoring removes the laughter that maintains the statement. For Simone, stopping the interaction and calling on someone else is the negative reinforcement that maintains it; extinction would be continuing to present the task, without removing it after the statement (Iwata & Worsdell, 2005, p. 31).

19.7 What the analysis does not provide

Five limits deserve a name. The first is that coincidence is not contingency: attention may be the most frequent consequence in the record without being a reinforcer (Iwata & Dozier, 2008, p. 4), and Gustavo's laughter only shows that the group laughs. The second is that several events appear together, and intermittent sources of reinforcement may not show up in the conditional probabilities (Iwata & Worsdell, 2005, pp. 27–28). The record looks at what came right after, where behavior is most sensitive (Mizael, 2018, p. 22); what comes much later, such as a reputation or a legal penalty, does not appear in it.

The third is that some evaluations may be under the control of rules rather than of the contingencies currently in place. Parks and Kirby (2022, as cited in Passarelli et al., 2023, p. 38) observe that, in racially biased responding, people behave under the control of rules related to an individual's specific characteristics, not of the contingencies present in the environment. In that case, the record of immediate consequences explains little, and the question is a different one: what rule, given by whom.

The fourth is that the results hold for the arranged conditions. A test shows the effects of the contingencies applied during the assessment, and whether those same contingencies operate under "real-world" conditions is an open question. Iwata and Dozier (2008, p. 4, note 1) grant the criticism some merit and point out that hundreds of studies have shown the contingencies identified to be "close enough" to ground effective treatments. For evaluations, no such track record exists. The fifth is that one person's result does not hold for another: how often the behavior occurs differs widely from one person to the next and, within the same person, from session to session (Iwata et al., 1982/1994, p. 205), and what holds for Gustavo says little about the next student who makes the same statement. A person's function may also change over time (Mace, 1994, p. 386), and that is why the record continues after the intervention.

TEST YOURSELF

The group's laughter comes right after almost all of Gustavo's statements. Why does this alone not show that the laughter is what maintains them?

ANSWER: Because coincidence is not contingency: the most frequent consequence in the record may not be a reinforcer (Iwata & Dozier, 2008, p. 4), and the laughter only shows that the group laughs. It is the variation test that tells the cases apart.

Common learner mistakes

1 **Taking the record for a demonstration.** The mistake happens because, after many recorded occasions, the regularity looks like proof. *How to spot the mistake:* you write "laughter maintains Gustavo's statement" with only the records in hand. Rewrite it as a hypothesis, with what would contradict it (Section 19.4).

2 **Naming a state as a consequence.** The mistake happens because the state seems to be what the person "gets" from the statement. *How to spot the mistake:* the "what followed" column says "relief," "consistency," or "felt accepted." Replace it with the event another observer could check, and move the rest to the "at stake" column (Section 19.3).

3 **Grouping by form.** The mistake happens because an identical statement draws more attention than the different occasions do. *How to spot the mistake:* you lump the three students together because they say the same thing. Ask about each one's occasion and consequence (Section 19.1).

4 **Intervening by form.** The mistake happens because intervening on the object seems simpler than finding the function. *How to spot the mistake:* the proposal is a talk, a campaign, or a conversation "to convince," the same for everyone, with no one having said what consequence maintains the statement. Write the hypothesis first (Section 19.6).

5 **Turning the function into a personal trait.** The mistake happens because a repeating pattern seems to say what the person is like. *How to spot the mistake:* you write "Simone is the type who escapes." The function is a relation across occasions: on other occasions, the same statement by Simone may have another (Sections 19.1 and 19.4).

SUMMARY

Three senses of "function" (objective 1). In social psychology, it is what the attitude does for the person, generally gathered through report; in behavior analysis, the effect on the environment or the relation between variables; in Guerin, the type of verbal operant. The second is used; the first is treated as a report to be examined, and the third as one question within the second.

Report, observation, and manipulation (objective 2). Report gives clues, not the function; observation gives regularities, not the cause; only manipulation demonstrates the relation, and it holds for the arranged conditions. What comes out of report and observation is a func-

tional hypothesis; "functional analysis of attitudes," in the title, names the whole path, and only manipulation is functional analysis in the strict sense.

The record (objective 3). One row per occasion, with what came before and what followed, including the occasions without the evaluation, what alters the value of the consequence, and what was "at stake" in a separate column. What follows is a checkable event, not a state.

The hypothesis (objective 4). It states, for a class of evaluations, the occasion, the consequence, and the establishing operation, which observations it rests on, and what would contradict it. The three families of consequences (getting something from the listener, removing or postponing something, unmediated consequence) are proposals of this book; the third is the least observable.

The test (objective 5). Test and control conditions, alternated, changing one element at a time. A differentiated result is evidence; an undifferentiated one tells us that the variables tested do not separate the conditions. The test can teach the behavior, and with evaluations unfavorable to a group it calls for ethical care.

The intervention (objective 6). Alter the occasion or the operation, remove the consequence, or reinforce an alternative, according to the hypothesized function; the same move has a different effect depending on the function. Extending this to evaluations is a proposal, and identifying the function does not guarantee the result.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. (Statements constructed for this exercise.) Which sense of "function" appears in each statement (what the attitude does for the person, relation between variables, or type of verbal operant)? (a) "Gustavo's statement disappears when nobody is around." (b) "This comment serves an ego-defensive function." (c) "By saying the meeting is pointless, Dora is asking her boss to excuse her." (d) "The statement increases with laughter and drops without it."

2. (Hypothetical case.) Classify each piece of information as report, observation, or manipulation: (a) the coordinator asks the class why they find math boring; (b) the schoolyard monitor writes down, each time it occurs, where, with whom, and what followed; (c) Heloísa alternates, in short sessions, a condition with an audience, one with a task, and a control condition; (d) a student fills out

a scale on how much he likes math; (e) Heloísa compares Simone's statement in classes with a new problem set and in review classes, without changing anything.

3. (Hypothetical case.) After recording six occasions, Heloísa writes, "Classmates' laughter maintains Gustavo's statement." What does the conclusion support?

a. That the statement is maintained by laughter, because laughter follows it on five of six occasions.

b. That laughter is the most frequent consequence in the record, and that this is a hypothesis to be tested, because the elements appear together and observation does not separate them.

c. Nothing, because six occasions are not enough for any claim.

d. That Gustavo has a negative attitude toward math, because he repeats the statement.

4. (Records constructed for this exercise.) Correct each entry in the "what followed" column into a checkable record: (a) "He was satisfied"; (b) "He got back at the teacher"; (c) "He got what he wanted"; (d) "The class backed him up."

5. (Hypothetical case.) Gilberto, who owns an auto repair shop, says "women don't know anything about cars" when serving female customers. In six customer visits, four were with his business partner present: Gilberto made the statement and the partner laughed, every time. In the other two, without the partner, he did not make the statement. Write a functional hypothesis, with occasion, consequence, and what would contradict it. Also say whether the statement alone is prejudice by the criterion of Chapter 18.

6. (Hypothetical case.) For the hypothesis in question 5, describe a test condition and a control condition, changing only one element, and say what each possible result would allow you to conclude.

7. (Hypothetical case.) In a test series, a student makes the statement 0, 1, 1, and 0 times per session in Audience; 6, 7, 5, and 8 in Task; and 1, 0, 0, and 1 in Control. What conclusion does the result allow? What conclusion does it not allow?

8. Match each intervention to the function for which it is suited (an audience's laughter, postponement of a task, or neither): (a) reinforcing a request for help that produces help; (b) the group's attention offered through another route, unrelated to the statement; (c) a talk on the importance of mathematics; (d) keeping the task in place after the statement, with help.

9. (Hypothetical case.) The school coordinators propose that, whenever a student makes the statement, the teacher "ignore" it and move on to the next student. For whom is this extinction, and for whom does it work as negative reinforcement? Explain.

10. A colleague says, "Functional analysis of attitudes is just finding the reinforcer and taking it away." In three sentences, (a) say what, in this claim, only manipulation demonstrates; (b) point out two limits it ignores; (c) say what else, besides removing the consequence, the analysis makes it possible to do.

ANNOTATED ANSWER KEY

1. (a) Relation between variables: the statement varies with the presence of people. (b) What the attitude does for the person, the social psychology sense (Ajzen, 2001, pp. 40–41). (c) Type of verbal operant: a mand, because it specifies what the boss should do. (d) Relation between variables, still as observation, unless someone has varied the laughter.

2. (a) Report. (b) Observation (descriptive analysis). (c) Manipulation. (d) Report: the scale is a verbal response about liking, and it measures the evaluation, but it does not say what maintains it. (e) Observation: comparing occasions that already exist, without control over them, is descriptive; it would be manipulation only if Heloísa chose and varied the problem sets.

3. b. Option **a** jumps from the record to a demonstration: laughter accompanies the statement, and what maintains it is what the test would show. Option **c** errs by excessive caution: six occasions support a hypothesis, even if not a demonstration. Option **d** goes back to explanation by a state: the statement repeats because of occasions and consequences, and "negative attitude" is a summary (Section 11.4), not the cause.

4. For example: (a) "He smiled and went back to his desk"; (b) "He told the teacher, in front of the class, that the lesson was worthless; his classmates laughed"; (c) "The task was postponed to the next day"; (d) "Three classmates said 'that's right.'" In all of them, the criterion is what another observer could check; "satisfied" and "got what he wanted" can come back, as hypotheses, in the "at stake" column.

5. A possible hypothesis: "In front of his partner, after a female customer asks a question about her car, Gilberto says 'women don't know anything about cars,' and the partner usually laughs (4 of 4); without the partner, he does not say it (0 of 2). The hypothesis would be contradicted if the statement occurred just as often without the partner, or if, with the laughter removed, the statement continued unchanged." Whether it is prejudice by the criterion of Chapter 18 depends on whether the group cue (the customer being a woman) occasions the evaluation, rather than what she asked or did: that is the test in Section 18.2, different from the one in this section. The record only shows that the partner matters for the statement.

6. Example: same customer, same question, with the partner present and laughing (test) and with the partner absent (control). If the statement occurs more with the partner, that is evidence that the audience is part of what occasions or maintains it; if it occurs equally, the audience does not separate the conditions; if it occurs in neither, the test situation does not reproduce that of the shop. In any case, the result holds for the situation tested. With a statement unfavorable to a group, the ethical caution of Section 19.5 applies.

7. It allows us to say that, under the arranged conditions, the statement occurs much more with the task than with an audience or with no task, which is consistent with the task-removal hypothesis and contradicts the audience hypothesis, as evidence. It does not allow us to say that this is the only function, that it holds outside the classroom or for other tasks, or that the occurrence in real life is maintained the same way.

8. (a) Postponement of the task: reinforcing an alternative that produces what the statement used to produce. (b) An audience's laughter: altering the operation by giving attention through another route. (c) Neither: it speaks about the object and touches neither occasion nor consequence. (d) Postponement of the task: it is extinction of escape.

9. For the statement maintained by laughter, "ignoring" is extinction: it removes the attention. For the statement maintained by postponement, moving on to the next student is the negative reinforcement that maintains it: the task goes away and the statement worked (Iwata & Worsdell, 2005, p. 31). The same rule, applied to everyone, reinforces some students' statements and extinguishes others'.

10. (a) "Finding the reinforcer" is a hypothesis when it comes from report or observation; only manipulation demonstrates it. (b) It ignores, for example, that coincidence is not contingency, that control may be by rules, that the result holds for the arranged conditions, and that "taking away" the consequence has different effects depending on the function. (c) Changing the occasion or the operation, and reinforcing an alternative that produces what the statement used to produce. Model answer: "Finding out what maintains an evaluation starts with observation and calls for testing. Removing the consequence is one of three paths, alongside changing the occasion or the operation and reinforcing an alternative. And what works for one function fails for another."

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 20. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1	19.1 and common mistake 3
2, 3	19.2 and common mistake 1

If you missed exercise	Review
4	19.3 and common mistake 2
5, 6	19.4 and 19.5, and common mistake 5
7	19.5 and 19.7
8, 9	19.6 and common mistake 4
10	19.6 and 19.7

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CHAPTER

20 Attitudes and Stimulus Equivalence

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Describe** matching-to-sample and **explain** why the relation between the sample and the correct comparison can be arbitrary.
2. **Distinguish** trained relations from derived relations and **state** which test shows reflexivity, symmetry, transitivity, and equivalence.
3. **State** what an equivalence class is and is not, and what evidence supports it.
4. **Explain** transfer of function and **separate**, among the functions that transfer, those that are attitudes from those that are not.
5. **Read** a study that forms classes with evaluative stimuli and **state** what it does and does not allow us to conclude about attitudes.

PREREQUISITES

The situation as the third term and generalization by similarity (Sections 13.1 and 13.3), the object that is a category (Section 5.4), ratings and classifications as evaluative topography (Section 6.5), evaluation kept separate from the elicited reaction, and evaluative conditioning (Section 17.4), and the caveat in Chapter 18 about prior relations that are hard to change (Section 18.1). The new terms (matching-to-sample, conditional discrimination, arbitrary relation, trained and derived relations, reflexivity, symmetry, transitivity, equivalence class, node, transfer of function, and functional equivalence) are defined here.

OPENING

(Hypothetical case.) Lia, the master's student who, in Chapters 15 and 17, chose the project's definition of attitude and defended it before her research group, visits the lab of Telma, who studies the formation of stimulus classes. An adult participant sits in front of a screen: at the top, an abstract figure; below it, three others. He picks one, and the screen shows "Correct!" or "Try again." After a few dozen trials, he hardly makes a mistake. In a second phase, the figure at the top is one

of those he has just learned to choose, and the comparisons are the words "good," "bad," and "neutral," which he already knows how to use; the feedback is the same. In a third phase, the screen stops giving feedback, and he chooses among combinations that nobody taught him, and gets them right. Finally, he is asked to give each figure a rating from 1 (bad) to 10 (good): figure A1 gets an 8, and A2, a 2. Telma points out that nobody taught the relation between A1 and "good" or between A2 and "bad." Four questions organize the chapter.

1. *"The figures don't look alike, and the screen says 'Correct!' anyway. What did he learn, and how do we describe what he did?"*
2. *"How does he get right combinations that nobody taught? What have the figures become to one another?"*
3. *"Why did A1's rating follow 'good' and A2's follow 'bad,' if nobody related them to those words?"*
4. *"Is this an attitude? Is this how people learn to like or to despise?"*

The first calls for the procedure and the arbitrary relation (Section 20.1); the second, for derived relations and the class (20.2 and 20.3); the third, for transfer of function (20.4); the fourth, for the link with attitudes and what the paradigm does not show (20.5 and 20.6).

20.1 Matching-to-sample: a relation without similarity

What Lia saw has a name: **matching-to-sample** (also written *matching to sample*; MTS). In a task of this kind, "a sample stimulus is presented first and, then or at the same time, two or more comparison stimuli." The person selects one of them, "only one comparison is defined as correct" on each trial, and correct and incorrect selections "result in the presentation of differential consequences" (Kist et al., 2025, p. 16). In the Brazilian edition of Catania (1999, p. 164), the procedure is called "emparelhamento com o modelo" (matching to sample), and the comparisons are "estímulos de comparação (ou de escolha)" (comparison, or choice, stimuli). Figure 20.1a shows a trial.

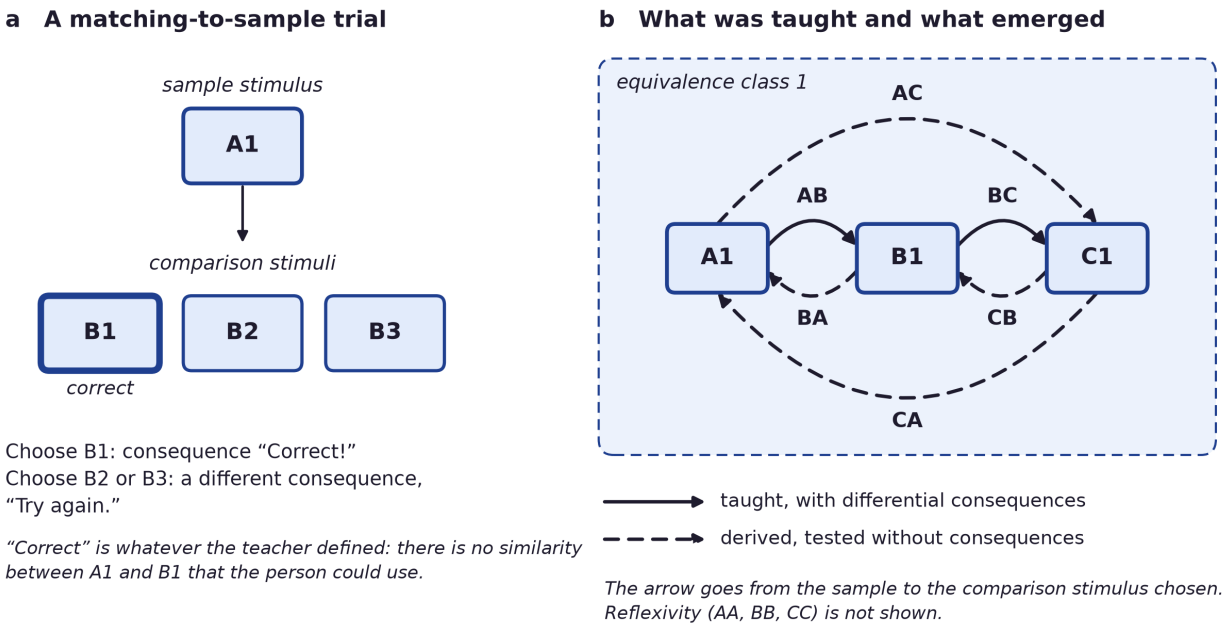
In it, the sample is A1: choosing B1 produces "Correct!", and choosing B2 or B3, "Try again." On another trial the sample is A2, and the correct comparison becomes B2. The same figure, B1, is the right choice on one trial and the wrong one on another: what it is worth depends on the sample. Catania (1999, p. 163) calls a **conditional discrimination** one "in which the role of a stimulus depends on other stimuli that provide the

context for it." In the language of Chapter 13, the situation occasions the choice, and here the situation has two parts, because the sample tells which comparison is correct. Sidman and Tailby (1982, p. 5) write the relation this way: "If A1, then B1; if A2, then B2."

The relation is **arbitrary**: nothing about A1 calls for B1. "Correct" is whatever the teacher defined, and the person has no similarity of shape, color, or size to rely on. Catania (1999, p. 164) notes that many conditional discriminations involve "arbitrary relations between a conditional discriminative stimulus and the discriminations for which it sets the occasion." He illustrates with a pigeon trained to peck a green key when the sample is a square and a red key when it is a circle (p. 166). In studies with people, the stimuli are usually figures, syllables, or nonsense words, "conventionally designated by alphanumeric combinations" (Mizael, dos Santos & de Rose, 2016, pp. 125–126). That is the notation of this chapter: the letter indicates the set (A, B, C) and the number, the class (1, 2, 3). In research on attitudes, however, "meaningful stimuli are often used, together with meaningless stimuli" (p. 126), and Section 20.4 shows what this makes possible.

Figure 20.1

A matching-to-sample trial (a) and what was taught and what emerged in a class (b)



Note. Diagram prepared for this book, based on Sidman and Tailby (1982, pp. 5–6).

Chapter 13 showed that, when two situations resemble each other, similarity predicts generalization. Here similarity is not available: B1 does not resemble A1 along any dimension, and the person comes to treat them as related because that is what the procedure taught. This is the process that Section 13.3 left for this chapter.

A word of caution about vocabulary. Chapter 17 used "pairing" for something else: presenting two stimuli together in time, whether or not the person does anything, as in evaluative conditioning. In matching-to-sample, the person responds (chooses), and the choice has differential consequences. Mizael, dos Santos, and de Rose (2016, p. 125) set the two research families side by side. Much research on attitudes starts from classical conditioning, whose standard procedure is "to systematically pair a stimulus evaluated as neutral with another one of positive or negative valence." But direct pairing between a meaningful stimulus and a neutral one "does not seem to be a prerequisite" for the evaluation to change, and that is why the authors present the equivalence paradigm as another approach.

KEY CONCEPT

Matching-to-sample is the procedure in which, in the presence of a sample stimulus, the person chooses among comparison stimuli, and the correct choice and the incorrect ones have different consequences (Kist et al., 2025, p. 16). It establishes a conditional discrimination: the role of each comparison depends on the sample (Catania, 1999, p. 163). The relation is arbitrary when what makes it correct was defined by the teacher and does not follow from any similarity between the sample and the comparison. On test trials, the task has the same format and no differential consequences: the format is matching-to-sample, and the consequences are what distinguish training from testing.

NON-EXAMPLE

Showing an abstract figure thirty times together with pleasant photographs, without the person having to choose anything, is stimulus pairing, the evaluative conditioning procedure of Chapter 17. It is not matching-to-sample: there is no sample, no comparisons, and no differential consequences for a choice. Both families use the word "pairing," and the questions each one answers are different.

TEST YOURSELF

A screen shows figure A1 at the top and, below it, B1 and B2. Choosing B1 is followed by "Correct!", and choosing B2, by "Try again." (a) Which is the sample stimulus and which are the comparisons? (b) Can B1 be the wrong answer on another trial? (c) Which part of the relation is arbitrary?

ANSWER: (a) A1 is the sample; B1 and B2 are the comparisons. (b) Yes: if the sample is A2, the correct one is B2, and B1 is wrong; the role of B1 depends on the sample, and that is why the discrimination is conditional. (c) That B1 is the correct one in the presence of A1: this was defined by the teacher and does not follow from any similarity between the figures.

20.2 What emerges: trained and derived relations

Telma did not teach the participant every combination. With "Correct!" and "Try again," she taught two families of relations: AB (given A1, choose B1; given A2, B2; given A3, B3) and BC (given B1, choose C1, and so on). Then she removed the differential consequences and presented trials with other combinations. The relations that were taught are **trained relations**; those that appear without having been taught are **derived relations**, or emergent relations, because they "emerged without explicit training" (Catania, 1999, p. 167; Mizael, dos Santos & de Rose, 2016, p. 126). Figure 20.1b shows the whole set, and Table 20.1 shows what each test requires.

Table 20.1
Trained and derived relations in an AB–BC design and the test for each property

Property	What it shows	Test	Response required, without differential consequences
Reflexivity	each stimulus is related to itself	identity matching (AA, BB, and CC)	given A1, choose a figure identical to A1
Symmetry	the relation holds in both directions	BA and CB	given B1, choose A1; given C1, choose B1
Transitivity	the relation passes through the shared stimulus	AC	given A1, choose C1, which was never a comparison for A1
Equivalence (symmetry of transitivity)	symmetry and transitivity together	CA	given C1, choose A1

Note. Table prepared for this book, based on Sidman and Tailby (1982, p. 6), Catania (1999, pp. 166–167), and Haydu et al. (2015, p. 385), with the AB–BC design. Reflexivity and symmetry follow Mizael, dos Santos, and de Rose (2016, p. 126).

Each property comes from logic, and Catania (1999, p. 166) defines them. **Reflexivity** holds between a term and itself (A = A). **Symmetry** is the reversibility of order (if A = B, then B = A). **Transitivity** is the property by which terms shared by two pairs determine a third (if A = B and B = C, then A = C). "Equivalence relations are those that have all three properties" (p. 166). The word has a technical sense here: it does not mean "equal" or "similar"; it means that the three properties have been shown.

The test exists because training alone does not tell us whether there is equivalence. Unlike conditionality, equivalence "is not definable solely by reference to the subject's ongoing interactions with the establishing procedure," and so it requires additional tests (Sidman & Tailby, 1982, p. 6). Symmetry, in particular, "cannot be taken for granted": a child may show it without explicit training, but a pigeon does not (Catania, 1999, p. 166). And the test is valid only if the relation tested was not taught: transitivity requires "if a, then c" to emerge "without differential reinforcement or other current instructions" (Sidman & Tailby, 1982, p. 6).

Reflexivity deserves a warning. It is checked through identity matching and, with verbal humans, it "is often assumed" rather than explicitly checked (Mizael, dos Santos & de Rose, 2016, p. 126); de Carvalho and de Rose (2014, p. 527) write that it is "sometimes also verified, and more frequently inferred." That is why Figure 20.1b does not draw it.

What makes the paradigm interesting is its economy. In the design of Figure 20.1b, with three classes, six relations are taught (A1B1, A2B2, A3B3, B1C1, B2C2, and B3C3) and twelve are tested (BA, CB, AC, and CA, three of each). The study that organized the paradigm taught 8 children aged 5 to 7 (Sidman & Tailby, 1982, p. 9) relations between dictated names of Greek letters and the printed letters. After AB, AC, and three more relations, DC, had been taught, the children derived relations that nobody taught: the three DC relations generated twelve additional emergent relations, and "enlarging each class by one member" brought about "a disproportionate increase" in their number (p. 5). Mizael, dos Santos, and de Rose (2016, p. 130) call this **teaching economy**: "it is not necessary to teach each of the relations for an individual to learn them." But derivation is not guaranteed: of the 8 children, 6 immediately showed matching between the B and D stimuli, and two did not (Sidman & Tailby, 1982, pp. 5 and 19).

And "derived" does not mean "without a history." Sidman and Tailby (1982, p. 20) write that the direct reinforcement of the taught relations "extends also to all of the other possible relations" within each class, and that it is "not correct to assume" that the new matching performances appeared with no history of reinforcement. What derived relations lack is direct teaching of the relation and differential reinforcement on the test trial.

EXAMPLE

"In Telma's lab, the participant learned, with 'Correct!', that given B1 the right choice is the word 'good' (C1). In another phase, with no feedback, given the word 'good' he chooses A1, from among A1, A2, and A3, even though A1 was never a comparison for 'good' in any training." This is the CA relation: derived from AB and BC, shown without differential consequences, and above chance, which with three comparisons is 33%.

TEST YOURSELF

A participant learned A1B1 and B1C1, with consequences. (a) Which test would show symmetry? (b) And transitivity? (c) And equivalence? (d) If he gets A1C1 right after receiving "Correct!" for choosing C1 given A1, what does the correct response show?

ANSWER: (a) BA (given B1, choose A1) and CB. (b) AC (given A1, choose C1). (c) CA (given C1, choose A1). (d) That he learned AC, not that he derived it: the relation was trained. The test is valid only without differential consequences and without direct teaching of the relation tested.

20.3 Equivalence class: what it is and what it is not

When AB and BC are taught and the tests show the properties, the related stimuli form an **equivalence class**. Kist et al. (2025, p. 16) define it as a set of stimuli that "can, in certain contexts, be interchangeable with one another" and that show reflexivity, symmetry, and transitivity. Mizael, dos Santos, and de Rose (2016, p. 126) speak of stimuli that are "substitutable for one another (on some occasions) in the control of behavior." In both texts the qualification is in the sentence itself: "in certain contexts," "on some occasions."

KEY CONCEPT

An **equivalence class** is a set of stimuli among which tests have shown symmetry and transitivity, and also reflexivity, which with verbal humans is usually assumed rather than tested (Section 20.2); its members are interchangeable in certain contexts, not in all of them (Kist et al., 2025, p. 16; Mizael, dos Santos & de Rose, 2016, p. 126). The class is a conclusion drawn from the tests, not from the training (Sidman & Tailby, 1982, p. 6).

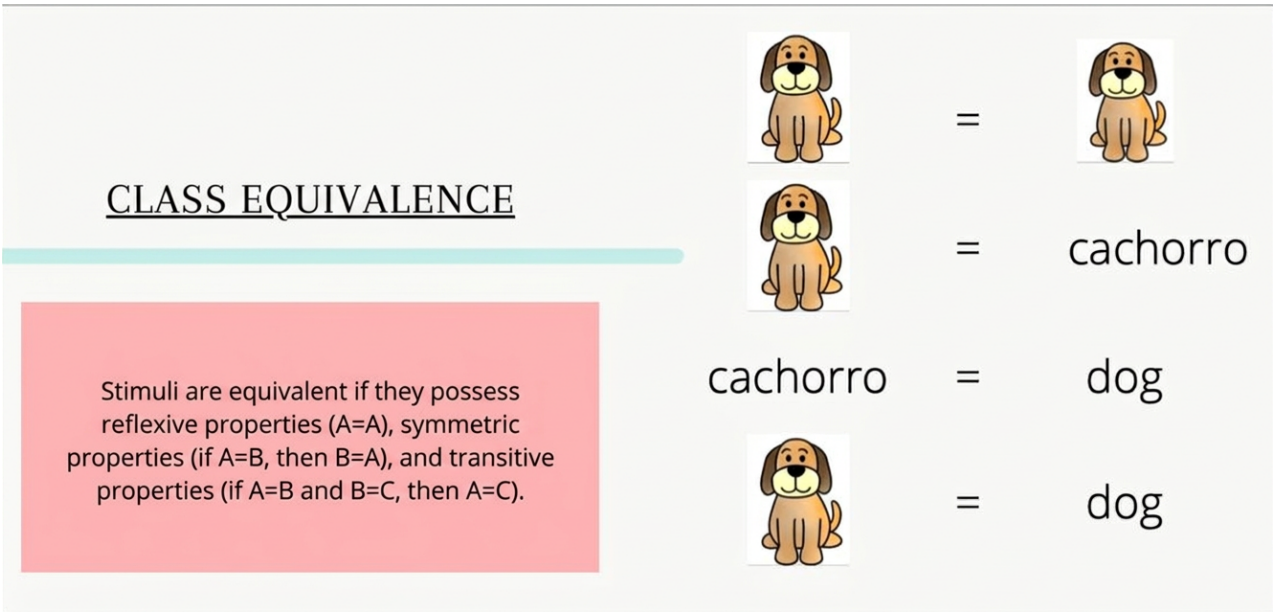
Four precautions prevent the most common misreadings.

The first is that an equivalence class is not a class based on similarity. In Section 13.3, similar stimuli occasioned the same response through generalization; here, the paradigm analyzes "how stimuli without physical similarity become substitutable for one another, on some occasions" (Mizael, dos Santos & de Rose, 2016, p. 125). Figure A1 and the word "good" do not look alike, and what links them is what was taught and derived. That is why the form of the stimuli does not explain the class, nor does the class explain their form.

Figure 20.2 gives an everyday example, from a teaching figure in the Instituto Walden4 volume of experiments (Moreira, Rocha et al., 2022, p. 72): a picture of a dog, the Portuguese word "cachorro," and the English word "dog" appear linked by equals signs, although they do not resemble one another in any way. Read with the chapter's notation, the four lines show reflexivity (A = A), the relation between the picture and "cachorro" (A = B), the relation between "cachorro" and "dog" (B = C), and the one derived from the two, between the picture and "dog" (A = C). The figure illustrates the idea, not a demonstrated class: whether a set of stimuli is a class is a conclusion drawn from tests, as the third precaution says.

Figure 20.2

A picture and two words that substitute for one another without looking alike



A, the picture of the dog; B, the word "cachorro"; C, the word "dog".
From top to bottom: A = A, A = B, B = C and A = C.

Note. Figure 1 of the theoretical section on the equivalence paradigm and prejudice in the volume of experiments (Moreira, Rocha et al., 2022, p. 72), created by its authors. The strip below the slide was added for this book. The reproduction has the resolution of the source material.

The second is that an equivalence class cannot be reduced to a class of discriminative stimuli. In a three-term contingency the relation is not symmetrical: the pigeon that pecks in the presence of green cannot "green" in the presence of pecks (Catania, 1999, p. 168). The consequence is stated in the text: "we cannot reduce equivalence classes to classes of discriminative stimuli. Equivalence relations are symmetrical, but the relations among the terms of a three-term contingency are not" (p. 168). The discriminative stimulus of Chapter 13 occasions a response; the equivalence relation holds between stimuli, in both directions.

The third is that the class is a conclusion drawn from the tests, not from the training. Anyone who reads "the classes were formed" in a report should look for tests without differential consequences and for scores above chance and above a stated criterion. In a study with 28 soccer fans, the participants formed the baseline relations and symmetry, but

"failed to show the emergence of transitivity and equivalence" (Haydu et al., 2015, p. 385). There was successful training and symmetry, and there was no demonstrated equivalence class.

The fourth is that class members can differ in what is called the **degree of relatedness** (or simply *relatedness*). Stimuli in the same class "may differ in their degree of 'relatedness,' as a function of several experimental parameters" (Bortoloti & de Rose, 2009, p. 564). One of them is the number of **nodes**: "A node is a stimulus that is related to two other stimuli in an equivalence class and, therefore, connects them" (p. 564). With AB and BC, B1 is the node that links A1 and C1; with AB, BC, and CD, B1 and C1 link A1 and D1. The more nodes between two stimuli, the smaller the transfer of function between them (Fields et al., 1993, 1995, as cited in Bortoloti & de Rose, 2009, p. 564). In the second experiment of Bortoloti and de Rose (2009, p. 563), figures one node away from the faces were judged like the faces, and figures three nodes away were not. Matching tests show that the relation has emerged, "but not any possible difference in the degree of relatedness" (p. 580).

TEST YOURSELF

A report says: "The participants formed classes A1B1C1 and A2B2C2, because A1 and C1 are similar figures." (a) What would you look for in the report before accepting the first part? (b) What is wrong with the justification?

ANSWER: (a) The BA, CB, AC, and CA tests, conducted without differential consequences, with scores above chance and above a stated criterion. (b) The relation is arbitrary: the class is not explained by similarity, and similar figures could be related through generalization (Section 13.3), with no class at all.

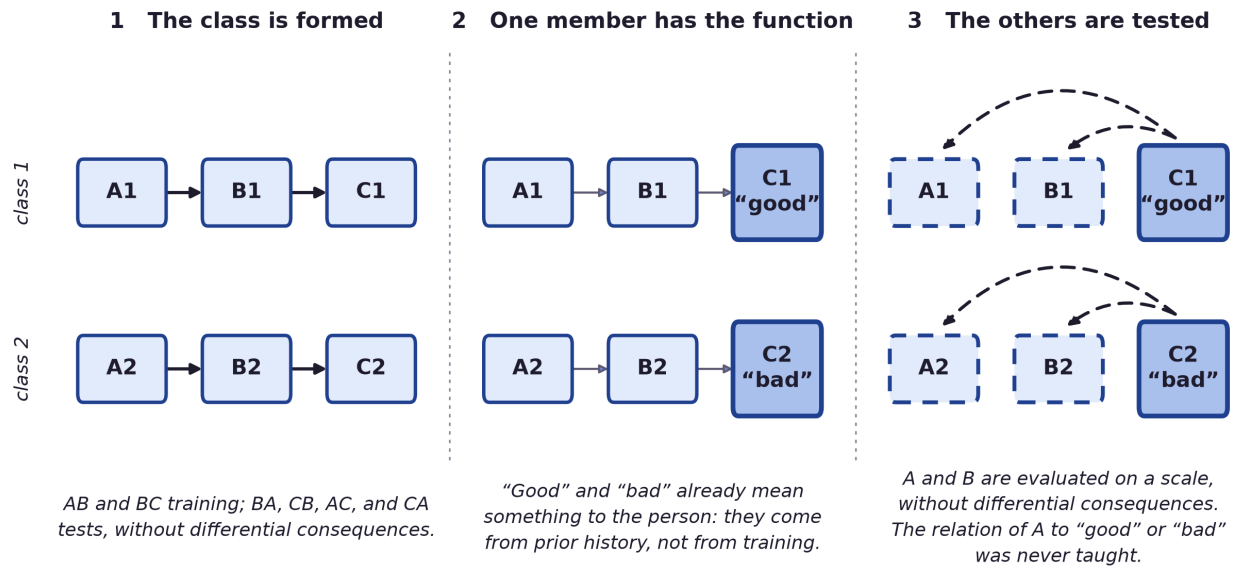
20.4 Transfer of function

So far, the class is a relation among stimuli. One word changes meaning in this section: "function," in Chapter 11, was the function of a behavior, the relation among circumstances, response, and consequence; here it is the function of a stimulus, what the stimulus comes to do for the person (occasion a response, elicit a reaction, reinforce, be evaluated), and this is the one that transfers. What interests anyone who studies attitudes is what the person does in the presence of the stimuli. The rating the participant gave A1 is an example: a function that A1 did not have, or that no one knew it had, and that followed the class. Mizael, dos Santos, and de Rose (2016, p. 126) write that "certain behavioral functions of a stimulus can be transferred to (or rather, shared with) the other

members of the class," with no need for direct teaching, "merely through participation in an equivalence class." Dougher et al. (1994, p. 331) define it as "the acquisition of stimulus function by virtue of membership in an equivalence class." Figure 20.3 shows the arrangement in three steps.

Figure 20.3

Transfer of function in three steps: the class is formed, one member has the function, the others are tested



Note. Diagram prepared for this book, with two of the three classes in the example; the third (A3, B3, and C3, the latter with the word "neutral") is not drawn.

Functions of very different kinds have been shown to transfer, and Table 20.2 brings together five. For each one, what matters is what was established in one member, what was measured in the others, and whether what was measured is an attitude by the book's definition.

Table 20.2

Functions that transferred through equivalence classes and which of them are attitudes

Function	What was established in one member	What was measured in the others	Result	Is it an attitude by the book's definition?
Discriminative	in a simple discrimination, A1 was S+ and A2, S−; B1 and B2 were related to A1 and A2 through matching-to-sample	selection of B1 or B2 on probes, with no sample and no consequences	the participants chose B1 almost always (de Rose et al., 1988, pp. 1 and 3; adults, preschool children, and adults with intellectual disabilities)	No: it is discrimination (Chapter 13), and the choice does not attribute value
Consequential	comparison stimuli came to function as conditioned reinforcers or punishers by being paired with verbal feedback in a sorting task	whether the other class members also functioned as reinforcers or punishers	in 8 of 9 participants, the function transferred with no additional training (Hayes et al., 1991, p. 119)	Not in itself: it is a function of the stimulus (Section 12.2); the attitude is the response that attributes value
Eliciting	electric shock was paired with one member of one class, while a member of the other class appeared with no shock	skin conductance in the presence of the remaining members	transfer in 6 of 8 participants (Dougher et al., 1994, p. 331)	No: it is an elicited reaction, recorded separately (Section 17.4)
Evaluative	faces with emotional expressions, which were already evaluated, placed in classes with arbitrary figures	judgments of the arbitrary figures on a semantic differential	the judgments came to resemble the evaluations of the faces, even more so when training used delayed matching (Bortoloti & de Rose, 2009, p. 563)	Yes: an evaluative response, given to someone (Section 6.5)
Choice and preference	in two classes, a pleasant picture (Ernie) and an unpleasant one (a crying child), with abstract symbols	of two identical bottles, labeled with symbols from the two classes, which one the child tastes first and which one the child likes better	14 of 16 children of about five years of age tasted first the drink from the class of the preferred picture, and 12 preferred that same drink (Smeets & Barnes-Holmes, 2003, as cited in Mizael, dos Santos & de Rose, 2016, pp. 127–128)	Yes, when the choice or the statement amounts to attributing value (Sections 6.7 and 6.10)

Note. Table prepared for this book, based on the studies indicated. The last column applies the book's fundamental definition (Chapter 15); it is not a conclusion of the authors. The row on choice and preference comes from a secondary source.

The table shows three things. The first is that only some of the functions that transfer are attitudes. By the definition in Chapter 15, an attitude is discriminated operant behavior whose topography is or implies attributing a value to an object: the rating, the judgment, and, when it amounts to evaluating, the choice count; the selection of B1 on a probe, the reinforcing function, and skin conductance do not. The skin conductance case is the case of fear: classically conditioned functions can be transferred through classes and produce "fear and anxiety responses to stimuli with which the person has had no prior direct experience" (Mizael, dos Santos & de Rose, 2016, p. 126). This matters to anyone who studies prejudice, and it is a reaction, which Chapter 17 (Section 17.4) says to record separately.

The second is that transfer is not automatic: it appears in 8 of 9 and in 6 of 8 participants, not in all of them. The third is that the result depends on what was established and how it was measured: in Bortoloti and de Rose (2009, p. 563), how closely the judgments matched varied with the training parameter (delayed matching increased it) and with the distance between the stimuli.

KEY CONCEPT

Transfer of function is the acquisition, by a stimulus, of a function of another member of the equivalence class, without direct training, by virtue of belonging to the class (Dougher et al., 1994, p. 331; Mizael, dos Santos & de Rose, 2016, p. 126). **Functional equivalence** is something else: that a member can be substituted for the others in other contexts, and it "has to be tested experimentally" (Catania, 1999, p. 169).

The distinction is Catania's (1999, p. 169). The members of an equivalence class are equivalent "in the sense that they can be interchanged with one another in the context of arbitrary matching procedures," but "this does not necessarily mean that they are functionally equivalent"; and "functional equivalence is not the same as membership in an equivalence class." Belonging to the class, therefore, does not guarantee that the function will come along, and that is why the rating is measured separately. The converse also holds: two figures that receive the same rating do not, for that reason, belong to the same class, because the class is concluded from the matching tests, and the rating is a different measure.

Part of the literature takes equivalence as a model of what everyday language calls meaning. Bortoloti and de Rose (2009, p. 563) open their abstract with the condition: "If stimulus equivalence is a model of meaning, abstract stimuli should acquire the meaning of meaningful stimuli equivalent to them." Hayes et al. (1991, p. 119) are equally cautious when they illustrate with the word "dog": they speak "to the extent that equivalence provides a working model" of verbal stimulation. The "if" is part of the sentence. In this book, "meaning" does not designate something in the head: it designates the functions a stimulus comes to have for the person, what the person does in its presence, and that is what ratings and choices measure.

There is one more distinction, which Chapter 21 develops. When the relations are not equivalence relations, as in hierarchy, the acquisition of new functions by all the members "is called transformation of functions" (Mizael & de Rose, 2017, p. 369). Dymond and Rehfeldt (2000, p. 239) define it as the case in which the functions of one stimulus alter those of another "in accordance with the derived relation between the two, without additional training." The same authors note that most of the relevant research has been discussed in terms of transfer rather than transformation (p. 241). What this chapter calls transfer is the case in which the function passes from one member of the class to the others.

NON-EXAMPLE

A participant learns to choose "good" given a blue triangle and later also chooses "good" given a light blue triangle. The function spread because of similarity between the stimuli: this is generalization (Section 13.3). There is no taught arbitrary relation and no class to test, and what spread did not require any relation between the two triangles.

TEST YOURSELF

After forming the classes, the participant rates A1 an 8 and A2 a 2 (a), and his skin conductance increases in the presence of A2, which is in the class of a stimulus paired with shock (b). Which of the two responses is an attitude by the book's definition? Why?

ANSWER: (a). It is an evaluative response, given to someone (the researcher), with a form that attributes value to an object. (b) is an elicited reaction: it does not attribute value and is produced by the stimulus; it is recorded separately (Section 17.4).

20.5 From equivalence to attitudes

The stimulus equivalence paradigm meets the study of attitudes in a proposal. Mizael, dos Santos, and de Rose (2016, p. 128) propose that "attitude formation can be conceptualized as the formation of equivalence classes between a class of stimuli (e.g., a social group, a set of objects) and evaluative attributes." In the book's terms: the object, which can be a category (Section 5.4), enters a class with stimuli that already have an evaluative function ("good," "bad," a positive or a negative symbol), and the person comes to evaluate it as he or she evaluates those stimuli. The "can be conceptualized" is the authors' wording, and it is a proposal: the article's abstract speaks of procedures that "simulate symbolic behavior in the laboratory" (p. 124), that is, of a model, not of a record of how attitudes are formed in real life.

The Part VI volume presents the same idea in an everyday example, in words (Moreira, Cardoso et al., 2024, p. 10). A person who, out of limited knowledge, considers autistic people "intellectually inferior" and considers that being intellectually inferior makes someone "incapable" of complex activities meets someone and finds out that this person is autistic; the first person may then come to relate the new acquaintance to "incapable," through the chain group, attribute, attribute. The example is the authors' illustration, with no data, and it shows the shape of the proposal: an object, the group, linked through intermediaries to evaluative attributes. What the laboratory adds is what Section 20.3 asked for: relations that are taught, derived relations that are tested without differential consequences, and an evaluation that is measured before and after.

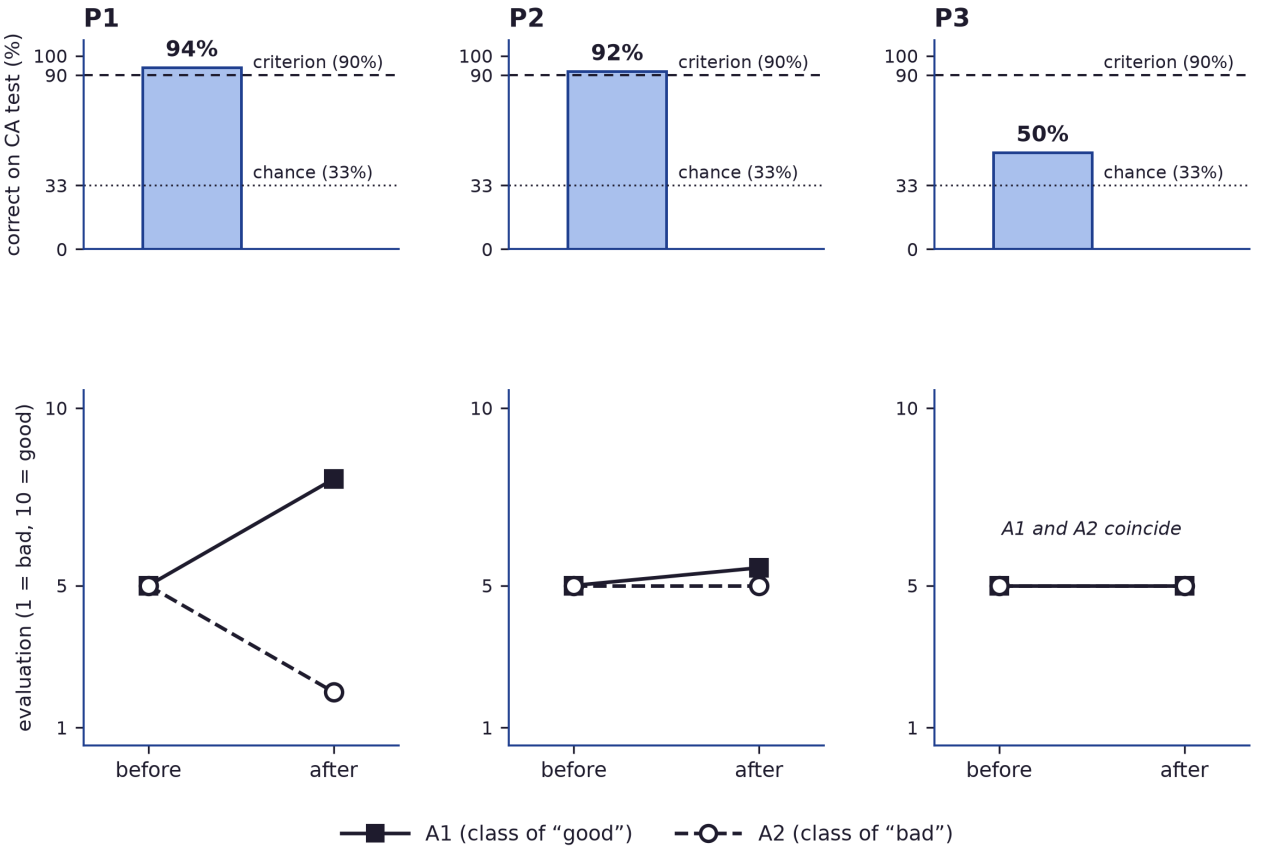
⚠ **CAUTION**

The equivalence class is a relation among stimuli, demonstrated by matching tests. The attitude, by the book's definition, is discriminated operant behavior whose topography is or implies attributing a value to an object: the rating, the classification, the choice. The class is not the attitude, and the attitude is not "in" the class. What links the two is transfer of function, which is verified in the rating (or in the choice) and which, like any operant, has an occasion, an audience, and consequences (Chapters 13 to 15).

To read a study in this literature, three questions, in this order, prevent the most common leaps. Were the trained relations learned, and in how many trials? Did the derived relations appear in the tests, without differential consequences and above chance and a stated criterion? Did the evaluation change relative to what it was before, or relative to a group that did not go through the training? The three answers are independent, and Figure 20.4 shows three hypothetical participants who separate the last two.

Figure 20.4

Three hypothetical participants: accuracy on the equivalence test and evaluation of the stimuli before and after



Note. Fictitious data, constructed for this book: they do not come from any study. With three comparison figures, chance is 33%; the 90% criterion is illustrative, like that of Dixon and Lemke (2007, p. 10).

The figure shows the answers to the second and third questions; the first is taken for granted, because only those who met the training criterion take the test. P1 answers yes to both: he got 94% of the CA test right, and the ratings of A1 and A2 followed the class. This is the pattern the paradigm predicts and the only one of the three that supports "transfer of function." P2 also formed the class (92%), but the ratings barely moved: the criterion was met, and the function did not follow,

which Dixon and Lemke (2007, p. 10) report for some of their participants and Catania (1999, p. 169) anticipates. P3 did not meet the criterion (50%, above the 33% chance level and below 90%): with no demonstrated class, there is nothing to transfer, and the unchanged ratings contradict nothing. There is a fourth pattern, which the figure does not show: ratings that change with no demonstrated class. In that case the change cannot be attributed to the class (Exercise 6).

Table 20.3 brings together five real studies, all with stimuli that carried a history prior to the research: training went, to a greater or lesser degree, against what the participants already did.

Table 20.3

Five studies that tried to establish or reverse evaluations through equivalence classes with stimuli that had a prior history

Study	Participants	What was there before	Arrangement and measure	Result
Dixon and Lemke (2007)	12 college students; 8 analyzed (four gave a rating of 5 to all the photographs of men in the pretest and were dropped; pp. 8–9)	in the pretest, Middle Eastern men received lower ratings than American men (p. 9)	abstract symbols, the words "Good," "Neutral," and "Evil," and 30 photographs (Middle Eastern men, objects, and American men); ratings from 1 to 10, before and after (pp. 7–8)	7 of 8 at 90% or higher on the symmetry and equivalence tests (p. 10); in 5 of 8, the rating of the Middle Eastern man's image used in training came to exceed that of the American's image, and in 3 of 8 the mean of the ten images of each group did (Table 1, p. 8; our count)
de Carvalho and de Rose (2014)	4 children aged 7 to 10, selected from 16 (p. 529)	in the pretest, they related negative symbols to faces of Black men	positive and negative symbols (A), abstract symbols (B), and faces (C); AB and BC training, delayed matching, and CA test (pp. 528–531)	only one of the four reversed the pretest relations (p. 527)
Mizael, de Almeida et al. (2016)	13 children aged 8 to 10	negative bias toward faces of Black people, in a pretest	same arrangement, with modified training (symmetry tested after each relation; AB and BC mixed with feedback on 100% and then on 50% of trials; p. 452); pleasure elicited by the faces, rated on a scale (SAM), before and after	all 13 formed classes on the standard test; 9 maintained the relation with three comparisons (p. 459); the evaluations of Black faces and of White faces stopped differing at a statistically significant level (p. 451)

Study	Participants	What was there before	Arrangement and measure	Result
Haydu et al. (2015)	28 men, fans of three soccer clubs	emblems with a history: the supported club, the main rival, and the minor rival	emblems, abstract paintings, and the words "Good," "Poor," and "Regular"; the intended classes linked the supported club to "Poor" and the main rival to "Good"	the baseline and symmetry were formed; transitivity and equivalence did not emerge, and most errors were consistent with the prior history (p. 385)
Rosendo and de Melo (2018)	16 in two experimental groups (8 and 8) and 32 in a control group	gender-linked occupations (the authors call for a closer check of prior history, p. 31)	classes with abstract symbols, adjectives, and occupations, with delayed matching; reversal in one of the groups; Semantic Differential	classes formed in both groups; the reorganization reached the criterion (91%) only for symmetry, and 83% for 6 participants on the other tests; evaluations partly consistent with the classes, with transfer on some scales (p. 31)

Note. Table prepared for this book, based on the studies indicated. The figures are the authors', except for the counts of five and of three out of eight in Dixon and Lemke, which were made from their Table 1 (p. 8).

An honest reading of the table is that the paradigm produced a change in evaluation in some studies and in some participants, and did not in others. What varied were the design, the training parameters, and the prior history of the stimuli. This design, in which training may lead to classes that run against relations existing before the research, was given a name by Mizael, de Almeida et al. (2016, p. 452): the **Conflicting Relations Paradigm** (*CRP*), first used by Watt et al. (1991, as cited in Mizael, de Almeida et al., 2016, p. 452) in Northern Ireland. According to de Carvalho and de Rose (2014, p. 528), none of the six Irish Protestants responded as the training predicted, the same happened with five of twelve Irish Catholics, and the five English Protestants responded in line with the training. The original authors attributed the result to competition between the trained relations and the prior religious ones (Watt et al., 1991, as cited in de Carvalho & de Rose, 2014, p. 528).

This is the caveat that Chapter 18 (Section 18.1) left for this one: in the studies that tried to teach relations opposite to those the participants brought with them, many participants did not form them, and in one of them all the children did. The difficulty, say Mizael and de Rose (2017, p. 370), is "managing, with a short training, to modify relations that have been reinforced during a large part of an individual's life, even in the case of a child." The exception is the study by Mizael, de Almeida et al. (2016), with a modified protocol, and even there the result can be

read two ways. On the standard test, all 13 children related the Black faces to the positive symbol. On the test with three comparisons, one of them a White face, nine continued to do so, and four came to relate the White faces to the positive symbol. This shows that prior relations can compete with those learned in the laboratory (Mizael, dos Santos & de Rose, 2016, pp. 129–130).

⚠ CAUTION

Research on evaluations of groups has an ethical limit. Mizael, de Almeida et al. (2016, p. 455, note 2), like de Carvalho and de Rose (2014), considered it ethically unacceptable to expose children to training that could establish equivalence between racial features and a negative sign; that is why the training brings the faces closer to the positive symbol and relates the negative symbol to an abstract symbol. The same care applies to any arrangement that "teaches" an unfavorable evaluation of a group: the project goes through a research ethics committee before any participant takes part.

What the paradigm does not settle is in the next section. On the question raised in Chapter 17, whether a change in evaluation through pairing results from an automatic associative process, from reasoning, or from both, it offers a description rather than a verdict: it arranges arbitrary relations, taught with consequences and tested without them, and calls the result transfer of function.

✓ TEST YOURSELF

A fictitious report says: "All participants met the training criterion; mean accuracy on the CA test was 52%, with three comparisons; the ratings of A1 and A2 changed in 6 of 8 participants." What conclusion does the report allow about classes and about transfer?

ANSWER: that the classes were not demonstrated (52% is above chance, 33%, but far from any usual criterion), and that the changes in the ratings, therefore, cannot be attributed to them. They may have other sources, which the report does not separate. The honest reading is "the training criterion was met and the ratings changed," without "through equivalence."

20.6 What the paradigm does not show

The paradigm shows that an evaluation *can* be established through equivalence classes. Four limits separate this from what many people want to conclude.

The first is that what is measured is a rating, in the laboratory. Dixon and Lemke (2007, p. 11) write that "These ratings are subjective and may not necessarily transfer to observed behavior in the real world," and add that they are inclined to believe the differences will look much the same outside the laboratory, which will be hard to test. Mizael, de Almeida et al. (2016, p. 460) consider it possible that features of the experimental setting work as contextual stimuli that control class membership, so that, outside the laboratory, the children would go on responding according to their earlier history. Based on the SAM ratings, they hypothesize that the change reached beyond the experimental context, but only insofar as that instrument has some predictive validity beyond the setting in which it is used. The second instrument, the IRAP (Chapter 24), did not show bias, and the possibility that it was insensitive cannot be ruled out. And, despite the change, they write that one should not be very optimistic about lasting effects, because the children would keep living in the same environment that established the biases. They call for tests of maintenance and of generalization outside the experimental context.

The second is that showing that an evaluation can emerge from a network of arbitrary relations does not show that this is how a particular person's evaluation was formed. Mizael, dos Santos, and de Rose (2016, p. 130) say that the evaluation "can emerge from a network of arbitrary relations and not only through direct experience"; the verb expresses possibility. The laboratory study demonstrates one sufficient route, not the actual history, which is investigated through the five layers of Chapter 18 (what happened and is recorded, what the person did, what maintains it, in what situation and, if said to someone, which verbal operant it is) and through the occasion record of Chapter 19, with one row per occasion, what came before, and what followed.

The third is that prior history competes, and training is short. Mizael, dos Santos, and de Rose (2016, p. 129) argue that, since pre-experimental relations are "widely reinforced by the verbal community," it is very likely that a training session of about one or two hours is "insufficient" to modify them. Dixon and Lemke (2007, p. 10) suggest that the lack of change in some participants may have come partly from unstated social contingencies of the culture, which controlled behavior more strongly than the few points the study used as differential reinforcement. Training itself may be far from instantaneous: in the Dixon and Lemke study, AB training took from 1 to 158 blocks of 18 trials, depending on the participant (pp. 8–9). The results, the authors say, support Sidman's (1994, as cited in Dixon & Lemke, 2007, p. 10) recommendation

to run a pretest when the stimuli are likely to carry relations prior to the research, and the importance of a posttest when the stimuli are social (pp. 10–11).

The fourth is that equivalence is one explanation among others. Mizael, dos Santos, and de Rose (2016, p. 131) point out that the paradigm "is not the only body of knowledge in behavior analysis" devoted to attitude formation and change, and they return to classical conditioning (Chapter 17). Chapter 21 deals with Relational Frame Theory. On that theory, Dixon and Lemke (2007, p. 11) write that, although their data support the account of prejudice given by Relational Frame Theory, "it is not the case that the RFT analysis is necessary or sufficient to explain" the results, because the functions transferred "in the same ways reported throughout many other descriptions of stimulus equivalence." Chapter 14 presents the reading of attitudes as verbal behavior, which Mizael, dos Santos, and de Rose (2016, p. 130) cite in connection with prejudices that arise without a direct history of reinforcement.

In research practice, this translates into five habits. State, before data collection, the class criterion, the chance level, and what would count as transfer. Record, for each participant, the three answers of Figure 20.4. Measure the evaluation before and after, and with a control group when possible. Describe the prior history of the stimuli. And state what the study does not reach. Chapters 27 and 28 analyze two studies in detail, Chapter 30 brings the literature together, and Chapter 33 shows how to design a study.

TEST YOURSELF

A report concludes: "equivalence training showed how prejudice is formed in people." Which limit in this section does that sentence ignore?

ANSWER: The second: showing that an evaluation can emerge from a network of arbitrary relations demonstrates one sufficient route, not that this is how a particular person's evaluation was formed. Mizael, dos Santos, and de Rose (2016, p. 130) use a verb of possibility ("can emerge").

Common learner mistakes

1 **Saying that stimuli in the same class look alike.** The mistake happens because, outside the laboratory, the things we treat as equal usually look alike. *How to spot the mistake:* you explain the class by something A1 and "good" "have in common." The relation is arbitrary: what links the members is what was taught and derived, not their form (Section 20.3).

2 **Taking the class as formed because there was training.** The mistake happens because the training criterion is the number reports highlight most. *How to spot the mistake:* the report gives the training criterion and no test without differential consequences. Look for BA, CB, AC, and CA, with scores above chance and above a stated criterion (Sections 20.2 and 20.3).

3 **Calling any joint presentation "pairing."** The mistake happens because the two research families use the same word. *How to spot the mistake:* you use the same word for a choice task with "Correct!" and for stimuli presented together, with no task. They are different procedures, and different questions (Section 20.1).

4 **Taking class membership as having the same function, or the reverse.** The mistake happens because "equivalent," in everyday use, means "worth the same" in every respect. *How to spot the mistake:* you write "they are in the same class, so they will be evaluated the same way" or "they received the same rating, so they are in the same class." Functional equivalence has to be tested, and the class is concluded from the matching tests (Section 20.4).

5 **Jumping from the laboratory to real life.** The mistake happens because the laboratory arranges, in miniature, situations that look like those of real life. *How to spot the mistake:* you write "this is how prejudice is formed" or "associating the group with positive things makes prejudice disappear" on the basis of ratings on a scale. The study shows that the evaluation can be established in this way, under arranged conditions (Sections 20.5 and 20.6).

SUMMARY

Matching-to-sample (Objective 1). In the presence of a sample, the person chooses among comparisons, and the correct choice and the incorrect ones have different consequences; the procedure establishes a conditional discrimination, in which the role of each comparison depends on the sample. The relation is arbitrary when correctness is defined by the teacher, without similarity, and it should not be confused with the stimulus pairing of evaluative conditioning.

Trained and derived relations (Objective 2). Once AB and BC have been taught with consequences, BA and CB (symmetry), AC (transitivity), and CA (equivalence) are tested without consequences; with verbal humans, reflexivity is usually assumed. Without a test, training does not show equivalence. The paradigm is economical, because a few taught relations generate many derived ones, but derivation is not guaranteed.

Equivalence class (Objective 3). It is a set of stimuli that are interchangeable in certain contexts, concluded from the tests. It is not similarity, nor a class of discriminative stimuli; it does not guarantee the same function, and it can have degrees of relatedness, depending on the number of nodes.

Transfer of function (Objective 4). The function acquired by one member passes to the others without direct training. It can be discriminative, consequential, eliciting, evaluative, or a matter of choice; only the evaluative functions, and choices that amount to evaluating, are attitudes, and the elicited reaction is recorded separately. Functional equivalence must be tested, and transformation of functions belongs to Chapter 21.

Attitudes and limits (Objective 5). Attitude formation "can be conceptualized" as classes between a category and evaluative attributes, and the studies are read with three questions: trained, derived, changed. In some studies all participants formed the class; in others, a minority did. The paradigm shows that an evaluation can be established in this way, not that it was; it measures ratings in the laboratory, faces prior history, and is one explanation among others.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. (Sentences constructed for the exercise.) Classify each situation as matching-to-sample, stimulus pairing (Chapter 17), or neither: (a) given figure A1, the person chooses among B1, B2, and B3, and choosing B1 is followed by "Correct!"; (b) an abstract figure appears 30 times together with pleasant photographs, without the person

having to do anything; (c) after learning to choose B1 given A1, the person chooses A1 given B1, from among A1, A2, and A3, with no feedback at all; (d) the person classifies photographs of faces as "I like it" or "I don't like it."

2. (Hypothetical case.) Renan taught, with differential consequences, the relations A1B1, A2B2, B1C1, and B2C2. He then tested BA, CB, AC, and CA, without consequences. Match each test to the property it shows (symmetry, transitivity, equivalence, or reflexivity): (a) BA and CB; (b) AC; (c) CA; (d) AA, BB, and CC.

3. (Hypothetical case.) Priscila gets 96% of the AC test right, with no feedback, after learning AB and BC. Which conclusion does the result support?

a. That the class is formed, because transitivity was demonstrated.

b. That transitivity emerged; to conclude that there is a class, the symmetry and equivalence tests (BA, CB, and CA) are still missing.

c. That A1 and C1 look alike, and that is why the test was answered correctly.

d. That the evaluation of A1 will change.

4. (Sentences constructed for the exercise.) What is missing from each report before an equivalence class can be concluded? (a) "After AB and BC training, the participant reached 98% correct and was dismissed." (b) "On the CA test, the participant got 97% right, and each correct response was followed by 'Correct!'." (c) "With AB and BC taught, the participant got BA and CB right; AC and CA were not tested." (d) "The participant got 40% of the CA test trials right, with three comparison figures, and the report concludes that the classes were formed."

5. (Hypothetical case.) Vinícius presents two results. In the first, a child who learned to call a picture of a banana "good" comes to call a banana drawn in a different way "good." In the second, a participant who learned AB and BC comes to give a high rating to A1, a figure with no resemblance at all to the word "good." In which of them does similarity explain the result, and in which is the chapter's procedure needed? Justify in two sentences.

6. (Hypothetical case; fictitious data.) Four participants took the CA test, with three comparisons (chance, 33%; criterion, 90%). P1: 96%; A1 ratings from 5 to 8 and A2 ratings from 5 to 2. P2: 93%; A1 and A2 ratings unchanged (5 and 5). P3: 48%; no change. P4: 55%;

A1 ratings from 5 to 8 and A2 ratings from 5 to 2. What does each result allow us to conclude about the class and about transfer of function?

7. Two studies tried to teach children relations opposite to a prior racial bias: de Carvalho and de Rose (2014), with 4 children, and Mizael, de Almeida et al. (2016), with 13. (a) What class result did each one obtain? (b) What protocol changes did the second group of authors introduce? (c) A classmate writes: "The 2016 study showed that children's racial prejudice goes away with a short training." Point out two things the sentence glosses over.

8. (Hypothetical case.) A school principal proposes a mural in which photographs of people from a group always appear next to positive words, "because studies show that associating the group with positive things makes prejudice disappear." In four sentences: (a) say which procedure the mural is, that of Chapter 17 or that of this chapter; (b) say what would be missing for it to be the other one; (c) say what data would still be missing to support the principal's claim.

9. (Sentences constructed for the exercise.) After forming the classes, a participant: (a) chooses A1, rather than A2, in a task in which only C1 had been S+; (b) rates A1 an 8 and A2 a 2; (c) shows increased skin conductance in the presence of A2, which is in the class of a stimulus paired with shock; (d) uses A1 as a conditioned reinforcer in a sorting task, because C1 already functioned that way. Classify each function (discriminative, consequential, eliciting, or evaluative) and say which are attitudes by the fundamental definition.

10. Lia writes in her notebook: "A1 and A2 received different ratings, so the attitude was formed through equivalence." In four sentences, say what the report needs to show to support that there was a class and transfer, what the second part of the sentence still leaves open, and why the sentence does not hold for life outside the laboratory.

ANNOTATED ANSWER KEY

1. (a) Matching-to-sample. (b) Stimulus pairing, the evaluative conditioning procedure: the stimuli appear together and the person chooses nothing (Section 20.1). (c) Matching-to-sample, on a symmetry test trial (BA): the format is the same, without differential consequences. (d) Neither: it is an evaluative response, a classification (Section 6.5).

2. (a) Symmetry. (b) Transitivity. (c) Equivalence (symmetry of transitivity). (d) Reflexivity (identity matching).

3. b. Option **a** concludes that there is a class from a single property: the class also requires symmetry and equivalence. Option **c** is common mistake 1: the figures are arbitrary, and the correct responses come from training and testing, not from similarity. Option **d** skips to question 3 of the opening: a class is a relation among stimuli, and a change in evaluation is a different piece of data.

4. (a) No test at all: the training criterion shows that the trained relations were learned, not that the derived ones appeared. (b) With "Correct!" after every correct response, CA becomes training; the relation would have to be tested without differential consequences (Sidman & Tailby, 1982, p. 6). (c) Only symmetry was tested; transitivity (AC) and equivalence (CA) are missing. (d) With three comparisons chance is 33%: 40% barely differs from it, and the report states no criterion.

5. In the first, similarity explains it: this is generalization (Section 13.3), and it requires no special procedure. In the second, similarity is not available; only a class formed through AB and BC, shown by the tests, and transfer of function would explain the rating, and that is what the chapter deals with.

6. P1: class demonstrated (96%, above 90%) and function transferred: this is the predicted pattern. P2: class demonstrated and no transfer observed; belonging to the class does not guarantee the function (Catania, 1999, p. 169), or the measure did not capture it. P3: class not demonstrated (48% is above chance and below the criterion); the unchanged ratings contradict nothing, because there is no class to transfer from. P4: class not demonstrated, and the ratings changed: the change cannot be attributed to the class and may come from another source, which the report does not separate; one cannot say there was transfer "through equivalence."

7. (a) De Carvalho and de Rose: one of 4 children reversed the pretest relations (p. 527). Mizael, de Almeida et al.: all 13 formed classes on the standard test, and nine maintained the relation on the test with three comparisons (pp. 451 and 459). (b) Symmetry tests after each baseline relation, and mixing of AB and BC with feedback on 100% of trials, followed by a review with 50% (p. 452). (c) For example: that the result holds for ratings and matching in the laboratory, not for behavior outside it (the IRAP showed no bias, and the authors do not rule out that it was insensitive); that four of the 13 children came to relate White faces to the positive symbol on the more demanding test; that the authors do not expect lasting effects in an environment that remains the same, and they call for tests of maintenance and generalization.

8. (a) Stimulus pairing, the procedure of Chapter 17: photographs and words presented together, with no choice task with differential consequences. (b) A matching-to-sample task, in which people choose comparisons in the presence of samples and receive differential consequences, teaching arbitrary relations, and tests without consequences that would show the derived relations. (c) A demonstration that the evaluation of the group changes outside the laboratory and is maintained: the studies measured ratings and matching in the laboratory, and they list prior history and lack of follow-up among their limits.

9. (a) Discriminative; not an attitude (the choice does not attribute value). (b) Evaluative; an attitude, an evaluative response given to someone. (c) Eliciting; not an attitude, it is an elicited reaction, recorded separately (Section 17.4). (d) Consequential; not an attitude in itself: the attitude is the response that attributes value.

10. Model answer: "To support the first part, the report needs to show that the trained relations were learned, that the derived ones appeared in the tests without differential consequences and above chance and a criterion, and that the ratings changed relative to the pretest or to a control. The second part, that the attitude 'was formed through equivalence,' leaves other explanations open, such as evaluative conditioning and relational frames. And the sentence holds for a rating given in the laboratory: it does not say how the evaluation was formed in the participant's life, nor whether it appears away from the screen."

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 21. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1	20.1 and common mistake 3
2	20.2
3	20.2 and 20.3, and common mistakes 1 and 2
4	20.2 and common mistake 2
5	20.1 and 20.3, and common mistake 1
6	20.4 and 20.5, and common mistake 4
7	20.5 and 20.6, and common mistake 5
8	20.1 and 20.6, and common mistakes 3 and 5
9	20.4
10	20.5 and 20.6, and common mistake 5

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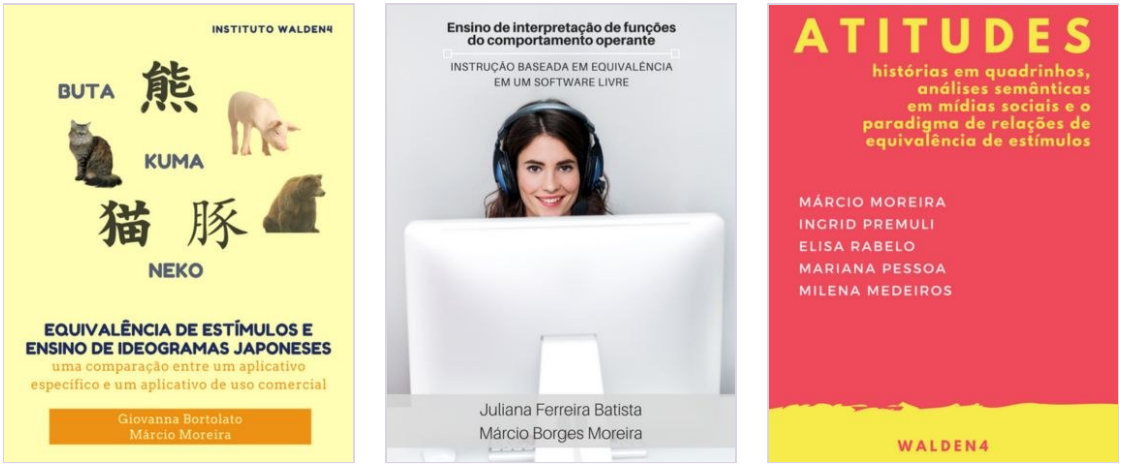
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CHAPTER

21 Relational Frame Theory

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** arbitrarily applicable relational responding and **separate** it from relational responding that depends on the physical properties of the stimuli.
2. **Describe** the relational frame by its three properties (mutual entailment, combinatorial entailment, and transformation of functions) and **derive**, in a small network, the relations and functions the theory predicts.
3. **Distinguish** the main frames (coordination, opposition, distinction, comparison, and hierarchy) and **state** what role contextual cues play.
4. **Contrast** stimulus equivalence with Relational Frame Theory and **state** the points on which Sidman (1994) disagrees with the theory.
5. **Read** an analysis of prejudice made in the terms of the theory and **state** what it proposes, what support the source itself presents, and what it does not settle.

PREREQUISITES

The equivalence class, transfer of function, and functional equivalence (Sections 20.3 and 20.4), the reinforcer as a function of the stimulus (Section 12.2), generalization by similarity (Section 13.3), the elicited reaction recorded separately (Section 17.4), and prejudice as an attitude with three conditions (Section 18.1). The new terms (nonarbitrary relation, arbitrarily applicable relational responding, generalized operant, relational frame, mutual entailment, combinatorial entailment, transformation of functions, contextual cue, relational network, and conceptualized group) are defined here.

OPENING

(Hypothetical case.) Lia returns to Telma's lab to see another task. On the screen are three nonsense syllables: ZUK, BEF, and LOM. The participant has already learned, with lines of different lengths, what the words SAME and OPPOSITE call for. In the first phase, he learns, with "Correct!" and "Try again," that given ZUK, with the word OPPOSITE on the screen, the right choice is BEF, and that given BEF, with the same word, it is LOM. In the second, ZUK appears twenty times next to photographs that, in a pretest, other people rated as very pleasant; BEF and LOM never appear with them. In the third, he gives each syllable a rating from 1 (bad) to 10 (good): ZUK gets a 9, BEF gets a 3, and LOM gets an 8. Lia, who has already seen in Telma's lab how equivalence classes are formed, expected similar ratings for all three. Telma points out that nobody taught the participant to give these ratings and that they are not similar. Four questions organize the chapter.

1. *"ZUK and LOM never appeared together on the screen, and he evaluates them almost the same way. What did he learn to do?"*
2. *"Why was BEF's rating low and LOM's high, if only ZUK appeared with the photographs?"*
3. *"Is 'opposite' the only possible relation? What else can people be taught to relate, and how does the person know which relation applies?"*
4. *"Does this redo what Chapter 20 said about equivalence? And what does it have to do with prejudice?"*

The first calls for relational responding and the frame (Sections 21.1 and 21.2); the second, for transformation of functions and contextual control (21.3); the third, for the families of frames (21.4); the fourth, for the comparison with equivalence (21.5) and with attitudes (21.6).

21.1 Relating without similarity

What Lia saw depends on an action that Chapter 20 described without giving it a general name: relating. The reference formulation is that of the volume edited by Hayes, Barnes-Holmes, and Roche (2001), and each of its chapters is cited here by its authors, with the volume's page numbers. For Hayes, Fox et al. (2001, p. 25), relating means "to respond to one event in terms of another." Most complex organisms can respond to formal, or nonarbitrary, relations between stimuli: selecting the larger, the brighter, or the rounder stimulus "simply becomes a learned operant" (p. 25). In that case the response "is entirely bound by the

formal properties of the related events" (p. 25), and it is not, in itself, an instance of derived relational responding. A relation that depends on these properties is called here a **nonarbitrary relation**.

The relation between ZUK and BEF is of another kind. Nothing about ZUK calls for BEF, and what makes the relation hold is the word OPPOSITE on the screen, which training with "Correct!" turned into a **contextual cue**: a stimulus that, through a history, indicates which relation holds among the stimuli present. The authors say "arbitrarily applicable" in the sense that "in some contexts this response is under the control of cues that can be modified on the basis of social whim" (Hayes, Fox et al., 2001, p. 25). The response no longer depends on the physical properties of the events and can be brought to bear on any stimuli, including new ones (pp. 25 and 34). This is **arbitrarily applicable relational responding**. "Applicable" is not "applied": in natural language, this response class "is generally not arbitrarily applied, however, since language is very much bound up with the nonarbitrary features of the environment" (p. 25). And verbal relations "are rarely arbitrarily applied outside of symbolic logic classes or equivalence experiments" (Hayes, Barnes-Holmes & Roche, 2001, p. 151). Telma's task is one of those laboratory cases, in which the relation is in fact applied arbitrarily.

The authors give a simple example (Hayes, Fox et al., 2001, p. 27). Suppose that X is arbitrarily designated as "greater than" Y and someone asks, "Which is greater: X or Y?" With no formal properties to support the answer, "the subject must guess." If choosing X is reinforced, the contingency becomes predictable for the question "Which is smaller: X or Y?" An adequate history in the presence of "greater than," and another, with the same stimuli, in the presence of "smaller than," lead to a coordinated response: "individuals given the relation in one direction will derive the relation in the other direction." The authors conclude: "That is the core idea of a 'relational frame'" (p. 27), a term the next section defines.

Where does this ability come from? The theory's answer is that relating is a **generalized operant**: a response class defined by function, not by topography, established through multiple exemplars in varied situations, like generalized imitation (Hayes, Fox et al., 2001, pp. 25–26). What is abstracted is "the pattern of responding among a set of stimuli," which comes to be "brought under the control of an arbitrary contextual cue" (p. 26). The theory's summary puts it this way: it "treats relational responding as a generalized operant, and thus appeals to a history of multiple-exemplar training" (Hayes, Barnes-Holmes & Roche, 2001, p.

141). The most familiar case is naming: the adult names an object and reinforces the child's orienting toward it; on other occasions, the adult holds or points to the object, says its name, and asks the child to repeat it. Each type of interaction may require explicit reinforcement, and, "with enough instances," symmetrical responding "may emerge with respect to novel stimuli" (Hayes, Fox et al., 2001, pp. 26–27). Catania (1999, p. 173) says something close, in other words: "training with many symmetry problems can produce generalized symmetry," and these generalized classes "have also been called relational frames," with a reference to Hayes (1994, as cited in Catania).

To argue that relating is an operant, the theory looks in it for the four properties of an operant: it develops over time, has a flexible form, is under antecedent control, and is under consequential control (Hayes, Fox et al., 2001, p. 41). The authors cite studies for each one (pp. 41–43) and say that "no contradictory evidence has yet been provided," with a few dozen studies, "all with confirmatory results" (p. 43). Their reading, however, is cautious: development over time "does not prove that relational responding is an operant, but it makes the notion more plausible" (p. 41), and "there is as yet no systematic analysis of the role of multiple-exemplar training in this regard" (p. 28). The exact history "is an empirical matter" (p. 25), and the purpose of the volume "is not to argue that RFT is proven and accepted, but to argue that it is plausible, coherent, supported by the available data, and is experimentally progressive" (p. 28).

Hence a reading rule for the rest of the chapter, which separates three kinds of claim. There is the procedure and the data: relations that emerge in the laboratory, functions that change. There is the hypothesis about origin: that this is an operant, learned through multiple exemplars. And there is the interpretation of phenomena that nobody manipulated, such as prejudice, in Section 21.6.

KEY CONCEPT

Arbitrarily applicable relational responding is responding to one event in terms of another under the control of contextual cues, not of the physical properties of the events; that is why it can be brought to bear on any stimuli, including new ones. In the theory, it is a **generalized operant**, established through multiple exemplars (Hayes, Fox et al., 2001, pp. 25–26 and 29). A **nonarbitrary relation** is one that is bound to the formal properties of the related events (p. 25).

EXAMPLE

In Telma's lab, given ZUK and the word OPPOSITE, the participant chooses BEF from among BEF, LOM, and REM. No property of ZUK calls for BEF: it was training with "Correct!" that made the word OPPOSITE the cue for the relation. With the word SAME, the correct comparison for the same ZUK would be a different one.

NON-EXAMPLE

Given two circles, one large and one small, a person learns to choose the larger one and later chooses the larger of two new squares. The relation "larger" lies in the physical property of the stimuli: it is nonarbitrary, even though it is learned and generalizes. It would be arbitrarily applicable only if it held between stimuli that do not differ in size, for example, given the word LARGER and two nonsense syllables.

TEST YOURSELF

In each situation, is the relation nonarbitrary or arbitrarily applicable? (a) Choosing the heavier of two boxes, after lifting them. (b) Choosing, between two nonsense syllables, the one that "is larger" than the other, when only the word LARGER and training with "Correct!" say which. (c) Choosing the brighter of two lamps.

ANSWER: (a) and (c) are nonarbitrary: the physical property (weight, brightness) supports the relation. (b) is arbitrarily applicable: nothing about the syllables says which one is "larger," and the cue is the word and the history with it.

21.2 The relational frame

Arbitrarily applicable relational responding is the general name; the **relational frame** is a specific type of it. (The Brazilian literature renders "frame" in more than one way: Catania, 1999, p. 173, says "molduras (ou quadros) relacionais," and Mizael and de Rose, 2017, p. 368, "molduras." Here "frame" is always the theory's technical term, not to be confused with the "frame" of an opinion in Chapter 16.)

The design of Lia's case follows, in broad outline, that of the studies by Steele and Hayes (1991), as Sidman (1994, p. 560) describes them: first, "establish contextual control over different relations" (same and opposite, for example) with nonarbitrary stimuli, such as lines of different

lengths; then, "use the contextual stimuli to control arbitrary conditional discriminations"; and finally, "examine the effects of the contextual cues on derived arbitrary relations."

A frame is recognized by three properties. The first is **mutual entailment** (*entailment* meaning that one relation implies another). "Arbitrary stimulus relations are always mutual: If A is related to B, then B is related to A," and the specific relations can vary: "If A is larger than B, then B is smaller than A. If the first relation is specified, the second is entailed" (Hayes, Fox et al., 2001, p. 29). The term describes "the fundamental bidirectionality of relational responding, even when such bidirectionality is not symmetrical," and serves as "a more generic term for what is called 'symmetry' in stimulus equivalence" (p. 29).

The second is **combinatorial entailment** (*combinatorial* because relations combine): two or more stimulus relations (trained or derived) "mutually combine" (p. 30). If Maria is more intelligent than Lisa, and Lisa more intelligent than Shannon, "a derived mutual relation between Maria and Shannon is entailed": Maria is more intelligent than Shannon, and Shannon is less intelligent than Maria (p. 30). It is the general term for what equivalence research calls "transitivity" and "equivalence" (p. 30). The third, **transformation of functions**, is the subject of Section 21.3.

With the three properties in hand, the definition of the frame becomes readable. Hayes, Fox et al. (2001, p. 33) give it as follows: "A relational frame is a specific class of arbitrarily applicable relational responding that shows the contextually controlled qualities of mutual entailment, combinatorial mutual entailment, and transformation of stimulus functions; is due to a history of relational responding relevant to the contextual cues involved; and is not solely based on direct non-relational training with regard to the particular stimuli of interest, nor solely to nonarbitrary characteristics of either the stimuli or the relation between them." There are three things in the sentence: the three properties, a history that produced them, and the requirement that what is observed cannot be reduced to what was taught directly or to physical properties.

Table 21.1 sets the vocabulary of Chapter 20 next to that of the theory, and Figure 21.1 shows what it allows us to say.

Table 21.1

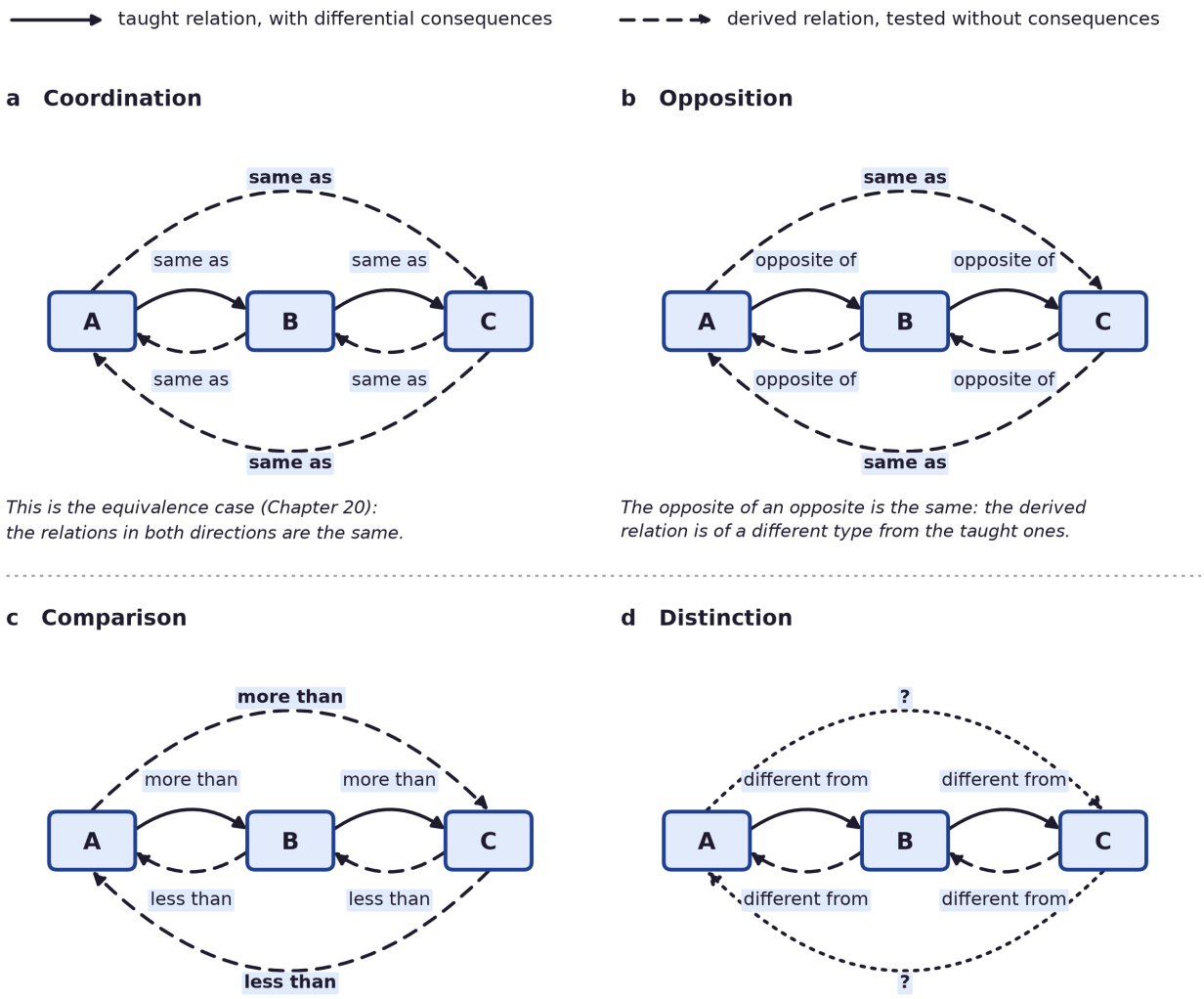
Terms of stimulus equivalence and of Relational Frame Theory, and what the theory adds

In equivalence (Chapter 20)	In Relational Frame Theory	What the theory adds
Symmetry	Mutual entailment	The relation in the reverse direction can be of another type: if A is larger than B, B is smaller than A (p. 29)
Transitivity and equivalence	Combinatorial entailment	The relations that combine can differ from one another, and the derived relation can be of another type or less precise (pp. 30–31)
Transfer of function	Transformation of functions	The change in function is "in terms of the underlying relation," not mechanical (p. 32)
Reflexivity	(no generic term)	"A more generic term for reflexivity is unnecessary": the properties that define reflexivity do not separate what results from derived relations from what results from formal similarity (p. 33)

Note. Table prepared for this book, based on Hayes, Fox et al. (2001, pp. 29–33). In the Portuguese edition, the Portuguese terms are translations proposed by the author; here, the terms are those of the source.

Figure 21.1

Taught and derived relations in four frames: what the theory derives from two taught relations among A, B, and C



Note. Diagram prepared for this book, based on Hayes, Fox et al. (2001, pp. 29–31 and 36). Reflexivity and transformation of functions are not shown.

In coordination, everything is "same as," and this is the equivalence case. In opposition, the reverse relation is also "opposite of," but the derived relation between A and C is "same as": "A opposite B opposite C, derives A same C, not A opposite C" (Hayes, Fox et al., 2001, p. 31). Catania (1999, p. 416), in his glossary, gives the variant in which B and C are both the opposite of A, and then BC is "the same as." In comparison, the reverse relation is a different one (less than), and the derived relation follows the order that was taught. In distinction, nothing can be said: "if A is different than B and B is different than C, we cannot say

what the relation is between A and C," and knowing that one cannot say "is itself a kind of stimulus relation" (p. 31). This imprecision is predictable from the nature of the relations involved.

A caveat about the word. For the authors, the word *frame* "is not a new technical term, and it is not a structure, mental entity, or brain process": it is "a metaphor" for purely functional response classes, in which the class provides an overall pattern and the current context provides the specific formal features (Hayes, Fox et al., 2001, p. 27). "A relational frame is always 'framing events relationally' – it is an action" (p. 34). Since the thesis adopted here is that attitude is behavior, this matters: saying that someone "has" a frame or a network is going back to the language of entities that the earlier chapters avoided. What is recorded is the response, the cue, and the history.

The theory also separates outcome and process. The three qualities "are outcomes, not processes": "They do not explain relational frames: they define them" (pp. 33–34). The process is the history from which an operant under a particular kind of contextual control arises: "the process involved is contingencies of reinforcement, but unlike Sidman (2000) relational responding is not a previously unknown secondary effect of such contingencies, it is the target of them" (p. 34). Hayes, Barnes-Holmes, and Roche (2001, p. 146) formulate the frame as a three-term contingency, in the language of Chapter 13: the contextual cue, the relational response (responding to B in terms of A and to A in terms of B), and a history in which differential reinforcement was correlated with the cue.

KEY CONCEPT

A **relational frame** is a particular class of arbitrarily applicable relational responding that displays, under contextual control, **mutual entailment** (if A is related to B, B is related to A, even if in another way), **combinatorial entailment** (relations combine and produce a derived relation), and **transformation of functions** (the functions of a stimulus change in terms of the derived relation); it is due to a relevant history and cannot be reduced to what was taught directly or to the physical properties of the stimuli (Hayes, Fox et al., 2001, pp. 29–34). It is an action, not a structure.

EXAMPLE

Telma taught, with the cue OPPOSITE, ZUK–BEF and BEF–LOM. Without consequences, the theory predicts: BEF–ZUK and LOM–BEF as "opposite of" (mutual entailment) and ZUK–LOM and LOM–ZUK as "same as," with the cue SAME (combinatorial entailment). The derived relation is of a different type from the taught ones.

NON-EXAMPLE

The participant learned, with "Correct!", to choose BEF given ZUK and the word OPPOSITE, and nothing else was tested. There is a taught relation, but we do not know whether there is a frame: tests showing mutual entailment, combinatorial entailment, and transformation of functions are missing. By definition, what is observed cannot be reduced to what was taught directly.

TEST YOURSELF

(a) ZUK is larger than BEF, and BEF is larger than LOM. What relation does the theory derive between LOM and ZUK? (b) ZUK is different from BEF, and BEF is different from LOM. What is derived between ZUK and LOM? (c) ZUK is the opposite of BEF, and BEF is the opposite of LOM. Is the relation between ZUK and LOM "opposite of"?

ANSWER: (a) LOM is smaller than ZUK (combinatorial entailment, in the reverse direction). (b) Nothing: the relation remains undetermined, and knowing this is part of the derivation. (c) No: the opposite of an opposite is "same as."

21.3 Transformation of functions and contextual control

In the third phase, Lia saw what interests anyone who studies attitudes: not only relations among stimuli, but what the person does in their presence. ZUK came to occasion high ratings because it had appeared together with pleasant photographs, as in the evaluative conditioning of Chapter 17 (Section 17.4). BEF and LOM never appeared with them. The question is what function each one has.

Hayes, Fox et al. (2001, p. 31) describe **transformation of functions** this way: "When a given stimulus in a relational network has certain psychological functions, the functions of other events in that network may be modified in accordance with the underlying derived relation." A **re-**

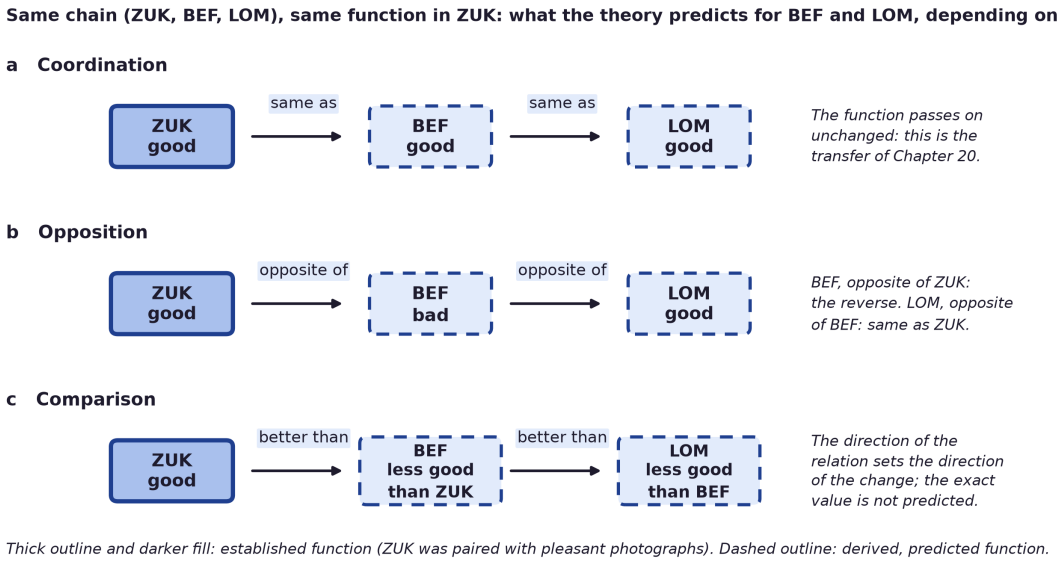
lational network is the set of stimuli that trained and derived relations link to one another; Section 21.4 shows how frames of different types combine within it. Dymond and Rehfeldt (2000, p. 239) put it in other words: the functions of one stimulus alter those of another "in accordance with the derived relation between the two, without additional training." The transfer of function of Chapter 20 is the case in which the relation is coordination.

Why doesn't the theory speak only of transfer? Because, outside coordination, the function does not pass on unchanged. "The change in functions of one event that stands in relation to another is not mechanical: it is in terms of the underlying relation" (Hayes, Fox et al., 2001, p. 32). The volume's example is one of opposition: a person is trained to select B as the "opposite" of A, and A is given a conditioned punishing function by being paired with a loss of points. "It might be predicted that B would then have reinforcing functions (without having that function directly trained), by virtue of its 'opposite' relation to the punishing A stimulus" (p. 32). According to the authors, Dymond and Barnes (1995) empirically demonstrated "just such an effect" with derived relations of more-than/less-than (as cited in Hayes, Fox et al., 2001, p. 32). That is why they adopt "transformation" as the general term and keep "transfer" for cases where the underlying relation produces derived functions "similar to those that were trained or that pre-existed" (p. 32); in some, such as equivalence, the terms "can be used interchangeably" (p. 32).

A note on Chapter 20: it gave hierarchy as an example of a relation that is not equivalence, following Mizael and de Rose (2017, p. 369), who cite Dymond and Barnes (1995); Hayes, Fox et al. (2001, p. 32) describe that study as one of more-than/less-than, that is, of comparison. What changes is the family the example belongs to, not what Chapter 20 said: outside coordination, one speaks of transformation.

Figure 21.2

Same chain and same function established in ZUK: what the theory predicts for BEF and LOM, depending on the relation taught



Note. Diagram prepared for this book, with the syllables of Lia's case. It is a prediction of the theory, not data: opposition is supported by the example in Hayes, Fox et al. (2001, p. 32), which the authors present as a prediction, and comparison, by the more-than/less-than study they cite (p. 32).

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Figure 21.2 shows the same chain and the same function established in ZUK, with three taught relations. In coordination, the function passes on unchanged: this is the transfer of Chapter 20. In opposition, BEF, opposite of ZUK, has the reverse function, and LOM, opposite of BEF, again has ZUK's function: this is what Lia saw, and equivalence alone does not predict it. In comparison, the direction of the relation defines the direction of the change, without the theory predicting the value. The description is the same in all three cases (the function changes in terms of the relation), and the result is different.

Transformation, however, is not indiscriminate. "The transformation of stimulus functions must itself be under contextual control," because "a given stimulus always has many functions, and if all functions of one stimulus transferred to another and vice versa, there would no longer be two separate psychological stimuli" (Hayes, Fox et al., 2001, p. 32). The volume's example is the banana: the word "banana" and an actual banana are in an equivalence relation, and in the presence of "picture a banana" the visual functions are actualized, whereas in the presence of "imagine tasting a …," it would be the taste functions (p. 32). The contextual cue, defined in Section 21.1, therefore has two roles: it selects the relation that holds for the stimuli present (which the authors symbolize

as Crel, p. 30), and it selects the functions that are transformed (Cfunc, p. 33). In the authors' words, "Contextual cues, then, not only establish and indicate the particular conditions under which relational activity occurs, they also specify which functions should be transformed or transferred" (p. 32). In Lia's case, the word OPPOSITE on the screen is the cue for the relation, and the instruction "give a rating from 1 to 10" is the cue for the evaluative function; with "which of them is easier to pronounce?", a different function would be at stake.

⚠ CAUTION

"Contextual cue" is not the "context" of Chapter 8, which is the situation in which the evaluation appears (where, with whom, after what). Here the cue is a stimulus (a word, a symbol, an instruction) that, through a history, changes the relation that holds or the function that is transformed. In the studies Sidman (1994, p. 560) describes, a "*contextual stimulus*" (his term) "*calls for*" a relation of sameness, opposition, or difference. The Brazilian literature also uses "dicas contextuais," another Portuguese rendering of "contextual cues" (Mizael & de Rose, 2017, p. 368).

Transformation applies to the function of the stimulus, not to the attitude. Among the functions that transfer or are transformed are conditioned reinforcing functions, discriminative functions, elicited conditioned emotional responses, extinction functions, and self-discrimination functions (Hayes, Fox et al., 2001, pp. 31–32). By the book's definition, only the evaluative functions, and the choices that amount to evaluating, are attitudes (Chapter 20, Table 20.2), and the elicited reaction is recorded separately (Section 17.4).

KEY CONCEPT

Transformation of functions is the change in the functions of a stimulus, within a network, in accordance with the underlying derived relation, without additional training (Hayes, Fox et al., 2001, p. 31; Dymond & Rehfeldt, 2000, p. 239). A **contextual cue** is the stimulus that, through a history, selects the relation (Crel) or the function transformed (Cfunc).

TEST YOURSELF

(a) In a ZUK–BEF–LOM chain taught with "opposite of," BEF receives a rating of 2 after being paired with unpleasant photographs. What direction does the theory predict for the ratings of ZUK and LOM? (b) And if the chain had been taught with "same as"? (c) In the task, the word OPPOSITE on the screen is the cue for what, and the instruction "give a rating from 1 to 10," the cue for what?

ANSWER: (a) High: ZUK and LOM are opposites of BEF, which has the "bad" function; the theory does not predict the exact value. (b) Low, like BEF's: this is the transfer of Chapter 20. (c) The word OPPOSITE is the cue for the relation (Crel); the instruction is the cue for the evaluative function (Cfunc).

21.4 Families of frames

"Opposite" is not the only possible relation. Hayes, Fox et al. (2001, p. 35) say that the number of ways of relating events is large and that it is useful to classify frames into a few categories, or families; the list "is not exhaustive," but it shows some of the most common frames and how they combine. Table 21.2 brings together the nine in the volume.

Table 21.2

Families of relational frames, with the examples from the volume by Hayes and colleagues (2001)

Family	What the person does	Example from the source	What is derived
Coordination	Responds to one event as identical, equal, or similar to another: "this is (or is similar to) that" (p. 35)	"This is called a cup"; "loathing is similar to hate" (p. 35)	Establishes equivalence classes (p. 35)
Opposition	Responds to one event as the reverse of another, along a dimension (p. 36)	"cool is the opposite of warm"; "pretty is the opposite of ugly" (p. 36)	The opposite of an opposite is the same: if hot is opposite to freezing, and cold opposite to hot, cold is the same as freezing (p. 36)
Distinction	Responds to one event by its differences from another, without specifying the appropriate response (p. 36)	"this is not warm water": one cannot tell whether it is ice cold or boiling (p. 36)	Different from different: nothing can be said (p. 31)

Family	What the person does	Example from the source	What is derived
Comparison	Responds to one event through a quantitative or qualitative relation with another, along some dimension (p. 36)	Bigger/smaller, faster/slower, better/worse; "A is twice as fast as B and B is twice as fast as C" (p. 36)	Once quantified, the relation among the three becomes precise (p. 36)
Hierarchy	"A is an attribute or member of B" (p. 37)	"Apples are round"; "Bananas are fruit" (p. 37)	From "Bob is the father of Dave and Barb," one derives that Dave and Barb are siblings; from "Bob is taller than both Dave and Barb," nothing is derived between the two (p. 37)
Temporal	Like comparison, with a dimension (time) that is verbally constructed (pp. 37–38)	"A is before B, B is before C, C is before D" (p. 29)	Ordering relations (p. 29)
Spatial	Arranges events in space, relative to one another (p. 38)	"house A faces the back of house B" (p. 38)	Allows the doors of the two houses to be ordered in a sequence (p. 38)
Conditionality and causality	"A causes B and B causes C"; "if–then" (p. 38)	One derives, through comparison, that "A caused C and C was caused by A" (p. 38)	There may also be a hierarchy of cause and effect (p. 38)
Deictic	Specifies the relation from the speaker's perspective: I/you, here/there, now/then (p. 38)	"What did you do when you got there?" (p. 39)	The person answering should speak from his or her own perspective, not describe what someone else is doing now (p. 39)

Note. Table prepared for this book, based on Hayes, Fox et al. (2001, pp. 29 and 35–39). The page numbers are those of the volume.

Four observations help in reading the table. The first is that coordination is the family of equivalence: "Frames of coordination establish equivalence classes" (Hayes, Fox et al., 2001, p. 35). And, "in the absence of other cues," matching-to-sample usually yields equivalence responding, "the only arbitrarily applicable relational response that is the same in training and testing, no matter how large the network" (p. 35). That is why Chapter 20 could deal with attitudes in terms of equivalence.

The second is that opposition, distinction, and comparison differ in what they allow to be derived: opposition gives back coordination, distinction gives back nothing, and comparison gives back the order. Hierarchy, in turn, is of close interest to anyone who studies prejudice (this book's reading, not the authors'), because it is the family in which someone is responded to as a member of a class. In the authors' words,

"If the nature of B is clear, this may determine responses to A," and "John is a man" "may permit appropriate responding to John to the degree that the class 'man' is relevant" (p. 37).

The third is that the list is provisional, and the authors say so: "If RFT is correct, the number of relational frames is limited only by the creativity of the social/verbal community that trains them" (p. 40). The empirical base is uneven: opposition and more-than/less-than have a database that is "much smaller" than that of coordination, and many of the frames listed "have not been analyzed empirically, or have only been subjected to the most preliminary of experimental analyses" (p. 40). The sentence dates from 2001: before planning a study with a specific frame, it is worth looking for what has been published since.

The fourth is that frames combine in relational networks: "It is possible to create relational networks from mixtures of various relational frames and to relate entire relational classes with other relational classes" (p. 40). The word "car" takes part in hierarchical classes (noun, vehicles), in comparisons ("faster then [sic] a snail"), in coordinations ("the same as 'automobile'"), and in distinctions ("different than a house"). And "A single specified relation between two sets of relata might give rise to myriad derived relations in an instant" (p. 40). Mizael and de Rose (2017, pp. 368–369) also speak of a "relational network."

KEY CONCEPT

A **relational network** is the set of stimuli linked to one another by trained and derived relations, from frames of various types (this book's formulation, based on Hayes, Fox et al., 2001, pp. 31 and 40). It describes what the person does in the presence of a stimulus, under certain cues, not something the person has.

NON-EXAMPLE

"The participant has a rigid network around ZUK." The sentence describes an entity and does not say which cue, which relation, and which function was recorded. The equivalent formulation in terms of action is "given ZUK and the cue OPPOSITE, he chooses BEF on 100% of trials, with and without consequences": it says what was measured.

TEST YOURSELF

Which family does each statement belong to? (a) "The bus is faster than the bicycle." (b) "A cat is a feline." (c) "Fire is the opposite of ice." (d) "This is called a 'chair.'" (e) "Lunch was after the meeting."

ANSWER: (a) comparison; (b) hierarchy; (c) opposition; (d) coordination (naming); (e) temporal.

21.5 Equivalence and relational frames: what changes and what is debated

Chapter 20 and this chapter describe, to a large extent, the same performances. Dymond and Rehfeldt (2000, p. 239) note that, after derived performances of this kind, the stimuli "are said to" participate in an equivalence class (Sidman, 1994) or in a relational frame of equivalence (Barnes, 1994; Hayes, 1991, as cited in Dymond & Rehfeldt, 2000): two names for the same result. They conclude by advocating "the adoption of the generic terminology of relational frame theory to describe both the derived transformation of stimulus functions and relational responding more generally" (p. 239). The reason, as this book reads it, is the one in Section 21.3: "transfer" describes coordination well, and most of the research has been discussed in those terms (p. 241), but it does not cover the other frames.

The Brazilian literature on attitudes sums up what the theory adds. Mizael and de Rose (2017, p. 369) say that "a central difference" is "the possibility of creating or deriving networks beyond that of coordination or equivalence," and that another is reversibility: "unlike the property of symmetry, one assumes the existence of a bidirectional, not necessarily symmetrical relation between the stimuli." In this chapter's formulation, there are four additions (relations beyond coordination; a reverse relation that can be of another type; combinations that yield relations of another type, or imprecise ones; functions that change in terms of the relation) and one claim about origin: that relating is a generalized operant, learned through multiple exemplars (Section 21.1).

That last claim is the one Sidman (1994) disputes, in the epilogue to his book (pp. 554–561). Sidman begins by acknowledging the theory. It "can be seen as an attempt to account for observations that our actions come under the control of environmental events that are related not only by equivalence but in other ways also" and "is the first such general formu-

lation that springs from a behavior-analytic orientation"; he finds in it, he writes, "much that is congenial" (p. 556). He then points out several problems, and Table 21.3 brings together three of them, alongside the theory's position.

Table 21.3

Three of the points on which Sidman (1994) and Relational Frame Theory diverge

Point	Sidman (1994)	The theory (Hayes, Fox et al., 2001; Hayes, Barnes-Holmes & Roche, 2001)
Where equivalence comes from	"Equivalence relations are a built-in effect of reinforcement contingencies" (p. 554); what calls for explanation are the cases in which they fail. He has "difficulty with the notion" that "equivalencing" "must itself be a learned response" (p. 556)	Relating is a generalized operant, learned through multiple exemplars (Hayes, Barnes-Holmes & Roche, 2001, p. 141); relational responding "is the target of them," not a previously unknown secondary effect of the contingencies (Hayes, Fox et al., 2001, p. 34); the exact history is "an empirical matter" (p. 25); the research generated by the theory has progressed without appealing to a mediating process, and postulating one "seems not to be required" for a behavior-analytic research program (Hayes, Barnes-Holmes & Roche, 2001, p. 149)
Equivalence and coordination	"Coordination is itself but one example of equivalence" (p. 559): any relation may also turn out to be an equivalence relation, and set theory has ways of detecting this	"Frames of coordination establish equivalence classes" (Hayes, Fox et al., 2001, p. 35)
What the "frame" adds	"Each relation has its own properties; placing those properties within the borders of an empty frame and then giving the frame a label does not account for them" (p. 561); transfer of functions fits within class union and intersection, with no special process (pp. 559–560)	The frame is "both an outcome and a process concept": the three qualities define it, and the process is the history (Hayes, Fox et al., 2001, pp. 33–34); the change in functions is "in terms of the underlying relation" (p. 32)

Note. Table prepared for this book, based on Sidman (1994, pp. 554–561) and the indicated pages of the 2001 volume. Sidman discusses earlier formulations of the theory (Hayes, 1986, 1991; Hayes & Hayes, 1989; Hayes, 1994, as cited in Sidman, 1994, p. 554), and the sentence by Hayes, Fox et al. (2001, p. 34) about the "target" explicitly contrasts with Sidman (2000), which is not among this book's sources.

Sidman (1994, p. 558) sums up one reservation this way: to interpret equivalence as a learned response is, "despite protestations to the contrary, merely to summarize a complex set of variables by postulating a hypothetical entity." And, on the description: "For me, the mathematical description of the equivalence relation has an elegance and simplicity that relational frame theory is unable to match" (p. 559).

For reading a report, what matters most is what both sides accept. Sidman (1994, p. 561) writes that the differences of opinion about the origin of equivalence relations "should not obscure the large area of concordance" regarding the empirical evaluation of relations between stimuli: "The empirical findings are robust and procedurally interrelated." About the studies by Steele and Hayes (1991), in which the same pair of stimuli enters relations of same, opposite, or different depending on the context, Sidman acknowledges that the contextually controlled relations "did not have to be equivalence relations," but notes that this "can be handled by any formulation of equivalence that recognizes the role of context" (p. 561). The disagreement is about origin and the language of description, not about what is observed when one teaches and tests. For anyone researching attitudes, the practical consequence (this book's reading) is that matching-to-sample with contextual cues, tests without consequences, and ratings before and after hold for both readings; the choice between them shows up in how the hypotheses and conclusions are worded, not in the procedure.

The study by Dixon and Lemke (2007, p. 11), which started from the theory (Chapter 20), points the same way. Although their data support the analysis of prejudice the theory offers, "it is not the case that the RFT analysis is necessary or sufficient to explain" the results, because the functions transferred "in the same ways reported throughout many other descriptions of stimulus equivalence." Where the theory may be useful, they say, is in explaining stimulus classes "that may be oppositional, comparative, or distinctive in ways that are beyond equivalence." That is where this chapter placed it: in the frames that equivalence does not reach.

⚠ CAUTION

The theory gives the adjective "verbal" a meaning of its own: "Verbal behavior is the action of framing events relationally" (Hayes, Fox et al., 2001, p. 43), defined "without an appeal to the history of some other organism" (Hayes, Barnes-Holmes & Roche, 2001, p. 144). Chapter 14 defined verbal behavior another way, Skinner's: behavior whose consequences arrive through another person. In this book, the meaning of Chapter 14 applies, and, when the theory's meaning is intended, we say "relational responding."

TEST YOURSELF

For each paraphrase, say whether it comes from Sidman (1994) or from Relational Frame Theory: (a) "relating is a generalized operant, established through multiple exemplars"; (b) "equivalence is a built-in effect of reinforcement contingencies"; (c) "an empty frame with a label does not explain the properties of each relation."

ANSWER: (a) the theory (Hayes, Barnes-Holmes & Roche, 2001, p. 141); (b) Sidman (1994, p. 554); (c) Sidman (1994, p. 561).

21.6 The theory and attitudes: what it proposes and what it does not settle

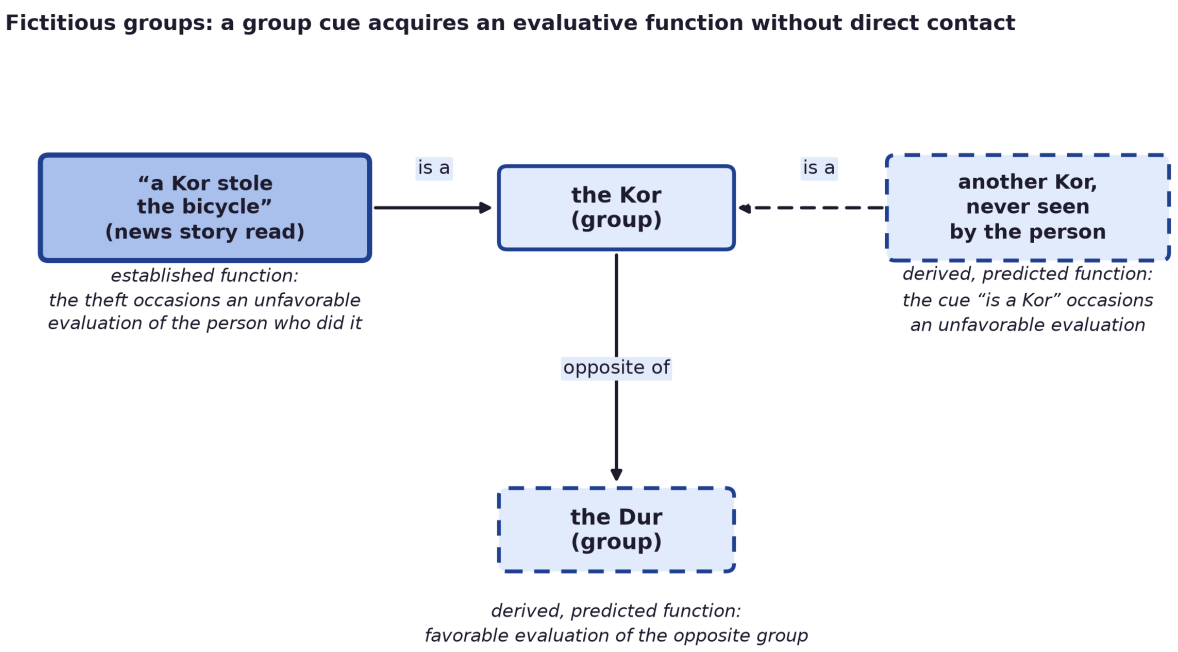
The theory is not a theory of attitude. In the 2001 volume, the subject index has no entry for "attitude," and the word "attitude(s)" appears five times in the text, four of them in the section on persuasion in the chapter by Roche et al. (2001, pp. 204–206) and once in another chapter (p. 229). The closest thing is an observation about the act of evaluating. Responding in terms of here and there, now and then "underpins the human ability to evaluate, compare, contrast, and judge all events from a constant perspective." And this "constant stream of evaluations is so pervasive that most of the time we fail to discriminate that an evaluation, HERE and NOW, is an evaluation and is not an inherent property of the event being evaluated" (Barnes-Holmes et al., 2001, pp. 124–125). In the terms of Chapter 4, an evaluation based on the object's "own value" (Section 4.2), in which the object is evaluated in itself, not for what it produces or for the place it occupies in a group, would be, on this reading, an evaluation that the evaluator does not discriminate as his or her own: a claim of the theory about what people tend to do, not data.

On prejudice, the volume has a section (pp. 202–204) in the chapter by Roche et al. (2001, pp. 197–209). The chapter describes itself this way: its purpose "is simply to illustrate how RFT might be used to develop a modern behavioral approach to human social behavior," and it is "an orientation to action, rather than a definitive RFT statement on social psychology" (p. 197). In the conclusion, the authors say that the theory "was applied here somewhat speculatively to a range of social phenomena" and that "much work remains to be done" (p. 209).

The analysis starts from the **conceptualized group**: "A conceptualized group emerges for a particular person when two or more individuals come to participate in a frame of coordination under the contextual control of one or more shared characteristics that are contained in a conceptualized self and conceptualized others" (p. 198). Prejudice, then, "involves a derived transformation of the functions of individuals based on direct or verbal contact with the functions of a few members of a conceptualized group" (p. 202). The example: if my car is vandalized in a certain neighborhood, "the functions of other 'members of that community' may be transformed in such a way that I also respond to them as vandals" (p. 202). Hence the conclusion that prejudice "is based largely on derived relations among individuals and their groups rather than upon direct experience" (p. 202). Figure 21.3 shows the scheme, with fictitious groups.

Figure 21.3

Hypothetical case, with fictitious groups: how a group cue can come to occasion an unfavorable evaluation without direct contact



Note. Diagram prepared for this book, with fictitious groups, in the form of the chains the literature describes. The derivations depend on each person's history, and none of them is data.

Dixon and Lemke (2007, pp. 5–6) say that the theory "provides us with a conceptual starting point" and give a chain of the same kind, with a real group. The September 11 attacks (A) may occasion rage (B). The im-

ages of the perpetrators (C), which the media relate to the attacks, may, "without direct training," occasion the same rage. And "Relational frames of opposition may also develop," so that "if Americans are the opposite of terrorists and Middle Eastern people are the opposite of Americans than [sic] Middle Eastern people are the same as terrorists," the opposite-of-opposite derivation of Figure 21.1b. For Matsuda et al. (2020, p. 338), respondent, operant, and observational accounts of prejudice "may not be complete without considering DRR [derived relational responding] processes": the theory offers itself as a complement, not as a replacement.

The definition of Chapter 18 is kept (an attitude with three conditions: unfavorable direction, a group of the kind on the list in Chapter 1, and a group cue that occasions the evaluation). The theory's definition is different: it is responding to people on the basis of conceptualized groups with which the responder shares few characteristics, which the source sums up as "the prejudiced person is not a member of the conceptualized group" (Roche et al., 2001, p. 202); the definition, as stated, does not mention the unfavorable direction. From the theory, the book takes a hypothesis about the history of one of the conditions: when the group cue occasions an unfavorable evaluation without direct contact with the group, the theory proposes derivation as the process, because the group entered relations of coordination, hierarchy, and opposition with events that already had a function. It is a hypothesis about the history of the discriminated layer (Chapter 13) when the contact was verbal (the verbal layer, Chapter 14), described in other terms.

The analysis also contains a prediction about intervention: the theory suggests "that prejudice is a natural effect of human language, and that instructional approaches to reducing prejudice are unlikely to be successful" (Roche et al., 2001, p. 202), because the transformation of functions through frames "is a common verbal event." There are three reasons (p. 203): instructions "usually refer to group membership and thus increase group membership"; they may "strengthen stereotypes in the name of denouncing them"; and they may "increase the fearsomeness of groups," by adding negative functions to the presence of prejudiced thoughts. A reported study (Langer et al., 1985, as cited in Roche et al., 2001, p. 203) showed children a person in a wheelchair, seen through a one-way mirror. Those who received anti-prejudice instructions avoided going near the person "significantly more" than those who were allowed to say out loud what they had heard about people with disabilities, without its being either confirmed or disputed. As an alternative, the authors suggest that one "create contexts that reduce the psychological importance of categorization per se, or the likelihood of a

transformation of stimulus functions in terms of such categorization" (pp. 203–204), and they say that "more basic work needs to be done on how to loosen relational networks" (p. 204). Matsuda et al. (2020, pp. 340–341), reviewing laboratory studies, say that adding more relations to the network "does not modify the preestablished biases" and, instead, "makes them harder to extinguish." Perhaps, they say, an approach is needed "that decreases the impact of rules and the transformation of function across the relational networks," and they cite acceptance and commitment therapy (ACT), "rooted in RFT principles," which Chapters 25 and 35 discuss.

The source also reports "one study" on rhetoric "explicitly driven by RFT conceptions" (Roche et al., 2001, p. 206). Clayton (1995, as cited in Roche et al., 2001) found out which beliefs about the workplace were common among the staff of a human services organization, and the executive director gave a scripted speech in which the desired attributes were either simply asserted, or asserted and tied to undesirable attributes the staff already accepted as true. "Testing showed that worker attitudes changed much more when the positive attributes were linked to existing negative beliefs," as the theory predicted, "since it should be much easier to elaborate an existing verbal network than to establish a new network that may literally conflict with the existing one" (p. 206). The result comes in a single sentence, with no numbers and no description of the measure; Chapter 25 deals with attitude formation and change. Table 21.4 brings together what the analysis claims, the support the source itself presents, and what remains open.

Table 21.4

The theory's analysis of prejudice: what it claims, what support the source itself presents, and what remains open

Claim	Support presented in the source	What remains open
Prejudice is a derived transformation of functions, arising when the person comes into contact, directly or through words, with the functions of some individuals who belong to a conceptualized group (Roche et al., 2001, p. 202)	Illustrative examples (the neighborhood where the car was vandalized) and a reinterpretation of the minimal group study by Tajfel et al. (1971, as cited in Roche et al., 2001, p. 202); the chapter describes itself as an "orientation to action" (p. 197)	That this is the process in a particular person: reinterpreting existing data is not a test of the derivation
Instructions against prejudice tend to fail (pp. 202-203)	Three reasons argued with constructed examples and one study reported secondhand (Langer et al., 1985, as cited in Roche et al., 2001, p. 203)	It is a prediction of the interpretation; the study needs to be read in the original source, and the later literature consulted

Claim	Support presented in the source	What remains open
Reducing the importance of categorization, or "loosening networks," would be more effective (pp. 203-204)	Examples of intervention (mindfulness, repeating words until they lose their meaning, overlapping categories), with no data presented in this passage (p. 204)	"More basic work needs to be done" (p. 204)
Dixon and Lemke's (2007) data support the theory's analysis (p. 11)	Functions transferred in a study with evaluative stimuli and a prior history (Chapter 20)	The analysis is not, in the authors' words, "necessary or sufficient" to explain them (p. 11): the functions transferred "in the same ways reported throughout many other descriptions of stimulus equivalence"

Note. Table prepared for this book, based on Roche et al. (2001, pp. 197, 202–204, and 209) and Dixon and Lemke (2007, p. 11).

What the analysis does not settle comes down to four points. It is interpretation, not a finding: the chapter itself says that, "once again," its analyses "are largely interpretive," but that they "do demonstrate that RFT can make direct contact with concepts and phenomena" that have received little attention in the behavioral literature (Roche et al., 2001, p. 206). The laboratory data are compatible with more than one analysis (Dixon & Lemke, 2007, p. 11; Sidman, 1994, p. 561). The prediction about instructions is a prediction, supported by argued reasons and by one study reported secondhand. And the network is not something the person has: what is recorded is still the evaluative response, its occasion, and its consequences (Chapters 13 to 15 and 19).

The IRAP (*Implicit Relational Assessment Procedure*), discussed in Chapter 24, has "relational" in its name, and Matsuda et al. (2020, p. 339) say that the assessment "often uses a relational elaboration and coherence model to assess a brief, immediate relational response." And Mizael, Coelho et al. (2021) suggest, as research still to be done, studies with frames of opposition, comparison, and hierarchy in the analysis of racial prejudice, beyond coordination.

⚠ **CAUTION**

When citing the theory's analysis of prejudice, state the type of claim: interpretation ("the theory suggests," "the theory proposes"), prediction ("the theory predicts"), or data (what a study measured). The same care applies to this section: Figure 21.3 is a diagram, and none of its elements was measured.

TEST YOURSELF

Marta read that "a Kor stole a bicycle" and has never met another Kor. When she learns that her new coworker is a Kor, she avoids sitting near him. (a) Which relation would the theory invoke to explain the avoidance without direct contact? (b) What, in this account, is interpretation? (c) What data would be needed to support it?

ANSWER: (a) That "the coworker is a Kor" places him in the class "the Kor," and the unfavorable evaluative function attributed to the Kor in the news story is transformed, within the class, into a function of the cue "is a Kor" (coordination and hierarchy). (b) That the avoidance results from this derivation: the account gives only the news story and the avoidance. (c) That the avoidance varies with the group cue (the variation test, Section 18.2), that the news story was the origin of the function, and that the relation with the group was shown in tests, not merely assumed.

Common learner mistakes

1 **Taking the frame for a structure the person "has."** The mistake happens because the word "frame" suggests a structure, and the theory uses it as a metaphor. *How to spot the mistake:* you write "he has an opposition frame regarding X" or "her network is rigid." A frame is an action, and a network is the set of relations the person derives under certain cues; what is recorded are responses, cues, and history (Section 21.2).

2 **Saying that the theory "explains" attitude, or that attitude "is" a network.** The mistake happens because the theory is broad, and it is tempting to take it as an explanation of everything it touches. *How to spot the mistake:* you replace the rating, the classification, or the choice with "the network." The attitude, by the book's definition, is the evaluative response; the theory proposes a hypothesis about the history of one of its conditions (Section 21.6).

3 **Treating transformation as transfer.** The mistake happens because transfer, seen first in Chapter 20, becomes the model for every change of function. *How to spot the mistake:* you predict that the function "passes on unchanged" in a relation of opposition or comparison. Outside coordination, the change is in terms of the relation (Section 21.3).

4 **Always expecting a derived relation, or a derived relation "of the same type."** The mistake happens because, in coordination, the derived relation is always of the same type, and the rule seems general. *How to spot the mistake:* you write that "if A is different from B and B is different from C, then A is different from C," or that "the opposite of an opposite is an opposite." In distinction, nothing can be said, and the opposite of an opposite is the same (Section 21.2).

5 **Taking the theory's interpretation for a finding.** The mistake happens because the 2001 volume is the theory's reference work, and what it says seems to carry the weight of a result. *How to spot the mistake:* you write "the theory showed that prejudice is..." on the basis of the chapter on social processes. The chapter describes itself as an orientation to action, and the application as "somewhat speculative" (Section 21.6).

SUMMARY

Arbitrarily applicable relational responding (objective 1). Relating is responding to one event in terms of another. When the relation depends on the physical properties of the stimuli, it is nonarbitrary; when it is under the control of contextual cues and can be brought to bear on any stimuli, it is arbitrarily applicable. In the theory, it is a generalized operant, established through multiple exemplars, and the exact history is an empirical question, with no systematic analysis yet.

The relational frame and its properties (objective 2). The frame is a class of arbitrarily applicable relational responding that shows, under contextual control, mutual entailment, combinatorial entailment, and transformation of functions. It is an action, not a structure. In a small network, one derives the reverse relation (of another type, when that is the case), the combination (the opposite of an opposite is the same; different from different, nothing), and the function (in terms of the relation, not unchanged).

Families and cues (objective 3). Coordination, opposition, distinction, comparison, hierarchy, and, in less detail, temporal, spatial, causal, and deictic. They differ in what they allow to be derived. Contextual cues select the relation (Crel) and the function (Cfunc). The list is provisional, and the empirical base, uneven.

Equivalence and the theory (objective 4). The same performances receive two names. The theory adds other relations, a reverse relation that can be different, combinations of various types, and functions that

change in terms of the relation; and it claims that relating is a learned operant. Sidman (1994) sees equivalence as a built-in effect of reinforcement, coordination as an example of equivalence, and the frame as an empty label; both sides agree on the findings.

Attitudes and limits (objective 5). The analysis of prejudice proposes a derived transformation of functions based on direct or verbal contact with a few members of a group, and predicts that instructions against prejudice tend to fail. The source itself describes it as an orientation to action and a somewhat speculative application. The definition of Chapter 18 is kept, and from the theory the book takes a hypothesis about history, not the attitude.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. (Sentences constructed for the exercise.) Classify each relation as nonarbitrary or arbitrarily applicable: (a) choosing the heavier of two stones, after lifting them; (b) choosing, between two nonsense syllables, the one that "is larger" than the other, when only the word LARGER and training with "Correct!" indicate which; (c) saying that figure A1 is "the opposite" of A2, when the figures are identical and only training says so; (d) choosing the brighter of two lamps.

2. (Hypothetical case.) Renan taught, with consequences, that given ZUK and the word LARGER the correct choice is BEF (ZUK is larger than BEF), and that given BEF and the same word it is LOM (BEF is larger than LOM). On tests without consequences, the person (a) chooses ZUK given BEF with the word SMALLER; (b) chooses ZUK given LOM with the word SMALLER. Which property of the frame does each test show?

3. (Hypothetical case.) ZUK is the opposite of BEF, and BEF is the opposite of LOM. What relation does the theory derive between ZUK and LOM?

   a. Opposite of.
   b. Same as.
   c. Different from.
   d. No relation can be derived.

4. (Hypothetical case.) ZUK is different from BEF, and BEF is different from LOM. (a) What relation does the theory derive between ZUK and LOM? (b) Why is the answer to (a) not "different from"?

5. (Sentences constructed for the exercise.) Classify each sentence into a family of frames (coordination, opposition, distinction, comparison, hierarchy, temporal): (a) “the lightning came before the thunder”; (b) “this coffee is worse than that one”; (c) “the cat is a mammal”; (d) “ice is the opposite of fire”; (e) “this is called a chair”; (f) “this soup is not cold.”

6. (Hypothetical case; prediction, not data.) In a task like Lia’s, BEF receives a rating of 2 after being paired with unpleasant photographs. ZUK was taught as “the opposite of” BEF, and LOM as “the same as” BEF. (a) What direction does the theory predict for the ratings of ZUK and LOM? (b) What would equivalence alone predict for ZUK?

7. (Hypothetical case.) Two fictitious studies. In the first, the reinforcing function established in A1 passes to B1 and C1, which were related to A1 through matching-to-sample with consequences, in a coordination class. In the second, B1 was taught as “the opposite of” A1, A1 receives a punishing function, and B1 comes to have a reinforcing function, without direct training. Which is transfer and which is transformation? Justify in two sentences.

8. Match each paraphrase to Sidman (1994) or to Relational Frame Theory: (a) “relating is a generalized operant, established through multiple exemplars”; (b) “coordination is just one example of equivalence”; (c) “the three qualities define the frame; they do not explain it”; (d) “an empty frame with a label does not explain the properties of each relation.” Then say in one sentence what both sides accept.

9. (Hypothetical case.) Marta read that “a Kor stole a bicycle” and has never met another Kor. When she learns that her new coworker is a Kor, she avoids sitting near him. (a) Which relations would the theory invoke? (b) Which part of the account is data and which part is interpretation? (c) What data would be missing to support the interpretation?

10. A classmate writes: “Relational Frame Theory proved that prejudice is a relational network that does not go away with information.” Point out three problems with the sentence.

1. (a) Nonarbitrary: weight is a physical property, and the person perceives it when lifting. (b) Arbitrarily applicable: nothing about the syllables says which one is "larger"; the cue is the word and the history. (c) Arbitrarily applicable: the figures are identical, and only the cue and training make one the "opposite" of the other. (d) Nonarbitrary: brightness is a physical property.

2. (a) Mutual entailment: the reverse relation (BEF–ZUK), with "smaller than" in place of "larger than." (b) Combinatorial entailment: ZUK and LOM were never related directly, and the relation is derived from the combination of ZUK–BEF and BEF–LOM and, in the reverse direction, is "smaller than."

3. b. The opposite of an opposite is the same. Option **a** is common mistake 4; option **c** confuses it with distinction; option **d** holds for "different from different," not for opposition.

4. (a) None: the relation remains undetermined, and knowing that it cannot be said is part of the derivation. (b) Because combining "different from" with "different from" does not define the relation between the ends: LOM may be the same as ZUK or different from it.

5. (a) Temporal. (b) Comparison. (c) Hierarchy. (d) Opposition. (e) Coordination (naming). (f) Distinction: it says what the soup is not, without saying what it is.

6. (a) ZUK, a high rating; LOM, a low rating. ZUK is the opposite of BEF, so the theory predicts for it the direction opposite to BEF's; LOM is the same as BEF, so it predicts the same direction, the low one. The exact value is not predicted. (b) If everything were coordination, ZUK would have a low rating, like BEF and LOM: this is the case of the transfer of Chapter 20.

7. The first is transfer: the relation is coordination, and the derived function is similar to the established one. The second is transformation: the relation is opposition, and the derived function (reinforcing) is a different one, in terms of the relation, not the same as the punisher's. In cases of coordination the terms can be used interchangeably (Hayes, Fox et al., 2001, p. 32).

8. (a) The theory (Hayes, Barnes-Holmes & Roche, 2001, p. 141). (b) Sidman (1994, p. 559). (c) The theory (Hayes, Fox et al., 2001, pp. 33–34). (d) Sidman (1994, p. 561). They share the procedures and the empirical findings, which Sidman (1994, p. 561) says are "robust and procedurally interrelated."

9. (a) That "the new coworker" enters the class "the Kor" through a membership relation (hierarchy or coordination), and that the evaluative function established for the Kor in the news story is transformed, within the class, into a function of the cue "is a Kor." (b) The news story read and the avoidance are data; the derivation is interpretation. (c) That the avoidance varies with the group cue and with the news story (the variation test, Section 18.2), and that the coworker's relation to the class and the function of the Kor in the news story were shown, not merely assumed.

10. For example: (1) "proved": the source describes the analysis as an orientation to action and a somewhat speculative application (Roche et al., 2001, pp. 197 and 209), and the laboratory data are compatible with more than one ana-

lysis (Dixon & Lemke, 2007, p. 11); (2) "is a network": the network is what the person derives under certain cues, and the attitude, by the book's definition, is the evaluative response; (3) "does not go away with information" is a prediction of the interpretation, supported in the source by three argued reasons and one study reported secondhand, and the laboratory studies of Chapter 20 show changes in evaluation in some participants, through training with consequences and not through information.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 22. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1	21.1
2	21.2 and common mistake 4
3	21.2 and common mistake 4
4	21.2 and 21.4
5	21.4
6	21.3 and common mistake 3
7	21.3 and common mistake 3
8	21.5
9	21.6 and common mistake 2
10	21.6 and common mistakes 2 and 5

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CHAPTER

22 The Measurement of Attitudes

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** a measure as the number assigned to an aspect of an occurrence, by a rule set before recording, and **separate** recording from interpretation.
2. **Apply** the six measurable properties (frequency, rate, duration, latency, magnitude, and topography) to an evaluation and **state** what each one records and what, on its own, it leaves unsaid.
3. **Calculate** rate and proportion of occasions from a record with denominators and **state** which question each one answers.
4. **Explain** why "intensity" and "persistence" are not a single measure and **specify** which measure is being used.
5. **Choose** the measure suited to a research question and **point out** what the choice leaves out.
6. **Recognize** what makes an attitude measure fragile: it is a response given to someone, in a situation, recorded by observers who may disagree.

PREREQUISITES

Valence and intensity (Section 4.3), topography and numbers as topography (Sections 6.1 and 6.5), the observation sheet (Table 8.2), occasion and recurrence (Section 9.6), the measurable aspect of the natural phenomenon (Section 10.3), resistance to extinction (Section 12.5), the gradient (Section 13.3), the answer to a questionnaire as a verbal response given to someone (Section 14.5), the elicited reaction recorded separately (Section 17.4), and report, observation, and the sheet with denominators (Sections 19.2 and 19.3). The new terms (measure, recording unit, frequency, rate, proportion of occasions, duration, latency, magnitude, persistence, consistency, interobserver agreement, and social desirability) are defined here.

OPENING

(Hypothetical case.) Beatriz coordinates the internship at a training clinic. This semester, supervision became group supervision, and the administration asked her, for the report, for one sentence on how the interns evaluate it. The sentence Beatriz has in mind is "favorable, strong, and stable." She sat in on four weekly meetings of an hour and a half each and wrote down what was said. She counted: Karina and Hugo made twelve evaluations of the supervision each, and Olívia, four. Karina talks about the subject at almost every meeting; Hugo is slow to answer and, when he does answer, talks for a long time; Olívia hardly ever brings it up, but is quick when she does. Beatriz realizes that she does not know what "strong" and "stable" would be in numbers, and that the same notes support different sentences. Four questions organize the chapter.

1. *"Karina and Hugo made twelve evaluations each. Do they evaluate in the same way?"*
2. *"Hugo is slow to answer and talks for a long time. What does that say about his evaluation?"*
3. *"What is a 'strong' evaluation, in numbers? And a 'stable' one?"*
4. *"If Beatriz asks out loud, with the director in the room, is the answer worth the same?"*

The first calls for frequency, rate, and proportion of occasions (Section 22.2); the second, for duration and latency (22.3); the third, for magnitude, topography (22.4), and the measures of "strength" and persistence (22.5); the fourth, for the limits of every measure (22.7). Section 22.6 uses all of this to choose the measure starting from the question.

22.1 What is measured when an attitude is measured

The word "measure" is misleading when we talk about attitudes, because it suggests a quantity stored inside the person and an instrument that reads it. Chapter 10 made a different decision: to measure is to assign a number to *an aspect of the event*, not to something stored in the person who evaluates. What happens, and can therefore be counted or timed, are occurrences: at a meeting, Karina says, "there's no time to discuss my case."

KEY CONCEPT

A **measure** is the number assigned to an aspect of an occurrence, or of a set of occurrences, by a rule set before recording. To measure an attitude is to record occurrences of evaluation, not to read the inner life of the person who evaluates.

Before counting, we must say what counts as an occurrence. Catania (1999, p. 420) defines response as a "unit of behavior; a discrete and usually recurring segment of behavior." The **recording unit** is the response as the researcher defines it for counting: the rule that separates one evaluation from another and leaves out whatever is not evaluation.

EXAMPLE

Beatriz's rule: "An evaluation is recorded each time the intern judges the group supervision, or a part of it, as good or bad, useful or useless, for or against. 'Supervision is on Wednesdays' is a fact, and does not count (Chapter 3). 'It helps, but it slows us down' counts as two: one favorable and one unfavorable."

NON-EXAMPLE

"I counted how many comments about the supervision each one made." Without a rule, the number lumps together description, question, and evaluation, and two observers would count different things. The count exists; the measure does not.

Recording has the discipline of the observation sheet in Chapter 8 (Table 8.2), which notes the object, the form, where, with whom, what came before, and what was at stake: it is what a second observer, using the same rule, would write down in the same way. Interpretation is whatever is added about the person. "At 10:20, after Hugo presented his case, Karina said: 'there's no time to discuss my case'" is a record. "Karina was resentful" is an interpretation, and it may come back, as a hypothesis, in a separate column (Section 19.3).

TEST YOURSELF

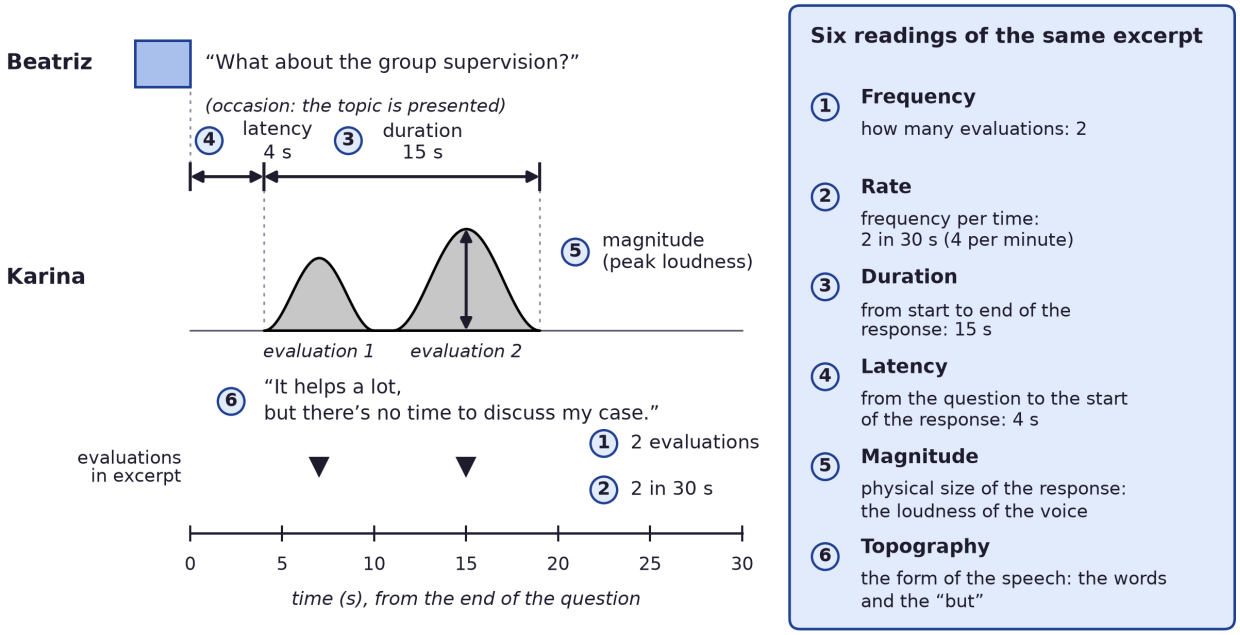
Classify as record or interpretation: (a) "Hugo was uncomfortable with the question." (b) "Hugo waited nine seconds before starting to answer."

ANSWER: (a) interpretation: it names a state that no one checked. (b) Record: another observer, with a stopwatch, would arrive at the same number.

An occurrence of evaluation, as Beatriz records it, has six aspects that can be read. Figure 22.1 shows a thirty-second excerpt from a meeting: Beatriz's question, Karina's answer, and the point at which each property is read. The following sections define them one by one.

Figure 22.1

An occurrence of evaluation and the six properties read from it



Note. Diagram prepared for this book, with illustrative values from a hypothetical case. The gray outline represents the loudness of the speech and was drawn without measurement.

22.2 How many times: frequency, rate, and proportion of occasions

The first property is the simplest. **Frequency** is the number of occurrences in the recorded period. In four meetings, Karina made twelve evaluations of the supervision. The number is true and, on its own, of little use: it cannot be compared with a longer or shorter period, or with someone to whom the subject was presented fewer times. Catania (1999, p. 423) notes, regarding reinforcers, that "frequency" sometimes refers "not to reinforcers per unit of time but to reinforcers per response, per session, or per trial." The word is ambiguous, and that is why the count over time gets another name.

The first correction is time. **Rate** is frequency per unit of time; Catania (1999, p. 423) defines it as "responses per unit of time" and distinguishes the overall or average rate, "determined over a substantial peri-

od of time," from the local rate, "determined over a short period of time." Karina made twelve evaluations in six hours of meetings: an average rate of 2.0 per hour. In the excerpt in Figure 22.1, two evaluations in half a minute: a local rate of 4 per minute. Both values are true, and that is why the period goes along with the number.

The second correction is opportunity. An evaluation occurs only when something occasions it (Chapter 13), and the sheet in Section 19.3 already asked that the occasions on which it could have occurred and did not be recorded as well. The **proportion of occasions** is the number of occurrences divided by the number of occasions on which it could have occurred. Catania (1999, p. 415) calls this probability and gives the calculation: "if a response occurs on 40 of 50 occasions during which it is sampled, its probability is 0.8 (40/50)." Here, the occasion is each time the topic was presented to the person, by a question from Beatriz or by a colleague's mention of it.

The recurrence of Chapter 9, the repetition of the same evaluation on different occasions, is thus measured in two ways, and each answers a question. Rate answers "how much does the subject come up in this person's speech, over time"; the proportion of occasions answers "how much does she evaluate when the subject is put to her." Table 22.1 and Figure 22.2 present the same record of three interns, read in both ways.

Table 22.1

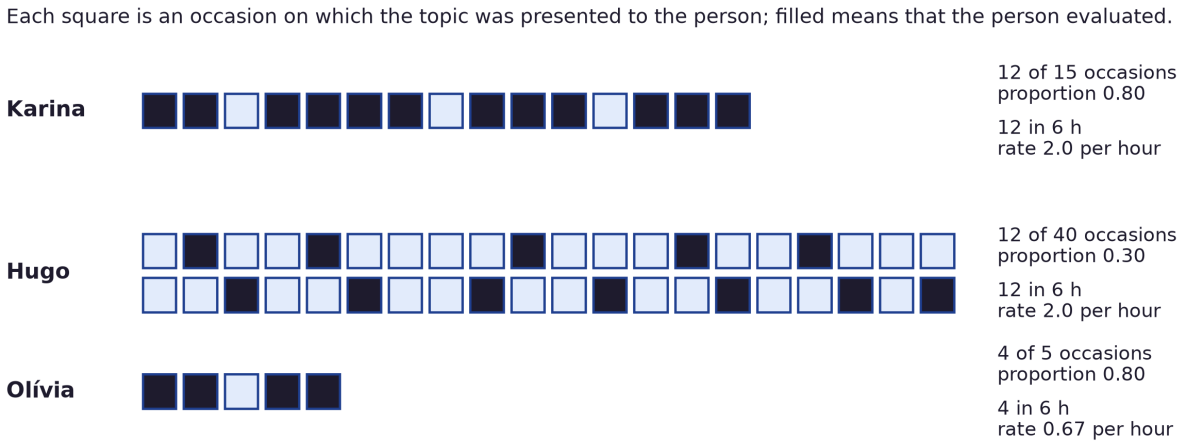
The same record of three interns, read by rate and by proportion of occasions

Intern	Evaluations	Meeting hours	Rate (per hour)	Occasions	Proportion of occasions
Karina	12	6	2.0	15	0.80
Hugo	12	6	2.0	40	0.30
Olívia	4	6	0.67	5	0.80

Note. Fictitious data, for illustration. Rate: evaluations ÷ meeting hours. Proportion of occasions: evaluations ÷ occasions on which the topic was presented to the person.

Figure 22.2

The same number of evaluations, with different denominators



Note. Diagram prepared for this book, with the fictitious data from Table 22.1.

Karina and Hugo have the same rate and very different proportions: the subject was put to Hugo forty times, and he evaluated it three times out of ten; to Karina, fifteen times, and she evaluated it eight times out of ten. Karina and Olívia have the same proportion and different rates: Olívia evaluates almost every time the subject is put to her, but it was put to her only a few times. There is no "right" reading; there is the one that answers the researcher's question. The direction of what was said is another question, and it is answered with the same calculation: nine of Karina's twelve evaluations were favorable (0.75), six of Hugo's (0.50), and all four of Olívia's (1.00). Catania (1999, p. 423) calls relative rate the "rate of an event (especially a response or a reinforcer) as a proportion of the sum of the rates of this and other events."

KEY CONCEPT

Frequency is the number of occurrences in the period; **rate** is frequency per unit of time; **proportion of occasions** is frequency divided by the number of occasions on which the occurrence was possible. Each answers a different question, and none of them spares you from stating the period and the occasion rule.

⚠ CAUTION

The occasion rule is set before recording and applies in the same way to everyone. If the denominator is counted afterward, knowing who evaluated and who did not, the number already carries the conclusion one wanted to test.

⊘ NON-EXAMPLE

One post got 40 likes and another, 12. The count does not say which is better evaluated: we would need to know how many people each one was shown to, which is the denominator. Likes are numerical topographies (Section 6.5); any calculation based on them needs the occasions.

✓ TEST YOURSELF

In three hours of meetings, an intern evaluated the topic nine times, and the topic was presented to him twelve times. What is the rate and what is the proportion of occasions?

ANSWER: a rate of 3 evaluations per hour (9 ÷ 3); a proportion of occasions of 0.75 (9 ÷ 12).

22.3 How long and how fast: duration and latency

Two properties concern the timing of an occurrence. **Duration** is the time from the beginning to the end of a response; Catania (1999, p. 397) defines it as "the time from the beginning to the end of a response." **Latency** is the time between an event and the response; for Catania (1999, p. 409), it is the "time from an event, usually the onset of a stimulus, to a response." In Figure 22.1, Beatriz asks "What about the group supervision?", and Karina starts answering 4 s later (latency) and speaks for 15 s (duration).

Each calls for its own precautions. Duration depends on a rule for the start and for the end: do we count from the first word of judgment until the subject changes, or until a colleague takes the floor? Catania (1999, p. 397) warns that analyses of duration "depend heavily on procedural details." Latency requires an event that marks zero: without a question or some other defined stimulus, there is nowhere to count from. This restricts latency to the occasions that have such an event: the direct question, yes; the evaluation that comes up in the middle of the conversation, no.

At the meeting on the 12th, Beatriz asked each of them: "What about the group supervision?" Karina started answering 4 s later and spoke for 15 s; Hugo, 9 s later, and spoke for 41 s; Olívia, 2 s later, and spoke for 6 s.

What do these numbers allow us to say? That, faced with that question, Olívia answered quickly and briefly, and Hugo slowly and at length. The temptation is to read more into them: "Hugo hesitates because he is conflicted," "Olívia answers right away because her evaluation is automatic." These are hypotheses about why the interval was what it was, and the interval alone does not decide among them: it also depends on the length of the question, on who asks, on what the person was doing a moment before, and on what has already been said at the meeting. Social psychology proposed using latencies to obtain attitude measures "free of reactive effects," above all for socially sensitive topics (Ajzen, 2001, p. 33). Bohner and Dickel (2011, p. 396), in turn, report that other researchers have argued that no measurement paradigm is "process-pure," so the kind of measure does not map one-to-one onto the kind of representation or process it assesses. Chapter 24 returns to latencies: in the IRAP, latency is the number of milliseconds from the start of the trial to the choice of a response (Matsuda et al., 2020, p. 339).

KEY CONCEPT

Duration is the time from the beginning to the end of an occurrence, and **latency** is the time between a defined stimulus and the beginning of the response. Both record an interval. Why the interval was short or long is a question answered by comparing conditions, changing one at a time (Section 18.2).

NON-EXAMPLE

"Hugo took 9 s because he has doubts about the supervision." The record is "9 s after Beatriz's question, in front of the group." The doubts are a hypothesis, and they can go in the separate column.

TEST YOURSELF

Beatriz finishes the question at 10:02:00. Olívia starts answering at 10:02:02 and finishes at 10:02:08. What is the latency and what is the duration?

ANSWER: a latency of 2 s (from 10:02:00 to 10:02:02) and a duration of 6 s (from 10:02:02 to 10:02:08).

22.4 With what force and in what way: magnitude and topography

Magnitude is the size or physical force of the response: the loudness of the voice, the amplitude of a gesture, the pressure on a key. Catania (1999, p. 63) introduces it when dealing with elicited responses: after the latency, "the response must occur with some magnitude and have some duration." In speech, loudness is measured in decibels, with the meter always in the same place; in the body, one of the most frequently recorded reactions is skin conductance, the change in how well the skin conducts electricity as it sweats, which Chapter 20 showed to transfer among members of an equivalence class, and Dougher et al. (1994, p. 332) describe it as a "widely used" measure of respondent conditioning, recording both the level and the response.

Magnitude is not how much the person values the object. How much she values it shows up, in the record, in the words she chooses: "I liked it" and "I loved it" have the same direction and different degrees (Section 4.3). That is topography, the form of the response. Someone may say "I love it" in a low voice and "I like it" at the top of their lungs; loudness and words are two readings of the same occurrence, and they may not agree.

NON-EXAMPLE

"She spoke loudly, so the evaluation is intense." Loudness is the magnitude of the response. The degree of the evaluation is something else, read in the words or on a scale, and the relation between the two readings is an empirical question.

Topography, defined in Chapter 6, is the form of the response; Catania (1999, p. 424) describes it as the "spatial configuration or form of responding" and notes that topographies "are more often described verbally than quantitatively." To become a measure, the description must be coded: categories are defined in advance (for example, favorable without reservation, favorable with reservation, unfavorable with reservation, and unfavorable without reservation), each occurrence is classified, and the categories are counted. The markers of authorship and firmness in Chapter 7 ("I think that," "I'm sure that") are good candidates for categories. A rating from 1 to 7 performs the same operation

on the respondent's side: the person chooses one of several ordered alternatives, and the researcher assigns the number (Section 6.5 and Chapter 23).

The elicited reaction, which Chapter 17 separated from evaluation, has its own magnitude and latency and is recorded separately. That it indicates the intensity of the evaluation (Section 4.3) is a hypothesis, and it is tested by recording both on the same occasions and seeing whether they vary together. If they do, that is a finding; if not, they are measures of different things, and one is not to be taken for the other.

TEST YOURSELF

A colleague records the loudness of each intern's voice when talking about the supervision and concludes: "Hugo evaluates more intensely because he speaks more loudly." What does the record allow, and what does it not allow?

ANSWER: it allows us to say that Hugo spoke more loudly (magnitude). It does not allow a conclusion about the degree of the evaluation: that requires recording the words (topography) or applying a scale, and the two readings may diverge.

Table 22.2 brings together the six properties, with what each one records and what, on its own, it leaves unsaid.

Table 22.2
The measurable properties of an evaluation and what each one leaves unsaid

Property	What it records	Example in the group supervision	What it does not say on its own
Frequency	how many occurrences in the period	12 evaluations in four meetings	over how much time, or in how many chances
Rate	occurrences per unit of time	2.0 evaluations per hour	how many times the subject was raised
Proportion of occasions	occurrences per occasion on which they could occur	12 of 15 occasions: 0.80	how much the subject comes up, over time
Duration	time from the beginning to the end of an occurrence	15 s in the answer to the question	why it lasted that long; it depends on the start and end rule
Latency	time between a defined stimulus and the beginning of the response	4 s after the question	why it was short or long; it exists only where there is a defined stimulus
Magnitude	size or physical force of the response	the loudness of the voice, at its peak	the degree the person assigns to the object

Property	What it records	Example in the group supervision	What it does not say on its own
Topography	the form of the response, coded into categories	"it helps a lot, but there's no time"	how many times, or with what force

Note. Table prepared for this book, based on the definitions in Catania (1999, pp. 397, 409, 415, 423, and 424). The application to Beatriz's supervision is a hypothetical case.

22.5 "Strong" and "stable": what the words hide

Beatriz wants to write that the evaluation is "strong" and "stable." Each word sums up several possible measures.

Strong. Chapter 4 listed ways in which intensity shows up: words that grade, superlatives, repetition, tone of voice, and what the person does (how much time, effort, or money she devotes to the object). Each of these is a property from this chapter. Words and superlatives are topography; repetition is frequency or rate; tone of voice is magnitude; time devoted is duration; effort is magnitude or rate of work; money is a choice, which can be counted; speed is latency. That these readings vary together is an assumption. In behavior analysis, "strength" has a technical meaning of its own: Catania (1999, p. 405) defines it as "the resistance of behavior to change." The term has also been used "in place of specific measures," "on the assumption that the different measures vary together and reflect an underlying disposition to respond." With operants, however, "rate, latency, force, and duration" have been used as indices of strength, and each of them "is independently modifiable by differential reinforcement" (p. 405).

Social psychology has the same history with "attitude strength." Ajzen (2001, p. 39) lists its operationalizations: importance, extremity, stability over time, certainty, vested interest, involvement, affective-cognitive consistency, knowledge, how often one thinks about the issue, and the latency of conscious, deliberate answers to questions about the attitude. And he concludes that research "continues to reveal only weak relations among these dimensions" and that different measures "tend to produce conflicting research findings." Table 22.3 translates the list into the chapter's terms.

Table 22.3

What the literature calls attitude "strength" and what each measure records

What the literature calls it	What is recorded	Property, in the chapter's terms
Importance, certainty, and knowledge	the person's answer, usually a rating, when she is asked about her own evaluation	report: a numerical topography given to someone, with an audience (Section 22.7)
Frequency of thinking about the issue	the person's answer when she is asked how often she thinks about it	report of a private event (Section 14.5)
Extremity	how far the answer is from the neutral point of the scale	numerical topography: the degree assigned (Chapter 23)
Stability over time	the same evaluation, requested on two or more separate occasions	comparison between records from separate occasions (defined later in this section)
Latency	the time taken to answer the question about the evaluation	latency

Note. First column: Ajzen (2001, p. 39). The second and third are this book's reading, supported by the studies Ajzen reports on p. 38, in which the person judged her own certainty, importance, strength, knowledge, and frequency of thinking. Vested interest, involvement, and affective-cognitive consistency, the fifth, sixth, and seventh items on the list, are not detailed in the passage cited and are left out of the table.

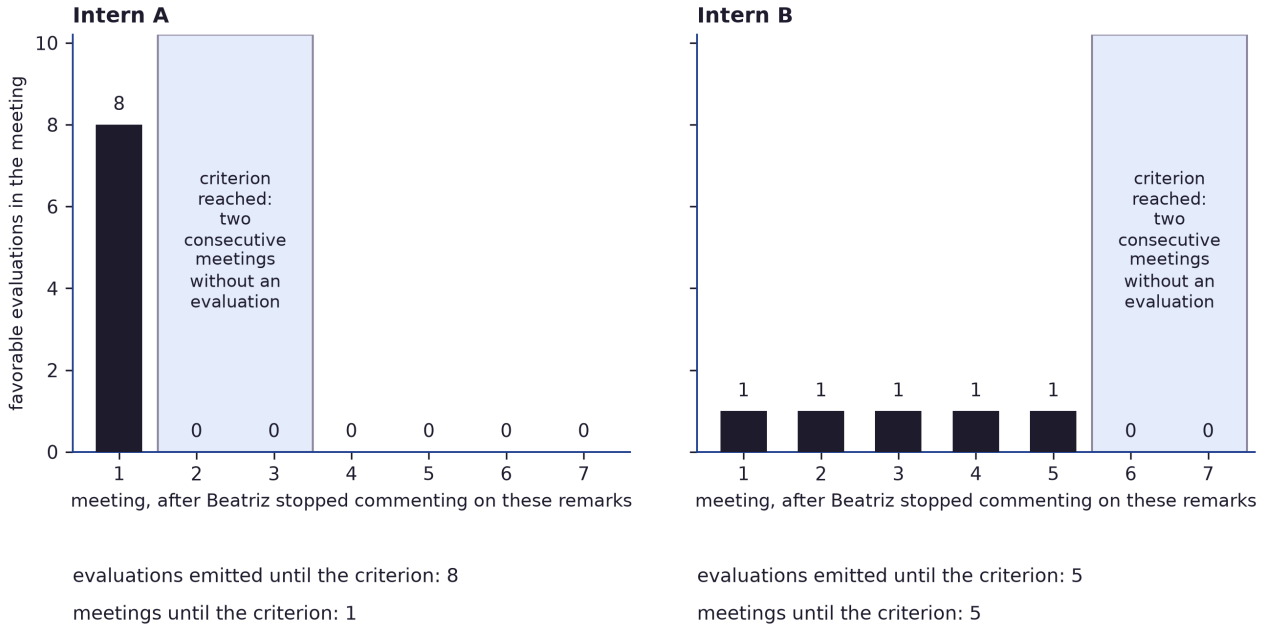
One finding in this literature helps clarify the difference. Bassili (1996, as cited in Ajzen, 2001, p. 38) separated "meta-attitudinal" measures, which are subjective (the person judges the certainty, importance, and strength of her own attitude), from "operative" measures, which are comparatively more objective (extremity, ambivalence, and latency). Resistance to change, assessed through the reaction to a counterargument and, in the second study, also through stability over two weeks, was affected only by the operative measures. And Haddock et al. (1996, as cited in Ajzen, 2001, p. 38) showed that the rating people give their own attitude follows what has just happened. After listing three or seven arguments for or against their own position, students rated importance, intensity, and certainty as higher when coming up with arguments in favor had been easy (three) and coming up with arguments against had been hard (seven). This did not happen when strength was measured by frequency of thinking about the issue or by knowledge. In this book's terms, the rating a person gives to her own "strength" is another response, given after a task, and it varies with that task.

Stable. "Stable" and "persistent" bring together another family of measures. **Persistence** is the extent to which the evaluation goes on occurring after some time has passed or after the situation that maintained it

has changed. Catania (1999, p. 420) deals with the case in which what changes is that reinforcement ends. He defines resistance to extinction by the "responses emitted, time elapsed, or number of trials until performance reaches some extinction criterion" and adds: "The measure must be specified, because one contingency or schedule may produce greater resistance to extinction than another according to one measure but less resistance according to another measure." Figure 22.3 shows what this means in a hypothetical case. After Beatriz stopped commenting on remarks favorable to the supervision, two interns went on making them for a while. The criterion for declaring persistence over was the same for both, two consecutive meetings with none, of the same kind as Catania's example: "before 10 min pass without responses."

Figure 22.3

Two measures of persistence, two results



Note. Fictitious data, constructed to show that the two measures can disagree. Criterion: two consecutive meetings without a favorable evaluation. "Meetings until the criterion" counts the meetings before the two that meet it.

By the count of evaluations emitted until the criterion, A persisted more (8 versus 5). By the number of meetings until the criterion, B did (5 versus 1). Neither is wrong, and saying "A is more persistent" without stating the measure says little. Scott (1957, p. 74) recorded opinions no more than five minutes after the result of the debate was announced and wrote that "the degree to which the new opinions persisted was not assessed in this study": in that study, there was no measure of persistence. Insko (1965, p. 622) measured the attitude again about a week

after the telephone interview, with a questionnaire filled out in class: a different time frame, a different situation, and a different instrument. Each of these choices is part of the measure.

Consistency, the extent to which the same evaluation occurs in similar situations (Section 15.5), calls for the same care. This is consistency across situations, a property of the attitude, and not the internal consistency of an instrument, which says how much the scales vary together (Table 23.1, Section 29.5). The evaluation is recorded in more than one situation (Chapter 13), and we state in how many it occurred and in how many it did not; a single situation cannot distinguish a flat gradient, in which the evaluation occurs equally in all situations, from a steep one, in which it drops as the situation moves away from the one in which it had consequences (Section 13.3). The same logic answers the question raised in Chapter 16. To find out whether values change less than specific attitudes, we record, with the same rule and at the same meetings, the evaluation of the value (“sustainability”) and that of a specific attitude (“solar energy is worth the investment”) and compare how many times each one changed from one record to the next. It is a way of measuring, and the question remains empirical.

KEY CONCEPT

“Strong” and “stable” are not measures: they are words that cover several. State which measure, with what criterion, and over what period: “a rate of 2.0 favorable evaluations per hour, over six hours,” “eight evaluations until two consecutive meetings with none,” “evaluation present in four of the five situations.”

NON-EXAMPLE

“Karina’s evaluation is strong because she talks about it all the time.” Karina’s rate is the same as Hugo’s, and their proportions of occasions are very different (Table 22.1). Rate says how much the subject comes up in speech, not that one evaluation is stronger than another.

TEST YOURSELF

After Beatriz stops commenting on favorable remarks, intern X makes 6 evaluations in the first meeting and none in the next two; intern Y makes one per meeting for four meetings and then none, for two consecutive meetings. Who persisted more?

ANSWER: it depends on the measure. By evaluations emitted until the criterion (two consecutive meetings with none), X (6 versus 4). By meetings until the criterion, Y (4 versus 1).

22.6 From the question to the measure

The most common mistake among beginners is to choose the instrument before the question. The right order is the question, the property, the recording rule, and only then the instrument. Table 22.4 relates frequent questions to the properties.

Table 22.4
From the question to the measure: what to choose and what the choice leaves out

The question	The property	How it is recorded	What the choice leaves out
Does the subject come up in the person's speech, over time?	rate	count per meeting hour, with the period stated	on how many of the chances she evaluated
When the subject is put to her, does the person evaluate it?	proportion of occasions	occurrences ÷ occasions, with the occasion rule set beforehand	how much the subject comes up on its own; the direction
On which side?	proportion of favorable evaluations (relative rate)	favorable ÷ all evaluations	the degree
Does she answer quickly when asked?	latency	seconds between a defined stimulus and the beginning	spontaneous evaluation; the why
Does she talk a lot about it, each time?	duration	from beginning to end, with a rule for both	what she said; it depends on the rule
With what force?	magnitude	loudness in decibels; skin conductance for the reaction	the degree assigned; the reaction is another response
In what way is it expressed?	topography	categories defined beforehand; or a rating on a scale (Chapter 23)	nuance, in the categories; the audience, in the rating

The question	The property	How it is recorded	What the choice leaves out
Does it hold up when something changes?	persistence	criterion and measure specified (responses, time, or occasions)	that another measure would give another result
Does it hold in other situations?	proportion of situations	the same rule in more than one situation	why it differs; it holds only for the situations recorded

Note. Table prepared for this book. The properties are those of Table 22.2; persistence is that of Section 22.5.

Only then comes the instrument, and there are three ways to obtain these records. The first is to observe what happens, as with the sheet in Section 19.3, which is the subject of this chapter. The second is to ask the person to respond to an instrument, such as a scale (Chapter 23). The third is to record performance on a task that does not ask her to report what she evaluates (Chapter 24). The six properties appear in all three: the rating on the scale is a numerical topography, and the response time on the task is a latency. What changes from one way to another is the situation in which the response is produced and what is asked of the person.

⚠ CAUTION

"Indirect" has two meanings in the literature. In the applied field, an indirect method is one that relies only on verbal report (structured interviews and checklists, some in scale form), as opposed to direct observation of behavior (Iwata & Worsdell, 2005, p. 27). In the social psychology of attitudes, an indirect measure, also called implicit, is one that derives the attitude from evaluative reactions that occur spontaneously when the object is presented, as opposed to the self-report scale, called explicit (Albarracín & Shavitt, 2018, p. 300). The same scale is "indirect" in one literature and "explicit" in the other. Here we avoid both labels and say what is asked of the person: to report or to perform a task.

EXAMPLE

Beatriz's paragraph, rewritten with the measures: "In four group supervision meetings (6 h), the three interns observed made 28 evaluations of it: 19 favorable and 9 unfavorable (proportion favorable of 0.68). The rate per intern ranged from 0.67 to 2.0 evaluations per hour, and the proportion of occasions from 0.30 to 0.80. In response to the direct question, latency ranged from 2 to 9 s. Persistence and evaluation outside the meetings were not measured."

The paragraph says less than "favorable, strong, and stable," and it is what the record supports.

TEST YOURSELF

Beatriz wants to know (a) whether, when asked, the intern answers quickly and (b) whether he talks about the subject without anyone asking. Which property serves each?

ANSWER: (a) latency, measured between the question and the beginning of the answer. (b) Rate, or proportion of occasions, of spontaneous speech: only what occurs without a direct question counts, and what would count as the occasion must be defined beforehand.

22.7 What a measure is not

A measure is an occurrence with a number. Three precautions follow from this.

The response is given to someone. If evaluation is verbal behavior (Chapter 14), the answer to Beatriz's question is another occurrence, with an audience. Guerin (1994, p. 157) writes that attitude scales and survey questions "will be a function of the particular person asking the question or of the whole verbal culture in which the survey is conducted." Faced with a 7-point scale, people often say or write "Well it depends on what this is for," and for Guerin this "problem" of measurement is "a fundamental property": social contingencies are what control attitudinal tacts.

Cameoka and Moreira (2021, p. 107), following Mizael and de Almeida, point out that "being prejudiced" usually has disapproval as its consequence. A person may therefore behave in a prejudiced way only in the presence of people and situations that, in her history, produced reinforcing consequences for such behavior, and this discriminative control "has been widely studied in social psychology under the label of social desirability." Bohner and Dickel (2011, p. 394) make the same point from the instrument's side. The logic of self-report scales assumes that people are willing and able to give an accurate account of their own attitudes, but that does not always hold: the person may have no introspective access to them, or may try to conceal them in order to look good.

KEY CONCEPT

Social desirability is the name social psychology gives to the discriminative control the audience exerts over what the person answers: she says what, in that situation, is not disapproved of. It is a property of the response, not a defect of the respondent.

In practice, along with the measure, we record who asked, where, with whom present, and in what words (Table 8.2) and, whenever the question allows, with more than one audience. The difference between audiences is data; it is not "lying" (Section 6.7).

The instrument is part of the situation. Cameoka and Moreira (2021) asked participants to rate photographs of White and Black men on a 10-point Likert-type scale, from "bad" to "good" (p. 97). In Study 1 (75 participants; p. 98), the faces had a neutral expression; in Study 2 (40 participants; p. 102), they were slightly smiling. The mean rating rose from the first study to the second, both for the faces of Black men (from 6.15 to 7.30) and for those of White men (from 5.45 to 6.87; Table 4 of the article, p. 106). The authors suggest that the slight smile exerted control, "raising the evaluation of all human stimuli," but caution that the photographs were of different people in the two studies, so that "it was not possible to isolate the attributes that controlled the variation" (p. 107). What is on the screen is part of what is measured, and Chapter 32 deals with the choice of stimuli. The authors further note that the attitudes one seeks to measure had their functions shaped by the verbal community and that, "if this is so, the very degree of validity of these measures is called into question if the context in which they occur is not taken into account" (p. 107).

Who records also varies. Two observers, working separately and with the same rule, should arrive at similar records; if they do not, what was measured was each one's reading. **Interobserver agreement** is the extent to which the records of two observers coincide. Iwata et al. (1982/1994, p. 200) had two observers independently record 35% of the sessions. They calculated interval-by-interval agreement "by dividing the number of agreements by the number of agreements plus disagreements" and multiplying by 100, in three versions: overall, occurrence, and nonoccurrence (means of 96.8%, 82.8%, and 91.7%). In this book, occurrence agreement considers only the intervals in which at least one observer recorded the evaluation, and nonoccurrence agreement only those in which at least one recorded that there was none.

An example shows why all three matter. Beatriz and Júlio recorded, each on their own, over ten one-minute intervals, whether Karina evaluated the supervision. Both recorded an evaluation in 3 intervals and both recorded none in 5; in 2, only one of the two recorded one. Overall agreement is 80% (8 of 10); occurrence agreement, 60% (3 of 5); nonoccurrence agreement, 71% (5 of 7). When the event is infrequent, overall agreement is pulled up by the intervals in which nothing happened. In the study by Iwata et al., participant 9 had an overall agreement of 99.2% and an occurrence agreement of 46.9% (Table 3, p. 201), and the authors note that the lowest agreements came from sessions with extremely high or extremely low levels of responding (pp. 200–201).

⚠ CAUTION

The result of a measure holds for the situation and the audience in which it was obtained, for the rule by which it was counted, and for the observers who counted it. "Karina's attitude is favorable" is a summary of a class (Section 11.4), and the number that supports it is a sample of that class.

✓ TEST YOURSELF

The director walks into the meeting and Beatriz asks: "What about the group supervision?" Everyone answers "great." What does the record show, and what additional record would help?

ANSWER: it shows that, in front of the coordinator and the director, the predominant answer was favorable. It does not show what they would say without the director. It would help to record the same question with another audience (only their peers, or in writing, anonymously) and to note who was present in each case.

Common learner mistakes

1 **Comparing counts without a denominator.** The mistake happens because the count is the first number the record yields, and it seems to be the measure already. *How to spot the mistake:* you write "made more evaluations, so evaluates more strongly" without having noted the time or the occasions. Calculate the rate and the proportion of occasions before comparing (Section 22.2).

2 **Reading the interval as a state.** The mistake happens because, in everyday life, slowness and haste are read as signs of what the person feels. *How to spot the mistake:* the note says "hesitated, so is conflicted." The record is the interval; the conflict is a hypothesis, and it goes in the separate column (Section 22.3).

3 **Calling any measure "intensity."** The mistake happens because "strong" and "stable" sound like measures, and they are only words that cover several. *How to spot the mistake:* the report says "stronger" or "more stable" without saying which measure, or takes the loudness of the voice for the degree of the evaluation. Replace the word with the measure and the criterion (Sections 22.4 and 22.5).

4 **Choosing the instrument before the question.** The mistake happens because the instrument is the most concrete part of the plan, and it seems the obvious place to start. *How to spot the mistake:* the first decision in the plan is "let's apply a scale." Write down the question, the property, and the recording rule; the instrument comes afterward (Section 22.6).

5 **Taking the number for "the attitude" and forgetting who asked.** The mistake happens because the number, in the table, appears apart from the situation in which it was produced. *How to spot the mistake:* the report says "the interns' attitude is favorable" without saying who asked, where, with whom present, and who counted (Section 22.7).

SUMMARY

Measuring and recording (objective 1). A measure is a number assigned to an aspect of an occurrence, by a rule set beforehand. The recording unit says what counts as an evaluation. A record is what another observer could check; the rest is interpretation, and it goes in a separate column.

The six properties (objective 2). Frequency counts; rate counts per unit of time; duration measures from beginning to end; latency measures from the defined stimulus to the beginning of the response; magnitude is the physical size of the response; topography is the form, coded into categories. Each one leaves unsaid what the others say.

Denominators (objective 3). Rate answers how much the subject comes up, over time; the proportion of occasions, how much the person evaluates when the subject is put to her. Two people may have the same rate and different proportions, and vice versa.

Strength and persistence (objective 4). "Strong" and "stable" cover measures that need not vary together (Catania, 1999, pp. 405 and 420; Ajzen, 2001, p. 39). State the measure, the criterion, and the period.

From the question to the measure (objective 5). Question, property, recording rule, and only then the instrument. Every choice leaves something out, and saying so is part of the result. The properties apply to observation, to the scale, and to the task.

Limits (objective 6). The response is given to someone, in a situation (social desirability); the instrument is part of the situation; and who records varies, which is checked through interobserver agreement, looking at occurrence agreement as well.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. (Records constructed for the exercise.) State whether each note is a record or an interpretation and, if it is an interpretation, rewrite it as a record: (a) "Olívia was embarrassed to talk about the supervision." (b) "Karina said, after Hugo spoke, 'there's no time to discuss my case.'" (c) "Hugo was aggressive in criticizing the supervision." (d) "Olívia started answering two seconds after the question."

2. Match each question to the property that answers it (frequency, rate, proportion of occasions, duration, latency, magnitude, or topography): (a) How many evaluations per meeting hour? (b) When the topic is raised, does she evaluate it? (c) How long after the question does she start answering? (d) Is her speech loud? (e) What words does she use to evaluate? (f) How long does her talk about the subject last?

3. (Hypothetical case.) In five 40-minute meetings, an intern made 10 evaluations. In another series, of three 60-minute meetings, he made 9. (a) What is the rate per hour in each series? (b) Which series has the higher frequency? (c) What does this show about comparing frequencies?

4. (Hypothetical case.) In five hours of meetings, the topic was presented to Rita 20 times, and she evaluated it on 5 of them; to Tânia, 8 times, and she evaluated it on 4. (a) Calculate the rate per

hour and the proportion of occasions for each. (b) Who evaluates more by rate? And by proportion? (c) Which question does each reading answer?

5. (Hypothetical case.) Beatriz's question ends at 14:07:30. Karina starts answering at 14:07:36 and finishes at 14:07:51; Hugo starts at 14:07:39 and finishes at 14:08:20. (a) Calculate the latency and the duration for each. (b) A colleague says: "Hugo was conflicted." What does the record allow us to say?

6. (Hypothetical case.) Beatriz writes: "Karina's attitude is stronger than Olívia's, because Karina evaluates more." What is the most appropriate criticism?

a. It is correct: the more one evaluates, the stronger the attitude.

b. Karina's rate is higher, but the proportion of occasions is the same, and "strong" admits other measures (latency, magnitude, persistence), which may not agree.

c. It is incorrect, because only a Likert scale measures the strength of an attitude.

d. It is incorrect, because rate is not a measure of behavior.

7. (Hypothetical case.) After Beatriz stops commenting on favorable remarks, intern X makes 3, 3, 0, 0, 0, 0 favorable evaluations per meeting, and intern Y, 2, 1, 1, 1, 0, 0. Criterion: two consecutive meetings without an evaluation. (a) How many evaluations did each emit until the criterion? (b) How many meetings until the criterion? (c) Who persisted more? (d) What should go in the report?

8. (Hypothetical case.) For each question, state the property, how to record it, and what the measure leaves out: (a) the administration wants to know whether, after group supervision began, the interns started talking about it more often; (b) a researcher wants to know whether evaluation of the supervision occurs as readily in meetings as in hallway conversation; (c) a researcher wants to know whether the evaluation holds up when Beatriz starts disagreeing with it.

9. (Hypothetical case.) The director walks into the meeting and Beatriz asks, out loud: "Who thinks the group supervision is good?" Everyone raises a hand. The next day, in a conversation among the interns alone, two of them complain about the time given to cases. (a) What does the first record show? (b) Do the two records contradict each other? (c) How should Beatriz record this?

10. (Records constructed for the exercise.) Beatriz and Júlio recorded, each on their own, over twelve one-minute intervals, whether Hugo evaluated the supervision (Y, yes; N, no). Beatriz: N Y N N N Y N N N Y N N. Júlio: N Y N N Y N N N N Y N N. Calculate overall, occurrence, and nonoccurrence agreement and say what the difference among them shows.

ANNOTATED ANSWER KEY

1. (a) Interpretation: it names a state; a possible record: "Olívia talked about the supervision for six seconds, in a low voice, and did not look at the group." (b) Record. (c) Interpretation: "aggressive" is a judgment; a possible record: "Hugo said, in a loud voice, that the supervision 'wastes time on cases that aren't ours.'" (d) Record, checkable with a stopwatch.

2. (a) Rate. (b) Proportion of occasions. (c) Latency. (d) Magnitude. (e) Topography. (f) Duration. Those who get (a) and (b) wrong usually swap the denominator: rate has time; proportion, occasions (Section 22.2).

3. (a) Series 1: 5 × 40 min = 200 min, or 3.33 h; 10 ÷ 3.33 = 3.0 per hour. Series 2: 3 × 60 min = 3 h; 9 ÷ 3 = 3.0 per hour. (b) Series 1 (10 versus 9). (c) That frequencies from different periods cannot be compared: the rates are equal.

4. (a) Rita: rate of 1.0 per hour (5 ÷ 5) and proportion of 0.25 (5 ÷ 20). Tânia: rate of 0.8 per hour (4 ÷ 5) and proportion of 0.50 (4 ÷ 8). (b) By rate, Rita; by proportion, Tânia. (c) Rate answers how much the subject comes up in speech, over time; proportion, how much the person evaluates when the subject is put to her. Rita talks more about the subject because it was put to her more times, and she evaluates on a smaller share of those times.

5. (a) Karina: latency of 6 s and duration of 15 s. Hugo: latency of 9 s and duration of 41 s (14:07:39 to 14:08:20). (b) It allows us to say that Hugo started 3 s after Karina and spoke 26 s longer. "Conflict" is a hypothesis about why, and the interval alone does not support it: it also depends on the question, on who asks, and on what has already been said (Section 22.3).

6. b. Option **a** takes frequency for strength, and rate, on its own, does not say that (Table 22.1). Option **c** is wrong to reduce measurement to an instrument: the properties appear in observation, in the scale, and in the task (Section 22.6). Option **d** is wrong because rate is a measure of behavior, "responses per unit of time" (Catania, 1999, p. 423); the problem is not rate, it is taking it for "strength."

7. (a) X: 6 evaluations (3 + 3), because the criterion is reached in meetings 3 and 4; Y: 5 evaluations (2 + 1 + 1 + 1), because the criterion is reached in meetings 5 and 6. (b) X: 2 meetings; Y: 4 meetings. (c) By the count, X (6 versus 5); by the number of meetings, Y (4 versus 2). (d) For example: "Until two consecutive meetings with none, X emitted 6 favorable evaluations in 2 meetings, and Y, 5 in 4 meetings." Saying only "X persisted more" or "Y persisted more" would hide the choice of measure (Section 22.5).

8. (a) Rate per hour, with the same period before and after the change, and the proportion of occasions, if the subject was presented more or fewer times; it leaves out the direction (favorable or unfavorable) and why it changed. (b) Proportion of occasions in each situation, with the occasion rule set beforehand; it leaves out why it differs, and it holds only for the situations recorded (Section 13.3). (c) Persistence, with criterion and measure specified (evaluations emitted, time, or meetings until the criterion); it leaves out that another measure would give another result (Section 22.5).

9. (a) It shows that, in front of the director and the coordinator, the answer was favorable, and that the raised hand is a response given to that audience. (b) They do not contradict each other: they are two responses, to two audiences, with different possible consequences (Section 22.7). The difference is data to be explained, not lying. (c) Along with the measure, who was present, where, and how the question was asked, and, if possible, with the same question put to more than one audience, including in writing and anonymously.

10. They agreed on occurrence in intervals 2 and 10 (2 intervals); on nonoccurrence, in intervals 1, 3, 4, 7, 8, 9, 11, and 12 (8 intervals); they disagreed in intervals 5 and 6 (2 intervals). Overall: 10 ÷ 12 = 83%. Occurrence: 2 ÷ (2 + 2) = 50%. Nonoccurrence: 8 ÷ (8 + 2) = 80%. The overall figure looks good, but the two observers agreed on only half of the intervals in which either of them saw an evaluation: the recording rule, or the training, needs to be revised before relying on the rate they produce (Section 22.7).

MASTERY CRITERION

Got 8 of the 10 exercises right? Move on to Chapter 23. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1	22.1 and common mistake 2
2	22.2, 22.3, and 22.4
3, 4	22.2 and common mistake 1
5	22.3 and common mistake 2
6	22.5 and common mistake 3
7	22.5
8	22.6 and common mistake 4
9	22.7 and common mistake 5
10	22.7

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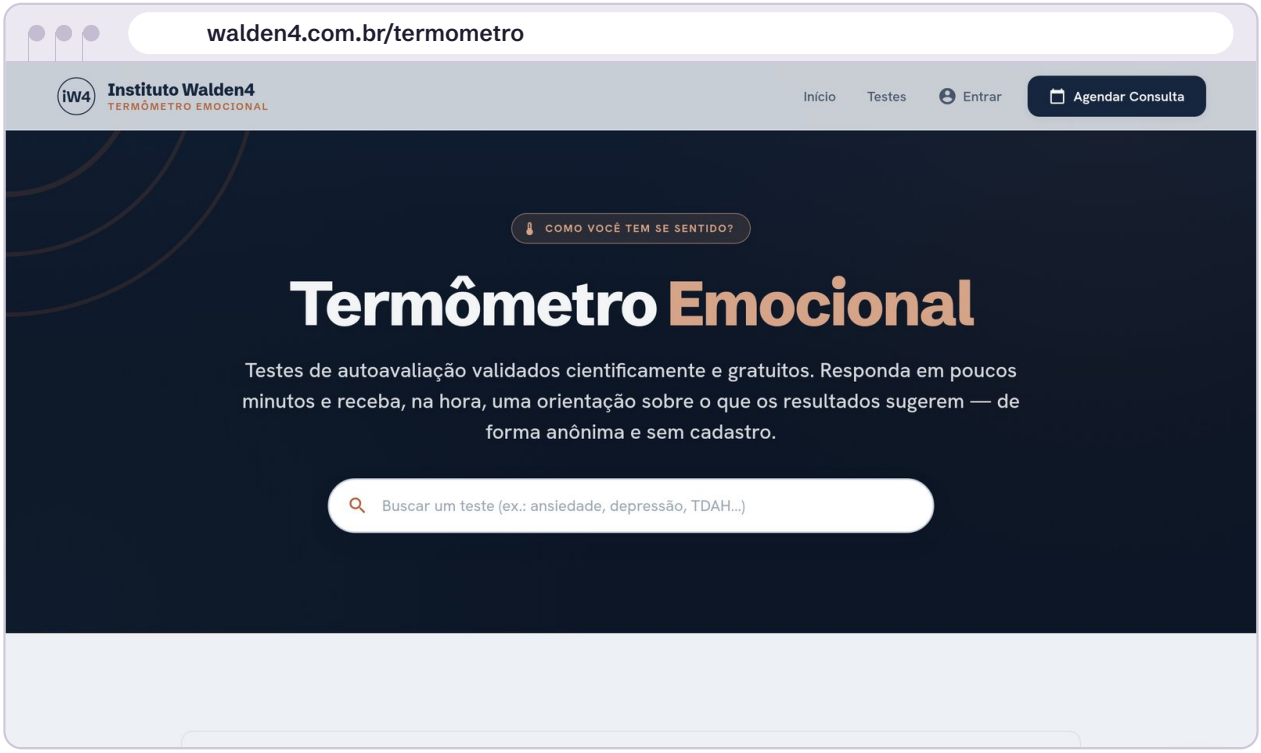
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CHAPTER

23 The Measurement of Attitudes

scales

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Describe** a scale as a situation of ordered alternatives with a rule that assigns a number, and **separate** the person's mark from the value the researcher assigns to it.
2. **Distinguish** the Likert-type scale, the semantic differential, and the SAM by what they present, what they ask of the person, and what the researcher reads.
3. **Build** a semantic differential sheet, with the direction of the poles alternated, and **calculate** the score of a concept.
4. **Interpret** a score (the sign, the distance from the neutral point, and the difference between conditions) without taking it for the whole attitude.
5. **Point out** what the format (number of points, anchors, direction, stimulus, audience) changes in the number and **state** what the result does not reach.

PREREQUISITES

Direction and intensity (Section 4.3), numbers as topography (Section 6.5), the questionnaire item (Section 9.5), the answer to a questionnaire as a verbal response given to someone and the autoclitic (Sections 14.4 and 14.5), the elicited reaction recorded separately (Section 17.4), the transfer of functions through equivalence classes (Chapter 20), and the measure, the rating as a numerical topography given to someone, and social desirability (Chapter 22). The new terms (scale, alternative, anchor, score, Likert-type scale, neutral point, semantic differential, and SAM) are defined here.

OPENING

(Hypothetical case, continued from Chapter 22.) Beatriz turned in the report on the group supervision, and the management of the training clinic asked for one more thing: one number per intern, to compare this semester with the individual supervision of the previous one, and "apply a scale." Beatriz has three ideas. A rating from 1 to 7, from "bad" to "good." A sheet with pairs of opposite adjectives, like the one she saw in an article. And a row of little faces, like the one a colleague uses with children. She wants to know whether they are the same instrument with three different looks and what she will be able to say with the numbers. Four questions organize the chapter.

1. *"What makes a question with alternatives a scale? And where does the number come from?"*
2. *"Do a rating, adjective pairs, and little faces measure the same thing?"*
3. *"If the group mean comes out at 5.2, what can Beatriz say?"*
4. *"What changes in the result if she changes the number of points, reverses the order of the alternatives, or changes who asks and where?"*

The first is the subject of Section 23.1; the second, of Sections 23.2 to 23.4; the third, of 23.5; the fourth, of 23.6.

23.1 What a scale is, and where the number comes from

When Hugo marks the 5 on the 1-to-7 rating that Beatriz is thinking of using, how much of that response comes from Hugo, and how much from Beatriz? Two studies from Chapter 20 help separate the two. In Bortoloti and de Rose (2009), participants received a sheet on which each line ran from an adjective to its opposite, divided into seven intervals, and they were to put an x at the point on each line where the figure belonged (pp. 568 and 583). The values, from −3 to +3, were not printed on the sheets they received (p. 570); it was the researcher who assigned them to the intervals, when analyzing the data (p. 569). In Rosendo and de Melo (2018, pp. 37–38), the task was to "mark an 'x' at the position on the scale" that best represented the relation between the stimulus and each adjective pair, and "the values -3, -2, -1, 0, +1, +2, and +3 were assigned to the seven intervals of the scales."

The person makes the mark; the number comes from the rule. This is the division that the chapter's definition records: a **scale** is a situation in which the person responds by marking one of several ordered **al-**

ternatives, usually between two anchors, the labeled ends (in the studies above, the two adjectives), and in which the researcher assigns a number to each alternative by a rule set beforehand.

KEY CONCEPT

A scale is a situation in which the person marks one of several ordered alternatives, usually between two anchors (the labeled ends), and the researcher assigns a number to each alternative by a rule set beforehand. The resulting number for a person or for a stimulus, whether the value of one mark or the mean of several, is the score.

In this book's terms, the mark is a numerical topography (Section 6.5), given to someone (Chapter 22). The question that precedes it is a mand (Section 14.5), and the scale adds the accepted responses to the mand: instead of "what do you think of the supervision?", it asks "which of these positions?" That is what makes the answers standard, and that is why it is used. The cost is that the "it depends" that, according to Guerin (1994, p. 157), people often say or write when faced with a 7-point scale has nowhere to go.

EXAMPLE

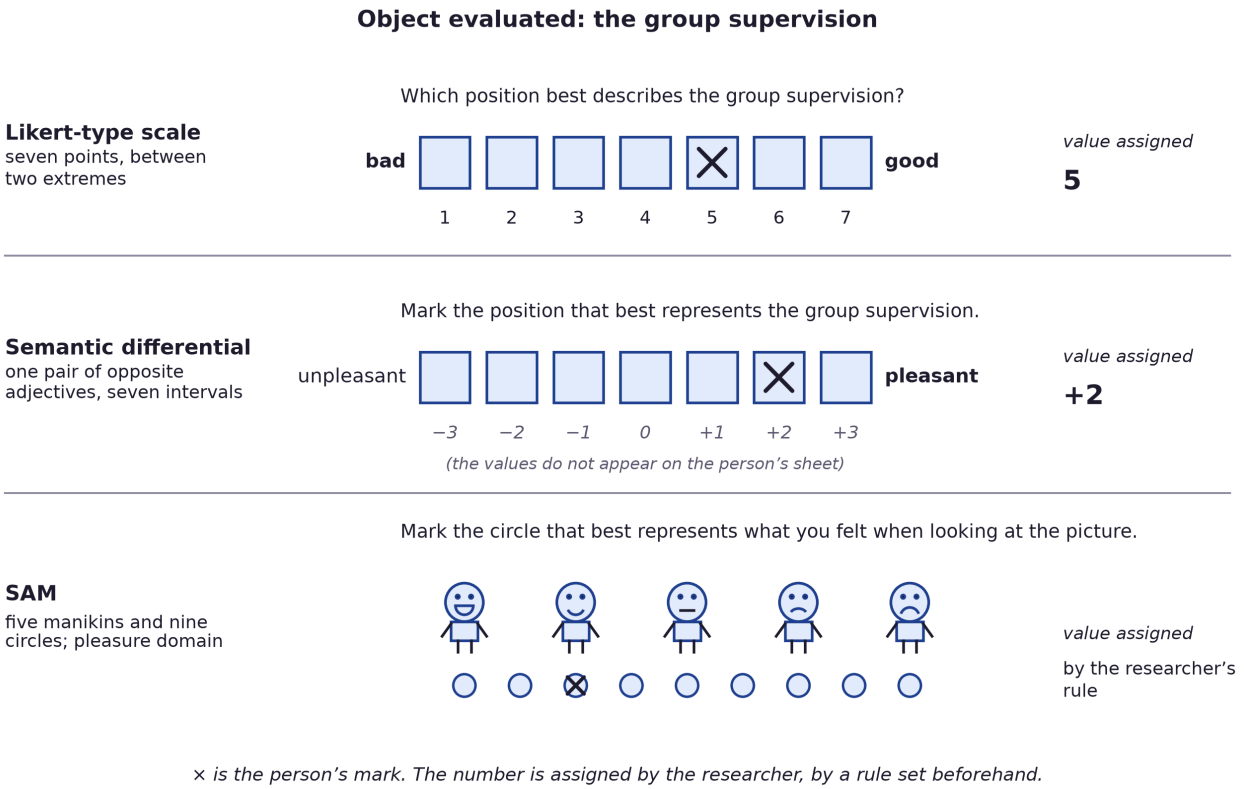
Beatriz's rating: "From 1 (bad) to 7 (good), which position best describes the group supervision?" Hugo marks the fifth box. The mark is Hugo's; the 5 comes from the rule Beatriz wrote beforehand: "the first position is worth 1, the second, 2, and so on."

NON-EXAMPLE

"Which supervision format do you prefer: in person, remote, or hybrid?" There are alternatives, but they have no order: none is more or less than another. It is a closed question, not a scale; a number assigned to them would be just a label.

Figure 23.1 shows three formats applied to the same object, with the person's mark and the value assigned. Sections 23.2 to 23.4 present them one by one.

Figure 23.1
The same object, three instruments



Note. Diagram prepared for this book, with illustrative marks from a hypothetical case. The manikins are our own simplified drawing and do not reproduce the figures of the original instrument (Section 23.4).

TEST YOURSELF

On a sheet, Olívia draws a line closer to "useful" than to "useless," and then Beatriz writes +2 next to it. Who produced the line? Who produced the +2? What had to exist before the +2 was written?

ANSWER: the line is Olívia's; the +2 is Beatriz's, by the assignment rule. Before that, the rule had to exist: how many intervals, which pole is the positive one, and what value each interval has.

23.2 The Likert-type scale

The **Likert-type scale** presents a question or a statement and graded alternatives between two extremes. The name comes from Rensis Likert, who proposed it in 1932. According to Dalmoro and Vieira (2014, pp. 162–163), Likert's scale had five response categories, from "strongly

approve" to "strongly disapprove," with a **neutral point** in the middle, the position that leans to neither side. Dalmoro and Vieira note that, when the scale does not have five options, "it does not constitute a Likert scale, but rather a 'Likert-type' one." By this criterion, the scales in the studies discussed in this book are "Likert-type." Dixon and Lemke (2007, p. 7) asked participants to rate each image on a 10-point scale, from 1 (evil) to 10 (good), by dragging the mouse pointer along a horizontal bar; Cameoka and Moreira (2021, p. 97) used a "10-point Likert-type scale ranging between 'bad' and 'good.'"

There are two uses that should not be confused. In Likert's use, what varies from one item to the next is the statement: in Dalmoro and Vieira's survey (2014, p. 166), 21 questions about money were answered between "strongly disagree" and "strongly agree." In the equivalence studies of Chapter 20, the item is always the same, from bad to good, and what varies is the stimulus: in Cameoka and Moreira (2021, p. 100), each item showed "a photograph at the top of the screen and, just below it, a 10-point Likert-type scale," in a 60-item questionnaire. The sources call any graded scale "Likert-type," including the bad-to-good one and, at times, the one made of pairs of opposite adjectives (Section 31.2); when reading a method, what matters is the format described (points, anchors, neutral point, and direction), not the name.

Building a scale means making decisions on which the literature has no consensus: Dalmoro and Vieira (2014, p. 171) conclude that "there is no single theoretical argument that can be used to defend the use of 'x' points," and they note that, in management studies, the method rarely justifies the number of points chosen. Table 23.1 brings together the four decisions present in every instrument and what the studies discussed in this book record about each.

Table 23.1

Decisions in building a scale and what the literature discussed in this book records

Decision	What is decided	What is recorded
Number of points	how many, and whether even or odd	No single theoretical argument (Dalmoro & Vieira, 2014, p. 171). In their survey, internal consistency (Cronbach's alpha, Section 29.5) was 0.66 with three points, 0.77 with five, and 0.80 with seven; 0.7 is the recommended minimum (Hair Jr. et al., 2005, cited by them, p. 168)
Neutral point	whether or not to have one	It may put the person more at ease and, according to Collings (2006, as cited in Dalmoro & Vieira, 2014, p. 165), produce ambivalence and indifference. With ten points, Cameoka and Moreira (2021, p. 100) defined 5 and 6 as neutral

Decision	What is decided	What is recorded
Anchors	only at the ends, or at every point	Verbal anchors only at the ends, because people tend to look only at the ends (Cummins & Gullone, 2000, as cited in Dalmoro & Vieira, 2014, p. 165). Bortoloti and de Rose (2009, p. 568) used a pair of opposite adjectives at the two ends
Direction	the positive pole always on the same side, or alternated	Dalmoro and Vieira (2014, p. 172) recommend avoiding reversed direction within the same instrument; Barnette (2000, cited by them, p. 165) concluded that items worded in opposite directions confuse respondents but, in his tests, did not reduce internal consistency and made it possible to detect response bias. Bortoloti and de Rose (2009, p. 570) alternated the position of the adjectives

Note. Table prepared for this book. The works cited by Dalmoro and Vieira (2014) were not consulted in the original.

The effect of one of these decisions appears in Dalmoro and Vieira's study (2014). Business administration students (211) answered the same 21 questions in four versions, one after the other: with three, five, and seven points and, in the fourth, with five points and the alternatives in reverse order (pp. 166–167). Around 33% marked, per question, a different answer when the order was reversed (from 22% to 42%, depending on the question; p. 169) and, even so, the mean changed significantly in only four of the 21 questions (p. 169). For Dalmoro and Vieira, the results suggest that a single instrument with reversed scales "may confuse respondents" (p. 171). The method does not report that the order of the versions varied across people, and part of the change may be an effect of answering the same questions for the fourth time: the study does not separate the two. Figure 23.4, below, uses fictitious data to show how the mean can stay the same with a third of the people in a different position.

The alternatives "agree" and "strongly agree" play the role that, in free speech, belongs to the firmness marker ("I think that," "I'm sure that"; Section 14.4): the grading comes ready-made, and the person chooses among the ones offered instead of producing her own. This is a reading proposed here, not a finding.

The format does not decide what the item measures. "Group supervision increases the number of cases discussed," on an agreement scale, measures agreement with a belief, not the attitude (Sections 9.5 and 16.5); to measure attitude, the item must ask for a position: "how do you evaluate the group supervision, from bad to good?"

KEY CONCEPT

The **Likert-type scale** is a scale of graded alternatives between two extremes, with or without a **neutral point**. Likert's scale had five categories, from "strongly approve" to "strongly disapprove"; those with a different number of points are "Likert-type" (Dalmoro & Vieira, 2014, p. 163). The number of points, the neutral point, the anchors, and the direction are decisions made by whoever builds it, and each one is part of the instrument.

TEST YOURSELF

A scale has seven points, from "strongly disagree" to "strongly agree." In Dalmoro and Vieira's (2014) sense, is it Likert or Likert-type? And the 10-point scale of Cameoka and Moreira (2021)?

ANSWER: Likert-type in both cases: Likert's scale had five categories (p. 163). The name does not tell you the number of points, and the report needs to state it.

23.3 The semantic differential

The **semantic differential** was born of a different problem: measuring the meaning of words. Catania (1999, p. 298) recounts that it was "an attempt to measure meaning without incurring these ambiguities" of word associations (Osgood et al., 1957, cited by him). Words were rated on dimensions such as "happy-sad, hard-soft, and slow-fast," and a factor analysis created a space in which words closer together were taken to be more similar in meaning: "good, beautiful, clean, and pleasant tended to cluster together, far from other clusters such as bad, foolish, dirty, and ugly."

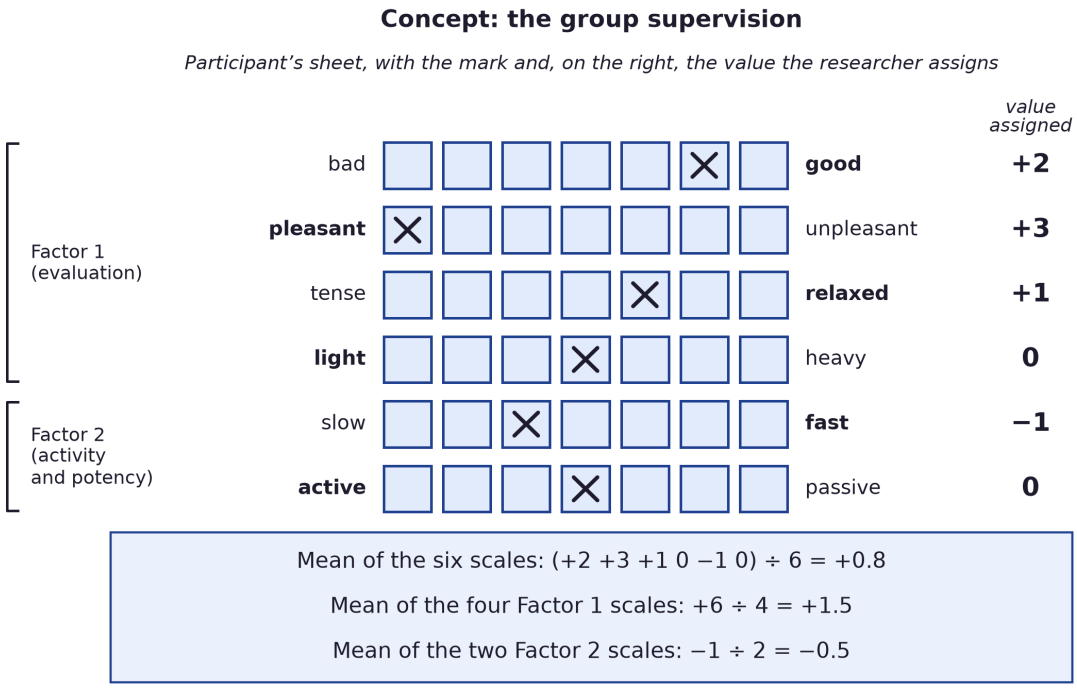
Bortoloti and de Rose (2009, pp. 564–565) describe the technique: a "concept" (words, phrases, pictures) is presented, and the participant assigns it Likert-type values, usually from −3 to +3, on several scales anchored by opposite adjectives, such as good and bad; indifference with respect to any pair counts as 0. The anatomy of a sheet, in their study, is that of Figure 23.2. Each scale had seven intervals and was anchored at its two ends by "polar terms," a pair of opposite adjectives, and the whole set was printed on an A4 sheet along with the stimulus to be rated (p. 568). The value −3 went to the position nearest the negative

adjective and +3 to the one nearest the positive adjective (pp. 569–570); the sheets the participants received carried no printed values, and the side on which each adjective appeared was random (p. 570).

Each participant made 13 judgments per stimulus, and the 13 evaluations were combined into a mean per participant and then per group (Bortoloti & de Rose, 2009, p. 570). Rosendo and de Melo (2018, p. 38) summarized by scale: "the median of the evaluations on each scale was calculated, which corresponds to the central value among the participants' evaluations." These are two ways of summarizing, and the report states which one was used.

Figure 23.2

A semantic differential sheet, from mark to score



Note. Fictitious data, from a hypothetical case. Adjective pairs from the lists of Bortoloti and de Rose (2009, p. 569) and of Rosendo and de Melo (2018, p. 41), applied to the group supervision; the classification into factors is that of Rosendo and de Melo (2018, p. 41).

The semantic differential can also be administered on screen, with a different response format. In Experiment 2 of Moreira, Rocha et al. (2022), which Chapter 30 summarizes, the scale, originally of seven points, was replaced by sliders, one for each of the 13 adjective pairs. The participant dragged a small ball with the mouse, from 0, all the way to the left, to 100, all the way to the right, and the blue area of the bar

grew or shrank with it (pp. 100–101). Each trial showed an image and the complete scale (pp. 95 and 99), as in Figure 23.3, and leaving the ball in the middle was the neutral evaluation (p. 100). The "Next" button appeared only 15 seconds after the start of the trial, to make it less likely that the participant would move on without rating the image (pp. 99–100), and the authors say that the bar was inspired by visual analog scales from research on the therapeutic alliance (p. 101).

Figure 23.3

The semantic differential on screen: one slider per adjective pair



Note. Excerpt from Figure 5 of Moreira, Rocha et al. (2022, p. 100), the screen of a pretest trial in Experiment 2. The image being rated, which appears to the left of the sliders on the screen, is not reproduced, and the gray strip was added for this book. The reproduction has the resolution of the source material.

Pereira and Moreira's (2021a, p. 19) book on attitudes toward presidents of Brazil uses the same format, with the same 13 adjective pairs, in the same order as the volume (Moreira, Rocha et al., 2022, p. 95). The scale comes from the study by Eilertsen and Arntzen (2020), as cited in Pereira and Moreira (2021a, p. 19). The authors describe it as a modified version of the seven-point scale, with the ball going from 0, fully to the left, to 100, fully to the right (p. 25). They also explain that the bar was originally chosen so that the adjective nearest the ball would darken and its partner would fade until it disappeared at the ends, which a technical problem prevented (pp. 25 and 26). The button to move on also appeared only after 15 seconds (p. 24). They define 0 as the value nearest the negative adjectives and 100 as the one nearest the positive adjectives (p. 19), which, with the side of the adjectives alternating, presupposes orienting the bars by pole; the authors do not describe this conversion (reading proposed here).

The new format raises points that must be declared. The value runs from 0 to 100, not from −3 to +3, and comparing it with seven-interval studies requires a conversion, which the report describes. As on the sheet in Figure 23.2, the positive adjective changes sides from one bar to another (happy is on the right; relaxed, on the left), and orienting them all toward the same pole is up to whoever calculates the score. The authors of the book on presidents, who used the same format, list this among the limitations: with the negative adjectives sometimes on one side and sometimes on the other, the participant may have become confused and rated the stimulus the opposite of how they intended (Pereira & Moreira, 2021a, pp. 107 and 108). The 19 comics studies collected in the Part III volume made a different choice: only the first two mixed the poles, and in the rest (89.5% of the total) the positive and the negative adjectives were kept in separate columns (Moreira, Lemos et al., 2024, pp. 13 and 17). And, since the ball starts in the middle, as Figure 23.3 shows, the middle of the bar may be a neutral evaluation, left there on purpose, or a bar no one touched: the delayed button makes the second possibility less likely, and the report states how pairs left in the middle were handled.

The differential measures more than the direction of the evaluation. Osgood et al. (1957, as cited in Bortoloti & de Rose, 2009, p. 570) argued that meaning has several dimensions, extracted by factor analysis, and that the most salient were the evaluative, potency, and activity dimensions. For the 13-pair instrument, the factor analysis by de Almeida et al. (2014, p. 276), which Chapter 29 examines, yielded two factors: a Factor 1 (Evaluation), with nine scales, and a Factor 2 (Potency), with four. Rosendo and de Melo (2018, p. 41) describe the same classification:

Factor 1 groups sad-happy, tense-relaxed, rough-smooth, ugly-beautiful, heavy-light, negative-positive, hard-soft, bad-good, and unpleasant-pleasant, and Factor 2, slow-fast, passive-active, poor-rich, and submissive-dominant. Citing Almeida and de Rose (2015), they report that the Factor 2 scales have lower correlations and more neutral medians, with less variation. With stimuli of social meaning (professions and gender), however, the study itself observed high scores and greater variation on them, and the authors suppose that these scales were closer to relations already learned between professions and gender (p. 41).

For those researching attitude in this book's sense, the dimension that matters is the evaluative one: evaluation is "a fundamental aspect of any concept's connotative meaning" (Ajzen, 2001, p. 30). Bortoloti and de Rose (2009, pp. 570 and 572) did not run a factor analysis on their own data; they considered that most of the scales relate to the evaluative dimension and that poor-rich, slow-fast, and dominant-submissive were used "mostly to mask the task." The analysis without those scales gave "very similar data, with slightly larger absolute values" (p. 572). Which scales go into the mean is a decision to be declared. And the classification into factors does not replace the criterion of Section 9.5: only the pair that says good or bad, pleasant or unpleasant, asks for a position on the object; tense-relaxed and heavy-light, although they load on the evaluation factor, describe how the object is felt or seen.

In Figure 23.2, the positive pole is on the right in three lines and on the left in three; the value is that of the marked interval relative to that pole, not to the physical position. The mean of the six scales is +0.8; that of the four Factor 1 scales, +1.5; that of the two Factor 2 scales, −0.5. On three of the four Factor 1 scales, Hugo marked the positive side and, on the fourth, the center; on the two Factor 2 scales, he marked an interval on the "slow" side and the center. A single mean of all six would hide this.

In the studies of Chapter 20, the instrument measured the transfer of functions. Bortoloti and de Rose (2009, p. 565) compared the evaluations of the abstract figures, after the classes had formed, with the ratings that a control group gave the faces. Rosendo and de Melo (2018, p. 33) used "Likert scales with opposite adjectives at the ends," with the note "standardized by" de Almeida et al. (2014). De Carvalho and de Rose (2014, p. 529), for their part, used it to pick, for each child, the Black faces rated most negatively. Chapter 29 examines the validation study of the instrument.

KEY CONCEPT

The **semantic differential** is a set of bipolar scales, each between two opposite adjectives, applied to the same concept. Each mark receives a value from −3 to +3, relative to the pole the researcher defined as positive, and the score is the mean of the chosen scales (or the group median on each scale). In the paper version, each scale has seven intervals; in on-screen versions, it may be a continuous bar, from 0 to 100, and the rule that assigns the number changes along with it.

CAUTION

The pairs in Figure 23.2 come from lists in the literature, where they served for stimuli such as faces and abstract figures. For another object, state which pairs you chose and why, and, if you want to compare with the studies, start from the 13 pairs that de Almeida et al. (2014) analyzed (Chapter 29) and state what changed.

TEST YOURSELF

On a sheet with four scales, Hugo marked: "useless-useful" (useful on the right), the second interval from the left; "pleasant-unpleasant" (pleasant on the left), the sixth; "slow-fast" (fast on the right), the seventh; "tense-relaxed" (relaxed on the right), the fourth. What is the value of each mark and the score?

ANSWER: useless-useful: second interval, positive pole on the right, value −2. Pleasant-unpleasant: sixth interval, positive pole on the left, value −2. Slow-fast: seventh, +3. Tense-relaxed: fourth, 0. The sum is −1 and the score, the mean, −0.25.

23.4 The SAM

The **SAM** (*Self-Assessment Manikin*) replaces words with figures. According to Mizael, de Almeida et al. (2016, p. 453), the instrument measures stimuli or events on pleasure, arousal, and dominance, its three domains (Bradley & Lang, 1994, cited by them), and the study used only pleasure. Thirteen children aged 8 to 10, one at a time and with an experimenter in the room, rated each stimulus on a row of five manikins, from one that smiles to one that looks unhappy and frowns. First, the children were asked what feeling each manikin showed and were corrected if they got it wrong, which "almost never occurred"; then they were told to pick the circle, "below each manikin and between them," that best matched what they had felt on seeing the picture shown

above. The experimenter said there were no right or wrong answers, because people differ in what they like, in clothes, TV characters, and so on (p. 453).

With five manikins and a circle under each one and between them, the row has nine positions (the count is ours). In the screening of the children, the instruction was to mark the circle that best represented "the pleasure level elicited by the target stimulus" (p. 454), and what the article reports are comparisons between pleasure levels, using the Mann-Whitney test (p. 457). Before training, the pleasure levels elicited by the White faces were significantly higher than those elicited by the Black faces; after training, the mean levels rose for the Black faces and fell for the White ones, which still came out above, but by a smaller margin that was not statistically significant (p. 457).

The instruction asks what the child "felt" and the pleasure level "elicited" (pp. 453 and 454). In the distinction drawn in Chapter 17, this is the report of a reaction, and Mizael, de Almeida et al. call the marks "evaluations" (p. 451). The question remains open, and the principle of Section 22.4 says how to settle it: record, for the same faces, the SAM mark and a rating from "bad" to "good," and see whether they vary together; if they do, the mark can be read as an evaluation. Nor does the figure remove the verbal from the task: the instruction is given in words, the child must discriminate what each manikin expresses (hence the initial check), and the response is given to someone, with the experimenter in the room. What changes is the form of the alternative, a drawing rather than a word. Table 23.2 compares the three instruments.

Table 23.2
The three instruments, side by side

	Likert-type scale	Semantic differential	SAM
What the person sees	a stimulus or statement and graded alternatives between two extremes	a concept and several seven-interval bipolar scales	a stimulus and five manikins, from smiling to unhappy, with circles under and between them
What she does	marks or clicks an alternative	marks a position on each scale	marks a circle: what she felt on seeing the figure
What the researcher assigns	a value to the position (from 1 to 10, in Dixon & Lemke and in Cameoka & Moreira)	a value from −3 to +3 to each mark, with the positive pole defined by the researcher	a pleasure level to the position marked

	Likert-type scale	Semantic differential	SAM
What is read	the degree, on a single pair of extremes	a profile by scale and, if desired, the mean	the reported pleasure, one domain at a time
What it leaves out	the why, and whatever does not fit the alternatives	the why, and whatever the chosen scales do not evoke	the why, and the other two domains
Example in this book	Dixon and Lemke (2007); Cameoka and Moreira (2021)	Bortoloti and de Rose (2009); Rosendo and de Melo (2018)	Mizael, de Almeida et al. (2016)

Note. Table prepared for this book, based on the studies in the last row.

KEY CONCEPT

The SAM is a scale of figures: among manikins ranging from smiling to unhappy, the person marks the position that represents what she felt on seeing the stimulus, in one domain at a time (pleasure, arousal, or dominance). The instruction, the experimenter, and the check on what each manikin expresses are part of the instrument.

TEST YOURSELF

A colleague says: "the SAM is a nonverbal measure, so it is not subject to social desirability." What does the procedure of Mizael, de Almeida et al. (2016) show about this?

ANSWER: the figure is the format of the alternative, but the instruction is verbal, the experimenter is in the room, and the child is told that there are no right or wrong answers (p. 453): the response is still given to someone, in a situation. That the SAM is less subject to the audience is a hypothesis, tested by recording the same task with different audiences (Chapter 22).

23.5 From number to interpretation

Beatriz now has the ratings of five interns, and the first temptation is to write "the group's attitude is 5.2." Catania (1999, p. 298) writes, regarding words, that "meanings are not properties of words themselves; they are properties of our responses to words." In this book's terms, the score is not a property of the object or of the person either: it is a property of a response, given in a situation. Five precautions separate what the number says from what it does not say.

The sign and the distance. On a scale with a neutral point, the sign of the value is the direction of the evaluation (valence, Section 4.3), and the distance to the neutral point is the degree assigned, the intensity of Section 4.3: the "extremity" that Table 22.3 listed among the operationalizations of "strength." It is Chapter 4's question "how much?", answered with a numerical topography. It is not the loudness of the voice or the latency: it is what the person chooses when the alternatives offer her degrees.

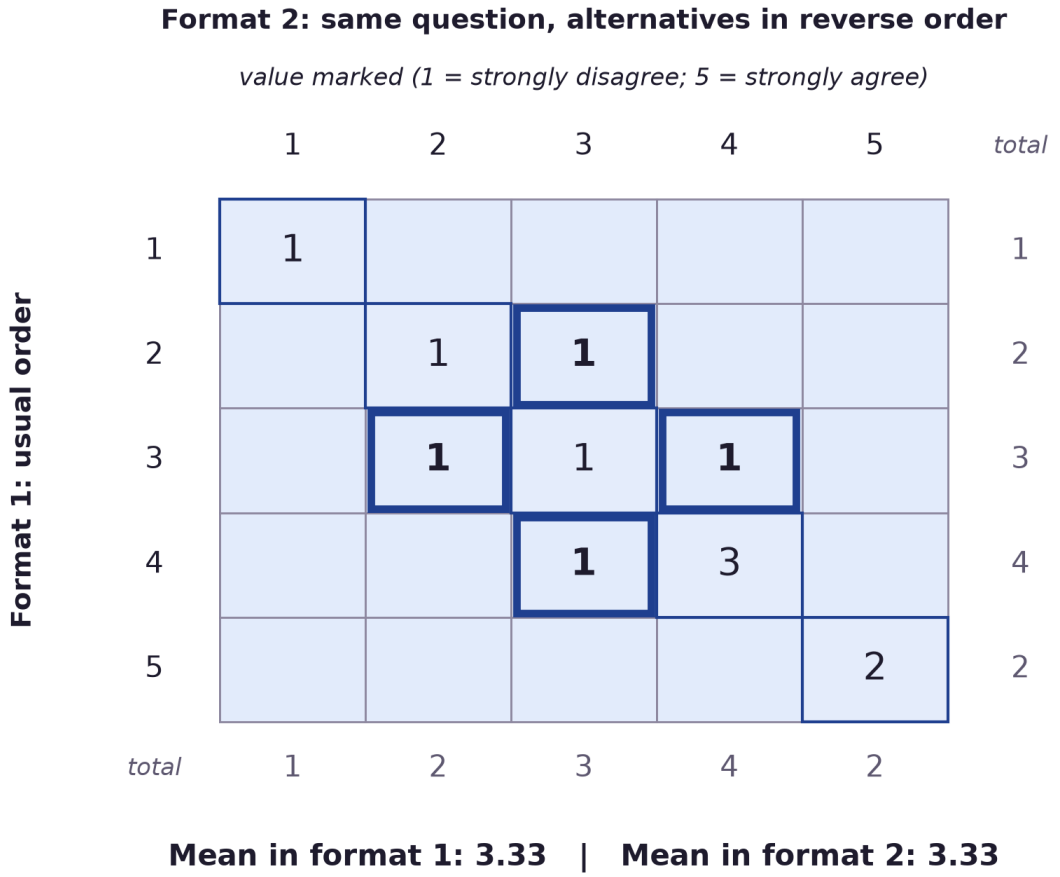
The zero belongs to the instrument. The neutral point is a convention set by whoever builds the scale: in the differential, indifference with respect to any pair of adjectives "is valuated as 0" (Bortoloti & de Rose, 2009, p. 565). In Cameoka and Moreira (2021, p. 100), the instruction said that "1 equals Bad, 5 and 6 Neutral, and 10 Good," and the analysis treated ratings from 1 to below 5 as negative, those from 5 to 6 as neutral, and those above 6 up to 10 as positive. On a ten-point scale there is no exact middle, and the rule picked two.

What people do with the neutral point is another question. Cameoka and Moreira expected photographs of everyday objects to be classified as "neither good nor bad" (p. 97); the mean rating of the objects was 6.6 (p. 101), and nine of the ten objects came out above 6 (p. 100). They note that the same happened in Dixon and Lemke's (2007) pretest and suppose that the positive ratings were related to the object's usefulness or to a value-laden comparison between categories of objects (p. 101). "Neutral" is what the rule says it is, not necessarily where people put what they are indifferent to. And a mark in the middle may be indifference, ambivalence, or lack of an opinion (Collings, 2006; Coelho & Esteves, 2007, as cited in Dalmoro & Vieira, 2014, p. 165).

The mean belongs to the group. A group's score, the mean or median of the marks, describes the set, not each person. Figure 23.4 uses fictitious data to show what Dalmoro and Vieira (2014, p. 169) observed with theirs: about a third of the people marked a different answer when the order was reversed, and the mean, on most questions, did not change significantly. The same mean does not mean the same people.

Figure 23.4

Same mean, different people



Note. Fictitious data, constructed to show what Dalmoro and Vieira (2014, p. 169) describe: about a third changed position and the mean, in general, did not. Each cell counts how many people marked the row value in format 1 and the column value in format 2.

A difference gains meaning through comparison. An isolated score says little; studies read it against another. Bortoloti and de Rose (2009, p. 565) compare the ratings of the abstract figures with the ratings of the faces made by a control group, and Dixon and Lemke (2007) and Mizael, de Almeida et al. (2016) measured before and after training. "No longer statistically significant" is not "now equal": on the SAM, after training, the White faces were still above the Black faces (Mizael, de Almeida et al., 2016, p. 457), and the mean for the White faces had also dropped. And measuring only before and after, without a control group,

leaves open what else happened between the two measurements; that is why Chapter 20 (Section 20.6) calls for a control group whenever possible.

Value and specific attitude. The item about a value ("sustainability") does not replace the item about a specific attitude ("solar energy is worth the investment"): they are different objects (Sections 16.4 and 16.5). Whether one changes and the other does not is an empirical question, and Section 22.5 says how to answer it: the same scale, at the same meetings, for both items. Table 23.3 summarizes what a score allows us to say.

Table 23.3

What a score allows us to say and what it does not

The score	Allows us to say	Does not allow us to say
The sign	the direction of the mark, by the instrument's rule	that zero is indifference; that the object is neutral
The distance from the neutral point	the degree assigned, on that instrument	the "strength" of the attitude (Section 22.5); what the person would do outside the measurement situation (Section 20.6)
The group mean or median	where the set is concentrated	that each person marked that; that the people are all alike
The difference between conditions	that the mark changed, with that rule and that design	that the attitude "changed" outside the instrument; that "not significant" means "equal"

Note. Table prepared for this book.

NON-EXAMPLE

"The mean was 5.2 out of 7, so the group is favorable to the group supervision." Neutral is 4 by the instrument's rule, and the mean does not say how each person marked: 7, 7, 6, 4, and 2 also give 5.2, and two of the five people are not on the favorable side (one marked 4, the neutral point; another, 2). The record is "mean of 5.2 on a 1-to-7 scale, with neutral at 4, from five interns, at the supervision meeting, with marks from 2 to 7."

TEST YOURSELF

In a study, the difference between the means of two conditions was no longer significant after training, and the mean of one rose less than the mean of the other fell. What can and what cannot be said?

ANSWER: we can say that the difference between the marks became smaller and did not reach significance, on that instrument and with that sample. We cannot say that the two conditions became equal, or that the evaluation of one of them became positive; and we need to look at where each mean moved.

23.6 Limits

The instrument is part of the situation. What is on the scale and on the screen changes what is recorded. Dalmoro and Vieira (2014, pp. 168–169) show the effect of format (direction and number of points). Cameoka and Moreira (2021, p. 98) built Study 3 by taking, from the earlier studies, the photographs of White men that had received the top ratings and those of Black men that had received the bottom ones, to "demonstrate the potential for distortion of an insufficiently rigorous stimulus selection process." The difference between the means for the two sets of faces reached statistical significance in Studies 1 and 2, but not in Study 3 (p. 93). The stimuli were chosen by a simple criterion, and the result changed. Chapter 32 deals with the choice of stimuli.

The setting of the study also counts. Bortoloti and de Rose (2009, p. 566) report that the experimental participants filled out the scales in the laboratory room, and the control group, in their classroom. In Rosendo and de Melo (2018, p. 36), the instrument was administered individually to the experimental groups and in small groups, of up to five people, to the control group. Stating this is part of the method: the reader decides whether the difference in setting matters for the comparison.

The response is given to someone. The rating is a verbal response, given to a person, in a situation (Chapter 22). In social psychology, the scale is the self-report measure, called "explicit," as opposed to the "implicit" ones (Albarracín & Shavitt, 2018, p. 300); here we prefer to say what is asked of the person, to report or to perform a task, and tasks without report are left for Chapter 24.

What the scale does not reach. A scale gives the position marked, at that moment, in the face of that stimulus and those alternatives. It does not say what maintains it (the function, Chapter 19) or what the person

would do outside the measurement situation: Dixon and Lemke (2007, p. 11) write that these ratings "are subjective and may not necessarily transfer to observed behavior in the real world" (Section 20.6). Nor does a high number say that the evaluation is "strong" (Section 22.5).

The order from Chapter 22 still holds: the question, the property, the recording rule, and only then the instrument. The scale is the right tool when the question is about the degree people assign, in a defined situation, and when we accept that the response is a report given to someone; for other questions, the right tool is observation (Chapter 22) or the task (Chapter 24).

⚠ **CAUTION**

What the chapter asked for fits on one line of the method: "scale from 1 to 7, from bad to good, with neutral at 4 and the positive pole always on the right, administered in writing, anonymously, by someone other than the supervisor." The reader can rebuild the instrument and decide what the number means.

✓ **TEST YOURSELF**

A report says: "the difference between the means for the photographs of White and Black people was small, so there is no bias." What methodological question should the reader ask before accepting the sentence?

ANSWER: how the photographs were chosen. The selection criterion can change the difference between the means (Cameoka & Moreira, 2021, pp. 93 and 98), and the report needs to state it, along with the scale, the situation, and who administered it.

Common learner mistakes

1 **Taking the score for the attitude.** The mistake happens because the number summarizes, and the summary seems to be the thing summarized. *How to spot the mistake:* the report says "Hugo's attitude is 5" or "the group's attitude is 5.2." The number is a mark, with an assignment rule, from one person, in one situation; state the instrument, the rule, and the situation (Sections 23.1 and 23.5).

2 **Calling any scale "Likert" without stating the format.** The mistake happens because "Likert" has become, in everyday use, a generic name for a scale. *How to spot the mistake:* the method says "we used a Likert scale" and does not state points, anchors, neutral point, or direction. Write down the four decisions (Section 23.2).

3 **Reading zero or the middle as "neutral" or "indifferent."** The mistake happens because the instrument's rule calls that point neutral, and the name seems to describe the person. *How to spot the mistake:* you write "evaluated neutrally" based on a mark in the center. The neutral point belongs to the instrument; the mark may be indifference, ambivalence, or lack of an opinion, and "neutral" objects do not always land in the middle (Section 23.5). The neutral valence of Chapter 2 is something else: "I don't care either way," said about an object, is a position of indifference taken by the person; a mark in the center does not, on its own, say that this is what happened.

4 **Mixing dimensions in the mean without saying so.** The mistake happens because a single mean is simpler to report than a profile by scale. *How to spot the mistake:* the mean includes evaluation scales and activity and potency scales, and the text talks about the "evaluation" of the object. Calculate by factor, or state which scales are included and why (Section 23.3).

5 **Comparing scores from different formats or stimuli as if they came from the same instrument.** The mistake happens because the name of the instrument is the same, and the changes in format seem like details. *How to spot the mistake:* before and after differ in points, direction, stimuli, or setting, and the text attributes the whole difference to training; or "not significant" turns into "equal." Keep the instrument the same and state what changed (Sections 23.2, 23.5, and 23.6).

SUMMARY

Scale (objective 1). A scale is a situation of ordered alternatives, usually between two anchors, with a rule set beforehand that assigns a number to each one. The mark is the person's; the number, the rule's. The score is the result for a person or a stimulus.

Three formats (objective 2). The Likert-type scale gives graded alternatives between two extremes; the semantic differential, several seven-interval bipolar scales about the same concept; the SAM, figures, in one domain at a time. Likert, in the strict sense, has five categories; the others are "Likert-type," and the report states points, anchors, neutral point, and direction.

Building and calculating (objective 3). In the differential, the value is that of the interval relative to the positive pole defined by the researcher, from −3 to +3, whether that pole is on the left or on the right. The score is the mean of the chosen scales, and we must state which ones (evaluation, activity, potency).

Interpreting (objective 4). The sign is the direction, and the distance from the neutral point, the degree assigned. The zero belongs to the instrument; the mean belongs to the group; the difference holds for the conditions compared, and "not significant" is not "equal."

Limits (objective 5). The format, the stimuli, the setting, and the audience are part of what is measured. A scale does not say why the person marked what she did or what she would do outside the measurement situation.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. (Hypothetical case.) For each item, state whether it is a scale and, if not, why: (a) "How do you evaluate the group supervision? Mark from 1 (bad) to 7 (good)." (b) "Which time do you prefer: morning, afternoon, or evening?" (c) "Tell us in your own words what you think of the group supervision." (d) "Mark, between 'useless' and 'useful,' the position that best represents the group supervision, with seven intervals."

2. (Hypothetical case.) On a semantic differential sheet, Olívia marked the third interval, counting from the left, on the "slow-fast" line (fast on the right) and the first interval on the "pleasant-unpleasant" line (pleasant on the left). (a) What is the value of each mark? (b) Who produced the mark and who produced the value?

3. (Records constructed for the exercise.) On five seven-interval scales, Hugo marked positions 2, 6, 4, 7, and 3, counting from the left. The positive pole is on the right on scales 1, 3, and 5 and on the left on scales 2 and 4. Calculate the value of each mark and the score.

4. (Records constructed for the exercise.) A sheet has six scales: four from Factor 1 (evaluation), with values +3, +2, +2, and +1, and two from Factor 2 (activity and potency), with −2 and −3. (a) Calculate the mean of the six, of the four, and of the two. (b) What does the difference among them show, and what should the report say?

5. (Hypothetical case.) Three instruments: (a) seven points, from "strongly disagree" to "strongly agree"; (b) five points, from "strongly approve" to "strongly disapprove," with a neutral point; (c) ten points, from 1 (bad) to 10 (good). In Dalmoro and Vieira's (2014) sense, which is Likert and which is Likert-type? What information does the report need to give about any of them?

6. (Records constructed for the exercise.) On a scale from 1 to 10, on which the instruction says that "5 and 6" are neutral, the means for six everyday objects were 7.3, 6.4, 6.1, 5.8, 5.5, and 4.7. Using Cameoka and Moreira's rule (below 5, negative; from 5 to 6, neutral; above 6, positive), classify each mean. What does the result say about the scale's "neutral"?

7. (Records constructed for the exercise.) Twelve people answered the same item in two formats, the second with the alternatives in reverse order. Values in format 1: 3, 4, 2, 5, 3, 4, 1, 3, 4, 2, 5, 3. Values in format 2, in the same order of people: 3, 3, 2, 5, 4, 4, 1, 3, 3, 3, 5, 4. (a) Calculate the mean of each format. (b) How many people marked different values? (c) What does this show about using only the mean?

8. (Hypothetical case.) A researcher uses the SAM with children and writes: "the mark shows the child's evaluation of the face." (a) Which SAM domain(s) did Mizael, de Almeida et al. (2016) use? (b) What did the instruction ask for? (c) What record would make it possible to decide whether the mark can be read as an evaluation?

9. (Hypothetical case.) Beatriz writes: "The group mean on the 1-to-7 scale was 5.2, so all the interns evaluate the supervision as favorable." What is the most appropriate criticism?

a. It is correct: a mean above 4 means that everyone evaluates favorably.

b. The mean describes the set, not each person; and "favorable" depends on the neutral point, which belongs to the instrument.

c. It is incorrect, because scales do not measure attitudes.

d. It is incorrect, because the mean of a scale cannot be calculated.

10. (Hypothetical case.) Beatriz wants to compare, across two semesters, the evaluation of the group supervision with that of the individual supervision, using the 1-to-7 rating. (a) List at least five decisions she needs to settle before administering it. (b) Write a sentence for the report that states what the result does not reach.

ANNOTATED ANSWER KEY

1. (a) It is a scale: ordered alternatives, from 1 to 7, with the number assigned by a rule. (b) It is not: the alternatives have no order, and the number would be only a label (closed question). (c) It is not: a free response, with no alternatives and no assignment rule set beforehand; the researcher may code it afterward as topography (Chapter 22). (d) It is a scale (one pair from the semantic differential, with seven intervals).

2. (a) Slow-fast: third interval, with fast on the right, worth 3 − 4 = −1. Pleasant-unpleasant: first interval, with pleasant on the left, worth 4 − 1 = +3. (b) The mark is Olívia's; the value, the researcher's rule (Section 23.1).

3. Scale 1 (positive on the right), position 2: 2 − 4 = −2. Scale 2 (positive on the left), position 6: 4 − 6 = −2. Scale 3 (right), position 4: 0. Scale 4 (left), position 7: 4 − 7 = −3. Scale 5 (right), position 3: −1. Sum: −8; score (mean of the five): −1.6. Hugo marked the negative side on four of the five scales.

4. (a) Six scales: (3 + 2 + 2 + 1 − 2 − 3) ÷ 6 = +0.5. Four from Factor 1: 8 ÷ 4 = +2.0. Two from Factor 2: −5 ÷ 2 = −2.5. (b) The mean of the six (+0.5) hides that the object is evaluated on the positive side (+2.0) and described on the "slow, passive, weak" side (−2.5). The report states which scales go into each mean, or presents the means by factor (Section 23.3).

5. Only (b) has the five categories and the neutral point of the strict sense (Dalmoro & Vieira, 2014, p. 163); (a) and (c) are Likert-type. In any case, the report states the number of points, the anchors, whether there is a neutral point, and the direction (Section 23.2).

6. 7.3, 6.4, and 6.1: positive (above 6). 5.8 and 5.5: neutral (5 to 6). 4.7: negative (below 5). Three of the six "everyday" objects came out on the positive side: the scale's neutral is a rule, not necessarily where people put what they are indifferent to (Section 23.5).

7. (a) Format 1: 39 ÷ 12 = 3.25. Format 2: 40 ÷ 12 = 3.33. (b) Five people (the 2nd, 5th, 9th, 10th, and 12th): 5 of 12, about 42%. (c) The means differ by 0.08, and almost half the people marked another value: the group mean barely moves, while the people do move (Section 23.5).

8. (a) Only pleasure, out of three domains (p. 453). (b) It asked what they felt on seeing the picture (p. 453), the pleasure level elicited (p. 454): a report of a reaction (Section 17.4), and not necessarily an evaluation of the face. (c) Recording, for the same faces, the SAM mark and a rating from "bad" to "good" and seeing whether they vary together (Section 22.4).

9. b. Option **a** treats the mean as if it described every person and assumes that 4 is neutral for everyone. Option **c** is wrong to say that scales do not measure attitudes: they give a measure, with the limits discussed in the chapter. Option **d** is wrong because means of scales are calculated in the studies discussed in this book (Bortoloti & de Rose, 2009, p. 570).

10. (a) For example: the number of points; the anchors; whether there will be a neutral point and what it means; the direction (always the same?); the wording, asking for a position and not agreement with a belief; the rule for assigning numbers; who administers it, where, and with whom present; and the same format in both semesters. (b) For example: "The ratings are the position marked by each intern, on a scale from 1 to 7 (from bad to good, neutral at 4), at the supervision meeting, with the coordinator present; they do not show why the interns marked that position or what they would do outside that meeting."

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 24. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1	23.1
2, 3	23.3 and common mistake 4
4	23.3 and common mistake 4
5	23.2 and common mistake 2
6	23.5 and common mistake 3
7	23.5 and common mistake 5
8	23.4
9	23.5 and common mistake 1
10	23.2 and 23.6

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CHAPTER

24 The Measurement of Attitudes

implicit measures

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** an implicit measure as the record of performance on a task that does not ask the person to report what they evaluate, and **separate** the term from the idea of a "hidden" attitude.
2. **Describe** the IAT and the IRAP (what appears, what the person does, and what the computer records) and **calculate** the between-block effect and the D score.
3. **State** what latency records, what the "bias" reading assumes, and what the time difference does not show by itself.
4. **Treat** a divergence between the scale and the task as two records under different controls, without picking the "true" one.
5. **Point out** the limits of these measures (stimuli, audience, sensitivity, stability, and the link to behavior outside the task) and **write** a report sentence consistent with them.

PREREQUISITES

The three senses of "hidden" and the separately recorded reaction (Sections 17.3 and 17.4), equivalence classes and transfer of function (Chapter 20), relational responding (Chapter 21), latency, "strength," and social desirability (Sections 22.3, 22.5, and 22.7), the three ways of obtaining a record (Section 22.6), and the scale, the score, and the neutral point (Chapter 23). The new terms (implicit measure, IAT, compatible block, incompatible block, IAT effect, D score, IRAP, target stimulus, label, consistent block, inconsistent block, and trial type) are defined here.

OPENING

(Hypothetical case, continued from Chapter 23.) Beatriz took the mean of 5.2 on the 1-to-7 scale to the management of the training clinic, with the caveat that the rating is a report given to someone. Someone from

the research unit objects: "They know group supervision is the clinic's big bet. They would give it a 5 no matter what. There is a computer test that finds out what people really think, without asking." Beatriz is not sure the description is fair. She wants to know what this test records, what she will be able to say with it, and, if its result differs from the scale's, which of the two counts. Four questions organize the chapter.

1. *"What makes a measure an 'implicit' measure? Does it find out what people really think?"*
2. *"What does the person do in an IAT and in an IRAP, and what does the computer record?"*
3. *"If response time is longer in one block, what can be said?"*
4. *"If the scale and the test diverge, which one counts? What does the result entitle us to say, and what does it not?"*

The first is the subject of Section 24.1; the second, of Sections 24.2 and 24.3; the third, of 24.4; the fourth, of Sections 24.5 and 24.6.

24.1 What makes a measure implicit

Saying that a test "finds out what people really think" credits it with two things: that the person has something stored away and that the task reaches it. What can be verified is less: an **implicit measure** is the record of performance on a task that does not ask the person to report what they evaluate. The rest is interpretation, and it is worth seeing what the literature says. Mizael and de Almeida (2019, p. 438) summarize current usage: explicit measures "require participants to report their judgments deliberately," whereas implicit ones "capture automatic, nondeclarative, and immediate evaluations." Bohner and Dickel (2011, p. 394) assign implicit measures two purposes: to minimize "motivated response biases" and to investigate "aspects of attitudes that are not open to introspection."

Three things are mixed together in these sentences. The first is a property of the task: it does not ask the person to say what they evaluate, and this can be read in the instructions. The second is a hypothesis about the process, namely that the response is "automatic." The third is a hypothesis about the person, namely that they have no access to what the task records. Only the first lies in the task. The other two are interpretations of what was recorded, and the literature itself does not treat them as settled. Bohner and Dickel (2011, p. 395) write that "the process

assumptions underlying response-time-based paradigms remain contentious," and Mizael and de Almeida (2019, p. 438) say that the distinction "depends directly on the explanatory perspective employed."

For behavior analysis, the same review proposes a criterion that does not go through consciousness. The difference between the two kinds of measure lies neither in the control of behavior (whether "deliberate or involuntary"), since behavior is determined by the environment, nor in the kind of behavior described: it "lies in how quickly these relational responses are evoked" (Mizael & de Almeida, 2019, pp. 438–439). In the relational elaboration and coherence (REC) model, brief and immediate relational responses would be the basis of what researchers call implicit attitudes, and elaborated, extended ones the basis of what they call explicit attitudes (p. 439). The proposal is recorded here; it was not consulted in the original source (Barnes-Holmes, Barnes-Holmes et al., 2010, as cited in Mizael & de Almeida, 2019, p. 439). One consequence is retained: on this reading, what distinguishes the two measures is a property of the response being measured, its timing, and not a place where the attitude would reside. The authors call attitude "verbal behavior" in the sense of Relational Frame Theory (p. 439); here, where "verbal" was fixed in Chapter 14, "relational responding" is used for that sense (Section 21.5).

The usage has a precedent within behavior analysis itself. Catania (1999) notes that some kinds of remembering "cannot be assessed simply by asking what someone remembers" (p. 351) and defines implicit memory as "remembering demonstrated by the effect of an item on other behavior, rather than by its own recall" (p. 411). "Implicit," there, means shown through an effect on another performance, not through a report. That is the sense adopted here for the measure.

KEY CONCEPT

An **implicit measure** is the record of performance (usually time and correct responses) on a task that does not ask the person to report what they evaluate, obtained under conditions the researcher manipulates; the evaluation is inferred from the difference between conditions. "Implicit" qualifies the measure, that is, the task, and not a place where the attitude would be hidden (Table 17.3).

Two consequences. First, what makes a measure implicit lies in the instructions, and so it can be verified. In the tests in this chapter, the response rule is given by the researcher and changes from one block to the next; the person is never invited to say what they think. Second, the

word does not claim that the person cannot report what they evaluate. They can, and on the scale (Chapter 23) they do. What we have, for the same person, are two records obtained in two tasks.

EXAMPLE

Beatriz asks the person to sort, as quickly as they can, expressions that refer to group supervision or to individual supervision and pleasant or unpleasant words, pressing one of two keys, and the computer records the time of each sorting response. Nobody asks what the person thinks: the record is the performance.

NON-EXAMPLE

"Tell me, without thinking too much, whether group supervision is good or bad," with Beatriz holding a stopwatch. The person is asked to report what they evaluate; the time is just one more property of the report (Section 22.3). By the book's criterion, it is still a question, not a task without report.

TEST YOURSELF

In a task, the person must press "J" if the word on the screen is pleasant and "F" if it is unpleasant. Before each word, a photograph of a face appears for an instant. The computer records the time. Is this an implicit measure by the chapter's criterion? At what point does the reading "it reveals the person's attitude toward the face" stop being description?

ANSWER: it is, because the task does not ask the person to report what they evaluate, and the record is the sorting time. Reading it as an attitude is interpretation: it assumes that the face elicited an evaluative response that sped up or slowed down the sorting of the word, and that is a hypothesis to be tested (evaluative priming, Section 24.2).

24.2 The IAT: two keys and four categories

The **IAT** (*Implicit Association Test*) is the best-known task in the group. Greenwald et al. (1998, p. 1464) present it as a measure of the "differential association of 2 target concepts with an attribute" and lay out its logic in the abstract itself. Responses are quicker when the instructions require two strongly associated categories (flower and pleasant) to be assigned to the same key than when the shared key goes to two weakly associated ones (insect and pleasant).

In the task, the person presses the left or the right key to sort, as quickly as they can, stimuli belonging to one of four categories: two target categories, such as the supervision formats, and two attribute categories, such as "pleasant" and "unpleasant." In one critical block, one key is assigned "group supervision or pleasant" and the other "individual supervision or unpleasant"; in the other critical block, the assignment of the target categories is reversed (Bohner & Dickel, 2011, p. 395). What is compared is the sorting time under the two combinations. Figure 24.1 shows the sequence of blocks.

Figure 24.1

The sequence of seven blocks in an IAT

Block	Trials	Function	Left key	Right key	
1	20	practice	group supervision	individual supervision	
2	20	practice	pleasant	unpleasant	
3	20	practice	group supervision or pleasant	individual supervision or unpleasant	presumably compatible combination (Beatriz's assumption)
4	40	**test**	group supervision or pleasant	individual supervision or unpleasant	
5	20	practice	individual supervision	group supervision	*target categories reversed*
6	20	practice	individual supervision or pleasant	group supervision or unpleasant	presumably incompatible combination
7	40	**test**	individual supervision or pleasant	group supervision or unpleasant	

Stimuli appear one at a time: expressions referring to each supervision format and pleasant or unpleasant words. The person presses the key for the category the stimulus belongs to, as fast as possible.

Note. Diagram prepared for this book, with the categories of a hypothetical case, based on the sequence and number of trials in Greenwald et al. (2003, p. 198). For half of the participants, blocks 1, 3, and 4 switch places with blocks 5, 6, and 7.

Blocks 1 and 2 present each discrimination on its own; blocks 3 and 6 repeat the combination as practice; blocks 4 and 7 are the test blocks. The original scoring used only blocks 4 and 7, and the improved scoring uses all four (Greenwald et al., 2003, p. 214).

The **compatible block** is the one that combines the categories the researcher assumes to be more strongly associated, and the **incompatible block** is the other one. The classification is the researcher's, made before data collection, based on what they assume about people's histories; it is not something the task shows. The **IAT effect** is the difference between the mean latencies of the two combinations, incompatible minus compatible (Greenwald et al., 1998, p. 1468). In current scor-

ing, this difference is divided by the standard deviation of all latencies in the two test blocks, and the quotient is the **D score** (Greenwald et al., 2003, p. 201). There is a reason for the division: the size of differences between means tends to be correlated with the variability of the data the means come from, and the divisor adjusts for this effect (p. 201).

KEY CONCEPT

In the IAT, the **IAT effect** is the mean latency of the **incompatible** block minus that of the **compatible** block, and the **D score** is this effect divided by the standard deviation of all latencies in the two blocks. "Compatible" is the researcher's assumption about which categories history associates, and the score does not confirm it by itself.

Two numbers from the original article show what the effect is and what it depends on. With flowers and insects, the mean effect was 129 ms when the incompatible combination came before the compatible one and 223 ms when the compatible one came first (Greenwald et al., 1998, p. 1468). The same task, with the same kind of stimulus, changed by 94 ms depending on block order. That is why the current IAT counterbalances order across people and, in one version, adds practice trials, strategies that "were used successfully to reduce the typical effect" of order (Greenwald et al., 2003, p. 198). With White American students and first names typical of White and of Black people, the mean effect was 179 ms, with faster responses when "White" and "pleasant" shared a key (Greenwald et al., 1998, p. 1474). The authors read it as an "implicit attitudinal preference" for White (p. 1474). Section 24.5 returns to this reading.

There are other tasks in the same group. In evaluative priming, the person classifies a target word as positive or negative; the word is preceded, sometimes in masked form, by a stimulus standing for the attitude object (photographs of older or younger people, for instance). When the prior stimulus and the word carry matching evaluations, times get shorter; when they do not match, times get longer (Bohner & Dickel, 2011, p. 395).

EXAMPLE

(Records constructed for the example.) In Beatriz's IAT, the first combination, which she assumes to be compatible, was "group supervision or pleasant" versus "individual supervision or unpleasant"; then the target categories were reversed. Hugo's mean latency was 780 ms in the first combination and 910 ms in the second, and the standard deviation of all latencies in the two blocks was 260 ms. IAT effect: 910 − 780 = 130 ms. D score: 130 ÷ 260 = 0.50.

NON-EXAMPLE

"Hugo's D score is 0.50, so his attitude toward group supervision is worth 0.50." The 0.50 is a time difference between two combinations, divided by the variability of the latencies, in a task with a given block order. It is not a position on a scale, nor the "size" of an attitude (Section 22.5).

TEST YOURSELF

Beatriz classified "group supervision or pleasant" as the compatible combination. Olívia had a mean latency of 820 ms in that combination and 700 ms in the other. What is Olívia's IAT effect? What does the sign say about Beatriz's assumption?

ANSWER: 700 − 820 = −120 ms. Olívia was faster in the combination Beatriz had classified as incompatible: the result runs against the assumption, and the name "compatible" was Beatriz's, not the task's.

24.3 The IRAP: relations to confirm or deny

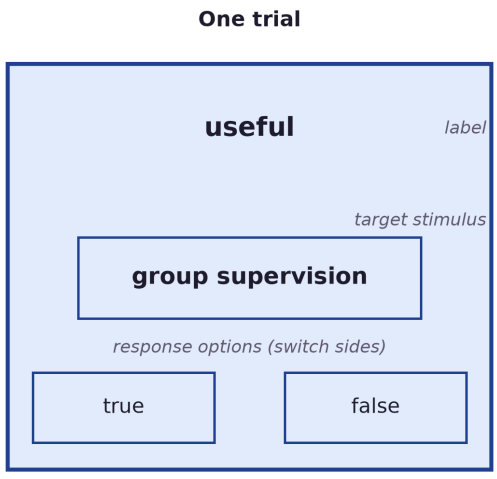
The **IRAP** (*Implicit Relational Assessment Procedure*) was proposed by behavior analysts (Barnes-Holmes et al., 2006, as cited in Mizael & de Almeida, 2019, p. 439). Matsuda et al. (2020, p. 339) describe it as a computer-based procedure for measuring "implicit cognition," or the "relatively quick reactions that cohere with the respondent's prevailing learning history." As the name says, what is presented is a relation.

On each trial, a **target stimulus** (the evaluated object, such as a photograph or an expression), a **label** (usually an adjective or another stimulus with valence), and two response options, such as "true" and "false," "yes" and "no," or "similar" and "opposite," appear at the same time. The person must confirm or deny the relation between label and target, and has, on average, about two seconds per trial (Mizael & de Almeida,

2019, p. 439). The positions of label and target vary across studies, and the response options usually switch corners from trial to trial (pp. 439–440). When reading an article, look for which stimulus it calls the target and which it calls the label: the term is not the same in every source.

The response rule comes from the researcher and changes from block to block. In a **consistent block**, the correct response is the one the researcher assumes to match people's learning history or social norm; in an **inconsistent block**, it is the opposite one. The blocks alternate. Errors produce a red X in the center of the screen, and the next trial appears only when the person responds according to the block's rule (p. 440). Training blocks come before the test, and in a large share of the studies with adults, moving on to the test phase requires at least 80% correct in each block and a mean latency of no more than two seconds, in two consecutive blocks. The test phase usually has six blocks (p. 440). Each combination of a target category with a label category is a **trial type**, and the score is calculated by trial type. Figure 24.2 shows one trial and the correct response for each trial type in the two kinds of block.

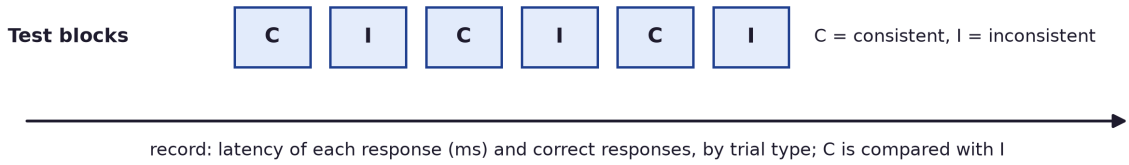
Figure 24.2
An IRAP trial and the response rule in each type of block



Correct response in each block

trial type (target + label)	consistent block	inconsistent block
group + useful	true	false
group + useless	false	true
individual + useful	false	true
individual + useless	true	false

What counts as "consistent" is the researcher's assumption (here, that history favors the clinic's preferred format), not something the screen shows.



Note. Diagram prepared for this book, with the categories of a hypothetical case. The screen layout (label at the top and target in the center) is the traditional one (Mizael & de Almeida, 2019, pp. 439–440); the position of the response options changes from trial to trial.

KEY CONCEPT

In the **IRAP**, the person answers, as quickly and accurately as they can, whether a relation between a label and a target is "true" or "false," in blocks whose rule the researcher reverses. The latency of each response and the correct responses are recorded by **trial type**, and time in consistent and inconsistent blocks is compared.

What the person says, in a block, is what the rule prescribes, not what they think. If the rule of the inconsistent block requires answering "true" to "group supervision" with "useless," Hugo's "true" on that trial is not his opinion; what matters is how long it took him to give it, compared with how long it took him, in the consistent block, to answer "false" to the same pair.

The study from Chapter 20 serves as an example. In Mizael, de Almeida et al. (2016), after equivalence-class training (Section 20.5), the children completed an IRAP with faces of White or Black people and positive or negative images, and the response options were "yes" and "no" (p. 456). White faces with positive images and Black faces with negative images were the relations treated as consistent (p. 456). The learning criterion was 70% correct in two consecutive blocks, with a maximum latency of three seconds (p. 456), and "latencies on the IRAP were transformed into D-IRAP scores for each of the four stimulus relations assessed" (p. 457). The D-IRAP formula is not the subject of this chapter. The four means did not differ from zero (p. 458), and the authors write that "the IRAP did not reveal positive or negative biases" toward either Black or White faces (p. 458) and that "the possibility that this IRAP was just insensitive cannot be ruled out" (p. 460).

Table 24.1 sets the two procedures side by side.

Table 24.1
The IAT and the IRAP side by side

	IAT	IRAP
What appears	one stimulus at a time, from one of four categories (two target, two attribute)	a label and a target at the same time, and two response options
What the person does	sorts the stimulus by pressing the left or the right key	confirms or denies the relation between label and target ("true" or "false")
Where the rule comes from	the assignment of categories to keys, given by the researcher and reversed between critical blocks	the correct response, given by the researcher and reversed between consistent and inconsistent blocks

	IAT	IRAP
What is recorded	the latency of each sorting response and the errors	the latency of each response and the correct responses, by trial type
How it is summarized	IAT effect (difference between means) or D score	D-IRAP score, by trial type
Who describes it here	Greenwald et al. (1998; 2003)	Mizael and de Almeida (2019); Mizael, de Almeida et al. (2016)

Note. Table prepared for this book.

TEST YOURSELF

In an IRAP, the block's rule requires answering "false" to "group supervision" with "useless," and Hugo answers "false" in 600 ms. The response is correct. What does it say about what Hugo thinks of group supervision?

ANSWER: by itself, nothing: he followed the block's rule. What the IRAP compares is mean time, by trial type, in the blocks where the rule requires one response and in the blocks where it requires the opposite.

24.4 What latency records, and what it does not

Latency is the time between a defined stimulus and the onset of the response (Section 22.3). In the IRAP, it is the number of milliseconds between the start of the trial and the choice of response (Matsuda et al., 2020, p. 339). That is the datum. What comes afterward is interpretation, and it is worth separating the steps.

The first step is the difference between blocks: on average, the person responded more slowly in blocks of one type than in blocks of the other. This is observation, subject to measurement error and order effects (Section 24.2). The second step is the assumption about history. The block the researcher assumes to match the respondent's history or social norm is called "consistent." Somewhat slower responding in the others would indicate that "stimulus pairings are not representative of a learning history or are inconsistent with a social norm" for the respondent, and such responses "are considered evidence of biased responding" (Matsuda et al., 2020, p. 339). The third step is the name: "bias" or "implicit attitude" is the label the researcher gives to the time difference.

Each step can fail on its own. The second fails visibly when the result runs against the assumption: in one of the reviewed studies, participants also answered "true" faster on "Black-safe" trials, contrary to the hypothesis (Barnes-Holmes, Murphy et al., 2010, as cited in Mizael & de Almeida, 2019, p. 449). And time itself can be manipulated: in the same study, reducing the latency limit from three to two seconds increased the pro-White bias on "White-safe" trials and produced a significant anti-Black bias on "Black-dangerous" trials, which had not appeared with three seconds (p. 450). The authors took the shorter limit as an increase in "automaticity" (p. 450). Here, "automatic," in this result, is the name of a time limit chosen by the researcher, not an observed property.

Two sources describe the same measure in ways that cannot be reconciled without a definition. Mizael and de Rose (2017, p. 370) say that the IRAP "measures the strength of brief relational responses"; Matsuda et al. (2020, p. 339) write that the test "does not measure the relative strength, probability, or persistence of relational responses" and that what is measured is latency. Section 22.5 showed why: "strength" has more than one sense, and here it was not defined. The report states what it measured, milliseconds between blocks, and says "strength" only if it has defined it. The lesson of Section 22.3 also applies: no paradigm is "process-pure" (Bohner & Dickel, 2011, p. 396).

⚠ CAUTION

The same number receives three names, each with one more assumption: "time difference" (datum), "bias" (assumes the inconsistent block is the one history makes less likely), and "implicit attitude" (further assumes the difference is an evaluation of the object). Write the name the datum supports.

✓ TEST YOURSELF

A report says: "The longer latency in the inconsistent block shows that the person has a negative implicit attitude." Which steps did the sentence skip?

ANSWER: the second and the third. It did not say where the assumption that that block is the inconsistent one comes from, nor why the time difference would be an evaluation. Rewritten: "In the blocks we assumed to be inconsistent with history, mean latency was longer by X ms."

24.5 When report and performance diverge

Beatriz may obtain, from the same interns, a mean of 5.2 on the scale and a D score close to zero on the IAT. What is that? Chapter 17 gave the formulation (Section 17.3): these are two responses, given in two tasks, under different controls, and the divergence is a datum to be explained. What remains is to see what the literature records.

The original IAT study offers a clear case. Of 26 White students who took the test with first names typical of White and of Black people, 19 marked, on the semantic differential, indifference or a preference for Black people, and all but one of those 19 had IAT scores indicating a preference for White people. Overall, the mean correlation between the explicit and the implicit measures was 0.14 (Greenwald et al., 1998, p. 1475). The authors read the result as a sign of "the pervasiveness of unconscious forms of prejudice" (p. 1475) and note two other things. First, that the weak correlation offers no support for convergent validity, but that, since they had expected implicit and explicit measures not to be necessarily related, it does not undermine construct validity either (p. 1475). Second, that there is a plausible alternative interpretation: the students knew the African American names much less well than the White ones, and this difference in familiarity "could explain the IAT results" (p. 1476).

Two comments, both proposed here. If a high correlation would count in favor and a low one does not count against, the correlation alone does not decide, and the reader needs another criterion (Section 24.6). And "unconscious prejudice" is the authors' interpretation, not what was observed: what was observed is that, in the same people, the rating on the semantic differential and the time on the IAT pointed in different directions. Audience does not suffice as an explanation either: the questionnaires were filled out in a booth and handed in inside an unmarked envelope (p. 1474), and the divergence appeared anyway.

Divergence is frequent in IRAP studies (Table 24.2). The review by Mizael and de Almeida (2019, p. 449) describes it as "common in research whose stimuli are related to a socially sensitive topic such as prejudice." Of the seven studies reviewed, coherence between the measures was assessed in four and found in two, in one of them only partially (p. 453).

Table 24.2

Five IRAP studies and what the report showed

Study	Participants	What the IRAP showed	What the report showed	Page
Power et al. (2009)	16 Irish and 16 Irish American participants	preferences in the predicted order (Irish over Scottish, Scottish over American, American over African)	13-point scales: equal preference for Irish and Scottish and greater preference for African than for American	448–449
Barnes-Holmes, Murphy et al. (2010)	31 Irish participants (public or private context) and 19 (2-s limit)	public context reduced the pro-White bias on "Black-safe"; 2-s limit increased the pro-White bias and produced an anti-Black bias	positive biases toward Black people, larger in the public context	449–450
Drake et al. (2015)	57 (36 met the criterion in both administrations)	in the second administration, in-group bias decreased, with no manipulation between administrations	less subtle racism and less social dominance among Black participants, more among White participants	450–451, 454
Power et al. (2017a)	34 (16 Black and 18 White)	White participants: pro-White with the label "White people," pro-Black on "Black-positive," and strong anti-Black bias on "Black-negative"	positive biases in both groups on the scales; only 6 of 30 correlations with the IRAP	452
Mizael, de Almeida et al. (2016)	13 children aged 8 to 10	no bias (means did not differ from zero), no IRAP at pretest	no difference between White and Black faces at posttest	451, 458

Note. Table prepared for this book, based on the summary of each study in Mizael and de Almeida (2019, pp. 448–452 and 454) and, in the last row, on Mizael, de Almeida et al. (2016, p. 458). The original studies, except the last one, were not consulted.

There are two readings in the literature, and here they are kept apart. In the REC model, divergence is predicted when the brief, immediate response is not coherent with the elaborated relational responding that follows it: "immediate or automatic evaluative responses may or may not agree with subsequent relational responding" (Barnes-Holmes, Barnes-Holmes et al., 2010, p. 60, as cited in Mizael & de Almeida, 2019, p. 453). On the reading of Chapter 17, the two responses are under different controls (the instructions, the type of response, the audience), and divergence is what one expects whenever those controls differ. They agree on one point that matters here: divergence is not, by itself,

the discovery of a true attitude beneath a false one. Mizael and de Almeida (2019, p. 453) say that "coherence is not necessarily desirable, just as its absence is not necessarily bad."

A hypothesis is raised here, and kept as a hypothesis: performance on the task reflects the history of relations between the object and evaluative stimuli, including those the culture establishes. Power et al. (2017a, as cited in Mizael & de Almeida, 2019, p. 452) explained the mixed pattern of the White participants in terms of stimulus control: on trials relating Black people to negative things, frequent negative portrayals in the media; on those relating them to positive things, exemplars such as Barack Obama and Nelson Mandela. It is a proposed explanation, not a tested one. Testing it would require manipulating the history (teaching or undoing a relation) and recording the task and the report before and after. That is almost the design of Mizael, de Almeida et al. (2016), which lacked the IRAP at pretest (p. 460).

⚠ CAUTION

When the scale and the task diverge, describe both responses and the conditions of each (instructions, type of response, who was present). Writing "the scale lied" or "the task revealed the truth" picks the result before having data that pick it.

TEST YOURSELF

In one study, 19 of 26 people said on the scale that they had no preference between two groups, and the IAT indicated a preference for one of them in 18 of those 19. Two possible explanations, without choosing between them?

ANSWER: for example, (a) the scale and the task are under different controls (audience and instructions on one side; the history of relations among the categories on the other); (b) the task's stimuli may have properties that have nothing to do with the group, such as the familiarity of the names (Greenwald et al., 1998, p. 1476).

24.6 Limits and use

The stimuli are part of what is measured. In the original IAT, the first names were selected by psychology students who judged which ones were more likely to belong to White or to Black people (Greenwald et al., 1998, pp. 1473–1474). Unequal familiarity was the alternative explanation the authors themselves pointed out (p. 1476). It is, in another instrument, the problem Section 23.6 pointed out in scales: Cameoka

and Moreira (2021, p. 98) set up a study using only the best-rated photographs of White men and the worst-rated photographs of Black men from earlier studies, to show how much the choice of stimuli can distort the result, and Chapter 32 deals with the choice of stimuli.

The audience does not disappear. A task without report reduces the exposure of what is said, but it does not eliminate the situation. Public or private context changed IRAP performance (Barnes-Holmes, Murphy et al., 2010, as cited in Mizael & de Almeida, 2019, pp. 449–450). In studies with the IAT, negative bias about homosexuality was smaller in the public context (Boysen et al., 2006, as cited in Mizael & de Almeida, 2019, p. 449). Cameoka and Moreira (2021, p. 107) point out that discriminative control by the audience has been "widely studied in social psychology under the label of social desirability."

Sensitivity and stability. A score that does not differ from zero may be absence of bias or insensitivity of the instrument, and the study from Chapter 20 says the second possibility "cannot be ruled out" (Mizael, de Almeida et al., 2016, p. 460). Internal consistency does not settle it: in that study, even and odd trials correlated at 0.676 (p. 458), which says the instrument is consistent with itself, not that it is sensitive to the change being sought. As for stability, which here means the instrument's stability (test–retest reliability) and not the persistence of an attitude (Section 22.5), in Drake et al. (2015) the second administration showed less in-group bias with no manipulation between administrations, and Mizael and de Almeida (2019, p. 454) write that changes of this kind "should not occur without some kind of experimental manipulation," which raises the question of test–retest reliability. Accuracy criteria also change what is concluded: a block with 100%, 100%, 100%, and 60% on the four trial types has a mean of 90%, and it passes a per-block criterion but not a per-trial-type criterion (p. 454). The authors conclude that the IRAP is an instrument still under development, with "promising" results, and that further investigations "are necessary" before its stability can be asserted (p. 455).

What is predicted outside the task. This is the question that matters most and the one least answered. Bohner and Dickel (2011, p. 410) report that attitude–behavior correlations tended to be stronger for explicit measures, but that implicit ones frequently added explanatory power beyond them, particularly on socially delicate topics. Albarracín and Shavitt (2018, pp. 303–304) cite a meta-analysis with the IAT that found mean correlations of 0.15 for racial attitudes and 0.12 for intergroup attitudes, somewhat smaller than earlier estimates (0.24 and 0.20). The review by Mizael and de Almeida (2019, p. 455) itself lists,

among the research still to be done, relating IRAP results to "behavioral tasks that illustrate discriminatory behaviors." And Mizael and de Rose (2017, p. 372) point out that such results "cannot be generalized," given the age, the specificity of the sample, and the latency and accuracy criteria.

Other records without report. Recording the physiological reaction separately (Section 17.4) is another route without report. In the study by Power et al. (2017b), with the IRAP and a 32-electrode electroencephalogram, the data of six of the 16 participants were excluded because of noise, and the authors say the results are "difficult to interpret" (as cited in Mizael & de Almeida, 2019, pp. 452–453). The FAST and the Relational Responding Task are other tasks proposed by behavior analysts (p. 439); this chapter does not describe them.

⚠ **CAUTION**

What the chapter asked for fits in one report sentence: "On the IRAP, participants responded, on average, 140 ms more slowly in the blocks we assumed to be inconsistent with history (D = 0.20) than in the consistent ones, with a 3-s limit, in the laboratory; we did not record what they would do outside the task." The reader redoes the task and decides what the number means.

Table 24.3 presents three report sentences that skip steps, with a rewrite of each.

Table 24.3
From what we have to what we can say

Report sentence	What it additionally assumes	Rewrite
"The test revealed Hugo's hidden attitude."	that there is a hidden attitude and that the task reaches it	"On the task, Hugo responded more slowly in the combination we assumed to be incompatible (effect of 130 ms)."
"The IRAP showed no bias, so there is no bias."	that "did not differ from zero" means absence	"The D-IRAP means did not differ from zero; the instrument may have been insensitive (Mizael, de Almeida et al., 2016, p. 460)."
"The implicit measure predicts discrimination."	a relation to behavior outside the task that was not recorded	"In this sample we did not record behavior outside the task; that relation is an open question (Mizael & de Almeida, 2019, p. 455)."

Note. Table prepared for this book; Hugo's sentences come from a hypothetical case.

The order from Chapter 22 still holds: the question, the property, the recording rule, and only then the instrument. The task is useful when the question is about performance under defined conditions and one accepts that the response is a time and a correct answer, not a report; for the degree people attribute, the scale is the tool (Chapter 23); for what they do outside any task, observation is (Chapter 22). Any of the three calls for joint recording, in the same people and on the same occasions, when the question is how they relate to one another.

TEST YOURSELF

A report says: "Because the IAT is an implicit measure, it is not subject to social desirability." Which source in the chapter allows you to challenge it?

ANSWER: the studies in which public or private context changed performance on the IRAP and on the IAT (Mizael & de Almeida, 2019, pp. 449–450). The task does not ask for a report, but it is done in front of someone, in a situation, and control by the audience may persist.

Common learner mistakes

1 **Taking "implicit" to mean "hidden" or "true."** The mistake happens because the literature itself describes these measures as access to what the person does not say. *How to spot the mistake:* you write "the task revealed what he really thinks." "Implicit" qualifies the task, which does not ask for a report; what is recorded is a performance (Section 24.1).

2 **Reading the D score or the IAT effect as the "strength" or "size" of the attitude.** The mistake happens because a bigger number seems to say "more attitude." *How to spot the mistake:* the report says "Hugo's attitude is 0.50." It is a time difference, divided by variability, between two combinations; "strength" was not defined (Sections 22.5 and 24.4).

3 **Treating "compatible" or "consistent" as data.** The mistake happens because block names appear in results tables as if they had been measured. *How to spot the mistake:* the text speaks of "the inconsistent block" without saying where the assumption about history comes from. The classification is the researcher's and can be contradicted by the result (Sections 24.2 and 24.4).

4 **Concluding "there is no bias" from a score that does not differ from zero.** The mistake happens because "did not differ from zero" sounds like "is zero." *How to spot the mistake:* the report says "the IRAP showed no bias" and goes on as if the bias did not exist. It may be insensitivity of the instrument or the lack of a pretest with the same measure (Section 24.6).

5 **Picking one of the two measures as the true one when they diverge.** The mistake happens because divergence seems to call for a tiebreaker. *How to spot the mistake:* you write "the scale is false" or "the task is what counts." Describe both responses and the conditions of each, and treat the relation between them as a question (Section 24.5).

SUMMARY

Implicit measure (objective 1). It is the record of performance on a task that does not ask the person to report what they evaluate. "Implicit" qualifies the task, not a place where the attitude would reside; that the response is "automatic" or "unconscious" are hypotheses, and the literature debates them.

IAT and IRAP (objective 2). In the IAT, the person sorts stimuli from four categories with two keys, in blocks in which the assignment of the target categories is reversed; the effect is the difference in mean latency between the blocks, and the D score divides it by the standard deviation. In the IRAP, the person confirms or denies the relation between a label and a target, in blocks whose rule is reversed, and the score is by trial type.

Latency (objective 3). The datum is time, in milliseconds. "Bias" assumes the inconsistent block is the one history makes less likely, and "implicit attitude" further assumes the difference is an evaluation. "Strength" has more than one sense, and the report does not use it without defining it.

Divergence (objective 4). Scale and task are two responses, given under different controls. Divergence is a datum to be explained, and neither result is "the true one."

Limits (objective 5). Stimuli, audience, sensitivity, stability, and the relation to behavior outside the task limit what can be said. The report sentence states what was measured, under what conditions, and what was not shown.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. (Hypothetical case.) For each item, say whether it is an implicit measure by the chapter's criterion and why: (a) a 1-to-7 scale, from "bad" to "good"; (b) sorting expressions and words with two keys, with time recorded; (c) "answer as fast as you can: do you like group supervision? Yes or no," with time recorded; (d) recording skin conductance while the person reads "group supervision."

2. (Records constructed for the exercise.) In Beatriz's IAT, the combination she assumes to be compatible is "group supervision or pleasant." Hugo had a mean latency of 760 ms in that combination and 880 ms in the other; Olívia, 810 ms and 790 ms. (a) Calculate each person's IAT effect. (b) What does the sign of Olívia's effect say about Beatriz's assumption?

3. (Records constructed for the exercise.) Using the effects from Exercise 2, calculate Hugo's D score, with a standard deviation of all latencies in the two blocks of 300 ms, and Olívia's, with 200 ms. Why does current scoring divide the effect by the standard deviation?

4. In the original IAT data, the mean effect was 129 ms when the incompatible combination came before the compatible one and 223 ms when it came after. (a) What is the difference? (b) What should the researcher do, when planning, because of it?

5. (Records constructed for the exercise.) In an IRAP block, the percentage correct on the four trial types was 100%, 100%, 100%, and 60%. (a) What is the block mean? (b) Does the block pass an 80% per-block criterion? (c) And an 80% per-trial-type criterion? (d) Why was the second form of criterion introduced?

6. (Hypothetical case.) In the inconsistent block of an IRAP, the rule requires answering "true" to "group supervision" with "useless." Hugo answers "true" in 640 ms. (a) What does the response say about what Hugo thinks of group supervision? (b) What does the researcher compare to arrive at any interpretation?

7. (Hypothetical case.) A report on children says: "The IRAP showed no racial bias; therefore, after training, they have no prejudice." Write a two-sentence critique, with the source.

8. (Records constructed for the exercise.) Beatriz obtained a mean of 5.2 on the 1-to-7 scale and, on the IAT, a mean D score of 0.05, which did not differ from zero. Write two sentences of interpretation that do not pick the "true" measure and that cite two controls over the response to the scale that the task does not have in the same way.

9. A meta-analysis with the IAT, as cited in Albarracín and Shavitt (2018, pp. 303–304), found mean correlations with behavior of 0.15 for racial attitudes and 0.12 for intergroup attitudes. (a) Calculate the square of each correlation. (b) What does this allow us to say about predicting what a person will do outside the task from their score?

10. (Hypothetical case.) Beatriz wants to give an IAT to the same interns who completed the scale. (a) List at least five decisions she needs to settle beforehand. (b) Write a report sentence that states what the result does not reach.

ANNOTATED ANSWER KEY

1. (a) No: the person reports what they evaluate (scale, Chapter 23). (b) Yes: it does not ask for a report, and the record is the performance (time and correct responses). (c) No, by the book's criterion: it asks the person to report what they evaluate, and the time is just one more property of the report. (d) It does not ask for a report, but it records a reaction, not a performance on a task: it is the separately recorded reaction (Section 17.4), whose reading as an evaluation is a hypothesis.

2. (a) Hugo: 880 − 760 = 120 ms. Olívia: 790 − 810 = −20 ms. (b) The negative sign indicates that Olívia was slightly faster in the combination Beatriz had classified as incompatible: the result runs against the assumption (and is small); the name "compatible" was Beatriz's (Section 24.2).

3. Hugo: 120 ÷ 300 = 0.40. Olívia: −20 ÷ 200 = −0.10. The division adjusts the effect for the variability of the data: the size of differences between means tends to be correlated with it (Greenwald et al., 2003, p. 201).

4. (a) 223 − 129 = 94 ms. (b) Counterbalance the order of the combinations across people (and, in one version, add practice trials), and state the order in the report (Section 24.2).

5. (a) (100 + 100 + 100 + 60) ÷ 4 = 90%. (b) It passes: 90% is greater than 80%. (c) It does not pass: one trial type stayed at 60%. (d) Because the block mean can hide a trial type with very low accuracy (Mizael & de Almeida, 2019, p. 454; Section 24.6).

6. (a) Nothing, by itself: the "true" is what the block's rule requires. (b) Mean time, by trial type, in consistent and inconsistent blocks; a single trial does not decide (Section 24.3).

7. For example: "A score that does not differ from zero does not prove the absence of bias: the authors of the study write that it cannot be ruled out that the IRAP was just insensitive (Mizael, de Almeida et al., 2016, p. 460). Moreover, the IRAP was not given before training, and we do not know what it would have shown then (p. 460)." (Section 24.6).

8. For example: "The mean of 5.2 is the position the interns marked on the scale, at Beatriz's request, in a setting where group supervision is the clinic's big bet; the D score close to zero is the time difference between two category combinations on a task without report. These are two responses, and we do not know which of them predicts what the interns do outside the clinic." Controls over the scale: the instructions (they ask for a position), the audience (who will read the rating), and the type of response (a number, with no time limit) (Sections 24.5 and 22.7).

9. (a) $0.15^2 = 0.0225$ (about 2% of the variance); $0.12^2 = 0.0144$ (about 1.4%). (b) That the score alone says little about what a person will do outside the task; the authors speak of low associations and of "promising" changes, but with no guarantee of change in behavior (Albarracín & Shavitt, 2018, pp. 303–304; Section 24.6).

10. (a) For example: what will be considered compatible and why; the order of the blocks across people; the stimuli in each category and how they were chosen; the criterion for excluding people and trials (errors, extreme latencies); and who administers the test, where, and with whom present. (b) For example: "The interns responded, on average, X ms more slowly in the combination we assumed to be incompatible; we have not shown that this corresponds to what they evaluate on the scale or to what they would do outside the task."

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 25. Fewer than that? Review the indicated sections and redo the exercises you missed:

If you missed exercise	Review
1	24.1 and common mistake 1
2, 3	24.2 and common mistake 3
4	24.2
5	24.3 and 24.6
6	24.3 and 24.4
7	24.6 and common mistake 4
8	24.5 and common mistake 5
9	24.6 and common mistake 2

If you missed exercise	Review
10	24.2, 24.3, and 24.6

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CHAPTER

25 Attitude Formation and Change

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** attitude formation and attitude change as differences between two points in time in the relation of an evaluation to its occasions and consequences, and **state** the record each claim requires (before, after, comparison, and persistence).
2. **Describe** the routes by which an evaluation is formed (direct consequences, observation of models, rules, stimulus pairing, generalization, and derived relations) in technical terms.
3. **Separate**, for each route, what the literature shows from what theory interprets.
4. **Choose** a route of change based on the hypothesized function of an evaluation and **justify** the record that would test it.
5. **Point out** the limits of a claim that an attitude "changed" (effect size, persistence, generalization, and report × behavior).

PREREQUISITES

The fundamental definition (Chapter 15), the operant, reinforcement, extinction, and shaping (Chapter 12), the separately recorded elicited reaction (Section 17.4), function and the three intervention paths (Sections 19.1 and 19.6), the equivalence class and transfer of function (Chapter 20), relational responding (Chapter 21), persistence (Section 22.5), and the measures in Chapters 23 and 24. The new terms (attitude formation, attitude change, comparable group, follow-up, imitation, modeling, rule, evaluative conditioning, and effect size) are defined here.

OPENING

(Hypothetical case, continued from Chapter 24.) The management of the training clinic read Beatriz's report and asked two questions. The first: "how do we get the class arriving next semester to come to evaluate group supervision favorably?" The second: "and the interns who

already evaluate it unfavorably, how do we change that?" Beatriz hesitates. Asking someone to "come to like" something seems to ask little of science and a lot of the person. She wants to know what the literature knows, what it only interprets, and what she would have to record to say that something changed. Four questions organize the chapter.

1. *"What counts as forming and as changing an attitude, and what must be recorded to claim it?"*
2. *"Through what routes does a person come to evaluate an object in a certain way?"*
3. *"How much does an intervention usually change, and what do the sources show about each route?"*
4. *"How do we choose a route for Beatriz's case, and what can be said about how long and how far the change extends?"*

The first is the subject of Section 25.1; the second, of 25.2; the third, of 25.3; the fourth, of Sections 25.4 and 25.5.

25.1 Forming and changing: what is claimed and what is recorded

By the definition in Chapter 15, an attitude is discriminated operant behavior whose topography is or implies attributing a value to an object. In that vocabulary, **attitude formation** is the transition to emitting this response in the presence of an object in whose presence it did not occur, under occasions and consequences that can be described. **Attitude change** is the alteration, in a person or a group, of the relation between the evaluative response, its occasions, and its consequences (its direction, its frequency, or the occasions on which it occurs). Both names designate differences between points in time, and they can be claimed only with a record of before and after (Section 20.6).

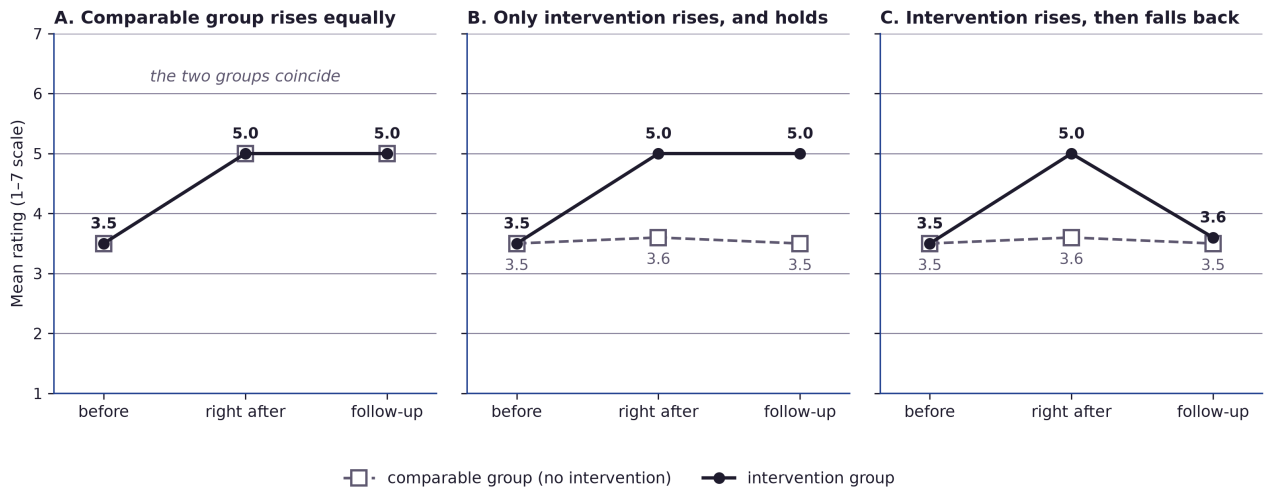
KEY CONCEPT

Attitude formation is the transition to evaluating an object in whose presence the evaluation did not occur; **attitude change** is the alteration, over time, of the relation between the evaluation, its occasions, and its consequences. Neither is observed at a single moment: both are claimed on the basis of a record made before and after, with the same measure.

The record has three requirements, and all three come from earlier chapters. The first is comparison: to attribute the difference to the intervention, one must know what would have happened without it, and so one measures before and after, and with a **comparable group** (the sources' control group) that did not receive the intervention, when possible (Section 20.6). The second is persistence, which requires a specified criterion and measure (Section 22.5): a new measurement, after an interval, called **follow-up**. The third is extension: on what other occasions and by what other measure the difference appears (Chapters 23 and 24). Albarracín and Shavitt (2018, p. 302) put the question in these terms: "If we measure attitudes at two points in time, how much of a difference will we notice?"

Figure 25.1

The record that supports "changed": three possible outcomes for the same before and after of the group that received the intervention



Note. Diagram prepared for this book; fictitious data.

Figure 25.1 shows why the three requirements are not a formality: the before and after of the group that received the intervention is the same in all three panels (from 3.5 to 5.0), and only the comparable group and the follow-up tell what it means. In the first panel, the comparable group rises in the same way, and what looked like an effect of the intervention is what would have happened without it; in the second, only the intervention group rises, and it keeps its rating; in the third, it rises and falls back.

EXAMPLE

(Records constructed for the example.) In the first three meetings, Hugo evaluated group supervision, without being asked, on 0 of 6 occasions when the topic came up. After two months, he did so on 4 of 6, and his evaluations came to be accompanied by an example of what had helped. There is a before and an after, with the same recording criterion (frequency per occasion, Section 22.2). It is a formation, in the chapter's sense, in Hugo's case.

NON-EXAMPLE

"This semester's class likes group supervision more than last semester's." These are two classes, each measured once. There is no before and after in the same people, and the difference may come from who enrolled, who administered the measure, and when. It is a comparison between groups, not a change.

TEST YOURSELF

A report says: "after the program, 70% of participants evaluate the format favorably; therefore, the program formed a favorable attitude." Which three recording questions does it leave unanswered?

ANSWER: how they evaluated it before (without the before, there is neither formation nor change); what happened to a comparable group without the program; and for how long, and on what other occasions or measures, the evaluation holds.

25.2 How an evaluation is formed

If attitude is an operant, the routes of formation are those of any verbal operant, and the literature consulted describes them in terms the reader already knows. The six routes follow, and Table 25.1, at the end of the section, brings them together.

Direct consequences. What Chapter 12 said of any operant applies here: the evaluation recurs if it is followed by a consequence that strengthens it. Matsuda et al. (2020, p. 337) write that operant learning of racial prejudice "occurs through reinforcement or punishment contingencies." Their example is someone who receives attention and approval from peers for voicing racist opinions and is therefore more likely to keep voicing them. Passarelli et al. (2023, p. 38) say that several reinforcers may be involved in learning individual racism: social approval,

tangible reinforcers, privileges, opportunities, and escape from or avoidance of aversive environments. Guerin (1994, p. 156) proposes that the first social function of attitudes probably arises through generalization: from tacts about environmental events to tacts about one's own behavior and, from there, to attitudinal tacts covering many of one's own actions. He also proposes (p. 158) that verbal communities can shape the verbal behavior of an attitude from one presented as an intraverbal to one presented as a tact, the latter being more likely to be reinforced in conversation.

Observation of models. In technical terms, **imitation** is behavior that duplicates some properties of a model's behavior (Catania, 1999, p. 407), and **modeling** is the presentation of the behavior to be imitated (p. 411). Matsuda et al. (2020, p. 337) write that observational learning consists of directly watching, or having modeled, the racist behavior of other people. They give the example of children whose parents make racist comments or take part in race-based attacks, who "may develop, practice, and perpetuate racially discriminatory behaviors." On homophobia, Fazzano and Gallo (2015, p. 540) point to three acquisition processes (shaping in terms of differential reinforcement, instruction following, and imitation of a behavioral model, which they also call modeling). And they judge it more likely that all three are involved in the development of prejudice and aggression against homosexuals. What the two sources provide is a description of processes, with examples, not a measure of how much each route contributes.

Rules. Catania (1999, p. 391) notes that, "because of the variety of definitions of rule," rule-governed behavior (verbally governed behavior) is "one of the most problematic expressions in the terminology of behavior analysis." In some usages, any verbal antecedent is a rule (when someone is told to do or say something); in others, only those that specify the contingencies (when someone is told what will happen if they do or say it). In this book, a **rule** is a verbal antecedent that tells the person what to do or say, or what will happen if they do it; when the distinction matters, the text says which of the two usages is meant. Guerin (1994, p. 160) analyzes his own case: his belief and his attitude about nuclear energy are "purely intraverbal," because he has never had any contact with it, and whatever he believes, likes, or dislikes about it comes from what others have told him and what he has read. This is the route of many attitudes: Guerin (p. 158) observes that many of the attitudes we hold concern events we have never encountered directly.

Stimulus pairing. The elicited reaction (Section 17.4) may come to occur in the presence of an object that was presented together with a stimulus that already elicited it; this is the pairing of respondent conditioning, not the matching-to-sample of Chapter 20. In social psychology, the effect of pairings on evaluations is studied as **evaluative conditioning** (*EC*, the abbreviation used by Bohner & Dickel, 2011, p. 400): in this book, the change in the evaluation of an object after it has been presented together with another, already evaluated stimulus. Bohner and Dickel (2011, p. 401) report, based on the meta-analysis by Hofmann et al. (2010, as cited by them), that the effects are larger when people are highly aware of the contingency, weaker in children than in adults, and larger when liking is self-reported than when it is assessed implicitly. This, according to them, suggests the operation of "higher-order mental processes" rather than simple associative links. They also note studies that obtained dependable effects in children, with little awareness of the contingency and with IAT-type attitude measures, which suggests that both associative processes and propositional reasoning may play a part. No choice between them is made here; transfer of function through classes is a third description (Sections 20.4 and 20.5).

Generalization. An evaluation formed with certain members of a category may occur in the presence of other members. Matsuda et al. (2020, p. 337) present the example of a child who watches a TV show in which the White characters are courageous police officers and the Black characters are criminals. Again and again, across different shows, the White officers arrest Black people, and after such exposure the child may come to think or say that all White people are courageous and all Black people are criminals. In the authors' terms, the child picks up a racial bias by being exposed to contingencies of reinforcement, and the bias generalizes "to people who look alike." It is a hypothetical example by the authors, and Chapter 13 showed how generalization is tested: the evaluation is recorded in the presence of stimuli that depart from the original along one dimension, to see whether it holds or drops.

Derived relations. Mizael, dos Santos, and de Rose (2016, p. 128) propose that attitude formation "can be conceptualized" as the formation of equivalence classes linking a stimulus class (for example, a social group, a set of objects) to evaluative attributes. The example they give (p. 130) is hypothetical: a child who directly learned the relations woman-thin, thin-beautiful, and beautiful-happy would, once the classes formed, have the "notion" that thin women are beautiful and happy,

and that beautiful, happy women are thin. The studies in Chapter 20 test formation and transfer in the laboratory; that attitudes form this way outside the laboratory is a proposal.

Table 25.1

Six routes by which an evaluation is formed

Route	What the person experiences	What the source says	Status
Direct consequences	evaluating, and having the evaluation followed by attention, approval, or another consequence	operant learning of prejudice takes place through contingencies of reinforcement or punishment (Matsuda et al., 2020, p. 337); several reinforcers may be involved (Passarelli et al., 2023, p. 38)	description of a process, with examples
Observation of models	seeing someone evaluate and be treated in a certain way	observational learning consists of directly watching, or having modeled, other people's racist behavior (Matsuda et al., 2020, p. 337); imitating a model is one of three processes by which prejudice against homosexuals is acquired (Fazzano & Gallo, 2015, p. 540)	description of a process, with examples
Rules	hearing or reading what to say and do	belief and attitude about an object one has never had contact with come from what one was told and has read (Guerin, 1994, p. 160, about himself)	analysis of a case, by Guerin
Stimulus pairing	encountering the object together with something that already elicited a reaction or evaluation	evaluative conditioning effects are larger when contingency awareness is high, and whether associative processes and propositional reasoning contribute is debated (Bohner & Dickel, 2011, p. 401)	laboratory findings, with a disputed interpretation
Generalization	evaluating an object and coming to evaluate similar objects in the same way	a child who sees, on television, White characters as courageous police officers and Black characters as criminals may come to say that all White people are courageous and all Black people are criminals (Matsuda et al., 2020, p. 337)	hypothetical example by the authors
Derived relations	learning relations between objects and other stimuli and deriving further ones	attitude formation "can be conceptualized" as the formation of equivalence classes linking a stimulus class to evaluative attributes (Mizael, dos Santos & de Rose, 2016, p. 128)	proposal, with laboratory studies (Chapter 20)

Note. Table prepared for this book.

⚠ CAUTION

The table and the text do not rank the routes by importance. None of the sources measures how much each route contributes to a given person's attitude, and the same evaluation may have been formed by more than one. When a text says "X's attitude was formed by modeling," ask what record shows it (Section 19.3).

TEST YOURSELF

(Hypothetical case.) Olívia has never attended a group supervision session and says it is "useless." She heard senior interns' opinions and read a complaint on a bulletin board. Which route is most plausible, and what record would show it?

ANSWER: the rule (what she was told and read), with the caveat that it is plausible, not demonstrated. The record: ask Olívia, before any intervention, where the evaluation comes from, and record whether her sentence repeats the senior interns' and on what occasions it occurs (Section 19.3).

25.3 How an evaluation changes: what is known

We begin with the order of magnitude. Albarracín and Shavitt (2018, p. 302) bring together meta-analyses and research syntheses on interventions, and Table 25.2 shows those relevant here. **Effect size** (d) is the difference between the means of two groups, measured in standard-deviation units (the usual statistical definition, not a quotation from the authors). They pair it with a percentage (U3) to make it easier to picture. For contact between two ethnic groups in field interventions, d = 0.28 and U3 = 61%, which they describe as roughly 61% of intervention participants holding positive intergroup attitudes, compared with 50% of those who had no contact.

Table 25.2

How much attitudes change: estimates from syntheses cited by Albarracín and Shavitt (2018)

Intervention (study cited)	d	U3	What the authors note
Imagining contact with a member of another group (Miles & Crisp, 2014)	0.36 (explicit); 0.31 (implicit)	64%; 62%	people asked to imagine the contact, in the laboratory, versus those who did not imagine it
Contact between two ethnic groups, in field interventions (Lemmer & Wagner, 2015)	0.28	61%	evaluation right after the contact

Intervention (study cited)	d	U3	What the authors note
Diversity training (Kalinoski et al., 2013)	0.23	59%	widely implemented in organizational settings
Interventions to reduce risky sexual behavior (Tyson et al., 2014)	0.257	about 60%	attitude measured right after and after a delay, with the same effect
Interventions based on the theory of planned behavior (Steinmetz et al., 2016)	0.24	59%	very varied domains: 33% physical activity, 19% nutrition, 16% work or study
Fear appeals (Tannenbaum et al., 2015)	0.20	57%	messages on health, financial decisions, and road safety

Note. Data from Albarracín and Shavitt (2018, p. 302); the studies cited were not consulted. The d is the usual statistical definition (difference between means divided by the standard deviation), not a quotation from the authors.

Three of the authors' observations matter for what follows. The first: "some attitude change is possible even in domains that are traditionally resistant to change" (p. 302). The second: many programs built for real-world settings aim at behavior change and frequently leave attitude change unmeasured. And laboratory research tends to yield larger effects than field studies, for several reasons, among them tighter control over distraction and less random error (p. 302). The third: overall, attitude change produced by interventions or messages delivered at one point in time "hovers around d = 0.22, which is a small effect" (p. 303). The numbers are small, and the interventions are very different from one another.

The behavior-analytic literature read in this book rarely calculates d. The studies follow a few people, one by one, and report how many changed and to what extent. Table 25.3 brings together those that sought to change an evaluation, already described in Chapters 20, 26, 27, 28, 30, 34, and 35, alongside the verbal reinforcement studies that preceded them. Two differences from Table 25.2 matter for anyone comparing them. The first is the unit: there, the mean of groups across dozens of studies; here, usually, the individual participant, in studies of 3 to 72 people. The second is what is asked: equivalence studies first ask whether the relations were learned and derived, and only then whether the evaluation changed. The numbers say in whom the change occurred, not how large it is on average.

Table 25.3

How much evaluations changed in the behavior-analytic and verbal reinforcement studies read in this book

Procedure (study)	Participants	What changed, and in how many	What the design does not tell us
Prearranged vote, of victory or defeat, after a debate (Scott, 1957)	72 debaters and 36 controls	up to five minutes later, opinion changed by +1.25 points, on a seven-point scale, among those who "won," −0.17 among those who "lost," and +0.31 among the controls (p. 73)	whether the change persists; separating approval from contact with the arguments (Chapter 26)
"Good" over the telephone after favorable or unfavorable answers (Insko, 1965)	72 students	about a week later, in class and on another scale, means of 10.40 and 8.20 in the groups reinforced in opposite directions (pp. 622–623)	whether the difference lasts longer than a week and whether it shows up in what people do (Section 26.4)
Equivalence training with photographs of Middle Eastern and American men and the words "Good" and "Evil" (Dixon & Lemke, 2007)	8 university students analyzed, of 12	in 5 of 8, the rating of the Middle Eastern man's image used in training came to exceed that of the American; on the mean of the ten images in each group, in 3 of 8 (Table 1, p. 8; the book's count)	comparable group, follow-up, and behavior outside the laboratory (Chapter 27)
Equivalence training with photographs of presidents, party acronyms, and abstract figures (Pereira & Moreira, 2021b)	5 students	the evaluation of the abstract figures changed by 11.9% to 48.8% between pretest and posttest (degree of transfer), and at posttest it was more than 90% similar to that of the photograph in the same class, in all of them (p. 150)	how much the scale varies without training; follow-up (Chapter 28)
Equivalence training between faces of Black men and positive symbols (de Carvalho & de Rose, 2014)	4 children, selected from 16	only one of the four reversed the pretest relations (p. 527)	why the other three did not reverse them; prior history competes with training (Section 20.5)
The same arrangement, with modified training (Mizael, de Almeida et al., 2016)	13 children	all 13 formed classes, and 9 maintained the relation when there were three comparisons (p. 459); on the SAM, the difference between Black and White faces stopped being statistically significant (p. 451), although White faces remained higher (p. 457)	comparable group, follow-up, and what the children do outside the room (Section 25.5)

Procedure (study)	Participants	What changed, and in how many	What the design does not tell us
The 2016 training with its parameters separated into four groups (Mizael, de Almeida et al., 2021)	46 children with bias at pretest	64% to 83% of the children in each group formed the classes; of the 33 who formed them, 27 maintained at least one relation after six weeks, and 17 maintained all four (Tables 30.1 and 30.2)	what was maintained were relations in the tests; evaluation outside the laboratory (Chapter 30)
Classes linking the supported club to "Poor" and the rival to "Good" (Haydu et al., 2015)	28 fans of three clubs	baseline and symmetry were formed; transitivity and equivalence did not emerge, and most errors were consistent with prior history (p. 385)	what would happen with different training or more sessions
Reorganization of classes with gender-linked professions (Rosendo & de Melo, 2018)	16 in two experimental groups and 32 controls	classes formed in both groups; reorganization reached criterion only in symmetry; evaluations partly consistent with the classes, with transfer on some scales (p. 31)	prior history with the professions, which the authors ask to be checked more carefully (p. 31)
Reading a comic, with the scale before and after (Moreira, Lemos et al., 2024; Silva & Moreira, 2025)	19 single-subject studies in the Part III volume; 3 swimming instructors in the 2025 study	the authors of the Part III volume speak of a "significant influence" of the characters (p. 19); in the 2025 study, adjective pairs changed in each participant, and the authors caution that the posttest right after the pretest may have induced bias (p. 398)	comparable group, delayed measure, and evaluation of the real object rather than the character (Section 34.5)

Note. Table prepared for this book, based on the studies indicated, described in Chapters 20, 26, 27, 28, 30, 34, and 35. The numbers are the authors', except the counts of five and three of eight in Dixon and Lemke.

Altering the consequences. In the literature consulted, the one most explicit about what to do with the consequence is the problem-behavior literature. Iwata, Pace et al. (1994, p. 235), discussing self-injurious behavior, write that the finding "underscores the importance" of interventions that replace the target response with another topography serving the same function, described collectively as functional communication training. Iwata and Worsdell (2005, p. 30), discussing noncontingent reinforcement, write that problem behavior tends to recur if it continues to be reinforced, so eliminating reinforcement should be an important component of the intervention. Both statements are about self-injury, not attitudes. Section 19.6 takes them as a logic (reinforce an alternative that produces what the response produced, without leaving the old response's consequence intact), and applying this to evaluation is the book's extrapolation. Passarelli et al. (2023, p. 39, note 8) point out that punishment generates avoidance and reduces prejudiced behavior

only in the context in which the person was punished, and they suggest that reinforcing antiracist speech may be a more effective strategy. These are the authors' propositions, not findings.

Reorganizing relations. Chapter 20 showed, in the laboratory, that equivalence classes can be formed and that evaluative functions can transfer through them, but that transfer is not automatic, that prior history competes, and that training is brief. Matsuda et al. (2020, p. 340) summarize the study by Mizael, de Almeida et al. (2016): following the procedure, every child showed the trained equivalence relations, and this learning lowered their negative bias toward faces of Black people. And they ask whether interventions built on laboratory procedures of this kind could be used to reduce racism more broadly. Mizael, dos Santos, and de Rose (2016, p. 128) ask, starting from the conceptualization of attitude formation as class formation, whether it would be possible to reverse or modify some attitudes by reversing or reorganizing the classes. Next (pp. 130–131), they propose, as a behavioral explanation of reclamation (the appropriation, by members of minority groups, of terms considered pejorative), the formation of new equivalence relations between words and neutral or positive evaluative attributes, through reorganization or reversal of the original classes; it is a proposal.

Telling the person. Telling the person that something else is true is the route the sources consulted treat with the most reserve. Matsuda et al. (2020, p. 340), after describing laboratory protocols aimed at reducing bias, write that research indicates that adding relations to the network ("Latin people come to the United States to work, not to steal") leaves preexisting biases unchanged and makes them more resistant to extinction. Perhaps, they say, what is needed is an approach that lessens the influence of rules and of the transformation of function within relational networks. The theory predicts the same in general terms: according to Roche et al. (2001, p. 202), instructional approaches to reducing prejudice are unlikely to succeed, and (p. 204) the propagandist would need to alter, through rhetoric, the functions of verbal relations already established, rather than trying to extinguish them. The study by Clayton (1995, as cited in Roche et al., 2001, p. 206), in which workers' attitudes changed more when positive attributes were linked to existing negative beliefs, is the support they present, and the authors themselves say their analyses are "largely interpretive" (Section 21.6).

Reading a story. Telling a story is another way of telling, and the comics studies in the Instituto Walden4 series use it as an intervention: the participant rates characters on 13 adjective pairs, reads the story, and

rates them again. In the 19 studies collected in the Part III volume, the design is always single-subject with a pretest and a posttest (Moreira, Lemos et al., 2024, pp. 13 and 18). The authors conclude that the characters exert a "significant influence" on participants' attitudes and that it was possible to identify attitude change (p. 19). What the record supports is a difference between points in time, on that scale and with those characters; Section 34.5 shows what is missing to say more: a comparable group, a delayed measure, and other ways of measuring.

Acceptance and commitment training. Matsuda et al. (2020, p. 341) write that only a handful of studies have evaluated interventions designed to reduce bias or to soften the effects of racial bias on the people affected. Most of the published ones, they write, deal with acceptance and commitment training (ACTr) interventions, an approach that teaches mindfulness, acceptance, and defusion skills in support of observable actions consistent with the person's values. The approach is described through what the source says about it, without examining the ACTr studies themselves; that is why it is presented as what has been published, not as what is known to work.

⚠ **CAUTION**

The effects in Table 25.2 are means across studies of group interventions, with varied instruments and measurement times. Saying that "contact reduces prejudice" is asserting a small mean across studies, not what will happen to each person or for how long.

TEST YOURSELF

A text says: "informing people about the facts corrects prejudice." Which source in the chapter allows you to challenge the sentence, and what exactly does it say?

ANSWER: Matsuda et al. (2020, p. 340): after describing laboratory protocols, they write that adding relations to the network leaves preexisting biases unchanged and makes them more resistant to extinction. The source describes what laboratory research shows, not a field measure.

25.4 Choosing the route for a case

Chapter 19 laid out the path: before intervening, observe the occasions and consequences, formulate a hypothesis about function, test it, and only then choose among altering the occasion, removing the consequence, or reinforcing an alternative (Sections 19.5 and 19.6). Table 25.4 adds the recording column.

Table 25.4

From hypothesized function to route and record (hypothetical case)

If the evaluation seems maintained by	Route of change	What to record
a social consequence from listeners (laughter, attention, approval)	change the audience or the consequence and reinforce an alternative that produces the same thing	the evaluations emitted per occasion, before and after, with the same audience and with a different one (Section 22.7)
a rule received ("it's useless"), without contact with the object	provide contact with the object's contingencies, rather than just saying something else, which the sources treat with reserve (Section 25.3)	the evaluation before and after the contact, and whether the sentence repeats the old rule
pairing with something aversive (being exposed, being corrected in public)	alter what accompanies the object, so that the reaction is elicited less	the separately recorded reaction (Section 17.4) and the evaluation, on the same occasions
a class of derived relations (the "group" format equivalent to "a waste of time")	reorganize the class, by training new relations	transfer tests and the evaluation, before and after, with a comparable group (Chapter 20)

Note. Table prepared for this book; the cases are hypothetical, and the routes are working hypotheses, not findings. The logic of the paths is that of Section 19.6.

For Beatriz's case, there is an order. The first task is not to choose the route but the hypothesis: why do the interns evaluate group supervision unfavorably? The answer comes from observing the occasions and asking what happens before and after each evaluation (Section 19.3), and there may be more than one, in different people. The second is to record, before anything else, the baseline, with the same recording criterion that will be used afterward. The third is to choose a route that can be tested: a change of format, a change in the audience, an experience of contact with the object. The fourth is to keep a comparable group, if possible.

TEST YOURSELF

(Hypothetical case.) The interns who evaluate group supervision unfavorably tend to do so when a senior intern is present and laughs at what the newcomers say. Which route does Table 25.4 suggest, and what record?

ANSWER: the first row (social consequence from listeners): change the audience or the consequence and reinforce an alternative. The record: evaluations emitted per occasion, with and without a senior intern present, before and after.

25.5 Limits, and what it means to intervene

Persistence. Saying that the change is "lasting" requires a criterion and a measure (Section 22.5). Scott (1957, p. 74) recorded opinion no more than five minutes after the result was announced and wrote that persistence was not assessed. Insko (1965, p. 622) measured attitude again about a week later, in a different situation (Section 22.5; Chapter 26 returns to these studies). Albarracín and Shavitt (2018, p. 303) write that change produced by interventions or messages can, in some cases, last quite a long time, since beliefs and attitudes are known to survive attempts to correct them. They add that changes in implicit attitudes "are promising, although still not an assurance of changes in behavior."

Extension. Change on one occasion may not appear on others. The requirement is the one from Section 25.1: record on other occasions and with another measure (Chapters 23 and 24). Mizael, de Almeida et al. (2016, p. 460), in the study with children from Sections 20.5 and 20.6, write that, although the training could change the participants' racial biases, "we should not be very optimistic" about lasting effects, because the children would go on living in the same environment that had produced those biases. And they call for future studies to check whether the outcomes are maintained at later follow-ups and whether they generalize beyond the experimental setting.

Report and behavior. When the measure of change is a report (Chapter 23), what changed is what the person says, in that situation, to whoever asks (Section 22.7). When it is a task, it is performance on that task (Chapter 24), and the relation between that performance and what the person does outside the task is an open question. Albarracín and Shavitt (2018, p. 302) note that many real-world programs aim at chan-

ging behavior and frequently leave attitude change unmeasured. Saying that "the attitude changed" is saying that what was measured changed, in that situation.

To intervene is to intervene. Forming or changing a person's evaluation of an object is an intervention on that person. It calls for a stated objective, the consent of those who take part, the possibility of declining, and evaluation of the outcome by the recording criterion that was announced. The processes in Section 25.2 do not distinguish the object: they apply to the evaluation that science is good and to the evaluation that a group is inferior, and Matsuda et al. (2020, p. 337) describe the second case. What distinguishes one use from the other is the objective and the decision of whoever conducts the intervention. Chapters 26 and 35 return to the subject with experiments and with behavioral engineering.

TEST YOURSELF

A program claims it "changed the attitude" of 40 employees, based on a questionnaire given on the last day of training. Which three limits does the chapter point out?

ANSWER: there is no record from before and no comparable group; the measure is from the last day and says nothing about persistence; and the questionnaire is a report and does not show what they do outside the training.

25

Common learner mistakes

1 **Claiming formation or change without a record of the before.** The mistake happens because the after is what one wants to show, and the before seems obvious. *How to spot the mistake:* the text compares two classes, or says "came to like" without saying what was there before. Demand the before, with the same measure (Section 25.1).

2 **Assigning the route without a record.** The mistake happens because, once you know the routes, any case seems to fit one of them. *How to spot the mistake:* you write "X's attitude was formed by modeling" because the example is plausible. The route is a hypothesis; the record of occasions tests it (Section 25.2).

3 **Taking the theory's proposal for a finding.** The mistake happens because the proposal appears on the same page as the studies, and in the same tone. *How to spot the mistake:* "change occurs through reorganization of relational networks" appears without a study. Say whether it is a description of a process, an interpretation, or data (Section 25.3).

4 **Expecting information alone to change the evaluation.** The mistake happens because, in everyday life, convincing someone seems to be just a matter of giving them the facts. *How to spot the mistake:* the intervention plan comes down to lectures or posters. Cite what the source says about adding relations to the network and check the occasion and the consequence (Sections 25.3 and 25.4).

5 **Concluding "it changed" from an immediate, self-report measure in one group.** The mistake happens because the measure taken at the end of the intervention is the easiest to obtain. *How to spot the mistake:* the sentence speaks of "lasting" change or change "in behavior." State what was measured, when, and in what situation (Section 25.5).

SUMMARY

Forming and changing (objective 1). They are differences, between points in time, in the relation of the evaluation to its occasions and consequences, and they can be claimed only with before, after, comparison, and persistence.

Routes of formation (objective 2). Direct consequences, observation of models, rules, stimulus pairing, generalization, and derived relations. The sources describe processes and give examples; they do not measure the contribution of each route.

Shows × interprets (objective 3). Meta-analyses yield small and varied effects; the theory's proposals (reorganizing classes, altering functions through rhetoric, ACT) are interpretation or prediction, and the studies that would test them are not among those consulted.

Choosing the route (objective 4). The hypothesized function guides the route, and the route brings the record that tests it; the first task is the hypothesis, and the second, the baseline.

Limits (objective 5). Effect size, persistence, extension, and report × behavior limit what can be said; and intervening in another person's evaluation is an intervention that calls for a stated objective and consent.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. (Hypothetical case.) Which route of formation (direct consequences, observation of a model, rule, stimulus pairing, generalization, or derived relations) does each situation illustrate? (a) A child laughs along when an uncle tells a joke about a group and receives attention. (b) A child sees the uncle tell the joke and later repeats it at school. (c) A child reads, on a poster, that "people from that neighborhood are no good." (d) A child had a bad experience with one neighbor and comes to avoid all residents of the neighborhood. (e) A child learned that A is equivalent to B and B to C, and comes to treat A as C.

2. (Hypothetical case.) "After the workshop, participants rated group supervision with a mean of 6.1." What records are missing to say that the workshop changed the evaluation? Name three.

3. (Records constructed for the exercise.) Intervention group: mean of 3.8 before and 5.1 after. Comparable group: 3.9 before and 4.4 after. (a) Calculate each group's change. (b) What is the difference between the changes? (c) What does the comparable group's result suggest?

4. In a synthesis cited by Albarracín and Shavitt (2018, p. 302), contact between ethnic groups had d = 0.28: about 61% of intervention participants had positive intergroup attitudes, versus 50% of those who had no contact. (a) What is the difference in percentage points? (b) What does this say about any particular person?

5. (Hypothetical case.) The interns evaluate group supervision unfavorably, usually when a senior intern is present and laughs at what the newcomers say. Beatriz proposes a poster listing the advantages of the format. (a) What is the hypothesized function? (b) Which route does Table 25.4 suggest? (c) Why does the poster, on its own, have little support in the sources?

6. (Records constructed for the exercise.) Beatriz measured a group's evaluation (1 to 7): mean of 3.6 before, 5.3 right after the intervention, and 3.7 three months later. Write a report sentence that says what can and cannot be claimed.

7. Classify each sentence as a description of a process, a proposal or interpretation of the theory, or a study result: (a) "operant learning of racial prejudice occurs through reinforcement or punishment contingencies" (Matsuda et al., 2020, p. 337); (b) "attitude formation can be conceptualized as the formation of equivalence classes" (Mizael, dos Santos & de Rose, 2016, p. 128); (c) "the propagandist needs to alter the functions of already established verbal relations through rhetoric" (Roche et al., 2001, p. 204); (d) d = 0.28 for contact between ethnic groups (Albarracín & Shavitt, 2018, p. 302).

8. (Hypothetical case.) A diversity program gave a questionnaire on the last day and says: "it changed the attitude of the 40 employees." Point out four limits and propose what to record.

9. (Hypothetical case.) Beatriz is thinking of telling the newcomers: "group supervision is good, trust us." Based on Matsuda et al. (2020, p. 340), what should she consider? And what does Guerin (1994, p. 160) add about people who have had no contact with the object?

10. (Hypothetical case.) Beatriz decides to change the format of the meetings and wants to know whether the evaluation improves. (a) List at least five recording decisions she needs to settle beforehand. (b) Write a report sentence that states what the result does not reach.

ANNOTATED ANSWER KEY

1. (a) Direct consequences (attention follows the response). (b) Observation of a model (imitation). (c) Rule (what the child was told or read). (d) Generalization (from one neighbor to the residents of the neighborhood). (e) Derived relations (equivalence). In each case, the route is the most plausible one, not a demonstrated one (Section 25.2).

2. For example: the evaluation before the workshop, with the same measure; a comparable group that did not take the workshop; and a measure after an interval, on other occasions (Section 25.1).

3. (a) Intervention: 5.1 − 3.8 = 1.3. Comparable: 4.4 − 3.9 = 0.5. (b) 1.3 − 0.5 = 0.8. (c) That the group without the intervention also rose: part of the change may come from time, history, or repeated measurement, and that is why the comparable group is necessary (Section 25.1; Figure 25.1).

4. (a) 61% minus 50% gives 11 percentage points. (b) Nothing definite about any one person: it describes groups. The 11 points summarize many people, and the same intervention may not have altered the evaluation of several of them (Section 25.3).

5. (a) Social consequence from listeners: the senior intern's laughter punishes the newcomer's speech, and the negative evaluation may be maintained by others' approval. (b) The first row: change the audience or the consequence and reinforce an alternative. (c) Because, in the sources, adding information does not modify preexisting biases and may make them more resistant to extinction (Matsuda et al., 2020, p. 340), and the poster changes neither the occasion nor the consequence (Sections 25.3 and 25.4).

6. For example: "The mean went from 3.6 to 5.3 right after the intervention and returned to 3.7 three months later: there was an immediate difference, not persistence (an interval of three months, with the same scale). We recorded neither a comparable group nor behavior outside the meeting." (Sections 25.1 and 25.5).

7. (a) Description of a process (with examples). (b) Proposal. (c) Interpretation of the theory (which the authors themselves call largely interpretive). (d) Result of a cited meta-analysis, not consulted in the source (Sections 25.2 and 25.3).

8. For example: there is no before and no comparable group; the measure is from the last day (no persistence); the questionnaire is a report, given to whoever administered it (Chapter 22); and the program did not record behavior. Record: the same measure before and after, a comparable group, a follow-up, and, if possible, observable behavior (Section 25.5).

9. That, according to what Matsuda et al. summarize from laboratory protocols, adding relations to the network (saying that something is good) does not modify preexisting biases and makes them more resistant to extinction, and that it may be necessary to reduce the impact of rules and of the transformation of function. Guerin adds that, for someone who has had no contact, the attitude is "purely intraverbal," made of what they were told and have read; contact with the object is what has not yet happened, and providing it is the working hypothesis of Section 25.4 (Sections 25.2 and 25.3).

10. (a) For example: the measure (scale or frequency of evaluations per occasion) and the recording criterion; the timing of the baseline; a comparable group; the follow-up (when and with what criterion); and who administers the measure and in front of whom. (b) For example: "The evaluation went from X to Y in the same people, with the same scale, over Z months; it does not show why it changed, nor what they do outside the meeting."

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 26. Fewer than that? Review the indicated sections and redo the exercises you missed:

If you missed exercise	Review
1	25.2 and common mistake 2

If you missed exercise	Review
2, 3	25.1 and common mistake 1
4	25.3
5	25.3 and 25.4 and common mistake 4
6	25.5 and common mistake 5
7	25.3 and common mistake 3
8	25.5
9	25.2 and 25.3
10	25.4 and 25.5

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PART IV

IV

Experimental Research

From theory to practice

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CHAPTER

26 Experiments

manipulations of consequences

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Describe**, for each study in the chapter, the procedure and the central finding.
2. **State** what the design of each study (groups, control, interval, measure) allows one to claim and what it leaves unanswered.
3. **Compare** the conditions under which a verbal consequence changed the response (which consequence, who noticed it, in what context).
4. **Separate** a change in what the person says, the persistence of that change, and manifest behavior outside the interview.
5. **Point out** the limits of what these studies show about attitude.

PREREQUISITES

The fundamental definition (Chapter 15), the operant and reinforcement (Chapter 12), attitude change and the record it requires: before, after, a comparable group, and follow-up (Chapter 25), and persistence (Section 22.5). The new terms (verbal reinforcement, awareness of the contingency, and manifest behavior) are defined here.

OPENING

(Hypothetical case, continued from Chapter 25.) A supervisor at the training clinic suggests to Beatriz: "just praise the people who speak well of group supervision, and the evaluation will improve." Beatriz wants to know what the experiments that manipulated verbal consequences show, and what they do not show. Four questions organize the chapter.

> 1. *"What did the first experiments do, and what did they find?"*
> 2. *"Does the effect last, and does it reach beyond the interview?"*
> 3. *"Does the person have to notice the consequence for it to work?"*

4. *"What does the effect say about what the person does outside the interview?"*

The first is the subject of Section 26.1; the second, of 26.2; the third, of 26.3; the fourth, of Sections 26.4 and 26.5.

26.1 Approval as a consequence: Scott, and Hildum and Brown

Verbal reinforcement is, here, the presentation of a verbal consequence (a word, a listener's approval, the announced result of a vote) right after a participant's response, with the effect on that response recorded. The studies in Sections 26.1 and 26.2 reinforce taking a position: defending one side in a debate, agreeing or disagreeing with a statement. In the broad sense of Section 19.2, that of any empirical demonstration of a cause-and-effect relation between the environment and behavior, they are functional analyses of evaluations, carried out with groups rather than with one person. A word on vocabulary: in "verbal reinforcement," as in the sources, "verbal" has the everyday sense of made of words; in the technical sense of Chapter 14, what is verbal is what the participant says, whose consequences are mediated by the interviewer.

Figure 26.1 illustrates the four situations the chapter examines: the debate with the announced vote, the telephone interview, the sentence-construction task, and the signing of the release form. What changes from one to the next is the response recorded and the consequence that follows it.

Figure 26.1

The experimental situations in the chapter



a Scott (1957)

Students argue in a debate for the side opposite to their own view; the class vote result, arranged beforehand, is announced, and opinion is measured again right afterward.



b Hildum and Brown (1956); Insko (1965)

By telephone, the interviewer reads statements and says "good" after answers in favor (or against); in Insko, attitude is measured again a week later, in class.



c Spielberger et al. (1962)

The participant builds sentences with a pronoun of her choice; the experimenter says "good" after those beginning with "I" or "we," and an interview checks whether she noticed the rule.



d DeFleur and Westie (1958)

At the end of an interview, the student receives a release form to be photographed with a Black person, with uses ranging from least to most objectionable, and decides what to sign.

Note. Illustrations generated for this book with artificial intelligence (Runway), from the description of the procedures in the articles; they do not reproduce the original participants, settings, or materials. The captions summarize the procedure described in Sections 26.1 to 26.4.

Scott (1957, pp. 73–75) asked general psychology students to debate in front of the class, on three topics, the side opposite to the one they had indicated on an opinion pretest. The result of the class vote was arranged in advance: half of the debaters, in a predetermined order, were rewarded by a supposed vote declaring them the better debater, and the other half were punished by having supposedly lost (pp. 73 and 75). Of the 58 planned pairs, 36 yielded complete data, that is, 72 debaters; an-

other 36 students, who did not debate, made up the control group (p. 73). The opinions, written as free responses, were copied onto cards identified only by numbers and coded on a seven-point scale (p. 73).

The "winners" shifted, on average, 1.25 points toward the side they had defended; the "losers," 0.17 in the opposite direction; the controls, 0.31 (p. 73). The difference between winners and losers was significant (t = 3.97; $p < .001$), the one between winners and controls was too (t = 2.49; $p < .02$), and the one between losers and controls was not (pp. 73–74).

Scott records what the design leaves unanswered. There was no condition in which students debated without a vote, so the effect of approval cannot be separated from the effect of contact with the arguments of the other side. Scott finds it more plausible that contact produced some change, which the vote then reinforced or extinguished, because an earlier study had shown that contact by itself tended to produce some change (p. 74). Few changes were large: of the 21 winners who shifted toward their debate position, only seven reversed their opinion, and the other 14 merely weakened it (pp. 73–74). At most five minutes passed between the announcement of the vote and the posttest, persistence was not assessed, and Scott assumes the effects were transitory (p. 74).

Hildum and Brown (1956, pp. 108–111) gave a telephone questionnaire of 15 questions, with four alternatives each, about the philosophy of Harvard's General Education program to 40 male students, randomly assigned to four groups of 10 (p. 109). The same interviewer, a trained linguist who kept his intonation the same across all groups, said "Good" or "Mm-hmm" right after favorable answers (in two groups) or unfavorable ones (in the other two) (p. 109). The statements were worded so that agreeing with some was favorable and agreeing with others was unfavorable; the interviewer was thus reinforcing an attitude, not one particular answer (p. 109).

Each answer was scored from 1 (strongly favorable) to 4 (strongly unfavorable), so the total ranged from 15 to 60, and fewer points meant more favorable (p. 109). With "Good," the mean was 24.95 in the group reinforced for favorable answers and 31.75 in the group reinforced for unfavorable ones (p = .01); with "Mm-hmm," it was 29.8 and 27.1, a difference in the direction opposite to the one predicted (p = .20) (p. 109). The authors sum up: "Good" biased the results and "Mm-hmm" did not, and the study, repeated with 25 undergraduates, gave the same result (pp. 110–111). They suppose that "Good" signaled approval more clearly than "Mm-hmm," whose meaning depends on intonation (p. 111).

KEY CONCEPT

Verbal reinforcement is the presentation of a verbal consequence contingent on a response, with the effect on the response recorded. In Sections 26.1 and 26.2, the response is taking a position (defending one side in a debate, agreeing or disagreeing with a statement); in Spielberger et al. (Section 26.3), it is beginning a sentence with a pronoun.

EXAMPLE

(Hypothetical case.) In an interview, each time the participant agrees with a statement favorable to group supervision, the interviewer says "good," in a neutral tone; after unfavorable answers, she says nothing. The consequence is verbal, contingent on the response, and recordable: the frequency of agreements over the course of the interview is the datum.

NON-EXAMPLE

Giving general praise, at the end of the meeting, to those who spoke well of supervision. It is not contingent on a defined response, and its effect on that response is not recorded: it is not verbal reinforcement in the sense used in this chapter.

TEST YOURSELF

In Scott's study, what was the consequence, and what was compared?

ANSWER: the announced result of the vote (winning or losing the debate); the "winners" were compared with the "losers" and with a group that did not debate (Scott, 1957, p. 75).

26.2 Does the effect reach beyond the interview? Insko, and Insko and Melson

Insko (1965, p. 622) asked the question raised in Section 22.5: is the effect a change in attitude, or only a short-lived change in the answers given during the interview? Six assistants each telephoned 12 students drawn at random from the experimenter's introductory psychology course ($N = 72$), six men and six women, and asked them to agree or disagree with 14 statements about creating a Springtime Aloha Week, a Hawaiian festival (p. 622). The statements said that the week would lead to certain ends, such as more tourist money or more traffic congestion,

and they were statements of opinion, not of attitude. Each assistant said "good" after answers indicating a positive attitude for 6 students and after answers indicating a negative attitude for the other 6 (p. 622).

In the interview, the mean of the group reinforced for positive answers was 28.22 and that of the group reinforced for negative answers, 20.69 (p. 622). About a week later, the experimenter handed out to his class of 225 students a questionnaire on local issues, with 15-point scales, and the Aloha Week scale was placed two-thirds of the way through (p. 622). Seventy of the 72 students interviewed answered the questionnaire. The mean of the positive reinforcement group (10.40) was higher than that of the negative group (8.20), with $t = 2.03$ ($p < .05$); the first fell in the area of the scale labeled "somewhat in favor of" and the second, in the area labeled "uncertain" (pp. 622–623).

Insko concludes that the effect backs the claim that verbal reinforcement changes attitudes, instead of merely altering, for a short time, what people answer in the interview. In operational terms, what the study showed is response generality: across time, across experimenters, across settings (home or classroom), across media of stimulation and of response (spoken or written), and across kinds of response (p. 623). Notice what supports this conclusion: one 15-point scale, answered by 70 people, one week later.

Insko and Melson (1969, p. 26) tested another explanation: if the effect were produced by the demand characteristics of the laboratory setting, it would not occur outside the laboratory and would be larger for people who know they are in an experiment. In Experiment I, 72 men from an introductory psychology course were reinforced with "good," on 12 statements about pay television, for favorable or unfavorable answers. Half were tested in the laboratory and half by telephone, without being told they were taking part in an experiment, at the beginning or at the end of the semester (p. 27). In Experiment II, with 20 participants in each combination of setting and direction of reinforcement, a baseline measured before reinforcement was added (pp. 31–32). At baseline, the means of the four groups were between 11.35 and 12.20. After reinforcement, the means of the groups reinforced for favorable and for unfavorable answers were 20.15 and 17.70 by telephone, and 20.35 and 18.95 in the laboratory (Table 4, p. 32). In both experiments, only the effect of reinforcement was significant ($F = 6.10$ and $F = 5.62$; $p < .05$), and setting did not interact with it ($F < 1$) (pp. 28 and 32). Reinforcement was therefore equally effective in both settings, and the demand-characteristics interpretation was not supported (pp. 36 and 39).

The effect was less robust than that of an earlier study by Insko and Butzine (1967, cited in Insko & Melson, 1969, p. 36), with the same statements: F = 6.10 and 5.62, against 23.09. The authors point out that the studies differ in several respects, such as the interviewer and the population (p. 36).

Two requirements that Passarelli et al. (2023, p. 40) set for applied research (Section 18.6) appear here in part: follow-up on the maintenance of effects "after the individual returns to his or her usual environment," and generalization tests "to new stimuli, contexts, and people." Insko's (1965) measure one week later is the only follow-up in the chapter, and Insko and Melson's (1969) comparison between laboratory and telephone is a test of generalization to another setting. What an intervention project records at these two points is in Section 35.4.

Table 26.1 is the map of the chapter: it brings together the eight studies, including those of Sections 26.3 and 26.4, for reference while reading.

Table 26.1

The studies in the chapter: what was done, what was measured, and what was found

Study	Participants and procedure	What was measured	Central finding
Scott (1957)	72 debaters (36 pairs) defend the opposite side; prearranged vote: winning or losing; 36 controls	opinion on a seven-point scale, before and up to five minutes after	winners +1.25; losers −0.17; controls +0.31 (p. 73)
Hildum and Brown (1956)	40 students by telephone; "Good" or "Mm-hmm" after pro or anti answers; four groups of 10	15 questions; total from 15 to 60	"Good": 24.95 vs. 31.75; "Mm-hmm": 29.8 vs. 27.1, in the opposite direction (p. 109)
Insko (1965)	72 students; "good" by telephone in opposite directions; classroom questionnaire about a week later	14 statements; one 15-point scale	28.22 vs. 20.69 (telephone); 10.40 vs. 8.20 (scale) (pp. 622–623)
Insko and Melson (1969)	72 and 80 participants; "good" in the laboratory or by telephone (pay TV)	statements; three measures of awareness	equally effective in both settings (p. 39)
Spielberger et al. (1962)	45 female undergraduates; sentences with a pronoun; "good" after I or we (30 reinforced, 15 controls)	pronouns; intensive interview	only those who reported the contingency learned (p. 115)
DeFleur and Westie (1958)	46 of 250 students (23 and 23, extremes of the verbal scale); release forms for a photograph with a Black person	release forms signed	significant relation, 14 of 46 in opposition (pp. 671–672)

Study	Participants and procedure	What was measured	Central finding
Linn (1965)	34 female undergraduates; seven items and seven matching release forms	attitude and signatures, from 0 to 7	means of 4.9 and 2.8; discrepancy of two or more points in 59% (p. 358)
Duke and Henninger (1998)	50 students; individual recorder lessons; correction by negative evaluation or by directive	11 statements; time and trials	no difference between conditions (p. 490)

Note. Table prepared for this book, with the figures from the sources.

⚠ **CAUTION**

Table 26.1 brings together studies with different measures, participants, and intervals; the columns do not make them comparable. Before comparing two findings, compare what was measured and when.

TEST YOURSELF

Why does Insko's (1965) study give stronger support than Scott's (1957) to the claim that attitude changed?

ANSWER: because the difference appeared about a week later, in another situation and with another instrument (Insko, 1965, pp. 622–623), whereas Scott measured only up to five minutes later and did not assess persistence (Scott, 1957, p. 74).

26.3 Does the person have to notice the consequence?

Awareness of the contingency is the person's ability to state, in a later interview, the relation between what he or she answered and the consequence received. Hildum and Brown (1956, p. 108) note that, in earlier verbal reinforcement studies, participants said they had seen no connection between their own behavior and the experimenter's reactions, and that this was described as learning without awareness.

In their data, 8 of 20 participants noticed that the interviewer said "Good," and only one of these took it as a sign of approval. Only 1 of 20 noticed the "Mm-hmm." And all of them denied that the interviewer's reactions had swayed their answers (p. 110). The authors see here a difference in awareness that may help explain why "Good" worked and "Mm-hmm" did not: "Good" is more "visible" in the interviewer's role,

because uttering it comes close to breaking the nondirective stance the role calls for (p. 110). They also distinguish levels of awareness (knowing the purpose of the study, noticing the interviewer's behavior, noticing the "Mm-hmm," realizing that it influenced one's answer). And they write that the reports of earlier experiments do not make clear which other questions were asked or what was answered (p. 110).

Spielberger et al. (1962, p. 106) reply that the absence of awareness had usually been inferred from brief and superficial postexperimental interviews, and that, with more intensive interviews, more participants were judged to be aware. In their study, the reinforced response was not an evaluation. Forty-five female undergraduates built sentences with a pronoun of their choice, and the experimenter said "good" after those beginning with "I" or "we"; 30 were reinforced and 15 formed the control group (pp. 108–109). An interview with increasingly specific questions (p. 109) classified 19 of the 30 reinforced participants as aware of a correct contingency: 13 already in the first four questions, similar to those of earlier studies, and 6 only with the rest of the interview (p. 110). Only the aware participants acquired the reinforced response: none of the 11 unaware participants increased her use of "I" and "we" by more than one sentence from the first to the fifth block of 20 trials (p. 115).

In this study, the "attitude toward the reinforcement" is how much the person said she wanted the experimenter to say "good" (pp. 108–109), and, among the aware participants, those who wanted it more acquired more (pp. 117–118). Performance was specific to the pronoun the person was aware of (pp. 115–116). The authors write that the answer to the question of how much earlier findings were due to insensitive interviews is "inextricably tied" to the investigators' concept of awareness and to the operations by which it is determined (p. 120).

Insko and Melson (1969, p. 25) used Dulany's three types of awareness (1962, cited in Insko & Melson, 1969): awareness of the reinforcement contingency, of what the experimenter wants the person to do, and of the intention to do what he wants. Few reported the last two; there were more reports of the contingency (p. 29). In each experiment, the difference between the groups reinforced in opposite directions was significant for those who reported neither an intention nor a hypothesis about what the experimenter wanted, but it was "far from significant" for those who did not report the contingency (pp. 30 and 36). The effect for these participants appeared only when the two experiments were pooled: in six out of six comparisons, the mean of the group reinforced for favorable answers was higher, which by chance would have a prob-

ability of 1/64, about .016, by the binomial test (pp. 36–37). A reanalysis of the data from the earlier study by Insko and Butzine (1967, cited in Insko & Melson, 1969, pp. 37–38) showed a significant difference (t = 3.32; $p < .01$) for those who did not report the contingency (p. 38).

The authors attribute the difference from the sentence-construction studies to the task. Building sentences is a problem solved after many trials (perhaps around 100); with opinions, the person learns in a few trials (at most 12) a response that usually earns social approval, perhaps an overlearned response, triggered more or less automatically (p. 38). This is an explanation proposed by the authors, not tested in the study. The two studies differ in task, participants, and measure of awareness, and no decision between them is made here. What remains is that "noticing" is a record (the answer to an interview), with the limitations of any self-report (Section 22.7), and that the result changes with the question asked.

⚠ CAUTION

"The participant did not notice" means that he or she did not state the contingency in the interview. More intensive interviews, such as that of Spielberger et al. (1962, p. 110), change the number of those who "notice": the first four questions identified 13 of the 30 reinforced participants; the whole interview, 19. The category depends on the instrument.

TEST YOURSELF

A participant says, in the final interview, that "the interviewer said good sometimes, but I thought it was just to show he was listening." Did the participant notice the contingency?

ANSWER: not in the sense used in this chapter: the participant noticed the consequence, but not its relation to his or her own response. This is what Hildum and Brown (1956, p. 110) record: 8 of 20 noticed the "Good," only 1 took it as approval, and all rejected the idea that the interviewer had influenced their answers.

26.4 From the verbal response to manifest behavior

Manifest behavior is what the person does other than answering a questionnaire or an interview (in the sources, *overt behavior* or *overt acts*). To know whether changing the verbal response changes what the person does, one has to record it. The sources call the answer to the

questionnaire the "verbal attitude" and contrast the act with it. By the definition in Chapter 15, the act can also be an attitude, because its form can imply attributing a value, and both are overt behavior, in the sense of Chapter 11; what the studies in this section compare are two forms, emitted in two situations.

DeFleur and Westie (1958, pp. 668–672) gave racial attitude scales to 250 sociology students and selected 46: 23 from the quartile with the strongest verbal rejection of Black people and 23 from the quartile with the weakest, matched on eight characteristics, such as age, social class, and prior contact with Black people (p. 669). Near the end of a one-hour interview, each one received a standard release form to be photographed with a Black person of the opposite sex, with a series of uses for the photograph, from least to most objectionable; the student could sign some, all, or none (pp. 669–671). Eight sociologists ranked the uses with almost no disagreement: only one reversed the order of an adjacent pair in 618 paired judgments (p. 671).

Table 26.2

Level of release signed, by verbal attitude (DeFleur & Westie, 1958)

Level signed	Prejudiced	Unprejudiced
Below the mean	18	9
Above the mean	5	14
Total	23	23

Note. Counts from DeFleur and Westie (1958, Table 1, p. 671); the totals and the reading of the 14 cases in opposition (5 and 9) are this book's.

In Table 26.2, the prejudiced students tended to sign less (18 of 23 below the mean) and the unprejudiced ones, more (14 of 23 above) (pp. 671–672). The relation was significant, but some prejudiced students signed at the highest level and some unprejudiced ones signed at none. It is therefore not a one-to-one correspondence: 14 of the 46 (almost a third) behaved contrary to their verbal attitude (p. 672). In the table, these are the 5 prejudiced students above the mean and the 9 unprejudiced students below it. The authors consider the proportion too large to be measurement error and attribute it to social constraints: 71.8% mentioned some reference group when deciding, and all of these mentioned some peer group (p. 672).

Linn (1965, p. 355) asked the question again with attitude items identical to the act observed. Thirty-four female undergraduates answered, on a class questionnaire, seven items about posing for a photograph with a

Black person of the opposite sex, for the same seven uses. Four weeks later, without knowing they were taking part in an experiment, they were invited by supposed representatives of a testing company to sign the corresponding release forms (pp. 355–358). In both studies, then, the act recorded is signing a piece of paper: a written response, given in front of another person, which the participants took to be a real situation (DeFleur & Westie, 1958, p. 671; Linn, 1965, p. 361). Linn checked the measure against attendance at the photograph session, and six of the 34 cases (18%) needed correction, because the person did not show up or changed her mind (p. 361).

The mean on the attitude scale was 4.9, out of a maximum of 7, and the mean for behavior, 2.8 (p. 358). The discrepancy was two or more points in 59% of the sample, and the association between attitude and behavior was not significant ($\chi^2 = 7.26$, with 4 degrees of freedom): the difference between what was observed and what would be expected with no association was not large enough to rule out chance. In a note, Linn writes that the small sample size probably accounts for the lack of significance (pp. 358–359). Of the 17 who declared high willingness, 7 signed at the highest levels and 7 at the lowest; of the 6 with low willingness, 5 signed at the lowest levels (p. 359). Of the 18 discrepant cases, 16 were in the "negative" direction: an attitude more liberal than the act (p. 359). For Linn, predicting the behavior of those who expressed a liberal attitude did no better than chance, and statements or forecasts about racial behavior that rest on attitude measures "have little reliability unless first validated empirically" (pp. 353 and 361). The relation, Linn writes, would depend on how socially involved the person is with the object and on how much experience the person has already had with it (p. 353).

Duke and Henninger (1998, p. 482) present a different case: the verbal consequence follows the student's performance in an individual recorder lesson, and attitude is measured afterward. Twenty-five college students and 25 fifth- and sixth-grade students learned to play an accompaniment with the same teacher, the second author. Correction came either as a negative evaluation of what had just been played or as a specific directive for the next trial, assigned at random before the first lesson (pp. 482, 486, and 487). At the end, each one answered 11 statements on a four-point scale, away from the teacher (p. 488). There was no significant difference between conditions on any of the 11, and the means were positive on all of them (p. 490). The authors attribute the positive attitudes to the students' success in meeting the goals. They

also note that positive statements outnumbered negative ones even under negative feedback, and that the teacher's tone of voice and facial expressions were not varied (p. 491).

TEST YOURSELF

What does DeFleur and Westie's study allow us to say about the relation between verbal attitude and the act of signing?

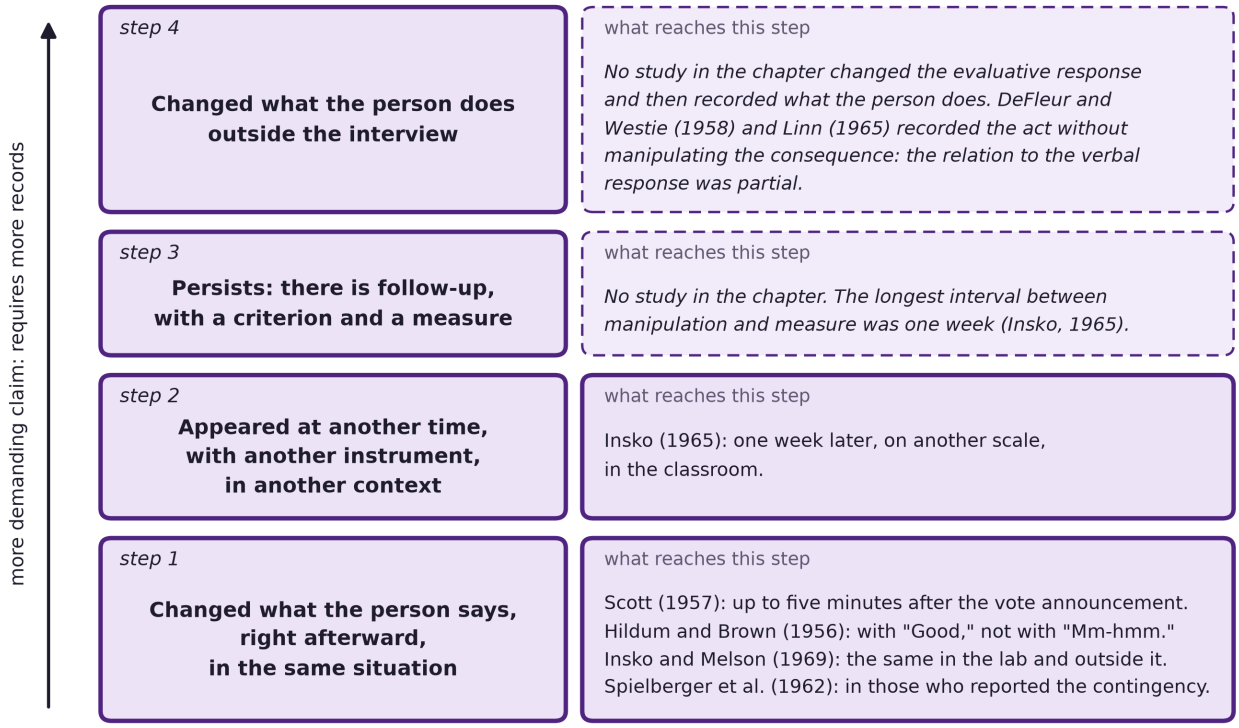
ANSWER: that there was a significant relation, and that it is not a one-to-one correspondence: 14 of 46 behaved contrary to their verbal attitude, 5 prejudiced students above the mean and 9 unprejudiced students below it (DeFleur & Westie, 1958, pp. 671–672).

26.5 What these studies allow us to claim

Figure 26.2 arranges what the chapter has shown into four steps of claims, from the most modest to the most demanding, and places on each one the studies that reach it. Table 26.3 links each type of result to what it supports and what it does not.

Figure 26.2

The ladder of claims: the highest step each study in the chapter reaches



Outside the ladder: Duke and Henninger (1998). The consequence followed performance, and the form of correction made no difference in attitudes or in performance (there is no step 1 to climb).

Note. Diagram prepared for this book, without data, from the studies in Sections 26.1 to 26.4; the step for each study is the one in Table 26.3 (Scott, 1957, p. 74; Hildum & Brown, 1956, p. 109; Insko, 1965, pp. 622–623; Insko & Melson, 1969, pp. 36–39; Spielberger et al., 1962, p. 115; DeFleur & Westie, 1958, p. 672; Linn, 1965, pp. 358–359; Duke & Henninger, 1998, pp. 482 and 490).

Table 26.3

What each type of result supports

Result	Supports	Does not support
The evaluative response changed in the direction of the consequence, right afterward, in the same situation (Scott; Hildum and Brown)	that, in that situation, those who received the favorable consequence changed more than those who received the unfavorable one	that approval is the sole cause (Scott lacked a debate without a vote), that the change lasts, or that the person does anything different outside the situation
The difference appeared a week later, on another instrument and in another setting (Insko)	generality of the response over time and across instruments	persistence beyond one week; manifest behavior
The effect appeared equally inside and outside the laboratory (Insko and Melson)	that laboratory demand does not by itself explain the effect	that the effect occurs in natural settings without the experimenter

Result	Supports	Does not support
The effect appeared only in those who reported the contingency (Spielberger et al.) or also, weakly, in those who did not report it (Insko and Melson)	that the result depends on the task, the population, and the question asked	that awareness is always necessary, or always unnecessary
The relation with the act was significant in DeFleur and Westie and not significant in Linn, with discrepancy in almost a third and in 59% of cases	that the verbal response can tell us something about the act, and that discrepancy is common	that the verbal response allows one to predict a person's act
Different verbal feedback with no difference in attitude (Duke and Henninger)	that, there, the form of correction did not change attitudes	that verbal consequences never matter

Note. Table prepared for this book, from the studies in Table 26.1.

For Beatriz's case: praising those who rate group supervision well is a verbal consequence. What the literature consulted allows us to expect is that the evaluative response will change, under certain conditions, right afterward (Scott; Hildum and Brown; Insko). Whether the effect occurs for those who do not notice the contingency is debated (Spielberger et al.; Insko and Melson). And that what is recorded outside the interview differs from the verbal response is what DeFleur and Westie and Linn show. The experiment that would test the proposal would have the requirements of Section 25.1: a measure before and after, a comparable group, follow-up, and some record of what people do in supervision.

Who took part. Section 25.5 left a question for this chapter: what did these experiments do with the people who took part? The articles record the safeguards it lists (stated purpose, consent, the possibility of refusing, and evaluation of the outcome) unevenly, and what we can read is what the authors chose to report. The purpose, in general, was not stated to the respondents, and in two studies concealment was part of the design. Insko and Melson (1969, p. 27), who were testing whether the effect occurred outside the laboratory, did not tell the participants reached by telephone that they were in an experiment or that the research had anything to do with psychology. Linn (1965, p. 356) attributes the credibility of the situation partly to the fact that the students did not know they were taking part in a psychological experiment. Hildum and Brown (1956, p. 109) presented the phone call as a survey to compare how summer school students thought with how the other students at the university thought.

Only two of the eight articles describe a debriefing at the end. In Scott (1957, p. 73), once the retest forms had been gathered, the students were told what the experiment was and what it was for, and the debaters' opinions before and after were read aloud. There was also an effort to make the situation less threatening for the losers and for the debaters whose opinions had supposedly shifted. In Linn (1965, p. 358), the participant was told that the program was an experiment, received some explanation, and was interviewed about the whole situation. Those who refused all the release forms were contacted by telephone with the same information. Refusal was provided for in DeFleur and Westie (1958, p. 670). The release form said that the person could sign some uses, all, or none, and that the decision would be kept in strict confidence. A note reports that each participant was told emphatically that he or she could stop taking part at any time, without penalty and anonymously, which no one did. Linn also records a cost for the participants: for a participant with a liberal attitude, refusing all the release forms seemed to be a confusing and stressful situation, and some explained, in an almost remorseful tone, that they wanted to sign and could not (p. 360).

The fourth requirement of Section 25.5, evaluating the outcome against the announced criterion, is what the whole chapter has examined: what each study measured, when, and with whom. In Beatriz's case, the participants would be interns at the training clinic, and refusal weighs differently if the person who praises and collects the answers is the one who supervises and evaluates them. The configuration is close to that of Insko (1965, p. 622), in which the people called were drawn from the students in the experimenter's own course. In this configuration the possibility of refusing has to be real, not merely declared: saying that refusal will have no consequence for supervision and recording how many refused are part of the design. Section 33.5 shows how laboratory studies with equivalence record the ethics committee, consent, refusal, and the final debriefing, and Section 35.5, the safeguards of an intervention project.

⚠ CAUTION

Seven of the eight studies are from the 1950s and 1960s (Duke and Henninger's is from 1998), all were carried out with students, and they measure attitude through questionnaires, scales, or interviews. This limits what can be said about other populations, periods, and contexts, without saying anything against the studies.

TEST YOURSELF

A sentence in a report says: "verbal reinforcement changes attitudes in a lasting way." Which study in the chapter would allow, at most, "one week later"?

ANSWER: Insko (1965, pp. 622–623): attitude was measured again about a week later, on another scale and in the classroom; this is step 2 of Figure 26.2, not step 3.

Common learner mistakes

1 **Treating "Mm-hmm" and "Good" as the same reinforcer.** The mistake happens because both are words of approval in everyday use, and the difference in effect is surprising. *How to spot the mistake:* the text speaks of "approval" without saying which consequence was used. Hildum and Brown (1956, p. 111) obtained an effect with "Good" and not with "Mm-hmm."

2 **Concluding persistence from a measure taken minutes later.** The mistake happens because "afterward" seems to be enough, and the interval goes unstated. *How to spot the mistake:* the sentence says "lasting" and the interval is five minutes (Scott, 1957, p. 74).

3 **Saying there was no awareness without saying how it was measured.** The mistake happens because "awareness" sounds like a state the person either has or lacks, and not like an answer to an interview. *How to spot the mistake:* the interview is not cited. Results change with the instrument (Spielberger et al., 1962, p. 106).

4 **Taking a change in the verbal response for a change in manifest behavior.** The mistake happens because we expect people to do what they say. *How to spot the mistake:* the conclusion speaks of what the person "does" and the datum is a questionnaire. DeFleur and Westie (1958, p. 672): 14 of 46 in opposition.

5 **Turning a study with no difference into proof that consequences do not matter.** The mistake happens because a null result looks like a definitive answer, when it is an answer for those conditions. *How to spot the mistake:* the sentence generalizes from Duke and Henninger (1998, p. 482) to every verbal consequence.

SUMMARY

Verbal reinforcement (objective 1). A verbal consequence contingent on a response, with the effect recorded; the studies reinforced taking a position and, in one case, sentences with a pronoun, using a vote, "Good," and "Mm-hmm."

The design (objective 2). Control group, interval, instrument, and setting tell us what each finding supports (Tables 26.1 and 26.3); in Scott, the lack of a condition without a vote makes it impossible to separate approval from contact with the arguments.

Conditions (objective 3). The consequence matters (Hildum and Brown), awareness of the contingency is debated (Spielberger et al.; Insko and Melson), and the laboratory setting did not by itself explain the effect (Insko and Melson).

Saying, persisting, doing (objective 4). Changing the response, maintaining it later, and changing manifest behavior are three different claims, with three records (the steps of Figure 26.2); in the signature studies (DeFleur and Westie; Linn), the act diverged from the verbal response in some of the cases.

Limits (objective 5). Short intervals, students, questionnaires, single-item measures, and, outside the interview, a significant relation and not a one-to-one one; in several studies the purpose was not stated to the respondents, and only two articles describe a debriefing at the end (Section 26.5).

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. How does verbal reinforcement differ from general praise?
2. In Scott's study, what does the design not allow us to separate, and how much time passed between the announcement of the vote and the posttest?

3. (Records constructed for the exercise.) A group reinforced for favorable answers has a mean of 10.4, and the group reinforced for unfavorable answers, 8.2. What is the difference, and what is missing before one can speak of attitude change?

4. Why are "Good" and "Mm-hmm" not interchangeable in Hildum and Brown's results?

5. How many of Hildum and Brown's 20 participants reinforced with "Good" noticed the word, and how many of them took it as approval? Why is this not enough to say they noticed the contingency?

6. What do Spielberger et al. conclude about those who were not aware of the contingency, and why does Insko and Melson's study not allow the same conclusion?

7. (Hypothetical case.) Beatriz measures the evaluation of group supervision at the end of the same interview in which she praised the favorable answers. What can she claim, and what records and what safeguards for the participants would she add?

8. In DeFleur and Westie, how many of the 46 behaved contrary to their verbal attitude, who were they in Table 26.2, and what does this allow us to say?

9. Linn found a discrepancy in 59% of the sample. What counted as a discrepancy, and what does Linn write about the reliability of predictions of racial behavior based on attitude measures?

10. Duke and Henninger found no difference between negative feedback and directives. What conclusion would go too far?

ANNOTATED ANSWER KEY

1. Verbal reinforcement is contingent on a defined response and its effect on that response is recorded; general praise is not (Section 26.1).

2. It does not separate the effect of approval from the effect of contact with the arguments of the other side, because the condition of a debate without a vote was missing; at most five minutes passed between the announcement and the posttest, which limits any claim of persistence, which was not assessed (Scott, 1957, p. 74).

3. 10.4 − 8.2 = 2.2. What is missing is the before (the same measure before reinforcement), a comparable group, and a follow-up (Section 25.1).

4. Because "Good" biased the answers and "Mm-hmm" did not (Hildum & Brown, 1956, p. 111): only with "Good" was the difference in the reinforced direction (24.95 vs. 31.75; 29.8 vs. 27.1 with "Mm-hmm," in the opposite direction; p. 109).

5. 8 noticed it; 1 of them took it as approval, and all rejected the idea that the interviewer had influenced their answers (Hildum & Brown, 1956, p. 110). Noticing the word is not stating the relation between it and one's own response (Section 26.3).

6. That there was no evidence that the unaware participants learned (Spielberger et al., 1962, pp. 115 and 119). In Insko and Melson (1969, pp. 30 and 36–38), the effect for those who did not report the contingency was not significant in either experiment; it appeared when the two were pooled (six out of six) and in the reanalysis of an earlier study. Task, participants, and measure of awareness differ.

7. Only that the evaluative response changed right afterward, in that situation (step 1 of Figure 26.2). She would add the before, a comparable group, a follow-up, and some record of what people do in supervision (Sections 25.1 and 26.5) and, because this is an intervention on people, a stated purpose, consent, the possibility of refusing without consequence, and a debriefing at the end (Sections 25.5 and 26.5).

8. 14 of 46: the 5 prejudiced students who signed above the mean and the 9 unprejudiced students who signed below it (Table 26.2). The verbal response tells us something, but it does not predict the act of signing one to one (DeFleur & Westie, 1958, pp. 671–672).

9. A difference of two or more points, out of seven possible, between the attitude score and the behavior score (Linn, 1965, p. 358). Forecasts of racial behavior drawn from attitude measures are not very reliable unless they have been checked empirically (p. 353).

10. That verbal consequences never matter; the study shows that, there, the form of correction did not change attitudes (Duke & Henninger, 1998, pp. 482 and 490).

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 27. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2, 4	26.1 and common mistakes 1 and 2
3, 7	26.2 and 26.5
5, 6	26.3 and common mistake 3
8, 9	26.4 (Table 26.2) and common mistake 4
10	26.4 and 26.5 and common mistake 5

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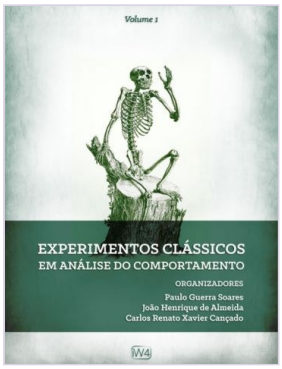
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CLASSICS OF BEHAVIOR ANALYSIS

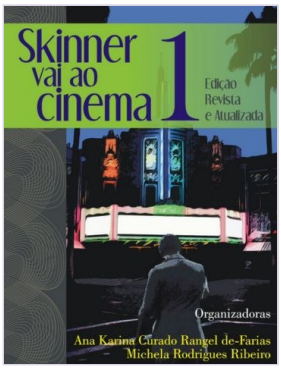
The experiments that founded the field.

To get a close look at the classic experiments of the field, after reading about them in the chapters on the operant.









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CHAPTER

27 Experiments

a close look at a study of equivalence class formation with scale evaluation (Dixon and Lemke, 2007)

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Describe** Dixon and Lemke's (2007) study phase by phase: participants, stimuli, training, tests, and measure.
2. **Identify**, in each phase, what is the manipulated variable, what is measured, and what is held constant.
3. **Read** the results at three levels, checking the authors' summary against the table of means: the training criterion, the emergence of relations, and the change in ratings.
4. **Explain** why the posttest rating does not, by itself, show transfer of function.
5. **Point out** what the design does not allow one to claim.

PREREQUISITES

Matching-to-sample, trained and derived relations, the equivalence class, and transfer of function (Chapter 20), the 1-to-10 scale as an instrument (Chapter 23), and the record before and after, with a comparable group and follow-up (Section 25.1). The new terms (accuracy criterion and generalization stimuli) are defined here.

OPENING

(Hypothetical case, continued from Chapter 26.) Beatriz decides to read, with the clinic's management, a complete study that tried to change the evaluation of a social group through equivalence training. She wants to know what was done on each screen, and what the result allows one to say. Four questions organize the chapter.

> 1. *"What was the study's question, and who took part?"*
> 2. *"What did the participant see and do, phase by phase?"*
> 3. *"What was found, at each level?"*
> 4. *"What does this allow us to claim, and what not?"*

The first is the subject of Sections 27.1 and 27.2; the second, of 27.3; the third, of 27.4; the fourth, of 27.5.

27.1 The question and the logic of the study

Dixon and Lemke (2007, p. 5) start from the observation that, after the attacks of September 11, 2001, many U.S. citizens came to hold a mistaken predisposition toward people from the Middle East: taking them to be terrorists or evil. This predisposition, they write, can be given an operational definition as differential responding toward the members of a race, which may show up as slurs, unfair treatment at work, or physical assault. Relational Frame Theory (Chapter 21) gives them their conceptual starting point (p. 5). The study's hypothesis is that of Chapter 20: if one equivalence class joins the image of a Middle Eastern person and the word "Good," and another joins the image of an American and the word "Evil," the evaluation of the images may change.

The **accuracy criterion** is the proportion of correct responses required in a block of trials for the participant to move on to the next phase.

KEY CONCEPT

In a class formation study with a scale measure, the same instrument (the rating) is applied to the same stimuli before and after training; the training never teaches the rating. What is compared is the pretest rating with the posttest rating.

EXAMPLE

(Hypothetical case.) To study the evaluation of a supervision format, an analogous study would have three photographs of group supervision sessions, three of individual supervision sessions, and three of objects; the words "good," "neutral," and "bad"; and a 1-to-10 scale answered before and after training.

NON-EXAMPLE

Training the participant to give a rating of 9 to images of group X. That teaches the rating; what the study measures is the rating the images receive after a training in which the rating was not taught.

TEST YOURSELF

In Dixon and Lemke's design, what does the training teach directly, and what does it not teach?

ANSWER: it teaches relations among abstract symbols, words, and images (A with B and A with C); it does not teach the 1-to-10 rating, which is requested only before and after (Dixon & Lemke, 2007, pp. 7–8).

27.2 Participants and stimuli

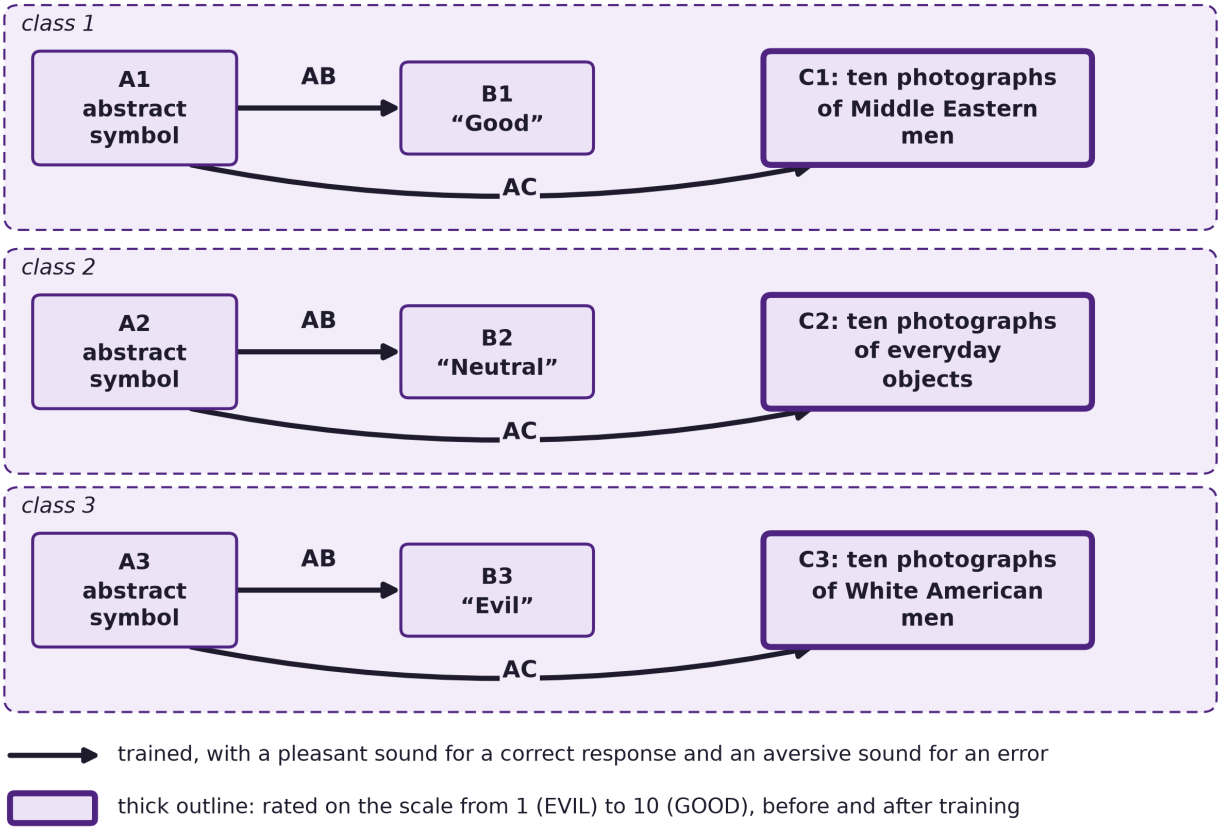
Twelve U.S. citizens took part in exchange for extra course credit (p. 7). On the pretest, four gave a rating of 5 to every image of a man, and their data were dropped from all later analyses (pp. 8–9); 8 participants remained. The stimuli were three abstract images (A1 to A3), the words "Good," "Neutral," and "Evil" (B1 to B3), and thirty photographs (C1 to C30): ten of White American men, ten of Middle Eastern men, and ten of everyday objects, with the photographs of people taken from a dating website (p. 7).

Generalization stimuli are those that appear only on the pretest and the posttest: from each set of ten photographs, one was used in training, and the other nine were not (p. 9).

Figure 27.1 shows what the training aims to bring together in each class. The authors write that the training could, in principle, produce equivalence relations between the image of a White American man and the word "Evil," between that of a Middle Eastern man and the word "Good," and between that of an everyday object and the word "Neutral" (p. 10). The link would be an abstract symbol, which serves as the sample in both trainings (p. 8).

Figure 27.1

The three classes the training aims to form, what was trained, and what was rated on the scale



Note. Diagram prepared for this book, from the procedure (Dixon & Lemke, 2007, pp. 7, 8, and 10); no data. The arrow goes from the sample to the comparison stimulus. In each set C, one photograph enters training and the other nine are the generalization stimuli (p. 9). After training, the tests without consequences use B with A, C with A, B with C, and C with B (p. 8).

TEST YOURSELF

How many participants were analyzed, and why?

ANSWER: eight; of twelve, four gave a rating of 5 to every image of a man on the pretest, and their data were removed (Dixon & Lemke, 2007, pp. 8–9).

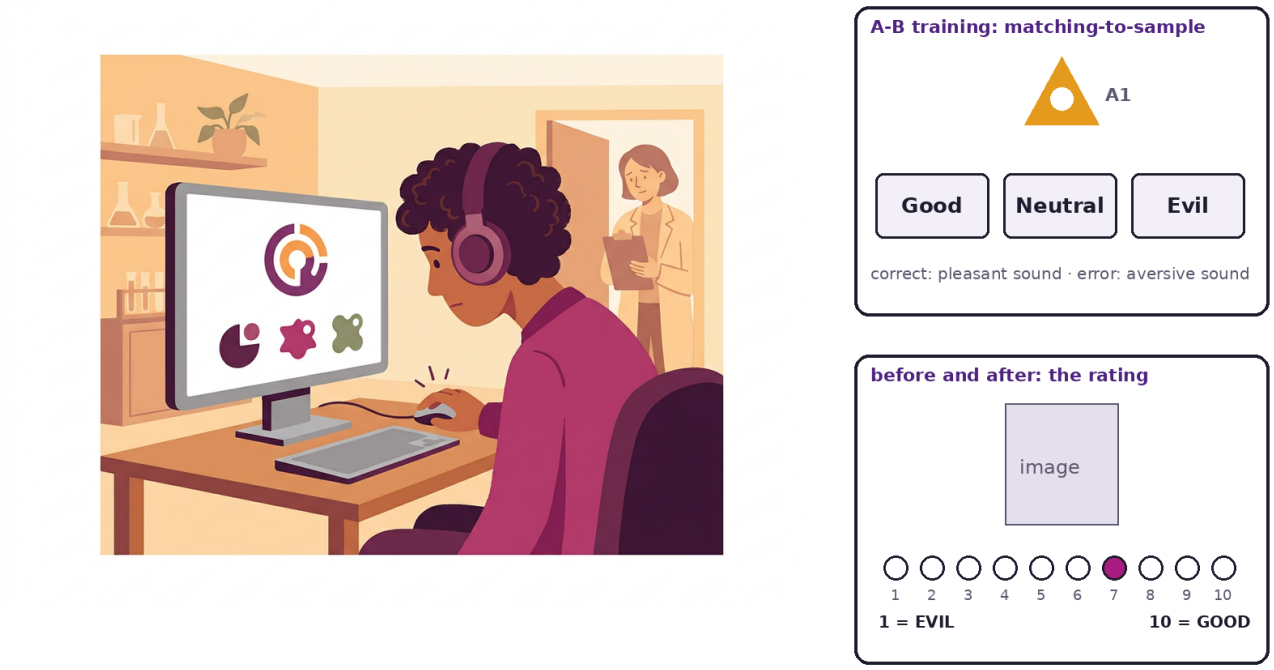
27.3 The procedure, phase by phase

Table 27.1 summarizes the phases; the text details what is specific to each one.

Figure 27.2 shows the situation. The participant, alone in front of the computer, goes through the matching-to-sample trials: in A-B training, an abstract symbol at the top and the words "Good," "Neutral," and "Evil" below, a pleasant sound after a correct response and an aversive one after an error. Before and after training, the participant gives each image a rating from 1 (EVIL) to 10 (GOOD).

Figure 27.2

The experimental situation and the two screens of the study



a the situation (illustration) **b the two screens (diagram)**

Note. In a, illustration generated for this book with artificial intelligence (Runway), from the description of the procedure; it does not reproduce the original laboratory or stimuli. In b, diagram prepared for this book; the photographs rated in the study are not reproduced.

Table 27.1

The phases of the study, what the participant did, and the criterion for moving on

Phase	What the participant did	Consequence and criterion
1. Pretest	rate each of the 30 C images from 1 (EVIL) to 10 (GOOD), in 60 responses	none described
2a. A-B training	given an A image, choose the corresponding B word	pleasant sound for a correct response and aversive sound for an error; blocks of 18 trials with at least 16 correct
2b. A-C training	given an A image, choose the corresponding C photograph	same as A-B

Phase	What the participant did	Consequence and criterion
2c. Mixed A-B and A-C training	intermixed trials	32 correct in 36 trials
2d. Symmetry and equivalence tests	B-A, C-A, B-C, and C-B, 36 trials	no criterion; no consequence (extinction)
3. Posttest	the same rating task as the pretest	none described

Note. Table prepared for this book with data from Dixon and Lemke (2007, pp. 7–8).

On the pretest, each C image appeared alone, and the participant moved the mouse along a 1-to-10 scroll bar and then clicked to record the answer; the phase ended after 60 responses to the 30 C stimuli shown in random order (p. 7). The instructions, given orally, defined 1 as "Evil," 5 as "approximately Neutral," and 10 as "Good" (p. 7). In A-B training, an A image was the sample and the three words were the comparisons; a correct choice produced a pleasant sound and a wrong one, an aversive sound (pp. 7–8). In A-C training, C1 was one of the ten photographs of Middle Eastern men, C2 one of the photographs of objects, and C3 one of those of Americans (p. 8). The test phase had 36 trials in random order, with no accuracy criterion and with every response under extinction (p. 8).

In terms of variables, the study manipulates training (Phases 2a to 2c), which takes place between two administrations of the same rating task. It measures the 1-to-10 rating given to each C image (Phases 1 and 3) and accuracy on the tests without consequences (Phase 2d). And it holds constant the rating task, the C stimuli, and the participant, who goes through all phases (p. 8).

⚠ CAUTION

The 90% criterion and the thresholds of 16 out of 18 or 32 out of 36 are choices made by the study, not rules of the paradigm. Changing the criterion changes who "forms the class" and how many participants enter the analysis.

✓ TEST YOURSELF

In which phase did correct responses have no programmed consequence, and why does that matter?

ANSWER: the symmetry and equivalence tests (Phase 2d): since there is no consequence, a correct response shows derived relations, not trained relations (Dixon & Lemke, 2007, p. 8).

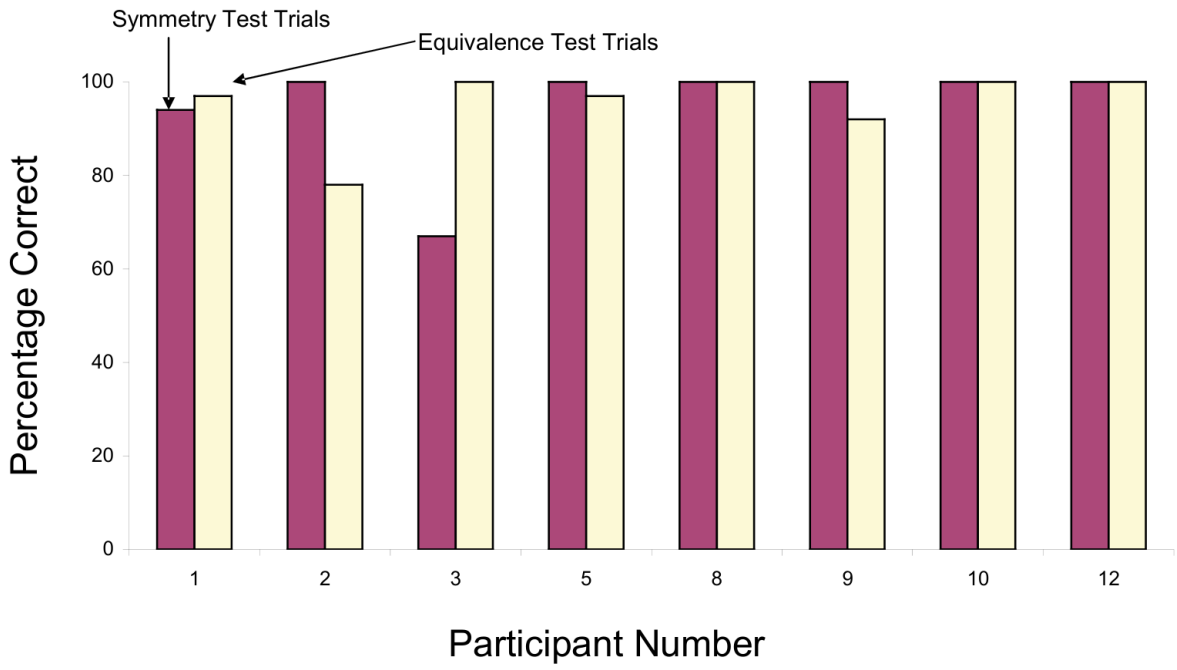
27.4 What was found

At a first level, that of training, all participants completed the matching phases: A-B training took from 1 to 158 blocks of trials, A-C from 1 to 6, and the mixed training from 1 to 10 (p. 9). At a second level, that of the tests, seven of eight showed symmetry and seven of eight, equivalence, at 90% or more (p. 10). At a third level, that of the ratings, the authors write that, on the pretest, all 8 participants gave the Middle Eastern men lower ratings, closer to "Evil," than the Americans (p. 9). They also write that every participant's ratings shifted afterward, with the Middle Eastern man now rated nearer to "Good" and the American nearer to "Evil." And that this extended to the nine stimuli of each set that were not used in training (p. 9).

Figure 27.3 reproduces the article's graph for the second level: each participant's percentage correct on the symmetry and equivalence tests. The two values below 90% are participant 3's on symmetry and participant 2's on equivalence.

Figure 27.3

Correct responses on the symmetry and equivalence tests, by participant



Note. Figure 1 of Dixon and Lemke (2007), reproduced from the article. The original caption describes the mean ratings of the images; what the graph shows, according to its axes and labels, is accuracy on the tests (this book's reading).

Table 27.2 presents the means from Table 1 of the article (p. 8) for the image used in training, and with it the authors' summary can be checked.

Table 27.2

Mean rating given by the participants to the image used in training, on the pretest and the posttest, and whether the order of ratings reversed

Participant	American, pre	American, post	Middle East, pre	Middle East, post	Object, pre	Object, post	Order reversed
1	6.50	1.00	4.67	5.33	9.67	5.00	yes
2	7.00	6.50	6.00	5.33	8.33	7.33	no
3	5.00	1.50	4.33	10.00	6.00	5.00	yes
5	8.00	1.00	2.33	10.00	9.00	5.00	yes
8	10.00	1.00	8.33	10.00	10.00	5.00	yes
9	8.50	9.00	2.00	5.00	10.00	5.33	no
10	5.50	5.00	4.00	4.00	8.00	8.00	no
12	9.00	1.00	6.33	10.00	10.00	5.00	yes

Note. Means from Dixon and Lemke (2007, Table 1, p. 8), on the scale from 1 (EVIL) to 10 (GOOD); participant numbers are those of the article, which does not include the four removed from the analysis. "Order reversed": the rating of the Middle Eastern man, lower than that of the American on the pretest, became higher on the posttest (column and counts are ours).

On the pretest, the Middle Eastern man received a lower rating than the American from all 8 participants, and on the posttest the order reversed for five (1, 3, 5, 8, and 12). For the other three, it did not: participant 2's rating of the Middle Eastern man fell (from 6.00 to 5.33), participant 10's stayed at 4.00, and participant 9's rose (from 2.00 to 5.00) but remained below the rating of the American (9.00). In the mean of the ten images of each set (the values in parentheses in Table 1 of the article), the reversal occurred for only three (3, 5, and 8), and participant 12 already gave, on the pretest, a slightly higher rating to the Middle Eastern set (6.94, against 6.73). This contradicts the authors' statement that the lower rating held both for the whole set and for the training image (p. 9). The counts of five and three are those of the table in Section 20.5.

The three levels are not the same finding. Participant 10 met the criterion on the equivalence test (only participant 2 did not; p. 9), and his or her rating of the Middle Eastern man was 4.00 at both times (Table 27.2). The authors themselves note that not every participant who met the criterion on the equivalence test showed significant differences in the ratings (p. 10). And they suggest that this may be due, in part, to implicit cultural social contingencies, a stronger source of control over

behavior than the study's meager differential reinforcement, which they describe as points (p. 10), even though the Method section speaks of pleasant and aversive sounds (p. 8). They also note, in a comparison they say was not planned, that participants 2, 3, and 8 were African American, whereas 1, 5, 9, 10, and 12 were White, and that this could account for part of the variability (p. 10).

The everyday objects were included as a control: the expectation was a neutral rating on both the pretest and the posttest (p. 10). The authors sum up that most participants gave them the highest ratings at both times. They suggest that, in comparing the categories shown, the participants may have placed the objects, which had not been linked to any prejudice, at the top of the scale (p. 10). Table 27.2 supports this only in part (our count). On the pretest, the object image used in training received the participant's highest rating in seven of the eight and tied with the American's in the eighth (participant 8). On the posttest, it stood at 5.00 or 5.33, near the middle of the scale, in six of the eight, and was the highest only for participants 2 and 10.

TEST YOURSELF

A participant met the criterion on the equivalence test, and his or her ratings barely changed. Does the study describe this?

ANSWER: yes: the authors note that not all who met the criterion showed significant differences (Dixon & Lemke, 2007, p. 10); participant 10 in Table 27.2 is one case.

27.5 What the design allows us to claim

Each participant went through all three phases: what is compared is the same participant's rating before and after (p. 8). This meets one part of Section 25.1 (there is a before and an after, with the same measure) and leaves out the others (there is no comparable group, no follow-up, and no record of what people do outside the laboratory). The objects, which would have served as a comparison within each participant, did not fill that role: they started from high ratings and, on the posttest, stayed near the neutral point for most participants. Since one of their images also went through training (class 2, with the word "Neutral"), this change may be an effect of the training, and the objects do not show what "no change" would look like (this book's reading).

Dixon and Lemke (2007, p. 11) write that these ratings "are subjective and may not necessarily transfer to observed behavior in the real world." About the theory, they write that their data are consistent with the Relational Frame Theory analysis, but that this analysis is neither necessary nor sufficient to account for the results (p. 11). About the procedure, they point out that pretesting may matter when the stimuli carry relations from before the experiment (p. 10).

⚠ CAUTION

What changed was the same participant's rating, on the same instrument, from before to after a training. Whether what each person does in the presence of a Middle Eastern person changed, the study does not know: that was not recorded.

✓ TEST YOURSELF

Which element of Section 25.1 does the study have, and which does it lack?

ANSWER: it has the before and after, with the same measure; it lacks a comparable group, follow-up, and a record of behavior outside the laboratory.

27

Common learner mistakes

1 **Saying that the training taught the evaluation.** The mistake happens because the rating changed after training, and the change seems to have been what was taught. *How to spot the mistake:* the sentence says "the participant learned to give a low rating." The training taught relations among stimuli; the ratings were requested before and after (pp. 7–8).

2 **Taking the posttest rating as transfer of function without the tests.** The rating can be read as transfer only if the tests showed the class. The mistake happens because the rating is the result of interest, and the tests look like a technical step. *How to spot the mistake:* it is not said how many met the criterion (7 of 8).

3 **Forgetting who left the analysis.** The four who gave a rating of 5 to all photographs of men were dropped before training. The mistake happens because the tables show only those analyzed, and the exclusions are in the text. *How to spot the mistake:* 12 participants are mentioned and 8 are analyzed, without saying why.

4 **Mixing up the training criterion and the test criterion.** The mistake happens because both are proportions of correct responses close to 90%. *How to spot the mistake:* 16 out of 18 and 32 out of 36 belong to training; 90% belongs to the test.

5 **Drawing conclusions about what people do.** The mistake happens because the article's title speaks of reducing prejudice, and it is easy to take the question for the result. *How to spot the mistake:* the conclusion speaks of "reducing prejudice" and the datum is a rating from 1 to 10.

SUMMARY

Question and logic (objective 1). Train relations among symbols, words, and images, without teaching the rating, and compare the rating before and after.

Phases and variables (objective 2). Training (Phases 2a to 2c) is manipulated between two administrations of the same rating task; the rating and accuracy on the tests are measured; the task, the C stimuli, and the participant are held constant.

Three levels (objective 3). Training criterion (all), derived relations (7 of 8), and ratings (the authors speak of a change in all eight; in Table 27.2, the order reverses in five).

Rating and transfer (objective 4). The posttest rating can be read as transfer of function only together with the tests that show the class.

Limits (objective 5). No comparable group, no follow-up, the rating as the only measure, and no control that shows what no change would look like.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. How many participants entered and how many were analyzed, and why?

2. How many C stimuli were there, and of what types?

3. The everyday objects were included as a control. What did the authors expect from them, what did they find, and what does this mean for reading the ratings of the photographs?

4. (Records constructed for the exercise.) In a block of 18 trials, the participant got 15 right. What happens, and what if the participant got 17 right?

5. Between the pretest and the posttest, what did the study manipulate, what did it measure, and what did it hold constant?

6. Why are the symmetry and equivalence tests carried out without consequences?

7. How many of eight showed symmetry and equivalence at 90% or more, and for how many of eight did the rating of the Middle Eastern man come to exceed that of the American (Table 27.2)?

8. (Hypothetical case.) A participant reached 95% on the equivalence test and gave the same ratings before and after. What does the study say about cases like this?

9. What do the generalization stimuli add to the interpretation?

10. Name two requirements of Section 25.1 that the study does not meet.

ANNOTATED ANSWER KEY

1. Twelve entered and eight were analyzed: four gave a rating of 5 to every image of a man on the pretest (Dixon & Lemke, 2007, pp. 7–9).

2. Thirty: ten of White American men, ten of Middle Eastern men, and ten of everyday objects (p. 7).

3. They expected a neutral rating before and after training; the authors sum up that most participants gave them the highest ratings at both times (p. 10), and Table 27.2 shows high ratings before and ratings near 5 after, for most participants (our count). Since the control did not stay at the neutral point, it cannot serve as a reference for saying what "no change" would be in the photographs (this book's reading; Sections 27.4 and 27.5).

4. With 15 of 18 the criterion (16) is not met and another block of 18 is presented; with 17, it is met (p. 8).

5. It manipulated the training of relations among A, B, and C (Phases 2a to 2c); it measured the 1-to-10 rating given to each C image and accuracy on the tests without consequences; it held constant the rating task, the C stimuli, and the participant (pp. 7–8; Section 27.3).

6. So that a correct response shows derived relations, not trained relations (p. 8).

7. Seven of eight, in both (p. 10); the order of ratings reversed for five of eight (Table 27.2; our count). The two numbers are not the same finding.

8. That not all who met the criterion showed significant differences in the ratings, which the authors attribute in part to cultural contingencies (p. 10).

9. They make it possible to see whether the change in ratings extended beyond the image used in training: the authors say the pattern generalized (p. 9), but, in the means of the ten images, the order of ratings reversed for only three of eight (Table 1, p. 8; our count).

10. A comparable group, follow-up, and a record of behavior outside the laboratory (Section 25.1).

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 28. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1	27.2 and common mistake 3
2	27.2
3	27.4 and 27.5
4, 6	27.3 and common mistake 4
5	27.1, 27.3, and common mistake 1
7, 8	27.4 and common mistake 2
9	27.2 and 27.4
10	27.5 and common mistake 5

REFERENCES

Dixon, M. R., & Lemke, M. (2007). Reducing prejudice towards Middle Eastern persons as terrorists. *European Journal of Behavior Analysis*, *8*(1), 5–12. https://doi.org/10.1080/15021149.2007.11434269

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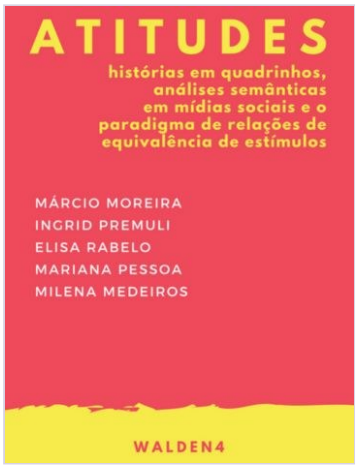
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CHAPTER

28 Experiments

a close look at a study of class formation and transfer of political attitudes (Pereira and Moreira, 2021b)

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Describe** Pereira and Moreira's (2021b) study: participants, stimuli, classes, phases, criteria, and measure.
2. **Explain** why the study uses stimuli with and without pre-experimental meaning and why it applies the scale before and after training.
3. **Read** the results at three levels: the training criterion, emergent relations, and evaluations on the scale.
4. **Calculate** the degree of transfer and the degree of equivalence from two evaluations and interpret them in a table.
5. **Point out** what the study allows one to claim, what the authors themselves leave open, and what is missing before one can claim a change (a comparable group and follow-up, Section 25.1).

PREREQUISITES

Matching-to-sample, the equivalence class, transfer of function, the node, and the degree of relatedness (Chapter 20), the semantic differential (Section 23.3), the accuracy criterion and the reading of Dixon and Lemke's study (Chapter 27), and the record before and after, with a comparable group and follow-up (Section 25.1). The new terms (pre-experimental meaning, degree of transfer, and degree of equivalence) are defined here.

OPENING

(Hypothetical case, continued from Chapter 27.) Beatriz reads, with the clinic's management, the second study: Brazilian political stimuli, a semantic differential scale, and 5 participants. In the abstract, one sentence makes her stop: the results "demonstrate how attitudes towards

politicians can be transferred to new stimuli." She wants to know what was done and measured for the authors to write that. Four questions organize the chapter.

1. *"What was the question, who took part, and with what stimuli?"*
2. *"What did the participant do, and with what criteria?"*
3. *"What was found, at each level?"*
4. *"What does the study allow us to claim, and what do the authors themselves leave open?"*

The first is the subject of Section 28.1; the second, of 28.2; the third, of 28.3; the fourth, of 28.4.

28.1 The question and the stimuli

Pereira and Moreira (2021b, p. 137) asked whether a matching-to-sample procedure (the article's Portuguese term is emparelhamento de acordo com o modelo) would suffice to build equivalence classes made up of photographs of presidents of Brazil and abstract figures. Using a semantic differential scale (the article's EDS, for escala de diferencial semântico), they also asked whether function would transfer from the photographs to the figures. One of the authors of the study is the author of this book. The question arises from a gap the authors point out: "there seem to be no studies yet on attitudes in which the stimuli with social meaning were stimuli related to political positions" (p. 140).

The participants were 5 university students, aged 20 to 25, in the fifth to seventh semester of a psychology program, selected by convenience (p. 140). The design is "single-subject pretest/posttest" (p. 141): each participant is compared with himself or herself, before and after training, and the data are presented participant by participant (p. 151). The independent variable is conditional discrimination training. There are two dependent variables: class formation, measured by the percentage of correct responses on the tests, and transfer of function, measured by the "difference between the values of the evaluations of the abstract figures in the two administrations of the EDS" (p. 141).

The stimuli form three five-member classes (Table 28.1). Each president's photograph is set A, two series of abstract figures are sets B and C, the party's acronym is set D, and the word for a political position is set E (pp. 142 and 143). A stimulus has **pre-experimental meaning** when, before the experiment, it already controls the person's responses be-

cause of his or her history outside the laboratory (definition proposed here; the study uses the expression). For the authors, the photograph and the acronym have this meaning, and the abstract figures are "supposedly without" it (p. 145).

Table 28.1

The three classes of the study: what each row brings together

Class	A: photograph	B and C: abstract figures	D: acronym	E: word
1	Bolsonaro	B1 and C1	PSL	"right"
2	Lula	B2 and C2	PT	"left"
3	Fernando Henrique Cardoso	B3 and C3	PSDB	"center"

Note. Table prepared for this book, from Figure 1 of the article (Pereira & Moreira, 2021b, p. 141) and from the text (pp. 145, 146, and 152). The scale evaluated sets A, B, C, and D, 12 stimuli; the words of set E appear only in test 2 (pp. 141 and 143).

The scale has 14 bipolar adjective pairs, with seven blanks between the adjectives of each pair in which the participant marks an "X" (p. 141): the 13 pairs of the instrument analyzed in Chapter 29 plus Right/Left. In half of the pairs the positive adjective was on the left; in the other half, on the right (p. 141). Each stimulus was evaluated on a separate sheet (p. 141).

KEY CONCEPT

The study brings together, in each class, stimuli with pre-experimental meaning (the photograph and the acronym) and stimuli taken to be without it (two abstract figures), and measures the evaluation of these four before and after training; the position word enters only in the tests. The question is whether the evaluation of the figures comes to resemble that of the photographs they were related to.

EXAMPLE

(Hypothetical case.) In an analogous study about supervision, the photographs of three well-known supervisors would be set A, and two series of abstract figures, B and C; the semantic differential scale would be answered for all stimuli before and after training.

NON-EXAMPLE

Showing a president's photo next to an abstract figure and asking what the person thinks. Without training, without testing the relations, and without a measure before and after, there is no way to say that there was a class or a transfer.

TEST YOURSELF

Why does the study need abstract figures, in addition to the photographs of the presidents?

ANSWER: because the figures are taken to be without pre-experimental meaning: if their evaluation changes after training, the change can be attributed to training, and not to a prior history with them (pp. 145 and 151).

28.2 The procedure and the criteria

The procedure has seven stages, in a single session, with intervals of about three minutes between them, the time the computer needed to set up the next one (p. 142). Training and tests ran on a program written by the second author for the study, which presented the stimuli and recorded the responses (pp. 140 and 141); the scale was answered with a pen, on A4 sheets (p. 141). Table 28.2 summarizes the stages, and Figure 28.1 shows what is trained, what is tested, and what is evaluated in one class.

Table 28.2
The seven stages, what the participant did, and the criterion for each

Stage	What the participant did	Blocks and trials	Criterion
1. Pretest	evaluate on the scale the 12 stimuli of A, B, C, and D, one per sheet	12 sheets	none described
2. AB training	given A1, A2, or A3, choose among B1, B2, and B3, with a happy emoji for a correct response and a sad one for an error	10 blocks of 18 trials, each relation 6 times per block	100% in one block, within 30 minutes; otherwise, redo on another day
3. AC training	the same, with the C figures	10 blocks of 18 trials	same as AB training
4. AB AC training	AB and AC trials intermixed	10 blocks of 18 trials, each relation 3 times per block	same as AB training

Stage	What the participant did	Blocks and trials	Criterion
5. Test 1	BA, CA, BC, and CB, without differential consequences	4 blocks of 18 trials, each relation 6 times	88.88% in each block
6. Test 2	AD, BD, CD, AE, BE, and CE, without differential consequences	6 blocks, otherwise identical to test 1	same as test 1
7. Posttest	same as the pretest	12 sheets	none described

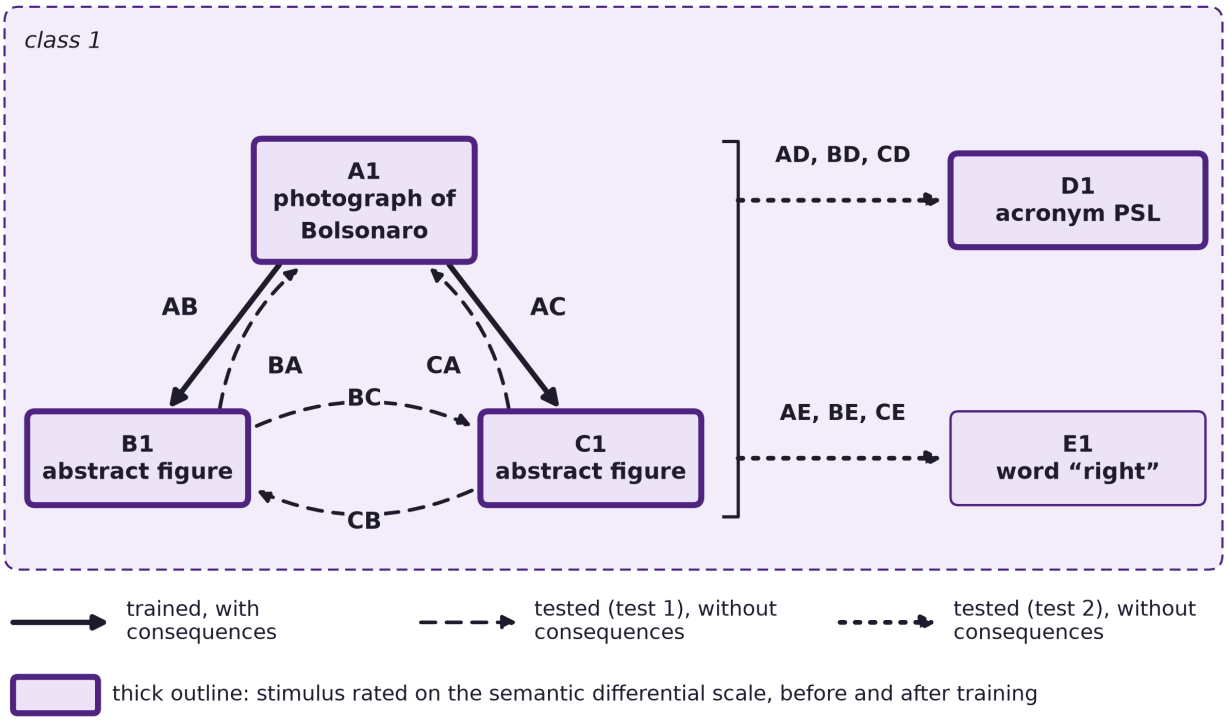
Note. Table prepared for this book, from Pereira and Moreira (2021b, pp. 142 and 143). The blocks of 18 trials are those of the article; the article calls BC and CB transitivity relations (p. 143).

On the pretest, the participant received a set of 12 sheets, each with one stimulus and the scale, and marked an "X" on the seven-point scale for every pair (p. 142). Each stimulus was presented once, in the order A1, C3, D2, B1, A3, C2, D1, B3, A2, C1, D3, and B2 (p. 142). Read carefully, the list is not just any sequence. The stimulus types repeat in the order A, C, D, B, and the classes in the order 1, 3, 2, so that a stimulus never comes right after another from the same class (this book's reading; the article does not explain the criterion for the order).

On each training trial, the sample (A1, A2, or A3) appeared at the top center of the screen. A click on it brought up, side by side at the bottom, three comparison stimuli (B1, B2, and B3), and the sample stayed on the screen, which the article calls simultaneous MTS (p. 142). A click on a comparison removed the stimuli and brought up, for one second, a happy emoji if the choice was the one defined as correct, or a sad one if not, followed by two seconds of blank screen (p. 142). The order of trials in each block was random (p. 142). AC training repeated AB with the C figures, and AB AC training intermixed the six relations (p. 143).

Figure 28.1

One class of the study: what was trained, what was tested, and what was rated on the scale



Note. Diagram prepared for this book, from the description of the procedure (Pereira & Moreira, 2021b, pp. 142 and 143); no data. The arrow goes from the sample to the comparison stimulus. Classes 2 and 3 have the same structure, with the photograph of Lula, the acronym PT, and the word “left,” and that of Fernando Henrique Cardoso, the acronym PSDB, and the word “center” (pp. 141 and 152). That the five stimuli form a class is a conclusion from the tests, not from the training (Chapter 20).

The criteria serve two different functions. The training criterion decides whether the participant moves on. The learning criterion was “100% correct in a block of trials”; if it was met within 30 minutes, the participant went on to the next stage and, if not, “was to redo the training on another day” (p. 142). The test criterion decides whether one can claim that the relation emerged: 88.88% correct in each block, “in order to claim that the tested relations had emerged” (p. 143). In the tests, clicks had no differential consequences (p. 143): a correct response is not an effect of consequences received there, and that is why it shows a derived relation, not a trained relation.

⚠ **CAUTION**

The acronyms and the position words were not trained with anything. That is why the authors warn that "emergence" does not apply to the AD (photograph and acronym) and AE (photograph and position) relations, "since these are probably pre-experimental relations that already existed" (p. 143). For BD, CD, BE, and CE, which link the abstract figures to the acronyms and words, the article makes no such caveat; they depend on the participant already relating the photograph to the acronym and to the word (this book's reading).

TEST YOURSELF

What happened if the participant did not reach 100% correct in AB training within 30 minutes?

ANSWER: the participant was to redo the training on another day (Pereira & Moreira, 2021b, p. 142).

28.3 What was found

There are three levels of results, and each one answers a different question. The first: did the participant learn what was taught? The second: did the relations that were not taught emerge? The third: did the evaluation of the figures change, and by how much?

At the first level, the session lasted from 80 to 100 minutes, and all participants met the learning criteria the first time they went through the trainings; that is, none had to repeat a training on another day (p. 143). All reached 100% in AB, AC, and AB AC training, and the authors conclude that all learned all the relations taught (p. 143). This level says that the trained relations were learned; it says nothing about the others.

At the second level, Table 28.3 gives each participant's percentage of correct responses on each relation. Except for P02 on BA symmetry, all reached 88.88% or more on test 1 (pp. 143 and 144), and all reached 94.44% or more on test 2 (p. 144). In a block of 18 trials, 88.88% is 16 correct responses, and P02's 72.22% on BA is 13 (this book's calculation). The authors conclude, "with some reservation for P02," that the formation of the three classes was verified for all participants (p. 144).

Table 28.3

Percentage correct for each participant on each trained and tested relation

P	AB	AC	AB AC	BA	CA	BC	CB	AD	BD	CD	AE	BE	CE
P01	100	100	100	100	100	100	94.44	100	100	100	100	94.44	100
P02	100	100	100	72.22	94.44	100	100	100	100	100	100	100	100
P03	100	100	100	100	100	100	100	100	100	100	100	100	100
P04	100	100	100	100	100	100	100	100	100	100	100	100	100
P05	100	100	100	100	100	100	94.44	100	94.44	100	100	100	100

Note. Data from Table 1 of the article (Pereira & Moreira, 2021b, p. 144). The first three columns are those of training (the AB AC column is the article's MI, for misto, mixed); BA, CA, BC, and CB, those of test 1; AD, BD, CD, AE, BE, and CE, those of test 2.

TEST YOURSELF

All participants reached 100% in training. Does that show that the classes formed?

ANSWER: no: it shows that the trained relations were learned. The class is concluded from the tests, the second level (Pereira & Moreira, 2021b, pp. 143 and 144).

The third level is that of the evaluations. To analyze them, the pairs whose positive adjective was on the left had their sign reversed, so that in every pair the negative adjective was on the left, with −3, and the positive one on the right, with +3. In the Right-Left pair, "for purposes of comparison with the other adjective pairs," Right was given −3 and Left 3 (p. 144). The Discussion describes the evaluation of the photographs as "right (values close to 3), left (values close to -3)" (p. 152), which does not match the convention of the Method; anyone who needs the sign should start from the Method, which defines how the data were plotted.

The authors describe the evaluations by visual inspection of line graphs, and they say why they chose lines. Although the evaluations of each pair "are not a continuous measure of one and the same behavior," the line graph was the one that made it easiest to see the "shape of the evaluation" of each stimulus (p. 144). For P01 and class 1, the description is as follows. On the pretest, the evaluations of Bolsonaro's photograph were "predominantly negative," except for the last three pairs (Active/Passive, Rich/Poor, and Submissive/Dominant). Those of figure B1 were close to −1, those of C1 between zero and three, and those of the acronym PSL were predominantly negative and similar to those of the photograph (p. 145). On the posttest, the photograph and the acronym stayed as before, and figures B1 and C1 became similar to the photograph (p. 145). The authors write that function transferred "from the stimuli with pre-experimental meaning (A1 and D1) to the stimuli supposedly without pre-experimental meaning (B1 and C1)" (p. 145).

The word "supposedly" is there for a reason. P02, "more markedly than P01," gave positive and negative evaluations to the abstract figures already on the pretest, and the authors write that, "strictly speaking, this result suggests that, for P02, these stimuli had pre-experimental meaning." P03, P04, and P05 gave neutral evaluations, zero, to these figures (p. 146). For P02, then, the premise of figures without meaning failed: the evaluations of his or her figures already had a direction before training.

Visual inspection has its limits, and the authors created two percentage measures, "beyond visual inspection" (p. 149). The **degree of equivalence** (DE) is the measure of overlap between the evaluations of two different stimuli from the same class on the same test, for example A1 and B1 on the posttest: 100% means that the evaluations were identical on all 14 pairs (p. 149). The **degree of transfer** (DT) is the measure of the difference between the evaluations of the same stimulus on different tests, for example B1 on the pretest and on the posttest: 100% means that the evaluation changed completely, for example from −3 to 3 on all 14 pairs (p. 149). The DE and the DT are related, according to the authors, to what the literature calls the degree of relatedness (Chapter 20), and "future analyses may indicate the adequacy of these measures" for comparing it (p. 152).

The calculation has four steps (p. 149). The −3 to +3 scale is converted to 1 to 7. For each adjective pair, the absolute value of the difference between the two evaluations is calculated. The 14 differences are added up. Since the largest possible difference in a pair is 6 (7 − 1), the largest possible sum is 84 (6 × 14), and the sum is expressed as a percentage of 84: this percentage is the DT. The DE follows the same steps, and at the end the percentage found is subtracted from 100 (p. 149).

KEY CONCEPT

The **degree of transfer** (DT) compares a stimulus with itself, at two times; the **degree of equivalence** (DE) compares two stimuli from the same class, at one time. The DT answers "did it change?"; the DE answers "did they become alike?" Neither one, by itself, answers "did it change because of the training?"

EXAMPLE

(Constructed records.) A figure was rated 0 on all 14 pairs on the pretest and, on the posttest, received +2 on eight pairs, +1 on three, and 0 on the other three. On the 1-to-7 scale, the pretest is 4 on every pair, and the posttest, 6, 5, and 4. The differences are 2 (eight times), 1 (three times), and 0 (three times), and the sum is 19. The DT is 19 ÷ 84 = 22.6%. If, on the posttest, the photograph of the class differed from the figure by 1 point on four pairs and on none of the other ten, the sum would be 4, and the DE, 100 − 4.8 = 95.2%.

NON-EXAMPLE

(Hypothetical case.) A figure B was already rated, on the pretest, almost the same as photograph A, and the posttest gives a DE of 95%. The DE is high, but the figure's DT is close to zero: nothing changed. The DE, "taken alone, can lead to a misleading interpretation" (p. 150), and that is why the authors also calculated the DTs.

The authors expected three things: a DT close to 0% for the stimuli with pre-experimental meaning, a DT close to 50% for those without it, and a DE close to 100% for those without it (p. 149). The 50% comes from a calculation. A figure rated 0 on every pair (4 on the 1-to-7 scale) that comes to be rated like an extreme photograph (7 on every pair) differs by 3 on each of the 14 pairs, 42 out of 84, or 50% (this book's calculation; the article gives the expectation, not the calculation). Table 28.4 gives each participant's values in each class, and Figure 28.2 sets them side by side with what the authors expected.

Table 28.4

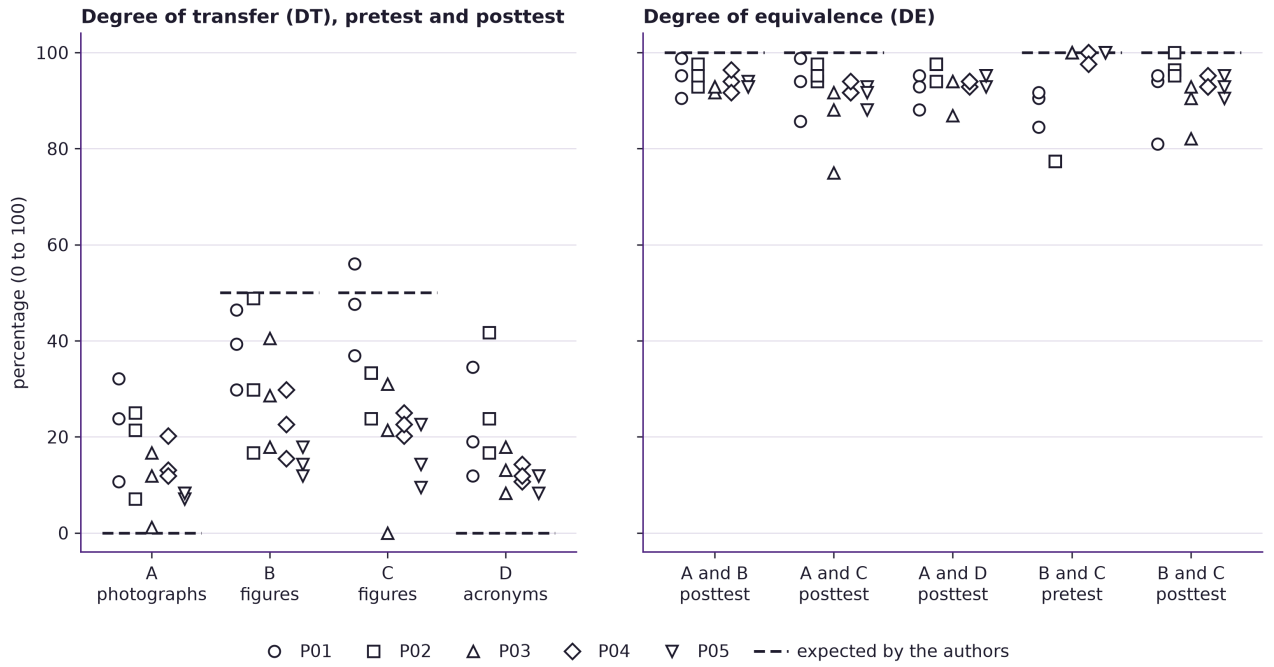
Degree of transfer (DT) and degree of equivalence (DE), by participant and by class

P	Class	DT-AA	DE-AB	DT-BB	DE-AC	DT-CC	DE-AD	DT-DD	DE-BC pre	DE-BC post
P01	1	10.7	95.2	46.4	98.8	56.0	95.2	19.0	84.5	94.0
P01	2	23.8	90.5	29.8	85.7	36.9	88.1	34.5	90.5	81.0
P01	3	32.1	98.8	39.3	94.0	47.6	92.9	11.9	91.7	95.2
P02	1	7.1	97.6	48.8	97.6	33.3	97.6	41.7	77.4	100.0
P02	2	25.0	92.9	16.7	94.0	33.3	94.0	16.7	77.4	96.4
P02	3	21.4	95.2	29.8	95.2	23.8	97.6	23.8	77.4	95.2
P03	1	1.2	92.9	40.5	88.1	31.0	86.9	17.9	100.0	90.5
P03	2	11.9	91.7	28.6	91.7	21.4	94.0	8.3	100.0	92.9
P03	3	16.7	92.9	17.9	75.0	0.0	94.0	13.1	100.0	82.1
P04	1	13.1	94.0	29.8	91.7	25.0	92.9	14.3	100.0	92.9
P04	2	11.9	96.4	22.6	91.7	20.2	94.0	10.7	100.0	95.2
P04	3	20.2	91.7	15.5	94.0	22.6	94.0	11.9	97.6	92.9
P05	1	8.3	92.9	17.9	92.9	22.6	92.9	11.9	100.0	95.2
P05	2	7.1	94.0	14.3	91.7	14.3	95.2	11.9	100.0	90.5
P05	3	8.3	92.9	11.9	88.1	9.5	95.2	8.3	100.0	92.9

Note. Data from Table 2 of the article (Pereira & Moreira, 2021b, pp. 149 and 150). DT-AA, DT-BB, DT-CC, and DT-DD are the DT of the photographs, of the B figures, of the C figures, and of the acronyms between the pretest and the posttest; DE-AB, DE-AC, and DE-AD, the DE between the photograph and each of the others on the posttest; DE-BC pre and DE-BC post (GE-BCe and GE-BCo in the article), the DE between B and C on the pretest and on the posttest (p. 150). In the row "P01, class 1," for example, DT-AA is that of A1.

Figure 28.2

DT and DE for each participant, with the values the authors expected



Note. Data from Table 28.4, which are those of Table 2 of the article (Pereira & Moreira, 2021b, pp. 149 and 150). Each participant has three dots per column, one per class. The dashed lines are what the authors expected (pp. 149 and 152): a DT close to 0% for the stimuli with pre-experimental meaning, photographs and acronyms (p. 145), a DT close to 50% for the figures, and a DE close to 100% for the stimuli without that meaning; for the DE between A and D, the article states no expected value.

Table 28.4 is read by row. In "P01, class 1": A1 changed 10.7% between the pretest and the posttest (DT-AA); B1 changed 46.4% (DT-BB) and C1, 56.0% (DT-CC); and, on the posttest, B1 was 95.2% the same as A1 (DE-AB) and C1, 98.8% (DE-AC). By column, the authors note three things: a DE between A and B above 90% for all participants and classes; a DT for the B figures ranging from 11.9% (P05, B3) to 48.8% (P02, B1); and differences between DE-AB and DE-AC of less than 5%, except for A3 and C3 for P03 (all on p. 150). According to the table, the DT of the C figures ranges from 0.0% (P03, C3) to 56.0% (P01, C1), and that of the photographs from 1.2% (P03, A1) to 32.1% (P01, A3), which the article illustrates with P01's 10.7% for Bolsonaro and 32.1% for Fernando Henrique (p. 150). For P03, P04, and P05, the DE-BC pre lies between 97.6% and 100.0%, which is what one expects from figures rated zero on all 14 pairs, as the authors describe (p. 146). P02, with 77.4% in all three classes, evaluated the two series differently before training, and the authors add the caveat "except for P02" (p. 150).

TEST YOURSELF

In the row "P03, class 3," DT-CC is 0.0 and DE-AC is 75.0. What does this say about figure C3?

ANSWER: that C3 was evaluated identically on the pretest and the posttest (DT 0.0%), and that on the posttest it was less similar to A3 (75.0%) than B3 was (92.9%). This is the exception the article points out: the differences between DE-AB and DE-AC were less than 5%, except for A3 and C3 for P03 (p. 150).

28.4 What the study allows us to claim

Taken together, the three levels support a limited claim: for 5 students, after a training in which the photographs were related to two series of abstract figures, the untrained relations emerged, with the caveat of P02 on BA symmetry. The figures also changed in evaluation (DT from 11.9% to 48.8% for the B figures) and, on the posttest, had a DE above 90% with respect to the photograph of the class, in all 15 combinations with the B figures and in 11 of the 15 with the C figures (Table 28.4). The authors sum up that the results "demonstrated both the formation of the equivalence classes and the transfer of function from stimuli with pre-experimental meaning to stimuli without pre-experimental meaning" (p. 138).

Section 25.1 asks for more than that: a comparable group, which answers the scale without going through training, and a follow-up, a new measure after an interval. The article itself records one of the limits. The evaluations of the photographs, which were not the target of the transfer, also varied: P01 changed 23.8% for Lula and 32.1% for Fernando Henrique (p. 151). The authors say that "it is not clear" whether these differences are variation within a "margin of error" for repeated measures or transfer from the other stimuli to the photographs (p. 151). Without a group that answers the scale twice without training, there is no way to know how much the scale varies on its own (Section 25.1), and so the DT of the figures has no point of comparison.

There are still other limits, some noted by the authors and others in the design. The article reports a single order of presentation of the stimuli (p. 142), and the posttest was identical to the pretest (p. 143). Data collection took place in a single session, of 80 to 100 minutes (p. 143): the posttest comes minutes after training, with no follow-up. The authors observe that using stimuli with pre-experimental meaning "comes with

additional problems of experimental control" (p. 151). They also observe that neutral evaluations, around the center of the scale, "are not an absence of meaning (or of attitude)" (p. 152): zero on the scale does not prove that the figure had no function. And the datum is a rating on a scale, not a vote or an action.

What the authors suggest, without demonstrating it, also counts. The acronyms and the words were correctly related to the abstract figures in the tests, even though no conditional discriminations were programmed with them. The authors conclude that these stimuli "were probably already part of an equivalence class with the photographs of the presidents before the experiment" (p. 151). They also suggest that "it seems possible that transfer of function is not a unidirectional phenomenon" (p. 152). It may not have gone only from the photographs to the other stimuli, and future studies could form classes with stimuli of opposite valences to see whether the evaluation becomes neutral (p. 152).

The authors explain why they expected similar DEs and DTs for the B and C figures: in principle, these would have the same initial meaning, and the nodal distance between A and B and between A and C was the same (p. 152). Since A is the sample in both trainings, there is no node between A and B or between A and C (a node is the stimulus that links two others of a class in training, as B links A to C when AB and BC are taught; Chapter 20), and it is this symmetry in the design that supports the expectation.

What the authors did next. The same authors published, in a book, two studies with the same three presidents (Pereira & Moreira, 2021a). They say that the study in this chapter was the only one in the paradigm with stimuli of political meaning and that it trained the relations separately, and they test another structure, with the relations trained together and feedback gradually reduced (p. 18; Section 33.3). Each experiment had 5 students, aged 18 to 25, data were collected remotely because of the pandemic, and the scale came to have 13 pairs and a bar from 0 to 100 (pp. 18, 19, and 25). In Experiment 1, most training errors occurred in the phase with 100% feedback, and all participants reached more than 90% on the tested relations (p. 63). The DE between the photograph and the figures, the same measure as in Section 28.3, increased from pretest to posttest by an average of 9.4 percentage points for the B figures and 14.1 for the C figures (Table 26, pp. 60 and 61).

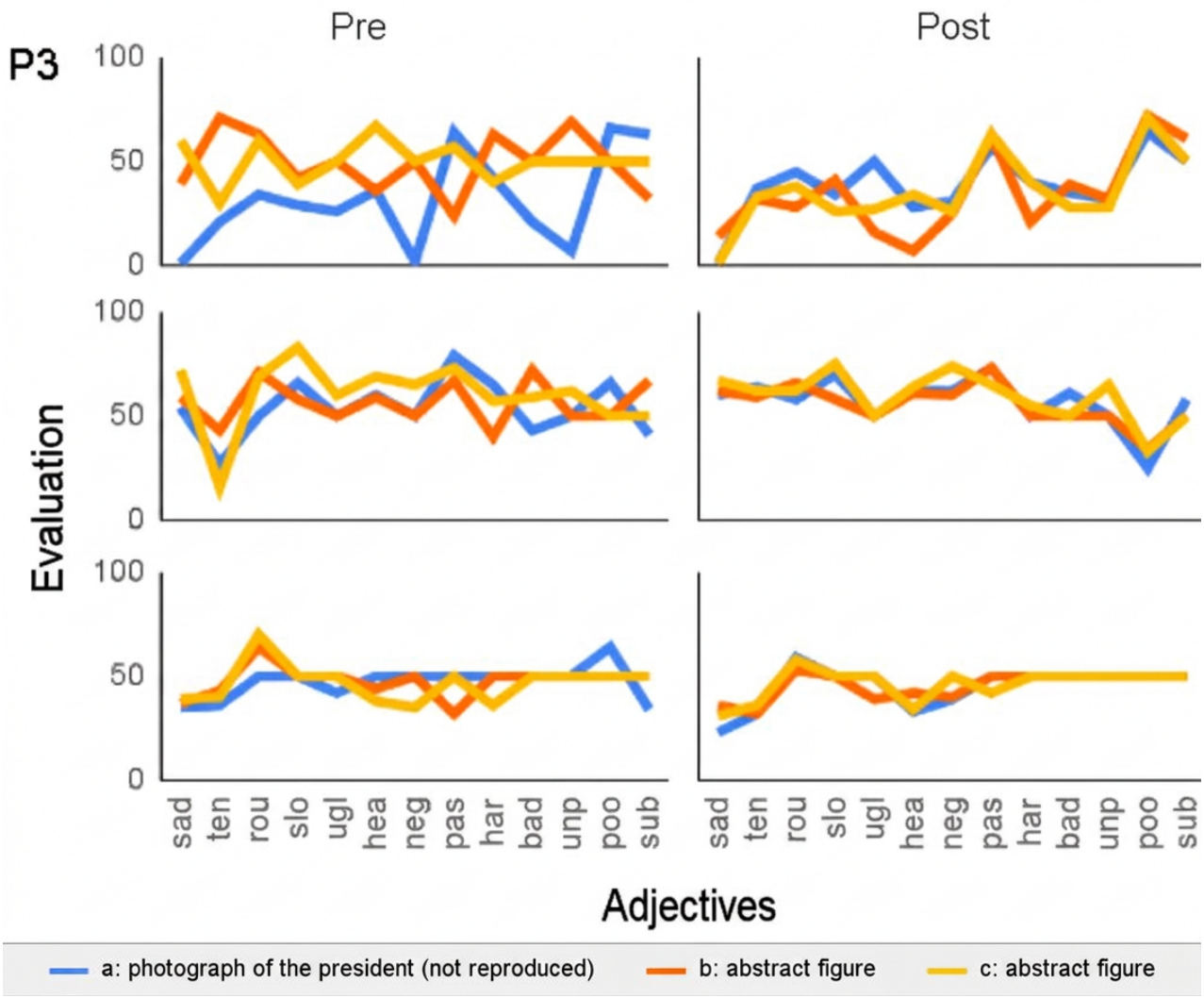
In Experiment 2, set B became faces of unknown people, rated as neutral in an earlier study by one of the authors (Chapter 32), and C remained abstract (p. 67). The five new participants formed the classes,

but the mean increase in DE was 6.4 points between the photograph and the face and 12.8 between the photograph and the abstract figure (Table 52, p. 101). For P8, there was no increase in the relation with the face (−0.3; p. 104). The authors conclude that it is harder to change the attitude toward unknown people, who already carry some prior evaluation, than toward symbols theoretically without meaning, which may have some prior meaning, but much less (p. 106). This is the point this chapter marked with P02 and with the word "supposedly": pre-experimental meaning is a matter of degree (this book's reading).

The book study has the limits already pointed out in this chapter: each participant is compared with himself or herself, with pretest and posttest in the same session, lasting one hour to an hour and a half (pp. 19 and 107), with no comparable group and no follow-up (Section 25.1). The authors add those of remote data collection (Section 33.4) and acknowledge that, from the graphs, it is hard to say whether there was transfer (p. 63). Figure 28.3 shows why, with P3. In class 1, the authors see a larger difference between the pretest and the posttest (p. 50), and the lines move closer together in the graph. In classes 2 and 3, the evaluations were already similar before training, and so, they write, one cannot claim that there was transfer in them (p. 63).

Figure 28.3

One participant's evaluations, in the three classes, before and after training



Note. Excerpt from Figure 13 of Pereira and Moreira (2021a, p. 50): P3's evaluations in Experiment 1, from 0 to 100, on the 13 adjective pairs (abbreviated names on the axis), before (Pre) and after (Post) training, for the stimuli of each class (a in blue, b in orange, and c in yellow; p. 47). The photographs of the presidents and the thumbnails of the stimuli, on the right in the original, are not reproduced, and the gray band with the colors was added for this book. The reproduction has the resolution of the source material.

TEST YOURSELF

In Figure 28.3, why is transfer not claimed in P3's classes 2 and 3?

ANSWER: because the evaluations of the three stimuli were already similar on the pretest, and similarity on the posttest, by itself, does not show transfer (Pereira & Moreira, 2021a, p. 63; Section 28.3, common mistake 4).

⚠ **CAUTION**

The authors write that the results "demonstrate how attitudes towards politicians can be transferred to new stimuli" (p. 138). Read the sentence with the design in hand: the data are ratings from 5 students on a scale, before and after, in one session, with no comparable group and no follow-up. The sentence says that it is possible to transfer the evaluation to new stimuli, under these conditions; it does not say that voters' political attitudes are changed.

TEST YOURSELF

Which requirements of Section 25.1 does the study not meet?

ANSWER: a comparable group, follow-up, and a record of what people do outside the session.

Common learner mistakes

1 **Saying that the training taught people to like or dislike.** The mistake happens because the evaluation changed after training, and the change seems to have been what was taught. *How to spot the mistake:* the sentence speaks of "teaching an attitude." The training taught relations between photographs and abstract figures; the evaluation was measured before and after, and was not taught (Section 28.2).

2 **Confusing class formation with transfer.** The mistake happens because the two appear together in the authors' summary, as if they were a single finding. *How to spot the mistake:* the sentence gives the test scores as proof that the evaluation changed, or gives the change on the scale as proof that the class formed. These are two levels, and the class is concluded from the tests (Section 28.3).

3 **Treating the acronyms and the words as trained.** The mistake happens because they appear in the tests and in the figure, next to the trained relations. *How to spot the mistake:* the sentence says that the training joined presidents and acronyms. The training did not include them, and the authors say that the AD and AE relations probably already existed (Section 28.2).

4 **Reading the DE, by itself, as proof of transfer.** The mistake happens because "ended up alike" sounds like "became alike." *How to spot the mistake:* the sentence says "the figures were 95% the same as the photograph" and does not say how they stood on the pretest (Section 28.3).

5 **Generalizing from 5 students, or from the rating to political behavior.** The mistake happens because the topic, politics, invites talk about voters, and the data come from five people in a laboratory. *How to spot the mistake:* the conclusion speaks of "voters" or of voting; the datum is a rating from 5 students on a scale (Section 28.4).

SUMMARY

Question, stimuli, and classes (objective 1). Matching-to-sample with photographs of presidents, abstract figures, acronyms, and words, in three classes, and a 14-pair semantic differential scale before and after, in a single session.

Pre-experimental meaning and measure (objective 2). Photographs and acronyms have pre-experimental meaning; the figures, supposedly, do not, and the change in their evaluation is read between the pretest and the posttest. P02's pretest shows why "supposedly" matters.

Three levels (objective 3). Training criterion (100% for all), emergent relations (88.88% or more, with P02 at 72.22% on BA symmetry; 94.44% or more on test 2), and evaluations on the scale.

DT and DE (objective 4). The DT is the percentage difference between two evaluations of the same stimulus; the DE is 100 minus the percentage difference between two stimuli on the same test. The DE alone is misleading, and the DT, without a comparison, does not separate transfer from margin of error.

Limits (objective 5). Five participants, a single session, no comparable group and no follow-up, a rating as the measure; prior classes with the acronyms, transfer perhaps not unidirectional, and a neutral rating that is not an absence of meaning; in the same authors' book study, pre-experimental meaning appears as a matter of degree (Section 28.4).

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. Which stimuli make up class 2, and which of them were rated on the scale?
2. Which relations were trained, and which relations were tested on test 1? For which relations do the authors say that "emergence" does not apply, and why?
3. In Dixon and Lemke (Chapter 27), the scale was applied to the photographs; in this study, also to the abstract figures. Why does this change the question?
4. What did P02's pretest show about the abstract figures, and what consequence does this have for reading this participant's result?
5. A test block had 18 trials, and the criterion was 88.88%. (a) How many correct responses does the criterion require? (b) How many correct responses is 72.22%? (c) According to Table 28.3, how many of the 5 participants met the criterion in all four blocks of test 1?
6. (Records constructed for the exercise.) A photograph was rated on the 14 pairs on the pretest and on the posttest. On the 1-to-7 scale, the absolute differences between the two times, pair by pair, were 0, 0, 1, 2, 0, 3, 1, 0, 0, 2, 1, 0, 0, and 0. Calculate the DT and say whether it fits what the authors expected for a photograph.
7. (Hypothetical case.) An abstract figure was rated 0 on all 14 pairs on the pretest. On the posttest, the photograph of the class and the figure received +3 on all 14 pairs. (a) What is the figure's DT? (b) What is the DE between the photograph and the figure on the posttest? (c) Where does the 50% that the authors expected for the figures come from?
8. In Table 28.4, in the row "P02, class 1," DE-BC pre is 77.4 and DT-BB is 48.8. What does the first value say, and how does it connect with what the article reports about P02?
9. P01 varied 23.8% in the evaluation of Lula's photograph and 32.1% in that of Fernando Henrique. Why does this make it hard to read the DT of the figures as transfer?
10. (Hypothetical case.) A popular science article sums up the study: "scientists show it is possible to make voters like a candidate just by associating his photo with symbols." Point out two problems.

ANNOTATED ANSWER KEY

1. The photograph of Lula (A2), abstract figures B2 and C2, the acronym PT (D2), and the word "left" (E2). A2, B2, C2, and D2 were rated on the scale; the word was not (Table 28.1; Pereira & Moreira, 2021b, p. 141).

2. AB and AC were trained (and, intermixed, AB AC); on test 1, BA and CA, which the article treats as symmetry, and BC and CB, which it calls transitivity (p. 143). "Emergence" does not apply to AD and AE (photograph and acronym, photograph and position), because they were probably already pre-experimental relations (p. 143).

3. In Dixon and Lemke, the question is whether the rating of the photographs, which already had meaning, changes after a training with abstract symbols and words. Here, the question is whether the evaluation of the figures, supposedly without meaning, comes to resemble that of the photographs; that is why the figures need a measure before and after (p. 141).

4. P02 gave positive and negative evaluations to the abstract figures already on the pretest, and the authors say that, for P02, these stimuli had pre-experimental meaning (p. 146). For this participant, the premise of figures without meaning does not hold, and the DT of his or her figures starts from evaluations that already had a direction; the reading requires this caveat.

5. (a) 16 correct responses (16 ÷ 18, which the article writes as 88.88%; p. 143). (b) 13 correct responses (13 ÷ 18). (c) Four: P01, P03, P04, and P05; P02 fell below on BA (72.22%) (Table 28.3; p. 144).

6. The sum is 10, and the DT is 10 ÷ 84 = 11.9%. This is a small value, in the direction the authors expected, a DT close to 0% for stimuli with pre-experimental meaning (p. 149), and close to the DTs "around 10%" they mention for the photographs and acronyms (p. 150); the photograph DTs in Table 28.4 range from 1.2% to 32.1%.

7. (a) On the 1-to-7 scale, 4 on the pretest and 7 on the posttest: a difference of 3 on each of the 14 pairs, a sum of 42, DT = 42 ÷ 84 = 50%. (b) The evaluations are identical on all 14 pairs, a sum of 0, DE = 100%. (c) From a neutral figure that comes to be rated at the extreme of the scale on every pair: 3 on each pair, 42 out of 84 (p. 149; this book's calculation).

8. That, on the pretest, P02 evaluated B1 and C1 differently (77.4% overlap; P03, P04, and P05 lie between 97.6% and 100.0%). It connects with what the article reports: P02 gave positive and negative evaluations to the figures before training, and the others gave zero (pp. 146 and 150).

9. Because the photographs were in the class, and the study cannot say whether the variation is a "margin of error" for repeated measures or transfer from the other stimuli to them (p. 151). Without knowing how much the scale varies on its own, the DTs of the figures (11.9% to 48.8% for the B figures) have no point of comparison (Section 28.4).

10. For example: (a) the participants were 5 psychology students selected by convenience, not voters (p. 140); (b) the datum is a rating on a scale, before and after, in a single session, with no comparable group and no follow-up (Section 28.4); (c) the training was matching-to-sample with differential consequences, not an association of a photo and a symbol (p. 142).

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 29. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2	28.1, 28.2, and common mistake 3
3, 4	28.1, 28.3, and common mistake 1
5	28.3 and common mistake 2
6, 7, 8	28.3 and common mistake 4
9, 10	28.4 and common mistake 5

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Pereira, P. B. G., & Moreira, M. B. (2021a). *Atitudes em relação a presidentes do Brasil: Formação de classes de equivalência e transferência de função* [Attitudes toward presidents of Brazil: Equivalence class formation and transfer of function]. Instituto Walden4 Press. https://www.walden4.com.br

Pereira, P. B. G., & Moreira, M. B. (2021b). Transferência de atitudes em relação a presidentes da república [Transfer of attitudes towards presidents of the republic]. *Acta Comportamentalia*, *29*(4), 137–154.

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CHAPTER

29 Experiments

a close look at a validation study of a semantic differential instrument (de Almeida et al., 2014)

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Explain** why an instrument already used in several studies still needed a validity study, and what the 2014 study set out to show.
2. **Describe** the study: participants, instrument, stimuli, and procedure.
3. **Read** the factor solution: which scales form each factor, what the loading criterion is, and how a stimulus's score on each factor is obtained.
4. **Interpret** the alpha coefficients of the two factors and what the authors conclude about each.
5. **State**, in a report, which scales you used, how you computed the score, and what evidence exists for the instrument, without claiming more than the study shows.

PREREQUISITES

The semantic differential, its adjective pairs, and the values from −3 to +3 (Section 23.3); the decisions involved in building a scale, among them the number of points and the direction, which Table 23.1 brought together; matching-to-sample and transfer of function (Chapter 20); and the study in Chapter 28, which uses the instrument. The new terms (validity, precision, internal structure, factor analysis, factor, factor loading, semantic space, and alpha coefficient) are defined here.

OPENING

(Hypothetical case, continued from Chapter 28.) Beatriz wants to use, at the training clinic, the semantic differential from the studies she has read, and the clinic's management asks: "Is this scale valid?" She finds a 2014 article that says it analyzes the validity and precision of the instrument. Four questions organize the chapter.

1. *"Why did an instrument already used in several studies need a validity study?"*
2. *"What was done, with whom, and with what material?"*
3. *"What did the analysis show, and how precise are the measures?"*
4. *"What does the study allow us to say, and what should a report say?"*

The first is the subject of Section 29.1; the second, of 29.2; the third, of Sections 29.3 to 29.5; the fourth, of 29.6.

29.1 Why validate an instrument that was already in use

Two terms organize the assessment of any measuring instrument. **Validity** is the degree to which the evidence supports that the instrument measures what it is meant to measure (definition proposed here). The article this chapter deals with speaks of "evidence of validity" (de Almeida et al., 2014, p. 272), and validity is a matter of evidence: each analysis adds one kind. **Precision**, or reliability, is the consistency or stability of the measure (p. 278). The two questions are different: a scale can give consistent measures of something other than what one wanted to measure.

The instrument in the article is the semantic differential of Section 23.3, with 13 adjective pairs, which the article itself presents as an instrument "that has been used to measure the transfer of meaning among equivalent stimuli" (p. 272). When the article says "meaning," this book understands, as in Section 20.4, the functions the stimulus comes to have for the person, what the person does in its presence; what the instrument records are the marks on the scales.

The reason for its use lies in the model. Sidman and colleagues, according to the article, argued that equivalence relations "constitute relations with semantic meaning": each member of the class "constitutes a symbol of the others," and the members "share meaning" (p. 273). Bortoloti and de Rose (2007, as cited in de Almeida et al., 2014, p. 273) proposed checking this inference with a measurement technique "external to the

equivalence model": the semantic differential. The technique was introduced by Osgood and colleagues, and the article defines it as "a technique used to measure the meaning that participants attribute to 'concepts' (words, phrases, photographs, drawings, etc.)" (p. 273).

In the study by Bortoloti and de Rose (2007, as cited in de Almeida et al., 2014, pp. 273–274), university students learned conditional discriminations that formed classes with facial expressions and abstract figures. Next, they rated some of the abstract figures on the instrument, made up of 13 seven-interval scales anchored by opposite adjectives (p. 273). A control group, which did not learn the relations, rated the abstract figures and the faces with the same instrument. The control group rated the figures as neutral (the mean tended toward the central interval, with a value of zero) and the faces differently depending on the emotion: the happy face as positive and the angry face as negative. The trained group's ratings of the figures equivalent to the faces came out close to the ratings of the faces (p. 274). For the authors of the article, the result "provided an external validation of equivalence as a model of meaning" (p. 274).

The studies that followed (Bortoloti & de Rose, 2008, 2009, and 2011, according to de Almeida et al., 2014, p. 274) used the instrument to see the effect of three variations in the procedure: delayed presentation of the comparison stimuli, the number of mediating stimuli present in the class (nodal distance; note 1 on p. 274), and the presentation time of the "meaningful stimuli." The instrument was sensitive to these three manipulations, which, the authors say, "the exclusive use of the classic procedures of the equivalence model would not be able to capture" (p. 274).

Hence the article's point: "Although the results of this series of experiments indicate that the semantic differential instrument seems adequate for the purposes to which it has been put, the psychometric validity of the instrument was not assessed in the studies described above" (p. 274). The authors propose assessing it through the instrument's **internal structure**, which is the pattern of correlations among the scales: which ones vary together and which do not (p. 274). The method is **factor analysis**, "widely used in the studies of Osgood and colleagues" (p. 274): a statistical procedure that groups the scales that correlate with one another.

The aim of the study was "to analyze the validity of the semantic differential based on its internal structure and the precision of the instrument in judging the stimuli that have been used in studies involving

transfer of meaning among equivalent stimuli" (p. 274). The sentence limits the scope: the analysis is done with the stimuli from that series of studies.

KEY CONCEPT

An instrument is assessed by two questions. **Validity**: does the evidence support that it measures what it is meant to measure? **Precision**: does it measure consistently? The study in this chapter answers the first through the instrument's **internal structure** (which scales vary together) and the second through a measure of consistency among the scales.

EXAMPLE

(Hypothetical case.) A training clinic builds a scale of ten adjective pairs for group supervision and administers it to 150 interns. If eight of the pairs vary together and two do not follow the others, there is evidence about the internal structure, and the clinic decides what to do with those two (remove them, revise them, treat them separately).

NON-EXAMPLE

Using the same list of pairs in a series of studies with consistent results, such as the 2007–2011 series. The article treats the series as a sign that the instrument "seems adequate" and says that its psychometric validity "was not assessed" in it (p. 274).

CAUTION

The "external validation of equivalence as a model of meaning" (p. 274) is not a validation of the instrument. In the 2007 study, the instrument was the measure with which the model was tested: what was put to the test was equivalence, and the instrument entered as a premise. It is the instrument that the 2014 study puts to the test.

TEST YOURSELF

The 2007–2011 studies gave results consistent with what was expected. Why does the article say that psychometric validity was not assessed?

ANSWER: because those studies used the instrument for other questions (the transfer of meaning and the effect of variations in the procedure), and none of them examined the instrument's internal structure or precision (p. 274).

29.2 What was done: participants, instrument, stimuli, and procedure

The participants were 196 undergraduate students at the Federal University of São Carlos, 111 male and 85 female, aged 18 to 27 (M = 21.4; SD = 2.2), invited through verbal contacts in classrooms and in the university library (de Almeida et al., 2014, p. 274). The stimuli were "the same ones that have been used in previous work": photographs of faces expressing emotions and abstract figures (p. 275). Each participant rated 12 of them, six faces and six abstract figures, and Figure 2 of the article reproduces them "in the order in which they were presented to the participants" (p. 275).

The instrument is the one in Figure 1 of the article (de Almeida et al., 2014, p. 274): 13 bipolar seven-interval scales, anchored at the ends by opposite adjectives. The pairs are triste and alegre (sad and happy), relaxado and tenso (relaxed and tense), áspero and liso (rough and smooth), lento and rápido (slow and fast), bonito and feio (beautiful and ugly), leve and pesado (light and heavy), negativo and positivo (negative and positive), ativo and passivo (active and passive), macio and duro (soft and hard), mau and bom (bad and good), agradável and desagradável (pleasant and unpleasant), pobre and rico (poor and rich), dominante and submisso (dominant and submissive), in the order in which the article prints them, from left to right. They are the same 13 pairs as in Figure 3 of Bortoloti and de Rose (2009, p. 569), in English, where they appear with the adjective considered positive on the right (p. 570); the comparison is this book's. In Figure 1 of the 2014 article, the positive adjective, as designated in 2009, is on the right in six pairs (happy, smooth, fast, positive, good, and rich) and on the left in seven (relaxed, beautiful, light, active, soft, pleasant, and dominant), which the appendix confirms (this book's count). The value of a mark therefore depends on the side on which the pair is printed. On each scale, the participant marked an end interval if they found the concept "very strongly" related to the adjective next to it, the next interval toward the center if the relation was "more or less," and the third, counting from the outside in, if it was "only slightly." The central interval was "the origin and the neutral point of each scale" (p. 275).

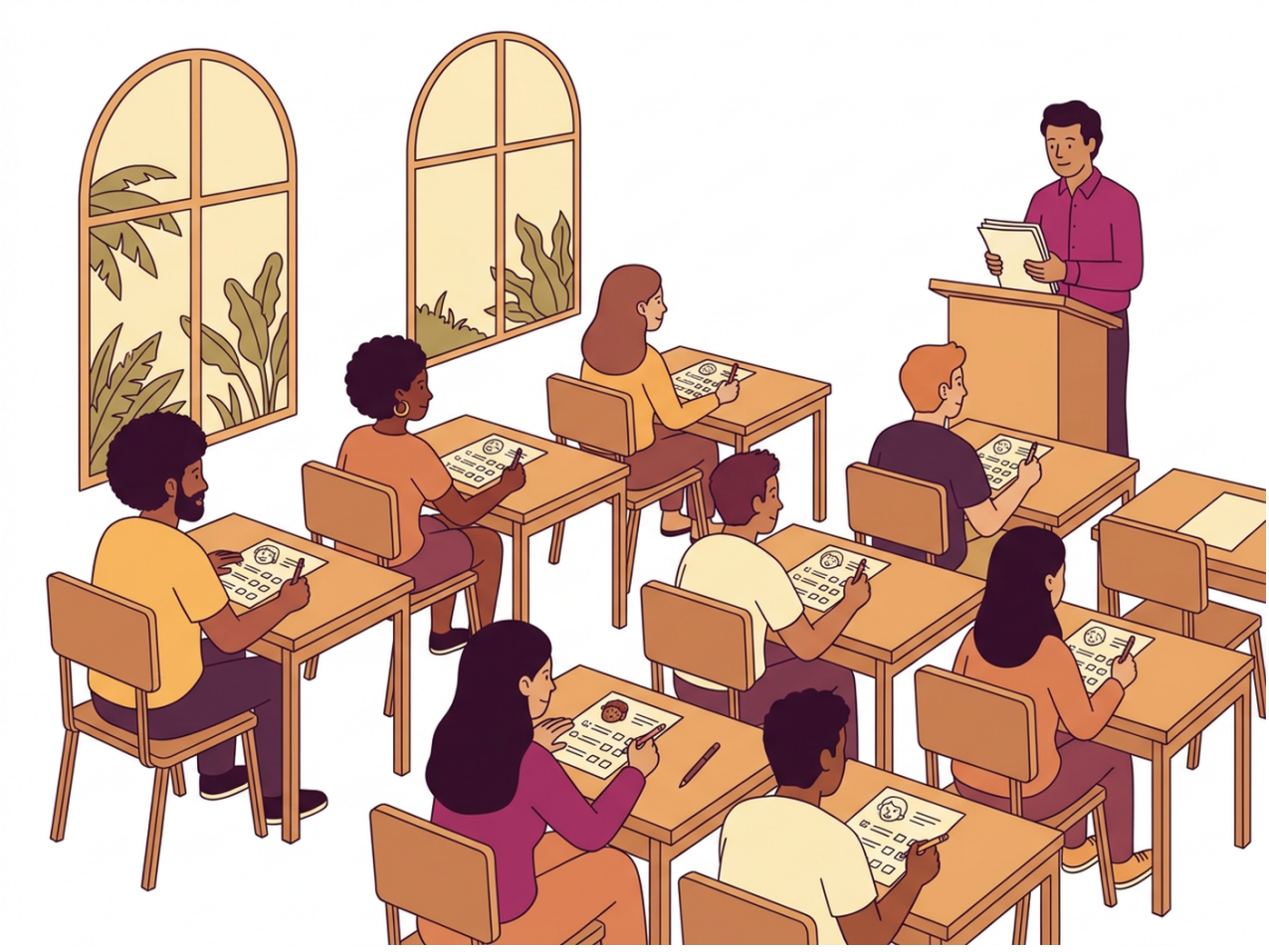
For the analysis, the central interval received the value 0 and the others, values from −3 to +3 (p. 275). In the article's example, the good-bad scale is drawn with "Good," considered positive, on the left, and the value runs from +3 at the left end to −3 at the right end. In the article's

words, "direction and distance correspond, respectively, to the quality and the intensity of the meaning of the concept judged on the bipolar scale" (p. 275). This is the rule that Section 23.3 described.

Figure 29.1 illustrates the administration setting: students, in a classroom, mark the scales on one sheet per stimulus, with the administrator in front.

Figure 29.1

Administration in the classroom: one sheet per stimulus



Note. Illustration generated for this book with artificial intelligence (Runway), from the description of the procedure; it does not reproduce the room, the participants, or the original sheets, which showed photographs of faces and abstract figures.

Each participant received 14 stacked sheets: the first two contained the instructions, and each of the following 12 had a photograph or abstract figure at the top and, just below it, the 13 scales (p. 275). With 12 stimuli and 13 scales, each person made 156 ratings (p. 275). The instructions, in the article's appendix, teach how to use the scales with the beautiful-ugly pair (p. 280), ask that no pair be left unmarked, and say that there is no "right or wrong answer": "Try to be sincere" (p. 281). Anyone with

a question was to call "the person who is administering this questionnaire" (p. 281). The situation is that of any written scale, a response given to someone (Section 23.6).

Two discrepancies within the article itself call for care from anyone who wants to reproduce the instrument. The interval labels in the appendix instructions are "extremely," "fairly," and "slightly" (p. 280), not those of the Method section, "very strongly," "more or less," and "only slightly" (p. 275): whoever reproduces the procedure chooses one set and states it. And the sample sheet in the appendix has, in the last pair, "dominant" and "tense" (p. 281), where Figure 1 has "dominant" and "submissive" (p. 274). The list in this chapter is the one in Figure 1, the same as in Table 1 of the article and in the text of the Discussion (pp. 276 and 277).

The article reproduces a single order of presentation and does not mention that it varied across participants. Readers who want to redo the procedure need to decide this, and state it.

TEST YOURSELF

How many ratings did each participant make, and how many marks would there be in total if everyone completed every sheet?

ANSWER: 156 per person (12 stimuli × 13 scales; p. 275) and, in total, 196 × 156 = 30,576 marks (the calculation is this book's).

29.3 The internal structure: from factor analysis to the two factors

Before analyzing, the authors checked whether the data lent themselves to the procedure. The Kaiser-Meyer-Olkin (KMO) index was .91 and Bartlett's test of sphericity was 13,025.93 ($p < .001$), values "considered suitable for the factor procedure" (Pasquali, 2005, as cited in de Almeida et al., 2014, p. 275). According to the article's notes, the KMO indicates "the proportion of the variance in the data that can be considered common to all the variables" and is better the closer it is to 1. Bartlett's test examines whether the correlation matrix is an identity matrix, "which would indicate that there is no correlation among the data" (p. 275).

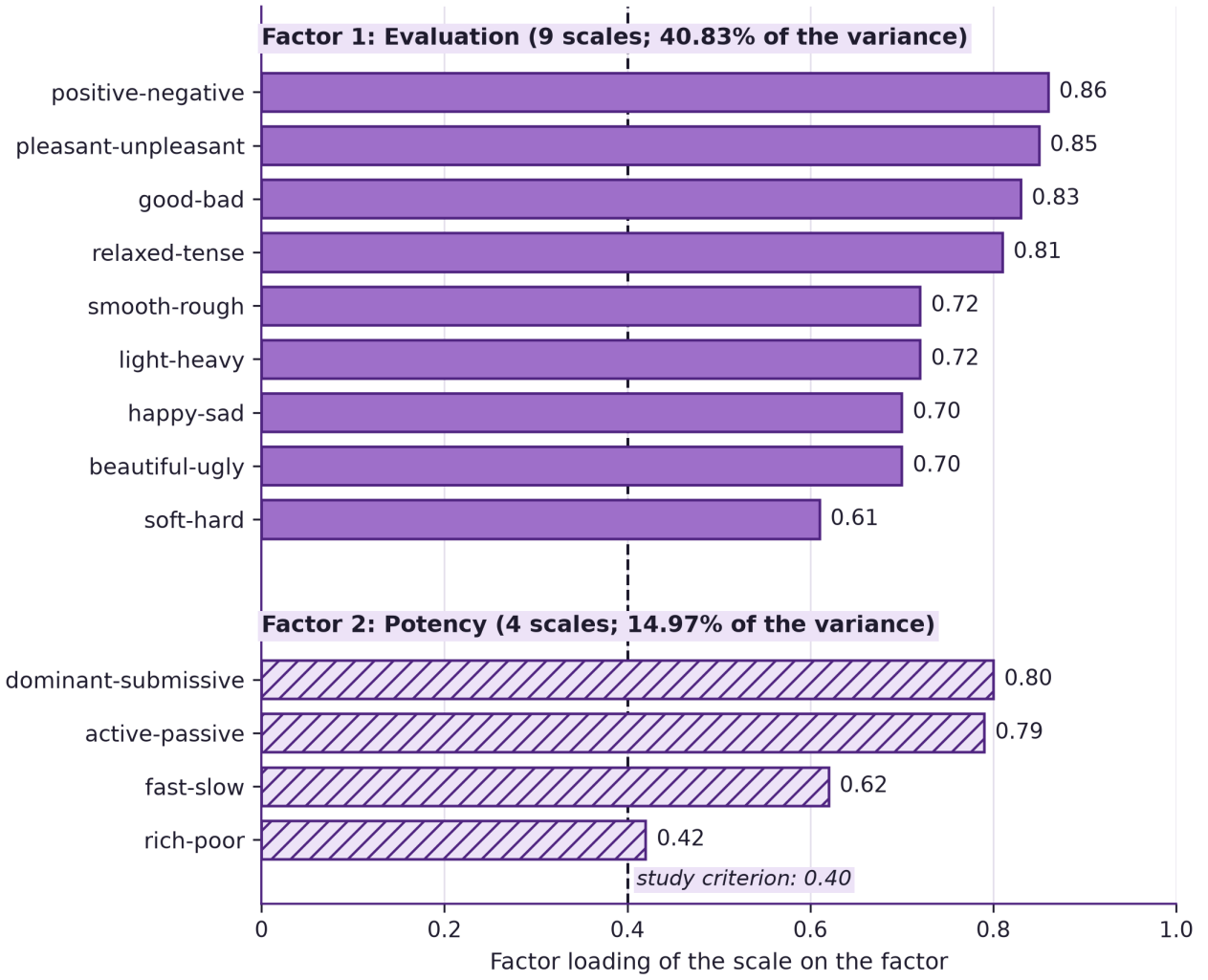
Each group of scales that vary together is a **factor**, and the number that says how strongly a scale is associated with a factor is its **factor loading** (this book's definitions). How many factors to keep is a decision in the analysis. A scree plot, obtained from the principal components analysis, which "allowed the transformation of the original variables into a smaller set of components" (p. 275), suggested a two-factor solution as the most adequate, explaining 55.8% of the total variance in the data (p. 275). The variance is the variation of the marks from one rating to another, and a factor "explains" it to the extent that it follows it.

The two factors were extracted by the principal axis factoring method, with promax rotation (p. 276). The chapter does not explain these two terms, because the reading asked of you here does not depend on them. What matters is the criterion: the authors decided that items with factor loadings below .40 would be excluded from the final solution (a criterion they base on Hair and colleagues, 1999, and on Kline, 1994, works that were not consulted), and none of the 13 was excluded (p. 276).

Figure 29.2 shows the 13 loadings, each scale in the factor where it ended up, and Table 29.1 brings together what each factor contains and what the authors say about it.

Figure 29.2

The 13 scales in the two factors, with the loading of each one and the .40 criterion



Note. Data from Table 1 of the article (de Almeida et al., 2014, p. 276), reordered from the highest to the lowest loading within each factor; in the article, the scales follow another order. The percentages of variance are those in the article's table: 40.83 and 14.97, which add up to 55.80, the value the text gives for the two (the sum is this book's). The article's table also gives the communality (h^2) of each scale, from .25 to .75, which this chapter does not use.

Table 29.1

What each factor brings together and what the authors say about it

	Factor 1, "Evaluation"	Factor 2, "Potency"
Scales, from highest to lowest loading	positive-negative, pleasant-unpleasant, good-bad, relaxed-tense, smooth-rough, light-heavy, happy-sad, beautiful-ugly, and soft-hard	dominant-submissive, active-passive, fast-slow, and rich-poor
Number of scales	9	4
Variance explained	40.83%	14.97%

	Factor 1, "Evaluation"	Factor 2, "Potency"
Highest and lowest loading	.86 (positive-negative) and .61 (soft-hard)	.80 (dominant-submissive) and .42 (rich-poor)
What it seems to measure, according to the authors	"characteristics inherent to physical and affective qualities of the stimuli rated"	"combined characteristics of activity and potency of the stimuli rated"
Correlation among the scales, according to the authors	"high levels of correlation with one another"	"were not as high," a dimension "albeit a provisional one"

Note. Table prepared for this book, from the article (de Almeida et al., 2014, pp. 276 and 277). The names "Evaluation" and "Potency" were chosen "in reference to the most relevant dimensions of meaning identified in several studies by Osgood and colleagues" (p. 277).

Bortoloti and de Rose (2009, p. 570) themselves said that they had not run a factor analysis on their data and that most of the scales were related to the evaluative dimension; poor-rich, slow-fast, and dominant-submissive, according to them, "were used mostly to mask the task." The 2014 analysis places these three, along with active-passive, in a separate factor (Table 29.1). The reading is this book's: this fits the 2009 decision not to treat them as evaluative.

KEY CONCEPT

A **factor** is a group of scales that vary together, and the **factor loading** is the number that says how strongly each scale is associated with the factor. A scale whose loading falls below the criterion (.40, in the study) is excluded from the solution.

EXAMPLE

Positive-negative has a loading of .86 on Factor 1: it is the scale most strongly associated with it. Rich-poor has a loading of .42 on Factor 2: it cleared the criterion by .02 (the calculation is this book's).

NON-EXAMPLE

(Hypothetical case.) In another sample, the pair useful-useless obtains a loading of .33 on one factor and .28 on the other. Under the study's criterion, it would be excluded: it is not associated strongly enough with either of the two, and the researcher, stating the criterion, decides to remove or revise it.

⚠ CAUTION

A factor's name is not its content. Factor 1 is called "Evaluation," but the authors say it brings together "physical and affective" characteristics (p. 276): smooth-rough, soft-hard, and light-heavy are in it, alongside good-bad and pleasant-unpleasant. Section 23.3 already noted that the classification into factors does not replace the criterion of Section 9.5, according to which only a pair that says good or bad, pleasant or unpleasant, asks for a position on the object, and the table is compatible with that reading. The three highest loadings on Factor 1 are those of positive-negative (.86), pleasant-unpleasant (.85), and good-bad (.83), the pairs that express value.

TEST YOURSELF

What does the .40 criterion do to a scale, and what did it do to the 13?

ANSWER: it excludes from the final solution any scale whose loading is lower than .40; none of the 13 was excluded (p. 276).

29.4 From factor to semantic space

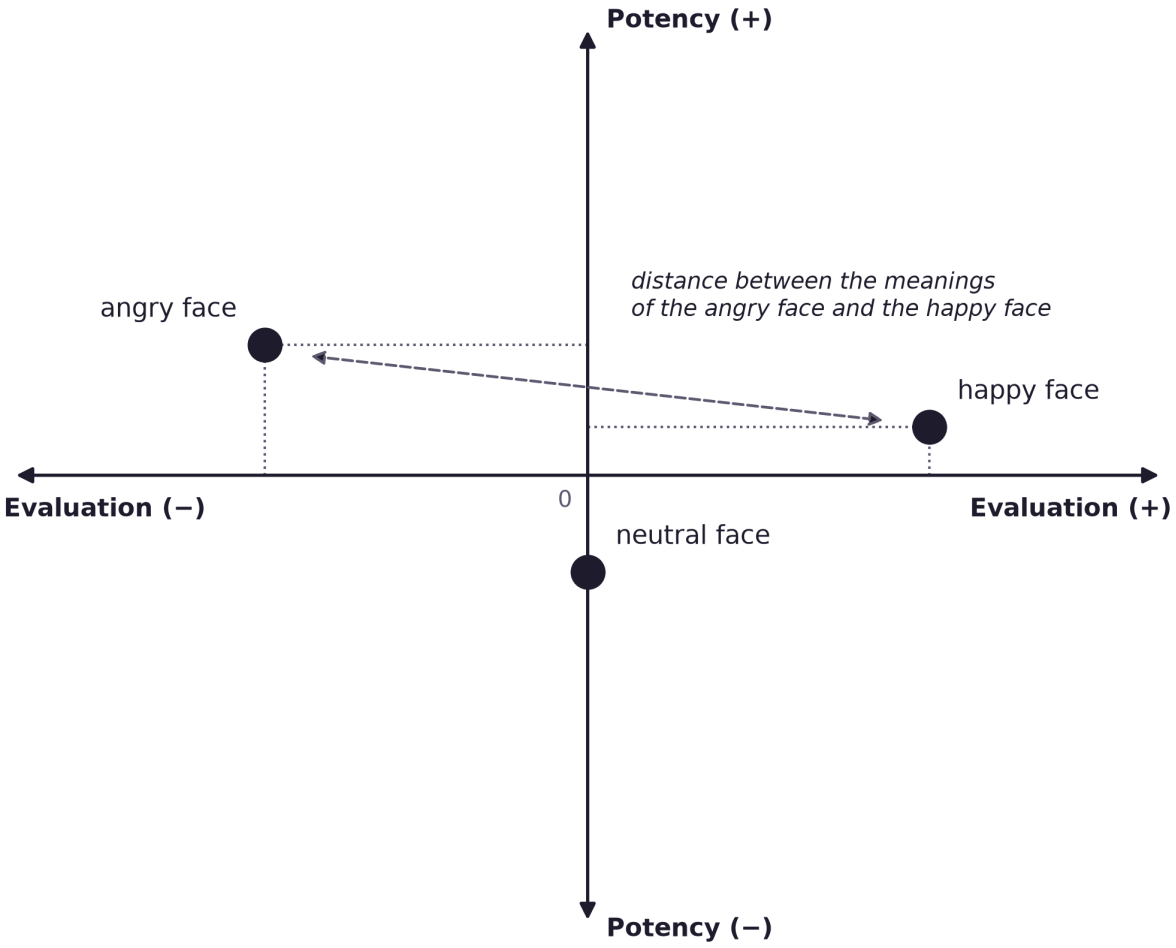
Grouping scales into factors serves a purpose. The authors write that the possibility of grouping the scales into factors, "or, in the case of this study, into dimensions of the semantic space," "is what makes it possible to develop an instrument for the quantitative measurement of meaning." If the scales were independent of one another, quantitative measurements "would have serious limitations" and comparisons between meanings would be "much more difficult to establish" (de Almeida et al., 2014, p. 277).

According to the article, "a limited number of dimensions can be used to define a semantic space within which the meanings of the concepts of interest to the researcher can be specified" (p. 276). The **semantic space**, in this chapter, is that set of dimensions: in the study, the two, Evaluation and Potency. To find a stimulus's place in it, "one must obtain that stimulus's score on each of the factors," and that score "is obtained by the sum of the scores of each scale in a factor divided by the number of scales in that factor" (p. 277), that is, the mean of the factor's scales. With the scores, "the meaning a stimulus has for a participant or group of participants and the distance that various stimuli keep from one another" can be determined (p. 277).

The article illustrates this with the same face when it expresses happiness, anger, and neutrality, rated by the 196 participants (p. 277). The happy face was rated positively and the angry one negatively, but the angry face was classified as more potent than the happy one; the neutral face received neutral ratings and was the least potent of the three (p. 278). Figure 29.3 reproduces this distribution as a schematic.

Figure 29.3

The two-dimensional semantic space and three facial expressions (schematic)



Note. Schematic prepared for this book, from Figure 4 of the article (de Almeida et al., 2014, p. 277) and from the text (p. 278). Only the order of the positions comes from the article: the happy face, on the positive side of Evaluation; the angry face, on the negative side and above the happy face in Potency; the neutral face, in the middle of Evaluation and below the other two in Potency. The coordinates are approximate, and the article's text does not give the values. The dotted lines project each face onto the axes: they are the scores on the two factors.

KEY CONCEPT

The **semantic space** is the set of dimensions (the factors) in which the meaning of a concept is specified. Each stimulus occupies a place in it, given by its score on each factor, and the distance between two places is the distance between the meanings that the participants attributed to the stimuli.

EXAMPLE

The angry face and the happy face differ in Evaluation (negative and positive) and also in Potency (the angry face is more potent). It is this position, with two scores, and not a single mean, that sets them apart (p. 278).

NON-EXAMPLE

(Hypothetical case.) Two stimuli have the same mean across the 13 scales, +0.92, and are in different places: one with Evaluation 0.0 and Potency +3.0; the other with Evaluation +1.0 and Potency +0.75. The mean of the 13 does not say where the stimulus is; the two scores do (the calculation is this book's).

TEST YOURSELF

A face receives a score of +2.0 on Factor 1 and −1.0 on Factor 2. Where is it, in words?

ANSWER: on the positive side of Evaluation and on the negative side of Potency.

29.5 Precision: the alpha coefficient of each factor

The study's second question is that of precision. The authors take it that precision "can be understood as the consistency or stability of a measure of behavior" (Anastasi & Urbina, 2000, as cited in de Almeida et al., 2014, p. 278). An instrument is reliable, on this reading, when it provides "a stable measure of the variable," one that does not "fluctuate" significantly from one administration to another (p. 278).

The indicator they use is the **alpha coefficient** (Cronbach's alpha), "one of the most widely used indicators of stability," in which "the correlation of each item with all the others is calculated, indicating an average correlation among the variables" (Anastasi & Urbina, 2000, as cited in de Almeida et al., 2014, p. 278). Dalmoro and Vieira (2014, p. 167) use it

to measure reliability, which they define as the "degree of internal consistency among the multiple indicators of a construct," and it is under the name of internal consistency that Table 23.1 presented it. This book's reading: the calculation, as described, is the correlation among the scales in one administration. It says that the factor's scales are coherent with one another, not that a person's mark would be repeated on another occasion, which would require administering the instrument again (Section 24.6). The article describes one administration to each participant, not a readministration.

Factor 1 had an alpha coefficient "considered excellent (.91)"; Factor 2, an alpha coefficient that was "moderate (.62), but suitable for use" (Nunnally, 1978, as cited in de Almeida et al., 2014, p. 276). In the Discussion, the same .62 is "considered low, but, for some authors (e.g., Nunnally, 1978), still acceptable," and the authors recall that Murphy and Davidshofer (1998) "consider alpha values below .6 unacceptable" (p. 278). Even though the value exceeds these authors' threshold of acceptability, the coefficient of the second factor "indicates that it may present a much higher measurement error than the first factor," and the factor "should, therefore, be revised" (p. 278).

Table 29.2 sets the .62 against three criteria. The same value passes two and fails the third, and that is why a report gives the value and the criterion, and not just "acceptable."

Table 29.2

The .62 alpha of Factor 2 against three criteria

Criterion	What it says	The .62
Nunnally (1978, as cited in de Almeida et al., 2014, pp. 276 and 278)	"suitable for use"; "still acceptable"	accepted
Murphy and Davidshofer (1998, as cited in de Almeida et al., 2014, p. 278)	"alpha values below .6 unacceptable"	passes, by .02
Hair Jr. et al. (2005, as cited in Dalmoro & Vieira, 2014, p. 168)	satisfactory internal consistency with values "equal to or greater than .7"	fails, by .08

Note. Table prepared for this book. The works of Nunnally, of Murphy and Davidshofer, and of Hair Jr. et al. were not consulted in the original. The minimum of .7 comes from another study (Dalmoro and Vieira's survey, with 21 questions about money on three-, five-, and seven-point scales), and the comparison with the .62 is this book's.

KEY CONCEPT

The **alpha coefficient** (Cronbach's alpha) summarizes how strongly the scales in a set correlate with one another: the higher it is, the more they vary together. It is an indicator of precision and is calculated per set of scales, which in the study is each factor.

A property of the coefficient helps to read the difference between the two factors. With the same average correlation among the scales, a larger set gives a higher alpha. Factor 1 has nine scales and Factor 2, four, and part of the gap between .91 and .62 may come from that; only part, because the scales of Factor 2 also correlate less with one another, as the authors say (Table 29.1). It is a general property of the coefficient, which the article does not discuss (this book's reading).

EXAMPLE

Factor 1, nine scales, alpha of .91; Factor 2, four scales, alpha of .62. These are two numbers, one per factor (p. 276).

NON-EXAMPLE

"The instrument has an alpha of .91." The .91 is that of Factor 1, with nine scales; the article does not report an alpha for the 13 scales together, and the one for Factor 2 is .62.

TEST YOURSELF

The alpha of Factor 2 is .62. Which criteria does it pass, which does it fail, and what do the authors decide?

ANSWER: it passes Nunnally's and Murphy and Davidshofer's .6 threshold, and fails Hair Jr. et al.'s minimum of .7. The authors conclude that the factor "should, therefore, be revised" (p. 278).

29.6 What the study allows us to say, and what to state in a report

The authors regard the study "as a first attempt at validation" (de Almeida et al., 2014, p. 278). They say that the factor analysis indicated that the instrument "seems to have a valid internal structure," that the

precision of the second factor calls for revision, and, in the end, that "a revision of the instrument is necessary (especially a revision of the second factor), but that it is worth continuing to invest in this instrument" (p. 278).

What the instrument adds, in their reading, lies in the comparison with matching-to-sample itself. That procedure sets up "contingencies of forced choices among discrete alternatives," which tell whether or not the participant formed the classes (an "all-or-nothing" effect), but do not allow "different degrees of relatedness to be assessed" (p. 278). Measuring the transfer of functions in the classes, with the semantic differential, is a way of estimating quantitative differences between equivalence relations (p. 278). The instrument, they say, "has proven sensitive to parametric manipulations" (p. 278), which comes from the studies in Section 29.1, and not from this one.

Table 29.3 separates what the study provides from what it leaves to be shown. The right-hand column is this book's reading: it lists research yet to be done, not a failing of a study that set out to examine internal structure and precision.

Table 29.3

What the 2014 study provides and what it leaves to be shown

Question	What the study provides	What it does not provide
Do the scales group together?	Two factors, of nine and four scales, none below .40 (p. 276)	A solution for each type of stimulus: the table is "for all the stimuli rated" (p. 276)
Are the scales in each factor coherent with one another?	Alphas of .91 and .62, from one administration (pp. 276 and 278)	Whether the mark is repeated on another occasion: the article does not describe a readministration
Does it hold for other participants and stimuli?	196 students aged 18 to 27 and 12 stimuli, six faces and six abstract figures (pp. 274 and 275)	Other ages; other objects, such as professions or politicians
Is the instrument sensitive to manipulations?	Reported in the earlier studies (pp. 274 and 278)	Not tested in this study
Is the score related to another measure or to what the person does outside the scale?	Nothing	Not examined (Sections 23.6 and 24.5)

Note. Table prepared for this book, from the article (de Almeida et al., 2014, pp. 274–278).

The third row has an example. Rosendo and de Melo (2018, p. 41) write that, with abstract stimuli and faces, the scales "can be classified" into the two factors. With socially meaningful stimuli, however, they ob-

served high scores and greater variation on the Factor 2 scales, and they suppose that these scales were closer to relations already learned between professions and gender (Section 23.3). The list of pairs also changes from one study to another. The study in Chapter 28 used 14: the 13 from Figure 1 of the article plus right-left, with the positive adjective on the left in half of the pairs and on the right in the other half (Pereira & Moreira, 2021b, p. 141; one of the authors is the author of this book). The added pair was not part of the 2014 analysis, and its internal structure is unknown (this book's comparison).

Rosendo and de Melo (2018, p. 33) describe the instrument as "made up of Likert scales with opposite adjectives at the ends," with the indication "standardized by" de Almeida et al. (2014). The 2014 article does not use the word: it describes what it did as an analysis of validity and precision and as a "first attempt at validation" (p. 278). In a report, what the study allows you to say is that the internal structure and precision of the instrument were analyzed by de Almeida et al. (2014), not that it was standardized or that it is validated.

EXAMPLE

(Hypothetical case.) Beatriz used the nine pairs of Factor 1, with values from −3 to +3 relative to the positive pole, and computed the score for group supervision as their mean. The report says: "The evidence for the instrument is of internal structure and internal consistency (alpha of .91 for these nine pairs), obtained with 196 undergraduate students and with photographs of faces and abstract figures (de Almeida et al., 2014, pp. 274–276). That study provides no evidence for another population, other objects, or another occasion. Factor 2, with an alpha of .62, was identified by the authors as needing revision (p. 278) and was not used."

NON-EXAMPLE

"We used the semantic differential validated by de Almeida et al. (2014)." The sentence does not say which scales were used, what evidence exists, or with whom; and the article describes itself as a "first attempt at validation" that calls for revising one of the factors.

TEST YOURSELF

Beatriz measures interns' attitude toward supervision. Which part of the report does the 2014 study not support?

ANSWER: that the instrument has structure and precision with interns and with that object. The study used undergraduate students and faces and abstract figures (pp. 274 and 275); for the new object and the new sample, the evidence is whatever she herself gathers, or none.

The answer to the clinic's management, then, has two parts. There is a first piece of evidence, of internal structure and precision, with university students and with faces and abstract figures. And there is, in that study, no evidence for the training clinic; the report says what the first is and does not claim to have the second.

Common learner mistakes

1 **Saying that the instrument "has been validated" and considering the matter closed.** The mistake happens because "validated" sounds like a seal of approval, not like a list of evidence. *How to spot the mistake:* the sentence does not say what evidence, in what sample, and with what stimuli. The article presents itself as "a first attempt at validation" and calls for revising the second factor (Section 29.6).

2 **Confusing validating the model with validating the instrument.** The mistake happens because the word "validation" appears in both cases. *How to spot the mistake:* the "external validation of equivalence" (p. 274) is read as proof that the instrument has been validated (Section 29.1).

3 **Attributing one factor's alpha to the whole instrument.** The mistake happens because .91 is the number from the article that circulates most. *How to spot the mistake:* "alpha of .91" appears without saying which factor; the article gives one alpha for each factor, .91 and .62 (Section 29.5).

4 **Taking a factor's name for its content.** The mistake happens because the name was chosen to recall Osgood's dimension, and the reader takes it for what the factor contains. *How to spot the mistake:* "Evaluation" is read as liking or disliking, without noticing that the factor also includes pairs of physical qualities, such as smooth-rough and soft-hard (Sections 29.3 and 23.3).

5 **Citing the analysis for a set of pairs different from the one analyzed.** The mistake happens because the instrument keeps its name, and the changes in the list of pairs seem like details. *How to spot the mistake:* the scale has 14 pairs, or ten, and the sentence says "the scale validated by de Almeida et al. (2014)" (Section 29.6).

SUMMARY

Why validate (objective 1). The instrument had a series of studies with consistent results, but its psychometric validity had not been assessed. The study analyzes internal structure and precision, with the stimuli from that series.

The study (objective 2). 196 undergraduate students, 13 seven-interval scales (−3 to +3), 12 stimuli (six faces and six abstract figures), and 156 ratings per person.

The factor solution (objective 3). Two factors, Evaluation (nine scales, 40.83% of the variance) and Potency (four, 14.97%), with a minimum loading of .40. A stimulus's score on a factor is the mean of that factor's scales, and the factors define the semantic space.

Precision (objective 4). Alpha of .91 for Evaluation and .62 for Potency; the second passes two criteria and fails a third, and the authors say the factor should be revised.

Stating (objective 5). Which scales you used, how you computed the score, the existing evidence (internal structure and consistency, with university students, faces, and abstract figures), and what it does not cover.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. The 2007–2011 studies gave results consistent with what was expected. Why does the article say that the instrument's psychometric validity had not been assessed?

2. The 2007 study "provided an external validation of equivalence as a model of meaning." What was put to the test in it, and what remained to be put to the test?

3. How many participants, of what ages, rated how many stimuli and with how many scales? How many marks would there be in total if everyone completed every sheet?

4. (Records constructed for the exercise.) On good-bad, with "good" on the left, a person marks the second interval from the right. On pleasant-unpleasant, with "pleasant" on the right, the person marks the third from the left. What value does each mark have?

5. Which scales form Factor 2? Which has the lowest loading, and by how much does it clear the criterion?

6. The article's text says that the two factors explain 55.8% of the variance, and the table gives 40.83% and 14.97%. How do the two pieces of information fit together?

7. (Hypothetical case.) In another sample, the pair useful-useless obtains a loading of .33 on one factor and .28 on the other. What would the study's criterion do with it, and what does that say about the pair?

8. (Records constructed for the exercise.) For one stimulus, a person marked, on the nine scales of Factor 1, +3, +2, +2, +1, +3, +2, +2, +1, and +2; on the four of Factor 2, −1, 0, +1, and −2. Calculate the score on each factor and say where the stimulus falls in the semantic space.

9. Explain the .91 and the .62, which criterion the .62 fails, and what the authors decide about Factor 2.

10. (Hypothetical case.) A report says: "We used the semantic differential validated by de Almeida et al. (2014), with ten of the 13 pairs, whose alpha is .91; it measures professionals' attitude toward supervision." Point out three problems.

ANNOTATED ANSWER KEY

1. Because those studies used the instrument for other questions (the transfer of meaning and the effect of variations in the procedure), and none of them examined its internal structure or precision. The article says the instrument "seems adequate," but that its psychometric validity "was not assessed" (p. 274). Consistent results show that the instrument was useful; they do not show, by themselves, that it measures what it is meant to measure.

2. What was put to the test was equivalence as a model of meaning, with the instrument as a premise. What remained to be put to the test was the instrument itself: its internal structure and its precision (p. 274; Section 29.1).

3. 196 students, aged 18 to 27, rated 12 stimuli (six faces and six abstract figures) on 13 scales, 156 ratings per person (pp. 274 and 275). In total, 196 × 156 = 30,576 marks (the calculation is this book's).

4. With "good" on the left, the first interval is worth +3 and the seventh, −3; the second from the right is the sixth, and it is worth −2. With "pleasant" on the right, the values run from −3 (left end) to +3 (right end); the third interval from the left is worth −1 (Section 29.2; p. 275).

5. Fast-slow, active-passive, rich-poor, and dominant-submissive. The lowest loading is that of rich-poor, .42, which clears the criterion (.40) by .02 (p. 276).

6. 40.83 + 14.97 = 55.80: the text gives the sum, and the table, each factor's share (pp. 275 and 276; the calculation is this book's).

7. It would be excluded, because both loadings are below .40 (p. 276). This says that the pair does not group with the other scales in either of the two factors; keeping, revising, or removing it is the researcher's decision, with the criterion stated.

8. Factor 1: sum 18, mean +2.0. Factor 2: sum −2, mean −0.5. The stimulus falls on the positive side of Evaluation, well away from zero, and near zero on Potency, slightly on the negative side (Section 29.4; p. 277).

9. The .91 is the alpha of Factor 1 (nine scales), called "excellent"; the .62, that of Factor 2 (four scales), called "moderate" in the Results and "low" in the Discussion (de Almeida et al., 2014, pp. 276 and 278). The .62 fails the minimum of .7 of Hair Jr. et al. (2005, as cited in Dalmoro & Vieira, 2014, p. 168) and passes Murphy and Davidshofer's .6 threshold. The authors conclude that the factor "should, therefore, be revised" (p. 278).

10. First, "validated": the article is a "first attempt at validation" and calls for revising one factor (p. 278). Second, the .91 is the alpha of Factor 1, with nine scales; with ten chosen pairs, the alpha of the set is different and was not calculated (p. 276). Third, the evidence comes from undergraduate students with faces and abstract figures (pp. 274 and 275), not from professionals rating supervision; internal structure and consistency do not show that the scale "measures the attitude" of those professionals. A better statement says which scales were used, how the score was computed, and what evidence exists, and with whom.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 30. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2	29.1 and common mistakes 1 and 2
3, 4	29.2
5, 6, 7	29.3 and common mistake 4
8	29.4
9	29.5 and common mistake 3
10	29.6 and common mistake 5

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CHAPTER

30 Experiments

research based on the stimulus equivalence paradigm

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Place** the studies of the equivalence paradigm in families: socially meaningful stimuli, other transferred functions, and training parameters.
2. **Describe**, for each family, the central finding and the source.
3. **Define** training parameter, class yield, and maintenance test, and **read** the comparison between groups that differ in one parameter.
4. **Distinguish** what the literature consulted shows from what the paradigm does not guarantee, including the limitations the authors themselves state.
5. **Cite** studies known through a secondary source without presenting them as read, and **point out** what a synthesis made only of consulted sources leaves out.

PREREQUISITES

The equivalence class and transfer of function (Chapter 20), the Conflicting Relations Paradigm (Section 20.5), the studies in Chapters 27 and 28, and measurement before and after, with a comparable group and follow-up (Section 25.1). The new terms (training parameter, class yield, and maintenance test) are defined here.

OPENING

(Hypothetical case, continued from Chapter 29.) After reading three studies in detail (Chapters 27 to 29), Beatriz asks what the broader literature shows and whether changing the way of training changes the result. Four questions organize the chapter.

> 1. *"Which studies used socially meaningful stimuli, and what other functions were transferred?"*
> 2. *"What changed when the training changed?"*
> 3. *"What remained after six weeks?"*

> 4. *"What does the paradigm not guarantee, and how should one cite what has not been read?"*

The first is the subject of Sections 30.1 and 30.2; the second, of 30.3; the third, of 30.4; the fourth, of 30.5.

30.1 Socially meaningful stimuli

A first family of studies uses socially meaningful stimuli, that is, stimuli that already have meaning for the participants before the research, such as names, faces, and symbols of groups. In these studies, the training tries to teach relations that may compete with that meaning. The study by Watt et al. (1991), as cited in Mizael and de Rose (2017, p. 371), was carried out in Northern Ireland, where it is possible to tell, from the name alone, whether someone is Catholic or Protestant. The authors used this feature to study classes with socially meaningful stimuli. Grey and Barnes (1996), as cited in Mizael, dos Santos, and de Rose (2016, p. 127), formed classes with nonsense syllables and showed each participant two short videos. Afterward, the participants sorted videos they had not seen and placed them in the same category as the watched video from the same class: "transfer of functions occurred for all participants."

The studies in Chapters 27 and 28 belong to this family, and the studies with children and faces of Black people, with gender-linked professions, and with supporters of soccer clubs were read in Chapter 20 (Table 20.3). Also belonging to it are the two experiments that the authors of Chapter 28 later published, in a book, with photographs of presidents of the Republic (Pereira & Moreira, 2021a, p. 18); Section 30.3 returns to them for their way of training. Grey and Barnes's result, however, contrasts with what Mizael, de Almeida et al. (2021, Introduction section) write about most studies with the Conflicting Relations Paradigm: in them, few classes formed, probably because the participants' prior history interfered with responding in accordance with the experiment's classes. Of the studies they cite, two were read for this book: de Carvalho and de Rose (2014) and Haydu et al. (2015). Three others, Barnes et al. (1996), Moxon et al. (1993), and Watt et al. (1991), were not, and they enter here as cited in that source. Haydu et al. (2015, p. 393) write, of their own study, that in all three groups the majority of participants failed to form the equivalence classes that had been expected.

A Brazilian series from this family is in the volume *Preconceito: doze experimentos e um paradigma* [Prejudice: Twelve experiments and a paradigm] (Moreira, Rocha et al., 2022). The research was done in the undergraduate Psychology program at CEUB, under the supervision of the author of this book (p. 30). Experiment 1 deals with stimulus control and the assessment of prejudice (p. 30), and Chapter 32 returns to it. The design of Experiment 2 is single-subject: the same participant goes through all the stages and is compared with themselves. The comparison is between the pretest and the posttest on a semantic differential scale, with the equivalence training and tests between the two (pp. 91 and 92). The later experiments repeat it with other socially meaningful stimuli (pp. 165, 214, and 284, for example), and Experiments 10, 11, and 12 add training and tests (p. 31). Table 30.4, in Section 30.5, brings together the stimuli, what the authors say about the result, and the limitation of each experiment.

TEST YOURSELF

Why does the study by Watt et al. use names?

ANSWER: because, in Northern Ireland, the name makes it possible to identify a person's religion: the stimulus is socially meaningful for the participants (Mizael & de Rose, 2017, p. 371).

30.2 Other functions that transfer

Not every function that transfers through equivalence is evaluative. Mizael, de Almeida et al. (2021, Introduction section) sum up that there is considerable evidence of the transfer of discriminative, eliciting, or consequential functions, and Table 20.2 brings these together. Barnes-Holmes et al. (2004), as cited in Mizael, dos Santos, and de Rose (2016, p. 127), found that mood functions, such as sadness and happiness, can also be transferred through equivalence. Dougher et al. (1994, p. 331) report that, after equivalence training, all the members of one class underwent respondent conditioning. Then one of them was presented in extinction, and the other stimuli in the class did not elicit skin conductance responses: extinction also transferred. Catania (1999, p. 168) writes that there are no obvious limits to the number of classes that can be created, nor to the number of stimuli in each class. This broadens the teaching economy seen in Chapter 20, in which a few taught relations can give rise to many untaught ones.

TEST YOURSELF

Which function transferred in the study by Dougher et al.?

ANSWER: the eliciting function, measured by skin conductance responses, and also its extinction: when one member of the class was presented in extinction, the others did not elicit the response (Dougher et al., 1994, p. 331).

30.3 Training parameters: what changed when the training changed

Two studies with the same stimuli and the same aim can train in different ways: in what order the relations are taught, on which trials there are differential consequences, when symmetry is tested. Each of these choices is a **training parameter**, and that is why "the equivalence paradigm" is not enough to say what was done. Mizael, de Almeida et al. (2021, Introduction section) write that training parameters can vary widely, and that several studies have shown that certain parameters can increase class formation or reorganization.

KEY CONCEPT

A **training parameter** is a feature of the training or testing procedure that the researcher sets and can vary across groups or studies, without changing the stimuli: the order of the taught relations, the proportion of trials with differential consequences, the timing of the symmetry test.

EXAMPLE

(Hypothetical case.) Beatriz trains AB and BC and tests equivalence right afterward. If she adds a symmetry test after each trained relation, she will have changed a parameter; the stimuli, the scale, and the criterion remain the same.

NON-EXAMPLE

The history the children already had with the faces of Black people is not a parameter: it is a variable of the participants and the stimuli, which the researcher selects at screening and does not vary in the procedure. The authors treat prior history as one variable, and training and testing parameters as another, which may also account for part of the results (Mizael, de Almeida et al., 2021, Introduction section).

The study by Mizael, de Almeida et al. (2021) separated three parameters that the 2016 study had used together. In the 2016 study, read in Chapter 20 and revisited in Section 33.3, 13 children went through equivalence training that related Black faces to a positive symbol, and all of them formed the classes. The three parameters were mixed training of the baseline relations, a feedback reduction phase before the tests, and symmetry tests after the training of each relation (Introduction section). Of the 78 children screened, 46, aged 8 to 10, showed racial bias on the pretest and were divided into four groups (Method section). Bias was measured by an index calculated from the choices of White and Black faces given the positive and the negative symbol, in which negative values indicate negative bias toward Black faces. Only children with an index of −4 or lower entered the study (Method section).

Figure 30.1 illustrates the setting of these studies: the child, facing the screen, chooses among comparisons, and the researcher, at the side, takes notes.

Figure 30.1
A child in a matching-to-sample task



Note. Illustration generated for this book with artificial intelligence (Runway), from the description of the procedures; it does not reproduce the children, the room, or the stimuli of the studies, which used faces of White and Black people and positive and negative symbols.

All the children first learned the AB relation. In it, A1 and A2 were a positive and a negative symbol, a hand with the thumb up and the same hand with the thumb down, and the B stimuli were abstract. Then they learned the BC relation, in which C1 was four photographs of faces of Black people and C2 was an abstract stimulus (Method section). The criterion for each training phase was at least 15 correct responses in blocks of 16 trials, in two consecutive blocks (Method section). The AC and CA tests came one day later, in four blocks of 16 trials, without differential consequences. The class counted as formed with at least 15 correct responses in at least three of the four blocks (Method section).

The Control Group (C) did only this and went on to the tests. The Mixed Training Group (M) added a block that mixed AB and BC, with differential consequences. The Feedback Reduction Group (R) did the same

block, with differential consequences on 50% of the trials, in random sequence. The Symmetry Group (S) was tested for symmetry after each trained relation, BA after AB and CB after BC. After the tests, all of them also took a test with three comparisons. The sample was the positive or the negative symbol, and the comparisons were a Black face, an abstract stimulus, and a White face; the last is the one that prior history would favor given the positive symbol (Section 33.3). Table 30.1 summarizes the four arrangements.

Table 30.1

The four groups in Mizael, de Almeida et al. (2021): what each did beyond the AB and BC training and how many children formed the classes

Group	What it did beyond the AB and BC training	Children who took the tests	Formed the classes	Kept the relation with the Black face in the three-comparison test
Control (C)	nothing: went straight to the tests	11	7	2
Mixed training (M)	a block mixing AB and BC, with differential consequences	11	8	5
Feedback reduction (R)	the same block, with differential consequences on 50% of the trials	10	8	5
Symmetry (S)	symmetry test after each trained relation	12	10	5

Note. Table prepared for this book, from Mizael, de Almeida et al. (2021, Method and Results sections). The number of children who took the tests is the number on the participant list (Table 1 of the article) minus the two who did not finish training (M12 and R11).

The first result is each group's **class yield**, which the authors take as one of their dependent variables (*yield*; Results section).

KEY CONCEPT

A group's **class yield** is the proportion of its participants who met the class formation criterion: the number who met it, divided by the number who took the tests. It counts people, not correct responses.

EXAMPLE

In Group S, 10 of the 12 children formed the classes: the yield was 83% (Mizael, de Almeida et al., 2021, Discussion section).

NON-EXAMPLE

A child who gets 15 of 16 trials right in a test block has 94% correct in that block. That is not the yield, which is a property of the group: how many of the children met the formation criterion.

From the counts in Table 30.1, the yield was 64% in the control group (7 of 11), 73% in mixed training (8 of 11), 80% in feedback reduction (8 of 10), and 83% with symmetry tests (10 of 12). The authors conclude that adding any one of the three parameters led to more children forming the classes and showing less bias at posttest than at pretest (Discussion section). They also write that the yield was higher than in most studies with the Conflicting Relations Paradigm, but lower than in the 2016 study, in which all 13 children formed the classes with the three parameters combined (Discussion section).

Three observations help to read the result with caution; the second and third are the authors' own. The first is size: the groups had 10 to 12 children, and the difference between the control and mixed training groups is one child (7 and 8 of 11). In groups of this size, one child more or fewer changes the yield by 8 to 10 percentage points (this book's calculation).

The second is that the parameter did not vary alone. The authors say it is possible that Groups M and R reached a higher yield because of the extra trials in the mixed baseline phase. They also point out that the other groups had at least 32 more trials than the control group. For this reason, they propose that future studies compare the parameters with the same number of trials (Discussion section). The number of trials is, here, an extraneous variable that changed together with the independent one, and the result is confounded: the difference may come from the parameter or from the extra trials (Section 31.3).

The third is age. This study was done with children, and most studies with the Conflicting Relations Paradigm were done with adults, whose history with relations that conflict with those of the research is presumably longer. The authors suggest studying the effect of the parameters with adults (Discussion section).

As for bias, 37 of the 44 children who finished training had their negative bias decrease between pretest and posttest, by 1 to 19 index points. Among the 33 who formed classes, the reduction averaged 8 points, with a median of 12; among the 11 who did not, 2.9 points, with a median of 3 (Results section). The authors conclude that class formation, and

not the amount of exposure to the Black faces, was the main variable in the change in bias. The argument is that the children in the control group who formed classes changed as much as those in the other groups, despite having been less exposed to the faces (Discussion section).

The name "feedback reduction" covers different arrangements. In Mizael, de Almeida et al. (2021, Method section), it is a block of mixed trials in which the differential consequence occurs on 50% of them. In two experiments with photographs of presidents of the Republic, by the authors of the study in Chapter 28, the whole training was divided into four phases, with differential consequences on 100%, 80%, 20%, and 0% of the trials (Pereira & Moreira, 2021a, p. 27). The structure comes from Eilertsen and Arntzen (2020), as cited in Pereira and Moreira (2021a, p. 18). In it, all the relations are trained together, and the gradual reduction of feedback aims to maintain the behavior with intermittent reinforcement, to make it more resistant to extinction during the test, which is done without feedback (pp. 18 and 28). The authors adopt this structure instead of training each relation separately, as in the earlier study (p. 18). In each phase, the blocks have 30 trials. The first block is mandatory and, from the second on, the participant moves to the next phase with at least 90% correct in the block; a participant who does not reach the criterion within 30 minutes is disqualified (p. 28).

Five students took part in each experiment (pp. 18 and 66), and the authors conclude that all of them formed the classes (pp. 63, 103, and 107). Most training errors occurred in the 100% phase, as expected on first contact with the relations (pp. 63 and 103). The result is compatible with phased training, but the experiments do not compare it with another way of training: the design is single-subject, with a pretest and a posttest (p. 19). In addition, relative to the study in Chapter 28, the data collection also changed, now done remotely, and so did the scale, which now had 13 adjective pairs and a bar from 0 to 100 (pp. 19 and 25; this book's reading). Describing a parameter, as these experiments do, is different from testing it, as the study in Table 30.1 does.

⚠ CAUTION

There are two studies by Mizael, de Almeida et al. in this book. The 2016 study, with 13 children, used the three parameters together, and all 13 formed classes (Table 20.3). The 2021 study, with 46, separated them into groups, and the yield ranged from 64% to 83% (Table 30.1). Citing one for the other misstates what the study showed.

TEST YOURSELF

Why can the difference between Group S and the control group not be attributed to the symmetry test alone?

ANSWER: because Group S also had more trials, at least 32 more than the control group, and the difference is a few children in groups of 10 to 12 (Mizael, de Almeida et al., 2021, Discussion section).

30.4 Maintenance: what remained after six weeks

Asking whether an equivalence class has formed is different from asking whether it persists after some time. The second question is answered with a **maintenance test**, which is the follow-up of Section 25.1 (the same measure, repeated after an interval) applied to the derived relations.

KEY CONCEPT

A **maintenance test** checks, after an interval without training, whether the derived relations persist. It is done without differential consequences, so that the test itself does not teach the relations again.

EXAMPLE

(Hypothetical case.) Beatriz tests BA, CB, AC, and CA one day after training. Four weeks later, she repeats the four tests, without differential consequences and without the AB and BC relations. The second set is the maintenance test, and the first, the formation test.

NON-EXAMPLE

The equivalence test the children took one day after the last training is the formation test, not a maintenance test: it says whether the class formed, not whether it persisted (Mizael, de Almeida et al., 2021, Method section).

Mizael, de Almeida et al. (2021, Method section) tested all the children six weeks after the initial test, in a 64-trial block: 32 testing symmetry (16 BA and 16 CB) and 32 testing equivalence (16 AC and 16 CA). The test had no differential consequences and did not include the baseline rela-

tions, so as not to retrain them. Of the 33 children who formed classes, 27 (81.8%) still showed at least one equivalence relation, and 17 (51.5%) showed all four (Discussion section). Table 30.2 shows, by group, how many children maintained all four.

Table 30.2

Children who maintained all four relations after six weeks, by group, with the two denominators

Group	Formed the classes	Maintained all four relations	Out of those who formed them	Out of the whole group
Control (C)	7	2	2 of 7	2 of 11
Mixed training (M)	8	4	4 of 8	4 of 11
Feedback reduction (R)	8	6	6 of 8	6 of 10
Symmetry (S)	10	5	5 of 10	5 of 12

Note. Table prepared for this book, from the counts in Mizael, de Almeida et al. (2021, Results section). The article gives percentages (Table 7); in the "out of those who formed them" column for Group R, the article's table prints 63%, a value that does not match the counts in the text (6 of 8), and the text is followed here.

The control group had the fewest children who maintained the relations, and the authors conclude that the use of the parameters increased the number of children who maintained their performance six weeks later (Discussion section). The first two observations in Section 30.3 apply here as well: the groups are small, and the number of trials varied together with the parameter.

The same number can be divided by two denominators. The 4 children in Group M who maintained all four relations are 4 of the 8 who formed classes (50%) and 4 of the 11 in the group (36%). The first percentage answers whether those who formed the class maintained it; the second, how many children in the group reached six weeks with the relations intact. The authors give both (Results section), and the question decides which to use (Section 22.2).

Two points call for care in reading. The first concerns vocabulary. The BA and CB tests had been given before only in Group S. For the other groups, the authors say that the term maintenance does not strictly apply to these tests, although one may suppose that those who passed AC and CA had derived symmetry (Method section). The second concerns how to read the number: some children who had not formed classes showed symmetry or equivalence at six weeks. The authors explain the BA relations by the type of stimulus: A is familiar, but its relation with B, which is abstract, does not conflict with prior history. The others,

according to them, are probably an artifact. The artifact would be a response pattern in which the child relates each comparison to a sample arbitrarily; with two samples and two comparisons, this pattern produces 100% or 0% on different relations (Discussion section).

TEST YOURSELF

Is the AC and CA test done one day after the last training a maintenance test?

ANSWER: no: it is the formation test; the maintenance test came six weeks later, without the taught relations (Mizael, de Almeida et al., 2021, Method section).

30.5 What the synthesis shows, what it does not guarantee, and how to cite

Table 30.3 brings together what the previous sections showed, by family. The question for this section is what it does not allow us to claim.

Table 30.3
Families of studies, central finding, and source

Family	Central finding	Source
Social meaning	transfer of functions between syllables and videos, for all participants (Grey & Barnes, 1996)	Mizael, dos Santos, and de Rose (2016, p. 127)
Mood	sadness and happiness transferred (Barnes-Holmes et al., 2004)	Mizael, dos Santos, and de Rose (2016, p. 127)
Eliciting function	extinction transferred, measured by skin conductance responses (Dougher et al., 1994)	Dougher et al. (1994, p. 331)
Few classes formed	most participants did not form the expected classes (Haydu et al., 2015)	Haydu et al. (2015, p. 393)
Training parameters	yield of 7 of 11 children with no added parameter and of 8 of 11 to 10 of 12 with one of the three; the number of trials also varied	Mizael, de Almeida et al. (2021, Results section)
Maintenance	27 of the 33 children who formed classes maintained at least one relation after six weeks, and 17 maintained all four	Mizael, de Almeida et al. (2021, Discussion section)
Political attitudes	classes formed in the 10 participants of two experiments, with feedback reduced in phases; transfer to neutral faces was smaller than to abstract figures	Pereira and Moreira (2021a, pp. 106 and 107)

Family	Central finding	Source
Instituto Walden4 experiments	classes formed and transfer of function in most participants in each experiment, with exceptions; class reorganization met its aims less fully (Experiment 12)	Moreira, Rocha et al. (2022; Table 30.4)

Note. Table prepared for this book; the studies by Grey and Barnes and by Barnes-Holmes et al. are cited in Mizael, dos Santos, and de Rose (2016).

The first limitation is that classes do not always form. With stimuli that carried a prior history, the yield was low in most studies with the Conflicting Relations Paradigm (Section 30.1), and most of the participants in Haydu et al. (2015, p. 393) did not form the expected classes. The second is that giving the same name to the stimuli does not guarantee the class: Sidman and Tailby (1982, p. 5) reported that applying a common name to each stimulus was not required for establishing classes of equivalent stimuli, nor was it enough to establish them. The third is that the yield may depend on what is done in training, but the study in Section 30.3 does not separate the parameter from the number of trials.

The authors of that study also state two limitations. The first is the use of only two comparison stimuli, which can produce false positives. If the child relates each comparison to a sample arbitrarily, the result will be 100% or 0%, with a 50% probability for each; a 100% can thus come from this coincidence, and not from the class. Several scores close to 0% raise suspicion of this pattern (Mizael, de Almeida et al., 2021, Limitations section). The second is that the measures were taken only in the experimental setting, and that the binary categories (formed or did not form, maintained or did not maintain) may not reflect the changes over the course of the experiment (Limitations section).

What the authors propose for future studies is research to be done, not a finding. The first proposal is to check whether the reduction of bias in the laboratory generalizes to other measures and to behavior in natural settings, such as the time children spend interacting with Black children on the playground or at snack time. The others are to use an implicit measure before and after and, in natural interventions, to go beyond the relation between faces and a single symbol (Discussion section).

Table 30.4 returns to the Instituto Walden4 experiments (Section 30.1), with the semantic field of the stimuli, the result the authors report for each, and the limitation they state.

Table 30.4

The experiments in Preconceito: doze experimentos e um paradigma, with the result and the limitation the authors state

Experiment	Semantic field of the stimuli	Result, according to the authors	Stated limitation
2	clothing and gender	transfer of function in all participants but one (p. 162)	remote data collection, with software restarts; instructions understood differently by some (p. 163)
3	sport and gender	4 of the 5 participants formed the classes and showed transfer of function (p. 211)	technological resources that can delay the experiment (p. 212)
4	religion	"overall," classes formed and transfer of function (p. 281)	data collection that switched from in person to remote; duplicate pretest records for 2 participants (p. 282)
5	tattoos and profession	transfer of function in most participants (p. 320)	administration time and noise in the data collection setting (p. 320)
6	obesity and gender	all formed classes; transfer in most, all but one participant (p. 387)	the effect of gender could not be assessed; the photographs may have had an influence (p. 388)
7	fame and gender	classes in all participants; transfer in most (p. 436)	few participants; fatigue due to the length of training (p. 437)
8	fame and criminality	transfer in most; one participant below 80% (p. 496)	remote data collection, with no control over the internet connection (p. 497)
9	older people and the job market	only 2 of 5 participants reached the minimum class value in all relations; most neutral stimuli moved closer to the meaningful stimulus (p. 553)	age and work context not separated (p. 554); wrong feedback from the software (p. 553)
10	legal and illegal drugs	3 of 4 participants with transfer to almost all stimuli (p. 602)	remote data collection and few participants (p. 603)
11	body types	classes formed in the great majority of cases, but only 6 stimuli showed transfer (p. 632)	transfer below what was expected; influence of body type not assessed (pp. 632 and 633)
12	body types	3 of 5 participants with most of the expected results; reorganization was the stage that least met its aims (pp. 724 and 725)	two images very different from each other; discomfort at being observed by the researcher (p. 725)

Note. Table prepared for this book, from Table 1 of the volume (semantic fields, p. 32) and from the Discussion sections of Moreira, Rocha et al. (2022). Experiments 2 to 9 differ from one another only in the stimuli and in the type of matching-to-sample, simultaneous or delayed; Experiments 10 to 12 add training and tests (p. 31). Experiment 1, on stimulus control and the assessment of prejudice, is not in the table (p. 30); Chapter 32 deals with it. Each experiment had 3 to 6 participants, according to the Participants and Discussion sections, and the authors note that some people's data were lost because of technical problems (p. 31).

Two features run through the table. The first is what the authors conclude from the set as a whole: that the results "corroborate the results of previous research and add generality to the phenomenon studied (different stimuli and different training procedures)" (p. 726). The generality they speak of is across stimuli and procedures. Each experiment compares the participant with themselves (p. 92), with no comparable group (Section 25.1), and supports, for each person, what Section 20.5 asked for: a stated class criterion, tests without differential consequences, and assessment before and after. The second feature is the choice of stimuli. In four experiments, the authors state that the image carried more than what they meant to measure: age and work context (Experiment 9, p. 554), gender and the characteristics of the photographs (Experiment 6, p. 388), facial expressions (Experiment 12, p. 725), and the social standard of desirable body types (Experiment 11, p. 633). In Experiment 11, this standard leads the authors to recommend a more careful choice of stimuli (p. 633). It is the problem of Section 18.2, now inside the stimulus of the experiment: what looks like a single cue, such as race in a photograph of a face, is a set of variables. In Experiment 6, the authors propose silhouettes, so that hair color, skin color, body position, and facial expression do not interfere (p. 388).

The limitation that recurs most often in Table 30.4 is remote data collection (Experiments 2, 4, 8, and 10), and Pereira and Moreira (2021a, p. 107) state it in general terms. The system depended on each participant's internet speed, and the presentation of the stimuli may have varied from one participant to another. Moreover, in home settings, even with guidance on avoiding interruptions, distracting variables cannot be controlled as they can in a selected setting.

The volume also summarizes two Brazilian studies that were not consulted in the original, and that enter here as cited in Moreira, Rocha et al. (2022). Portela (2014), with 101 students and silhouettes of body types, concluded that, even after reversal training, the concept of obesity did not change (pp. 84 and 85). Santos and de Rose (2017) worked with 11 children aged 5 and 6. The children said they liked the foods associated with the character rated as positive better, and this result held in a maintenance test done two weeks later (pp. 85 and 86).

It remains to say what this synthesis leaves out and how to cite what has not been read. Eight studies enter here as "cited in," because they were not consulted in the original: those of Watt et al., Barnes et al., Moxon et al., Grey and Barnes, Barnes-Holmes et al., Eilertsen and Arntzen, Portela, and Santos and de Rose. None of them appears in the references. The form is: the authors and year of the study, "as cited in," and the source that was read, with the page or, when the source does not have the journal's pagination, the section. The synthesis brings together only consulted sources, with no systematic database search or inclusion criterion. It is therefore not a systematic review, and anyone planning one must obtain the cited studies and read them.

TEST YOURSELF

How is Grey and Barnes (1996) cited in this book?

ANSWER: "Grey and Barnes (1996, as cited in Mizael, dos Santos, & de Rose, 2016, p. 127)," with no entry of its own in the reference list, because the study was not consulted in the original.

30

Common learner mistakes

1 **Citing as read a study known through a secondary source.** The mistake happens because the source that was read often describes the study in detail, and it is easy to pass those details on as if they came from the original. *How to spot the mistake:* "Grey and Barnes (1996)" appears with details and without "as cited in" (Section 30.5).

2 **Taking the table for a systematic review.** The mistake happens because a table with families, findings, and sources looks like a review. What distinguishes a systematic review, the database search and the inclusion criterion, does not appear in the table. *How to spot the mistake:* the sentence says "the literature shows," and the only basis is a list of consulted studies (Section 30.5).

3 **Expecting every class to form.** The mistake happens because the paradigm is usually presented with abstract stimuli, which have no prior history. What holds for them is then extended, without further ado, to socially meaningful stimuli, which bring relations capable of competing with those of the training. *How to spot the mistake:* the conclusion ignores that most studies with the Conflicting Relations Paradigm had few classes formed (Section 30.1).

4 **Attributing the whole difference between groups to the parameter.** The mistake happens because the group's name, such as "symmetry group," highlights the parameter, and what varied along with it, such as the number of trials, does not appear in the name. *How to spot the mistake:* the explanation is "because it had a symmetry test," without saying that the group also had more trials and that the difference is one child or a few (Section 30.3).

5 **Giving a maintenance percentage without stating the denominator.** The mistake happens because the two percentages have the same numerator, and the denominator, which is what changes from one to the other, disappears when only the result is written. *How to spot the mistake:* "36% maintained" without saying whether it is out of those who formed the class or out of the whole group (Section 30.4).

SUMMARY

Families (objective 1). Social meaning (Watt et al. and Grey and Barnes, through a secondary source; the studies in Chapters 20, 27, and 28; the two experiments of Pereira & Moreira, 2021a; the experiments of Moreira, Rocha et al., 2022), other functions (mood and the eliciting function, with its extinction), and training parameters (Mizael, de Almeida et al., 2021).

Findings (objective 2). Transfer for all participants in Grey and Barnes; transfer of mood and of the extinction of the eliciting function; yields from 64% to 83%; and, of the 33 children who formed classes, 27 maintained at least one relation after six weeks, and 17, all four.

Terms and reading (objective 3). Training parameter: a feature of the procedure that the researcher sets and varies without changing the stimuli. Class yield: the proportion of the group's participants who formed the classes. Maintenance test: the derived relations, after an interval, without training or differential consequences. With the paramet-

er, the yield was higher, but the number of trials also varied and the groups were small. The same name, "feedback reduction," covered two arrangements (one block with 50% consequences; four phases, from 100% to 0%), and describing a parameter is not testing it.

Limitations (objective 4). Classes that do not always form; the same name, which does not guarantee the class; two comparison stimuli; measures only in the laboratory; binary categories; remote data collection, without control of the setting. What the authors propose to do is a proposal, not a finding.

Citing (objective 5). "As cited in," with the page of the source that was read, and outside the reference list; the synthesis includes only consulted sources and is not a systematic review.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. Which function did Barnes-Holmes et al. (2004) find transferred, according to Mizael, dos Santos, and de Rose (2016), and which function did Dougher et al. (1994) measure?
2. Why did Watt et al. use names, and how is that study cited in this book?
3. Define training parameter and say which items are parameters: (a) the symmetry test after each trained relation; (b) the children's age; (c) the proportion of trials with differential consequences; (d) the children's history with the faces.
4. Calculate the yield of each group in Mizael, de Almeida et al. (2021), from Table 30.1, and say what the difference is, in number of children, between the control and mixed training groups.
5. Why do the authors not claim that the parameter, by itself, explains the higher yield of Groups M and R? And why do the two experiments on presidents, in which everyone formed the classes with feedback reduced in phases, not show that the reduction worked?
6. Which are maintenance tests: (a) BA, CB, AC, and CA one day after the last training; (b) the same four, six weeks later, without differential consequences; (c) AB and BC again, six weeks later, with differential consequences?
7. Four children in Group M maintained all four relations. Give the two percentages that Table 30.2 allows and the question each one answers.

8. (Hypothetical case.) Beatriz writes: "Mizael et al. (2021) showed that the symmetry test makes children maintain the classes for six weeks." Point out two problems and rewrite the sentence.

9. What limitations do the authors of Mizael, de Almeida et al. (2021) state regarding the number of comparisons and the measures, and what do they propose as a next step?

10. (Hypothetical case.) Beatriz writes in her project: "Transfer of function occurs in all cases (Grey & Barnes, 1996)," and puts the study in the reference list. Point out three problems.

ANNOTATED ANSWER KEY

1. Mood functions, such as sadness and happiness (Mizael, dos Santos, & de Rose, 2016, p. 127). Dougher et al. measured the eliciting function, through skin conductance responses, and the transfer of its extinction: one member of the class was presented in extinction, and the others did not elicit the response (1994, p. 331).

2. Because, in Northern Ireland, the name identifies the person's religion (Mizael & de Rose, 2017, p. 371). It is cited as "Watt et al. (1991, as cited in Mizael & de Rose, 2017, p. 371)," with no entry of its own in the reference list, because the study was not consulted in the original.

3. A training parameter is a feature of the training or testing procedure that the researcher sets and can vary across groups or studies, without changing the stimuli. Items (a) and (c) are parameters. Age (b) and the history with the faces (d) are variables of the participants and the stimuli, which the researcher selects and does not vary in the procedure; the authors treat prior history as one variable and the parameters as another (Mizael, de Almeida et al., 2021, Introduction section).

4. Control, 7 of 11 (64%); mixed training, 8 of 11 (73%); feedback reduction, 8 of 10 (80%); symmetry, 10 of 12 (83%). Between the control and mixed training groups, the difference is one child.

5. Because the number of training trials also varied: Groups M and R had more, and the authors say it is possible that the higher yield is due to the added trials, and that the other groups had at least 32 more than the control group (Discussion section). The number of trials is an extraneous variable that changed together with the independent one, and the result is confounded (Section 31.3). In the experiments on presidents, the 10 participants formed the classes (Pereira & Moreira, 2021a, pp. 63, 103, and 107), but the design is single-subject, with a pretest and a posttest (p. 19), with no group that trained in another way: the result is compatible with phased feedback reduction, but does not compare it with another kind of training.

6. Only (b). Item (a) is the formation test, done one day after the last training, and (c) is retraining, with the taught relations and with differential consequences.

7. 4 of 8 (50%): of the children who formed the classes, how many maintained them. 4 of 11 (36%): of the group, how many reached six weeks with the relations intact. The question decides which to use.

8. First, the study did not isolate symmetry: Group S also had more trials, and the comparisons are between groups of 10 to 12 children. Second, "makes" asserts a rule, and the data are counts: in Group S, 5 of 12 children maintained all four relations (6 of 10 in feedback reduction). For example: "In the group that was tested for symmetry after each relation, 10 of 12 children formed the classes and 5 of the 12 maintained all four relations six weeks later; the study does not separate the parameter from the number of trials (Mizael, de Almeida et al., 2021, Results and Discussion sections)."

9. Using only two comparison stimuli can produce false positives: arbitrarily assigning each comparison to a sample gives 100% or 0%, with a 50% probability for each, and several scores close to 0% raise suspicion of this. The measures are limited to the experimental context, and the binary categories may not reflect the changes over the course of the experiment (Limitations section). As next steps, they propose checking generalization to other measures and to behavior in natural settings, using an implicit measure before and after, and going beyond the relation between faces and a single symbol (Discussion section). These are proposals, not findings.

10. First, the study was not consulted in the original: the form is "Grey and Barnes (1996, as cited in Mizael, dos Santos, & de Rose, 2016, p. 127)." Second, it does not go in the reference list, which includes only the source that was read. Third, "in all cases" overgeneralizes: what the source reports is transfer "for all participants" in that study, and Haydu et al. (2015, p. 393) show that most participants in another study did not form the expected classes.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 31. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2	30.1, 30.2, and common mistake 1
3, 4	30.3
5, 8	30.3 and common mistake 4
6, 7	30.4 and common mistake 5
9	30.5
10	30.5 and common mistake 1

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CHAPTER

31 Experiments

independent, dependent, and controlled variables

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** independent variable, dependent variable, extraneous variable, and controlled variable.
2. **Identify** the independent, the dependent, and the controlled variable in a described study (Dixon & Lemke, 2007; Pereira & Moreira, 2021b; Kist et al., 2025).
3. **Distinguish** what is manipulated, what is measured, and what is kept the same, and **separate** the controlled variable from the comparable group.
4. **Recognize** an extraneous variable that was left uncontrolled and **state** how another one was controlled.
5. **Fill in** the variables sheet of a proposed study, including what was left out.

PREREQUISITES

Matching-to-sample (Section 20.1), the studies in Chapters 27 and 28, measurement (Section 22.1), the scale (Section 23.1), and the record before, after, with a comparable group, and with follow-up (Section 25.1). The new terms (variables sheet, independent variable, dependent variable, extraneous variable, and controlled variable) are defined here.

OPENING

(Hypothetical case, continued from Chapter 30.) Before planning her own study, Beatriz wants a sheet in which every piece of information has its place. The study also changes its object, and she writes down why. The records in Chapters 22 to 25 measured the evaluation of group supervision, a work format; in the occasion records, however, several unfavorable sentences were about the supervisors who run the group, not about the format. These are different objects (Section 5.3), and the

management asked that the second be studied separately: does the rating the interns give to photographs of the supervisors change after equivalence training? Four questions organize the chapter.

1. *"What did the study vary?"*
2. *"What did the study measure?"*
3. *"What did the study keep the same, and what else could explain the change?"*
4. *"What was left out?"*

The first is the subject of Section 31.1; the second, of 31.2; the third, of Sections 31.3 and 31.4; the fourth, of 31.5.

31.1 What is manipulated: the independent variable

An experiment asks whether something the researcher makes happen changes something the researcher records. To read one, this book uses the **variables sheet**, a four-row sheet on which you record what the study varied, what it measured, what it kept the same, and what was left out. The following sections take one row at a time.

The first two rows have names that come from experimental research, and Skinner used them to rewrite the idea of cause. The **independent variable** is what the researcher manipulates to see whether behavior changes, and the **dependent variable** is what the researcher measures to find out whether it changed. For Skinner (1953, p. 23, as cited in Schlinger & Normand, 2013, pp. 285–286), what used to be called a cause is now treated as a change in an independent variable, and what used to be called an effect, as a change in a dependent variable. The old link between cause and effect is recast as a functional relation. The independent variables, which are the causes of behavior, are the outside conditions on which behavior depends functionally (Skinner, 1953, p. 35, as cited in Schlinger & Normand, 2013, p. 286).

To be independent in a study, the variable must take on at least two values that the study compares: present and absent, or one level and another. Hanley et al. (2003, p. 157) describe the logic of the conditions of a functional analysis this way: test conditions include some independent variable that may be relevant, and control conditions are arranged so that this same variable is missing. In class formation studies, the two

values are usually the absence and the presence of training: the measurement taken before it and the one taken after it, with the same stimuli and the same instrument.

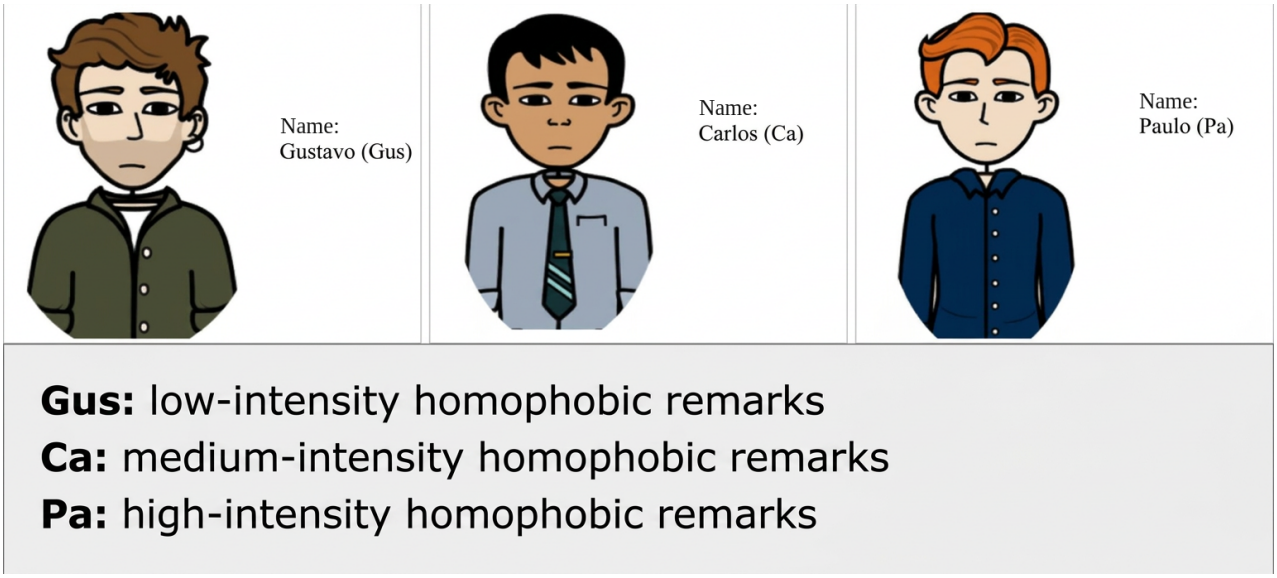
In the studies of the previous chapters, the independent variable is almost always a training procedure. In Dixon and Lemke (2007, p. 8), it is conditional discrimination training, with a pleasant sound after a correct response and an aversive sound after an error, in blocks of 18 trials and a criterion of at least 16 correct. Pereira and Moreira (2021b, p. 141) name it: "the independent variable of this research was conditional discrimination training," with a criterion of 100% correct in a block (p. 142). In the same authors' book on presidents of the Republic, the independent variable is also matching-to-sample training, now with the relations trained simultaneously (Pereira & Moreira, 2021a, p. 19; Section 30.3). In Kist et al. (2025, p. 18), it is the type of matching-to-sample procedure, typical or multiple-sample, manipulated within the session; Section 31.4 describes both.

The author of this book is a coauthor of six of the texts used in this chapter: Pereira and Moreira (2021a and 2021b), Kist et al. (2025), Cameoka and Moreira (2021), Moreira et al. (2021), and Moreira, Martins et al. (2024).

In the comics studies of the Instituto Walden4 series, the independent variable is the story. In the study on homophobia in Part IV, the method describes the variable field by field (Moreira, Martins et al., 2024, p. 76). The name is "character interactions in a comic story"; the description, "lines with homophobic content"; the manipulation, exposing the participants to the story; and the values are the aggression levels of three characters. Gustavo makes homophobic remarks of low intensity; Carlos, of medium intensity; and Paulo, of high intensity, as Figure 31.1 shows. The three values come from different characters, and Paulo arrives at the coffee shop only after the other two (p. 80). The authors report that Paulo was the character whose evaluations varied most between pretest and posttest (p. 96) and suggest that the intensity of the characters' actions and traits weighs on readers' perception (p. 99). The difference between Gustavo's ratings and Paulo's ratings may therefore come from the aggression level, from who the character is, or from when he enters the scene, and the design does not allow us to say which of the three (this book's reading; Section 31.3).

Figure 31.1

The three characters in the story and the aggression level of each



Note. Figure 1 of the study on homophobia in Part IV (Moreira, Martins et al., 2024, p. 79): the characters in the story, cut out and placed side by side. The gray band, with the aggression levels described on p. 76, was added for this book. The reproduction has the resolution of the source material.

Being independent is a role in the study, not a property of the thing. The ratings that participants gave to the photographs in Studies 1 and 2 of Cameoka and Moreira (2021) were results; in Study 3, they served as the criterion for choosing which photographs would be presented (p. 98; Section 32.2). And naming the independent variable with a single word can hide several variables: the authors write that, to use race as an independent variable, one must bear in mind that race, when embodied in faces, is actually a set of variables (p. 106). Chapter 32 deals with this point.

KEY CONCEPT

The **independent variable** is what the researcher varies, with at least two values compared, to see whether behavior changes. It is a role in the study: the same quantity can be a result in one study and a selection criterion in another.

EXAMPLE

(Hypothetical case.) Beatriz plans a training procedure that relates the supervisors' photographs, by way of an abstract figure, to positive words. The independent variable is the training, with two values: absent, at pretest, and present, at posttest. The rating the interns will give to the photographs is not independent: it is what she will measure.

NON-EXAMPLE

The race of Dixon and Lemke's (2007) participants varies from one to another, but no one manipulated it: the authors noticed it afterward, as another possible source of the variability in the pre–post comparisons (p. 10). What varies among people without the researcher having manipulated it is not, in that study, an independent variable; Section 31.3 gives a name to what it is.

TEST YOURSELF

In Dixon and Lemke, is the 1-to-10 rating independent?

ANSWER: no, it is the measure; what is manipulated is the training (p. 8).

31.2 What is measured: the dependent variable

In behavior analysis, what is measured is behavior. The three-term contingency (Chapter 13) provides the division of labor: in it, antecedents and consequences are the independent variables, and behavior is the dependent variable (Moreira et al., 2021, p. 49). For Skinner (1953, p. 35, as cited in Schlinger & Normand, 2013, p. 286), the dependent variable is the effect whose cause is being sought. What counts as a measure is decided by a rule set before recording (Section 22.1): marking a point on the scale, choosing a comparison, counting the correct responses in a block.

Pereira and Moreira (2021b, p. 141) name two dependent variables: equivalence class formation, measured by the percentage of correct responses in the test phases, and transfer of function, measured by the difference between the evaluations of the abstract figures in the two administrations of the scale. In the first, participants scored 88.88% correct or higher on the first test, except P02 on BA symmetry (72.22%), and 94.44% or higher on the second (p. 144). In the 2021 book, the de-

pendent variable is described in the same terms: class formation in the symmetry and transitivity tests and transfer of function, evaluated on the scale before and after training (Pereira & Moreira, 2021a, p. 19).

Dixon and Lemke (2007) do not use these terms, but, in this book's reading, the study has three dependent variables. The first is performance in training, from 1 to 158 blocks to criterion on the A-B relation (p. 9). The second is the emergent relations in the tests: 7 of 8 participants demonstrated symmetry, and 7 of 8, equivalence, with 90% or more correct (p. 10). The third is the 1-to-10 rating given to the images before and after training (p. 7). Kist et al. (2025, p. 18) use the percentages of errors in the training trials and in the test trials that assessed the emergence of equivalence classes.

In the Part IV study, the method also describes the dependent variable field by field (Moreira, Martins et al., 2024, pp. 76 and 77). The name is "attitude"; the description, "attitude change toward fictional characters"; the topography, "clicking on one of the options of a Likert-type scale on a form"; the measurement, the semantic differential scale; and the possible values, from 1 to 7. This is the recording rule of Section 22.1 written out in fields: what is recorded (the click), with which instrument, and with which values.

Each dependent variable answers a different question. The tests show whether derived relations occurred, and the rating shows whether the evaluation changed; one does not imply the other. In Dixon and Lemke (2007, p. 10), not everyone who reached criterion on the equivalence test showed significant differences in their ratings.

KEY CONCEPT

The **dependent variable** is what is measured to find out whether it changed. In behavior analysis, it is a behavior (marking, choosing, responding correctly), recorded by a rule set beforehand, and a study usually has more than one.

EXAMPLE

(Hypothetical case.) Beatriz will record three things: how many blocks each intern needs to reach the training criterion, the percentage of correct responses in the tests, and the 1-to-10 rating given to each photograph, before and after. All three are dependent variables, and none of them is the training.

NON-EXAMPLE

The criterion of 16 correct out of 18, in Dixon and Lemke (2007, p. 8), is not a dependent variable: it is a rule of the training, set beforehand and the same for everyone. The dependent variable is how many blocks each participant needed to reach it (from 1 to 158 on A-B; p. 9).

TEST YOURSELF

Why are test performance and the rating different variables?

ANSWER: the first shows derived relations; the second, the evaluation, and one does not imply the other (Dixon & Lemke, 2007, p. 10).

31.3 What is kept the same: the controlled variable

If the posttest rating differs from the pretest rating, training is the most obvious explanation, but not the only one: the scale may have been different, the interval may have been long, the person who administered it may have changed. Iwata and Dozier (2008, p. 4) say that a demonstration is credible when there is control over the measure (the dependent variable), over how the treatment is applied (the independent variable), and over possible sources of confounding. The previous sections defined the dependent and the independent variable; this one deals with the third requirement, the control of sources of confounding.

Any variable other than the independent variable that could alter the dependent variable is an **extraneous variable**. Hanley et al. (2003, p. 159) give as examples those of the organism itself, such as allergies and changes in medication, and Kist et al. (2025, p. 24) speak of extraneous variables related to the way of interacting with the stimuli. When an extraneous variable changes together with the independent variable, the result is confounded: the difference may come from one or the other, and the study does not allow us to say which.

The **controlled variable** is the extraneous variable that the researcher keeps the same across all conditions, so that it cannot explain the change. The general rule is in Hanley et al. (2003, p. 170): control conditions rest on the strategy of keeping every feature of the experimental condition unchanged except the contingency under study.

In the studies of the previous chapters, this appears in simple lines. In Dixon and Lemke (2007, p. 8), at posttest the participants were exposed again to the same experimental task. In Pereira and Moreira (2021b, p. 138), the posttest scale is the same as the pretest scale, and data collection took place in a single session for everyone (p. 143). In Pereira and Moreira's book (2021a, p. 22), the instructions were given through standardized videos, so that they would not vary from one participant to another. During the activity, the researcher turned off audio and camera to avoid interference. In Cameoka and Moreira (2021, p. 99), the photographs of faces came standardized in size, quality, framing, and background. In the Part IV comics study, each slide advanced on its own every 15 seconds, so that all participants were exposed to the content for the same period (Moreira, Martins et al., 2024, p. 89). The scale was also the same before and after the story (p. 88).

KEY CONCEPT

The **controlled variable** is the extraneous variable that the study keeps the same across all conditions. Saying "it was controlled" requires saying what stayed the same and in what respect.

31

EXAMPLE

In Pereira and Moreira (2021b, pp. 138 and 143), the semantic differential scale was the same in both administrations, and data were collected in a single session: the difference between the evaluations cannot come from another instrument or from another day.

NON-EXAMPLE

(Hypothetical case.) In the controlled-variables row of a sheet, Beatriz writes "group without training." The group without training is a condition, the one in which the independent variable is absent, not a controlled variable. The row asks for what stayed the same for both groups, for example, the same scale and the same interval between measurements.

⚠ CAUTION

"Control" has more than one meaning in these chapters. A controlled variable is what is kept the same. A control condition is one in which the independent variable is absent (Hanley et al., 2003, p. 157). Control stimuli are those that serve as a comparison, such as the everyday objects that Dixon and Lemke (2007, p. 10) expected to receive neutral ratings. And stimulus control is the relation between the response and the properties of the stimulus (Chapter 13).

TEST YOURSELF

What is "same scale before and after" on the sheet?

ANSWER: a controlled variable: it keeps the instrument the same, so that the difference does not come from it.

31.4 How control is achieved, and what escapes it

There are three ways to control an extraneous variable, and the sources we have read show all three. The first is to keep it the same: the same instrument, the same reinforcer, the same way of responding. The second is to distribute it: alternate the conditions, vary the order across people, or present the stimuli in random order, so that whatever changes with time or with position affects all conditions in the same way. In the multielement design, conditions alternate rapidly. Because the person goes through all of them within a relatively short period, variables of the organism should affect behavior similarly in all of them (Hanley et al., 2003, p. 159). In the IAT, block order changed the effect, and that is why it is counterbalanced across people (Section 24.2). Random order, however, is not order distributed across people. In Pereira and Moreira (2021a, p. 28), the system drew the order of the trials in each block at random, but the sequence of trials in each test was identical for all participants: across people, the order was kept the same, not varied (this book's reading). The third way is to equate, across conditions, whatever each condition brings with it apart from what one wants to test, such as the probability of a correct response in the study described next.

The study by Kist et al. (2025) uses all three. The authors compare two matching-to-sample procedures: the typical one, in which each trial presents one sample and three comparisons, and the multiple-sample

one, in which each trial presents three samples and three comparisons at the same time. In the multiple-sample procedure, the person makes three matches in the same trial (pp. 16 and 18).

According to the authors, the earlier studies they describe may have let extraneous variables slip through. In one of them, all participants did the tasks in the same sequence, and the order may have influenced the results (Gomes & de Souza, 2008, as cited in Kist et al., 2025, p. 16). The replication of that study controlled the order of the conditions (Gomes, 2011, as cited in Kist et al., 2025, p. 16). In other earlier studies, the arrangement of the stimuli and the topography of the required responses differed between conditions, which may have biased the conclusions (p. 17).

And the probability of a correct response by chance was not balanced: 33% in typical matching and, in multiple-sample matching, 33% on the first match of the trial, 50% on the second, and 100% on the third (p. 17). This is because, with each match made, fewer samples and comparisons remain. For this reason, they write, it is hard to tell whether the results come from the structure of the procedures or from other sources of discriminative control (p. 17).

Table 31.1 shows what Kist et al. did with each of these variables, and with a few others. On the sheet, all of them go in the controlled row, with the way indicated: by extension, this row also receives what was distributed or equated, not only what was kept the same.

Table 31.1

How Kist et al. (2025) dealt with what could explain the difference between the two matching procedures

What could explain the difference	What was done	Way	Page
The order of the conditions	the conditions alternate from trial to trial, in the same session	distribute	pp. 19 and 24
The probability of a correct response by chance in each match	each match in the multiple-sample condition is yoked to a trial in the typical condition with the same number of comparisons; as a result, the number of reinforcing stimuli is also the same	equate	p. 24
The way of responding	the same topography in both conditions: touch and drag	keep the same	p. 24
The value of the reinforcer	the same reinforcing stimulus in both conditions	keep the same	pp. 18 and 24

What could explain the difference	What was done	Way	Page
The history with the stimuli	arbitrary visual stimuli, with no referent in the Portuguese language	keep the same (no history)	pp. 18 and 24
Who responds	the same participants in both conditions, compared with themselves	keep the same	p. 24

Note. Table prepared for this book, based on Kist et al. (2025); the "Way" column is this book's reading.

According to the authors, all analyses showed no differential effect of task type on the emergence of equivalence classes (pp. 23–24), and the disagreement with earlier studies may be attributed to methodological differences between the procedures adopted (p. 24). Strictly speaking, an analysis that finds no difference shows that the difference did not appear in these data, not that it does not exist (this book's reading). The point here is not which procedure is better, but what control makes possible: a difference, or the lack of one, can be attributed to the independent variable only when everything else stayed the same.

What escapes control goes in the last row of the sheet (Section 31.5). In Dixon and Lemke (2007, p. 10), the everyday objects were supposed to serve as control stimuli, with neutral ratings before and after training. Most participants, however, gave them the highest ratings at both points, and the authors say this may have come from participants comparing the categories presented and from the objects not being paired with any prejudice or stereotype. In attitude studies, the hardest extraneous variable is the prior history with the stimulus: Pereira and Moreira (2021b, p. 151) write that using stimuli with pre-experimental meaning comes with additional problems of experimental control. The sources respond to this in two ways: they include stimuli with no history, such as the abstract figures (Section 28.1), and they measure before training, which Dixon and Lemke (2007, p. 10) say may be important when the stimuli probably have pre-experimental relations.

In studies with photographs, the photographs themselves bring extraneous variables. In Study 2 of Cameoka and Moreira (2021, p. 104), the faces wore a slight smile, and the authors suggest that this may have induced more positive evaluations. They write, however, that it was not possible to isolate the attributes that controlled the variation between the first two studies, because the photographs were of different people, and that photographs of the same faces in both studies would lead to more secure conclusions (p. 107). Chapter 32 deals with this point.

In remote data collection, it is the person's environment that escapes. To make it similar across participants, Pereira and Moreira (2021a, p. 19) required a private room, with the person alone, and a computer with a download speed of at least 10 Mbps, measured before starting; anyone with less was excluded. Even so, they state that the distracting variables of the home environment cannot be controlled as in a selected setting and that internet speed may have made the presentation of the stimuli fluctuate from one participant to another (p. 107). The requirement is an attempt to keep things the same; what it does not reach goes in the last row of the sheet.

KEY CONCEPT

To control is to prevent an extraneous variable from changing together with the independent variable. There are three ways: keep it the same across all conditions, distribute it (alternate the conditions, vary the order across people, present in a random order that differs for each one), and equate what the condition itself drags along with it.

EXAMPLE

(Hypothetical case.) Beatriz shows the twelve photographs in random order, different for each intern and in each administration. If the first photographs on the screen received different ratings just because of their position, this would be spread across all the photographs, before and after, and would not be confounded with the training.

NON-EXAMPLE

(Hypothetical case.) A report says: "the study was controlled, because it measured the participants before and after." Measuring before and after makes comparison possible, but it does not control what changed between the two measurements for other reasons, such as time and history; for that, Section 25.1 calls for a comparable group.

TEST YOURSELF

In Kist et al., why does alternating the conditions from trial to trial, in the same session, control order?

ANSWER: because neither condition always comes before the other, and whatever changes with time affects both (Kist et al., 2025, pp. 19 and 24; Hanley et al., 2003, p. 159).

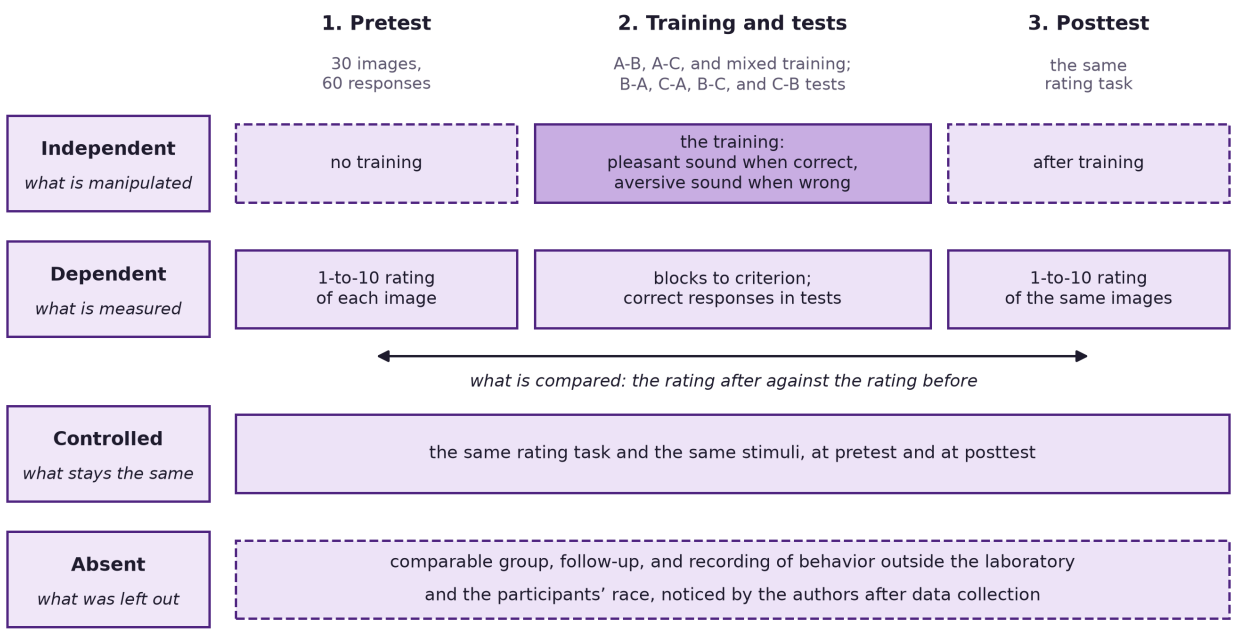
31.5 What was left out, and the sheet

The last row of the variables sheet holds what was left out: what the study did not keep the same, did not measure, and did not compare. It brings together two things: elements of the Section 25.1 record that the study lacks (comparable group, follow-up, and recording of behavior outside the situation) and extraneous variables that it did not isolate. Each study sets itself a question, and the row lists what that question left out; it is not a verdict on the study.

To fill in the sheet for a study, ask four questions, in this order. What did the study vary, and with what values? What did it measure, and by what rule? What did it keep the same, and in what respect? What was left out? Figure 31.2 places the four rows on the timeline of Dixon and Lemke's (2007) study, and Table 31.2 brings together the sheets for the two studies in Chapters 27 and 28.

Figure 31.2

The four rows of the sheet on the timeline of Dixon and Lemke's (2007) study



Note. Diagram prepared for this book, based on Dixon and Lemke (2007, pp. 7–10); no new data.

Table 31.2

Variables sheet for the two studies

	Dixon and Lemke (2007)	Pereira and Moreira (2021b)
Independent	A-B, A-C, and mixed training, with a pleasant sound for correct responses and an aversive one for errors, and criteria of 16 out of 18 and 32 out of 36 (p. 8)	AB, AC, and mixed conditional discrimination training, with 100% correct (pp. 141–143)
Dependent	blocks to criterion (p. 9); correct responses in the tests, 7 of 8 with 90% or more (p. 10); 1-to-10 rating before and after (p. 7)	correct responses in the tests (88.88% or more; 94.44% or more; p. 144); difference between the evaluations of the abstract figures, on a 14-pair scale (pp. 138 and 141)
Controlled	same rating task before and after (p. 8)	same scale before and after (p. 138); single session (p. 143)
Absent	comparable group, follow-up, and behavior outside the laboratory (Section 25.1); the participants' race, noticed afterward (p. 10)	comparable group, follow-up, and behavior outside the session (Section 25.1); the prior history with photographs and acronyms (p. 151)

Note. Table prepared for this book, based on Chapters 27 and 28; the extraneous variables in the last row are those the authors point out.

Two reading rules apply to any sheet. The first is that the same entry does not fall into two rows: "the scale" is controlled, and "the rating given on the scale" is dependent. The second is that an entry that only names the stimulus does not say what stayed the same: "the photographs" is the beginning of the answer to the third question, not the answer.

⚠ CAUTION

What the sheet shows as "absent" is a condition from Section 25.1, or a variable the study did not isolate, not a flaw: each study set itself a question.

EXAMPLE

(Hypothetical case.) Beatriz writes the sheet for the study she is planning. Independent: the training that relates the supervisors' photographs, by way of an abstract figure, to positive words, with two values: absent, at pretest, and present, at posttest. Dependent: the percentage of correct responses in the tests and the 1-to-10 rating given to each photograph, before and after. Controlled: the same scale in both administrations, a single session, and the supervisors' photographs. Absent: comparable group and follow-up, which she will decide on in the design (Chapter 33).

CAUTION

"The supervisors' photographs" names the stimulus, not what stayed the same in it. Beatriz needs to say in what respects the photographs are the same (framing, background, expression) and what in them was not isolated; that is the question of Chapter 32.

NON-EXAMPLE

(Hypothetical case.) A sheet says: independent, the semantic differential scale; dependent, the training; controlled, everything; absent, nothing. The scale is what is measured, and the training, what is manipulated; "everything" does not say what stayed the same; and "nothing" claims a study without limits, which does not exist.

TEST YOURSELF

In which row does "the interval between the two measurements was the same for everyone" go?

ANSWER: in the controlled row; if it had varied across people, it would be an uncontrolled extraneous variable, and it would go to "absent."

Common learner mistakes

1 **Calling what is measured independent.** The mistake happens because the rating is what varies in the results, and the word "variable" leads one to look for what varied, not for what the researcher made vary. *How to spot the mistake:* the rating appears as "manipulated" (Sections 31.1 and 31.2).

2 **Listing only the rating as dependent.** The mistake happens because the study's question is about evaluation, and the other measures, such as correct responses in the tests, look like steps of the procedure rather than results. *How to spot the mistake:* test performance, which tells whether the derived relations emerged, does not appear on the sheet (Section 31.2).

3 **Calling controlled what varied or is part of what is manipulated.** The mistake happens because the passing criteria are fixed and the same for everyone, like a controlled variable, but they define the training, which is the independent variable. *How to spot the mistake:* the passing criteria (16 out of 18 and 32 out of 36) appear among the controlled variables, but they are part of the training (Section 31.3).

4 **Confusing the controlled variable with the comparable group.** The mistake happens because both are called "control": control group and controlled variable. *How to spot the mistake:* the controlled row contains "control group" (Section 31.3).

5 **Writing the name of the stimulus where the question is what stayed the same.** The mistake happens because the stimulus is in fact the same in both measurements, and naming it seems enough; the question, however, is in what respect it stayed the same. *How to spot the mistake:* the controlled row contains "the photographs" and does not say in what respect they are the same (Section 31.5).

SUMMARY

The sheet and the definitions (objective 1). Independent: what is manipulated, with at least two values compared. Dependent: what is measured, a behavior recorded by a rule set beforehand. Extraneous: what, besides the independent variable, could alter the dependent variable. Controlled: the extraneous variable kept the same across all conditions.

Identify (objective 2). In each study, three questions: what was varied, what was recorded, and what was kept the same.

Distinguish (objective 3). The role belongs to the study, not to the thing: the rating is dependent in Dixon and Lemke and a selection criterion in Study 3 of Cameoka and Moreira. The comparable group is the condition without the independent variable, not the controlled variable.

Control (objective 4). When an extraneous variable changes together with the independent variable, the result is confounded. Control is achieved by keeping things the same, by distributing (alternating, varying the order), or by equating what the condition drags along. An order

drawn at random but the same for everyone keeps the order the same; it does not distribute it. Measuring before and after, or noting the variable, does not control it.

The sheet (objective 5). Four rows (independent, dependent, controlled, absent); the last holds what the study lacks and what it did not isolate, without an accusatory tone.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. Define independent variable, dependent variable, extraneous variable, and controlled variable, and give, from Pereira and Moreira (2021b), one independent and one dependent variable.
2. Hildum and Brown (1956) administered a questionnaire by telephone and inserted the reaction "Good" or "Mm-hmm" after favorable or unfavorable answers, in four groups; afterward, they asked what the participant had noticed. State the independent variable and the dependent variables.
3. (Hypothetical case.) Beatriz measures the rating before and after, but uses different scales. Which variable did she fail to control, and what does that do to the conclusion?
4. In Kist et al. (2025), classify each item as independent, dependent, controlled, or extraneous and uncontrolled in an earlier study: (a) the type of matching; (b) the percentage of errors in the tests; (c) touching and dragging in both conditions; (d) the fixed sequence of conditions, the same for everyone; (e) the reinforcing stimulus, the same in both conditions.
5. In Scott (1957), a group that did not debate was also measured and did not change. What is it on the sheet, and what is it not?
6. What role does the 1-to-10 rating play in Dixon and Lemke (2007), and what role do the ratings from Studies 1 and 2 play in Study 3 of Cameoka and Moreira (2021)?
7. (Hypothetical case.) In a study, the training was given in a laboratory, in the morning, and the posttest was administered in a classroom, in the afternoon, by another person. Which extraneous variables varied together with the independent variable? Propose a control for each one.

8. (Hypothetical case.) A report concludes: "the means rose from Study 1 to Study 2 because the faces began to smile." What is missing to be able to say this, according to Cameoka and Moreira (2021)?

9. In Dixon and Lemke (2007), the everyday objects were supposed to receive neutral ratings. What happened, and what explanation do the authors give?

10. (Hypothetical case.) Fill in the sheet for a study on group supervision: before and after a training procedure, interns rate photographs of supervisors from 1 to 10. Include the "absent" row.

ANNOTATED ANSWER KEY

1. Independent: what the researcher manipulates, with at least two values compared. Dependent: what is measured to find out whether it changed. Extraneous: a variable, besides the independent variable, that could alter the dependent variable. Controlled: the extraneous variable kept the same across all conditions. In Pereira and Moreira (2021b, p. 141), the independent variable is conditional discrimination training, and the dependent variable, class formation (correct responses in the tests) or transfer of function (difference between the evaluations of the abstract figures).

2. Independent: the interviewer's reaction, "Good" or "Mm-hmm," after favorable or unfavorable answers (Hildum & Brown, 1956, p. 111). Dependent: the answers to the questionnaire, in which "Good" biased the results and "Mm-hmm" did not (p. 111), and what the participant noticed afterward, since 8 of 20 noticed the "Good" (p. 110): what is asked at the end is also a measure.

3. The instrument. If the scale changed, the difference between the ratings may come from it, not from the training: the extraneous variable varied together with the independent variable, and the result is confounded. The control is the same scale in both administrations, as in Pereira and Moreira (2021b, p. 138).

4. (a) Independent (Kist et al., 2025, p. 18). (b) Dependent (p. 18). (c) Controlled (p. 24). (d) Extraneous and uncontrolled in an earlier study: the order, which the authors say may have influenced the results (p. 16). (e) Controlled: identical reinforcing stimulus in both conditions (pp. 18 and 24).

5. It is the condition in which the independent variable is absent: the comparable group of Section 25.1, which the English-language sources call a control condition or control group (Hanley et al., 2003, p. 157; Scott, 1957, p. 75). It is not a controlled variable: that is what was kept the same across conditions, not one of the conditions.

6. In Dixon and Lemke, the rating is dependent: it is what is measured before and after (p. 7). In Study 3 of Cameoka and Moreira, the ratings from Studies 1 and 2 served as the criterion for choosing the photographs (p. 98), and the Study 3 rating is dependent again. The role belongs to the study, not to the rating.

7. The place, the time of day, and the person who administered the measures varied together with before and after: the difference may come from them, and the result is confounded. Controls: keep the same (the same place, time, and administrator in both measurements, or instructions by standardized video, as in Pereira & Moreira, 2021a, p. 22) or distribute (half of the interns with the combination reversed, so that the effect of place and time is split between before and after).

8. Isolating the smile. The photographs in the two studies were of different people, and for that reason it was not possible to isolate the attributes that controlled the variation (Cameoka & Moreira, 2021, p. 107). The authors suggest the smile as a possibility (p. 104) and say that photographs of the same faces in both studies would lead to more secure conclusions (p. 107).

9. Most participants gave them the highest ratings at pretest and posttest. The authors say this may have come from participants comparing the categories presented and from the objects not being paired with any prejudice or stereotype (Dixon & Lemke, 2007, p. 10). What was meant to serve as a neutral comparison did not work as a control.

10. For example: independent, the training that relates the photographs to positive words, with two values, absent at pretest and present at posttest; dependent, the percentage of correct responses in the tests and the 1-to-10 rating before and after; controlled, the same scale, the same interval between measurements, and the photographs in random order, different for each intern; absent, comparable group, follow-up, and behavior in supervision (Section 25.1), and whatever in the photographs may alter the rating. There is more than one correct sheet; what does not vary is that each entry falls into only one row.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 32. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2	31.1, 31.2, and common mistake 1
3, 4	31.3, 31.4, and common mistake 3
5, 6	31.1, 31.3, and common mistake 4
7, 8, 9	31.4 and common mistake 2
10	31.5 and common mistake 5

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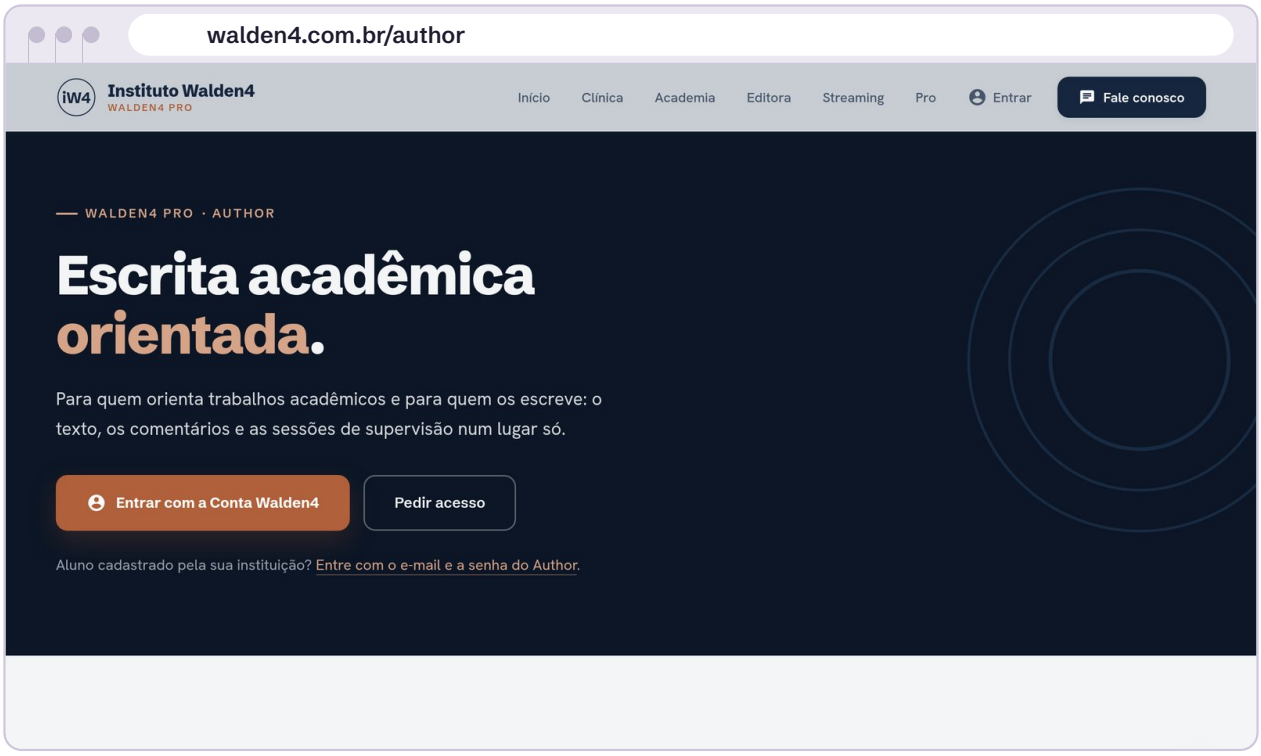
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CHAPTER

32 Stimulus Control

how the choice of stimuli can bias the measure

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Explain** why a face is a compound stimulus and why the rating may come under the control of only one of its properties.
2. **Describe** the three studies by Cameoka and Moreira (2021): stimuli, data collection, means, and tests.
3. **Interpret** the possible effect of the slight smile (Study 2) and of selection by a simple criterion (Study 3) as stimulus control and selection bias.
4. **Point out** what the studies do not allow us to claim: different stimuli in Studies 1 and 2, objects that did not serve as a control, and properties that were not isolated.
5. **Apply** stimulus selection criteria to the planning of an attitude measure.

PREREQUISITES

The functional stimulus, generalization, and the gradient (Chapter 13), the variation test (Section 18.2), the Likert-type scale (Section 23.2) and the limits of the instrument (Section 23.6), Dixon and Lemke's study (Chapter 27), and the variables sheet (Chapter 31). The new terms (compound stimulus, stimulus selection, and stimulus selection bias) are defined here.

OPENING

(Hypothetical case, continued from Chapter 31.) While filling in the sheet, Beatriz wrote "supervisors' photographs" in the controlled-variables row and stopped: she cannot say what, in a photograph, will control the rating a person gives. Four questions organize the chapter.

> 1. *"What, in a photograph of a face, does the rating depend on?"*
> 2. *"What did three studies that varied the photographs show?"*
> 3. *"What did the smile and the selection criterion do to the ratings?"*

> 4. *"How can photographs be chosen without producing the result one is looking for?"*

The first is the subject of Section 32.1; the second, of 32.2; the third, of 32.3; the fourth, of 32.4.

32.1 What, in a face, controls the rating

Chapter 13 separated what is present from what controls: the nominal stimulus is what the sheet lists, and the functional stimulus is the set of properties that control behavior. Applied to a photograph of a face, the question is which of the image's properties is the functional one, and the first difficulty is that the image has several. A **compound stimulus** is one that combines properties that can vary, or be presented, independently of one another (definition proposed here). Such is the case of the triangle on a red background in Reynolds's (1961) experiment, as cited in Moreira et al. (2021, p. 53). Two pigeons' pecks were reinforced in the presence of the triangle on the red background, and the test, with the components separated, showed that the responses were under the control of only one of the stimulus's properties (p. 53). For pigeon 105, response frequency was higher in the presence of the triangle and lower in the presence of the color red; for pigeon 107, the largest number of responses occurred in the presence of the color red (p. 53).

A face is compound in the same sense: skin tone, facial features, hair, expression, apparent age. Studies in social psychology show that these properties weigh differently depending on the judgment requested. Stepanova and Strube (2012a), as cited in Moreira et al. (2021, p. 47), found that both skin tone and facial features influenced racial evaluations recorded by implicit measures, independently and in the same direction. Judging someone as African American or Caucasian is, according to another study by the same authors, a function of an interaction of variables, such as skin color and facial features, and of the time available (Stepanova & Strube, 2012b, as cited in Moreira et al., 2021, p. 50). And Song et al. (2012), as cited in Moreira et al. (2021, p. 47), examined whether people judge smiling faces as lighter than frowning faces. The hypothesis was confirmed in four studies, with different tasks, stimuli, and words (p. 47): expression can change even the judgment of skin tone.

What varies with the property is the probability of the response, and the gradient of Section 13.3, the curve that shows how much the response drops, or not, as the stimulus moves away from the original, is

its map. Moreira et al. (2021, p. 50) give as an example Burch's (2015) research, in which judges' sentencing behavior varied as a function of variations in the skin color of the individuals who received the sentences. The authors call the field that studies these relations stimulus control (p. 46).

It remains to be seen who decides which properties will be present. **Stimulus selection** is the criterion by which the researcher chooses, among the possible stimuli, those that will be presented (definition proposed here). Moreira et al. (2021, p. 48) stress the importance of a closer look at this selection in experimental research and at its possible consequences for the results. When the criterion makes the measure differ from what one wanted to measure, there is **stimulus selection bias** (definition proposed here). This is what Cameoka and Moreira (2021, p. 105) describe when they say that the deliberate selection of the faces was able to produce a bias in the participants' evaluation.

KEY CONCEPT

A face is a **compound stimulus**: the rating may come under the control of one or several of its properties, and not necessarily those the researcher defined as relevant. That is why **stimulus selection** is not a methodological detail: it decides which properties will be present and in what combination, and it can produce **stimulus selection bias**.

EXAMPLE

(Hypothetical case.) For the study, Beatriz chooses the photographs of three well-known supervisors; in one of them the person is smiling, and in the other two, not. If that photograph gets the highest rating, she will not know whether the rating follows the supervisor, the smile, or both: the photograph is compound, and the sheet only lists what is present.

NON-EXAMPLE

"The photographs of group A received lower ratings, so group A is evaluated worse." The sentence treats the group as the only property of the image. Before concluding, one needs to know what else differed between the photographs of the two groups.

TEST YOURSELF

Why is the triangle on a red background a compound stimulus, and what does that have to do with a face?

ANSWER: because it combines two properties that can be presented independently of each other, shape and color, and the response may come under the control of only one of them (Moreira et al., 2021, p. 53). A face combines even more properties, and the rating may follow one of them rather than the one the researcher had in mind.

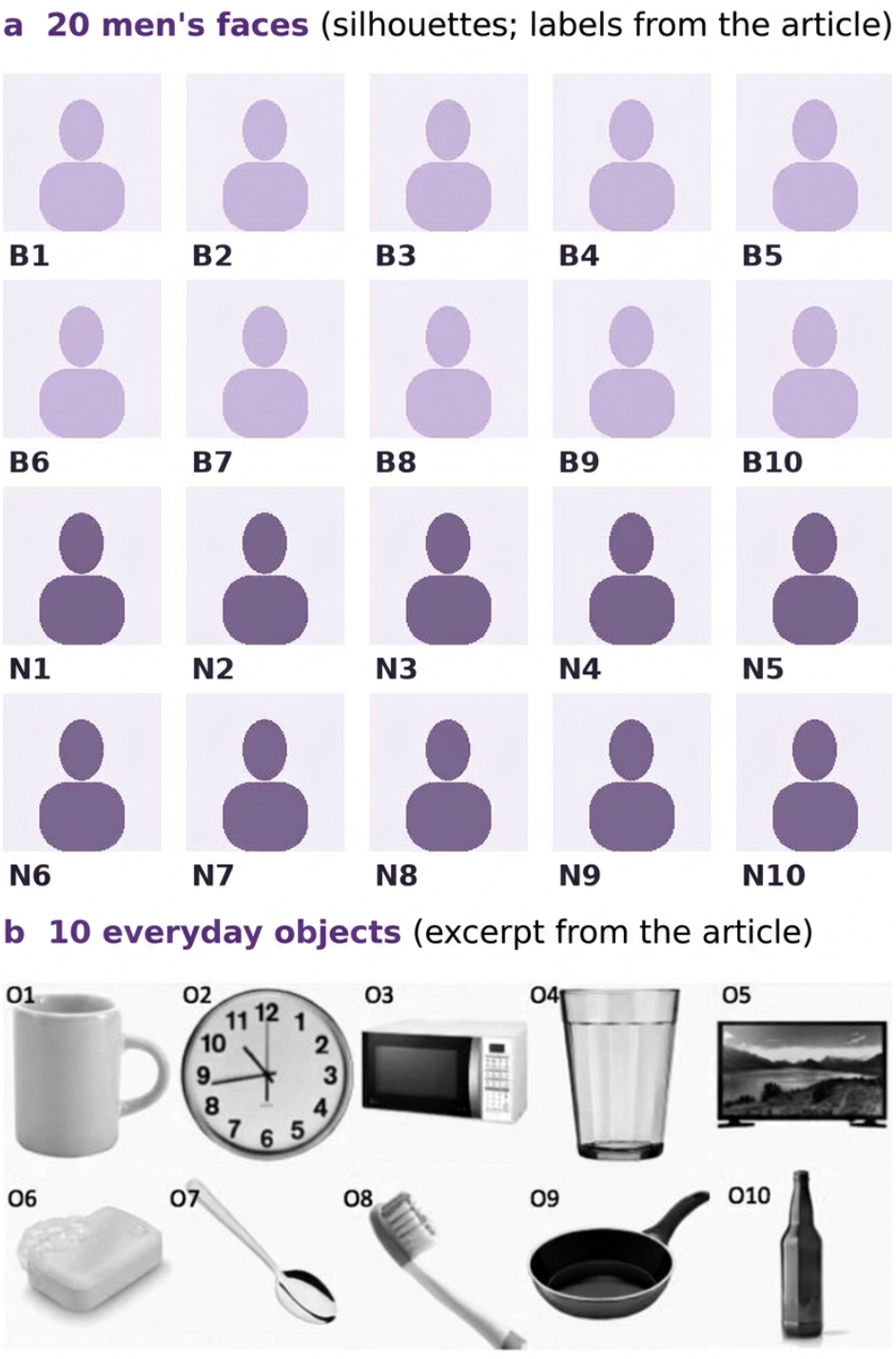
32.2 The three studies: stimuli, data collection, and results

Cameoka and Moreira (2021, p. 93) report three studies in which participants evaluated photos of White and Black men on a Likert-type scale like Dixon and Lemke's (2007). The instrument was similar to the one used in the pretest of that experiment (Cameoka & Moreira, 2021, p. 97). Each screen showed a photograph at the top and, just below it, a 10-point scale on which 1 corresponds to "Bad," 5 and 6 to "Neutral," and 10 to "Good" (p. 100). One of the authors of the study, and of the chapter by Moreira et al. (2021), is the author of this book.

The stimuli were 10 photographs of the faces of White men, 10 of Black men, and 10 of everyday objects (Cameoka & Moreira, 2021, p. 98). The face photographs came from the Humanae Project, which makes them available in standardized form in size, quality, framing, and background, all from the shoulders up, without clothing or accessories (p. 99). The questionnaire had 60 items, with each photograph presented twice, in random order (p. 100). The photographs of objects were meant to serve as a kind of stimulus control group: they were expected to be rated as neutral (p. 97).

Figure 32.1 shows the makeup of the Study 1 set: two rows of five faces of White men (B1 to B10), two of Black men (N1 to N10), and two of objects (O1 to O10).

Figure 32.1
The 30 stimuli of Study 1



Note. In b, a crop of Figure 1 of Cameoka and Moreira (2021). In a, the article's photographs of faces, from the Humanae Project, are not reproduced: each appears as a silhouette, with the label the article gives it; the labels were not shown to the participants. B and N are the Portuguese initials for "branco" (White) and "negro" (Black).

The studies differ in what was put on the screen. In Study 1, the faces had a neutral expression, according to the researchers' subjective assessment (p. 97). In Study 2, new faces showed a slight smile, without showing teeth (p. 102). In Study 3, the photographs were those of White men with the highest evaluations and those of Black men with the lowest evaluations obtained in Studies 1 and 2. The stated goal was to demonstrate the potential for distortion of a loose stimulus selection process (p. 98). Table 32.1 brings together the three studies, and Figure 32.2, the means from Table 4 of the article (p. 106).

Table 32.1

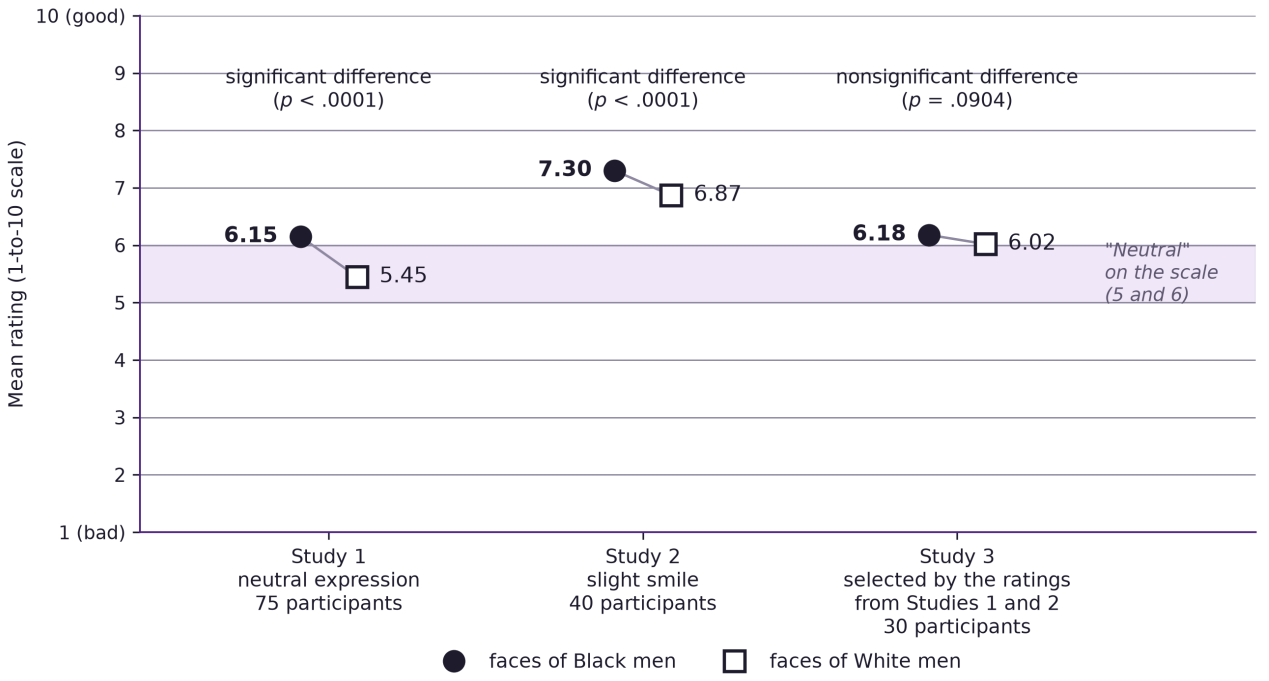
The three studies by Cameoka and Moreira (2021)

	Study 1	Study 2	Study 3
Participants	75 college students (p. 98)	40 people: 22 from the general public and 18 psychology students (p. 102)	30 college students (p. 104)
Data collection	online and on campus (p. 98)	online only (p. 102)	in person only (p. 104)
Photographs of men	10 White and 10 Black, with a neutral expression (p. 97)	10 White and 10 Black, with a slight smile (p. 102)	10 White men with the highest ratings and 10 Black men with the lowest from Studies 1 and 2 (p. 98)
Mean for faces of Black men (SD)	6.15 (1.96; p. 101)	7.30 (2.21; p. 103)	6.18 (1.88; p. 105)
Mean for faces of White men (SD)	5.45 (1.96; p. 101)	6.87 (2.16; p. 103)	6.02 (2.04; p. 105)
Difference between the means	significant, $p < .0001$	significant, $p < .0001$	not significant, $p = .0904$

Note. Table prepared for this book, based on Cameoka and Moreira (2021). Scale from 1 ("bad") to 10 ("good"); SD: standard deviation.

Figure 32.2

The mean ratings given to photographs of Black and White men in the three studies



Note. Graph prepared for this book, with data from Table 4 of Cameoka and Moreira (2021, p. 106).

32

Figure 32.2 shows at a glance what Section 32.3 details: the means of both groups rise from Study 1 to Study 2, and in Study 3 they are so close that the difference is no longer significant.

⚠ CAUTION

"Control" has two meanings in this chapter. In stimulus control, it is the relation between the response and the properties of the stimulus. In "stimulus control group," it is the set that the design uses for comparison. The objects in the study were chosen for the second role and did not fulfill it (Section 32.3).

TEST YOURSELF

What criterion defined the photographs in Study 3?

ANSWER: the photographs of White men with the highest evaluations and those of Black men with the lowest, obtained in Studies 1 and 2 (Cameoka & Moreira, 2021, p. 98).

32.3 What each study shows

In Study 1, 75 college students evaluated the 30 photographs (Cameoka & Moreira, 2021, p. 98). The mean for the faces of Black men was 6.15 (SD = 1.96) and that for the faces of White men, 5.45 (SD = 1.96), and the difference was statistically significant (p. 101). The variation within each group is greater than the difference between them. The means for each White man's face ranged from 3.7 (B7) to 7.0 (B8), a range of 3.3 points; those for each Black man's face, from 5.0 (N6) to 6.9 (N2), a range of 1.9 points (p. 101). For the authors, this provides empirical support for the proposition that, when attitudes are measured with human faces, responding may come under the control of different characteristics of these stimuli. The study, they caution, did not make it possible to identify the discriminative controls of each of these characteristics (p. 101).

The objects did not play the expected role: nine of the ten received positive evaluations (Cameoka & Moreira, 2021, p. 100). The one with the lowest mean, O10 (5.8), looked like a beer bottle, and the one with the highest, O5 (7.3), was a television (p. 101). The authors conclude that using them as a kind of control, in comparison with stimuli that carry social meaning, seems to have contributed neither to experimental control nor to data analysis (p. 101).

In Study 2, 40 people evaluated new faces with a slight smile (Cameoka & Moreira, 2021, p. 102). All 20 faces received positive evaluations (p. 103): the mean for the faces of Black men was 7.30 (SD = 2.21) and that for the faces of White men, 6.87 (SD = 2.16), with a statistically significant difference (p. 103). Compared with Study 1, there was a statistically significant increase in the mean, both for the faces of White men and for those of Black men (p. 103). The authors suggest that the presence of the slight smile may have induced more positive evaluations and that choosing faces that are homogeneous in facial expression seems to be an important control (p. 104).

Study 3 was carried out to see what the selection criterion does. Thirty college students evaluated the selected faces (Cameoka & Moreira, 2021, p. 104). The mean for the faces of Black men was 6.18 (SD = 1.88) and that for the faces of White men, 6.02 (SD = 2.04), and the difference, unlike what happened in Studies 1 and 2, was no longer statistically significant (p. 105). The difference between the means, 0.70 in Study 1 (6.15 minus 5.45), was 0.16 in Study 3 (6.18 minus 6.02; this book's calcula-

tion). According to the authors, the result suggests that the deliberate selection of the faces was able to produce a bias in the participants' evaluation. The makeup of the set strengthens the hypothesis that facial expression is salient: nine of the ten faces of White men were smiling, and seven of the ten faces of Black men were not (p. 105). Face B8, the only non-smiling White man's face in the set and the most highly evaluated in Study 1, received the lowest evaluation in Study 3 (p. 105).

In this book's terms, the Study 3 criterion chose each group's faces by their earlier ratings, without saying which property of the faces produced those ratings. If the ratings followed the smile in part, the set assembled by that criterion carried more smiles on one side than on the other, and the difference between the groups changed in size with the choice of photographs. The variation test of Section 18.2 varies one element at a time; here, sets of photographs varied, and that is why each reading is evidence, not proof.

NON-EXAMPLE

"In Study 3 the difference was no longer significant, so there is no prejudice." The sentence takes a difference between the means of photographs as a measure of the prejudice of a population, and the authors say that this was not the primary goal of the study (Cameoka & Moreira, 2021, p. 106). What Study 3 shows is that the choice of photographs changed the difference.

TEST YOURSELF

According to the authors, what does the result of Study 3 suggest, and what fact about the set of photographs strengthens it?

ANSWER: that the deliberate selection of the faces was able to produce a bias in the evaluation; and that nine of the ten faces of White men were smiling and seven of the ten faces of Black men were not (Cameoka & Moreira, 2021, p. 105).

32.4 What the studies allow us to claim, and how to choose the stimuli

The authors mark the limits of what the study allows us to claim. Although measuring racial prejudice in a population was not the primary goal, they point out that, in Studies 1 and 2, the faces of White men received significantly more negative evaluations than those of Black men (Cameoka & Moreira, 2021, p. 106). They also discuss the accuracy of re-

ports about prejudice (p. 106) and social desirability (p. 107), which Section 22.7 deals with. Nor is the smile demonstrated to be the cause of the difference between Studies 1 and 2. One limitation, they write, was using different stimuli in the two, for convenience, because the photograph bank has no more than one image of each person; for that reason, it was not possible to isolate the attributes that controlled the variation (p. 107). In addition, the sample and the mode of data collection changed from one study to the other (Table 32.1). In Study 1, there were 75 college students, online and on campus; in Study 2, 40 people, 22 of them from the general public, online only (this book's reading). On skin color, the authors note that the literature on colorism, that is, on unequal treatment according to skin tone, gives grounds to suspect a correlation with the evaluations. A more precise answer would require a formal analysis, which was not done, and a visual inspection of the rank order of the evaluations does not seem to confirm the suspicion (p. 107).

For the authors, race, at least when embodied in the form of faces, is actually a set of variables: facial features, presence or absence of hair, type and shape of hair, different skin tones, apparent age, apparent physical build, and facial expression (Cameoka & Moreira, 2021, p. 106). On the variables sheet of Chapter 31, which has one row for what is manipulated, one for what is measured, one for what is kept the same, and one for what was left out, this has an address: the controlled-variables row says what was kept the same across the photographs (expression, framing, background), and the left-out row, what was not isolated (skin color, facial features, hair). This is this book's reading.

Moreira et al. (2021, p. 54) make a proposal for the literature on class reversal and transfer of function with socially relevant stimuli. The inconsistent results of this literature, they propose, may be explained, at least in part, by the characteristics of the stimuli used, whose control over behavior may have occurred in a way other than the researchers predicted. It is a proposal, not a finding of the three studies, and it does not rule out pre-experimental history. Mizael, de Almeida et al. (2016), according to Cameoka and Moreira (2021, p. 96), attributed the difficulty of earlier studies to the conflict with the participants' pre-experimental history, and also raised the possibility of a problem of experimental design.

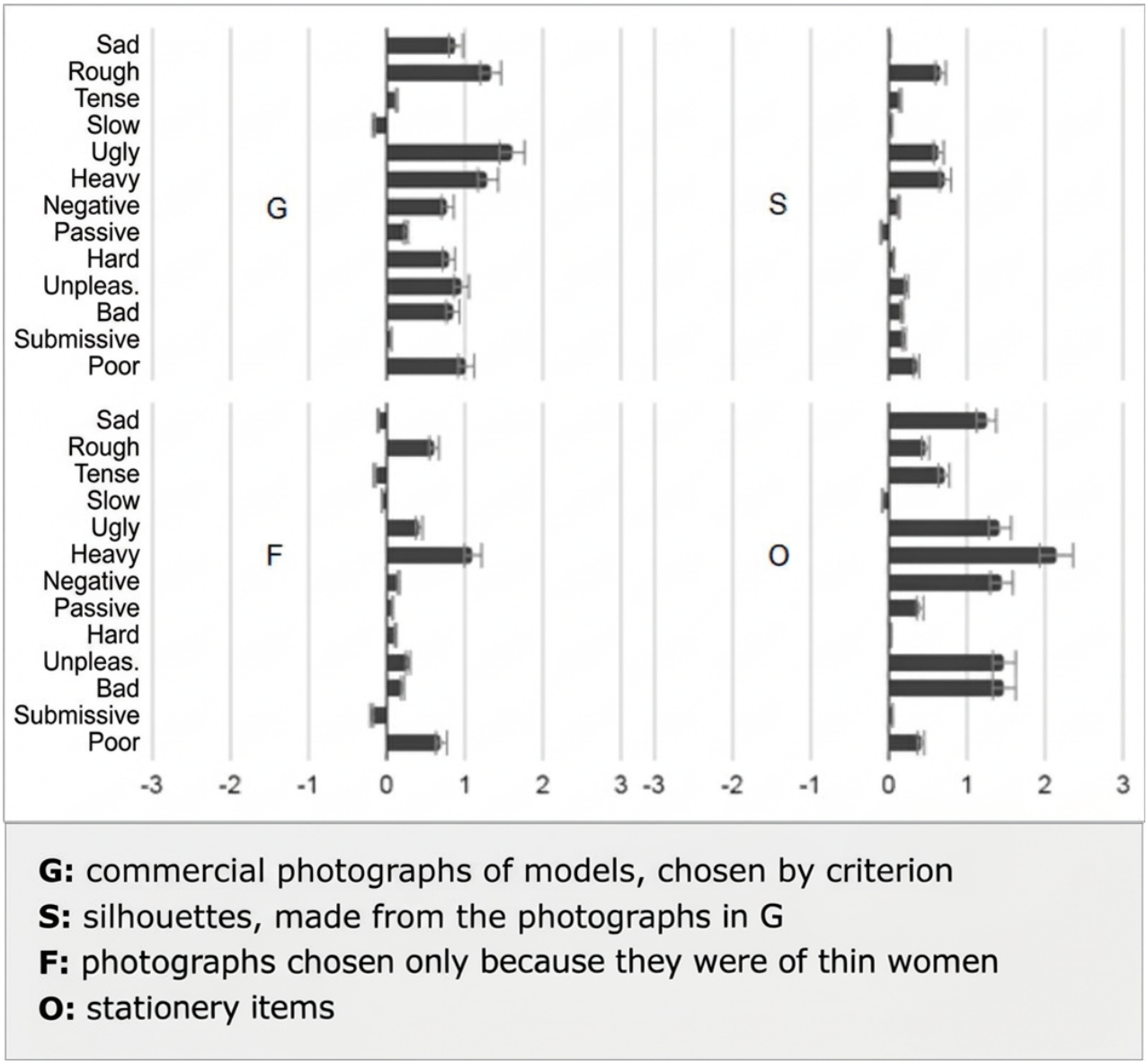
The Instituto Walden4 volume of experiments includes a study from the same family, with the body as the target and two experiments (Moreira, Rocha et al., 2022, pp. 40–66). In each, 33 people evaluated, on 13 adjective pairs, pictures of thin women (Experiment 1a) or of obese women

(Experiment 1b), presented in four ways (pp. 40–43, 51, 54, and 62). Set G had commercial photographs of models, which eight judges chose for their resemblance to silhouettes 2 or 3 of the Stunkard Silhouette Scale, in Experiment 1a, and to silhouettes 7 or 8, in 1b. It is the most widely used scale for assessing the perception of body image (p. 43). Set S had silhouettes made by painting black the bodies in the G photographs. Set F had photographs chosen only because they were of thin or obese women, at the researcher's discretion. Set O had stationery items.

With the thin women, the evaluations of G were the most positive, those of S stayed close to zero, and the three pictures in F differed from one another (pp. 46, 47, and 51). With the obese women, G was evaluated positively, S more neutrally, and F negatively (p. 62). For the authors, the neutrality of the silhouettes suggests that, in the photographs, the responses were not under the control of body shape but of other parts of the stimulus. In Experiment 1a, these would be the color of the hair and of the bikini, the smile, and the position of the hands (pp. 52 and 53); in 1b, skin color, hair color, and facial expression (p. 63). In the experiment with obese women, the G photograph that tended to receive the most positive evaluations was that of the only blonde, White model in the set (p. 63). The authors call for attention to skin and hair color when they are not the variable of interest (p. 65). They conclude that standardization in the selection of stimuli is essential for responses to come under the control of the programmed variable (p. 65) and suggest two studies, one to select the stimuli and another for the task (p. 66). Figure 32.3 presents the means from Experiment 1a. The contrast between G and S removes several properties at once, and so it shows that something besides body shape carried weight, without saying what (this book's reading; Section 18.2).

Figure 32.3

Four ways of presenting pictures of thin women and the evaluations of each



Note. Figure 3 of Experiment 1a, from Moreira, Rocha et al. (2022, p. 47): each bar is the mean for one adjective pair, from −3 to +3, with positive values on the side of the pair's positive adjective (p. 46). The legend below the graphs was added for this book. The photographs in sets G and F are not reproduced. The reproduction has the resolution of the source material.

The choice of neutral faces also appears in the book on presidents of the Republic. For the second experiment, Pereira and Moreira (2021a, p. 67) chose, from among the faces in Cameoka and Moreira's (2021) first study, the three whose evaluations came closest to "neutral." The means were 5.5, 5.5, and 5.4, on a 10-point scale on which 5 and 6 are the mid-points. In training, these faces were related to the photographs of the presidents and to abstract figures. Transfer of function was smaller for

the faces than for the abstract figures (p. 106). The authors explain that, even though they were chosen to be neutral, the faces have characteristics, such as being of a White man, with a beard and hair, that give them more pre-experimental load than the abstract stimuli have (p. 107). The neutral rating therefore describes the evaluation the face received in one study, not the absence of history with it (this book's reading; Sections 28.4 and 33.2).

Selection, therefore, is not a neutral step, and the same question applies to instruments that are not scales: in the IAT, choosing the names and the words is choosing the stimuli (Section 24.6). Table 32.2 brings together the criteria that the sources consulted support and those proposed here.

Table 32.2
Criteria for selecting the stimuli of an attitude measure

Criterion	What is done	Where it comes from
Formal criterion	choose the photographs by an explicit criterion, such as the judgment of independent judges, and not by the researchers' perception	de Carvalho and de Rose (2014, p. 534); Cameoka and Moreira (2021, p. 105)
Standardization	keep size, quality, framing, background, clothing, and accessories the same	Cameoka and Moreira (2021, p. 99)
Homogeneous expression	keep facial expression homogeneous within and across the sets being compared	Cameoka and Moreira (2021, p. 104)
The same faces	use photographs of the same faces in the conditions being compared	Cameoka and Moreira (2021, p. 107)
Respondents and data collection	control the respondents' socioeconomic, racial, and gender variables and those of data collection (in person or remote, setting)	Cameoka and Moreira (2021, p. 107)
Tested control	check beforehand whether the comparison stimuli, such as the objects, are in fact neutral	this book, based on Cameoka and Moreira (2021, p. 101); in the volume of experiments, the box of wooden pencils received evaluations close to "hard" and "rough" (Moreira, Rocha et al., 2022, p. 53)
Prior evaluation	choose, from among stimuli already evaluated in another study, those whose mean is closest to what is wanted, and remember that a neutral rating does not prove that the stimulus has no history	this book, based on Pereira and Moreira (2021a, pp. 67 and 107)

Criterion	What is done	Where it comes from
Separate study	test the stimuli in a study of their own, before the task in which they will be used	Moreira, Rocha et al. (2022, p. 66)
Record	reproduce the stimuli and describe the selection criterion, so that another researcher can redo it	this book

Note. Table prepared for this book. De Carvalho and de Rose (2014) write that future research might gain from a more formal procedure for choosing the face stimuli, for instance, one based on the judgments of independent raters (p. 534).

EXAMPLE

(Hypothetical case.) Beatriz has 40 photographs of supervisors and needs 12. Instead of choosing the "most neutral" ones, she asks three colleagues, without telling them the goal, to classify the expression in each one: neutral, smiling, or serious. She keeps the ones all three classify as neutral, standardizes framing and background, and uses the same photographs before and after. On the sheet, "controlled" lists the expression, the framing, the background, and the same photographs in both measurements; "absent," apparent age and the other properties she did not isolate.

NON-EXAMPLE

Choosing the ten "best-rated" photographs for one group and the ten "worst-rated" for the other, and comparing the means. This is the Study 3 criterion: the result reflects the choice.

TEST YOURSELF

In which row of the Chapter 31 sheet does the facial expression kept the same in the photographs go, and in which row does skin color, which was not isolated, go?

ANSWER: expression, in the controlled-variables row; skin color, in the left-out row (this book's reading; Cameoka & Moreira, 2021, p. 106).

TEST YOURSELF

The three faces in the second experiment of the book on presidents had means near 5.5, the neutral point. Does that mean they carried no history with the participants?

ANSWER: no; the rating describes the evaluation they received in another study, and the authors explain the smaller transfer to these faces by the pre-experimental load they carry (Pereira & Moreira, 2021a, pp. 67, 106, and 107).

Chapter 33 takes up these criteria again in planning a study.

Common learner mistakes

1 **Treating the group as the only property of the photograph.** The mistake happens because the group is the property the researcher chose to compare, and the others, such as expression and background, do not appear in the study's question. *How to spot the mistake:* the conclusion talks about the group and does not say what else differed between the photographs (p. 106).

2 **Choosing the stimuli by the expected rating.** The mistake happens because choosing the "most typical" photographs of each group seems a way of making the contrast clearer, and the choice passes for methodological care. *How to spot the mistake:* the criterion is "the best-rated" for one group and "the worst-rated" for the other, and the result confirms what was expected (p. 98).

3 **Taking an everyday object as neutral.** The mistake happens because an object unrelated to the topic seems to have no evaluation at all; but a television or a beer bottle also has a history for the person responding. *How to spot the mistake:* the objects are used as a comparison without prior testing; in the study, nine received a positive evaluation (p. 100).

4 **Saying that the smile caused the difference between Studies 1 and 2.** The mistake happens because the smile is the difference one sees in the photographs and the one the authors highlight, and the other, less visible differences are left out of the explanation. *How to spot the mistake:* the sentence forgets that the photographs were of different people in the two studies (p. 107) and that the sample and data collection also changed (Table 32.1).

5 **Taking the difference between means as a measure of a population's prejudice.** The mistake happens because the scale asks whether the person in the photograph is good or bad, and the difference between the ratings of the two groups seems to answer the question about prejudice directly. *How to spot the mistake:* the conclusion generalizes from three data collections with students, and that was not the primary goal of the study (p. 106).

SUMMARY

Compound stimulus (objective 1). A face combines several properties, and the rating may come under the control of only one.

The three studies (objective 2). A 1-to-10 scale with faces of White and Black men and objects; 75, 40, and 30 participants; faces that were neutral, slightly smiling, and selected by the ratings from the earlier studies.

Smile and selection (objective 3). The means of both groups rose from Study 1 to Study 2, and the authors suggest the slight smile as the explanation, without being able to isolate it. Selection by the ratings made the difference stop being significant, which the authors present as bias produced by the selection of stimuli.

Limits (objective 4). Different stimuli in Studies 1 and 2, objects that were not neutral, and properties that were not isolated.

Choosing (objective 5). Formal criterion, standardization, homogeneous expression, the same faces, control of respondents and data collection, tested control, prior evaluation (whose neutral rating does not prove the absence of history), and record.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. Which properties of a face do the authors list as the set of variables in which race is embodied in faces?

2. How many participants did Studies 1, 2, and 3 have, and what expression did the faces have in each?

3. What was the criterion for choosing the photographs in Study 3?

4. Calculate the difference between the means for the faces of Black and White men in Studies 1 and 3. What changed?

5. Why do the authors say that using the objects as a control seems not to have helped?

6. (Hypothetical case.) Beatriz compares the photographs of the supervisors in group A, taken in a studio, with those of group B, taken at an event, and group A receives higher ratings. What can she conclude?

7. What can be concluded from the difference between Studies 1 and 2 about the effect of the smile, and what cannot? Why?

8. (Hypothetical case.) A report concludes, from Study 3, that "racial prejudice disappeared in this sample." Point out two problems.

9. (Hypothetical case.) Beatriz wants to measure, before and after a training course, how supervisees evaluate the clinic's 12 supervisors, using photographs, and she has 40, taken on different occasions. Describe three selection or standardization decisions she should make and say which bias each one prevents.

10. (Hypothetical case.) Classify each decision as producing stimulus selection bias or not: (a) the ten photographs of group X come from those that had the highest ratings in a pilot, and the ten of group Y, from those that had the lowest; (b) three independent judges, unaware of the goal, classify the expression in each photograph, and those classified as neutral are kept; (c) the photographs of group X come from a standardized bank, and those of group Y, from the participants' social media; (d) the same 12 photographs are used before and after the intervention.

ANNOTATED ANSWER KEY

1. Facial features, presence or absence of hair, type and shape of hair, different skin tones, apparent age, apparent physical build, and facial expression (Cameoka & Moreira, 2021, p. 106).

2. According to Cameoka and Moreira (2021): 75 college students and a neutral expression in Study 1 (pp. 97 and 98); 40 people and a slight smile in Study 2 (p. 102); 30 students and faces selected by the ratings from Studies 1 and 2 in Study 3 (pp. 98 and 104).

3. The photographs of White men with the highest evaluations and those of Black men with the lowest, obtained in Studies 1 and 2 (Cameoka & Moreira, 2021, p. 98).

4. In Study 1, 6.15 minus 5.45, or 0.70; in Study 3, 6.18 minus 6.02, or 0.16 (means in Cameoka & Moreira, 2021, pp. 101 and 105). The difference decreased and was no longer significant (p. 105).

5. Because the evaluations of the objects did not tend toward neutrality (nine were positive), so they did not serve as a comparison for stimuli with social meaning (Cameoka & Moreira, 2021, pp. 100 and 101).

6. That the difference may come from the properties of the images (studio and event differ in framing, background, and lighting), and not from the group; without equating these properties, the conclusion remains open (Section 32.1; on standardization, Cameoka & Moreira, 2021, p. 99).

7. One can conclude that the means rose, in both groups, to a statistically significant degree (Cameoka & Moreira, 2021, p. 103); one cannot conclude that the smile was the cause, because the faces were different in the two studies and the attributes were not isolated (p. 107). In addition, the participants and the mode of data collection also changed (Table 32.1).

8. First, the nonsignificant difference does not measure prejudice: measuring a population's prejudice was not the primary goal (Cameoka & Moreira, 2021, p. 106). Second, the difference stopped being significant after a deliberate selection of the photographs, which the study presents as bias produced by selection (p. 105), and not as an absence of prejudice.

9. Model answer (any set that pairs a decision with the bias it prevents is acceptable): (1) choose by a formal criterion, such as three colleagues who, unaware of the goal, classify the expression in each photo, and not by her own perception or by the expected rating: this prevents the selection bias of Study 3 (Cameoka & Moreira, 2021, p. 105; de Carvalho & de Rose, 2014, p. 534); (2) keep size, framing, background, and expression the same: this prevents the rating from following the smile or the background rather than the supervisor (Cameoka & Moreira, 2021, pp. 99 and 104); (3) use the same photographs before and after: this prevents the change from coming from different stimuli, the limitation of Studies 1 and 2 (p. 107). Table 32.2 lists the other criteria.

10. (a) Produces bias: it is the Study 3 criterion, in which the result reflects the choice (Cameoka & Moreira, 2021, pp. 98 and 105). (b) Does not produce bias: it is a formal criterion, by independent judges (de Carvalho & de Rose, 2014, p. 534), with homogeneous expression (Cameoka & Moreira, 2021, p. 104). (c) Produces bias: framing, background, and quality differ between the groups, and the rating may follow them (p. 99). (d) Does not produce bias: the same faces in the conditions being compared (p. 107).

Did you get 8 of the 10 exercises right? Move on to Chapter 33. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 6	32.1 and common mistake 1
2, 3	32.2 and common mistake 2
4, 5	32.3 and common mistake 3
7, 8	32.4 and common mistakes 4 and 5
9, 10	32.4 (Table 32.2) and common mistake 2

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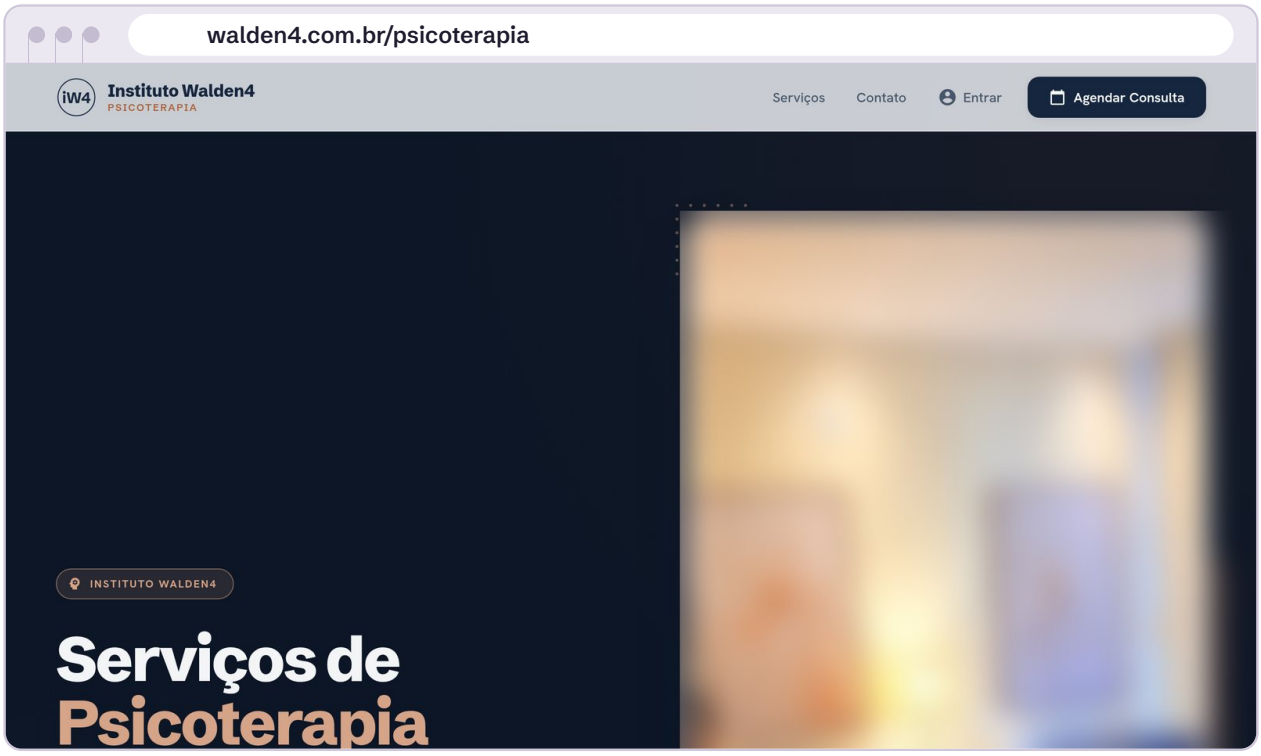
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CHAPTER 33

Designing an Attitude Study Based on the Equivalence Paradigm and a Semantic Differential Scale

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Write down**, before data collection, the question, the class criterion, chance level, and what would count as transfer.
2. **Choose** the stimuli and the instrument, and **state** the number of points, the neutral point, the anchors, and the direction of the scale.
3. **Set up** the training and the tests of the AB and BC relations, and **say** what each phase records.
4. **Plan** recording before and after, with a comparable group and follow-up, and **read** "was no longer significant" without taking it to mean "stayed the same."
5. **Fill out** the design sheet, including ethics, setting and mode of administration, and limitations.

PREREQUISITES

Research habits and the ethical limit (Sections 20.5 and 20.6), scales (Chapter 23), the history hypothesis and the limits of the task (Sections 24.5 and 24.6), the minimum record (Section 25.1), the studies in Chapters 27 and 28, the variables sheet (Chapter 31), and the stimulus selection criteria (Chapter 32). The new term (design sheet) is defined here.

OPENING

(Hypothetical case, continued from Chapter 32.) Beatriz has the photographs, the scale, and the variables sheet. The management of the training clinic asks for a single sheet with everything that has been decided,

in the order in which data collection will take place, for the ethics committee and for whoever will run the sessions. Four questions organize the chapter.

1. *"What needs to be written down before the first person responds?"*
2. *"Which stimuli and which scale should be used, and what should be said about them?"*
3. *"How should the training and the tests be set up, and what does each phase record?"*
4. *"How should change be recorded, and what should be stated about ethics and limitations?"*

The first is the subject of Section 33.1; the second, of 33.2; the third, of 33.3; the fourth, of Sections 33.4 and 33.5.

33.1 The question and what would count as an answer

As we saw in Section 25.1, forming and changing an attitude are differences between moments in time; for this reason, the question of a design is written as a difference. Beatriz's question reads as follows: is the rating that interns give to photographs of supervisors different after a training procedure that relates the photographs, by way of an abstract figure, to positive words? Written this way, the question already says what will be measured twice. The decisions that follow go into a **design sheet**, the sheet filled out before data collection on which the study states, in the order in which collection takes place, what it will manipulate, measure, hold constant, compare, and protect (definition proposed here). Table 33.1, in Section 33.5, shows the complete sheet.

Before the first data collection, three decisions say what would count as an answer, the same ones Section 20.6 asked for when reading any equivalence study. The first is the class criterion, the percentage of correct responses on the tests from which one will say that the class has formed (Figure 20.4). It is best kept separate from the training pass criterion, which decides whether the participant moves on to the next phase. In Dixon and Lemke (2007, p. 8), training required at least 16 correct responses in a block of 18 trials. In the final test, no accuracy criterion was in force, and every response took place under extinction. The 90% figure appears in the interpretation of the results: 7 of 8 participants showed symmetry and 7 of 8 showed equivalence, at 90% or above (p. 10). In Pereira and Moreira (2021b), both criteria were in the

method: 100% correct in one block to pass AB training (p. 142) and 88.88% in each block to claim that the tested relations had emerged (p. 143).

The second is chance, the performance expected when the choice does not depend on the relation. It depends on the trial format: with three comparisons, one choice in three would be correct by chance; with two, one in two (this book's calculation; this is the 33% in Figure 20.4). In Pereira and Moreira (2021b, p. 143), each block of the first emergence test had 18 trials, and each trial had three comparisons (for example, B1/A1-A2-A3). The 88.88% criterion is equivalent to 16 correct out of 18 (this book's calculation). By chance, the expected number would be 6 out of 18, and the probability of reaching 16 or more is about 1.7 in 1 million. That probability comes from the binomial distribution, which gives the probability of each number of correct responses when every trial has the same chance of being correct (this book's calculation). Writing chance next to the criterion shows whether the criterion is far from it: 9 out of 18, or 50%, would be reached by chance in about 11% of blocks (this book's calculation).

The third is what would count as transfer. Pereira and Moreira (2021b, p. 141) measured transfer of function as the difference between the ratings of the abstract figures in the two administrations of the scale. The rule can go further and state which stimuli, in which direction, and by how much. The scale used by Cameoka and Moreira (2021, p. 100) provides a model: ratings from 1 to less than 5 have negative valence; from 5 to 6, neutral; above 6 up to 10, positive. Beatriz could write that the rating of the photographs moves from the neutral range to the positive range in those who formed the class and does not change range in the comparable group (this book's hypothetical rule).

KEY CONCEPT

The **design sheet** brings together, before data collection, what the study will manipulate, measure, hold constant, compare, and protect. Three decisions open it: the class criterion (accuracy on the tests), chance (which depends on the number of comparisons), and what would count as transfer (which stimuli, in which direction, by how much). After the data have been seen, any value seems reasonable.

There is also the question about history. In Section 24.5, a hypothesis specific to this book was raised: performance on a task reflects the history of relations between the object and evaluative stimuli, including those of the culture. If that were Beatriz's question, the design would

have to manipulate history, as training does, and record, in the same people, both the task and self-report before and after (Section 22.4). In the study by Mizael, de Almeida et al. (2016), read in Chapter 20, the IRAP was administered only after training (Section 24.5), and the authors themselves write that it matters to use it, or some comparable instrument, at pretest as well as at posttest (p. 460). Finally, if the question calls for a relational frame other than coordination, the empirical base is uneven (Section 21.4), and, before planning, it is advisable to look for what has been published since 2001, the year of the volume that served as the reference in Chapter 21. This chapter deals with equivalence classes, the coordination family.

EXAMPLE

(Hypothetical case.) Beatriz writes on the sheet: "Training pass criterion: 100% in one block of 18 trials, within 30 minutes. Class: 16 correct out of 18 in each test block, with three comparisons, and chance at one third. Transfer: the rating of the supervisors' photographs goes from 5 or 6 to more than 6 in those who formed the class; in the comparable group, it does not change range."

NON-EXAMPLE

"We considered that the class had formed in the participants who got a lot of the test trials right." Without a number, the sentence does not say who formed the class, and the criterion may have been chosen after seeing who answered correctly.

TEST YOURSELF

In Dixon and Lemke (2007), where does the 90% appear, and what criterion did the final test have during the session?

ANSWER: the 90% is in the interpretation of the results, for symmetry and equivalence (p. 10); during the final test, no accuracy criterion was in force and responses took place under extinction (p. 8).

33.2 Who is included, which stimuli, and which scale

The studies that tried to change an evaluation made sure there was something to change. De Carvalho and de Rose (2014, p. 529) used a screening pretest: of 16 children, 4 showed a negative bias toward Black men and were selected, and the rest, with a neutral or positive attitude,

were not included. In Dixon and Lemke (2007), 4 participants gave a rating of 5 to all the male stimuli at pretest (p. 8), and their data were removed from the subsequent analyses (p. 9). The authors write that pretesting may be important when the stimuli probably carry pre-experimental relations (p. 10). Screening has two effects that the report should state. The first concerns to whom the result applies: to those who had the bias, not to just anyone. The second is that people selected for an extreme score tend to obtain a less extreme score on a new measurement, even without training. This is what statistics calls regression to the mean, and it is why the comparable group should come from the same screening (this book's reading).

Stimuli are organized into sets. De Carvalho and de Rose (2014, p. 529) divided theirs into three: set A, with one positive stimulus (A1) and one negative stimulus (A2); set B, with abstract symbols (B1 and B2); and set C, with Black men's faces (C1), an abstract symbol (C2), and White men's faces (C3). In Pereira and Moreira (2021b), the photographs of the presidents form set A and the abstract figures form sets B and C (pp. 142 and 143). The party acronyms (D) and the words "right," "center," and "left" (E) appear only in the tests. The authors caution that "emergence" does not apply to the relations between the photographs and the acronyms or the words, because those relations probably already existed before the experiment (p. 143). Describing the prior history of the stimuli means just this: stating, on the sheet, what relations the stimulus already carried. What goes into each set follows the criteria in Table 32.2: a formal criterion, standardization, homogeneous expression, the same photographs across the conditions compared, control of respondents and data collection, tested control, and recording.

When a set needs stimuli with no history, the selection can start from an earlier study, as in Experiment 2 of Pereira and Moreira (2021a, p. 67), in which the faces were included because their mean was closest to neutral in Cameoka and Moreira (2021). A neutral rating on the scale says that the mean evaluation fell in the middle, not that the stimulus is free of history: transfer was smaller for those faces than for the abstract figures (Sections 28.4 and 32.4). That is why the sheet states the selection criterion and what it does not guarantee.

The pretest also serves to discover what controls the choice. According to de Carvalho and de Rose (2014, p. 529), some of the children who were excluded reported choosing on the basis of irrelevant features. One child said they had chosen both the thumbs-up and the thumbs-down after White faces because the thumbs had a pink background, and pink matched White faces better. Drawing on these reports, the au-

thors simplified the material, and the symbols became black-and-white drawings. They also cut the photographs of men down to two from each group, to avoid the inattentive and random responding they had observed in the children who complained about how long the session took (p. 529). This is the compound stimulus from Chapter 32, now in the training material: the choice may follow the pink background rather than the figure.

As for the scale, four decisions by whoever builds it need to be written down: the number of points, the neutral point, the anchors, and the direction (Section 23.2). Dalmoro and Vieira (2014, p. 171) note that, in studies in the field of business administration, it is common for the method section to say only that a Likert-type scale with "x" points was used, and rare for a justification of the number to appear; there is, they write, no single theoretical argument capable of defending the use of "x" points. Within a single instrument, they recommend avoiding different formats and reversing the direction (p. 172). The studies in the previous chapters show how each decision appears when it is stated. Cameoka and Moreira (2021, p. 100) used 10 points, with 1 corresponding to "Bad," 5 and 6 to "Neutral," and 10 to "Good." In Pereira and Moreira (2021b, p. 141), there are 14 bipolar adjective pairs, with seven blanks between the adjectives of each pair; in half of the pairs, the positive adjective was on the left, and in the other half, on the right. Bortoloti and de Rose (2009, p. 568) used seven intervals between opposite adjectives, without the values −3 to +3 printed on the sheets and with the position of the adjectives randomized (p. 570). There were 13 scales per stimulus, and some of them (poor–rich, slow–fast, dominant–submissive, among others) were there mainly to mask what the task was about (p. 570).

The Instituto Walden4 series shows two of these decisions in different formats. In the 19 comics studies that the Part III volume brings together, the scale is always the 13-pair semantic differential, but the direction changed. Only the first two mixed positive and negative adjectives; in the rest, they were placed in separate columns (Moreira, Lemos et al., 2024, p. 17). In the study with presidents, in which the side of the adjectives alternated across pairs, the authors list among the limitations the risk of confusing respondents (Pereira & Moreira, 2021a, pp. 107–108; Section 23.3). On screen, the seven intervals gave way to a 0–100 slider, with neutral in the middle, in that study (Pereira & Moreira, 2021a, p. 25) and in Experiment 2 of the volume of experiments (Moreira, Rocha et al., 2022, pp. 100–101; Section 23.3).

The order of presentation is also stated. In Pereira and Moreira (2021b), each stimulus was rated once, on a separate sheet (p. 141), in the order A1, C3, D2, B1, and so on (p. 142). In Cameoka and Moreira (2021, p. 100), the photographs came in random order, twice each. For the semantic differential, what to state was covered in Chapter 29 (Section 29.6): where the list of pairs came from, such as the 13-pair list (de Almeida et al., 2014); the format, with seven intervals and values from −3 to +3; how the score is computed, by factor or as the mean of the selected scales; and the evidence available for that instrument and those stimuli. When the instrument is the SAM (Section 23.4), reading the mark as an evaluation is a hypothesis, which is tested by recording, for the same faces and the same people, both the mark and a rating from "bad" to "good," and seeing whether they vary together (Section 22.4).

EXAMPLE

(Hypothetical case.) Beatriz decides: a 10-point scale, from "bad" to "good," with 5 to 6 as the neutral range, as in Cameoka and Moreira; verbal anchors at the ends; "good" always on the right, with no reversal; photographs in random order, twice each. She writes the reason for each choice alongside it, as well as the screening: those who give the supervisors' photographs a mean below 6 are included.

NON-EXAMPLE

"We selected the interns with the lowest ratings, applied the training, and afterward the mean went up; therefore the training works." People selected for an extreme score tend to obtain a less extreme score even without training, and without a comparable group from the same screening the increase cannot be attributed to the training.

TEST YOURSELF

A report says only "we used a Likert scale." What decisions are missing, and why does it matter?

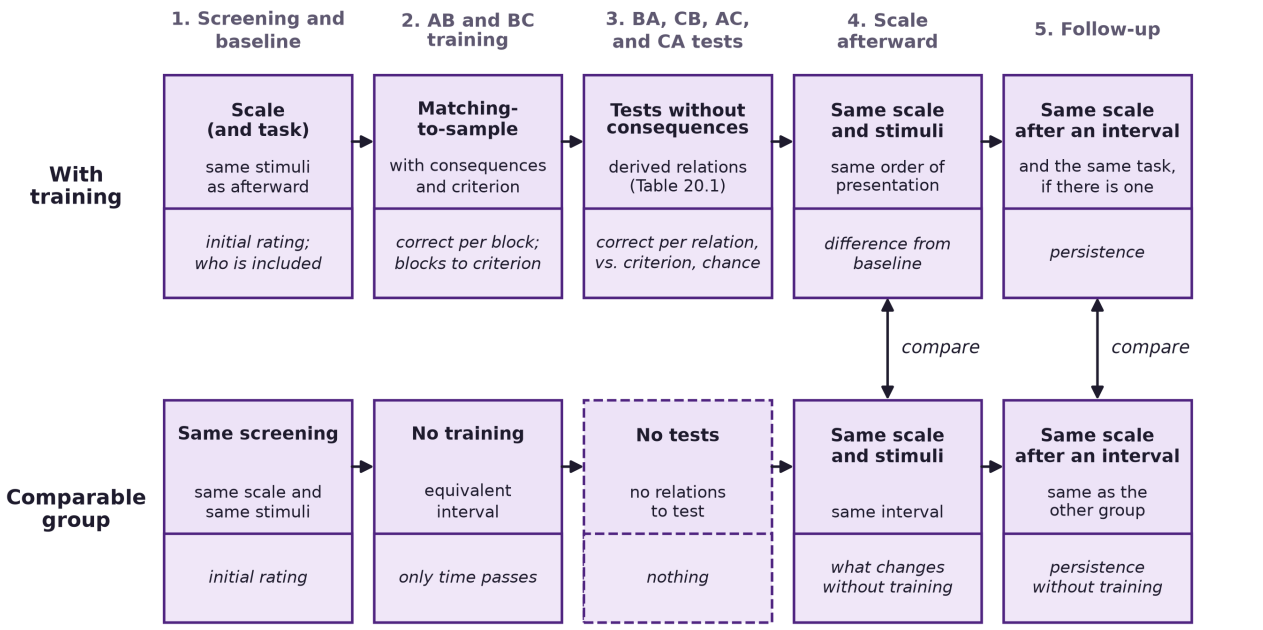
ANSWER: the number of points, the neutral point, the anchors, and the direction; without them the instrument cannot be reproduced, and Dalmoro and Vieira (2014, p. 171) note that the choice of the number is rarely justified.

33.3 Training, tests, and what each phase records

Figure 33.1 puts in sequence what the previous sections decided and what comes next. The design is the one in Section 20.2: the relations between A and B and between B and C are taught with differential consequences, and the derived relations in Table 20.1 are tested without them: symmetry (BA and CB), transitivity (AC), and equivalence (CA), the choice of A1 in the presence of C1, which were never taught together. Table 28.2, from the study by Pereira and Moreira (2021b) read in Chapter 28, shows the phases of an actual study.

Figure 33.1

The flow of a design with equivalence training and a scale: the training group and the comparable group



Note. Diagram prepared for this book; no data.

Training records the correct responses per block and how many blocks were needed to reach criterion. Variation across people can be large: in Dixon and Lemke (2007, p. 9), A-B training took from 1 to 158 blocks, A-C from 1 to 6, and mixed training from 1 to 10. That is why the pass criterion is written with a time or block limit and with what happens to those who do not reach it. In Pereira and Moreira (2021b, p. 142), the limit was 30 minutes, and anyone who did not reach criterion repeated

the training on another day. In the book-length study by the same authors, the limit was also 30 minutes, and anyone who did not meet it was disqualified from the study (Pereira & Moreira, 2021a, p. 28). In Mizael, de Almeida et al. (2016, p. 455), the criterion for advancing was at most one error per block, in two consecutive blocks.

The training format is also decided and stated. De Carvalho and de Rose (2014, pp. 528–529) used delayed matching-to-sample because, according to them, earlier research had shown that the delay increases the probability of class formation and the degree of relatedness among the stimuli. Mizael, de Almeida et al. (2016) compared a group trained with delay to another trained with simultaneous matching (p. 452), with 6 and 7 children (p. 455). Accuracy on the symmetry and equivalence tests was similar in the two groups (p. 456). The authors expected the delay to be more effective, and the prediction was not confirmed, possibly because of a ceiling effect, since all the children reached criterion on the standard tests (p. 460). A ceiling effect occurs when almost everyone reaches the maximum of the measure, which is then left with no room to show differences. The lesson for design is this book's: a test that everyone passes does not distinguish conditions.

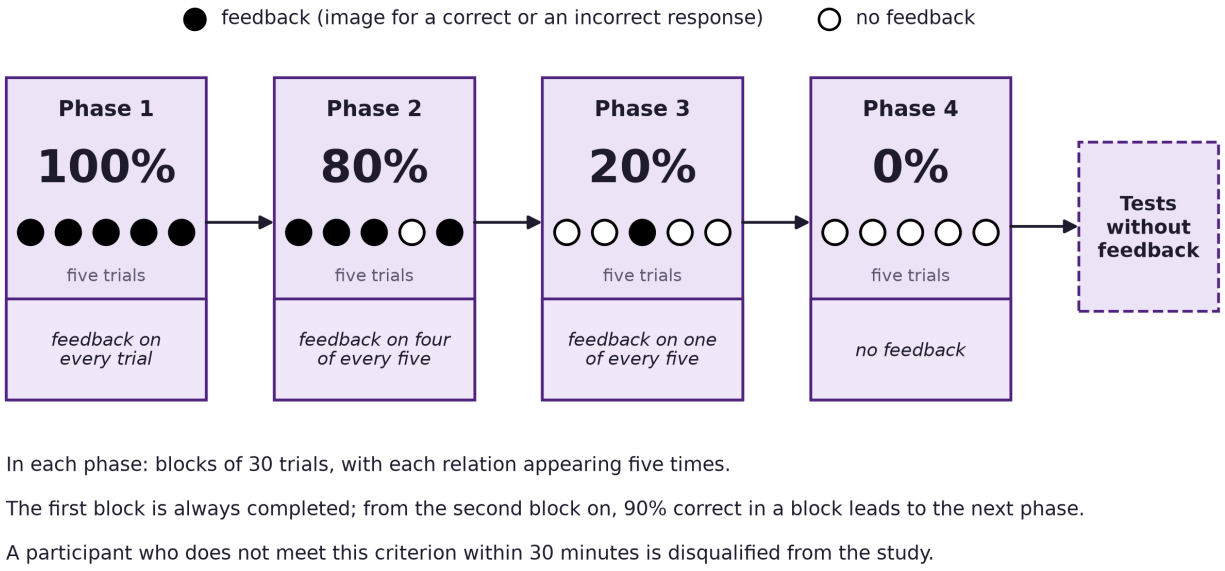
For teaching, Mizael, de Almeida et al. (2016, p. 452) used a simple-to-complex protocol: symmetry tests after training each baseline relation, then mixed AB and BC trials with feedback on 100% of trials, followed by a baseline review with 50% feedback. Each step of this protocol is a decision that the report states: the order of the symmetry tests, the mixing of relations, the proportion of feedback.

Another format decision is what happens to the consequences over the course of training. Eilertsen and Arntzen (2020), as cited in Pereira and Moreira (2021a, p. 18), proposed a structure in which all relations are trained together and feedback is gradually reduced, so as to reinforce intermittently and obtain greater resistance to extinction during testing. Pereira and Moreira adopted it to ask whether transfer of function occurs with it (p. 18). AB/AC training had four phases, with feedback on every trial (100%), on four of every five (80%), on one of every five (20%), and on none (0%; p. 27), and Figure 33.2 puts them in sequence. Each relation appeared five times in a block of 30 trials. The first block of each phase was completed regardless of performance, and from the second block on, 90% correct in a block led to the next phase (p. 28). Experiment 2 of the volume of experiments repeats the structure and gives three reasons for it (Moreira, Rocha et al., 2022, p. 108). The first is that the more a conditional discrimination is trained, the greater the chances of forming classes. The second, that reinforcing intermittently

makes behavior more resistant to extinction, which is the condition of the tests. The third, that the absence of feedback on some trials prepares the person for the tests, in which there is no feedback at all. In Pereira and Moreira (2021a, p. 19), the design is single-subject, with pretest and posttest. All participants went through the same structure, with no group trained in another way, and so what the gradual fading adds cannot be separated from the rest of the procedure (this book's reading; Section 30.3).

Figure 33.2

The four phases of a training procedure in which feedback decreases: 100%, 80%, 20%, and 0%



Note. Diagram prepared for this book, based on Pereira and Moreira (2021a, pp. 27 and 28); no data. The five circles in each phase are five consecutive trials, and the position of the trials with feedback is only illustrative. The tests have no feedback (p. 28).

The tests record the derived relations without differential consequences: in Dixon and Lemke (2007, p. 8), under extinction, and in Pereira and Moreira (2021b, p. 143), with no consequences for clicks on correct or incorrect comparisons. In Pereira and Moreira (2021a, p. 28), the trained, symmetry, and transitivity relations came together in a single block of 90 trials, without feedback. For each test, the report states the relations (BA and CB, symmetry; AC, transitivity; CA, equivalence), the number of trials per block, the criterion, and chance. There is also a test that asks whether the class holds up against history. In Mizael, de Almeida et al. (2016, p. 459), all 13 children responded, on the standard test, in line with the emergent relations. When the test was modified to include a White face as a third comparison, 9 of the 13 kept

choosing the Black faces when the samples were the positive symbols, and vice versa. The standard test does not ask that question, and so it does not answer it.

Who records also goes on the sheet (Section 22.7). In Pereira and Moreira (2021b, p. 141), the software presented the stimuli and recorded responses in the training and test phases, and participants marked the scale themselves, with a pen, on a sheet of paper. When someone classifies utterances or behaviors, there is an observer, and the sheet states on how many occasions two observers recorded and the overall and occurrence agreement.

⚠ CAUTION

A test counts only for a relation that was not taught. If the person received "Correct!" for choosing C1 in the presence of A1, accuracy on AC shows that they learned AC, not that they derived it (Section 20.2).

EXAMPLE

(Hypothetical case.) Beatriz specifies: A1, "useful," and A2, "useless" (words); B1 and B2, abstract figures; C1, the supervisors' photographs; C2, a third abstract figure. She trains AB and BC, mixes the relations, and tests BA, CB, AC, and CA in blocks of 18 trials, without consequences, with a criterion of 16 out of 18. She does not train any relation between "useless" and photographs of people.

TEST YOURSELF

Why is the test with a White face among the comparisons more demanding, and what did it show in the study?

ANSWER: because it places, alongside the learned relations, the stimulus that prior history would favor; all 13 children had formed the class on the standard test, and 9 kept choosing the Black faces on the modified one (Mizael, de Almeida et al., 2016, p. 459).

33.4 Recording: before, after, comparison, and follow-up

Recording has three requirements, seen in Section 25.1: comparison, persistence, and extension. In a study with equivalence and a scale, they become four planning decisions.

The first is to measure the same thing before and after. In Pereira and Moreira (2021b, p. 143), the posttest was identical to the pretest, with the same scale (p. 138). In Dixon and Lemke (2007, p. 8), the final phase re-exposed each participant to the same task. When there is an implicit task, the same rule applies: Mizael, de Almeida et al. (2016, p. 460) call for the IRAP, or a similar instrument, at pretest and posttest. Different scales before and after make the difference a mixture of what changed and what the instrument changes.

The second is comparison. Without a group that did not go through training, there is no way to know what would have happened without it; so, in addition to measuring before and after, it is advisable to have a comparable group whenever possible (Section 20.6). Bortoloti and de Rose (2009, p. 565) compared the ratings of the participants in the experimental groups with those that a control group gave to the same faces. In Rosendo and de Melo (2018, p. 31), the control group, of 32 participants, was not exposed to any of the training or tests. The comparable group should come from the same screening and be measured over the same interval, with the same stimuli and the same scale (Figure 33.1).

KEY CONCEPT

"Changed" is a claim about two identical measurements, taken before and after, and about a comparison with people who did not receive the training. The repeated measurement says that there was a difference between moments; the comparable group says whether it is due to the training; follow-up says whether it persists.

The third is what to do with the result. For each participant, the record keeps the three answers in Figure 20.4: whether the person learned the trained relations, whether they showed the derived relations above chance and criterion, and whether the evaluation changed relative to before. In Mizael, de Almeida et al. (2016, p. 457), before training, White faces received significantly higher pleasure marks on the SAM than Black faces did. Afterward, the marks rose for Black faces and fell for White faces; ratings of White faces remained above those of Black faces, but the difference was smaller and was no longer statistically significant. "Was no longer significant" describes the result of a test, not that the ratings became equal: in the same study, the difference still had the same sign. Nor is it, in itself, a test of change: to say that the difference decreased, one has to compare the two differences, not just note that one crossed the criterion and the other did not (this book's

reading). Measuring only before and after, without a comparable group, also leaves open what else happened between the two measurements (Section 23.5).

The fourth is follow-up, which checks persistence, and the check of extension to other occasions and measures. Mizael, de Almeida et al. (2016, p. 460) write that future studies ought to examine, in follow-up assessments, whether the training results are maintained, and to evaluate generalization beyond the experimental setting. Albarracín and Shavitt (2018, p. 303) point out that changes recorded by implicit measures are promising, though they do not yet guarantee changes in behavior. They cite a meta-analysis in which the mean correlation between the IAT and behavior was .15 or .12, weak correlations, for racial and intergroup attitudes (pp. 303–304). What the study does not reach should be stated: here, what people would do outside the task (Section 24.6).

Finally, the setting and mode of administration are part of the method. In Bortoloti and de Rose (2009, p. 566), the experimental group filled out the scales in the laboratory room, and the control group in their classroom. In Rosendo and de Melo (2018, p. 36), the semantic differential was administered individually in the experimental groups and in small groups, of up to 5 participants, in the control group. In Cameoka and Moreira (2021, p. 98), data were collected online and on campus, and in-person collection was carried out by the first author, an Asian woman. Mizael, de Almeida et al. (2016) wanted to see whether the race of the experimenter influenced the results (p. 452): the sessions of 5 participants were run by a White person, and those of the others by a Black person (p. 455). They concluded that the comparison was inconclusive, because the number of participants was small and the child with the greatest bias was randomly assigned to the White experimenter (p. 460). In the study in the Part IV volume, the session was online, via Google Meet, with the experimenter at home and the participant alone, in a quiet environment (Moreira, Martins et al., 2024, p. 77). In Experiment 2 of the volume of experiments, also remote, the participants were in their home environments, using their own computers (Moreira, Rocha et al., 2022, p. 92). When the difference between groups is also a difference in setting, mode, or who administers, the report needs to say so.

The book-length study on presidents, carried out at home because of the pandemic, shows what remote administration has to state. The person had to be alone in a private room, with a computer and a connection of at least 10 Mbps; speed was tested before the session, and anyone with less was excluded (Pereira & Moreira, 2021a, p. 19). The ses-

sion took place by video call, with the person's screen shared, and the consent form was sent by email, with agreement given by replying to the message (p. 22). Instructions came in standardized videos, so that they would not vary from one participant to another, with an animated assistant, Gabriela, who explained each step through standardized text and examples (p. 22; Figure 33.3). During the task, the researcher turned off audio and camera (p. 22). Among the 19 comics studies in the Part III volume, 7 used a virtual assistant with the instructions on slides, and 12 put the instructions in the data-collection form (Moreira, Lemos et al., 2024, p. 17; Figure 34.2). The authors state the cost of the arrangement: internet speed varied across people, which may have made stimulus presentation fluctuate, and distractions in the home environment cannot be controlled as they can in a chosen environment (Pereira & Moreira, 2021a, p. 107).

Figure 33.3

Video instructions: the assistant demonstrates the task and the signal for a correct response before the person begins



Note. Four frames from Figure 3 of Pereira and Moreira (2021a, p. 23), the instruction sequence of the video for the matching-to-sample stage, made on an animation platform, with that platform's watermark on the frames; the semantic differential scale sequence, in Figure 2 of the source, is made the same way. The reproduction has the resolution of the source material.

⚠ CAUTION

When the comparable group is measured in a different place and in a different way from the experimental group (in a classroom and as a group, instead of in a laboratory and individually), the difference between the groups mixes the training with the setting and the mode. This is a limitation to be stated, not an accusation against the studies in Section 23.6 that recorded it: the instrument is part of the situation.

⊘ NON-EXAMPLE

"The difference was no longer significant; therefore, the evaluation of the photographs became the same for both groups." What the test shows is that the difference did not cross the statistical criterion; the means may still differ, as in Mizael, de Almeida et al. (2016, p. 457).

✓ TEST YOURSELF

Which three recording decisions distinguish "the rating went up after training" from "the training changed the rating"?

ANSWER: the same measure before and after; a comparable group, from the same screening and measured over the same interval; and, to say that the change persists, a follow-up (Section 25.1).

33.5 Ethics, the sheet, and the report

A project of this kind goes to an ethics committee before any participant takes part. Cameoka and Moreira (2021, p. 98) record approval by the university's Research Ethics Committee, with the approval number, and the first page of the questionnaire contained the consent terms (p. 99). Pereira and Moreira (2021b, p. 140) record that the participants read and signed the Free and Informed Consent Form and that the project was approved by the committee, with the approval number. In Rosendo and de Melo (2018, p. 33), all participants read and signed the form, and the study was approved by the university's committee. In Experiment 2 of the volume of experiments, the session began only after the project had been approved by the committee and the form had been returned, read and signed (Moreira, Rocha et al., 2022, p. 92). In the study in the Part IV volume, the form was sent by link, and the experiment began after it had been read and agreed to (Moreira, Martins et al., 2024, p. 77).

Haydu et al. (2015, p. 389) report that participants signed a consent form that the ethics committee at the authors' institution had approved. Consent goes together with the option to refuse: in Dougher et al. (1994, p. 332), participants were informed that they were free to withdraw whenever they wished and, at the end, everyone received a debriefing. This is what Section 25.5 asks of any intervention: a stated goal, consent, the option to refuse, and evaluation of the outcome.

With children, care includes who does the inviting. De Carvalho and de Rose (2014, p. 529) recruited participants at school or in neighborhoods near the university; in the second case, an assistant of the experimenter went door to door to talk with parents and invite the children.

There is also what the design chooses not to teach. Mizael, de Almeida et al. (2016, p. 455, note 2) considered it ethically unacceptable to expose children to training that could establish equivalence between racial features and a negative sign. For this reason, the training brings the Black faces together with the positive symbol and relates the negative sign to an abstract symbol. De Carvalho and de Rose (2014, p. 534) write that training that simply reversed the classes, making White faces equivalent to the negative symbols, did not seem acceptable to them for ethical and educational reasons, however effective it might be. This care extends to any arrangement that teaches an unfavorable evaluation of a group (Section 20.5): the sheet states, on the ethics line, what is not trained.

Table 33.1 brings together the lines of the sheet, in the order in which data collection takes place, and where each one was discussed.

Table 33.1
Design sheet: what to state before data collection

Line	What the sheet contains	Where it is covered
Question	the difference between moments that one wants to claim, and the hypothesis, about function or about history	Sections 24.5, 25.1, and 33.1
Criteria	training pass criterion, class, chance, and what would count as transfer	Section 33.1
Variables	independent, dependent, controlled, and absent	Chapter 31 (Table 31.2)
Participants	who is included and who is excluded (screening), how many, and how they were recruited	Section 33.2
Stimuli	sets, selection criterion, and standardization	Section 33.2 and Table 32.2

Line	What the sheet contains	Where it is covered
Instrument	points, neutral point, anchors, direction, pairs, order of presentation	Section 33.2 and Chapter 23
Training and tests	relations, format, criteria, trials per block, consequences, and who records	Section 33.3
Recording	same measure before and after, comparable group, follow-up	Sections 33.4 and 25.1
Administration	setting, mode (individual or group), who administers, instructions	Section 33.4
Ethics	committee, consent, refusal, what is not trained, debriefing at the end	Section 33.5
Limitations	what the study does not reach	Sections 33.4 and 33.5

Note. Table prepared for this book, based on the sections of this chapter and on Chapter 31.

The sheet becomes the method section of the report: each line becomes a sentence, and the reader should be able to redo the study and say what the result means.

EXAMPLE

(Hypothetical case.) On the ethics line, Beatriz writes: "Committee approval before the first data collection; consent form on the first screen, with the option to stop at any time; no relation trained between photographs of people and the negative sign; debriefing about the purpose at the end, for everyone, including the comparable group."

TEST YOURSELF

Why does the sheet ask for "what is not trained"?

ANSWER: because training a relation between features of a group and a negative sign is what the authors considered ethically unacceptable (Mizael, de Almeida et al., 2016, p. 455, note 2; de Carvalho & de Rose, 2014, p. 534).

Common learner mistakes

1 **Deciding the criterion after seeing the data.** The mistake happens because, before data collection, one does not yet know what performance to expect, and it is tempting to wait for the data to choose a threshold that seems reasonable. *How to spot the mistake:* the report gives a threshold without saying when it was set, and does not state chance next to it (Section 33.1).

2 **Saying "Likert scale" and stopping there.** The mistake happens because "Likert scale" sounds like the name of a standardized instrument, rather than a family of formats with decisions to be stated. *How to spot the mistake:* the method gives no points, neutral point, anchors, or direction, and the instrument cannot be reproduced (Dalmoro & Vieira, 2014, pp. 171–172).

3 **Measuring before and after with different instruments.** The mistake happens because the new version seems better, or the task is ready only after training, and the switch passes for a technical adjustment rather than a change in the measure. *How to spot the mistake:* the posttest scale differs from the pretest scale, or the implicit task appears only after training (Mizael, de Almeida et al., 2016, p. 460).

4 **Taking "was no longer significant" to mean "stayed the same."** The mistake happens because, in everyday language, "not significant" means unimportant or nonexistent, not below the criterion of a statistical test. *How to spot the mistake:* the difference between the means still had the same sign (Mizael, de Almeida et al., 2016, p. 457).

5 **Leaving out where, how, and by whom the data were collected.** The mistake happens because this information seems like logistics, not method; but the difference between groups may come from it. *How to spot the mistake:* the method does not say whether collection took place in a laboratory or a classroom, individually or in a group (Rosendo & de Melo, 2018, p. 36), or who administered it.

SUMMARY

The question and the criteria (objective 1). A difference between moments, with the class criterion, chance, and transfer written down before data collection.

Stimuli and instrument (objective 2). Screening, stimulus sets chosen by the criteria in Table 32.2 (a stated formal criterion, standardization of size, background, and framing, homogeneous expression, the same faces across the conditions compared, and control tested beforehand), and a scale with points, neutral point, anchors, and direction stated.

Training and tests (objective 3). Training records correct responses and blocks to criterion, and the report states the format, including the proportion of feedback in each phase; the tests record the derived relations without consequences, against criterion and chance; a more demanding test shows whether the class holds up against history.

Recording (objective 4). The same measure before and after, a comparable group from the same screening, and follow-up; "was no longer significant" is not "stayed the same," nor is it, in itself, a test of change.

The sheet (objective 5). Eleven lines, including ethics, setting and mode of administration, and limitations.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. In Dixon and Lemke (2007), what was the training pass criterion, and where does the 90% appear?
2. In Pereira and Moreira (2021b), each test block had 18 trials with three comparisons and a criterion of 88.88%. How many correct responses does the criterion require, how many are expected by chance, and why is the criterion far from chance?
3. (Records constructed for the exercise.) A test block has 12 trials with two comparisons, and the criterion is 7 correct. Calculate chance and say why the criterion is weak.
4. What four decisions about the scale should the report include, and what do Dalmoro and Vieira (2014) say about justifying the number of points?
5. Why does the pretest also serve to discover what controls the choice? Give the example from de Carvalho and de Rose (2014).

6. Say what the training, the tests, the scale after training, and the follow-up record.

7. (Hypothetical case.) Beatriz chooses the 10 interns with the lowest ratings, trains them, and the mean goes up. Point out two problems and what she should do.

8. (Hypothetical case.) A report concludes, from a before-and-after study: "the difference between the ratings of the photographs was no longer significant, so the evaluation stayed the same." What should be said?

9. Give three administration decisions that the report states, with one study for each.

10. Why did de Carvalho and de Rose (2014) and Mizael, de Almeida et al. (2016) not train a relation between White faces and a negative sign, and which line of the sheet records this?

ANNOTATED ANSWER KEY

1. At least 16 correct in a block of 18 trials (Dixon & Lemke, 2007, p. 8). The 90% appears in the interpretation of the results, for symmetry and equivalence (p. 10).

2. The 88.88% criterion requires 16 correct out of 18 (this book's calculation; Pereira & Moreira, 2021b, p. 143). By chance, with three comparisons, 6 out of 18 are expected, and the probability of reaching 16 or more is about 1.7 in 1 million (this book's calculation).

3. Chance is half, 6 out of 12. The criterion of 7 out of 12 is one correct response away from what is expected by chance and would be reached by chance in about 39% of blocks (this book's calculation), and that is why it is weak.

4. The number of points, the neutral point, the anchors, and the direction (Section 23.2). Dalmoro and Vieira (2014, p. 171) observe that a justification for the choice of the number rarely appears and that there is no single theoretical argument capable of defending the use of "x" points.

5. Because participants may choose on the basis of irrelevant features. One excluded child chose the thumbs-up and the thumbs-down after White faces because the thumbs had a pink background (de Carvalho & de Rose, 2014, p. 529).

6. Training records correct responses per block and blocks to criterion; the tests, the derived relations without consequences, against criterion and chance; the scale afterward, the difference from baseline; follow-up, persistence (Sections 33.3 and 33.4).

7. There is no comparable group, and people selected for an extreme score tend to obtain a less extreme score even without training; so she would also measure a group from the same screening, over the same interval, and with the same scale. Follow-up is also missing, to say whether the change persists (Sections 33.2 and 33.4).

8. That "was no longer significant" describes the test, not that the ratings became equal: in the study by Mizael, de Almeida et al. (2016, p. 457), ratings of White faces remained above those of Black faces, with a smaller difference. Nor does the sentence show, by itself, that the difference decreased: the two differences would have to be compared. Without a comparable group, it is still unknown what else occurred (Section 23.5).

9. For example: laboratory or classroom (Bortoloti & de Rose, 2009, p. 566); individual administration or groups of up to five (Rosendo & de Melo, 2018, p. 36); online or in-person data collection and who conducted it (Cameoka & Moreira, 2021, p. 98); instructions in a standardized video, with the researcher off screen during the task (Pereira & Moreira, 2021a, p. 22).

10. Because they considered it ethically unacceptable to expose children to training that would establish equivalence between racial features and a negative sign (Mizael, de Almeida et al., 2016, p. 455, note 2; de Carvalho & de Rose, 2014, p. 534). It goes on the ethics line of the sheet, as "what is not trained" (Table 33.1).

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 34. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2, 3	33.1 and common mistake 1
4, 5	33.2 and common mistake 2
6	33.3 and common mistake 3
7, 8	33.4 and common mistake 4
9, 10	33.4, 33.5, and common mistake 5

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CHAPTER

34 Attitudes and Comics

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** narrative, comic, and attitude resistance, and **say** why Murrar and Brauer (2019) propose narratives for changing intergroup attitudes.
2. **Describe** the procedure of a study with a comic: the rated characters, the roles, the time per panel, and the measurement points.
3. **Read** the report of a study by character, by participant, and by measurement point, separating what the record shows from the summary sentence.
4. **Distinguish** the study with a comic from the study with equivalence training by the three questions of Chapter 20 (were the trained relations learned? did the derived relations appear on the tests? did the evaluation change?), and **say** what the rating given to a character allows one to claim.
5. **Apply** Murrar and Brauer's (2019) criteria and the design sheet from Chapter 33 to say what a design with a comic allows one to claim and what is still missing.

PREREQUISITES

The routes by which an evaluation forms and changes (Sections 25.1 and 25.2), the semantic differential (Section 23.3), the three questions for reading an equivalence study (Section 20.5), the variables sheet (Chapter 31), the stimulus selection criteria (Chapter 32), and the design sheet (Chapter 33). The new terms (narrative, comic, attitude resistance, rated character, character role, and measurement point) are defined here.

OPENING

(Hypothetical case, continued from Chapter 33.) Beatriz handed the design sheet to the management of the training clinic, and the clinic's coordinators made a request: the training with abstract figures and the

tests take more time per intern than the schedule allows. They suggested a short comic, one that can be read in a few minutes, with the same scale before and after, and pointed out that there are published studies using this format. Beatriz wants to know whether the switch keeps the sheet intact and what she would then be able to say. Four questions organize the chapter.

1. *"What is a comic, as research material, and why would anyone use one to study attitudes?"*
2. *"How is a study with a comic run, and what is measured at each point?"*
3. *"What did the published studies find, and what does the rating given to a character allow one to say?"*
4. *"What does the design with the comic allow one to claim, and what is missing for it to be used with confidence?"*

The first is the subject of Section 34.1; the second, of 34.2; the third, of Sections 34.3 and 34.4; the fourth, of 34.5.

34.1 Resistance, narrative, and comics

Murrar and Brauer (2019, p. 164) open their article with an assessment: social scientists and practitioners understand rather little about how to bring about durable change in attitudes toward members of other social groups. Most initiatives in favor of diversity go unevaluated, and the majority of the few that have been assessed prove ineffective. Researchers who study attitudes have long had a name for what prevents change, **attitude resistance**, which the book series also uses (Moreira, Premuli et al., 2022, p. 67). Strongly resistant attitudes tend to be unaffected by pressure to change, and, when faced with persuasive messages, people often come up with counterarguments, discredit the persuader, pay selective attention to information that agrees with their attitude, or even feel anger (Murrar & Brauer, 2019, p. 164). The word "resistance" also appears in behavior analysis, in another sense: Catania (1999, p. 405) defines the strength of a behavior as "the resistance of behavior to change" (Section 22.5). Here, the resistance is that of an attitude to persuasive messages.

KEY CONCEPT

Attitude resistance is the tendency of an attitude not to change in the face of pressures or messages that call for its change. It shows up in what the person does with the message: counterargues, discredits whoever sends it, attends only to what agrees with the attitude, or reacts with anger (Murrar & Brauer, 2019, p. 164).

According to the authors, intergroup attitudes are resistant for two reasons. The first is that they are bound up with social identity, and people tend to ascribe positive traits to the groups they belong to and negative traits to other groups. The second is that people rely on processes that strengthen these attitudes, such as treating someone who contradicts the stereotype as an exception who does not represent the group and interpreting ambiguous behavior by members of other groups in a negative light (p. 165). Hence the authors' diagnosis of the usual methods of combating prejudice: the person knows they are the target of an attempt to persuade them and is often required to take part. They are also told, indirectly, that they have a problem and must change (p. 165).

The alternative Murrar and Brauer (2019) propose is **narrative**: "a series of events that are tied together through characters and that usually has a beginning, a middle, and an end," conveyed through television, YouTube, radio, podcasts, books, comics, and paintings, among other formats (p. 165). In Portuguese, Moreira, Ávila et al. (2023, p. 40) define narrative as "a form of communication that tells a story or account of events through a sequence of interconnected events." In the same work, a **comic** (história em quadrinhos, or HQ, in Portuguese) is "a specific form of visual narrative that combines text and images in organized sequences" (p. 41).

Figure 34.1 shows the beginning, middle, and end in a story from the series, "A Matter of Respect!!" ("Uma questão de respeito!!"), which has three chapters. Each opens with a title card ("The excitement...," "Meeting disappointment...," "Not all is lost...") and continues with scenes linked by the same characters. Ana, a student, bikes to the university, late on the day a paper is due; she looks for Professor Carlos; and, later on, a friend, Lídia, sees that she is crying and asks what happened (Moreira, Lemos et al., 2024, pp. 104, 106, and 108). The panels in chapter 2 in which Carlos directs misogynistic remarks at Ana, which are what the study investigates (p. 85), were left out of the figure.

Figure 34.1

The three chapters of a comic: the chapter card and the first panel



Note. First panel of each chapter of "A Matter of Respect!!," by Nogueira (Moreira, Lemos et al., 2024, pp. 104, 106, and 108). The panels in chapter 2 in which the professor directs misogynistic remarks at the student were not reproduced.

Why would narrative meet less resistance? Murrar and Brauer (2019, p. 165) give three reasons, summarized in Figure 1 of the article. First, the message can be subtle: because the plot is usually what stands out most for the people consuming the narrative, the "perception of persuasive intent" is minimized. Moreover, someone who chooses to read a book or watch a show expects to be entertained, not persuaded. Second, transportation: the person feels absorbed into the world of the narrative, identifies with the characters, and scrutinizes the embedded messages less, being less motivated and having less cognitive capacity to do so. They therefore find fewer points to counterargue. Third, observation of social models: the reader sees characters receive consequences for behaving in certain ways. The third reason coincides with the observation-of-models route in Table 25.1. The first two describe what goes on with the reader, and the article asks that resistance be measured and that it be shown to mediate the effect of the narrative, that is, that the narrative works because it reduces resistance (p. 167). None of the three Part III reports, read below, records counterarguments or reactance, the opposition of someone who perceives that others want to persuade them (this book's reading).

The authors' own assessment is cautious. They describe an earlier study of theirs (Murrar & Brauer, 2018, cited in their article, p. 166). In it, people randomly assigned to watch episodes of a series showed less prejudice toward Muslims, right afterward and four weeks later, than those who watched a different series. But they write that none of the published studies meets the six characteristics in Table 1 of the article (p. 166) and that the current evidence is "suggestive at best" (p. 167). Section 34.5 returns to these characteristics.

The book "Atitudes" (Attitudes) draws on this article. Moreira, Premuli et al. (2022, p. 61) write that Murrar and Brauer (2019) suggest narrative-based methods for addressing resistance in intergroup attitudes. Study 1, by Rabelo (p. 68), is justified on the grounds that no experiments had been found in the literature evaluating attitude formation after reading comics with the equivalence paradigm and the semantic differential. In the Part III volume, Nogueira (Moreira, Lemos et al., 2024, p. 133) places the study in the same line: Murrar and Brauer "argue for the effectiveness of narrative approaches, such as comics, in overcoming resistance to attitude change."

EXAMPLE

(Hypothetical case.) Beatriz's story, "The Feedback Session," has eight panels and three characters. Nina presents a client's case in group supervision; Elias, the supervisor, interrupts her with a harsh criticism; Selma, her colleague, asks what he would do with the same complaint, and the conversation changes course. There is a series of events linked by characters, with a beginning (the presentation), a middle (the criticism), and an end (the question and the change of course). It is a narrative in Murrar and Brauer's sense.

NON-EXAMPLE

A poster with the phrase "Supervision is learning" and a drawing of two people talking. It has image and text, but it has no series of events linked by characters and no beginning, middle, and end: it is a message, not a narrative. In it, the intent to persuade is the most salient thing, and that is precisely what, by Murrar and Brauer's first reason, narrative avoids (this book's reading).

TEST YOURSELF

One leaflet has four panels: an intern arrives late; the supervisor reprimands him; the intern apologizes; the supervisor forgives him. Another leaflet has a list: "1. Be punctual. 2. Respect your supervisor." Which one is a narrative, and why?

ANSWER: the first, because it has a series of events linked by characters, with a beginning, middle, and end (Murrar & Brauer, 2019, p. 165). The list has neither events nor characters.

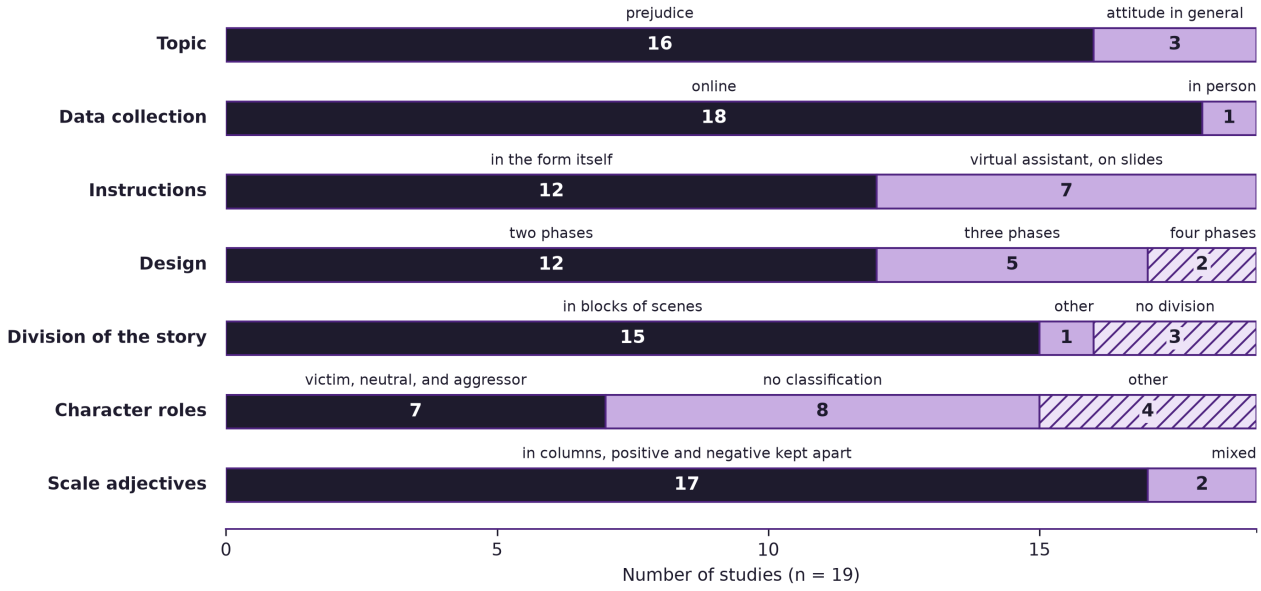
34.2 How a study with a comic is run

The three studies read in this chapter are in the Part III volume of the series (Moreira, Lemos et al., 2024): Nogueira, on psychological violence against women in a university setting (p. 78); Assumpção, on attitudes toward pseudosciences, with family constellation therapy as the example (pp. 137 and 142); and Godoy, on transphobia (p. 273). They share the same skeleton, which Part III itself summarizes: the procedure "makes it possible to record how each participant evaluates the stimuli presented before and after reading the story" (p. 61). The person rates, on a scale, images of characters they do not yet know; reads the story panel by panel, at a set pace; and rates the same images again.

This skeleton goes back further. Part III opens with a retrospective of 19 studies from three earlier volumes (2 from "Atitudes," 10 from Part I, and 7 from Part II), with 83 participants and 72 characters (Moreira, Lemos et al., 2024, pp. 13 and 15). Figure 34.2 brings together what it reports. All follow a single-subject design with pretest and posttest, in two, three, or four phases (p. 18). In all of them, the scale is the 13-pair semantic differential, and in 5 another instrument also appears (p. 17). Data collection was online in 18 studies and in person in 1 (pp. 17 and 18); the instructions came in the form itself in 12 and from a virtual assistant, on slides, in 7 (p. 17). Sixteen deal with prejudice, and 3 with attitude in general (p. 16). In 7, the characters are given the roles of victim, neutral, and aggressor (p. 15).

Figure 34.2

What the 19 studies in the first three volumes have in common



Note. Chart prepared for this book, with the counts from the retrospective in Moreira, Lemos et al. (2024, pp. 13–18). The two-, three-, and four-phase designs are the A-B, A-B-C, and A-B-C-D designs, in the notation of Part III (p. 18).

The series continued after these 19. Table 34.1 lists the volumes consulted for this book, with what each one contains according to its table of contents. For anyone planning a study, the table is also a map: it shows which topics have already been turned into comics and in which volume the report can be found.

Table 34.1

The volumes of the series consulted for this book and what each one contains

Volume	What it contains
"Atitudes" (Moreira, Premuli et al., 2022)	summaries of 10 studies on stimulus equivalence and social network analysis, starting on p. 22; a section on comics (p. 61); 4 studies: Rabelo's, with comics (Study 1, p. 65); the one on authoritarianism expressed by characters (Study 2, p. 95); the one on domestic work (Study 3, p. 153); and the one on Twitter and the Black Lives Matter movement (Study 4, p. 168)
Part I (Moreira, Sousa et al., 2022)	basic concepts (p. 25) and related research (p. 41); 12 experiments, from the first (p. 80) to the last (p. 373), on the inclusion of autistic people in school and in the job market, transphobia, pseudoscience, psychologists with a religious creed, physical attractiveness, former prisoners, political prejudice, xenophobia, women in video games, digital influencers, and the flaunting of wealth by celebrities; 10 use comics (Moreira, Lemos et al., 2024, p. 13)
Part II (Moreira, Ávila et al., 2023)	the definition of narrative and of comics (pp. 40 and 41); summaries of 6 studies on attitudes and equivalence, starting on p. 59, among them the one on presidents of the republic (p. 71) and the one on racial prejudice and stimulus control (p. 74); 7 experiments, from the first (p. 89) to the last (p. 342): ageism, aggressive, assertive, and passive communication, childhood obesity, clothing, autism in the job market, religious intolerance, and racial discrimination
Part III (Moreira, Lemos et al., 2024)	retrospective of the 19 earlier studies (p. 13); chapters on verbal behavior and equivalence (p. 32), transfer of function (p. 45), and the semantic differential (p. 64); 5 studies, from the first (p. 78) to the last (p. 273): psychological violence against women, pseudosciences, emotional appeal, musical genres, and transphobia
Part IV (Moreira, Martins et al., 2024)	5 studies: transphobia in a job interview (p. 22), homophobia (p. 69), discrimination based on clothing (p. 104), gender in high-performance sport (p. 133), and fatphobia (p. 155); general discussion (p. 188)
Part VI (Moreira, Cardoso et al., 2024)	4 studies: schizophrenia in the job market (p. 16), ableist behavior toward autistic people (p. 50), inclusion of children with autism (p. 86), and ambivalence (p. 122); general discussion (p. 188)
Part VII (Moreira, 2025)	a chapter on basic concepts (p. 1) and 13 studies, from the first (p. 25) to the last (p. 479): homophobia and ambivalence, soccer, gossip, people experiencing homelessness, women who are mothers, treatments for autism, emotional stimuli, hiring of people with autism, social media, inclusive swimming, racism, and former addicts, among others

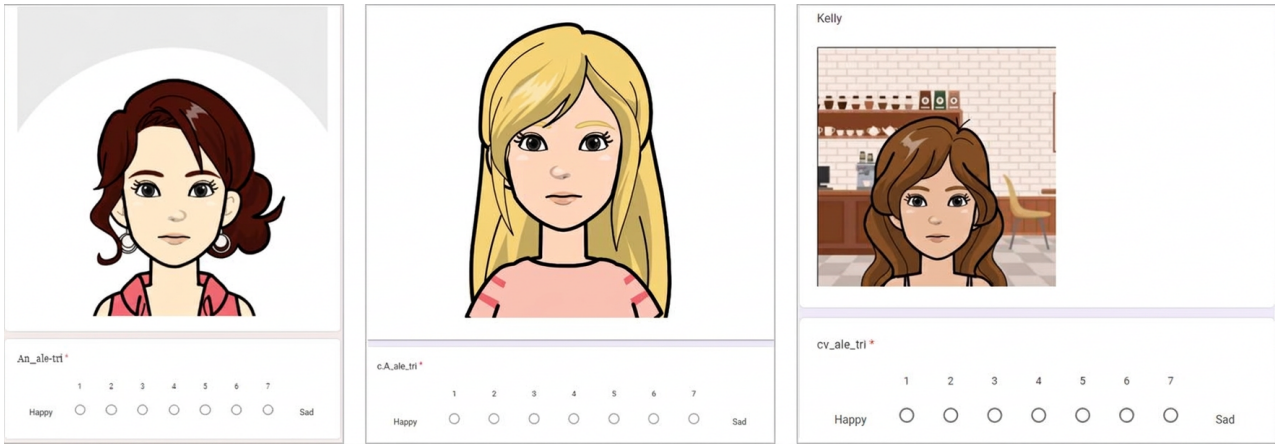
Note. Table prepared for this book, based on the table of contents of each volume and on the retrospective in Moreira, Lemos et al. (2024, p. 13); the page numbers are those printed in each volume. Only the volumes listed were consulted.

The **rated character** is the image of each character that the participant receives, one at a time, with the 13-adjective-pair scale: in Nogueira, "photos of the comic's characters" (p. 123). The rating applies to that image, not to the group or practice that the story portrays. Figure 34.3

shows the screen in the three studies: the image of a character and, below it, one of the 13 adjective pairs, with seven points between "happy" and "sad."

Figure 34.3

The rated-character screen in the three Part III studies: the image and one of the 13 adjective pairs

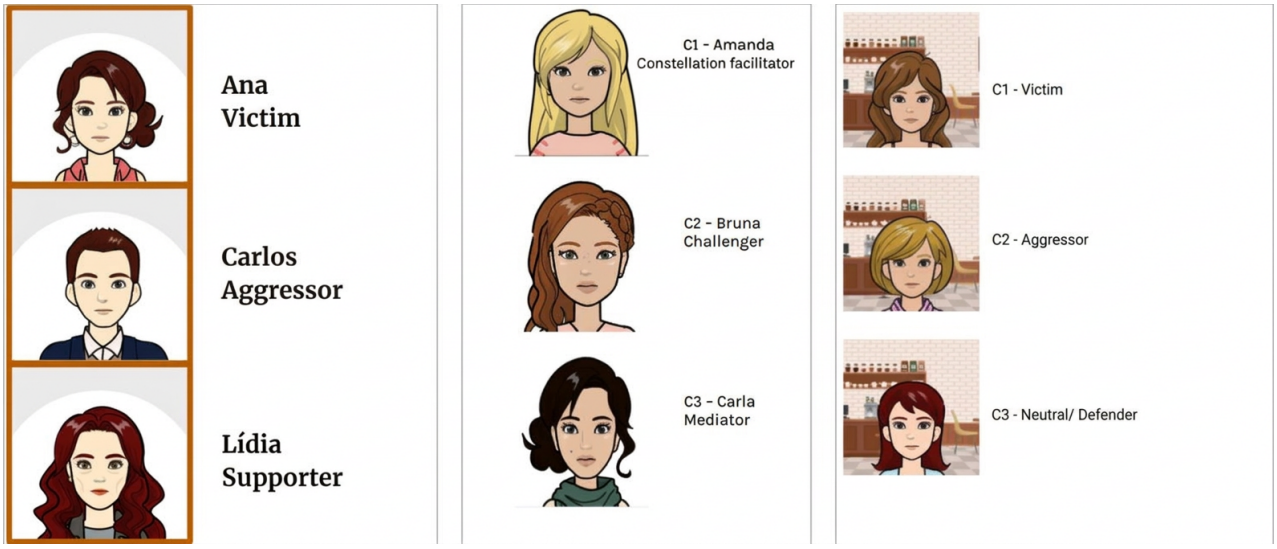


Note. Scale item in Nogueira (Moreira, Lemos et al., 2024, p. 90), Assumpção (p. 147), and Godoy (p. 280): the character's image and one of the 13 adjective pairs, from 1 to 7.

Before data collection, each study assigns each character a **character role**, what the character does in the story. In Nogueira, Carlos is the professor who attacks Ana, Ana is the student who is attacked, and Lídia is the one who opposes Carlos's attitudes (p. 91). In Assumpção, Amanda is the family constellation facilitator, Bruna is the advocate of scientifically based techniques, and Carla is the friend who tries to mediate (p. 148). In Godoy, C1 is the victim, C2 the aggressor, and C3 the defender (p. 278). Figure 34.4 brings together the cast of each study, with the role written next to each image; Assumpção's report calls Bruna the "challenger" and Carla the "mediator" (p. 150).

Figure 34.4

The characters and roles in the three Part III studies

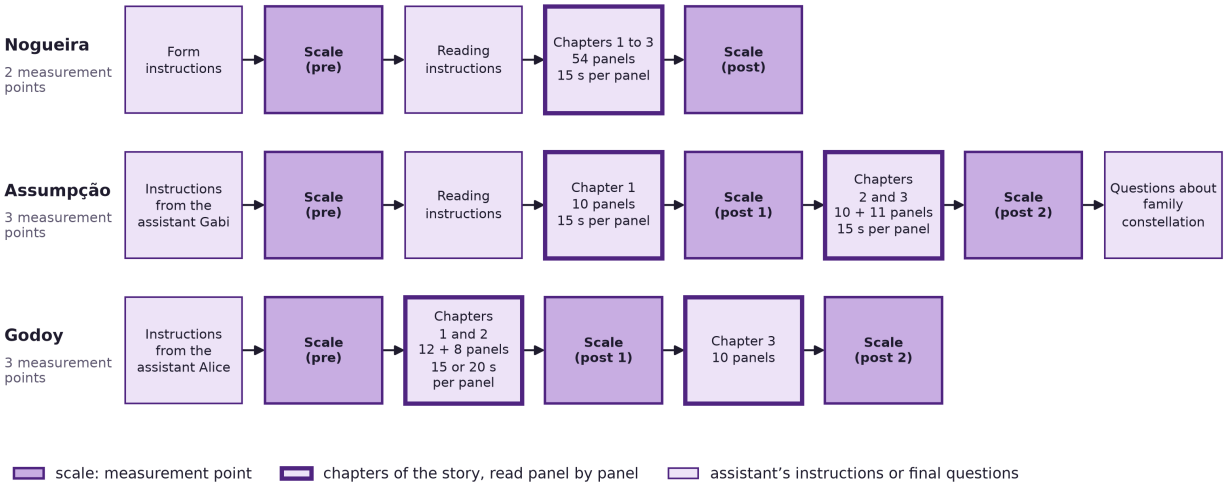


Note. Characters and roles in Nogueira (Moreira, Lemos et al., 2024, p. 92), Assumpção (p. 150), and Godoy (p. 282), as in the reports.

The role gives each character the values of the independent variable (Chapter 31). In Nogueira, there are two: no exposure to the scene and exposure to the scenes in which the character acts (p. 85). In Assumpção and Godoy, there are three: no exposure and two sets of scenes, one after the other (Assumpção, p. 144; Godoy, p. 278). In both, the evaluation of each character is treated "as an isolated experiment" (Assumpção, p. 144; Godoy, p. 278). Reading is interrupted for measurement, and each administration of the scale is a **measurement point**: the pretest, before any panel, and one or two posttests. Figure 34.5 shows where each study measured relative to what the story does.

Figure 34.5

Where the scale was administered relative to the story, in the three Part III studies



Note. Diagram prepared for this book, based on Nogueira (p. 123), Assumpção (pp. 184 and 185), and Godoy (pp. 312 and 313); no data.

Table 34.2 brings together what each report states.

Table 34.2

The three Part III studies, side by side

Aspect	Nogueira	Assumpção	Godoy
Topic of the story	psychological violence against women at the university (p. 78)	pseudotherapy: family constellation therapy (p. 137)	transphobia (p. 273)
Participants	3: two women and one man, aged 17 to 45 (p. 84)	3: one woman and two men, aged 17 to 40 (p. 142)	3 students, aged 20 to 30 (p. 277)
Panels	16 instruction slides, with the assistant Fábio, and 54 panels in 3 chapters (p. 93)	11 instruction panels, with the assistant Gabi, and chapters of 10, 10, and 11 panels (p. 148)	11 instruction panels, with the assistant Alice, and chapters of 12, 8, and 10 panels (p. 283)
Measurement points	2: pre and post, with the whole story between them (p. 123)	3: pre; post 1, after chapter 1; post 2, after chapters 2 and 3 (p. 185)	3: pre; post 1, through the end of chapter 2; post 2, after chapter 3 (p. 313)
Scale	semantic differential, 13 pairs, values from 1 to 7 (p. 86)	the same (pp. 145 and 146)	the same (pp. 278 and 279)

Aspect	Nogueira	Assumpção	Godoy
Time per panel	15 seconds (pp. 94 and 118)	15 seconds (p. 185)	15 seconds in the instruction panel (p. 309) and 20 seconds in the procedure (p. 313)
Mode and duration	remote, via Google Meet; about 20 minutes (pp. 86 and 122)	remote, via Google Meet; about 30 minutes (pp. 145 and 184)	in person, with a projector and tablet; about 20 minutes (pp. 312 and 313)

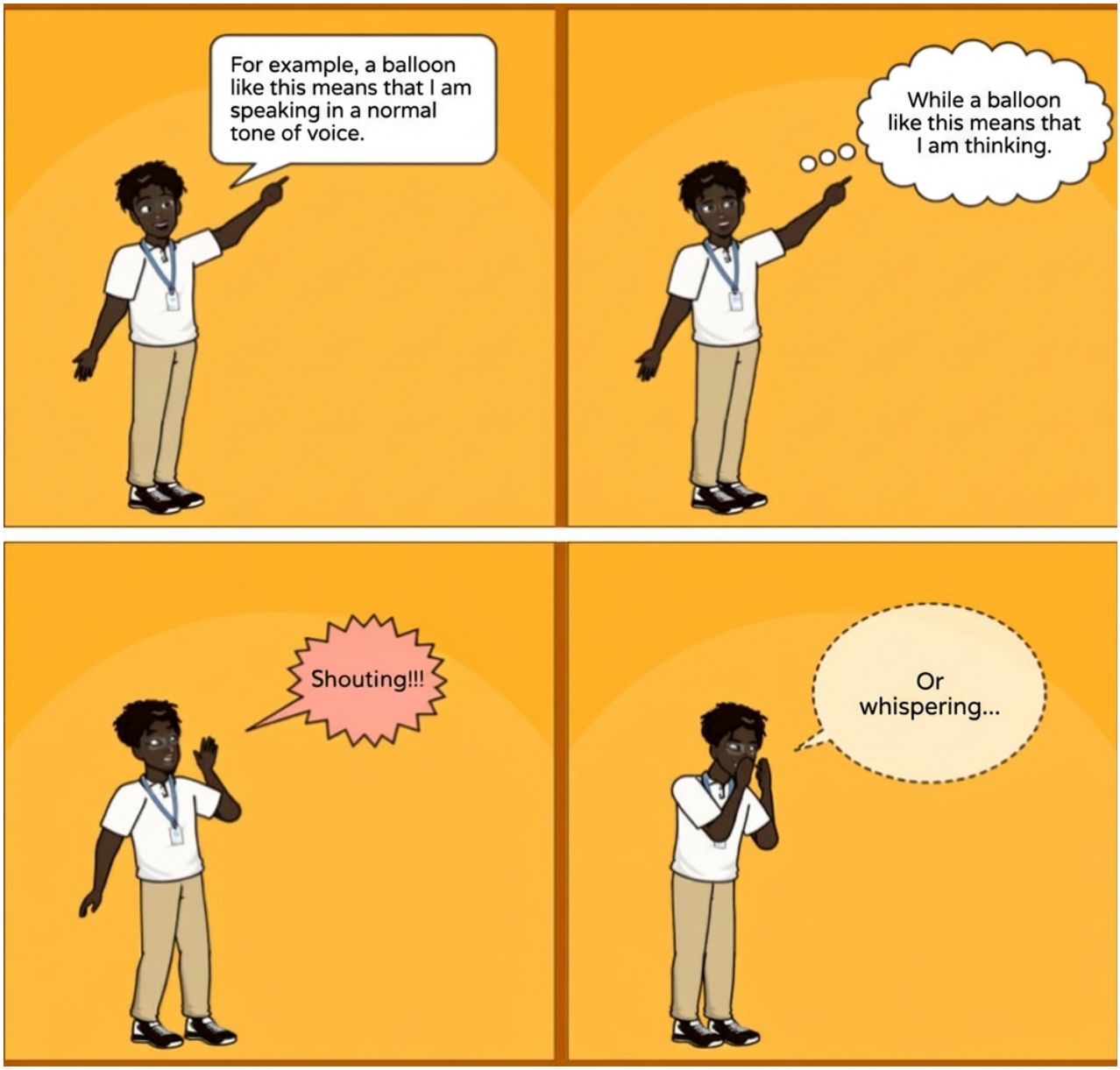
Note. Table prepared for this book, based on the reports by Nogueira, Assumpção, and Godoy in Part III (Moreira, Lemos et al., 2024); page numbers are in the cells.

The instrument is the semantic differential from Section 23.3. The scale runs from 1 to 7 and, in the analysis, is converted to −3 to +3 (Nogueira, pp. 123 and 124). Of the 13 pairs, nine are evaluation pairs and four are potency pairs (Assumpção, p. 187). Nogueira (p. 124) and Godoy (p. 313) also say that they multiplied the results by −1 "to correct the direction of the evaluation," in general terms and without listing the pairs. Direction is one of the four decisions made by whoever builds a scale (Table 23.1), along with the number of points, the neutral point, and the anchors, and the report would need to say in which pairs the multiplication was done.

The story itself carries the instructions. A fictional assistant (Fábio, Gabi, or Alice) explains the speech, thought, shout, and whisper balloons and announces the time per panel (Nogueira, pp. 93 and 118), as Figure 34.6 shows (pp. 102 and 104). At the measurement point, the assistant announces a pause in the story to answer the questionnaire again, and a panel with an hourglass marks the wait (p. 122). In Assumpção, the researcher timed the 15 seconds and asked whether there were any questions, because communication would be cut off during the presentation (p. 185). Nogueira's report includes the full text of the story, "in order to facilitate the replication of this work" (p. 117), and reproduces it in comic-book format, although the participants saw it on slides (p. 94).

Figure 34.6

The assistant explains the four types of balloon



Note. Panels with the assistant Fábio in Nogueira (Moreira, Lemos et al., 2024, pp. 102 and 104): speech, thought, shout, and whisper balloons.

The earlier studies in the series were leaner. In Study 1 of "Atitudes," 7 participants read two stories of seven panels each, one per session, two days apart. Each panel stayed on the screen for 20 seconds, and the scale was administered before and after each story (Rabelo, pp. 68, 71, and 80).

KEY CONCEPT

In a study with a comic, each **rated character** has a **character role**, and the scale is administered at **measurement points** that divide the story. The independent variable for each character is the part of the story read before each measurement point.

EXAMPLE

(Hypothetical case.) Beatriz plans a fifteen-minute session. First measurement point: the scale for Nina, Elias, and Selma, whom the interns do not know. Then the first six panels, in which Nina presents the case and Elias criticizes her, at 15 seconds each, and the second point: the scale again. Then the last two, in which Selma asks her question and Elias rephrases, and the third point. For each character, the independent variable has three values: no exposure, after panels 1 to 6, and after panels 7 and 8.

TEST YOURSELF

In Assumpção, how many measurement points are there, and what values does the independent variable take for Bruna?

ANSWER: three (pre, post 1 after chapter 1, and post 2 after chapters 2 and 3; p. 185). For Bruna: no exposure; exposure to scenes in which she shows bewilderment at Amanda's statements; and exposure to scenes in which she confronts Amanda about ethical-scientific principles (p. 144).

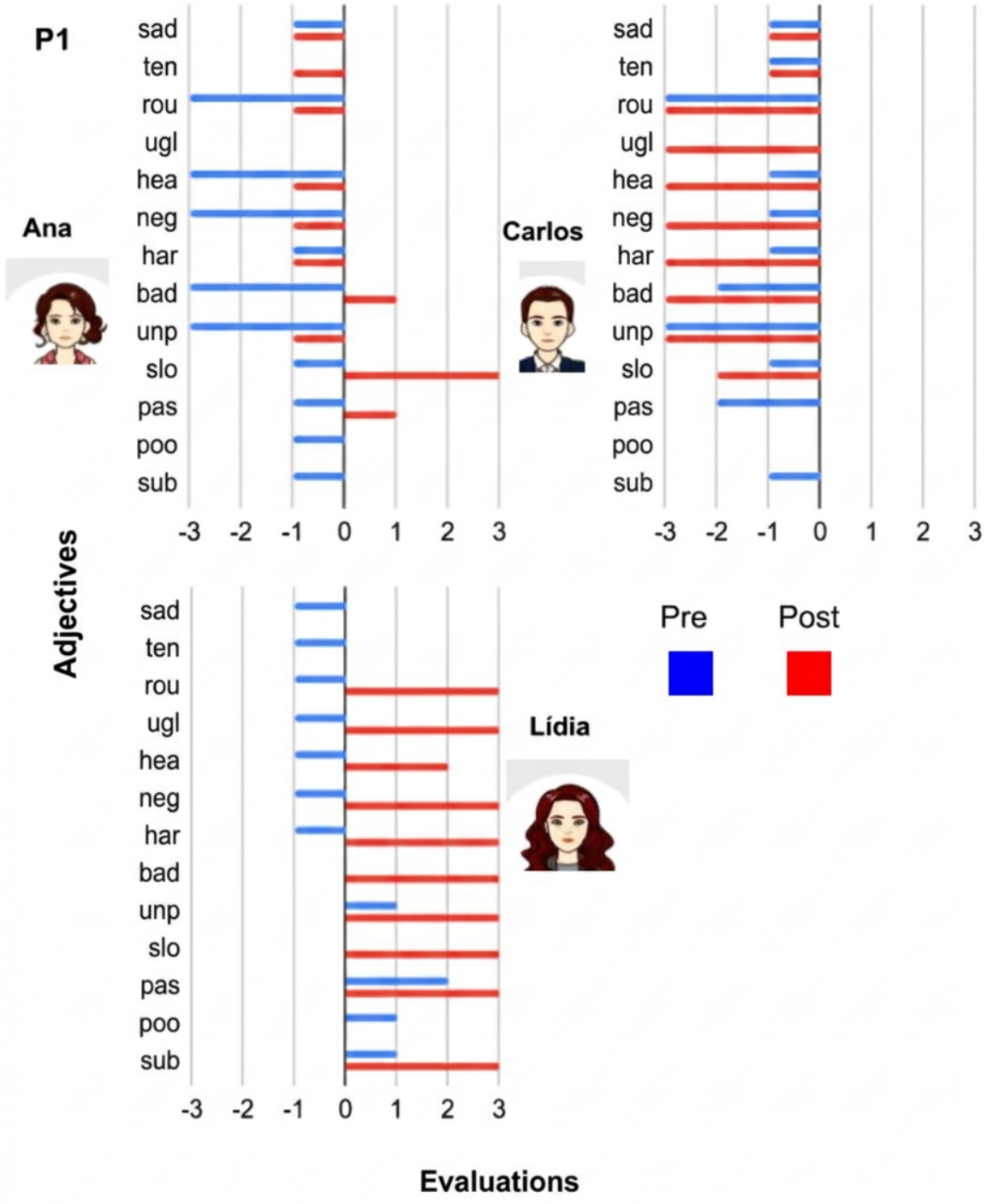
34.3 What the studies recorded

A report with 3 participants is read in three cuts: by character, by participant, and by measurement point. The Part III reports give, for each participant, a chart with the rating of each adjective pair at each measurement point and a paragraph describing it. Only afterward come the means and the discussion (Nogueira, pp. 125 and 131; Assumpção, pp. 187 and 194). Figure 34.7 reproduces P1's chart in Nogueira, with one panel per character: Ana, Carlos, and Lídia. Each panel has, for each of the 13 pairs, a blue bar, for the pretest, and a red one, for the posttest, from −3 to +3, the scale used in the analysis (pp. 123 and 124). The abbreviations on the vertical axis follow the order of the 13 pairs that Part

III lists (sad and happy, tense and relaxed, rough and smooth, and so on; p. 25). For Lídia, the blue bars are short and negative, and the red ones long and positive; for Carlos, several red bars reach −3.

Figure 34.7

One participant's chart: P1 in Nogueira, for Ana, Carlos, and Lídia



Note. Figure 4 of Nogueira (Moreira, Lemos et al., 2024, p. 126), reproduced as in the report. Blue: pretest; red: posttest. Values from −3 to +3, after conversion of the 1-to-7 scale (pp. 123 and 124).

Table 34.3 brings together what Nogueira's report describes, by character and by participant.

Table 34.3

Nogueira: what each participant recorded, by character

Character (role)	P1	P2	P3
Ana (victim)	predominantly negative before and after; three pairs became positive, two of them potency pairs (p. 125)	mostly positive or neutral, with four negative pairs before; more negative pairs after (p. 126)	predominantly positive before and after; two of the four negative pairs became positive (p. 128)
Carlos (aggressor)	largely negative or neutral; some negative characteristics became more negative; seven evaluation pairs at −3 (p. 125)	eight evaluation pairs positive before and from −2 to −3 after (p. 127)	all positive or neutral before; nine evaluation pairs negative after, five at −3 (p. 129)
Lídia (defender)	seven negative pairs, down to −1, before; ten positive, up to 3, after (p. 125)	positive or neutral before and after, with the positive ones intensified (p. 127)	mostly negative, from −1 to −2, before; all positive or neutral after, eight of the twelve positive ones at 3 (p. 129)

Note. Table prepared for this book, based on Nogueira (Moreira, Lemos et al., 2024, pp. 125–129); the charts for each participant, in the report, give the values pair by pair.

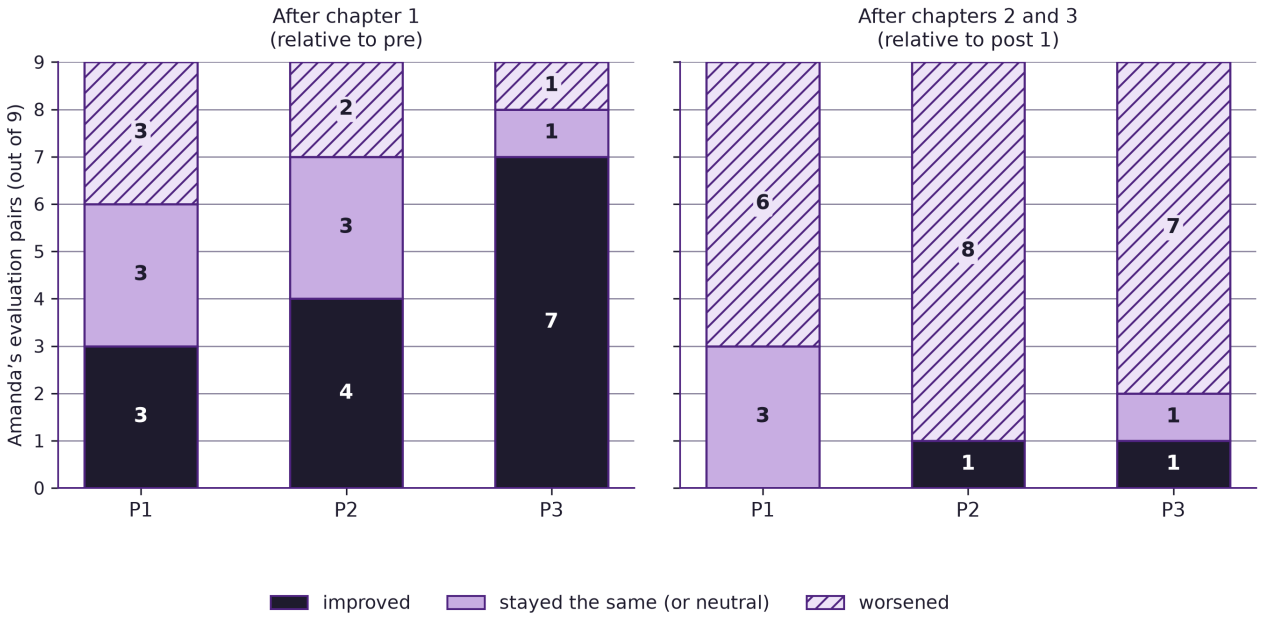
Read by character, the record shows that Lídia rises for all 3 participants; Carlos drops for P2 and P3 and, for P1, starts on the negative side and becomes more negative on some characteristics. Ana is the character for whom the report itself describes mixed results: Ana "received predominantly negative evaluations from P1 and varied changes from P2 and P3" (p. 134). The mean of the three, however, describes Ana as, "on average," more positive afterward (p. 132), and it is from the mean that the final sentence comes: "This suggests that the story had a positive effect on changing attitudes toward female characters" (p. 134). The mean is a summary, and P2 gave Ana more negative ratings afterward (p. 126).

In Assumpção's study, the extra measurement point shows what a single posttest would hide. Chapter 1 presents "an example of pseudo-therapy being applied in groups in a Psychology internship," and chapters 2 and 3 bring the confrontation over ethical-scientific principles and the well-grounded information about the consequences of these therapies (p. 148). After chapter 1, Amanda's rating improved on

3, 4, and 7 of the nine evaluation pairs (P1, P2, and P3). After chapters 2 and 3, the picture is reversed: 6, 8, and 7 of the nine got worse (pp. 187, 189, 190, 191, and 192). Figure 34.8 shows the counts.

Figure 34.8

Amanda, on the nine evaluation pairs: how many pairs improved, stayed the same, or worsened at each measurement point



Note. Counts from Assumpção (Moreira, Lemos et al., 2024, pp. 187, 189, 190, 191, and 192) for the character C1, Amanda; the pairs that stayed the same include P1's neutral pair (p. 187). The chart is the book's.

The reports say what "improved" and "worsened" mean: the first term indicates "a change in evaluation from negative to positive," and the second, "a change in evaluation from positive to negative" (p. 187). The rule does not square with all the counts. P2 had 6 positive pairs, no negative ones, and 3 neutral ones before (p. 189), and 4 pairs "improved" after chapter 1 (pp. 189 and 190); by the stated rule, none could have improved (this book's calculation). The report does not say how it counted the neutral pairs.

The means appear in the report in a chart (Figure 6) and in the text: Amanda's mean rises from pre to post 1 and falls from post 1 to post 2 for all 3 participants (pp. 194 and 195). Count and mean answer different questions: the count says how many pairs switched sides, and the mean, where the rating ends up.

In Godoy's study, the means are given by participant and by character (p. 322). The aggressor, C2, has a lower mean at post 1 than at pre for all 3 participants and, at post 2, rises again for P1 and P3 without returning

to the pre level, while it keeps falling for P2. The defender, C3, keeps her mean from pre to post 1 and increases it at post 2, after the chapter in which she intervenes in defense of the victim (p. 283); for P1, it had already risen at post 1. The victim, C1, is the case the summary sentence does not cover. For P1, the mean increases at post 1 and again at post 2; for P2 and P3, it decreases at post 1, after chapters 1 and 2, with the conflict, and increases at post 2, after chapter 3, with the defense. Table 34.4 sets side by side the summary sentence of each report and what the record, in the same report, describes.

Table 34.4

The summary sentence and the record, in each report

Study	Summary sentence	What the record describes
Nogueira	"This suggests that the story had a positive effect on changing attitudes toward female characters" (p. 134)	Lídia more positive for all 3 participants (pp. 125, 127, and 129); Ana predominantly negative before and after for P1 (p. 125) and with more negative ratings afterward for P2 (p. 126)
Assumpção	"the comics had a significant effect on the participants' attitudes" (p. 137)	Amanda better after chapter 1 and worse after chapters 2 and 3, for all 3 participants (pp. 194 and 195); the report includes no statistical test
Godoy	for C1, "an overall increase in the mean of all participants between the Pre and Post 1 conditions" (p. 323)	for C1, the mean decreases from pre to post 1 for P2 and P3 (p. 322)

Note. Table prepared for this book, based on the reports by Nogueira, Assumpção, and Godoy (Moreira, Lemos et al., 2024); what the record describes is taken from the reports themselves.

Three reading rules follow from this, and the first two concern the summary and the count. The first: the summary sentence summarizes, and the record by participant says where it holds; when a participant does the opposite of the summary, the text needs to say so. In Godoy, there is more than one case. For C2, the discussion speaks of a negative trend that "was maintained or worsened between the Post 1 and Post 2 conditions" (p. 323), but the results describe the mean rising again for P1 and P3 (p. 322). The second: a count of pairs that "improved" or "worsened" depends on the counting rule, and the stated rule has to square with the numbers; that is why the count is read next to the mean.

The third rule is that not every pair describes the character as an object of evaluation. Rabelo (p. 92) observes that sad–happy and relaxed–tense, "although they refer to the participant's own judgments regarding the characters, do not necessarily carry negative or positive biases, and may also be mere physical descriptions." For that reason, to say

who was rated better or worse, Rabelo paid more attention to bad–good, negative–positive, and pleasant–unpleasant. This is the warning in Section 23.3: not every pair that loads on the evaluation factor says good or bad; some describe how the object is seen or felt. Assumpção (p. 197) notes that the happy–sad pair received a positive rating for Amanda even with the participants' negative evaluation at posttest 2, and asks whether "happy, cheerful, excessively positive" behavior influences the evaluation of the characters.

⚠ CAUTION

The tables and the figure show what the reports describe, not what the story "caused." None of the three studies includes a group that did not read the story, a statistical test, or a measurement after an interval (Section 25.1). What can be read in them is each participant's before and after.

⊘ NON-EXAMPLE

"For all participants, the story improved the evaluation of the victim." In Nogueira, P1 rated Ana predominantly negatively before and after, and P2 gave her more negative ratings afterward (pp. 125 and 126). A sentence with "all" needs the record of each one.

✓ TEST YOURSELF

In Assumpção, 6 of Amanda's 9 evaluation pairs worsened for P1 from post 1 to post 2. What other information is needed to say that Amanda came to be evaluated negatively?

ANSWER: the mean, or the values of the pairs, at post 2. "Worsened" counts pairs that switched sides; it does not say where the rating ends up.

34.4 What a character's rating says, and what equivalence training adds

By the definition in Chapter 15, attitude is discriminated operant behavior whose topography is or implies the attribution of a value, ranging from positive to negative, to an object. The rating the participant gives Carlos, on 13 pairs, is an evaluation in this sense, given on a certain occasion and to a certain audience: the session, the shared screen, whoever administers the scale (Section 23.6). The object evaluated, how-

ever, is the character. The abstracts name the group or practice in the aim and the character in the results. Nogueira's states that it investigates "the formation of attitudes regarding prejudice against women in universities" and examines "how reading the comic affected the change in attitudes toward the fictional characters" (p. 78). Godoy's states that it investigates "attitude change regarding transphobia" and examines the change "toward the fictional characters portrayed" (p. 273). For the change to reach the group or practice, the person's evaluation would have to generalize from the character to them (Section 13.3). Claiming that is extending the result, and Section 25.5 says what extension requires: recording on other occasions and with another measure.

Assumpção's study is the only one of the three that asked something about the real object: at the end, the researcher asked whether participants already knew about family constellation therapy and, if so, whether their impressions were positive or negative (p. 185). The reports obtained at that point say that P1 and P2 had an initially positive view and that P3, who already knew about it, had a negative opinion (p. 195). This is what the person says, at the end, about what they thought before; without the same question before reading, it does not show change. Beatriz would solve this by including, at pre and post, photographs of the clinic's supervisors, who do not appear in the story and enter only at the measurement points.

KEY CONCEPT

The rating given to a character is an evaluation of the character. Claiming that the attitude toward a group, a practice, or a real person has changed requires measuring that object, before and after, with the same scale.

The series describes its own procedure in the vocabulary of the equivalence paradigm. The introduction to Part III describes the procedure this way: situations, utterances, and behaviors that "already have a meaning" are "paired with a character," figures that function as initially meaningless stimuli, and so the procedure "is similar to matching-to-sample (MTS)" (p. 60). Godoy (p. 324) writes that the variation in responses "can be interpreted through the concept of substitutable stimuli from the stimulus equivalence paradigm" and (p. 325) that initially neutral stimuli, such as comic characters, "can acquire positive or negative connotations through arbitrary associations."

In this book, "matching-to-sample" has a narrower sense. In Section 20.1, it is the procedure in which there is a sample, comparisons, and differential consequences for a choice. Presenting a meaningful stimulus together with a meaningless one, without the person choosing anything, is stimulus pairing, the procedure of Chapter 17. Reading a story calls for no choice and has no differential consequence and, in that sense, is not matching-to-sample; among the routes it brings together is stimulus pairing (this book's reading). The three questions in Section 20.5 show what is missing to support "class": were the trained relations learned? Did the derived relations appear on the tests, without differential consequences and above chance? Did the evaluation change? The study with a comic answers only the third. It is the fourth pattern that Section 20.5 left out of Figure 20.4: ratings that change without a demonstrated class, in which case the change is not attributed to the class.

What the story offers, through the routes in Table 25.1, is a package. The reader sees characters speak and receive consequences (observation of models); encounters the image of each character together with utterances and scenes (stimulus pairing); and, in chapter 3 of Assumpção, reads "the well-grounded information about the consequences of these types of therapy" (p. 148), which, in the vocabulary of Section 25.2, is a rule. Because the routes come together, the design does not separate which one operated, and it does not set out to (this book's reading). Table 34.5 compares the two arrangements.

Table 34.5

The study with equivalence training and the study with a comic

Aspect	With equivalence training (Chapters 20 and 33)	With a comic (Part III)
What the person does before the final measurement	chooses among comparisons, with differential consequences during training	reads the panels at a set pace, without choosing or receiving any programmed consequence
Derived relations	tested without differential consequences, against criterion and chance (Pereira & Moreira, 2021b, p. 143)	no test
What is measured	the rating of the stimuli, before and after (Pereira & Moreira, 2021b, p. 141)	the rating of the characters, before and after parts of the story
Questions in Section 20.5	trained, derived, changed	changed only

Aspect	With equivalence training (Chapters 20 and 33)	With a comic (Part III)
What the change allows one to say	if the relations were trained and derived, that the function followed the class	that the rating of the characters changed after reading; nothing about class

Note. Table prepared for this book, based on Chapters 20 and 33 and on the three Part III studies; Pereira and Moreira (2021b) is the study in Chapter 28.

⚠ CAUTION

Saying that the study with a comic does not test classes is not saying that reading does not change evaluation. The reports show that the rating of the characters changed for several participants. What they leave unshown is by which route, and whether the change reaches an object that was not in the story.

TEST YOURSELF

A report says: "after the story, the interns began to rate the supervisors less favorably." The story had a fictional supervisor, Elias, and the scale was administered only for him. What does the record allow one to say?

ANSWER: that Elias's rating changed. About "the supervisors" there is no record: another object would have to be measured, before and after (the photographs of the real supervisors, for example).

34.5 What the design allows one to claim, and what is missing

Murrar and Brauer (2019, p. 167) list, in Table 1 of the article, four essential characteristics for a study to put the effectiveness of a narrative to the test and two desirable ones. Table 34.6 applies them to the three studies, without accusation: each set out to check whether reading changes the evaluation of the characters, and for that question the before and after of the same participants is a first step (Section 25.1).

Table 34.6

Murrar and Brauer's (2019) six characteristics and the three studies

Characteristic (Murrar & Brauer, 2019, p. 167)	In the three studies
Essential 1: participants randomly assigned to conditions	no groups: 3 participants, all with the same story (Nogueira, p. 84; Assumpção, p. 142; Godoy, p. 277)

Characteristic (Murrar & Brauer, 2019, p. 167)	In the three studies
Essential 2: a control narrative comparable in length, genre, quality, and entertainment value	there is no second narrative and no group that does not read; the design is each participant's pre and post, "single-case" (Nogueira, p. 84; Assumpção, p. 143; Godoy, p. 277)
Essential 3: validated measures, in more than one way (self-report, behavior, climate as perceived by those who are targeted)	a single way of measuring: the rating on the scale (Nogueira, p. 86; Assumpção, p. 145; Godoy, p. 278); Assumpção adds a question at the end (p. 185)
Essential 4: effects measured immediately and after an interval	only immediately, in a single session (Nogueira, p. 122; Assumpção, p. 184; Godoy, p. 313)
Desirable 5: narrative tested in the field	session arranged with the researcher, by video call (Nogueira, p. 86; Assumpção, p. 145) or in a room with a projector and tablet (Godoy, p. 312)
Desirable 6: compared with other methods	no comparison with another method

Note. Table prepared for this book, based on Murrar and Brauer (2019, p. 167) and on the reports by Nogueira, Assumpção, and Godoy (Moreira, Lemos et al., 2024).

For what they set out to do, the studies deliver what the design allows: they say how each participant rated each character at each point. What they do not allow is saying that reading "has an effect," in the sense Murrar and Brauer give the term, or that the effect persists. The authors' own earlier study, described in the article (p. 166), shows what would be missing: random assignment, another series as a control, and measurement right afterward and four weeks later.

The same caution appears in the books of the series. In Study 1 of "Atitudes," each participant read two stories, one per session, two days apart (Rabelo, p. 80). In the first, the one who responds with a swear word is Amanda, the only Black character (pp. 71 and 72). For 5 participants, the aggressor in the first story received lower values on the bad/good pair than the one in the second. The report writes that this "may be due either to a racial bias or to interference from reading the first story on the reading of the second" (p. 93). To separate the two, one would need to "reproduce the experiment with new participants, switching the order in which the stories are presented" (p. 93). This is what Section 33.4 called mixing: the difference between the two stories carries, at the same time, the character's appearance, the content of the scene, and the order.

There is also what the story shows to the reader. The consent form for Study 1 of "Atitudes" (Rabelo) has five sections: nature and aims of the study; study procedures; risks and benefits; participation, refusal, and the right to withdraw from the study; and confidentiality. It states low risks "related to everyday computer use and the presence of swear

words in the respective comics" (pp. 69 and 70), and Assumpção's form has the same sections (p. 143). In Nogueira, at the end of the script, after the pause for the posttest, the assistant says: "It is worth remembering that this is a comic and that its authors are against violence and prejudice" (p. 122). The ethics line of the sheet thus gains two items: what the story shows and how the person is debriefed.

The choice of roles also comes in. According to Murrar and Brauer (2019, p. 167), social psychological theory suggests that depicting a bigoted character can work, but only if that character is not the protagonist and meets with negative social sanctions within the narrative. The first condition stems from people's strong inclination to identify with a story's protagonist, and both conditions, they write, still need to be verified. In Nogueira, Carlos appears "as the protagonist," and Ana as "another protagonist" (p. 91). The plot ends with the school administration taking "measures to ensure the safety of the young student" (p. 93). This is not a criticism of the study: it is a design parameter that the sheet asks to be stated, the role and consequences of each character.

Finally, reach. The same authors point out that change on a societal scale depends both on how effective a narrative is and on how likely people are to choose to expose themselves to it (p. 167). In the three studies, exposure is arranged with the researcher and timed: panel by panel, 15 or 20 seconds. Talking about combating prejudice on a large scale would require another study, with self-chosen exposure, a comparable group, and delayed measurement. Chapter 35 changes the question: instead of asking whether reading changes the rating, it deals with interventions planned to reduce prejudice and with what is required of them.

Table 34.7 shows how the Chapter 33 sheet changes when the story replaces training. The Participants and Instrument lines of Table 33.1 stay as they were.

Table 34.7

The Chapter 33 sheet when the story replaces training: what changes

Line of the sheet (Table 33.1)	What changes
Question	goes from "does the rating of the photographs change after training?" to "does the rating of the characters change after reading?"; the question about the real object is a different one (Section 34.4)
Criteria	the training pass criterion, the class, and chance drop out; what counts as change comes in, by character and by participant, with the counting rule stated (Section 34.3)

Line of the sheet (Table 33.1)	What changes
Variables	the independent variable is the part of the story read before each measurement point, with the values for each character (Section 34.2)
Stimuli	the image and role of each character; the real photographs, which do not appear in the story, enter only at the measurement points (Sections 34.2 and 34.4)
Training and tests	become exposure: panels, time per panel, instructions within the story, and measurement points; there is no test of derived relations (Section 34.2)
Recording	the same scale at the measurement points; a group that reads another story and follow-up are what is missing (Section 34.5)
Administration	setting, mode, who administers, and time per panel, stated (Section 34.2)
Ethics	the consent form says what the story shows; roles and consequences of the characters; debriefing at the end (Section 34.5)
Limitations	what a character's rating does not say (Section 34.4)

Note. Table prepared for this book, based on the sections of this chapter and on Chapter 33.

EXAMPLE

(Hypothetical case.) On the "Limitations" line, Beatriz writes: "The rating is of Nina, Elias, and Selma. What is said about the clinic's supervisors comes only from the photographs, which do not appear in the story. A group of interns reads another story, of the same length and with the same scale. Follow-up two weeks later." On the "Ethics" line: "consent form stating what the story shows (harsh criticism of an intern), Elias's role and consequence, and debriefing at the end, for both groups."

TEST YOURSELF

In a study with 3 participants who read the same story in the same session, which of Murrar and Brauer's essential characteristics can be met with the smallest addition, and how?

ANSWER: measurement after an interval (characteristic 4): readminister the scale, for example, two weeks later. Characteristics 1 and 2 require groups and a second narrative.

Common learner mistakes

1 **Taking the character's rating for the attitude toward the group or practice.** The mistake happens because the abstracts themselves name the group or practice in the aim, and the reader moves from the aim to the conclusion without noticing that the object measured was the character. *How to spot the mistake:* the conclusion talks about "prejudice against women," "pseudoscience," or "transphobia," and the record is the rating of fictional characters (Section 34.4).

2 **Calling the difference between two moments in a few participants an effect.** The mistake happens because, in everyday life, "effect" means what came afterward, not what shows up in comparison with people who did not go through the condition. *How to spot the mistake:* the report says "significant effect" with no group that did not read the story, no test, and no follow-up, or concludes "all" when one participant did the opposite (Sections 34.3 and 34.5).

3 **Counting pairs without checking the rule, or treating all pairs as an evaluation of the character.** The mistake happens because the count is easy to read and seems to make the mean unnecessary, and because the 13 pairs appear together on the same scale, as if they all measured the same thing. *How to spot the mistake:* "6 of 9 worsened" appears without the mean and without the counting rule, or sad–happy and relaxed–tense go into the rating of a character who suffers an attack in the scene (Section 34.3).

4 **Attributing to the story what the design mixes together.** The mistake happens because the most visible difference between the two stories, such as a character's appearance, seems the natural explanation, and the reading order does not appear on the page. *How to spot the mistake:* the second story is always read after the first, with other characters and other content, and the difference is attributed to a character's appearance (Section 34.5).

5 **Jumping from exposure to intervention.** The mistake happens because the topic of the study is a social problem, and the result of one research session is read as an answer to that problem. *How to spot the mistake:* the text talks about combating prejudice on a large scale on the basis of a single timed session, with no delayed measurement and no behavior (Section 34.5).

SUMMARY

Resistance and narrative (objective 1). Attitude resistance is what the person does with a message that calls for change. A narrative is a series of events linked by characters, with a beginning, middle, and end, and a comic is a visual narrative. The evidence that narratives change intergroup attitudes is, in the authors' own words, "suggestive at best."

The procedure (objective 2). Images of characters with assigned roles are rated on 13 pairs; the story is read panel by panel, at a set pace; the scale returns at measurement points that divide the story.

Reading the report (objective 3). It is read by character, by participant, and by measurement point; the summary sentence summarizes, and the record says where it holds; the counts of "improved" and "worsened" follow a rule, which has to square with the numbers, and are read next to the mean.

What the rating says (objective 4). The rating is an evaluation of the character; the study with a comic neither trains nor tests derived relations and answers only the third question of Section 20.5, whether the evaluation changed; the other two, whether the trained relations were learned and whether the derived relations appeared on the tests, do not apply.

What can be claimed (objective 5). The three studies show each participant's before and after; missing are a comparable group, a control narrative, delayed measurement, and measurement of the real object, and the sheet states the characters' roles and the debriefing at the end.

EXERCISES

Answer without looking at the chapter. Then check your answers in the answer key.

1. Define narrative and attitude resistance in Murrar and Brauer's (2019) words and say why, according to them, the usual methods of combating prejudice meet resistance.

2. (Hypothetical case.) One clinic campaign hands out a poster with "Ask for help early" next to a drawing of a smiling intern. Another hands out a six-panel strip in which an intern puts off asking for help, runs into a problem, and then asks. Which of the two is a narrative, and which of Murrar and Brauer's routes would the strip use?

3. In Assumpção, what values does the independent variable take for Amanda, and after which part of the story is each measurement point taken?

4. Name three procedural decisions that the report of a study with a comic needs to state so that someone else can redo it, with an example from the chapter's studies for each one.

5. (Records constructed for the exercise.) A participant rated a character on nine pairs, with values of +3, +3, +3, +1, +1, +1, +1, +1, and +1 before and of +3, +3, +3, −1, −1, −1, −1, −1, and −1 after. (a) Classify each pair by Assumpção's rule. (b) Calculate the mean before and after. (c) What does the count say, and what does the mean say?

6. In Nogueira, the final sentence suggests that the story had "a positive effect on changing attitudes toward female characters." Which data in the report do not fit the sentence where Ana is concerned?

7. In Godoy, the discussion states, for C1, "an overall increase in the mean of all participants between the Pre and Post 1 conditions." What does the results paragraph describe, and what should be done about the discrepancy?

8. (Hypothetical case.) After reading "The Feedback Session," 12 interns give Elias a mean of −0.9 (before, +0.4). Beatriz writes: "The story made the interns rate the supervisors poorly." Point out two passages that the record does not support and what she would add.

9. Apply the three questions in Section 20.5 to a study with equivalence training and to a study with a comic. Which questions does each one answer?

10. Which of Murrar and Brauer's (2019) essential characteristics are missing from each of the three Part III studies, and what design parameter do they cite regarding the bigoted character?

ANNOTATED ANSWER KEY

1. Narrative: "a series of events that are tied together through characters and that usually has a beginning, a middle, and an end" (p. 165). Attitude resistance: what prevents attitude change; strongly resistant attitudes tend to be un-

affected by pressure to change, and the person counterargues, discredits the persuader, attends selectively to what agrees with the attitude, or feels anger (p. 164). The usual methods meet resistance because the person knows they are the target of persuasion, is often required to take part, and receives the message that something is wrong with them (p. 165).

2. The strip is a narrative: it has a series of events linked by a character, with a beginning, middle, and end. The poster is a message. The strip would use observation of models (the character receives consequences for putting off and for asking) and, by the first reason, would make the intent to persuade less salient than the plot (Murrar & Brauer, 2019, p. 165).

3. No exposure; exposure to scenes in which Amanda acts as a family constellation facilitator; exposure to scenes in which she is confronted by Bruna about ethical-scientific principles (p. 144). Measurement points: pre, before any panel; post 1, after chapter 1; post 2, after chapters 2 and 3 (p. 185).

4. For example: the time per panel (15 seconds in Nogueira, p. 118; 15 in the instruction panel and 20 in the procedure in Godoy, pp. 309 and 313); the measurement points and where they fall (Assumpção, p. 185); the mode of administration (remote in Nogueira, p. 86; in person, with a projector and tablet, in Godoy, p. 312); the number of panels per chapter (Assumpção, p. 148).

5. (a) The first three pairs stayed the same (positive before and after); the last six worsened (from positive to negative); none improved. (b) Before, 15 ÷ 9 = +1.67; after, 3 ÷ 9 = +0.33 (this book's calculation). (c) The count says that six of the nine pairs switched sides; the mean says that the rating fell 1.33 points and still stayed on the positive side (this book's calculation).

6. P1 rated Ana predominantly negatively before and after, with three ratings that became positive (p. 125), and P2, who had rated her positively or neutrally, gave more negative ratings afterward (p. 126); only for P3 do positive ratings predominate at both moments (p. 128). The report itself speaks, for Ana, of "varied changes from P2 and P3" (p. 134).

7. The results describe, for P2 and P3, a decrease in C1's mean from pre to post 1, and only P1 showed an increase (p. 322). The discussion (p. 323) summarizes what the results paragraph does not describe; the record by participant prevails, and the discussion should be corrected or explained.

8. First: "the supervisors"; the rating is of Elias, and the scale was not administered for real supervisors (Section 34.4). Second: "made"; the before and after have no comparable group and no follow-up (Section 25.1). She would add the photographs of the real supervisors, who do not appear in the story, at the measurement points, a group that reads another story, and the scale two weeks later; and she would separate the pairs that describe the scene (tense–relaxed) from those that evaluate.

9. With equivalence training: were the trained relations learned? Did the derived relations appear on the tests, without differential consequences and above chance? Did the evaluation change? With a comic: only the third, because there is no trained relation and no test of derived relations (Section 34.4).

10. In all of them, random assignment, a control narrative, and measurement after an interval (Table 34.6); measurement in more than one way is also missing, with the partial exception of the question at the end in Assumpção (p. 185). On the bigoted character: according to social psychological theory, it would be effective only if it were not the protagonist and suffered social sanctions in the narrative (Murrar & Brauer, 2019, p. 167).

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 35. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2	34.1
3, 4	34.2
5	34.3 and common mistake 3
6, 7	34.3 and common mistake 2
8, 9	34.4 and common mistake 1
10	34.5 and common mistakes 4 and 5

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CHAPTER

35 Behavioral Engineering and Combating Prejudice

OBJECTIVES

By the end of this chapter, you will be able to:

1. **Define** behavioral engineering, in the sense proposed here, and **distinguish** it from a campaign by what the plan declares before it starts.
2. **Describe** what an intervention requires at each level (individual, institutional, and structural): the target, what is proposed to change, and what would be recorded.
3. **Classify** the status of what a source offers (proposal, laboratory, applied study with a measure, or synthesis) and **state** what can be claimed on that basis.
4. **Build** the intervention plan for a case: functional hypothesis, components, recording and comparison, follow-up, and decision criterion.
5. **Point out** the dual use of a procedure and what the plan declares about its objective, participation, and what is not done.

PREREQUISITES

The functional hypothesis and the three paths of intervention (Sections 19.4, 19.5, and 19.6), shaping (Section 12.4), the levels of racism (Section 18.6), the routes of formation and change and what is recorded (Sections 25.2 to 25.5), interobserver agreement (Section 22.7), the design sheet and the ethics of a design (Chapter 33), and Murrar and Brauer's criteria (Section 34.5). The new terms (behavioral engineering, intervention plan, component, status, decision criterion, and dual use) are defined here.

OPENING

(Hypothetical case, continued from Chapter 34.) The coordinators of the training clinic approved Beatriz's comic for a trial session and, at the same meeting, brought up a bigger request. In the previous week's supervision, an intern had said, about the patients referred by social

services, "these people don't adhere to anything," and the room laughed. The administration wants "a week against prejudice," with a lecture, posters, and the comic. Beatriz wants to know what would change if, instead of a week, the clinic had an intervention plan, and what the sources allow one to promise. Four questions organize the chapter.

1. *"What does behavioral engineering add to a campaign, and how does one tell them apart?"*
2. *"At what level does an intervention act, and what changes from one level to another?"*
3. *"What do the sources show about each component, and with what status?"*
4. *"How is the plan put together, and what precautions does it call for?"*

The first is the subject of Section 35.1; the second, of 35.2; the third, of 35.3; the fourth, of Sections 35.4 and 35.5.

35.1 From campaign to engineering

Chapter 34 opened with Murrar and Brauer's (2019, p. 164) assessment: researchers in the social sciences and practitioners know comparatively little about producing durable change in attitudes between groups. Most pro-diversity initiatives are never evaluated at all, and, among the few that have been assessed, the majority prove ineffective. The behavior-analytic literature describes the same gap from its own side. Matsuda et al. (2020, p. 336) write that there is little behavior-analytic research to serve as a guide, and they report that the review they had planned, with keywords related to racism across 30 years of literature, yielded "zero." Passarelli et al. (2023, p. 34) ran a new search, from 1990 to 2022, in 14 international and 3 Brazilian behavioral journals, with the keyword "racism." They identified 43 articles, 33 of them from 2020 to 2022, and conclude that, despite the substantial increase, output is still low. For the absence of experimental and applied work, the authors infer that the heart of the matter may lie "in the difficulty of defining this phenomenon and of identifying which variables should be considered when planning the intervention" (p. 34).

This changes what a clinic can promise. There is no ready-made program against prejudice, with a demonstrated effect, to buy or apply. What exists are proposals, laboratory results, a few applied studies, and syntheses of studies, with very different kinds of support (Section 35.3).

The question becomes how to plan an intervention whose result will be recorded and used. This is what this book calls **behavioral engineering**. The definition is proposed here, and none of the sources consulted uses the term. From engineering comes the idea of designing, implementing, and testing a solution to a concrete problem. To it are added two requirements that Chapters 19 and 25 already made: describing the procedure so that someone else can carry it out again, and recording the result before saying that a change occurred.

KEY CONCEPT

Behavioral engineering is the planning, implementation, and evaluation of an intervention on what people do and on the contingencies under which they do it. Before it starts, four things are declared: what is to be changed, written as behavior or as an arrangement of contingencies, and not as a characteristic of the person; what will be done, described so that someone else can carry it out again; what will be recorded, with what comparison, and after what interval; and what will be decided with each result.

The document in which these four declarations are written is the **intervention plan**. It is a relative of the design sheet from Chapter 33. The sheet says what a study will measure and compare; the intervention plan also says what will be changed, how, and which result will lead to maintaining, adjusting, or discontinuing what is being done. Section 35.4 presents the rows of the plan.

The difference from a campaign does not lie in the content: a lecture, a poster, and a comic can all be part of a plan. It lies in what is declared. Table 35.1 compares the week the administration asked for and the plan Beatriz would sketch, on the six questions the plan answers before it starts.

Table 35.1
The administration's week and an intervention plan: what each one declares (hypothetical case)

Question	The administration's week	Beatriz's plan
What is to be changed?	"prejudice" in the clinic	the statement that attributes an unfavorable characteristic to all patients of a given origin ("these people don't adhere to anything"), in supervision sessions, and the laughter that follows it
Why is it supposed to work?	not stated (it is assumed that informing and raising awareness are enough)	because of a functional hypothesis, to be tested across occasions: the laughter and agreement of the room maintain the statement

Question	The administration's week	Beatriz's plan
What is done?	lecture, posters, and comic	described procedures: what the supervisor says and does, on what occasion, and with what consequence
What is recorded?	the opinion of those present on the last day ("did you like it?")	the rate of the statement per hour of supervision, before, during, and after, with two observers
With what comparison?	none	supervision groups that have not yet started
What is decided with the result?	not stated	maintain, adjust, or discontinue, by a rule written in advance

Note. Table prepared for this book; the case is hypothetical.

The first question is the one that fails most often. Mizael and de Rose (2017, p. 373) observe that explaining discriminatory practices as caused by racist individuals or by racism "does not help in overcoming such acts," because these terms are general and "do not make clear what must be changed, in behavioral terms." Moore (2003, cited by them) goes further: disparaging dispositional attributions about certain classes of individuals tend to become "a license or justification for treating such people differentially" (p. 373). That is why the target of the plan is the statement, the occasion, and the consequence, and not "the prejudiced intern." It is what was done with Nélson in Chapter 18: cue, occasions, and consequences, in place of "he is prejudiced."

There is also a practical reason for the record to come before the promise. Matsuda et al. (2020, p. 342) report a study of brief perspective-taking interventions in which taking the other's perspective, on its own, made views of older people more negative. Adding a mindfulness component softened the effect to some degree (Edwards et al., 2017, cited by them). A procedure that seems obvious, asking a person to put themselves in someone else's shoes, moved the measure in the opposite direction. Only the record, before and after, shows this.

EXAMPLE

(Hypothetical case.) Beatriz's plan says: "Target: statements in which an intern attributes an unfavorable characteristic to all patients of a given origin, per hour of supervision, and the laughter that follows them. Recording: two observers, in three supervision groups, before, during, and four weeks after. Decision: maintain the procedure if the rate falls by half within three weeks; adjust it if it does not." It has an observable target, a described procedure, recording, comparison, and a decision rule: it is behavioral engineering.

NON-EXAMPLE

(Hypothetical case.) The administration's week has a lecture on Monday, posters in the hallways, and, on Friday, a satisfaction questionnaire. It may be well-intentioned and even useful, but it does not declare what will be changed in terms of behavior, records nothing beforehand, compares with nothing, and does not say what it will do with the result: it is a campaign, not behavioral engineering (this book's reading).

TEST YOURSELF

(Hypothetical case.) After a week of lectures, a report says: "92% of participants rated the week as excellent, and prejudice decreased." Which declarations of a plan are missing to support the second part of the sentence?

ANSWER: what changed, written as behavior or as an arrangement of contingencies; the record from before, for comparison; a comparison; and the interval. The 92% is satisfaction with the week, not a record of the target.

35.2 Three levels, three targets

To say where the plan acts, we use the distinction Passarelli et al. (2023, p. 35) draw for racism (Section 18.6): the structural level, "a large-scale hierarchical system marked by the concentration of power and wealth"; the institutional level, of "segregating institutional practices"; and the individual level, "based on prejudice and racial discrimination." The authors warn that the distinction "is didactic," that "it is not a hierarchy," and that "to combat racism, it is necessary to intervene at all its levels" (p. 40). They deal with "the racism that is practiced against Black people" (note 5, p. 35). Applying the levels to other groups, as has been done since Chapter 18, is a transposition made here.

What changes from one level to another is the target, what is proposed to change in order to reach it, and what would be recorded. Table 35.2 brings together what the sources consulted say about each. The proposals are described, by the authors themselves, as proposals: Passarelli et al. (2023, p. 36) say that, even though "there are no works in behavior analysis that directly address interventions in structural racism," "some works present proposals that could bring about changes at this level."

Table 35.2

The three levels: the target, what the sources propose, and what would be recorded

Level	Target, in the words of the sources	What the sources propose	What the sources say would be recorded
Individual	"modification of an individual's prejudiced and discriminatory behavior" (Passarelli et al., 2023, p. 39)	reinforcing antiracist remarks with attention, support, and praise, and interrupting and disagreeing with a racist remark, with the caveat in note 8 about punishment; equivalence training with children; acceptance and commitment training with police officers (Passarelli et al., 2023, p. 39)	"Likert-type scale, implicit measures, and relational tests" (Passarelli et al., 2023, p. 40); rates of praise and reprimands by category of student (Knochel et al., 2019, as cited in Matsuda et al., 2020, pp. 338–339)
Institutional	"classes of responses emitted by members of an institution" and "arrangement of contingencies that favor racist practices within an organization" (Passarelli et al., 2023, p. 38)	selecting institutional practices to alter and implementing new ones, with a cultural design guide (Orlandi & Reis, 2022, as cited in Passarelli et al., 2023, p. 37); giving Black people the conditions to file official complaints, for example with lawyers available for free consultation (Mizael, Coelho et al., 2021, section on institutional racism in the Military Police); regularly publishing the "state of the organization," with goals, progress, and the modifications to be made if there is no progress, a proposal addressed to professional organizations and regulatory bodies (Levy et al., 2022, step 8 of the first list)	"interviews with Black people with accounts of the service they received, or data on the structure of the organization (how many Black people work there, positions, salaries)" (Passarelli et al., 2023, p. 38)

Level	Target, in the words of the sources	What the sources propose	What the sources say would be recorded
Structural	"modifying the arrangement of contingencies present in different social segments" (Passarelli et al., 2023, p. 36)	changing the policy of monetary incentives to police officers for arrests and fines, with legislative changes and a training protocol (Rose et al., 2022, as cited in Passarelli et al., 2023, p. 36); communication training for leaders of antiracist movements (Esquierdo-Leal & Houmanfar, 2021, as cited in Passarelli et al., 2023, pp. 36–37); laws criminalizing homophobia and education in the medium and long term (Fazzano & Gallo, 2015, p. 543; this book's reading)	"the national statistics" (Passarelli et al., 2023, p. 37)

Note. Table prepared for this book, based on the sources cited; the proposals are proposals, not results. The studies cited by other authors were not consulted.

The levels touch. Passarelli et al. (2023, p. 39) note that "the institution defines how the service is regulated, and individuals carry out the actions, generating consequences for themselves and for others." They add (p. 40) that "interventions at the institutional and individual levels can be reflected at the structural level," such as Orlandi and Reis's (2022, cited by them) intervention in a school, which could become public policy. For the clinic, this is practical.

(Hypothetical case.) What Beatriz saw was the individual level: an intern's statement and the laughter of the room. Suppose, however, that the clinic has a rule that discharges any patient who misses two sessions, and that those who depend on paid transportation miss more. Then "don't adhere" describes, in part, what the rule does to certain patients. The institutional target becomes the rule and what it produces, measured by what the clinic itself records: how many patients were discharged for absences, by source of referral. The structural level, that of income and transportation, is beyond the reach of a training clinic. The plan does not ignore it: it declares it as a limit.

⚠ **CAUTION**

Table 35.2 lists proposals and what the sources say would be recorded; it does not list results. That a measure is the "benchmark" of change (Passarelli et al., 2023, p. 37) says what to look at, not that change has occurred.

TEST YOURSELF

(Hypothetical case.) Three actions by the clinic: (a) the supervisor calmly interrupts a statement that generalizes about the patients; (b) the clinic starts recording, by source of referral, how many patients are discharged for absences; (c) the city discusses funding transportation for the patients. Which level is each one, and what would be recorded?

ANSWER: (a) individual: the statement, by occasion; (b) institutional: data on the structure of the organization (Passarelli et al., 2023, p. 38); (c) structural: the arrangement of contingencies of a broad segment, with indicators as a benchmark (p. 37).

35.3 What the sources show about each component

When the plan chooses what to apply, it chooses among procedures that the sources describe with very different degrees of support. Two terms organize the reading.

KEY CONCEPT

A **component** is each procedure the plan applies, described so that someone else can carry it out again: who does what, on what occasion, and with what consequence, and which path in Table 19.4 it corresponds to (altering the occasion or the operation, removing the consequence, or reinforcing an alternative).

We distinguish four kinds of support a source can give a component. In a *proposal*, the authors suggest what to do, without data from a project of their own. In the *laboratory*, the effect was measured on a laboratory task. In an *applied study with a measure*, the intervention was applied in the setting where the behavior occurs, and something was measured before and after. A *synthesis* combines several studies into an average or a count.

KEY CONCEPT

The **status** of a source is the kind of support it gives a component: proposal, laboratory, applied study with a measure, or synthesis. The classification is the book's, and a single source can offer more than one. Saying that "the source shows it works" without saying the status is the sentence the plan avoids.

EXAMPLE

Passarelli et al. (2023, p. 39) write that, at the individual level, "a stance that could be adopted" would be the punishment of prejudiced behavior and "the reinforcement of antiracist behaviors." Status: proposal. The verb is in the conditional, and there are no data.

NON-EXAMPLE

Writing, in a report, that "studies show that reinforcing antiracist remarks reduces racism." The source contains neither a study nor a measure; citing it as a result substitutes a demonstration for a proposal.

Table 35.3 brings together what the sources consulted report about each component, with its status and what remains open.

Table 35.3

What the sources consulted report about each component, and with what status

Component	What the source reports	Status	What remains open
Social consequences for remarks	reinforcing antiracist remarks with attention, support, and praise; interrupting and disagreeing with a racist remark; reinforcement "may be a more effective strategy" than punishment (Passarelli et al., 2023, p. 39)	proposal	there are no data; the comparison between reinforcing and punishing is an argument by the authors, based on the fact that punishment produces avoidance (note 8)
Feedback on one's own rate	teachers trained to self-monitor, receiving feedback on how many praise statements and reprimands they gave per session; next, training on why praise should be evened out; finally, feedback that named the three students praised and reprimanded the most and the three praised and reprimanded the least; at the end, equitable rates across the categories of students (Knochel et al., 2019, as cited in Matsuda et al., 2020, p. 343)	applied study with a measure, secondhand	the source gives no design, numbers, or follow-up, and the study is listed as a submitted manuscript (p. 346)

Component	What the source reports	Status	What remains open
Equivalence training	children formed the trained relations and reduced their negative biases toward faces of Black people (Mizael, de Almeida et al., 2016, reported by Matsuda et al., 2020, p. 340); in a subsequent study, which separated the training parameters into groups, 27 of the 33 children who formed classes maintained at least one relation six weeks later (Mizael, de Almeida et al., 2021, Discussion section); in experiments with adults and socially meaningful stimuli, the Instituto Walden4 volume reports class formation and transfer of function to very different degrees from one experiment to another (Moreira, Rocha et al., 2022; Table 30.4)	laboratory	Matsuda et al. do not claim that the procedures change prejudices in the long run or that they prevent racist behaviors outside the laboratory (p. 340); the authors of the 2016 study say that "we should not be very optimistic" about lasting effects (Mizael, de Almeida et al., 2016, p. 460); in Experiment 12 of the Instituto Walden4 volume, the class reorganization phase was the one that least met its objectives, and the stimuli that already had social meaning were the hardest to reorganize (Moreira, Rocha et al., 2022, p. 725); Portela (2014, as cited in Moreira, Rocha et al., 2022, p. 85) concluded that the concept of obesity did not change after reversal training
Intergroup contact	right after contact, in field interventions with contact between two ethnic groups, d = 0.28 (Lemmer & Wagner, 2015, as cited in Albarracín & Shavitt, 2018, p. 302)	synthesis	another source says that contact has not been adequately evaluated in the field (Murrar & Brauer, 2019, p. 165)
Diversity training	d = 0.23 (Kalinoski et al., 2013, as cited in Albarracín & Shavitt, 2018, p. 302); "ineffective or counterproductive," in research covering hundreds of studies (Dobbin & Kalev, 2016, as cited in Murrar & Brauer, 2019, p. 165)	synthesis	the two sources do not say the same thing, and they are not reconciled here
Changing bias on implicit measures	in an analysis of almost 500 studies, these methods have no effect on discriminatory behavior (Forscher et al., 2018, as cited in Murrar & Brauer, 2019, p. 165); with a mindfulness recording, less race and age bias on implicit measures and, with a 10-minute meditation recording, less discrimination than in two control conditions (Lueke & Gibson, 2015, 2016, as cited in Matsuda et al., 2020, p. 342)	synthesis and laboratory	the two sources do not say the same thing; Matsuda et al. note that the mindfulness studies they describe next are not behavior-analytic (p. 342)

Component	What the source reports	Status	What remains open
Narratives	a radio soap opera in villages in Rwanda for 12 months: greater openness to future generations marrying members of another religious, ethnic, or regional group (Paluck, 2009, as cited in Murrar & Brauer, 2019, p. 166)	applied study with a measure, secondhand	the authors of the synthesis say that the current evidence is "suggestive at best" (p. 167)
Comics	19 comics, read by 83 participants in all, who rated the stimuli presented on a semantic differential scale, before and after reading, in a single-subject design (Moreira, Lemos et al., 2024, pp. 13, 17, and 18)	laboratory	the authors of the series call for larger samples and mixed methods (pp. 27 and 28), and in one of the studies attitude change was not identified (pp. 27 and 29); the measure is the evaluation recorded in the session itself, not what the person does in the setting where the behavior occurs (this book's reading)
Telling the person	Matsuda et al. (2020, p. 340) write that research shows that adding relations to the network (for example, the statement that Latinos come to the United States to work and not to steal) does not modify preestablished biases and makes them harder to extinguish	laboratory, as read by the authors of the review	the conclusion belongs to those who review the laboratory studies; Section 25.3 deals with this route, and Chapter 21 with what the theory predicts
Perspective taking	college students who imagined the point of view of an African American person treated unfairly in a store, or who wrote a narrative about a day lived by a member of a minority group, showed attenuated racial prejudice, measured by the IAT (Todd et al., 2011); in a study of brief interventions, perspective taking on its own made views of older people more negative, and adding mindfulness softened the effect to some degree (Edwards et al., 2017), both cited by Matsuda et al. (2020, p. 342)	laboratory	Matsuda et al. say that perspective taking can backfire under certain conditions, depending on the context and on the characteristics of the people involved (p. 342)

Component	What the source reports	Status	What remains open
Values clarification	values exercises (essays about what matters to the student) improved grades and narrowed the racial achievement gap among low-performing African American students, and grade averages were still affected two years later (Cohen et al., 2006); in a pilot with college students, a brief lesson grounded in ACT, unlike a conventional class, changed some answers on a prejudice questionnaire, especially positive behavioral intentions (Lillis & Hayes, 2007), both cited by Matsuda et al. (2020, p. 343)	applied study with a measure (grades) and pilot with a questionnaire, secondhand	the grades study measures performance, not prejudice; the pilot measures what the student answers, not what the student does (p. 343)

Note. Table prepared for this book; the studies cited by other authors were not consulted, with the exception of Mizael, de Almeida et al. (2016). The d is the difference between means in standard deviation units (Section 25.3).

Three readings come out of the table. The first is that no component appears, in the sources consulted, with support that would allow one to say it works. The only one that measures, in the setting where it occurs, a behavior linked to prejudice, feedback on the rate of praise and reprimands, comes secondhand, without a design, without numbers, and without follow-up. Matsuda et al. (2020, p. 344) conclude that the article "does not present a definitive solution" for this complex social problem, since present-day behavioral research "is neither sufficient nor robust."

The second is that the sources diverge, and no choice is made here. Murrar and Brauer (2019, p. 165) say that methods for changing bias on implicit measures have no effect on discriminatory behavior. Matsuda et al. (2020, p. 342) describe studies in which a mindfulness recording lowered bias on an implicit measure and, in another, discrimination. They may be measuring different things, with different participants and tasks (this book's reading). The original studies were not consulted, and what is recorded is that both readings exist. The same goes for contact and diversity training. Albarracín and Shavitt's (2018, p. 302) synthesis concludes that some attitude change is possible even in domains traditionally resistant to change. Murrar and Brauer's (2019, p. 165) says that diversity training has been ineffective or counterproductive and that contact has not been adequately evaluated in the field.

The third is that the same research can support two sentences. Lai et al. (2016) appear in Matsuda et al. (2020, p. 340) as an example that exposure to counterstereotypical exemplars can reduce bias, as measured on laboratory tests. In Passarelli et al. (2023, p. 40), by contrast, they

appear, along with Sawyer and Gampa (2018), as an example that most interventions tested in applied research tend to be ineffective or not to last over time. Lai et al.'s (2016) study was not consulted, and no choice is made here: each reading is cited with the name of whoever made it. The reason Passarelli et al. (p. 40) give for the lack of maintenance is that "individuals return to the same cultural environment, where the racist contingencies operate," and it is this reason that Section 35.4 turns into a row of the plan.

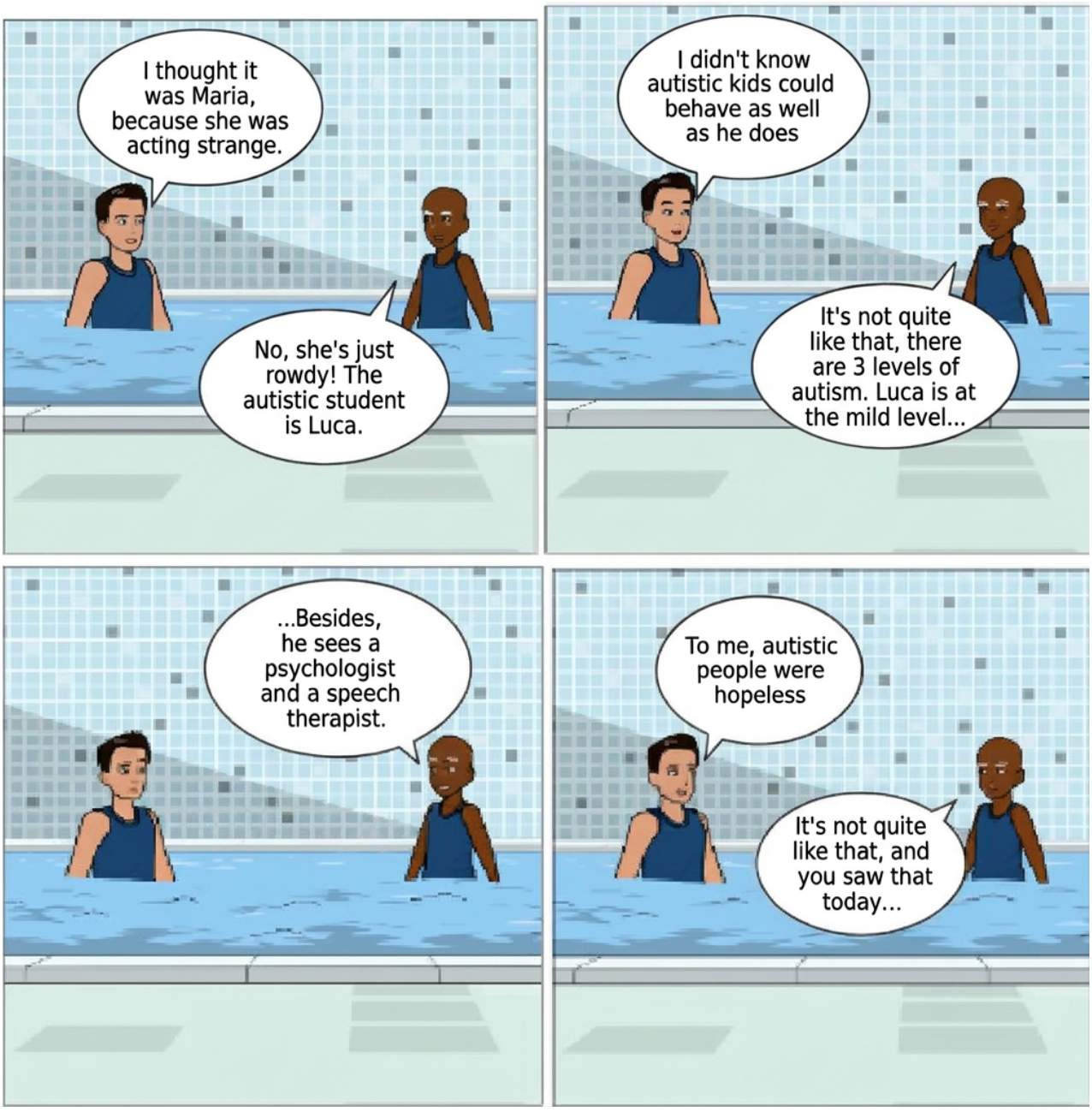
One family of components deserves a separate word, because Chapter 21 left it for this chapter and for Chapter 25: what the sources call *acceptance and commitment training* (ACTr). Mindfulness, perspective taking, values clarification, and the lesson based on acceptance and commitment therapy (ACT), from which the training derives, come from work that Matsuda et al. (2020, pp. 341–342) place in this family. According to them, few studies have evaluated interventions to reduce bias or soften its effects, and most of those published deal with ACTr interventions. ACTr teaches strategies of mindfulness, acceptance, and defusion that serve observable behaviors consistent with the person's values, and the six processes it targets are the present moment, acceptance, defusion, *self* as context, values, and committed action. For the plan, ACTr comes in like any other component: one declares what is taught, on what occasion, and with what recording, and the status of each row is that given in the table, not that of the family. The approach is described by what the source says about it, and the ACTr studies themselves were not examined (Section 25.3).

Beatriz's comic has a literature of its own, that of the line of research presented in Chapter 1, and one of its studies shows what the comic allows one to say. Silva and Moreira (2025) sent the invitation to a group of 194 swimming instructors, and the first 3 who replied were the participants (p. 392), physical education professionals specialized in swimming (p. 381). Each participant read 29 pages, 10 of instructions and 19 of story, in which the instructor Lucas, having only heard negative accounts of children with autism spectrum disorder (ASD), developed a prejudiced attitude toward them (pp. 384 and 392). Then the participant answered the scale, read the final 10 pages, which the study treats as the intervention, and answered again (pp. 392 and 393). Figure 35.1 shows the scene in which a colleague describes the student, corrects what Lucas assumed, and replies "It's not quite like that" to the line "To me, autistic people were hopeless" (p. 391). Between pretest and posttest, adjective pairs changed for each participant. The authors attribute the variation to the continuation of the story and to the characters' perspectives, and they caution that giving the posttest right after the

pretest may have introduced bias (p. 398). Read with the sheet in Table 35.4, the study declares its target, the evaluation of two characters and of the term "autism" (p. 383), describes the procedure, and records before and after. It has no comparison, follow-up, or decision rule (this book's reading). Its status is that of the laboratory, with 3 people: one may say that adjective pairs changed between pretest and posttest, but not that the story reduces swimming instructors' prejudice (this book's reading).

Figure 35.1

A colleague describes the student and corrects what the character assumed about autistic children



Note. Panels from the comic created by Silva and Moreira (2025, p. 391) for a study of swimming instructors' attitudes toward autistic children. The bottom row shows the end of the conversation, and the panels are read from left to right and from top to bottom. The reproduction has the resolution of the source material.

TEST YOURSELF

(Hypothetical case.) A clinic document says: "Mindfulness reduces racial prejudice." What status do the sources consulted allow one to assign to this sentence, and what rewording is appropriate?

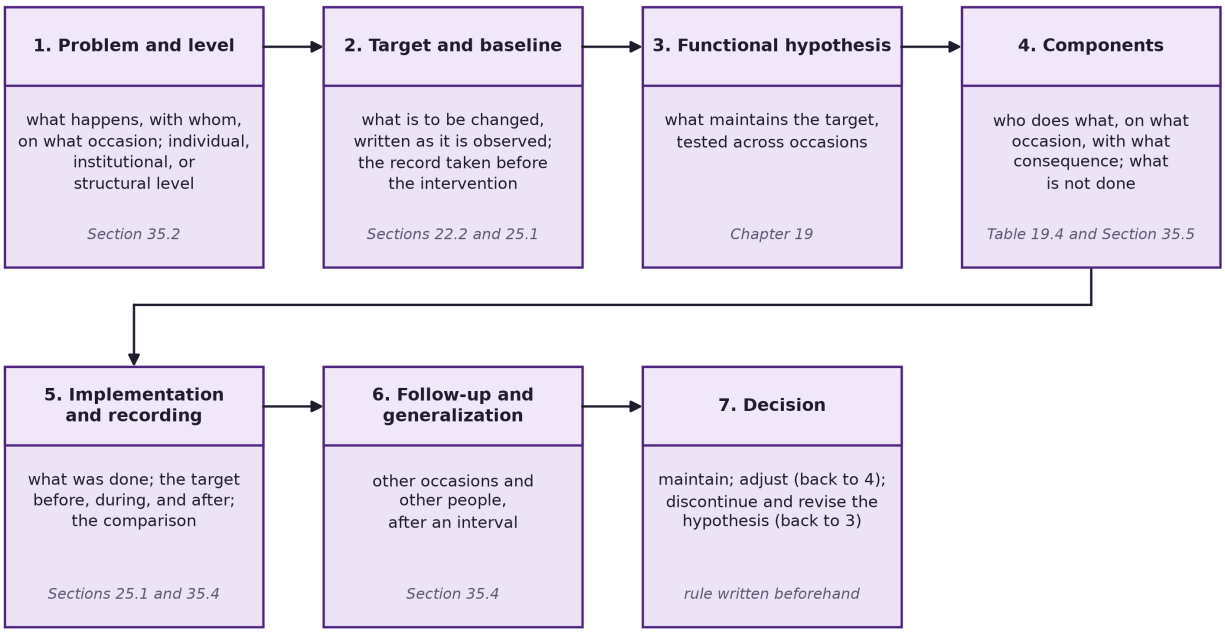
ANSWER: laboratory, in psychology studies that Matsuda et al. (2020, p. 342) describe and say are not behavior-analytic. An appropriate wording: "in laboratory studies with students, a mindfulness recording lowered race and age bias on an implicit measure (Lueke & Gibson, 2015, as cited in Matsuda et al., 2020, p. 342)."

35.4 From problem to plan

Matsuda et al. (2020, p. 343) say what the practitioner can do: gather data on racist behaviors, identify their functions, design an intervention, step up the monitoring and reporting of prejudiced behaviors, reinforce alternative behaviors, or punish prejudice by means of social contingencies. The list offers possible actions, not a method. Here the actions are arranged in seven steps (Figure 35.2), together with what is needed for the result to be readable: comparison, follow-up, and a decision rule. The last item on the list is not taken as a component, for the reasons given in Section 35.5.

Figure 35.2

The seven steps of the intervention plan, from question to decision



Note. Diagram prepared for this book; no data.

From problem to target. "Prejudice in the clinic" is not yet a target. The target is what is observed: the statement "these people don't adhere to anything," said in supervision about patients of a given origin, per hour, and the laughter that follows it. Before applying anything, the plan checks, with the variation test (Section 18.2), whether there is prejudice in the sense of Chapter 18: does the statement appear for a patient of the same origin who does not miss sessions? And for a patient of another origin who misses just as many? If it follows origin and not absences, the group cue is the functional stimulus. If it follows absences, whatever the origin, the evaluation is of the act, and the target of the plan changes (Table 18.1). As there, each result is evidence, not proof. Fazzano and Gallo (2015, p. 543) ask for the same care: "one must look at behaviors in terms of their function in particular contexts," and "paying attention to context can help a great deal in not making the mistake of accusing a person of being homophobic."

The hypothesis before the components. Guerin (2005, as cited in Mizael & de Rose, 2017, p. 374) states that interventions to reduce "racism" should begin with a contextual analysis, to understand the functions and the situations in which people engage in discriminatory practices. "Racist" comments used to be included in a group, he adds, call for in-

terventions different from those for comments used to hurt. For the statement in supervision, the occasion record from Chapter 19 says what to observe (who speaks, in front of whom, what happens next), and the hypothesis is tested across occasions (Section 19.5). If the laughter and agreement of colleagues maintain the statement, the intervention addresses the audience and the alternative; if the statement spares the intern from examining the case, it addresses what makes that examination difficult. An intervention blind to function, such as the lecture for everyone (Section 19.6), addresses neither.

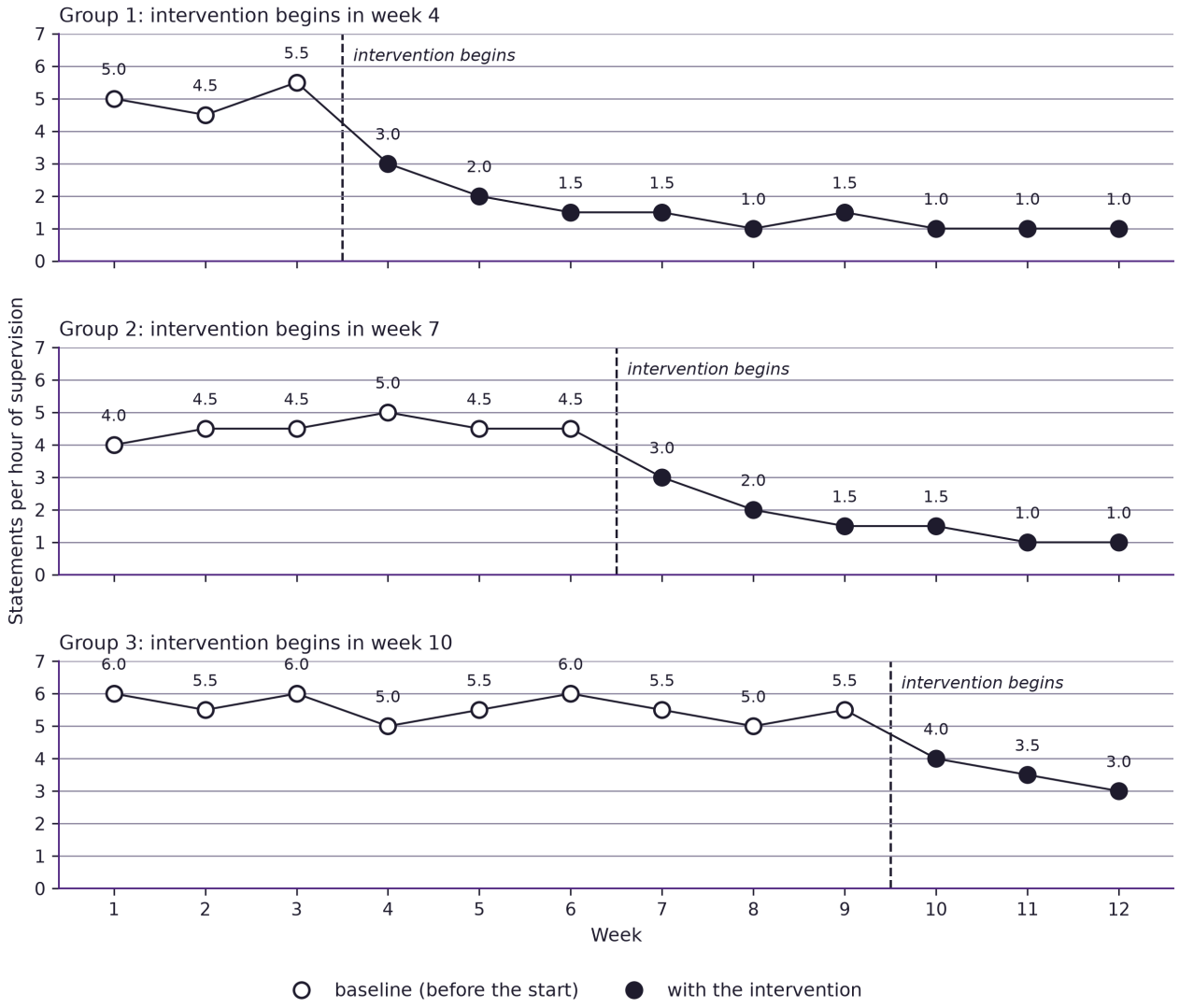
The components. Each component states who does what, on what occasion, and with what consequence, and which path in Table 19.4 it corresponds to. For the case, there are four. (a) The supervisor states the rule of describing an absence by what happened before and after it, and not by a trait of the group, and models it on one case, which teaches the alternative through instruction and imitation. (b) The supervisor reinforces with attention and praise the intern who uses it, in the format Passarelli et al. (2023, p. 39) describe for antiracist remarks, which is differential reinforcement of the alternative. (c) The supervisor does not join in the laughter and goes back to the clinical question, which removes the consequence and also depends on the group (Table 19.4). (d) Each week, the supervisor shows the class the group's rate of statements, in the format of Knochel et al.'s (2019, as cited in Matsuda et al., 2020, p. 343) feedback, which alters the occasion (this book's reading). Correcting the intern in public is left out (Section 35.5). Applying to the case what the sources describe for racism is a transposition by the book.

Recording and comparison. The record answers the questions from Chapter 25: before, after, comparison, persistence, and extent (Sections 25.1 and 25.5). For the target, the measure is the rate per hour of supervision (Section 22.2). The baseline, here, is the record taken before the intervention, not the baseline relations of an equivalence training (Chapter 20). The person who records is a trained observer who is not the supervisor, working from a consented recording. A second observer records part of the sessions, so that occurrence agreement can be calculated (Section 22.7). The proposed comparison is to start at different times: the clinic has three supervision groups, and the intervention starts in one of them, three weeks later in another, and three weeks after that in the third. Each group that has not yet started serves as a comparison for the one that has.

Figure 35.3 shows what one is looking for: the rate in each group changes when, and only when, the intervention starts in it. If all three lines dropped in the same week, regardless of when each one started, the explanation of an event that affected the whole clinic (a change in the administration, the start of vacation) would gain strength, and that of the intervention would lose it. This design, known in behavior-analytic research as a multiple baseline, does not appear in the sources consulted, and applying it to the clinic is the book's proposal. What the sources call for is comparison and measurement after an interval. Murrar and Brauer (2019, p. 167) list, among the features of a rigorous evaluation, random assignment of people to conditions and outcomes measured right away and after a delay, and Matsuda et al. (2020, p. 342) point out that behavior-analytic researchers have been applying mindfulness interventions in single-subject designs.

Figure 35.3

The rate of statements per hour of supervision in three groups that start the intervention in different weeks (fictitious data)



Note. Fictitious data, constructed for this book: they do not come from any study. The open circles are the baseline; the filled ones, the weeks with the intervention.

Follow-up and generalization. Recording does not end when the intervention ends. Passarelli et al. (2023, p. 40) write that most interventions tested in applied research tend to be ineffective or not to last over time, because "individuals return to the same cultural environment, where the racist contingencies operate." They therefore ask that applied research be planned with *follow-up* of whether the effects are maintained after the individual returns to their usual environment, and with tests of generalization of the intervention "to new stimuli, contexts, and

people." For the plan, this becomes recording on other occasions (the staff meeting, the hallway, another supervisor), with other groups of patients, and four weeks after the end.

The figure alone does not say what to do. It calls for a rule written before the data.

KEY CONCEPT

The **decision criterion** is the rule, written before implementation, that says which result of the record leads to maintaining, adjusting, or discontinuing the intervention.

Levy et al. (2022, step 8 of the first list of "Actionable Steps"), in proposing that professional organizations and regulatory bodies regularly publish the "state of the organization," call for specific goals, a report of progress, and "a description of modification to be made if progress is not being made." It is the same requirement, at the level of the organization, and applying it to a clinic is a transposition by the book. For the clinic, the rule has three outcomes. If the mean of the first three weeks after the start is at most half the baseline mean, the component is maintained. If it falls between half the baseline mean and the baseline mean, it is adjusted (the frequency of feedback, who gives it). If it is above the baseline mean, it is discontinued and the hypothesis is revised. The values are illustrative; what matters is that they are set in advance.

EXAMPLE

(Hypothetical case, with the fictitious data in Figure 35.3.) In group 1, the baseline mean was 5.00 and the mean of the first three weeks after the start was 2.17, below half (2.50): maintain. In group 2, they were 4.50 and 2.17, against a half of 2.25: maintain. In group 3, they were 5.56 and 3.50, above half (2.78) and below the baseline: adjust (this book's calculation).

NON-EXAMPLE

"Let's see how it goes and decide afterward." This is not a criterion: it does not say which value leads to which decision, and it leaves the decision until after the result, when any number can be read as success (this book's reading).

Table 35.4 brings together the rows of the plan, in the order of Figure 35.2, with what Beatriz would write for the clinic. It is the design sheet from Chapter 33 extended to intervention.

Table 35.4

The intervention plan: what to declare before starting (hypothetical case)

Row	What the plan includes	In the clinic's case
Problem and level	what happens, with whom, on what occasion, and the level at which the plan acts (Section 35.2)	statements about patients referred by social services, made in supervision and followed by laughter; individual level, with the absence rule as an institutional hypothesis to be checked
Target	the behavior or the arrangement of contingencies, written as it is observed, and the record taken before the intervention	statements that attribute an unfavorable characteristic to all patients of a given origin ("these people"), per hour of supervision, and the laughter that follows them; at least three weeks of recording beforehand
Functional hypothesis	what is assumed to maintain the target and how it will be tested across occasions (Sections 19.3 to 19.5)	the laughter and agreement of the room; the statement also spares the speaker from examining the case; test: record the occasions with and without an audience
Components	each procedure: who does what, on what occasion, with what consequence; which path in Table 19.4 it corresponds to; what is not done	the supervisor states the rule and models another way of describing the absence, reinforces with attention and praise whoever uses it, does not join in the laughter, and shows the group's rate each week; no one is corrected in public
Recording	measure, unit, who records, interobserver agreement (Section 22.7)	rate per hour; trained observer who is not the supervisor, working from a consented recording; second observer in part of the sessions, with occurrence agreement calculated
Comparison	what the change is compared with	the three supervision groups start in different weeks (4, 7, and 10; Figure 35.3)
Follow-up and generalization	other occasions, other people, after an interval (Passarelli et al., 2023, p. 40)	staff meeting and another supervisor; statements about other groups of patients; four weeks after the end
Decision criterion	the rule, written in advance, that leads to maintaining, adjusting, or discontinuing	at most half the baseline in the first three weeks: maintain; between half and the baseline: adjust; above the baseline: discontinue and revise the hypothesis
Participants and ethics	who participates, consent, refusal, what is not done, who sees the record, debriefing (Chapter 33 and Section 25.5)	consent form for everyone present, with the option of refusing to be recorded without any effect on the internship; no one is named in the reports; the last groups wait and know it; debriefing at the end, for everyone

Row	What the plan includes	In the clinic's case
Who implements	who implements and how what was done is recorded	the supervisors receive the description of the components; a checklist for each session says what was done
Limits	what the plan does not reach	the rate is of statements in supervision, not of the care given to patients; the structural level is outside the plan; no claim that "prejudice decreased" is made beyond what the record shows

Note. Table prepared for this book, based on the sections of this chapter and on Chapter 33; the case is hypothetical, and the values in the criterion are illustrative.

TEST YOURSELF

(Hypothetical case.) A plan says: "We will give the class weekly feedback and see if things improve." Which rows of the sheet are missing?

ANSWER: the target, written as it is observed (what "improve" means); the comparison; the follow-up; and the decision criterion, with the value that leads to maintaining, adjusting, or discontinuing.

35.5 Two uses of the same procedure

In Chapters 12 and 18, we saw that shaping "can be used for good or for ill, and many people use it without even knowing what they are doing" (Catania, 1999, p. 131). Chapter 18 also brought in Fazzano and Gallo (2015, p. 540), who, regarding homophobia, point to three acquisition processes, "the shaping of behavior, which occurs in terms of differential reinforcement," "the following of instructions (rules)," and "the imitation of a model of behavior, or modeling," and judge it more likely that "all three" are involved. Chapter 18 promised that Chapter 35 would use the same logic in the opposite direction, and the plan in Section 35.4 keeps that promise. Differentially reinforcing the alternative wording is the first process, which becomes shaping when successive approximations to it are reinforced; giving the rule is instruction; modeling it is imitation (this book's reading). The arrangement is the one that forms the evaluation one wants to reduce, with the object swapped.

KEY CONCEPT

The **dual use** of a procedure is its property of serving, with the same arrangement, both to establish or maintain an unfavorable evaluation and to reduce it. The procedure does not distinguish the object (Section 25.5): what distinguishes one use from the other is the objective and the decision of whoever conducts it.

EXAMPLE

(Hypothetical case.) The supervisor smiles at and praises the intern who rewords a patient's absence. The same smile and the same praise, directed at the statement "these people don't adhere to anything," maintain the statement: someone who receives attention and approval from peers for voicing racist views is more likely to keep voicing them (Matsuda et al., 2020, p. 337). Same procedure, attention and praise contingent on speech, with opposite objects.

NON-EXAMPLE

(Hypothetical case.) One supervisor smiles at the comment, and another corrects the intern in front of the class. These are two different procedures (one reinforces the statement, the other tries to suppress it), not the same procedure pointed in opposite directions.

Hence what the plan declares beyond the record. There are four precautions, each with its source.

Objective. The plan says what it intends to change and for what purpose, and those who take part need to know this before consenting (Section 25.5). Passarelli et al. (2023, p. 39) describe a proposal with police officers (Ghezzi et al., 2022, cited by them) whose objective is "to reduce the suffering these professionals face in their day-to-day work, by increasing psychological flexibility." The effects they point to concern well-being, stress, performance, and emotional reactivity. This is a legitimate objective and a different one from reducing racism, and a plan with this objective cannot present as a reduction in racism what it measured as well-being.

Participation. Murrar and Brauer (2019, p. 165) write that people are frequently required by their employers or schools to take part in the traditional methods, which undermines their self-determination and thus heightens resistance to attitude change. In a training clinic, where supervision is part of the internship, voluntariness has to be spelled

out: what is recorded, who sees the record, and that refusing to be recorded does not affect the evaluation of the internship. In the line of research with comics, Silva and Moreira (2025, p. 399) suggest that those in charge of the instructors use the test to identify negative attitudes and adopt strategies to modify them. A plan that followed the suggestion would have to declare, beforehand, who sees each instructor's record and whether refusing it has any effect on the refuser's situation at work. Chapter 33 and Section 25.5 call for consent and the option to refuse.

What is not done. The rule about what is not trained came in Chapter 33. De Carvalho and de Rose (2014, p. 534) did not consider acceptable, for ethical and educational reasons, no matter how effective it could be, a training that reversed the classes and made White faces equivalent to the negative symbols. Mizael, de Almeida et al. (2016, p. 455, note 2) judged that it would be ethically unacceptable to submit children to training capable of making racial features equivalent to a negative sign. The plan extends the rule to what it does itself: it does not teach or reinforce the unfavorable evaluation it wants to reduce and, if it shows it, as the comic shows a prejudiced character, it declares the evaluation's role and its consequence (Section 34.5).

Punishment. Passarelli et al. (2023, p. 39, note 8) point out that punishment produces avoidance and that, for this reason, it may reduce prejudiced behavior only in the context in which the person was punished; reinforcing antiracist remarks "may be a more effective strategy." Fazzano and Gallo (2015, p. 541) bring in, from Millenson (1967/1975, p. 399, cited by them), that the punishment procedure seems to be used often "not because it works so well, but because (1) it has an immediate effect; and (2) its delivery and/or side effects are almost always positively reinforcing for the person who administers the punishment." And, from Sidman (1989/2003, pp. 232–233, cited by them), that "in the short term, punishment is often the easy way," easy "in the sense that it requires no special training." For whoever conducts a plan, then, correcting the intern in front of the class carries a risk the sources point to: it reinforces, in the one who corrects, the act of correcting. It is for this reason, and because the effect may not extend beyond the room, that the clinic's plan does not take public correction as a component (this book's reading). Matsuda et al. (2020, p. 343), however, list "punish prejudice through social contingencies" among the possible actions. Whoever adopts punishment should record what it produces, also outside the context in which it was applied (this book's reading).

What the plan does not promise. Mizael and de Rose (2017, p. 374) write that it seems extremely difficult to extinguish only the "prejudiced" behaviors. According to an argument they bring in (Hayes et al., 2002, cited by them), the learning of everyday behaviors, such as problem solving and reasoning, depends on the same relations or verbal operants involved in prejudice and is widely reinforced by the verbal community. This does not mean that reducing prejudice is impossible, but that the undertaking "constitutes a highly complex task." Matsuda et al. (2020, p. 343) list, among the possible next steps, gathering data on prejudiced behaviors in applied settings, creating organizational procedures to reduce bias systematically, conducting longitudinal studies of outcomes, and developing interventions across the whole community. Each of these steps corresponds to a row of this chapter's sheet (recording, the institutional level, follow-up, and the structural level), and all of them have yet to be filled in with data (this book's reading).

The reading began in a café, with four evaluations that no one planned, and it ends with a sheet that someone fills out before intervening. Between those two points, the question changed: from "what is an attitude?" to "what is going to be changed, how will we know it changed, and with what care." Those who study attitudes can take up the rows that the sources leave open, and this requires what the earlier chapters asked for: saying what is recorded, with what comparison, and what the record does not allow one to claim.

TEST YOURSELF

(Hypothetical case.) A supervisor proposes reprimanding, in front of the class, any intern who makes the statement, "because it works right away." What reasons do the sources give for the plan not to take this as a component, and what is required of anyone who adopts it anyway?

ANSWER: punishment produces avoidance and may reduce the behavior only in the context in which the person was punished (Passarelli et al., 2023, p. 39, note 8), and it is used because it has an immediate effect and reinforces the punisher (Fazzano & Gallo, 2015, p. 541). Whoever adopts it records what it produces, also outside the room (Section 35.5).

Common learner mistakes

1 **Taking the campaign for the intervention.** The mistake happens because the campaign is visible and has a date, and the satisfaction of those present looks like a result; what was not recorded does not appear in the report. *How to spot the mistake:* the report describes lectures, posters, and the satisfaction of those present and concludes that "prejudice decreased"; there is no target written as behavior, no prior record, and no comparison (Section 35.1).

2 **Aiming at the person instead of the behavior and the contingencies.** The mistake happens because everyday language explains what someone does by what that person "is," and "prejudiced" seems to describe the cause. *How to spot the mistake:* the plan talks about "raising the awareness of prejudiced people" and does not say which statement, on what occasion, and with what consequence (Sections 35.1 and 35.4).

3 **Going beyond the status.** The mistake happens because, cited secondhand, a proposal or a laboratory result arrives as "the literature shows," and the kind of support gets lost along the way. *How to spot the mistake:* the sentence "studies show that X reduces racism" cites a proposal, a laboratory study, or a synthesis with a small effect without saying which (Section 35.3).

4 **Forgetting where the person goes back to.** The mistake happens because recording is done where the intervention takes place, and that is where the change shows up; outside it, the old contingencies keep operating. *How to spot the mistake:* recording ends on the last day, in the room where the procedure was applied, and the conclusion speaks of lasting change (Section 35.4).

5 **Treating the procedure as innocent.** The mistake happens because praising and correcting seem good in themselves, and what each one maintains depends on the object and the occasion, which the name of the procedure does not say. *How to spot the mistake:* the plan adopts public punishment or praise without stating the objective, who takes part, and what is not done, and does not record what the procedure maintains alongside what it reduces (Section 35.5).

SUMMARY

Campaign and engineering (objective 1). Behavioral engineering is, in this book, the planning, implementation, and evaluation of an intervention, with what is changed, what is done, what is recorded, and what is decided declared in advance; a campaign differs in what it declares, not in its content.

The levels (objective 2). At the individual level, the target is an individual's prejudiced and discriminatory behavior; at the institutional level, the responses of members and the organization's arrangement of contingencies; at the structural level, the arrangement of contingencies of broad segments. Each level has its own record, and the sources treat their proposals as proposals.

Status (objective 3). Each component comes with a status (proposal, laboratory, applied study with a measure, or synthesis), and that status says what can be claimed; the sources diverge on important points, and each reading is cited with the name of whoever made it.

The plan (objective 4). The plan goes from the problem to the target, the functional hypothesis, the components, recording with comparison, follow-up, and the decision criterion, and it declares what it does not reach.

Dual use and precautions (objective 5). The same procedure serves to form and to reduce an evaluation; what distinguishes it is the objective, and the plan declares its objective, voluntary participation, what is not done, and why punishment is not included as a component.

EXERCISES

Answer without looking at the chapter. Then check the answer key.

1. Define behavioral engineering and name four things the intervention plan declares before it starts.

2. (Hypothetical case.) Two proposals reach the administration. The first: "an afternoon of films about diversity for all interns and, at the end, a satisfaction questionnaire." The second: "record, for three weeks, how many statements per hour of supervision attribute an unfavorable characteristic to all patients of a given origin; then the supervisor reinforces the alternative wording with attention and praise; recording continues and is compared with that of two groups that have not yet started." Which one is behavioral engineering? Which declarations are missing from the other and, indeed, from the one you chose?

3. Classify each action as individual, institutional, or structural and say what, according to Passarelli et al. (2023), would be recorded: (a) a manager interrupts and disagrees with a colleague's racist remark; (b) a company starts publishing how many Black people work there, in which positions, and at what salaries; (c) the justice system changes the policy of monetary incentives to police officers for arrests and fines.

4. (Records constructed for the exercise.) Over the last semester, the clinic recorded that 12 of 30 patients referred by social services were discharged for absences, compared with 6 of 40 of the others. (a) Calculate the proportions. (b) At what level is what the record describes? (c) What does it allow one to say, and what does it not allow?

5. Classify the status of each passage (proposal, laboratory, applied study with a measure, or synthesis) and say which verb would fit when reporting it: (a) "a stance that could be adopted would be [...] the reinforcement of antiracist behaviors" (Passarelli et al., 2023, p. 39); (b) equivalence training with children, in which all of them demonstrated the trained relations and the learning reduced their negative biases toward faces of Black people (Matsuda et al., 2020, p. 340); (c) the analysis of almost 500 studies of methods for changing bias on implicit measures (Forscher et al., 2018, as cited in Murrar & Brauer, 2019, p. 165); (d) the feedback given to teachers on their rates of praise and reprimands (Knochel et al., 2019, as cited in Matsuda et al., 2020, p. 343).

6. (Hypothetical case.) A clinic report says: "Equivalence training reduced racial prejudice in children, and the effect was lasting." What caveats do the chapter's sources impose?

7. (Records constructed for the exercise.) Two supervision groups recorded the rate of target statements per hour. Group A, weeks 1 to 3 (baseline): 6, 5, and 7; the intervention began in week 4, and weeks 4 to 6 gave 3, 2, and 1. Group B, weeks 1 to 6: 5, 6, 4, 6, 5, and 4; the intervention began in week 7, and weeks 7 to 9 gave 4, 3, and 4. (a) Calculate the baseline mean and the mean of the first three weeks after the start, in each group. (b) Apply the decision criterion from Section 35.4. (c) What do weeks 4 to 6 of group B say about the change in group A?

8. (Hypothetical case.) In a school's staff meetings, a teacher says "kids from the outskirts can't learn" and her colleagues nod. Write, for this case, the "Target" and "Functional hypothesis" rows of the plan.

9. (Hypothetical case.) A supervisor starts publicly praising whoever rewords a patient's absence. A colleague, in the same group, publicly praises whoever makes the funniest joke about the patients. Is there dual use? Why, and what does this require of the plan?

10. Name the four precautions the plan declares beyond the record and, for each one, a source from the chapter and what it says.

ANNOTATED ANSWER KEY

1. Behavioral engineering is the planning, implementation, and evaluation of an intervention on what people do and on the contingencies under which they do it. The plan declares: what is to be changed, written as behavior or as an arrangement of contingencies; what will be done, described so that someone else can carry it out again; what will be recorded, with what comparison, and after what interval; and what will be decided with each result. The definition is the book's (Section 35.1).

2. The second. It has an observable target (the statement per hour), a prior record, a described procedure, a comparison (groups that have not yet started), and a later record. The first lacks what is to be changed, written as behavior, the prior record, the comparison, and the rule for what to do with the result; the satisfaction questionnaire measures opinion about the afternoon, not the target. The second still lacks the decision criterion ("recording continues," but it does not say which value leads to which decision) and follow-up after the end (Sections 35.1 and 35.4).

3. (a) Individual: the target is an individual's prejudiced and discriminatory behavior (Passarelli et al., 2023, p. 39), and the remarks would be recorded by occasion; for racial prejudice, the authors cite scales, implicit measures, and relational tests (p. 40), and applying this to remarks is this book's reading. (b) Institutional: data on the structure of the organization, such as how many Black people work there, positions, and salaries (Passarelli et al., 2023, p. 38).

(c) Structural: the policy is an arrangement of contingencies of the justice system (Passarelli et al., 2023, p. 36); the benchmark would be the national statistics (p. 37).

4. (a) 12 ÷ 30 = 40%, and 6 ÷ 40 = 15% (this book's calculation). (b) Institutional: it is data on what the organization itself produces, by source of referral (Passarelli et al., 2023, p. 38). (c) It allows one to say that, in that semester and at that clinic, discharge for absences was more frequent among those referred by social services (40% versus 15%). It does not allow one to say why (the rule, transportation, the interns' statement), nor that there is prejudice: the occasions and consequences and the variation test (Section 18.2) would be missing.

5. (a) Proposal; "it is proposed" or "it is suggested." (b) Laboratory; "in the laboratory, the training reduced." (c) Synthesis; "the pooled analysis indicates." (d) Applied study with a measure, secondhand; "it has been reported that," with the name of whoever reports it.

6. First, the status is that of the laboratory: Matsuda et al. (2020, p. 340) say they do not claim that the procedures are changing prejudices in the long run, nor that they prevent racist behaviors outside the laboratory. Second, "lasting": the subsequent study tested maintenance six weeks later, and 27 of the 33 children who formed classes maintained at least one relation (Mizael, de Almeida et al., 2021, Discussion section), which is a short follow-up, of relations in the laboratory, not of behavior (this book's reading); the authors of the 2016 study write that "we should not be very optimistic" about lasting effects, because the children would go on living in the same environment that established the biases (Mizael, de Almeida et al., 2016, p. 460). Third, Passarelli et al. (p. 40): most of the interventions tested tend not to last, because people return to the same cultural environment.

7. (a) Group A: 18 ÷ 3 = 6.00 before and 6 ÷ 3 = 2.00 after. Group B: 30 ÷ 6 = 5.00 before and 11 ÷ 3 = 3.67 after (this book's calculation). (b) Group A: half the baseline is 3.00, and 2.00 is below it: maintain. Group B: half is 2.50, and 3.67 falls between half and the baseline (5.00): adjust. (c) Weeks 4 to 6 of group B (6, 5, and 4) have a mean of 5.00, the same as that of weeks 1 to 3 (5, 6, and 4): B did not change while A was already changing, which weakens the explanation of an event that would have affected the whole clinic (Section 35.4).

8. A model: "Target: statements that attribute an inability ('can't learn') to all children of a given origin (the neighborhood), per meeting, and the agreement that follows them (nodding). Functional hypothesis: the colleagues' agreement maintains the statement (social consequence); the statement could also spare the teacher from examining each child's case. Test: record the occasions on which the statement occurs, with and without the colleagues, and what happens next (Sections 19.3 to 19.5)." Other wordings are acceptable if the target is written as it is observed, and not as "the teacher is prejudiced" (Section 35.1).

9. Yes: it is the same procedure, attention and praise contingent on speech, with opposite objects, and the procedure does not distinguish the object (Section 25.5). Matsuda et al. (2020, p. 337) describe the case of someone who re-

ceives attention and approval from peers for voicing racist views and is more likely to keep voicing them. The plan declares its objective and records what each procedure maintains, not only what it reduces.

10. (1) Objective: Passarelli et al. (2023, p. 39) describe a proposal with police officers whose objective is to reduce their suffering by increasing psychological flexibility, which is different from reducing racism. (2) Participation: Murrar and Brauer (2019, p. 165): being required to participate undermines self-determination and heightens resistance to change. (3) What is not done: de Carvalho and de Rose (2014, p. 534) and Mizael, de Almeida et al. (2016, p. 455, note 2): do not train relations that would establish an unfavorable evaluation of a group. (4) Punishment: Passarelli et al. (2023, p. 39, note 8): it produces avoidance and may reduce the behavior only in the context in which the person was punished; Fazzano and Gallo (2015, p. 541): it is used because it has an immediate effect and reinforces the punisher.

MASTERY CRITERION

Did you get 8 of the 10 exercises right? Move on to Chapter 36. Fewer than that? Review the sections indicated and redo the exercises you missed:

If you missed exercise	Review
1, 2	35.1 and common mistakes 1 and 2
3, 4	35.2
5, 6	35.3 and common mistake 3
7, 8	35.4 and common mistake 4
9, 10	35.5 and common mistake 5

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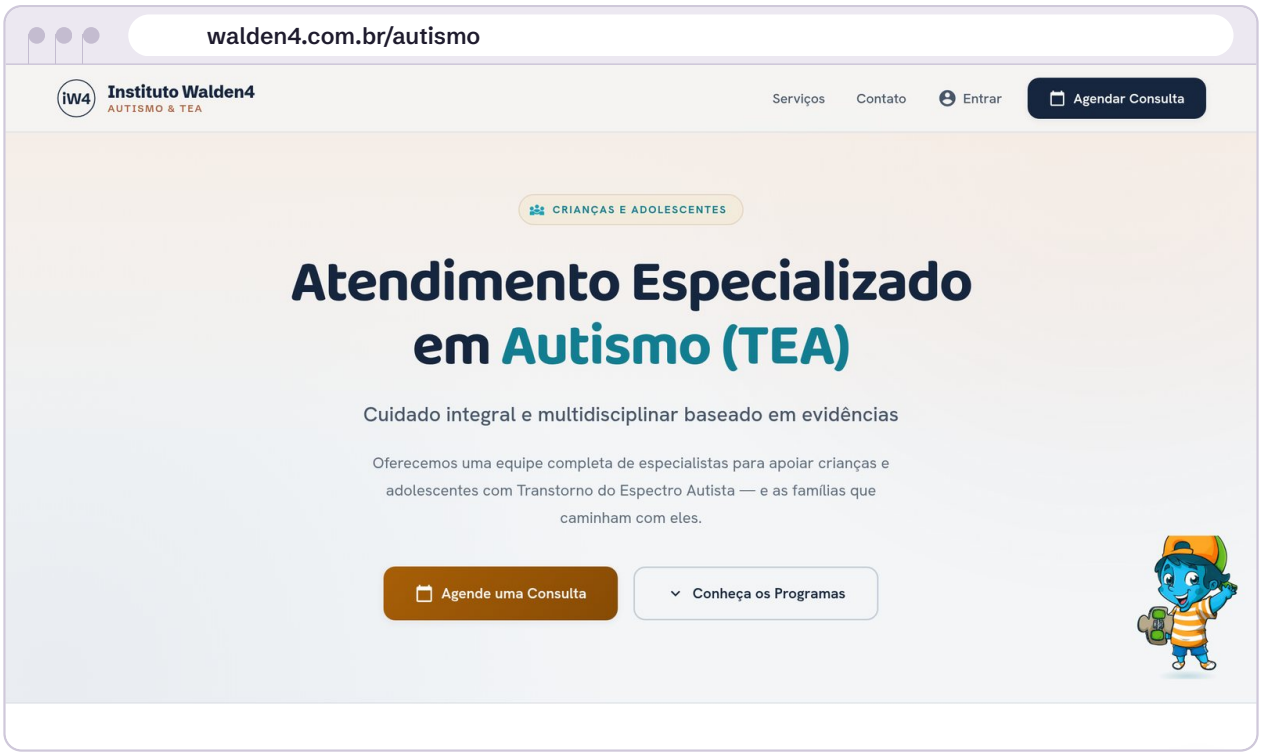
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Glossary

This glossary brings together the technical terms from Chapters 1 to 35, in alphabetical order. After each term comes the chapter in which it is defined (Ch. N). When the term is taken up again or refined in another chapter, the numbers appear in sequence, and the first is that of the first definition.

The definitions summarize what the chapter says and do not replace reading it: the sources and pages are in the chapter, and that is where one should go in order to cite. Words that the fields use in more than one sense, such as “discrimination,” “verbal,” and “baseline,” come with the sense adopted here and the chapter in which it is distinguished. A few entries are not in bold in the chapters: they are words that the text defines and that several chapters use, such as “occasion” and “pretest,” or that the text distinguishes from another, such as “frame.”

A

acceptance and commitment training (ACTr) (Ch. 25). An approach that teaches strategies of mindfulness, acceptance, and defusion that serve observable behaviors consistent with the person’s values. It is presented here as what has been published, not as what is known to work.

accuracy criterion (Ch. 27). The proportion of correct responses required in a block of trials for the participant to move on to the next phase.

agreement test (Ch. 9). Can two observers who agree with the sentence disagree about liking what it says? If so, the sentence describes (it is a description of fact or a descriptive qualification), and the valence, if any, lies in another sentence; if the sentence already carries the position, favorable or unfavorable, it is an attitude.

alpha coefficient (Ch. 29). A number that summarizes how strongly the scales in a set correlate with one another, also called Cronbach’s alpha. It is an indicator of precision and is calculated per set of scales (in the study in Ch. 29, per factor).

altering the consequences (Ch. 25). Route of attitude change: replacing the target response with another one that serves the same function, without leaving the consequence of the old response intact. The logic comes from the literature on problem behavior; its application to evaluations is the book’s extrapolation.

alternative (Ch. 23). Each of the ordered options of a scale, from which the person marks one.

anchor (Ch. 23). Each of the named endpoints of a scale.

annotated answer key (Ch. 1). The answers to the exercises, with an explanation of each.

arbitrarily applicable relational responding (Ch. 21). Responding to one event in terms of another under the control of contextual cues, and not of the physical properties of the events; that is why it can be applied to any stimuli, including new ones.

arbitrary relation (Ch. 20). A relation between stimuli in which nothing in one calls for the other: what makes it correct was defined by the teacher, not by similarity of shape, color, or size.

attitude (Chs. 1, 2, and 15). A favorable or unfavorable evaluation that someone makes of a person, a thing, a group, an idea, or a situation (Ch. 1). In the minimal definition (Ch. 2), an evaluation directed at an identifiable object, with positive, negative, or neutral valence; in the fundamental definition (Ch. 15), discriminated operant behavior whose topography is or implies the attribution of a value, ranging from positive to negative, to an object.

attitude change (Ch. 25). The alteration, over time, of the relation among the evaluation, its occasions, and its consequences. Neither formation nor change is observed at a single moment: they are asserted on the basis of a record made before and after, with the same measure.

attitude formation (Ch. 25). The shift to evaluating an object in the presence of which the evaluation did not occur.

attitude object (Chs. 2 and 15). That on which someone takes a position: an animal, a person, a group, an idea, an event, a practice, or the speaker themselves. Every attitude is about something.

attitude resistance (Ch. 34). The tendency of an attitude not to change in the face of pressures or messages that call for its change. It appears in what the person does with the message: counterargues, discredits the sender, attends only to what agrees with the attitude, or reacts with anger.

audience (Ch. 14). Discriminative stimuli that set the occasions on which verbal behavior has consequences. Different audiences make different verbal classes probable.

autoclitic (Ch. 14). Verbal behavior that depends on other verbal behavior and modifies its effects on the listener. Descriptive autoclitics involve the discrimination of the speaker's own behavior: "I doubt that," "I am sure that."

avoidance (Ch. 19). Negative reinforcement in which the response prevents or postpones what would come.

awareness of the contingency (Ch. 26). The person's ability to state, in a later interview, the relation between what they answered and the consequence they received.

B

baseline (Chs. 20, 25, and 35). Two uses: in studies with equivalence classes, the baseline relations are those of training (Ch. 20); in the recording of an intervention, it is the record taken before it, with the criterion that will be used afterward (Chs. 25 and 35).

behavior (Ch. 11). Anything an organism does, whether overt or covert.

behavior analysis (Ch. 1). The science that studies behavior (what people and other animals do) in relation to the environment: the conditions under which it occurs and what happens afterward.

behavioral engineering (Ch. 35). The planning, implementation, and evaluation of an intervention on what people do and on the contingencies under which they do it, with four things declared before it starts: what is to be changed, what will be done, what will be recorded, and what will be decided with each result. A definition proposed here; none of the sources consulted uses the term.

behavioral nature (Ch. 15). The first of the three conditions of a definition of attitude: the phenomenon is said to be behavior, a response, a class of responses, or an equivalent term.

belief (Ch. 16). A statement that says how things are, will be, or relate to one another, without taking a position on them. A belief describes, and an attitude takes a position; an attitude supported by a belief calls for two records.

borderline case (Ch. 3). A statement whose classification depends on the situation, the tone, or the listener: the same sequence of words can be a fact in one situation and an evaluation in another. The situation and the decision made are recorded.

C

category (Ch. 5). An object that groups together several objects that have something in common (sports cars, physicians). Moving from the evaluation of individuals to that of the category is extending the evaluation.

character role (Ch. 34). What the character does in the story, assigned by the study before data collection (for example, who attacks, who is attacked, who opposes).

checking test (Ch. 4). It asks whether the sentence can be checked by direct observation: what any observer can check describes the object; what cannot be checked, and admits the opposite position without an error of observation, evaluates. The agreement test (Ch. 9) refines it.

choosing how to ask (Ch. 5). The second precaution: about some objects, especially groups of people, people are more careful about what they say, and the same question can have different degrees of candor in different families of objects.

class yield (Ch. 30). The proportion of participants in a group who met the class formation criterion: the number of those who met it divided by the number of those who took the tests. It counts people, not correct responses.

combinatorial entailment (Ch. 21). Relations that combine and generate a derived relation.

comic (Ch. 34). A specific form of visual narrative that combines text and images in organized sequences (história em quadrinhos, or HQ, in Portuguese).

common learner mistakes (Ch. 1). The part of the chapter that describes the most frequent mistakes of people learning the topic and how to spot each one.

comparable group (Ch. 25). A group that did not receive the intervention, with which what was recorded before and after is compared, in order to know what would have happened without it.

compatible block (Ch. 24). In the IAT, the block that combines the categories the researcher assumes to be more strongly associated. The classification is the researcher's, made before data collection.

component (Ch. 35). Each procedure the plan applies, described so that someone else can carry it out again: who does what, on what occasion, and with what consequence.

compound stimulus (Ch. 32). A stimulus that brings together properties that can vary, or be presented, one without the other, such as shape and color, or the skin tone and the expression of a face: the response may come under the control of one or several of them, and not necessarily of those the researcher defined as relevant.

concept (Ch. 18). As an object of evaluation, an idea or a policy (inclusion, reserved quotas). Evaluating it is a different attitude, recorded separately.

conceptualized group (Ch. 21). In Relational Frame Theory, what emerges for a person when two or more individuals are brought into a frame of coordination with one another, under contextual control by the characteristics they share.

conditional discrimination (Ch. 20). A discrimination in which the role of one stimulus depends on the context provided by other stimuli: if A1, then B1; if A2, then B2.

Conflicting Relations Paradigm (Ch. 20). A design (CRP) in which training can lead to classes that contradict relations that existed before the research.

consequence (Ch. 12). In operant contexts, an event produced by a response: the presentation or removal of a stimulus, or any other environmental change. It is not only what is pleasant.

consistency (Ch. 22). The extent to which the same evaluation occurs in similar situations. The evaluation is recorded in more than one situation, and one states in how many it occurred and in how many it did not.

consistent block (Ch. 24). In the IRAP, the block in which the correct response is the one the researcher assumes to fit the people's learning history or social norm.

context (Ch. 8). The situation in which an evaluation appears, described by four questions: where (place and medium), with whom (who hears or reads), after what (what came before), and with what at stake (what may happen afterward). For the narrow sense, see contextual stimuli (Ch. 13).

contextual cue (Ch. 21). A stimulus that, by virtue of history, selects the relation (Crel) or the transformed function (Cfunc).

contextual stimuli (Ch. 13). The constant features of a situation: the narrower sense the word "context" has in one of the sources. In this book, context remains the situation in which the evaluation appears (Ch. 8).

contingency (Ch. 12). The relation between the response and what it produces.

control condition (Ch. 19). A condition that serves to rule out that the behavior would have occurred anyway.

controlled variable (Ch. 31). The extraneous variable that the researcher keeps the same across all conditions, so that it does not explain the change. It is not the comparable group, which is the condition in which the independent variable is absent. On the variables sheet, the row for controlled variables also receives, by extension, what was distributed or equated across conditions.

covert (Ch. 17). Said of an occurrence that no one but the person observes. It is not a synonym of implicit or of implied.

covert behavior (Ch. 11). What is neither observed nor observable and is therefore only inferred, such as thinking or counting to oneself.

D

D score (Ch. 24). The IAT effect divided by the standard deviation computed over every latency in both test blocks.

decision criterion (Ch. 35). The rule, written before implementation, that says which result of the record leads to maintaining, adjusting, or discontinuing the intervention.

defining the object (Ch. 5). The first of the three precautions when studying attitudes: saying what one means by the word that names the object, especially when it is an idea ("justice," "inclusion"), so that two people do not evaluate different things.

definition (Ch. 15). What fixes what counts as an attitude, so that two people apply the word to the same cases: it holds for all attitudes and only for them. It contrasts with property and type.

definition of attitude (Ch. 15). A sentence of the form "Attitude is..." that specifies, at the same time, the behavioral nature of the phenomenon, the evaluative content, and the object at which the evaluation is directed.

degree of equivalence (Ch. 28). A percentage measure of the overlap between the evaluations of two different stimuli from the same class on the same test: 100 minus the percentage of difference, calculated as in the degree of transfer. On its own, it can mislead, because the figure may already have been evaluated like the photograph before training.

degree of relatedness (Ch. 20). The difference, among members of the same class, in how strongly they are related, as a function of experimental parameters such as the number of nodes (the English term in the sources is relatedness).

degree of transfer (Ch. 28). A percentage measure of the difference between the evaluations of the same stimulus on two tests: the sum, over the 14 pairs, of the absolute differences on the 1-to-7 scale, divided by 84. It is 0% when nothing changed and 100% when it changed completely. On its own, it does not separate transfer from margin of error.

delimited (Ch. 10). A criterion for studying an event as a natural phenomenon: one can say when and where it occurred and in front of whom.

delimiting the object (Ch. 5). Saying exactly what the object is and whether it is an individual, a category, or a behavior.

dependent variable (Ch. 31). What is measured to find out whether it changed. In behavior analysis, it is a behavior, recorded by a rule set in advance.

derived relations (Chs. 20 and 25). The relations that appear without having been taught, also called emergent relations (Ch. 20). In Ch. 25, a route of attitude formation: attitudes formed in the way equivalence classes are formed, linking a class of stimuli to evaluative attributes, which outside the laboratory is a proposal.

describing, evaluating, and treating (Ch. 18). The three classes of responses that the same group cue can occasion: describing the group (stereotype, a belief), evaluating it (prejudice, an attitude), and treating it (discrimination). Only evaluation is an attitude under the fundamental definition; the relation among the three is an empirical question.

descriptive analysis (Ch. 19). Direct observation of behavior and of the situations in which it occurs, whose most common form is A–B–C recording (antecedent, behavior, consequence). It does not allow control over the situations in which the behavior occurs.

descriptive qualification (Ch. 9). A statement with a word that seems evaluative (“tall,” “narrow,” “correct,” “late”) but that only places the object on a dimension, against a standard, or in a category, without placing it between favorable and unfavorable. That is why it is not an attitude: attitude adds valence.

design sheet (Ch. 33). The form filled out before data collection in which the study declares what it will manipulate, measure, hold constant, compare, and protect. Three decisions open it: the class criterion, chance, and what would count as transfer.

differential reinforcement (Ch. 12). Reinforcing some responses and not others, according to their properties.

direct consequences (Ch. 25). Route of attitude formation: the evaluation recurs if it is followed by a consequence that strengthens it, as Ch. 12 said of any operant.

discriminated operant (Ch. 13). An operant defined in terms of the stimuli in the presence of which it occurs as well as its effects on the environment.

discrimination (Ch. 13). Any difference in responding in the presence of different stimuli. Not to be confused with discrimination in the social sense (Ch. 18).

discrimination (social sense) (Ch. 18). Treating someone unfavorably for belonging to a group. It is recorded as rates, without anyone needing to say what they think. Not to be confused with the discrimination of Ch. 13 (“discriminated” and “discriminatory” are not synonyms).

discriminative stimulus (Ch. 13). A stimulus in the presence of which a response has certain consequences and which, for that reason, comes to occasion that response. It does not elicit the response: it sets the occasion.

dual use (Ch. 35). The property of a procedure of serving, with the same arrangement, both to establish or maintain an unfavorable evaluation and to reduce it. What distinguishes one use from the other is the objective and the decision of whoever conducts it.

duration (Ch. 22). The time from the beginning to the end of an occurrence.

E

effect size (Ch. 25). The difference between the means of two groups, measured in standard deviation units.

elicit (Ch. 17). To produce a response reliably by means of a stimulus, in unconditioned or conditioned reflexes. It contrasts with occasion.

emitted (Ch. 12). Said of a response that occurs without a stimulus eliciting it, that is, producing it reliably. The term does not say that the person planned the response. It contrasts with elicited (Ch. 17).

equivalence class (Ch. 20). A set of stimuli among which the tests showed reflexivity, symmetry, and transitivity; its members are interchangeable in certain contexts, not in all. The class is a conclusion from the tests, not from the training.

escape (Ch. 19). Negative reinforcement in which the response ends what is already present.

establishing operation (Ch. 19). Any operation that changes the status of a stimulus as a reinforcer or punisher, such as deprivation and satiation. It changes the value of the consequence and evokes the response that produces it; the discriminative stimulus, by contrast, occasions.

evaluate (Ch. 4). To take a position on an object in a way that cannot be checked by direct observation of its properties: to place it closer to the favorable or to the unfavorable.

evaluation (Chs. 2 and 4). What one says, or does, when taking a position on an object: for or against, with liking or disliking, in a way that cannot be checked by direct observation of the object's properties. Words such as "cute," "annoying," and "unfair" usually carry evaluations.

evaluative conditioning (Ch. 25). A change in the evaluation of an object after it has been presented together with another stimulus that is already evaluated.

evaluative content (Ch. 15). The second condition: the definition says that it is a matter of evaluating, valuing, judging, approving, or disapproving.

evaluative word (Ch. 7). In the "X is Y" structure, the word (Y) that carries the valence: "cute" is positive, "corrupt" is negative, "reasonable" is neutral (middle ground).

example (Ch. 3). A statement in which the object is identifiable and the evaluation is clear, so that recognizing it as an attitude does not depend on the situation in which it was said.

exercises (Ch. 1). Questions at the end of the chapter, to be answered before checking the annotated answer key.

express (Ch. 17). In attitude research, it has four readings: sign, occurrence, report, and summary. The first is discarded, and the other three are kept.

extend (Ch. 5). To move from the evaluation of individuals to that of the category (Ch. 5). From Ch. 13 on, this process in the person is called generalization, and "extend" comes to name the researcher's decision about how far a result holds.

extending results with caution (Ch. 5). The third precaution: a result holds, at first, for the type of object and the slice of reality in which it was obtained; extending it to other objects is a hypothesis to be tested.

extent (Ch. 25). A limit on what is said about a change: a change on one occasion may not appear on others, and so it is recorded on other occasions and with another measure.

extinction (Ch. 12). The discontinuation of reinforcement of responses, or the reduction in responding that this procedure produces.

extraneous variable (Ch. 31). Any variable, other than the independent variable, that could alter the dependent variable. When it changes along with the independent variable, the result is confounded: the difference may come from one or the other.

F

factor (Ch. 29). A group of scales that vary together. In the study in Ch. 29, Evaluation (nine scales) and Potency (four).

factor analysis (Ch. 29). A statistical procedure that groups the scales that correlate with one another into factors.

factor loading (Ch. 29). The number that says how strongly a scale is associated with a factor. Below a criterion (0.40 in the study in Ch. 29), the scale is excluded from the solution.

families of consequences (Ch. 19). The three families of hypothesized consequences for an evaluation: obtaining something from the listener (positive reinforcement, social), removing, postponing, or avoiding something (negative reinforcement, social), and unmediated consequence (automatic). A classification proposed here.

families of objects (Ch. 5). Five practical groupings of attitude objects: things, ideas and institutions, people and groups, moments and events, behaviors and practices. They guide the question "what is being evaluated?"; many objects fit in more than one family.

five layers (Ch. 18). The analysis of a prejudiced statement in five questions: what occurred and can be recorded (natural phenomenon), what the person did (behavior), what maintains it (operant), in what situation and under what cue (discriminated), and what verbal operant it is, for what audience (verbal).

follow-up (Ch. 25). A new measurement, taken after an interval, that checks whether the difference persists.

form (Ch. 17). The topography of the response, which the definition of attitude uses to say what enters the record. It contrasts with function, which explains and groups the occurrences.

frame (of an opinion) (Ch. 16). The part of an opinion that says whose statement it is and how firmly it is held ("in my opinion," "I think"), around a content. Not to be confused with the moldura relacional (relational frame) of some Portuguese-language sources (see relational frame).

frequency (Ch. 22). The number of occurrences in the period.

function (Chs. 11 and 17). The relation among the circumstances in which behavior occurs, what the person does, and what this produces next (Ch. 11). In Ch. 17, the counterpart of form: form delimits what enters the record, and function explains and groups the occurrences.

functional analysis (Ch. 19). Empirical demonstration of a cause-and-effect relation between environmental variables and behavior: an occasion, an operation, or a consequence is varied and the behavior is observed. What is obtained without manipulation, through report or observation, is a functional hypothesis.

functional equivalence (Ch. 20). The possibility that a member of the class can be substituted for the others in other contexts. It is not the same as transfer of function and has to be tested experimentally.

functional hypothesis (Ch. 19). A statement that says, for a class of a person's evaluations, on what occasions they occur, what consequence maintains them, and what operation makes that consequence valuable; it also says what observations it rests on and what result would contradict it. A statement that no result contradicts is not a hypothesis.

functional stimulus (Ch. 13). The properties of a stimulus that control behavior, in contrast with the nominal stimulus. What controls can only be discovered by testing.

fundamental definition (Ch. 15). Attitude is discriminated operant behavior whose topography is or implies the attribution of a value, ranging from positive to negative, to an object. The other formulations in Ch. 15 start from it.

G

generalization (Chs. 13 and 25). The spread of the effects of reinforcement (or of extinction, or of punishment) in the presence of one stimulus to other stimuli that differ from the original along one or more dimensions. In Ch. 25, a route of attitude formation: the evaluation formed with certain members of a category may occur in the presence of others.

generalization stimuli (Ch. 27). Stimuli that appear only in the pretest and the posttest, not in training.

generalized operant (Ch. 21). A class of responses defined by function, not by topography, established through multiple exemplars in varied situations. In Relational Frame Theory, relational responding is a generalized operant.

Glossary (Ch. 1). Brings together, at the end of the book (Ch. 36), all the technical terms, with the chapter in which they appear.

gradient (Ch. 13). The map of generalization: the rate of response along a continuum of stimuli. It is steeper the greater the change in responding from one point to another, and flat when responding does not change.

group (Ch. 18). As an object of evaluation, the people brought together by belonging to it, or the person taken as part of it. The unfavorable evaluation of the group, when the group cue occasions it, is what Ch. 18 calls prejudice.

group cue (Ch. 18). What, in the situation, functions as an indicator of the social group of the person being evaluated (skin color, name, accent, date of birth on a résumé). It is the cue, and not membership itself, that occasions the evaluation; it plays the role of a discriminative stimulus.

H

history (Ch. 1). What the person has lived through and what shapes their behavior. Like all behavior, attitudes have a history.

I

IAT (Ch. 24). Implicit Association Test: a task in which performance is faster when strongly associated categories share a response key than when less associated categories share it.

IAT effect (Ch. 24). The difference between the mean latencies of the two pairings: that of the incompatible block minus that of the compatible block.

imitation (Ch. 25). Behavior that duplicates some properties of a model's behavior.

implicit (Ch. 17). Said of the measure (an indirect task), not of a place where the attitude would be hidden.

implicit measure (Ch. 24). A record of performance (usually time and accuracy) on a task that does not ask the person to report what they evaluate, obtained under conditions the researcher manipulates. The evaluation is inferred from the difference between the conditions.

implied (Ch. 17). Said of the form: evaluating without saying so.

incompatible block (Ch. 24). In the IAT, the other block: the one that combines the categories the researcher assumes to be less strongly associated.

inconsistent block (Ch. 24). In the IRAP, the block in which the correct response is the opposite one.

independent variable (Ch. 31). What the researcher manipulates to see whether behavior changes; it must take at least two values that are compared. It is a role in the study, not a property of the thing: the same quantity can be a result in one study and a selection criterion in another.

individual (Ch. 5). Said of an object that is a single one (this car, Dr. Helena). It contrasts with category.

intensity (Ch. 4). How pronounced an evaluation is, in a single direction: "I liked it" and "I'm crazy about it" have the same valence (positive) and different intensities. Direction and intensity are independent questions.

intermittent reinforcement (Ch. 12). Reinforcement of some responses in the class and not others. It is the most common situation: reinforcement of every response is the exception, not the rule.

internal state (Ch. 11). A condition said to exist inside the person and invoked to explain what they say or do: "having a negative attitude," "being unmotivated," "being afraid."

internal structure (Ch. 29). The pattern of correlations among the scales of an instrument: which vary together and which do not. It is one kind of validity evidence.

interobserver agreement (Ch. 22). The extent to which the records of two independent observers coincide.

intervention plan (Ch. 35). The document in which the four declarations of behavioral engineering are written. A relative of the design sheet, it also says what will be changed, how, and which result will lead to maintaining, adjusting, or discontinuing what is being done.

intraverbal (Ch. 14). A verbal response occasioned by a verbal stimulus, in an arbitrary relation between stimulus and response established by the verbal community: reciting the alphabet, saying "Lima" on hearing "Peru."

IRAP (Ch. 24). Implicit Relational Assessment Procedure: the person responds, as quickly and accurately as possible, whether a relation between a label and a target is "true" or "false," in blocks whose rule the researcher reverses.

L

label (Ch. 24). In the IRAP, the adjective or other valenced stimulus that appears, on the same trial, at the same time as the target stimulus.

latency (Ch. 22). The time between a defined stimulus and the beginning of the response.

Likert-type scale (Ch. 23). A scale of graded alternatives between two extremes, with or without a neutral point. Likert's had five categories, from "strongly approve" to "strongly disapprove"; those with a different number of points are "Likert-type."

listener (Ch. 14). The one who responds to the verbal response and thereby provides the consequence.

M

magnitude (Ch. 22). The size or physical force of the response: the loudness of the voice, the amplitude of a gesture, the pressure on a key.

maintenance test (Ch. 30). A test of derived relations given after an interval without training. It is done without differential consequences, so that the test itself does not teach the relations again. It is follow-up applied to derived relations.

mand (Ch. 14). A verbal response that specifies its reinforcer. Requests and commands specify the listener's behavior; questions are also mands.

manifest behavior (Ch. 26). What the person does apart from answering a questionnaire or an interview (in the sources, overt behavior or overt acts).

marker of authorship and firmness (Ch. 7). The part of the sentence that says whose evaluation it is and with what firmness ("I think that," "I'm sure that," "I suspect that"). Without it, the evaluation appears on its own, as in "cats are cute."

mastery criterion (Ch. 1). The final part of the chapter, which says whether one can already move on or whether it is worth reviewing something first, and what.

matching-to-sample (Ch. 20). A procedure in which, given a sample stimulus, the person chooses among comparison stimuli, and the correct choice and the incorrect ones have different consequences. It establishes a conditional discrimination. It is not the pairing of respondent conditioning.

measurable (Ch. 10). A criterion for studying an event as a natural phenomenon: some aspect of it can be assigned a number.

measure (Ch. 22). A number assigned to an aspect of an occurrence, or of a set of occurrences, by a rule set before recording.

measurement point (Ch. 34). Each administration of the scale during the reading of the story: the pretest, before any panel, and one or two posttests.

minimal definition (Chs. 2 and 15). A deliberately lean formulation that says what lies at the core of an attitude and leaves the rest open: an evaluation directed at an identifiable object, with positive, negative, or neutral valence (Ch. 2); in Ch. 15, with the continuum in place of the three valences, "attitude is an evaluation of an object, ranging from positive to negative."

modeling (Ch. 25). The presentation of the behavior to be imitated.

moldura relacional (Ch. 21). See relational frame. It is the word some Portuguese-language sources use; the Portuguese edition of this book says quadro, as in the Portuguese title of the theory, so as not to confuse it with the frame of an opinion (Ch. 16).

multielement design (Ch. 19). A design in which conditions alternate in short sessions; it is the most efficient for several comparisons.

mutual entailment (Ch. 21). When A is related to B, B is also related to A, though possibly in a different way.

N

narrative (Ch. 34). A series of events linked through characters, which typically runs from a beginning through a middle to an end, conveyed through formats such as television, radio, books, and comics.

natural phenomenon (Ch. 10). An event in the world that can be observed and measured and whose conditions are also events in the world, so that they can be studied and put to the test.

negative reinforcer (Ch. 12). A stimulus whose removal increases the occurrence of the responses that terminate or postpone it.

negative valence (Ch. 2). An evaluation unfavorable to the object: disapproval, dislike, rejection.

neutral point (Ch. 23). The middle alternative of a scale, the position that leans toward neither side.

neutral valence (Ch. 2). An evaluation that leans toward neither side: indifference or middle ground. It counts as an attitude.

node (Ch. 20). A stimulus related to two others in an equivalence class and that, therefore, connects them: in AB and BC, B1 is the node that links A1 and C1. The more nodes between two stimuli, the less transfer of function between them.

nonarbitrary relation (Ch. 21). One that is tied to the formal properties of the related events.

non-example (Ch. 3). A statement that mentions an object and looks like taking a position, but in which no one takes a position on the object: a description of fact, an instruction, a question, a report of what was done.

O

objectives (Ch. 1). The opening part of each chapter, which says what you will be able to do by the end of it.

observable (Ch. 10). A criterion for studying an event as a natural phenomenon: someone other than the person who produces it, or an instrument, can record it.

observation of models (Ch. 25). Route of attitude formation through imitation of a model's behavior (observational learning).

occasion (verb) (Ch. 13). To say that a stimulus occasions a response is to say that the response is emitted in its presence, not elicited by it: the response depends as much on the stimulus as on the reinforcer, and this is what distinguishes it from the reflex relation.

occurrence (Ch. 17). The reading of "express" in which what the person says or does is an occurrence of the attitude.

operant (Ch. 12). A class of responses that consequences modify. Responses are assigned to classes because no two are exactly alike.

operant behavior (Ch. 12). Behavior that can be modified by its consequences; it is said to be emitted, not elicited.

opinion (Ch. 16). What someone says, writes, or marks when giving their opinion: a frame ("in my opinion," "I think," "to me") around a content, which can be evaluative, descriptive, predictive, or prescriptive. Only what takes a position on an object is an attitude.

overt behavior (Ch. 11). What is observed and observable, or what affects the organism's environment.

P

paradigmatic case (Ch. 2). An example of a concept so clear and typical that almost no one hesitates to recognize it. It serves as an anchor: what is discovered in it becomes a criterion for judging doubtful cases.

perception (Ch. 16). Responding discriminatively to properties of the environment; what one says about what one perceives is a tact of properties. Attitude adds the position.

persistence (Chs. 22 and 25). The extent to which the evaluation continues to occur after some time has passed or the situation that maintained it has changed. It requires a specified criterion and measure.

phenomenon (Ch. 10). Something that happens: an event, with a beginning and an end, that can be observed, directly or with the help of instruments.

positive reinforcer (Ch. 12). A stimulus whose presentation increases the occurrence of the responses that produce it.

positive valence (Ch. 2). An evaluation favorable to the object: approval, liking, preference.

posttest (Ch. 20). The measurement taken after training or the intervention, with the same instrument as the pretest.

practice (Ch. 18). As an object of evaluation, a way of doing things (a ritual, the use of a chosen name). Evaluating it is a different attitude, recorded separately, and it is not prejudice by the criterion of Ch. 18.

precision (Ch. 29). The consistency or stability of the measure; the same as reliability. A scale can give precise measures of something other than what one wanted to measure.

pre-experimental meaning (Ch. 28). A characteristic of a stimulus that, before the experiment, already controls the person's responses because of their history outside the laboratory: photographs of presidents and party acronyms have it; abstract figures supposedly do not, and a participant's pretest may show that they did.

prejudice (Chs. 1 and 18). An unfavorable attitude directed at someone for belonging to a group, and not for what that person did or said (Ch. 1). In the definition in Ch. 18, an attitude with three additional conditions: the direction is unfavorable, the object is a group (or a person taken as part of it), and the group cue occasions the evaluation.

prerequisites (Ch. 1). The opening part of each chapter, which says what needs to have been learned beforehand and where it comes from.

pretest (Ch. 20). The measurement taken before training or the intervention, with the same instrument as the posttest.

property (Ch. 15). A characteristic that some attitudes have and others do not, or that they have to different degrees: persisting for weeks, varying across situations, resisting extinction.

proportion of occasions (Ch. 22). Frequency divided by the number of occasions on which the occurrence was possible.

punishment (Ch. 12). A response producing a punisher, and the resulting reduction in the class. A positive punisher is a stimulus whose presentation reduces the probability of the responses that produce it, and a negative punisher is a stimulus whose removal reduces the probability of the responses that terminate it.

R

rate (Ch. 22). Frequency per unit of time.

rated character (Ch. 34). The image of each character that the participant receives, one at a time, with the scale. The rating falls on this image, not on the group or the practice the story portrays.

recording unit (Ch. 22). The response as the researcher defines it for counting: the rule that separates one evaluation from another and leaves out what is not an evaluation.

recurrence (Ch. 9). The repetition of the same evaluation (same object, same valence) by the same person on different occasions. One occasion is a datum; recurrence is a pattern.

reflexivity (Ch. 20). A property of a relation that holds between a stimulus and itself (A = A). It is verified by identity matching.

reify (Ch. 10). To treat an event, or the summary of several events, as if it were a thing stored inside the person.

reinforcement (Ch. 12). A response producing a reinforcer, and the resulting increase or maintenance of the class.

relational frame (Ch. 21). A particular class of arbitrarily applicable relational responding that displays, under contextual control, mutual entailment, combinatorial entailment, and transformation of functions, and that is due to a relevant history. It is an action, not a structure.

relational network (Ch. 21). A set of stimuli linked to one another by trained and derived relations, from frames of various types. It describes what the person does in the presence of a stimulus, under certain cues, not something the person has.

reorganizing relations (Ch. 25). Route of attitude change: forming new equivalence classes, or reorganizing or reversing existing ones, between stimuli and evaluative attributes. It has laboratory support (Ch. 20); its application outside the laboratory is a proposal.

replicable (Ch. 10). A criterion for studying an event as a natural phenomenon: the conditions under which it occurred can be described and re-created, and events of the same type occur again when they are repeated. What repeats is the type of event, not an exact copy.

report (Ch. 17). The reading of "express" in which telling that one evaluated is a different behavior.

report and behavior (Ch. 25). A limit on what is said about a change: when the measure is a report, what changed is what the person says, in that situation, to whoever asks; when it is a task, it is the performance on it. The relation with what the person does outside the task is an open question.

respondent (Ch. 17). A class of responses defined by the stimuli that produce them reliably.

respondent conditioning (Ch. 17). The modification of respondent behavior by stimulus–stimulus contingencies: one stimulus comes to signal another and thereby to elicit responses.

rule (Ch. 25). In this book, a verbal antecedent that tells the person what to do or say, or what will happen if they do; when the distinction matters, the text says which of the two uses is meant. As a route of formation, attitudes about events the person has never experienced come from what they were told and what they read.

S

SΔ (Ch. 13). Notation ("S-delta") for the stimulus correlated with the extinction of the response, in contrast with the SD.

SAM (Ch. 23). A pictorial scale (Self-Assessment Manikin): the person marks, among figures ranging from smiling to unhappy, the position that represents what they felt when looking at the stimulus, in one domain at a time (pleasure, arousal, or dominance).

scale (Ch. 23). A situation in which the person marks one of several ordered alternatives, usually between two anchors, and the researcher assigns a number to each alternative by a rule set in advance.

score (Ch. 23). The number that results for a person or for a stimulus, whether the value of a single mark or the mean of several.

SD (Ch. 13). Notation ("S-dee") for the stimulus in the presence of which the response is reinforced. It is defined in relation to a response and to what that response produces: the same stimulus can be the SD for one evaluation and the SΔ for another.

semantic differential (Ch. 23). A set of bipolar scales, each between two opposite adjectives, applied to the same concept. Each mark receives a value from −3 to +3, and the score is the mean of the chosen scales.

semantic space (Ch. 29). The set of dimensions (the factors) in which the meaning of a concept is specified. Each stimulus occupies a place in it, given by its score on each factor.

sensitivity to the present (Ch. 1). The dependence of behavior on the situation in which it occurs. Like all behavior, attitudes depend on the situation in which they occur.

shaping (Chs. 4 and 12). The gradual modification of some property of responding by the differential reinforcement of successive approximations to a target operant class (Ch. 12). In Ch. 4, the process by which what happens afterward favors, little by little, forms ever closer to a certain way of evaluating.

sign (Ch. 17). The reading of "express" in which the evaluation is a sign of a stored state. It is discarded here.

social desirability (Ch. 22). The name social psychology gives to the discriminative control exerted by the audience over what the person answers: the person says what, in that situation, is not disapproved of. It is a property of the response, not a defect of the respondent.

speaker (Ch. 14). The one who emits the verbal response.

speech (Ch. 6). A topography in which the evaluation appears in direct sentences, comparisons, and gradations, accompanied by what is not words: tone, rhythm, pause.

status (Ch. 35). The kind of support a source gives a component: proposal, laboratory, applied study with a measure, or synthesis. The classification is the book's.

stereotype (Ch. 18). A set of beliefs about the attributes of the people in a group, which usually serves to justify attitudes, behaviors, and differences between social groups. It is the belief of Ch. 16 supporting an attitude.

stimulus (Ch. 13). Any physical event, combination of events, or relation between events: a sound, a place, a question. The absence of something can also be a stimulus.

stimulus pairing (Ch. 25). Route of attitude formation: the elicited reaction may come to occur in the presence of an object that was presented together with a stimulus that already elicited it. It is the pairing of respondent conditioning, not the matching-to-sample of Ch. 20.

stimulus selection (Ch. 32). The criterion by which the researcher chooses, among the possible stimuli, those that will be presented. It decides which properties will be present and in what combination.

stimulus selection bias (Ch. 32). The difference between what the measure records and what one wanted to measure, when it is the criterion for selecting the stimuli that produces it.

summary (Ch. 17). The reading of "express" in which "Marta's attitude" summarizes a class of occurrences.

summary (Ch. 1). The part of the chapter that brings together the main points, each one linked to an objective.

symmetry (Ch. 20). A property of a relation that holds in both directions: if A = B, then B = A.

T

tact (Ch. 14). A verbal response occasioned by a nonverbal discriminative stimulus (an object, an event, or a property of them): the point at which verbal behavior makes contact with the environment.

target stimulus (Ch. 24). In the IRAP, the object evaluated on a trial, such as a photograph or an expression.

teaching economy (Ch. 20). The fact that it is not necessary to teach each of the relations in a class for the person to learn them. Derivation, however, is not guaranteed.

telling the person (Ch. 25). Route of attitude change: telling the person that something else is true, adding relations to the network. It is the route the sources consulted treat with the most reservation.

test condition (Ch. 19). A condition that contains the variable whose influence is being assessed.

Test Yourself (Ch. 1). A box with a short question, at the end of each section, to be answered before reading the answer that comes right below it.

thing (Ch. 10). What exists and endures, in contrast with a phenomenon: the chair, the table, the cell phone. The chair is a thing; sitting on it is a phenomenon.

three levels of racism (Ch. 18). A didactic distinction, not a hierarchy, among structural racism (a large-scale hierarchical system, with a concentration of power and wealth), institutional racism (segregating institutional practices), and individual racism (based on prejudice and racial discrimination). The analysis in Ch. 18 is at the individual level.

three questions (Ch. 3). A sequence of steps, in order, for classifying a statement: is there an identifiable object? Does the speaker take a position on it (for, against, indifferent, or in the middle)? What is the valence? If the first two answers are "yes," it is an attitude, and the third says of what kind.

three-term contingency (Ch. 13). The relation among a stimulus, a response, and a consequence: the stimulus in the presence of which the response has certain consequences.

to intervene is to intervene (Ch. 25). Forming or changing the evaluation a person makes of an object is an intervention on that person: it calls for a declared objective, consent, the option to refuse, and evaluation of the result with the announced recording criterion.

topic (Ch. 5). The general theme a conversation is about (health, politics, traffic). The attitude object is what, within the topic, the person evaluates.

topography (Chs. 6 and 22). The form an evaluation (or a response) takes: what the person says, writes, draws, or does, described as an observer would describe it, without interpreting. The same evaluation can have many topographies.

trained relations (Ch. 20). The relations between stimuli that were taught, with consequences.

training parameter (Ch. 30). A feature of the training or testing procedure that the researcher defines and can vary across groups or studies, without changing the stimuli: the order of the relations taught, the proportion of trials with differential consequences, the timing of the symmetry test. The prior history of the stimuli, which the researcher selects and does not vary in the procedure, is not a parameter.

transfer of function (Ch. 20). The acquisition, by a stimulus, of a function of another member of the equivalence class, without direct training, by virtue of belonging to the class.

transformation of functions (Ch. 21). The change in the functions of a stimulus, in a network, in accordance with the underlying derived relation, without additional training.

transitivity (Ch. 20). A property of a relation that passes through the common stimulus: if A = B and B = C, then A = C.

trial type (Ch. 24). Each combination of a target category with a label category. The score is calculated per type.

type (Ch. 15). A subset of attitudes delimited by an additional criterion, usually the object: political, racial, dietary attitudes.

V

valence (Ch. 2). The direction of an evaluation: positive (favorable), negative (unfavorable), or neutral (leaning toward neither side).

validity (Ch. 29). The extent to which the evidence supports that the instrument measures what it sets out to measure. Each analysis adds one kind of evidence; an instrument used in several studies is not, for that reason, validated.

value (Ch. 16). In the sense of "having values," an attitude whose object is an abstract and general entity (justice, freedom, sustainability), from which many specific attitudes are expected. It is set apart from a specific attitude by the generality of its object, not by the nature of the behavior.

variables sheet (Ch. 31). A four-row form on which one records, for a study, what it varied, what it measured, what it kept the same, and what was left out. The last row is not a defect of the study: it lists what its question left out.

variation test (Ch. 18). A comparison of the evaluation in situations that differ in a single element: the group cue, or what the person did or said. If the evaluation changes with the cue and not with what the person did, the cue is the functional stimulus and the attitude is prejudice, by the criterion of Ch. 18. It is evidence, not proof.

verbal (Chs. 14 and 21). In the technical sense, from Ch. 14 on, it refers to the path of the consequence (it comes through the mediation of another person), not to form. Before Ch. 14, "verbal" and "nonverbal" are used in the everyday sense of made or not made of words (Ch. 6 speaks of nonverbal topography). For the sense Relational Frame Theory gives the adjective, this book says "relational responding" (Ch. 21).

verbal behavior (Ch. 14). Behavior whose consequences come through the mediation of another person. It is defined by function, not by form: writing and gesturing can be verbal, and speaking is not enough. There are borderline cases, such as the gesture without words, on which the sources disagree.

verbal community (Ch. 14). A set of people whose reinforcement practices establish under what conditions verbal responses are reinforced and which listener behaviors are reinforced in the presence of which verbal stimuli. A definition proposed by one of the chapter's sources, identified as such.

verbal definition (Ch. 15). Attitude is verbal behavior whose topography is or implies the attribution of a value, ranging from positive to negative, to an object. It replaces "discriminated operant" with "verbal" in the fundamental definition: it builds in the community that mediates the consequences and leaves out what does not pass through anyone.

verbal reinforcement (Ch. 26). The presentation of a verbal consequence contingent on a response, with its effect on the response recorded. In Sections 26.1 and 26.2, the response is taking a position (defending a side, agreeing or disagreeing with a statement).

W

writing (Ch. 6). A topography in which the evaluation appears in text that can be revised before it is sent and remains there afterward; it tends to be more elaborate than speech and more exposed to being read far from the context in which it was written.

X

"X is Y" structure (Ch. 7). A sentence that links an object (X) to an evaluative word (Y) by the verb to be, as in "cats are cute."

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The figures listed below were reproduced from books published by Instituto Walden4 Press, which state that they are distributed free of charge in digital format (walden4.com.br/livros). All other figures in this book are original, prepared for this work. The comic panels were created by the authors of each study (the Method section of several of them mentions the Pixton platform); the screens and diagrams come from the books themselves. Each figure bears the number of the chapter in which it appears, and the page is the one printed in the source book.

Figure	Source work	Page	What the figure shows
1.1	Moreira, Martins et al. (2024)	45	four panels in which Lisa and Davi talk about the same job candidate and take different positions
2.2	Moreira, Martins et al. (2024)	113 and 115	two panels from the psychology clinic story: Isabela says she loves planning her outfits, and the client Camila thinks she looks more like a circus performer than a psychologist
3.1	Moreira, Martins et al. (2024)	112 and 117	two panels from the psychology clinic story: Luiza greets Isabela with a polite question, and Camila asks herself a rhetorical question about Isabela
4.2	Moreira, Lemos et al. (2024)	90	the screen of a semantic differential scale item (the character Ana and the seven-point scale between “happy” and “sad”); the legend below the scale was added for this book
4.3	Moreira, Cardoso et al. (2024)	61	six panels from a Part VI comic story, in which the research assistant shows where to mark the dot on the seven-point scale between “beautiful” and “ugly” for “extremely,” “moderately,” and “slightly”
6.1	Moreira, Martins et al. (2024)	114	two panels from the psychology clinic story: Camila watches two people talking (one in silhouette) and, in the next panel, frowns
7.2	Moreira, Martins et al. (2024)	116 and 119	two panels from the psychology clinic story: Camila’s thought that ends in “right?” and the one that uses “seems”
8.2	Moreira, Martins et al. (2024)	114 and 120	two panels from the psychology clinic story: Camila in the waiting room, with two psychologists talking, and Camila being called in for her session with Isabela

Figure	Source work	Page	What the figure shows
9.2	Moreira, Martins et al. (2024)	119	two panels from the psychology clinic story: Camila's thought about "the normal psychologist" and the receptionist's call
11.2	Moreira, Martins et al. (2024)	118	two consecutive panels from the psychology clinic story: Camila's thought and the receptionist's call
12.2	Moreira, Lemos et al. (2024)	251 and 255	two panels from the story "Música e Atitude" [Music and attitude], by João Pedro Nobre and Márcio Moreira: one character criticizes funk and his friend reproaches him; later, he agrees to give funk a chance and the other laughs and approves; the bands below the panels were added for this book
13.1	Moreira, Ávila et al. (2023)	44 and 45	two diagrams from Part II (Figures 3 and 4 of the volume): Sofia says "Good morning!" to Clara, who answers, and to Teddy the teddy bear, who does not
13.4	Moreira, Ávila et al. (2023)	46	diagram from Part II (Figure 5 of the volume): Sofia also says "Good morning!" to Nina and Raul, and they answer
14.2	Moreira, Sousa et al. (2022)	27, 28, and 29	four panels from the basic concepts chapter of Part I (Figures 1, 2, and 3 of the chapter): two tacts ("What a beautiful place!", "What a dirty place"), a mand ("Pass me the cannonball!"), and an intraverbal ("What's your name?"); the bands below the panels were added for this book
18.3	Moreira (2025)	174 and 175	two panels from the job interview story in the study by Oliveira and Moreira, in the Part VII volume: one interviewer says he liked the female candidate's profile better but worries that she may need to be away because of her child, and the other announces that the other candidate was chosen; the bands below the panels were added for this book
20.2	Moreira, Rocha et al. (2022)	72	teaching slide from the volume of experiments (Figure 1 of the section "O paradigma de relações de equivalência e o estudo do preconceito: aspectos teóricos" [The equivalence relations paradigm and the study of prejudice: Theoretical aspects]): the picture of a dog, the word "cachorro," and the word "dog" connected by equal signs, next to the definition of equivalence by reflexivity, symmetry, and transitivity; the legend below the slide was added for this book
23.3	Moreira, Rocha et al. (2022)	100	crop of Figure 5 of Experiment 2 in the volume of experiments (screen of a pretest trial): thirteen slider bars, each between two opposite adjectives, with the dot in the middle, and the "Next" button; the evaluated image, which is on the left of the screen, is not reproduced; the band below the screen was added for this book
28.3	Pereira and Moreira (2021a)	50	Figure 13 of the book on presidents (p. 50): line graphs, for P3, of the 0-to-100 ratings given, on the 13 adjective pairs, to stimulus a, b, and c of each of the three classes, at pretest and posttest; the photographs of the presidents and the stimulus thumbnails, on the right in the original, were cropped out, and the color legend was added for this book

Figure	Source work	Page	What the figure shows
31.1	Moreira, Martins et al. (2024)	79	Figure 1 of the study on homophobia in Part IV (p. 79): the three characters in the comic story, Gustavo (Gus), Carlos (Ca), and Paulo (Pa), each with his name beside him, cut out and placed side by side; the band below them, which gives each one's aggression level (p. 76), was added for this book
32.3	Moreira, Rocha et al. (2022)	47	bar graphs from Experiment 1a in the volume of experiments (Figure 3 of the experiment): the mean evaluations, on 13 adjective pairs, of three commercial photographs (G), three silhouettes (S), three photographs chosen without a criterion (F), and three stationery items (O); the legend below the graph was added for this book
33.3	Pereira and Moreira (2021a)	23	Figure 3 of the book on presidents (p. 23): four frames from the standardized matching-to-sample instruction video, with the animated assistant Gabriela, the butterfly-shaped cursor, the comparison figures, and the correct-response mark
34.1	Moreira, Lemos et al. (2024)	104, 106, and 108	the opening of each of the three chapters of the story "Uma questão de respeito!!" [A matter of respect!!]: the chapter card and the first panel
34.3	Moreira, Lemos et al. (2024)	90, 147, and 280	the screen the participant sees in each of the three Part III studies: the image of a character and a pair of opposite adjectives with seven points
34.4	Moreira, Lemos et al. (2024)	92, 150, and 282	the cast of each of the three Part III studies, with the role assigned to each character
34.6	Moreira, Lemos et al. (2024)	102 and 104	four panels in which the fictional assistant explains speech, thought, shout, and whisper balloons
34.7	Moreira, Lemos et al. (2024)	126	the graph for participant 1 in Nogueira: the rating on each of the 13 adjective pairs for Ana, Carlos, and Lídia, at pretest and posttest
35.1	Moreira (2025)	391	four panels from the swimming story in the study by Silva and Moreira, in the Part VII volume: a colleague says which child is the one with autism and corrects the teacher's assumptions ("I thought it was Maria"; "I didn't know autistic kids could behave as well as he does") and answers "It's not quite like that, and you saw that today..." to the remark "To me, autistic people were hopeless"

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