REVIEW AND REFLECT

The Need for Psychological Science

The Limits of Intuition and Common Sense

Although in some ways we outsmart the smartest computers, our intuition often goes awry. To err is human. Without scientific inquiry and critical thinking we readily succumb to *hindsight bias*, also called the I-knew-it-all-along phenomenon. Learning the outcome of a study (or of an everyday happening) can make it seem like obvious common sense. We also are routinely *overconfident* of our judgments, thanks partly to our bias to seek information that confirms them. Such biases lead us to overestimate our unaided intuition.

Enter psychological science. Science, with its procedures for gathering and sifting evidence, restrains error. Although limited by the testable questions it can address, a scientific approach helps us sift reality from illusion, taking us beyond the limits of our intuition and common sense.

The Scientific Attitude

Scientific inquiry begins with an attitude—a *curious* eagerness to *skeptically* scrutinize competing ideas and an open-minded *humility* before nature. Putting ideas, even crazy-sounding ideas, to the test helps us winnow sense from nonsense. The curiosity that drives us to test ideas and to expose their underlying assumptions carries into everyday life as *critical thinking*.

The Scientific Method

Research stimulates the construction of *theories*, which organize *observations* and imply predictive *hypotheses*. These hypotheses (predictions) are then tested to validate and refine the theory and to suggest practical applications.

CHECK YOURSELF: What is the scientific attitude and why is it important for critical thinking?

ASK YOURSELF: How might the scientific method help us understand the roots of terrorism?

Answers to the Check Yourself questions can be found in the yellow appendix at the end of the book.

Description

Preview: Psychologists describe behavior using case studies, surveys, and naturalistic observations.

The starting point of any science is description. In everyday life, all of us obser and describe people, often drawing conclusions about why they behave they do. Professional psychologists do much the same, only more objectively a systematically.

The Case Study

Among the oldest research methods is the **case study**, in which psychologists stu one individual in great depth in the hope of revealing things true of us all. Some e amples: Much of our early knowledge about the brain came from case studies of in viduals who suffered a particular impairment after damage to a certain brain regic Sigmund Freud constructed his theory of personality from a handful of case studi Developmental psychologist Jean Piaget taught us about children's thinking af carefully observing and questioning but a few children. Studies of only a few chi

"'Well my dear,' said Miss Marple, 'human nature is very much the same everywhere, and of course, one has opportunities of observing it at closer quarters in a village.'"

Agatha Christie, *The Tuesday Club Murders*, 1933

panzees have revealed their capacity for understanding and language. Intensive case studies are sometimes very revealing.

Although case studies can also suggest hypotheses for further study, they sometimes mislead us: An individual may be atypical. Unrepresentative information can lead to mistaken judgments and false conclusions. Indeed, anytime a researcher mentions a finding ("Smokers die younger: 95 percent of men over 85 are nonsmokers") someone is sure to offer a contradictory case ("Well, I have an uncle who smoked two packs a day and lived to be 89"). Anecdotal cases—dramatic stories, personal experiences, even psychological case examples—have a way of overwhelming general truths. Highly publicized school shootings can raise alarm about school violence even while school violence rates are subsiding. Numbers can be numbing (in one study of 1300 dream reports concerning a kidnapped child, only 5 percent correctly envisioned the child as dead—see page 259). Anecdotes are often more startling. ("But I know a man who dreamed his sister was in a car accident, and two days later she was badly injured.")

Susan Kuklin/Photo Researchers

The case of the conversational chimpanzee

In intensive case studies of chimpanzees, psychologists have explored the intriguing question of whether language is uniquely human. Here Nim Chimpsky signs *hug* as his trainer, psychologist Herbert Terrace, shows him the puppet Ernie. But is Nim really capable of using language? We'll explore that issue in Chapter 10.

After 2-year-old James Bulger was abducted from a Liverpool shopping mall and bludgeoned to death, and after a murderous rampage at Colorado's Columbine High School, children and parents in both countries became noticeably "scared" (as a *Newsweek* cover story put it)—much more scared than they were of car accidents or cancer, which cause child deaths many hundreds of times more often than kidnappings and school assassinations do. The brutal kidnapping was impressed on people's memories, and people intuitively judge various risks based on how easily they remember examples of them. As psychologist Gordon Allport said, "Given a thimbleful of [dramatic] facts we rush to make generalizations as large as a tub."

So, individual cases can suggest fruitful ideas. What's true of all of us can be glimpsed in any one of us. But to discern the general truths that cover individual cases, we must answer questions with other methods.

The Survey

The **survey** method, commonly used in both descriptive and correlational studies, looks at many cases in less depth. A survey asks people to report their behavior or opinions. Questions about everything from sexual practices to political opinions get put to the public. It's hard to think of a significant question that survey researchers have not asked. For example, Harris and Gallup polls have revealed that 72 percent of Americans think there is too much TV violence, 84 percent favor equal job opportunities for homosexual people, 89 percent say they face high stress, 95 percent believe in God, and 96 percent would like to change something about their appearance.

Wording Effects

Asking questions is tricky. Even subtle changes in the order or wording of questions can have major effects. Should cigarette ads or pornography be allowed on television? People are much more likely to approve "not allowing" such things than "forbidding" or "censoring" them. In a national survey, only 27 percent of Americans approved of "government censorship" of media sex and violence, though 66 percent approved of "more restrictions on what is shown on television" (Lacayo, 1995). People are similarly much more approving of "aid to the needy" than of "welfare," of "affirmative action" than of "preferential treatment," and of "revenue enhancers" than of "taxes." Because wording questions is such a delicate matter, critical thinkers will reflect on how the phrasing of a question might have affected the opinions respondents expressed.

- **case study** an observation technique in which one person is studied in depth in the hope of revealing universal principles.
- **survey** a technique for ascertaining the self-reported attitudes or behaviors of people, usually by questioning a representative, random sample of them.

- **false consensus effect** the tendency to overestimate the extent to which others share our beliefs and behaviors.
- **population** all the cases in a group, from which samples may be drawn for a study. (Note: Except for national studies, this does *not* refer to a country's whole population.)
- **random sample** a sample that fairly represents a population because each member has an equal chance of inclusion.
- **naturalistic observation** observing and recording behavior in naturally occurring situations without trying to manipulate and control the situation.

Sampling

In our everyday experience we spend most of our time with a biased sample of people—mostly those who share our attitudes and habits. Thus, when we wonder how many people hold a particular belief, those who think as we do come to mind most readily. This tendency to overestimate others' agreement with us is the **false consensus effect** (Ross & others, 1977). Vegetarians will think more people are vegetarians than will meat-eaters, and conservatives will perceive more support for conservative views than will liberals. To restrain this bias, researchers aim to gather a representative sample of people.

Most surveys sample a target group. If you wished to survey the students at your college or university you could question them all, but probably there are too many. Instead, you could survey a representative sample of the total student **population**—the whole group you wanted to study and describe. How could you make your sample representative of this population? Typically by making it a **random sample**, one in which every person in the entire group has an equal chance of participating.

To sample the students at your institution randomly, you would *not* send them all a questionnaire. (The conscientious people who return it would not be a random sample.) Rather, you would aim for a representative sample by, say, using a table of random numbers to pick participants from a student listing and then making sure you involve as many as possible. Large representative samples are better than small ones, but a small representative sample of 100 is better than an unrepresentative sample of 500.

The point to remember: Before believing survey findings, think critically: Consider the sample. You cannot compensate for an unrepresentative sample by simply adding more people.

You can forecast the weather by taking an arbitrary sample—by looking at the clouds and holding your finger in the wind—or you can look at weather maps based on comprehensive reporting. You can describe human experience using common sense, dramatic anecdotes, personal experience, and arbitrary samples. But for an accurate picture of the experiences and attitudes of a whole population, there's only one game in town—the representative sample.

We can extend this point to everyday thinking, as we generalize from samples we observe. We meet a few students and attend a few classes during a visit to a college and infer from those instances how friendly the campus is and how good the teaching is. We observe the weather during a three-day visit to Copenhagen and then tell our friends about the climate there.

Overgeneralizing from such select samples is tempting, especially when they are vivid cases. Given (a) a statistical summary of a professor's student evaluations and (b) the vivid comments of two irate students, an administrator's impression of the professor may be influenced as much by the two unhappy students as by the many favorable evaluations in the statistical summary. Standing in the checkout line at the supermarket, George sees the woman in front of him pay with government-provided food stamps and then watches with dismay as she drives away in a fancy car. In both situations, the temptation to generalize from a few vivid but unrepresentative cases is nearly irresistible.

The point to remember: The best basis for generalizing is from a representative sample of cases.

The random-sampling principle also works in national surveys. Imagine that you had a giant barrel containing 60 million white beans mixed with 40 million red beans. A scoop that randomly sampled 1500 of them would contain about 60 percent white and 40 percent red beans, give or take 2 or 3 percent. Sampling voters in a national election survey is like sampling the bean

With very large samples, estimates become quite reliable. *E* is estimated to represent 12.7 percent of the letters in written English. *E*, in fact, is 12.3 percent of the 925,141 letters in Melville's *Moby Dick*, 12.4 percent of the 586,747 letters in Dickens' *A Tale of Two Cities*, and 12.1 percent of the 3,901,021 letters in 12 of Mark Twain's works (*Chance News*, 1997).

This Modern World by Tom Tomorrow © 1991.

1500 randomly sampled people, drawn from all areas of a country, provide a remarkably accurate snapshot of the opinions of a nation (**FIGURE 1.2**).

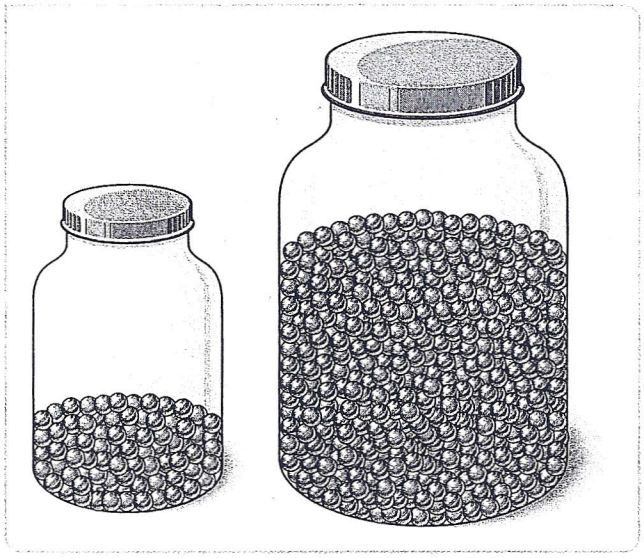


FIGURE 1.2
World in a jar
If marbles of two colors are mixed well in the large jar, the fastest way to know their ratio is to blindly transfer a few into a smaller jar and count them. This approach is called random sampling.

Because gathering a random sample can be a huge task, some don't make the effort. Shere Hite's book *Women and Love* reported survey findings based on only a 4.5 percent response rate from mailings to an unrepresentative sample of 100,000 women. The response was doubly unrepresentative because not only did she have a modest, self-selected return, but the women initially contacted were members of women's organizations. Nonetheless, "It's 4500 people. That's enough for me," reported Hite. And it was apparently enough for *Time* magazine, which made a cover story of her findings—that 70 percent of women married five or more years were having affairs, and that 95 percent of women felt emotionally harassed by the men they love (Wallis, 1987). Evidently it didn't matter that on less publicized surveys, *randomly* sampled American women expressed much higher levels of satisfaction. And only 1 in 7 reported having had an affair during their current marriage—a level of faithfulness replicated in British, French, and Danish surveys (Greeley, 1991, 1994). Without random sampling, large samples like Hite's—including call-in phone samples and TV web site polls—often merely give misleading results.

"How would you like me to answer that question? As a member of my ethnic group, educational class, income group, or religious category?"

Naturalistic Observation

A third descriptive research method involves watching and recording the behavior of organisms in their natural environment. These **naturalistic observations** range from watching chimpanzee societies in the jungle, to using unobtrusive measures of parent-child interactions in different cultures, to recording students' self-seating patterns in the lunchrooms of multiracial schools.

Like the case study and survey methods, naturalistic observation does not *explain* behavior. It *describes* it. Nevertheless, descriptions can be revealing. We once thought, for example, that only humans use tools. Then naturalistic observation revealed that chimpanzees sometimes insert a stick in a termite mound and withdraw it, eating the stick's load of termites. Such naturalistic observations, recalls chimpanzee observer Jane Goodall (1998), paved the way for later studies of animal thinking, language, and emotion. "Observations, made in the natural habitat, helped to show that the societies and behavior of animals are far more complex than previously supposed," thus expanding our understanding of our fellow animals. We later learned that chimps and baboons also use deception to achieve their aims.

Courtesy of Richard Byrne and David Myers

Naturalistic observation
Some psychologists study human and animal behavior in natural environments. As University of St. Andrews psychologist Richard Byrne observes an adult gorilla, recording its behavior on a hand-held computer, a curious infant approaches and investigates his camera lens cap.

Psychologists Andrew Whiten and Richard Byrne (1988) repeatedly saw one young baboon pretending to have been attacked by another as a tactic to get its mother to drive the other baboon away from its food.

Naturalistic observations are also done with humans. Here's one funny finding: We humans laugh 30 times more often in social situations than in solitary situations. (Have you noticed how seldom you laugh when alone?) And when we do laugh, 17 muscles contort our mouth and squeeze our eyes, and we emit a series of 75-millisecond vowellike sounds that are spaced about one-fifth of a second apart (Provine, 2001).

Naturalistic observation also enabled Robert Levine and Ara Norenzayan (1999) to compare the pace of life in 31 countries. By operationally defining *pace of life* as walking speed, the speed with which postal clerks completed a simple request, and the accuracy of public clocks, they concluded that life is fastest paced in Japan and Western Europe, and slower paced in economically less developed countries. People in colder climates also tend to live at a faster pace (and are more prone to die from heart disease). Naturalistic observation is often used to describe behavior. But this study, showing how pace of life is associated with culture and climate, illustrates how naturalistic observation can also be used with correlational research, our next topic.

REVIEW AND REFLECT

Description

The Case Study, the Survey, and Naturalistic Observation

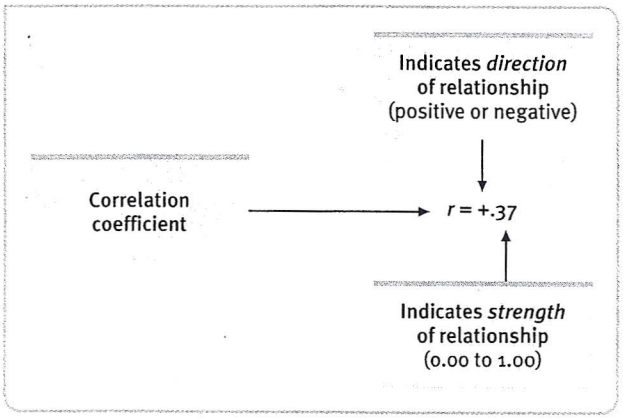
Through individual case studies, surveys among random samples of a population, and naturalistic observations, psychologists observe and describe behavior and mental processes. In generalizing from observations, remember: Representative samples are a better guide than vivid examples.

CHECK YOURSELF: What are the strengths and weaknesses of the three different methods psychologists use to describe behavior—case studies, surveys, and naturalistic observation?

ASK YOURSELF: Can you recall examples of misleading surveys you have experienced or read about? What principles for a good survey did they violate?

Answers to the Check Yourself questions can be found in the yellow appendix at the end of the book.

FIGURE 1.3
How to read a correlation coefficient



Correlation

Preview: Psychologists use numbers to describe the strength of a relationship expressed as a correlation. But they caution against illusory correlations and incorrectly inferring cause and effect.

Describing behavior is a first step toward predicting it. When surveys and naturalistic observations reveal that one trait or behavior accompanies another, we say the two *correlate*. The **correlation coefficient** is a statistical measure of relationship (**FIGURE 1.3**): It reveals how closely two things vary together and thus how well either one *predicts* the other. Knowing how much aptitude test scores *correlate* with school success tells us how well the scores *predict* school success.