

## The Need for Psychological Science

### Frequently Asked Questions About Psychology

# 2

## Thinking Critically With Psychological Science

*What good fortune for those in power that people do not think.*

*Adolf Hitler, 1889–1945*

Hoping to satisfy their curiosity about people and to remedy their own woes, millions turn to “psychology.” They listen to talk-radio counseling, read articles on psychic powers, attend stop-smoking hypnosis seminars, and absorb self-help books on the meaning of dreams, the path to ecstatic love, and the roots of personal happiness.

Others, intrigued by claims of psychological truth, wonder: Do mothers and infants bond in the first hours after birth? Should we trust childhood sexual abuse memories that get “recovered” in adulthood—and prosecute the alleged predators? Are first-born children more driven to achieve? Does handwriting offer clues to personality? Does psychotherapy heal?

In working with such questions, how can we separate uninformed opinions from examined conclusions? *How can we best use psychology to understand why people think, feel, and act as they do?*

## The Need for Psychological Science

As we familiarize ourselves with psychological science’s strategies and incorporate its underlying principles into our daily thinking, our thinking becomes smarter. Two phenomena—hindsight bias and judgmental overconfidence—illustrate why we cannot rely solely on intuition and common sense. The critical inquiry that flows from a scientific approach—undergirded by curiosity, skepticism, and humility—helps winnow sense from nonsense.

### The limits of intuition

Personnel interviewers tend to be overconfident of their gut feelings about job applicants. Their confidence stems partly from their recalling cases where their favorable impression proved right, and partly from their ignorance about rejected applicants who succeeded elsewhere.



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### The Limits of Intuition and Common Sense

Some people think psychology merely documents what people already know and dresses it in jargon: “So what else is new—you get paid for using fancy methods to prove what my grandmother knew?” Others scorn a scientific approach because of their faith in human intuition. Advocates of “intuitive management” urge us to distrust statistical predictors and tune into our hunches when hiring, firing, and investing. Like *Star Wars*’ Luke Skywalker, should we trust the force within?

Actually, notes writer Madeleine L’Engle, “The naked intellect is an extraordinarily inaccurate instrument” (1972). Our intuition can lead us astray.

- Imagine (or ask someone to imagine) folding a sheet of paper on itself 100 times. Roughly how thick would it then be?
- A rope is placed around the Earth at the equator. How much more rope would have to be added for the rope to be 1 foot above the Earth all the way around? (See this module’s final page for the answers.)

Our notions of common sense similarly err. We’re all wise after the fact, presuming that we could have foreseen what happened.

## Did We Know It All Along? Hindsight Bias

**OBJECTIVE 2-1** | Describe *hindsight bias*, and explain how it can make research findings seem like mere common sense.

How easy it is to seem astute when drawing the bull's eye after the arrow has struck. After each stock market downswing—after the bursting of the dot-com bubble, for example—investment gurus say “the market was obviously overdue for a correction.” After the first World Trade Center tower in New York was hit on September 11, 2001 (9/11), commentators said people in the second tower *should* have immediately evacuated (it became obvious only later that it was not an accident). And after physicians receive case information *plus* an autopsy report, they find the cause of death to be self-evident—something they presume they easily could have foreseen, knowing the symptoms. But *before* the arrow strikes, the stock market drops, the terrorists attack, and death occurs, these results are anything but obvious. Causes of death, for example, are not so clear to doctors told the same symptoms without the autopsy report (Dawson & others, 1988). Finding that something has happened makes it seem inevitable. Psychologists Paul Slovic and Baruch Fischhoff (1977) have called this 20/20 hindsight vision **hindsight bias**, also known as the *I-knew-it-all-along phenomenon*.

This phenomenon is easy to demonstrate: Give half the members of a group some purported psychological finding, and the other half an opposite result. Tell the first group, “Psychologists have found that separation weakens romantic attraction. As the saying goes, ‘Out of sight, out of mind.’” Ask them to imagine why this might be true. Most people can, and nearly all will then regard this true finding as unsurprising.

Tell the second group just the opposite—that “psychologists have found that separation strengthens romantic attraction. As the saying goes, ‘Absence makes the heart grow fonder.’” People given this untrue result can also easily explain it, and they overwhelmingly see it as unsurprising common sense. Obviously, when both a supposed finding and its opposite seem like common sense, there is a problem.

Such errors in our recollections and explanations show why we need psychological research. Just asking people how and why they felt or acted as they did can sometimes be misleading—*not* because common sense is usually wrong, but because it is after the fact. Common sense describes what has happened more easily than it predicts what will happen. As physicist Neils Bohr reportedly said, “Prediction is very difficult, especially about the future.”

The phenomenon is widespread. Some 100 studies have observed hindsight bias in various countries and among both children and adults (Bernstein & others, 2004; Guilbault & others, 2004). Nevertheless, Grandmother is often right. As Yogi Berra once said, “You can observe a lot by watching.” (We have Berra to thank for other gems, such as “Nobody ever comes here—it’s too crowded,” and “If the people don’t want to come out to the ballpark, nobody’s gonna stop ’em.”) Because we’re all

“Life is lived forwards, but understood backwards.”

Philosopher Søren Kierkegaard, 1813–1855

“History is written through a rearview mirror, but it unfolds through a foggy windshield.”

Samuel Berger, President Clinton’s national security adviser, in testimony before the 9/11 Commission, 2004

“Anything seems commonplace, once explained.”

Dr. Watson to Sherlock Holmes

### Non Sequitur



■ **hindsight bias** the tendency to believe, after learning an outcome, that one would have foreseen it. (Also known as the *I-knew-it-all-along phenomenon*.)

**Hindsight bias** After the horror of 9/11, it seemed obvious that the U.S. intelligence analysts should have taken advance warnings more seriously, that airport security should have anticipated box-cutter-wielding terrorists, that occupants of the second World Trade Center tower should have known to play it safe and leave. With 20/20 hindsight, everything seems obvious. Thus we now spend billions to protect ourselves against what the terrorists did last time.



TABLE 2.1

TRUE OR FALSE?

Psychological research has either confirmed or refuted each of these statements (adapted, in part, from Furnham & others, 2003).

1. If you want to teach a habit that persists, reward the desired behavior every time, not just intermittently.
2. Patients whose brains are surgically split down the middle survive and function much as they did before the surgery.
3. Traumatic experiences, such as sexual abuse or surviving the Holocaust, are typically “repressed” from memory.
4. Most abused children do *not* become abusive adults.
5. Most infants recognize their own reflection in a mirror by the end of their first year.
6. Adopted siblings tend not to develop similar personalities, even though reared by the same parents.
7. Fears of harmless objects, such as flowers, are just as easy to acquire as fears of potentially dangerous objects, such as snakes.
8. Lie detection tests often lie.

(For answers, see this module’s final page.)

behavior watchers, it would be surprising if many of psychology’s findings had *not* been foreseen. Many people believe that love breeds happiness, and they are right, according to researchers who have found we have a deep “need to belong” to others. Indeed, note Daniel Gilbert, Brett Pelham, and Douglas Krull (2003), “Good ideas in psychology usually have an oddly familiar quality, and the moment we encounter them we feel certain that we once came close to thinking the same thing ourselves and simply failed to write it down.”

But sometimes Grandmother’s intuition has it wrong. Informed by countless casual observations, our intuition may tell us that familiarity breeds contempt, that dreams predict the future, and that emotional reactions coincide with menstrual phase. The available evidence suggests that these common-sense ideas are wrong, wrong, and wrong. Do you know which of the popular ideas in **TABLE 2.1** have been confirmed by psychology’s

research, and which have been refuted? Throughout this book we will see how research has both inspired and overturned popular ideas—about aging, about sleep and dreams, about personality. And we will also see how it has surprised us with discoveries about how the brain’s chemical messengers control our moods and memories, about animal abilities, and about the effects of stress on our capacity to fight disease.

Overconfidence

**OBJECTIVE 2-2** | Describe how overconfidence contaminates our everyday judgments.

Our everyday thinking is limited not only by our after-the-fact common sense but also by our human tendency toward overconfidence—we tend to think we know more than we do. Asked how sure we are of our answers to factual questions (Is Boston north or south of Paris?), we tend to be more confident than correct.<sup>1</sup>

<sup>1</sup>Boston is south of Paris.

Or consider these three anagrams, which Richard Goranson (1978) asked people to unscramble:

WREAT → WATER

ETRYN → ENTRY

GRABE → BARGE

Reflect for a moment: About how many seconds do you think it would have taken you to unscramble each of these?

Once people know the target word, hindsight makes it seem obvious—so much so that they become overconfident. They think they would have seen the solution in only 10 seconds or so, when in reality the average problem solver spends 3 minutes, as you also might, given a similar anagram without the solution: OCHSA (see this module's final page to check your answer).

Are we any better at predicting our social behavior? To find out, Robert Vallone and his associates (1990) had students predict at the beginning of the school year whether they would drop a course, vote in an upcoming election, call their parents more than twice a month, and so forth. On average, the students felt 84 percent confident in making these self-predictions. Later quizzes about their actual behavior showed their predictions were correct only 71 percent of the time. Even when they were 100 percent sure of themselves, their self-predictions erred 15 percent of the time.

It's not just collegians. For a dozen years, Ohio State University psychologist Philip Tetlock (1998) collected experts' predictions of political, economic, and military situations. In the late 1980s, for example, he invited expert professors, think-tank analysts, government experts, and journalists to project the governance of the Soviet Union or of South Africa five years later, and to rate how confident they felt. Others did the same for the future of Canada in 1992. After the five years had elapsed (and Communism had collapsed in the Soviet Union, South Africa had become a multiracial democracy, and the Canadian constitution continued), Tetlock invited the experts to recall and reflect on their predictions—which, as in laboratory studies, were far more confident than correct. Experts who had felt more than 80 percent confident were right less than 40 percent of the time.

Despite their lackluster predictions, those who erred were nearly as likely as those who got it right to convince themselves that their initial analysis was *still basically right*. I was “almost right,” many of them felt. “The hardliners almost succeeded in their coup attempt against Gorbachev.” “The Quebecois separatists almost won the secessionist referendum.” “But for the coincidence of de Klerk and Mandela, the transition to black majority rule in South Africa would have been a lot bloodier.” The overconfidence of political experts (and stock market forecasters and sports prognosticators) is therefore hard to dislodge, no matter what the outcome.

*The point to remember:* Hindsight bias and overconfidence often lead us to overestimate our intuition. But scientific inquiry, fed by curious skepticism and by humility, can help us sift reality from illusions.

## The Scientific Attitude

**OBJECTIVE 2-3** | Explain how the scientific attitude encourages critical thinking.

Underlying all science is, first, a hard-headed *curiosity*, a passion to explore and understand without misleading or being misled. Some questions (Is there life after death?) are beyond science. To answer them in any way requires a leap of faith. With many other ideas (Can some people demonstrate ESP?), the proof is in the pudding. No matter how sensible or crazy-sounding an idea, the hard-headed question is, Does it work? When put to the test, can its predictions be confirmed?

Fun anagram solutions from

Wordsmith.org:

Elvis = lives

Dormitory = dirty room

Slot machines = cash lost in 'em

“We don't like their sound. Groups of guitars are on their way out.”

Decca Records, in turning down a recording contract with the Beatles in 1962

“Computers in the future may weigh no more than 1.5 tons.”

*Popular Mechanics*, 1949

“The telephone may be appropriate for our American cousins, but not here, because we have an adequate supply of messenger boys.”

British expert group evaluating the invention of the telephone

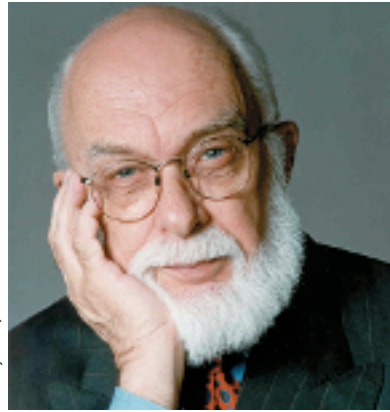
“They couldn't hit an elephant at this dist—.”

General John Sedgwick's last words, uttered during a U.S. Civil War battle, 1864



“The scientist . . . must be free to ask any question, to doubt any assertion, to seek for any evidence, to correct any errors.”

Physicist J. Robert Oppenheimer, *Life*,  
October 10, 1949



Courtesy of the James Randi Education Foundation

**The amazing Randi** The magician James Randi exemplifies skepticism. He has tested and debunked a variety of psychic phenomena.

“A skeptic is one who is willing to question any truth claim, asking for clarity in definition, consistency in logic, and adequacy of evidence.”

Philosopher Paul Kurtz, *The Skeptical Inquirer*,  
1994

“My deeply held belief is that if a god anything like the traditional sort exists, our curiosity and intelligence are provided by such a god. We would be unappreciative of those gifts . . . if we suppressed our passion to explore the universe and ourselves.”

Carl Sagan, *Broca's Brain*, 1979

This scientific approach has a long history. As ancient a figure as Moses used such an approach. How do you evaluate a self-proclaimed prophet? His answer: Put the prophet to the test. If the predicted event “does not take place or prove true,” then so much the worse for the prophet (*Deuteronomy* 18:22). Magician James Randi uses Moses’ approach when testing those claiming to see auras around people’s bodies:

**Randi:** Do you see an aura around my head?

**Aura-seer:** Yes, indeed.

**Randi:** Can you still see the aura if I put this magazine in front of my face?

**Aura-seer:** Of course.

**Randi:** Then if I were to step behind a wall barely taller than I am, you could determine my location from the aura visible above my head, right?

Randi has told me that no aura-seer has agreed to take this simple test.

When subjected to such scrutiny, crazy-sounding ideas sometimes find support. During the 1700s, scientists scoffed at the notion that meteorites had extraterrestrial origins. When two Yale scientists dared to deviate from the conventional opinion, Thomas Jefferson jeered, “Gentlemen, I would rather believe that those two Yankee Professors would lie than to believe that stones fell from heaven.” Sometimes scientific inquiry refutes skeptics.

More often, science relegates crazy-sounding ideas to the mountain of forgotten claims of perpetual motion machines, miracle cancer cures, and out-of-body travels into centuries past. To sift reality from fantasy, sense from nonsense, therefore requires a scientific attitude: being skeptical but not cynical, open but not gullible.

As scientists, psychologists approach the world of behavior with a *curious skepticism*. They persistently ask two questions: What do you mean? How do you know? In business, the motto is “Show me the money.” In science, it is “Show me the evidence.”

Do parental behaviors determine their children’s sexual orientation? Can astrologers analyze your character and predict your future based on the position of the planets at your birth? As you will see in the pages that follow, putting such claims to the test has led most psychologists to doubt them. In the arena of competing ideas, skeptical testing can reveal which ones best match the facts. “To believe with certainty,” says a Polish proverb, “we must begin by doubting.”

Putting a scientific attitude into practice requires not only skepticism but also *humility*, because we may have to reject our own ideas. In the last analysis, what matters is not my opinion or yours, but the truths nature reveals in response to our questioning. If people don’t behave as our ideas predict, then so much the worse for our ideas. This is the humble attitude expressed in one of psychology’s early mottos: “The rat is always right.”

Historians of science tell us that these attitudes of curiosity, skepticism, and humility helped make modern science possible. Many of its founders, including Copernicus and Newton, were people whose religious convictions made them humble before nature and skeptical of mere human authority (Hooykaas, 1972; Merton, 1938). Today’s deeply religious people sometimes view science, especially psychological science, as a threat. Yet, notes sociologist Rodney Stark (2003a,b), the scientific revolution was led mostly by deeply religious people acting on the religious idea that “in order to love and honor God, it is necessary to fully appreciate the wonders of his handiwork.”

Of course, scientists, like anyone else, can have big egos and may cling to their preconceptions. We all view nature through the spectacles of our preconceived ideas. Nevertheless, the ideal that unifies psychologists with all scientists is the curious, skeptical, humble scrutiny of competing ideas. As a community, scientists check and recheck one another’s findings and conclusions.

This scientific attitude prepares us to think smarter. Smart thinking, called **critical thinking**, examines assumptions, discerns hidden values, evaluates evidence, and assesses conclusions. Whether reading a news report or listening to a conversation, critical thinkers ask questions. Like scientists, they wonder, How do they know that?

What is this person's agenda? Is the conclusion based on anecdote and gut feelings, or on evidence? Does the evidence justify a cause-effect conclusion? What alternative explanations are possible? Carried to an extreme, healthy skepticism can degenerate into a negative cynicism that scorns any unproven idea. Better to have a critical attitude that produces humility—an awareness of our own vulnerability to error and an openness to surprises and new perspectives.

Has psychology's critical inquiry been open to surprising findings? The answer is plainly yes. Believe it or not . . .

- massive losses of brain tissue early in life may have minimal long-term effects.
- within days, newborns can recognize their mother's odor and voice.
- brain damage can leave a person able to learn new skills, yet be unaware of such learning.
- diverse groups—men and women, old and young, rich and working class, those with disabilities and without—report roughly comparable levels of personal happiness.
- electroconvulsive therapy (delivering an electric shock to the brain) is often a very effective treatment for severe depression.

And has critical inquiry convincingly debunked popular presumptions? The answer is again yes. The evidence indicates that . . .

- sleepwalkers are *not* acting out their dreams and sleepwalkers are *not* verbalizing their dreams.
- our past experiences are *not* all recorded verbatim in our brains; with brain stimulation or hypnosis, one *cannot* simply “play the tape” and relive long-buried or repressed memories.
- most people do *not* suffer from unrealistically low self-esteem, and high self-esteem is not all good.
- opposites do *not* generally attract.

In each of these instances and more, what has been learned is not yet what is widely believed.

## The Scientific Method

**OBJECTIVE 2-4** | Describe how psychological theories guide scientific research.

Psychologists arm their scientific attitude with the *scientific method*: They make observations, form theories, and then refine their theories in the light of new observations. In everyday conversation, we tend to use *theory* to mean “mere hunch.” In science, however, *theory* is linked with observation. A scientific **theory** *explains* through an integrated set of principles that *organizes* and *predicts* behaviors or events. By organizing isolated facts, a theory simplifies things. There are too many facts about behavior to remember them all. By linking facts and bridging them to deeper principles, a theory offers a useful summary. When we connect the observed dots, we may discover a coherent picture.

A good theory of depression, for example, helps us organize countless observations concerning depression into a short list of principles. Imagine we observe over and over that people with depression describe their past, present, and future in gloomy terms. We might therefore theorize that low self-esteem contributes to depression. So far so good: Our self-esteem principle neatly summarizes a long list of facts about people with depression.

Yet no matter how reasonable a theory may sound—and low self-esteem seems a reasonable explanation of depression—we must put it to the test. A good theory doesn't just sound appealing. It must produce testable predictions, called **hypotheses**. By enabling us to test and reject or revise the theory, such predictions give direction to research. They specify what results would support the theory and what results would disconfirm it. To test our self-esteem theory of depression, we might assess people's self-esteem by having them indicate their agreement to statements such as “I

“The real purpose of the scientific method is to make sure Nature hasn't misled you into thinking you know something you don't actually know.”

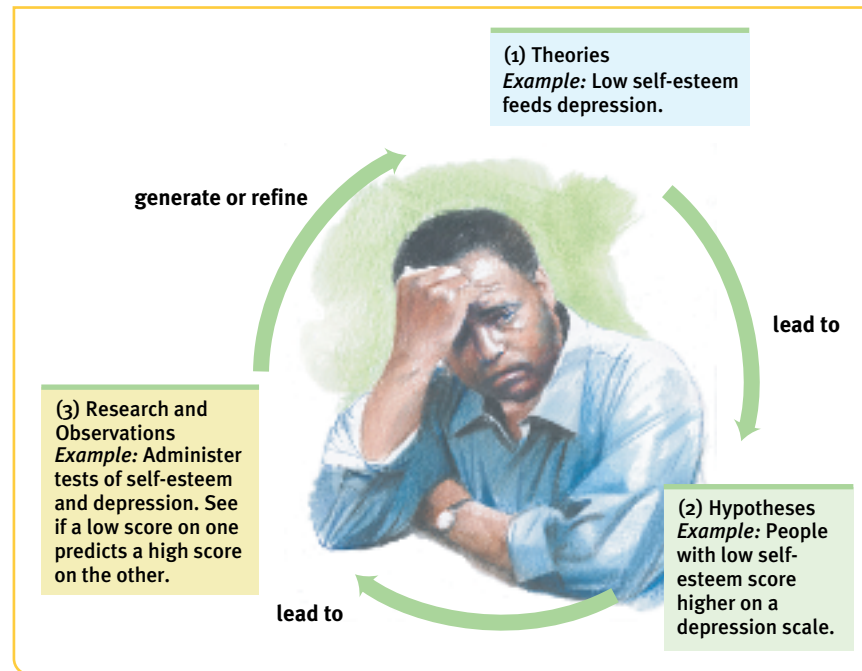
Robert M. Pirsig, *Zen and the Art of Motorcycle Maintenance*, 1974

■ **critical thinking** thinking that does not blindly accept arguments and conclusions. Rather, it examines assumptions, discerns hidden values, evaluates evidence, and assesses conclusions.

■ **theory** an explanation using an integrated set of principles that organizes and predicts observations.

■ **hypothesis** a testable prediction, often implied by a theory.

**FIGURE 2.1**  
**The scientific method** A self-correcting process for asking questions and observing nature's answer.



have good ideas” and “I am fun to be with.” Then we could see whether, as we hypothesized, people who report poorer self-images also score higher on a depression scale (**FIGURE 2.1**).

In testing our theory, we should be aware that it can bias subjective observations. Having theorized that depression springs from low self-esteem, we may see what we expect. We may perceive depressed people’s neutral comments as self-disparaging. The urge to see what we expect is an ever-present temptation for all of us. For example, according to the bipartisan U.S. Senate Select Committee on Intelligence (2004), preconceived expectations that Iraq had weapons of mass destruction led intelligence analysts to wrongly interpret ambiguous observations as confirming that theory, and this theory-driven conclusion then led to the preemptive U.S. invasion of Iraq.

As a check on their biases, psychologists report their research—with precise **operational definitions** of concepts that allow anyone to **replicate** (repeat) their observations. If other researchers re-create a study with different participants and materials and get similar results, then our confidence in the finding’s reliability grows. The first study of hindsight bias aroused psychologists’ curiosity. Now, after many successful replications with differing people and questions, we feel sure of the phenomenon’s power.

In the end, our theory will be useful if it (1) effectively *organizes* a range of self-reports and observations and (2) implies clear *predictions* that anyone can use to check the theory or to derive practical applications. (If we boost people’s self-esteem, will their depression lift?) Eventually, our research will probably lead to a revised theory that better organizes and predicts what we know about depression.

**Good theories explain by**  
**1. organizing and linking observed facts.**  
**2. implying hypotheses that offer testable predictions and, sometimes, practical applications.**

## Frequently Asked Questions About Psychology

You are now prepared to think critically about psychological matters. Yet, even knowing this much, you may still be approaching psychology with a mixture of curiosity and apprehension. So before we move ahead, let’s address some frequently asked questions.



## Can Laboratory Experiments Illuminate Everyday Life?

**OBJECTIVE 2-5** | Explain the value of simplified laboratory conditions in discovering general principles of behavior.

When you see or hear about psychological research, do you ever wonder whether people's behavior in the lab will predict their behavior in real life? For example, does detecting the blink of a faint red light in a dark room have anything useful to say about flying a plane at night? Does our tendency to remember best the first and last items in a list of unrelated words tell us anything about why we remember the names of certain people we meet at a party? After viewing a violent, sexually explicit film, does an aroused man's increased willingness to push buttons that he thinks will electrically shock a woman really say anything about whether violent pornography makes a man more likely to abuse a woman?

Before you answer, consider: The experimenter *intends* the laboratory environment to be a simplified reality—one that simulates and controls important features of everyday life to allow focused study of one or two specific behaviors. Laboratory experiments have the advantage of allowing researchers to rule out effects from other factors. Just as an aeronautical wind tunnel enables an engineer to re-create atmospheric forces under controlled conditions, a laboratory experiment enables a psychologist to re-create psychological forces under controlled conditions.

People in the lab are not different creatures from their out-of-lab selves. For example, Cecilia Cheng (2001) observed that Hong Kong adults who coped flexibly with laboratory stresses also coped flexibly with stress in their marriages. In aggression studies, deciding whether to push a button that delivers a shock may not be the same as slapping someone in the face, but the *principle* is the same. And the experiment's purpose, notes Douglas Mook (1983), is not to re-create the exact behaviors of everyday life but to test theoretical principles. *It is the resulting principles—not the specific findings—that help explain everyday behaviors.*

When psychologists apply laboratory research on aggression to actual violence, they are applying theoretical *principles* of aggressive behavior, principles they have refined through many experiments. Similarly, it is the principles of the visual system, developed from experiments in artificial settings (such as looking at red lights in the dark), that we apply to more complex behaviors such as night flying. And many investigations show that principles derived in the laboratory *do* typically generalize to the everyday world (Anderson & others, 1999).

*The point to remember:* As psychologists, our concerns lie less with particular behaviors than with the general principles that help explain many behaviors.

## Does Behavior Depend on One's Culture?

**OBJECTIVE 2-6** | Discuss whether psychological research can be generalized across cultures and genders.

If culture shapes behavior, what can psychological studies done in one culture, often with white Europeans or North Americans, really tell us about people in general? As we will see time and again, **culture**—shared ideas and behaviors that one generation passes on to the next—matters. Our culture influences our standards of promptness and frankness, our attitudes toward premarital sex and varying body shapes, our tendency to be casual or formal, our eye contact, our conversational distance, and much, much more. Being aware of such differences, we can restrain our assumptions that others will think and act as we do. Given the growing mixing and clashing of cultures, our need for such awareness is urgent.

■ **operational definition** a statement of the procedures (operations) used to define research variables. For example, *human intelligence* may be operationally defined as what an intelligence test measures.

■ **replication** repeating the essence of a research study, usually with different participants in different situations, to see whether the basic finding extends to other participants and circumstances.

■ **culture** the enduring behaviors, ideas, attitudes, and traditions shared by a large group of people and transmitted from one generation to the next.

**A cultured greeting** Because culture shapes people's understanding of social behavior, actions that seem ordinary to us may seem quite odd to visitors from far away. Yet underlying these differences are powerful similarities. Supporters of newly elected leaders everywhere typically greet them with pleased deference, though not necessarily with bows and folded hands, as in India. Here influential and popular politician Sonia Gandhi greets some of her constituents shortly after her election.



Ami Vitale/Getty Images



Our shared biological heritage does, however, unite us as a universal human family. The same underlying processes guide people everywhere:

- People diagnosed with dyslexia, a reading disorder, exhibit the same brain malfunction whether they are Italian, French, or British (Paulesu & others, 2001).
- Variation in languages—spoken and gestured—may impede communication across cultures. Yet all languages share deep principles of grammar, and people from opposite hemispheres can communicate with a smile or a frown.
- People in different cultures do vary in feelings of loneliness. But across cultures, loneliness is magnified by shyness, low self-esteem, and being unmarried (Jones & others, 1985; Rokach & others, 2002).
- Most Japanese prefer their fish raw and most North Americans prefer theirs cooked. But the same principles of hunger and taste influence all of us when we sit down to a meal. We are each in certain respects like all others, like some others, and like no other. Studying people of all races and cultures helps us discern our similarities and our differences, our human kinship and our diversity.

“All people are the same; only their habits differ.”

Confucius, 551–479 B.C.

*The point to remember:* Even when specific attitudes and behaviors vary across cultures, as they often do, the underlying processes are much the same.

### Does Behavior Vary With Gender?

At your birth, friends and family immediately wondered which of the two human types you were: male or female. Given how important gender is to our identity and to others' perceptions of us, do we need a different psychology for women and for men?

You will see throughout this book that gender issues permeate psychology. Researchers report gender differences in what we dream, in how we express and detect emotions, and in our risk for alcoholism, depression, and eating disorders. Not only is studying such differences interesting, it also is potentially beneficial. For example, many researchers believe that women carry on conversations more readily to build relationships, while men talk more to give information and advice (Tannen, 1990). Knowing this difference can help us prevent conflicts and misunderstandings in everyday relationships.

Nevertheless, it's important to remember that psychologically as well as biologically, women and men are overwhelmingly similar. Whether female or male, we learn to walk at about the same age. We experience the same sensations of light and sound. We feel the same pangs of hunger, desire, and fear. We exhibit similar overall intelligence and well-being. We also tend to exhibit and perceive the very behaviors our culture expects of males and females.

So, gender matters. Biology determines our sex, and then culture further bends the genders. Yet in many ways female and male are similarly human.

### Why Do Psychologists Study Animals?

**OBJECTIVE 2-7** | Explain why psychologists study animals, and discuss the ethics of experimentation with both animals and humans.

Many psychologists study animals because they find them fascinating. They want to understand how different species learn, think, and behave. Psychologists also study animals to learn about people, by doing experiments that are permissible only with animals. Human physiology resembles that of many other animals. We humans are not *like* animals; we *are* animals. Animal experiments have therefore led to treatments for human diseases—insulin for diabetes, vaccines to prevent polio and rabies, transplants to replace defective organs.

Likewise, the same processes by which humans see, exhibit emotion, and become obese are present in rats and monkeys. To discover more about the basics of human learning, researchers even study sea slugs. To understand how a combustion engine

“Rats are very similar to humans except that they are not stupid enough to purchase lottery tickets.”

Dave Barry, July 2, 2002



D. Shapiro, © Wildlife Conservation Society

### Animal research benefiting animals

Thanks partly to research on the benefits of novelty, control, and stimulation, these Bronx Zoo gorillas are enjoying improved quality of life.

works, you would do better to study a lawn mower's engine than a Mercedes'. Like Mercedes engines, humans are complex. But the simplicity of the sea slug's nervous system is precisely what makes it so revealing of the neural mechanisms of learning.

### Is It Ethical to Experiment on Animals?

If we share important similarities with other animals, then should we not respect them? "We cannot defend our scientific work with animals on the basis of the similarities between them and ourselves and then defend it morally on the basis of differences," noted Roger Ulrich (1991). The animal protection movement protests the use of animals in psychological, biological, and medical research. Researchers remind us that the world's 30 million mammals used each year in research are but a fraction of 1 percent of the billions of animals killed annually for food (which means the average person eats 20 animals a year). While researchers each year conduct experiments on some 200,000 dogs and cats cared for under humane regulations, humane animal shelters are forced to kill 50 times that many (Goodwin & Morrison, 1999).

Animal protection organizations, such as Psychologists for the Ethical Treatment of Animals, advocate naturalistic observation of animals rather than laboratory manipulation. Animal researchers have responded that the issue is not the morality of good versus evil but of compassion for animals versus compassion for people. How many of us would have attacked Pasteur's experiments with rabies, which caused some dogs to suffer but led to a vaccine that spared millions of people (and dogs) from agonizing death? And would we really wish to have deprived ourselves of the animal research that led to effective methods of training children with mental disorders; of understanding aging; of relieving fears and depression; and of controlling obesity, alcoholism, and stress-related pain and disease? The answers to such questions vary by culture. In Gallup surveys in Canada and the United States, about 6 in 10 adults deem medical testing on animals "morally acceptable." In Britain, only 37 percent do (Mason, 2003).

Out of this heated debate, two issues emerge. The basic one is whether it is right to place the well-being of humans above that of animals. In experiments on stress and cancer, is it right that mice get tumors in hopes that people might not? Should some monkeys be exposed to an HIV-like virus in the search for an AIDS vaccine? Is our use of other animals as natural as the behavior of carnivorous hawks, cats, and whales? Defenders of research on animals argue that anyone who has eaten a hamburger, worn leather shoes, tolerated hunting and fishing, or supported the extermination of crop-destroying or plague-carrying pests has already agreed that, yes, it is sometimes permissible to sacrifice animals for the sake of human well-being.

Scott Plous (1993) notes, however, that our compassion for animals varies, as does our compassion for people—based on their perceived similarity to us. We feel more attraction, give more help, and act less aggressively toward similar others. Likewise,

"I believe that to prevent, cripple, or needlessly complicate the research that can relieve animal and human suffering is profoundly inhuman, cruel, and immoral."

Psychologist Neal Miller, 1983

"Please do not forget those of us who suffer from incurable diseases or disabilities who hope for a cure through research that requires the use of animals."

Psychologist Dennis Feeney (1987)

“The righteous know the needs of their animals.”

Proverbs 12:10

“The greatness of a nation can be judged by the way its animals are treated.”

Mahatma Gandhi, 1869–1948

we value animals according to their perceived kinship with us. Thus, primates and companion pets get top priority. (Western people raise or trap mink and foxes for their fur, but not dogs or cats.) Other mammals occupy the second rung on the privilege ladder, followed by birds, fish, and reptiles on the third rung, with insects at the bottom. In deciding which animals have rights, we each draw our own cut-off line somewhere across the animal kingdom.

If we give human life first priority, the second issue is the priority we give to the well-being of animals in research. What safeguards should protect them? Most researchers today feel ethically obligated to enhance the well-being of captive animals and protect them from needless suffering. In one survey of animal researchers, 98 percent or more supported government regulations protecting primates, dogs, and cats, and 74 percent supported regulations providing for the humane care of rats and mice (Plous & Herzog, 2000). Many professional associations and funding agencies now have guidelines for the humane use of animals. For example, British Psychological Society guidelines call for housing animals under reasonably natural living conditions, with companions for social animals (Lea, 2000). American Psychological Association (2002) guidelines mandate ensuring the “comfort, health, and humane treatment” of animals, and of minimizing “infection, illness, and pain of animal subjects.” Humane care also leads to more effective science, because pain and stress would distort the animals’ behavior during experiments.

Animals have themselves benefited from animal research. One Ohio team of research psychologists measured stress hormone levels in samples of millions of dogs brought each year to animal shelters, and they devised methods of handling and stroking them that reduced stress and eased their transition to adoptive homes (Tuber & others, 1999). Thanks to animal behavior studies, formerly idle Bronx Zoo animals are now staving off listless boredom by working for their supper, as would their counterparts in the wild (Stewart, 2002). Other studies have helped improve care and management in animals’ natural habitats. By revealing our behavioral kinship with animals and the remarkable intelligence of chimpanzees, gorillas, and other animals, experiments have also led to increased empathy and protection for them. At its best, a psychology concerned for humans and sensitive to animals serves the welfare of both.

### Is It Ethical to Experiment on People?

If the image of animals or people receiving supposed electric shocks troubles you, you may be relieved to know that most psychological research involves no such stress. With people, blinking lights, flashing words, and pleasant social interactions are more common.

Occasionally, though, researchers do temporarily stress or deceive people, but only when they believe it is essential to a justifiable end, such as understanding and controlling violent behavior or studying mood swings. Such experiments wouldn’t work if the participants knew all there was to know about the experiment beforehand. Either the procedures would be ineffective or the participants, wanting to be helpful, might try to confirm the researchers’ predictions.

Ethical principles developed by the American Psychological Association (1992) and the British Psychological Society (1993) urge investigators to (1) obtain the informed consent of potential participants, (2) protect them from harm and discomfort, (3) treat information about individual participants confidentially, and (4) fully explain the research afterward. Moreover, most universities today screen research proposals through an ethics committee that safeguards the well-being of every participant.

Much research, however, occurs outside of university laboratories, in places where there may be no ethics committees. For example, retail stores routinely survey people, photograph their purchasing behavior, track their buying patterns, and test the effectiveness of advertising. Curiously, such research attracts less attention than the scientific research done to advance human understanding.



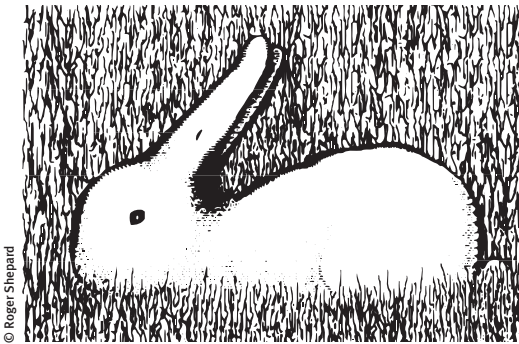
## Is Psychology Free of Value Judgments?

**OBJECTIVE 2-8** | Describe how personal values can influence psychologists' research and its application, and discuss psychology's potential to manipulate people.

Psychology is definitely not value-free. Values affect what we study, how we study it, and how we interpret results. Consider: Researchers' values influence their choice of research topics—whether to study worker productivity or worker morale, sex discrimination or gender differences, conformity or independence. Values can also color “the facts.” As we noted earlier, our preconceptions can bias our observations and interpretations; sometimes we see what we want or expect to see (FIGURE 2.2).

Even the words we use to describe a phenomenon can reflect our values. Labeling the sex acts we do not practice as “perversions” or as “sexual variations” conveys a value judgment. The same holds true in everyday speech, when one person’s “rigidity” is another’s “consistency,” or one person’s “faith” is another’s “fanaticism.” Our labeling someone as “firm” or “stubborn,” “careful” or “picky,” “discreet” or “secretive” reveals our feelings. Both in and out of psychology, labels describe and labels evaluate.

Popular applications of psychology also contain hidden values. If you defer to “professional” guidance about how to live—how to raise children, how to achieve self-fulfillment, what to do with sexual feelings, how to get ahead at work—you are accepting value-laden advice. A science of behavior and mental processes can certainly help us reach our goals, but it cannot decide what those goals should be. (See Thinking Critically About Desegregation and the Death Penalty, on the next page.)



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**FIGURE 2.2**

**What do you see?** People interpret ambiguous information to fit their preconceptions. Did you see a duck or a rabbit? Before showing some friends this image, ask them if they can see the duck lying on its back (or the bunny in the grass). (From Shepard, 1990.)

“It is doubtless impossible to approach any human problem with a mind free from bias.”

Simone de Beauvoir, *The Second Sex*, 1953

## Is Psychology Potentially Dangerous?

If some people see psychology as merely common sense, others have a different concern—that it is becoming dangerously powerful. Is it an accident that astronomy is the oldest science and psychology the youngest? Exploring the external universe is one thing, but exploring our own inner universe seems more dangerous and threatening. Might psychology be used to manipulate people?

Knowledge, like all power, can be used for good or evil. Nuclear power has been used to light up cities—and to demolish them. Persuasive power has been used to educate people—and to deceive them. The power of mind-altering drugs has been used to restore sanity—and to destroy it.

Although psychology does indeed have the power to deceive, its purpose is to enlighten. Every day, psychologists are exploring ways to enhance learning, creativity, and compassion. Psychology also speaks to many of our world’s great problems—war, overpopulation, prejudice, family dysfunction, crime—all of which involve attitudes and behaviors. And psychology speaks to our deepest longings—for nourishment, for love, for happiness. True, psychology cannot address all of life’s great questions, but it speaks to some mighty important ones.

## DESEGREGATION AND THE DEATH PENALTY— WHEN BELIEFS COLLIDE WITH PSYCHOLOGICAL SCIENCE

An influential modern viewpoint, ironically called *post-modernism*, questions scientific objectivity. Rather than mirroring the real world, say post-modernists, scientific concepts are socially constructed fictions. Like all knowledge, they reflect the culture that formed them. “Intelligence,” for instance, is a concept psychologists created and defined. Because personal values guide theory and research, “truth” is said to be personal and subjective. (What behaviors shall we call “intelligent”?) In our quest for truth, we cannot help following our hunches, our biases, our cultural bent.

Psychological scientists agree that many important questions lie beyond the reach of science. And they agree that personal beliefs often shape perceptions. But they also believe that there is a real world out there, and that we advance truth by checking our hunches against it. Marie Curie did not just construct the concept of radium, she *discovered* radium. It really exists. In the behavioral sciences, pure objectivity, like pure love, may be unattainable. Yet most would argue that it is better to humble ourselves before reliable evidence than to cling to untested presumptions.

Humbling itself before the evidence is what the U.S. Supreme Court did in making its historic 1954 decision declaring segregated schools unconstitutional. This was the Court’s first case in which social psychologists participated actively. They did so as expert witnesses and as authors, led by Kenneth Clark (1952), of an influential social science brief that formed part of the case presented. The Court found it noteworthy that when Kenneth Clark and Mamie Phipps Clark



Office of Public Affairs at Columbia University

### Psychologists Mamie Phipps Clark and Kenneth B. Clark

Their work was cited in the historic U.S. Supreme Court school desegregation decision in 1954.

(1947) gave African-American children a choice between Black dolls and White dolls, most chose the White, which suggested that under segregation Black children were internalizing anti-Black prejudice.

This social science success inspired hundreds more studies that researchers hoped would inform future judicial decisions. More recently, however, the Court has joined postmodernists in discounting behavioral science research. In deciding whether the death penalty falls under the Constitution’s ban on “cruel and unusual punishment,” the Court wrestled with whether society defines execution as cruel and unusual, whether courts inflict the penalty arbitrarily, whether they apply it with racial bias, and whether execution deters crime more than all other available punishments. The behavioral science answers to each of these questions, note psychologists Mark Costanzo (1997) and Craig Haney and Deana

Logan (1994), could hardly be clearer. And yet, on two of these issues—the fairness of the death penalty and its effectiveness—the Court has disregarded social science research.

*Is the death penalty applied fairly?* Studies show that those eligible to serve as jurors in capital punishment cases—namely, those who accept the death penalty—do not represent the greater population. Compared with people excluded by virtue of their qualms about capital punishment, those chosen as jurors are less likely to be minorities and women. They are also more likely to believe the prosecution’s arguments, and they are more conviction-prone.

*Does the death penalty work—does it deter crime?* The evidence is consistent: States with a death penalty do not have lower homicide rates. After instituting the death penalty, these states did not see their rates drop. And homicide has not risen in states that have abandoned the death penalty. A person committing a crime of passion doesn’t pause to calculate the consequences (and, if she or he did, would likely consider life in a prison cell an ample deterrent). Yet the Court persists in its belief that “the death penalty undoubtedly is a significant deterrent.”

Beliefs guide perceptions. And that, say psychological scientists responding to postmodernists, is why we *need* to think smarter—to restrain our hunches, our biases, and our cultural leanings by checking them against available evidence. Why not put our testable beliefs to the test? If they find support, so much the better for them. If they collide against a wall of observation, so much the worse for them. These ideals of skeptical scrutiny and humility fuel all scientific endeavor.

## >> LEARNING OUTCOMES

### Thinking Critically With Psychological Science

**OBJECTIVE 2-1** | Describe *hindsight bias*, and explain how it can make research findings seem like mere common sense.

*Hindsight bias* (also called the *I-knew-it-all-along phenomenon*) is the tendency to believe, after learning an outcome, that we would have foreseen it. Thus, learning the outcome of a study can make it seem like obvious common sense. Scientific inquiry and critical thinking can help us overcome this tendency to overestimate our unaided intuition.

**OBJECTIVE 2-2** | Describe how overconfidence contaminates our everyday judgments.

We are routinely *overconfident* of our judgments, thanks partly to our bias to seek information that confirms them. Science, with its procedures for gathering and sifting evidence, restrains error by taking us beyond the limits of our intuition and common sense.

**OBJECTIVE 2-3** | Explain how the scientific attitude encourages critical thinking.

Although limited by the testable questions it can address, a scientific approach helps us sift reality from illusion. Scientific inquiry begins with an attitude—a curious eagerness to *skeptically* scrutinize competing ideas and an open-minded *humility* before nature. This attitude carries into everyday life as *critical thinking*, which examines assumptions, discerns hidden values, evaluates evidence, and assesses outcomes. Putting ideas, even crazy-sounding ideas, to the test helps us winnow sense from nonsense.

**OBJECTIVE 2-4** | Describe how psychological theories guide scientific research.

Psychological *theories* organize *observations* and imply predictive *hypotheses*. After constructing precise operational definitions of their procedures, researchers test their hypotheses (predictions), validate and refine the theory, and, sometimes, suggest practical applications. If other researchers can replicate the study with similar results, we can then place greater confidence in the conclusion.

**OBJECTIVE 2-5** | Explain the value of simplified laboratory conditions in discovering general principles of behavior.

Researchers test theoretical principles by creating a controlled, simplified environment in the lab. Their concern is not the particular behavior being studied, but rather the underlying principles that help explain many behaviors.

**OBJECTIVE 2-6** | Discuss whether psychological research can be generalized across cultures and genders.

Behaviors, ideas, attitudes, and traditions vary across cultures, but the principles that underlie them are shared, in part because of our common biological heritage. Biology also determines our sex, but our culture sets up expectations about what it means to be male or female. Males and females do differ in some ways, but they are biologically and psychologically much more alike than different.

**OBJECTIVE 2-7** | Explain why psychologists study animals, and discuss the ethics of experimentation with both animals and humans. Some psychologists study animals out of an interest in animal behavior. Others do so because knowledge of other animals' physiological and psychological processes helps them understand similar human processes.

Under ethical and legal guidelines, animals used in psychological experiments rarely experience pain. Nevertheless, animal rights groups raise an important issue: Even if it leads to

the relief of human suffering, is an animal's temporary suffering justified?

Occasionally researchers temporarily stress or deceive people to learn something important. Professional ethical standards, enforced by university ethics committees, safeguard research participants' well-being.

**OBJECTIVE 2-8** | Describe how personal values can influence psychologists' research and its application, and discuss psychology's potential to manipulate people.

Psychologists' own values influence their choice of research topics, their theories and observations, their labels for behavior, and their professional advice. Psychology has the power to deceive, but so far, applications of psychology's principles have been overwhelmingly for the good. Psychology can help us reach our goals, but it cannot decide what those goals should be.

### TERMS AND CONCEPTS TO REMEMBER

hindsight bias, p. 17	operational definition, p. 22
critical thinking, p. 20	replication, p. 22
theory, p. 21	culture, p. 23
hypothesis, p. 21	

### TEST YOURSELF

1. What is the scientific attitude, and why is it important for critical thinking?
2. How are human and animal research subjects protected?

(Answers in Appendix B.)

### ASK YOURSELF

1. How might the scientific method help us understand the roots of terrorism?
2. Were any of the Frequently Asked Questions your questions? Do you have other questions or concerns about psychology?

### ANSWERS TO QUESTIONS WITHIN THE MODULE

- Q.** Which of the popular ideas in Table 2.1 have been confirmed or refuted by psychological research?
- A.** The odd-numbered statements have been refuted. The even-numbered statements have been confirmed.
- Q.** Roughly how thick would a sheet of paper be if you folded it on itself 100 times?
- A.** Given a 0.1-millimeter-thick sheet, the thickness after 100 folds would be 800 trillion times the distance between the Earth and the Sun (Gilovich, 1991).
- Q.** If a rope were placed around the Earth at the equator, how much additional rope would be needed for the rope to be 1 foot above the Earth all the way around?
- A.** About 6 more feet of rope. The circumference of a circle, or of the Earth, is  $2\pi r$ . The circumference of a rope elevated one foot is  $2\pi(r + 1)$ . Thus the added length is  $2\pi(r + 1) - 2\pi r = 2\pi$ , or about 6 feet.
- Q.** Can you unscramble this anagram? OCHSA.
- A.** Did you figure it out? The answer is CHAOS.

### >WEB

Multiple-choice **self-tests** and more may be found at [www.worthpublishers.com/myers](http://www.worthpublishers.com/myers).