



## Gateway THEME

Psychology is a science and a profession. Scientific observation is the most powerful way to critically answer questions about behavior.

# Introduction to Psychology and Research Methods

# 1

## Fly Like an Eagle

**Just about every weekend**, Henry can be found jumping from airplanes. Not content to be a mere parachutist (“It’s so *boring!*” he insists), he wears a skin-tight “wing suit” so he can soar head-first as fast and as far as he can before deploying his tiny parachute at the last possible moment. Being a bit superstitious, Henry never jumps without his lucky 1986 American silver eagle dollar, minted the year of his birth, safely tucked in his pocket. Yup, that’s him hurtling toward the ground at a frighteningly high rate of speed. Henry is an extreme skydiver.

Why, you might wonder, would Henry do anything that crazy even once, much less again and again? But then, you might equally wonder why people get married, join the army, travel to different countries, grow roses, become suicide bombers, go to school, or live out their lives in monasteries. And what’s with the silver dollar?

You might even wonder, at least sometimes, why *you* do the things you do. In other words, just like your authors, the odds are you are curious about human behavior. That may even be a part of the reason you are taking a course in psychology and reading this book.

Psychology is an ever-changing panorama of people and ideas. You really can’t call yourself educated without knowing something about it. And, although we might envy those who have walked on the moon or explored the ocean’s depths, the ultimate frontier lies much closer to home. Psychology can help you better understand yourself and others. This book is a guided tour of human behavior. We hope you enjoy the adventure.

## Gateway QUESTIONS

- |  |   |
|--|---|
| 1.1 <i>What is psychology and what are its goals?</i>                      | 1.7 <i>What are the major specialties in psychology?</i>                      |
| 1.2 <i>What is critical thinking?</i>                                      | 1.8 <i>How is an experiment performed?</i>                                    |
| 1.3 <i>How does psychology differ from false explanations of behavior?</i> | 1.9 <i>What is a double-blind experiment?</i>                                 |
| 1.4 <i>How is the scientific method applied in psychological research?</i> | 1.10 <i>What nonexperimental research methods do psychologists use?</i>       |
| 1.5 <i>How did the field of psychology emerge?</i>                         | 1.11 <i>How good is psychological information found in the popular media?</i> |
| 1.6 <i>What are the contemporary perspectives in psychology?</i>           |   |

## Psychology—Behave Yourself!

**Gateway Question 1.1:** *What is psychology and what are its goals?*

Those of us wondering about Henry’s extreme skydiving are not the first humans ever to be curious about human behavior. The word *psychology* itself is thousands of years old, coming from the ancient Greek roots *psyche*, meaning “mind,” and *logos*, meaning “knowledge or study.” However, have you ever actually seen or touched a “mind”? Because the mind can’t be studied directly, **psychology** is now defined as the scientific study of behavior and mental processes.

*What does “behavior” refer to in the definition of psychology?* Anything you do—eating, hanging out, sleeping, talking, or sneezing—is a behavior. So are studying, gambling, watching television, tying your shoes, giving someone a gift, learning Spanish, reading this book, and, yes, extreme skydiving. Naturally, we are interested in *overt behaviors* (directly observable actions and responses) like these. But psychologists also study *covert behaviors*. These are private mental events, such as thinking, dreaming, and remembering (Jackson, 2011).

Today, psychology is both a *science* and a *profession*. As scientists, some psychologists do research to discover new knowledge. Others apply psychology to solve problems in fields such as mental health, business, education, sports, law, medicine, and the design of machines (Coolican et al., 2007). Still others are teachers who share their knowledge with students. Later we will return to the profession of psychology. For now, let’s focus on how psychologists create knowledge. Whether they work in a lab, a clinic, or a classroom, all psychologists rely on critical thinking and especially information gained from scientific research.



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Psychologists are highly trained professionals who have specialized skills in counseling and therapy, measurement and testing, research and experimentation, statistics, diagnosis, treatment, and many other areas. Here, psychologist Steven LaBerge wears goggles designed to alert him that he is dreaming, in order to increase his chances of having a lucid dream (Holzinger, LaBerge, & Levitan, 2006). (See Chapter 5 for more details.)

## Seeking Knowledge in Psychology

*Isn’t psychology really just a matter of using your common sense?* Actually, much “commonsense” wisdom is pure B.S. (B.S., of course, stands for *Before Science*). Many people regard themselves as expert “people watchers” and form their own commonsense theories of behavior. However, you may be surprised to learn how often self-appointed authorities and long-held commonsense beliefs about human behavior are wrong (Lilienfeld et al., 2010). Take a moment and read “Testing Commonsense Beliefs” for more information.

*But how could common sense be wrong so often?* We’ll spend quite a bit of time in this chapter exploring why this might be so. One problem is that much of what passes for common sense is vague and inconsistent. Suppose that your friend marries someone very different from her. What do people say? “Ah. . . opposites attract.” And what do they say if she gets divorced soon after? “Well, she should have known that birds of a feather flock together.” Let’s examine another commonsense statement. It is frequently said that “every cloud has a silver lining.” With this in mind, you use your lover’s worrisome absences as a chance to spend more time with your family. You take comfort in this “silver lining” until a family member cautions, “Where there’s smoke, there’s fire!” Also notice that, like these examples, most of these commonsense statements work best after the fact.

Another problem with common sense is that it often depends on limited personal observations. For example, have you ever had someone tell you he heard that the food in New York City (or Mexico, or Canada, or Paris, or wherever) is terrible? But this might mean no more than that someone didn’t like the food in one restaurant on one visit. Like such casual observation, psychologists rely on **scientific observation**, which is also based on gathering *empirical evidence* (information gained from direct observation). However, unlike our everyday personal experiences, scientific observation is *systematic*, or carefully planned. Scientific observations are also *intersubjective*, which means they can be confirmed by more than one observer.

Basically, the empirical approach says, “Let’s take a more objective look” (Stanovich, 2010). Psychologists study behavior directly and collect data (observed facts) so they can draw valid conclusions. Would you say it’s true, for instance, that “Absence makes the heart grow fonder”? Why argue about it? As psychologists, we would simply get some people who are separated (“absent hearts”) and some who see each other every day (“present hearts”) and find out who is fonder of their loved ones!

Here’s an example of gathering empirical evidence: Have you ever wondered whether people become more hostile when it’s boiling hot outside? John Simister and Cary Cooper (2005) decided to find out. They obtained data on temperatures and criminal activity in Los Angeles over a 4-year period. When they graphed air temperature and the frequency of aggravated assaults, a clear relationship emerged (see ● Figure 1.1). Assaults and temperatures rise and fall more or less in parallel (so there may be something to the phrase “hot under the collar”).

Critical Thinking

Testing Commonsense Beliefs

**It may appear** that psychological research “discovers” what we already know from everyday experience. Why waste time and money confirming the obvious? Actually, commonsense beliefs are often wrong. See if you can tell which of the following commonsense beliefs are true and which are false (Landau & Bavaria, 2003):

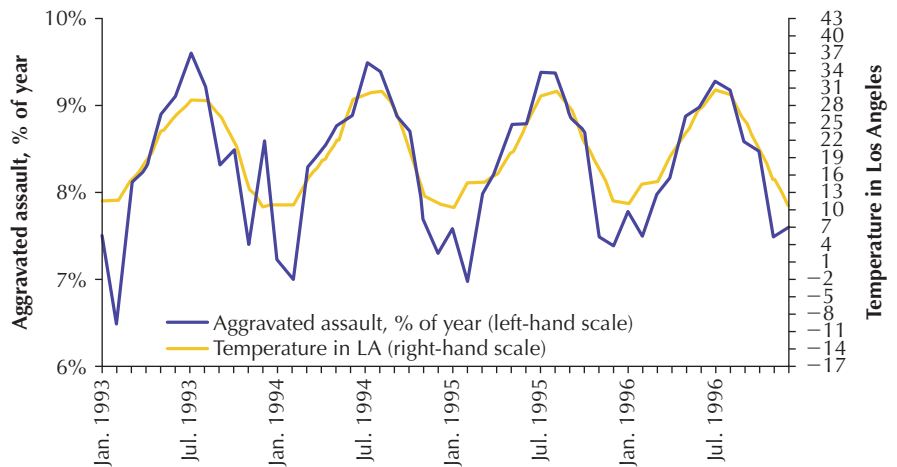
- Babies love their mothers because mothers fulfill their babies’ physiological need for food. True or False?
- Most humans use only 10 percent of their potential brainpower. True or False?
- Blind people have unusually sensitive organs of touch. True or False?
- The more motivated you are, the better you will do at solving a complex problem. True or False?
- The major cause of forgetting is that memory traces decay or fade as time passes. True or False?
- Psychotherapy has its greatest success in the treatment of psychotic patients who have lost touch with reality. True or False?
- Personality tests reveal your basic motives, including those you may not be aware of. True or False?
- To change people’s behavior toward members of ethnic minority groups, we must first change their attitudes. True or False?

Actually, research has shown that *all* these beliefs are false. Yet in a survey, *all* the beliefs were accepted as common sense by many college students (Landau & Bavaria, 2003). How did you do?

We can all benefit from being more reflective as we evaluate our beliefs. It’s valuable to ask whether they make logical sense or whether there is any evidence supporting them (Jackson & Newberry, 2012). Do any of the concepts in this book apply to the belief? Can you imagine how you could collect evidence that might get you closer to the truth? *Critical Thinking* boxes like this one will help you be more reflective about human behavior.

● **Figure 1.1** Results of an empirical study. The graph shows that aggravated assaults in Los Angeles become more likely as temperature increases. This suggests that physical discomfort is associated with interpersonal hostility. (Data adapted from Simister & Cooper, 2005.)

*Isn’t the outcome of this study fairly predictable?* Not if you started out believing otherwise. Sometimes, the results of studies match our personal observations or commonsense beliefs and sometimes they come as a surprise. In this instance, you may have guessed the outcome. Your suspicions were confirmed by scientific observation. However, hostile actions that require more extreme physical exertion, such as fistfights, might become *less* likely at very high temperatures. Without systematically gathering data, we wouldn’t know for sure whether overheated Angelenos become sluggish or more aggressive.



ing. People who “never dream,” it turns out, dream frequently. If they are awakened during a dream, they vividly remember it. Thus, the EEG helped make the study of dreaming more scientific.

Psychological Research

Many fields, such as history, law, art, and business, are also interested in human behavior. How is psychology different? Psychology’s great strength is that it uses scientific observation to systematically answer questions about all sorts of behaviors (Stanovich, 2010). Of course, studying some topics may be impractical or unethical. More often, questions go unanswered for lack of a suitable **research method**—a systematic approach to answering scientific questions. In the past, for example, we had to take the word of people who say they never dream. Then the EEG (electroencephalograph, or brainwave machine) was invented. Certain EEG patterns, and the presence of eye movements, can reveal whether a person is dream-

Psychology’s Goals

What do psychologists hope to achieve? As scientists, our ultimate goal is to benefit humanity (O’Neill, 2005). More specifically, the goals of psychology are to *describe, understand, predict, and control* behavior. What do psychology’s goals mean in practice? Let’s see.

**Psychology** The scientific study of behavior and mental processes.  
**Scientific observation** An empirical investigation structured to answer questions about the world in a systematic and intersubjective fashion (observations can be reliably confirmed by multiple observers).  
**Research method** A systematic approach to answering scientific questions.



The scientific study of dreaming was made possible by use of the EEG, a device that records the tiny electrical signals generated by the brain as a person sleeps. The EEG converts these electrical signals to a written record of brain activity. Certain shifts in brain activity, coupled with the presence of rapid eye movements, are strongly related to dreaming. (See Chapter 5 for more information.)

## Description

Answering psychological questions often begins with a careful description of behavior. **Description**, or naming and classifying, is typically based on making a detailed record of scientific observations.

*But a description doesn't explain anything, does it?* Right. Useful knowledge begins with accurate description, but descriptions fail to answer the important “why” questions. *Why* do more women attempt suicide, and *why* do more men complete it? *Why* are people more aggressive when they are uncomfortable? *Why* are bystanders often unwilling to help in an emergency?

## Understanding

We have met psychology's second goal when we can explain an event. That is, **understanding** usually means we can state the causes of a behavior. For example, research on “bystander apathy” reveals that people often fail to help when *other* possible helpers are nearby. Why? Because a “diffusion of responsibility” occurs. Basically, no one feels personally obligated to pitch in. As a result, the more potential helpers there are, the less likely it is that anyone will help (Aronson, Wilson, & Akert, 2010; Darley, 2000). Now we can explain a perplexing problem.

### BRIDGES

Bystander apathy and conditions that influence whether people will help in an emergency are of great interest to social psychologists. See Chapter 17, pages 581–583, for details.

## Prediction

Psychology's third goal, **prediction**, is the ability to forecast behavior accurately. Notice that our explanation of bystander apathy makes a prediction about the chances of getting help. If you've ever been stranded on a busy freeway with car trouble, you'll recognize



Some psychologists specialize in administering, scoring, and interpreting psychological tests, such as tests of intelligence, creativity, personality, or aptitude. This specialty, which is called psychometrics, is an example of using psychology to predict future behavior.

the accuracy of this prediction: Having many potential helpers nearby is no guarantee that anyone will stop to help.

## Control

*Description, explanation, and prediction seem reasonable, but is control a valid goal?* “Control” may seem like a threat to personal freedom. However, to a psychologist, **control** simply refers to the ability to alter the conditions that affect behavior. If a clinical psychologist helps a person overcome a terrible fear of spiders, control is involved. If you suggest changes in a classroom that help students learn better, you have exerted control. Control is also involved in designing cars to keep drivers from making fatal errors. Clearly, psychological control must be used wisely and humanely.

In summary, psychology's goals are a natural outgrowth of our desire to understand behavior. Basically, they boil down to asking the following questions:

- What is the nature of this behavior? (description)
- Why does it occur? (understanding and explanation)
- Can we forecast when it will occur? (prediction)
- What conditions affect it? (control)

### Knowledge Builder

## The Science of Psychology

### RECITE

To check your memory, see if you can answer these questions. If you miss any, skim over the preceding material before continuing to make sure you understand what you just read.

1. Psychology is the \_\_\_\_\_ study of \_\_\_\_\_ and \_\_\_\_\_ processes.

2. Commonsense beliefs are often
  - a. vague
  - b. inconsistent
  - c. based on limited observations
  - d. all of the above
3. The best psychological information is typically based on
  - a. forecasting behavior
  - b. opinions of experts and authorities
  - c. anthropomorphic measurements
  - d. empirical evidence.
4. Which of the following questions relates most directly to the goal of *understanding* behavior?
  - a. Do the scores of men and women differ on tests of thinking abilities?
  - b. Why does a blow to the head cause memory loss?
  - c. Will productivity in a business office increase if room temperature is raised or lowered?
  - d. What percentage of college students suffer from test anxiety?

**REFLECT**

**Think Critically**

5. All sciences are interested in controlling the phenomena they study. T or F?

**Self-Reflect**

At first, many students think that psychology is primarily about abnormal behavior and psychotherapy. Did you? How would you describe the field now?

**Answers:** 1. scientific, (overt) behavior, (covert) mental 2. d 3. d 4. b 5. False. Astronomy and archaeology are examples of sciences that do not share psychology's fourth goal. Think about it for a moment: No one can control the stars or the past.

## Critical Thinking—Take It with a Grain of Salt

### Gateway Question 1.2: What is critical thinking?

*How does critical thinking play a role in psychology?* Most of us would be skeptical when offered a “genuine” Rolex watch or expensive designer sunglasses for just a few dollars on eBay. And most of us easily accept our ignorance of subatomic physics. But because we deal with human behavior every day, we tend to think that we already know what is true in psychology. All too often, we are tempted to “buy” commonsense beliefs, urban legends, and even outrageous claims about the powers of “healing” crystals, “miraculous” herbal remedies, astrology, psychics describing people’s personalities and predicting their future, and so forth.

For this, and many more reasons, learning to think critically is one of the lasting benefits of a college education. **Critical thinking** in psychology is a type of reflection (you DID read the *Psychology of Studying*, on pages 1–11, right?) that involves asking whether a particular belief can be supported by scientific theory and observation (Yanchar, Slife, & Warne, 2008). Critical thinkers are willing to challenge conventional wisdom by asking hard questions (Jackson & Newberry, 2012). For example, everyone knows that women are more talkative than men, right? Critical thinkers might immediately ask: “Is there any theory to explain why women might talk more than men? Is there any empirical evidence that supports this ‘wisdom?’” What could we do to find out for ourselves? (Be on the lookout later in this chapter for some evidence concerning this belief.)

## Critical Thinking Principles

The heart of critical thinking is a willingness to actively *reflect* on ideas. Critical thinkers evaluate ideas by probing for weaknesses in their reasoning and analyzing the evidence supporting their beliefs. They question assumptions and look for alternate conclusions. True knowledge, they recognize, comes from constantly revising our understanding of the world.

Critical thinking relies on the following basic principles (Elder, 2006; Jackson & Newberry, 2012; Kida, 2006):

1. *Few “truths” transcend the need for logical analysis and empirical testing.* Whereas religious beliefs and personal values may be held as matters of faith, most other ideas can and should be evaluated by applying the rules of logic, evidence, and the scientific method.
2. *Critical thinkers often wonder what it would take to show that a “truth” is false.* Critical thinkers actively seek to *falsify* beliefs, including their own. They are willing to admit when they are wrong. As Susan Blackmore (2001) said when her studies caused her to abandon some long-held beliefs, “Admitting you are wrong is always hard—even though it’s a skill that every psychologist has to learn.” At the same time, critical thinkers can be more confident in beliefs that have survived their attempts at falsification.
3. *Authority or claimed expertise does not automatically make an idea true or false.* Just because a teacher, guru, celebrity, or authority is convinced or sincere doesn’t mean you should automatically believe or disbelieve that person. Naïvely accepting (or denying) the word of an “expert” is unscientific and self-demeaning without asking, “Is this a well-supported explanation or is there a better one? What evidence convinced her or him?”
4. *Judging the quality of evidence is crucial.* Imagine you are a juror in a courtroom, judging claims made by two battling lawyers. To decide correctly, you can’t just weigh the *amount* of evidence. You must also critically evaluate the *quality* of the evidence. Then you can give greater weight to the most credible facts.
5. *Critical thinking requires an open mind.* Be prepared to consider daring departures and go wherever the evidence leads. However, don’t become so “open-minded” that you are simply gullible. As astronomer Carl Sagan once noted, “It seems to me that what is called for is an exquisite balance between two conflicting needs: the most skeptical scrutiny of all hypotheses that are served up to us and at the same time a great openness to new ideas” (Kida, 2006, p. 51).

**Description** In scientific research, the process of naming and classifying.

**Understanding** In psychology, understanding is achieved when the causes of a behavior can be stated.

**Prediction** An ability to accurately forecast behavior.

**Control** Altering conditions that influence behavior.

**Critical thinking (in psychology)** A type of reflection involving the support of beliefs through scientific explanation and observation.

To put these principles into action, here are some questions to ask as you evaluate new information (Browne & Keeley, 2010; Jackson & Newberry, 2012):

1. What claims are being made? What are their implications?
2. Are the claims understandable? Do they make logical sense? Is there another possible explanation? Is it a simpler explanation?
3. What tests (if any) of these claims have been made? What was the nature and quality of the tests? Can they be repeated? Who did the tests? How reliable and trustworthy were the investigators? Do they have conflicts of interest? Do their findings appear to be objective? Has any other independent researcher duplicated the findings?
4. How good is the evidence? (In general, scientific observations provide the highest quality evidence.)
5. Finally, how much credibility can the claim be given? High, medium, low, provisional?

A course in psychology naturally enriches thinking skills. In this book, all upcoming chapters include *Think Critically* questions based on the ones you have seen here. Take the time to tackle these questions. The effort will sharpen your thinking abilities and make learning more lively. For an immediate thinking challenge, let's take a critical look at several nonscientific systems that claim to explain behavior.

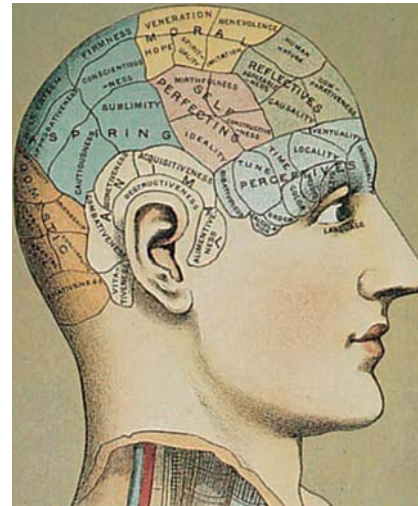
## ➤ Pseudopsychologies—Palms, Planets, and Personality

**Gateway Question 1.3:** *How does psychology differ from false explanations of behavior?*

A **pseudopsychology** (SUE-doe-psychology) is any unfounded system that resembles psychology. Many pseudopsychologies give the appearance of being scientific but are actually false. (*Pseudo* means “false.”) Pseudopsychologies are types of **superstitions**, unfounded beliefs held without evidence or in the face of falsifying evidence.

Unlike “real” psychology, pseudopsychologies change little over time because followers seek evidence that appears to confirm their beliefs and avoid evidence that falsifies them. Critical thinkers, scientists, and psychologists, in contrast, are skeptical of their own theories (Schick & Vaughn, 2011). They actively look for contradictions as a way to advance knowledge.

*Can you give some examples of false psychologies?* One pseudopsychology, known as *phrenology*, was popularized in the nineteenth century by Franz Gall, a German anatomy teacher. Phrenology claimed that personality traits are revealed by the shape of the skull. Psychological research has long since shown that bumps on the head have nothing to do with talents or abilities. In fact, the phrenologists were so far off that they listed the part of the brain that controls hearing as a center for “combativeness”! *Palmistry* is a similarly falsified system that claims lines on the hand reveal personality traits and predict the future. Despite the overwhelming



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Phrenology was an attempt to assess personality characteristics by examining various areas of the skull. Phrenologists used charts such as the one shown here as guides. Like other pseudopsychologists, phrenologists resisted attempts to empirically verify their concepts.

evidence against phrenology and palmistry, these pseudopsychologies are still practiced today. Palmists, in particular, can still be found separating the gullible from their money in many cities.

At first glance, a pseudopsychology called *graphology* might seem more reasonable. Some graphologists claim that personality traits are revealed by handwriting. Based on such claims, some companies even use graphologists to select job candidates. This is troubling because graphologists score close to zero on tests of accuracy in rating personality (Dazzi & Pedrabissi, 2009; Furnham, Chamorro-Premuzic, & Callahan, 2003). In fact, graphologists do no better than untrained college students in rating personality and job performance (Neter & Ben-Shakhar, 1989). Even a graphological society recommends that handwriting analysis should not be used to select people for jobs (Simner & Goffin, 2003). (By the way, graphology's failure at revealing personality should be separated from its value for detecting forgeries.)

Graphology might seem harmless enough until you imagine being denied a job because a graphologist didn't like your handwriting. This false system has been used to determine who is hired, given bank credit, or selected for juries. In these and similar situations, pseudopsychologies do, in fact, harm people.

*Would you hire this man?  
Here's a sample of your  
author's handwriting. What  
do you think it reveals?  
Your interpretations are  
likely to be as accurate  
(or inaccurate) as those  
of a graphologist.*

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If pseudopsychologies have no scientific basis, how do they survive and why are they popular? There are several reasons, all of which can be illustrated by a critique of astrology.

## Problems in the Stars

Arguably the most popular pseudopsychology, astrology holds that the positions of the stars and planets at the time of one's birth determine personality traits and affect behavior. Like other pseudopsychologies, astrology has repeatedly been shown to have no scientific validity, either theoretically or empirically (Kelly, 1999; Rogers & Soule, 2009):

1. **The theory of astrology is unconvincing.** Astrology is based on a zodiac map invented several thousand years ago in an ancient civilization called Babylon. Unlike scientific theories, which are regularly falsified and rejected or revised accordingly, the basic underpinnings of astrology have remained relatively unchanged. To date, no astrologer has offered a convincing explanation of *how* the positions of the planets at a person's birth could affect his or her future. Astrologers have also failed to explain *why* the moment of birth should be more important than, say, the moment of conception. (Perhaps it is because it is relatively easy to figure out the moment of birth and much trickier to determine the moment of conception.) Besides, the zodiac has shifted in the sky by one full constellation since astrology was first set up. (In other words, if astrology calls you a Scorpio you are really a Libra, and so forth.) However, most astrologers simply ignore this shift (Martens & Trachet, 1998).
2. **The evidence against astrology is convincing.** One study of more than 3,000 predictions by famous astrologers found that only a small percentage were fulfilled. These "successful" predictions tended to be vague ("There will be a tragedy somewhere in the east in the spring") or easily guessed from current events (Culver & Ianna, 1988). Similarly, if astrologers are asked to match people with their horoscopes, they do no better than would be expected by chance. In one famous test, astrologers could not even use horoscopes to distinguish murderers from law-abiding people (Gauquelin, 1970). In fact, there is no connection between people's astrological signs and their intelligence or personality traits (Hartmann, Reuter, & Nyborg, 2006). There is also no connection between the "compatibility" of couples' astrological signs and their marriage and divorce rates or between astrological signs and leadership, physical characteristics, or career choices (Martens & Trachet, 1998).

In short, astrology doesn't work.

Then why does astrology often seem to work? Even the daily horoscopes printed in newspapers can seem uncannily accurate. For many people this apparent accuracy can only mean that astrology is valid. Unfortunately, such *uncritical acceptance* overlooks a much simpler psychological explanation (see, for example, Rogers & Soule, 2009). The following discussion explains why.

## Uncritical Acceptance

Perceptions of the accuracy of horoscopes are typically based on **uncritical acceptance**—the tendency to believe claims because they seem true or because it would be nice if they were true. Horoscopes are generally made up of mostly flattering traits. Naturally, when your personality is described in *desirable* terms, it is hard to deny that the description has the "ring of truth." How much acceptance would astrology receive if a birth sign read like this:

**Virgo:** You are the logical type and hate disorder. Your nitpicking is unbearable to your friends. You are cold, unemotional, and usually fall asleep while making love. Virgos make good doorstops.

## Confirmation Bias

Even when an astrological description contains a mixture of good and bad traits, it may seem accurate. To find out why, read the following personality description.

### Your Personality Profile

You have many personality strengths, with some weaknesses to which you can usually adjust. You tend to be accepting of yourself. You are comfortable with some structure in your life but do enjoy diverse experiences from time to time. Although on the inside you might be a bit unsure of yourself, you appear under control to others. You are sexually well-adjusted, although you do have some questions. Your life goals are more or less realistic. Occasionally you question your decisions and actions because you're unsure that they are correct. You want to be liked and admired by other people. You are not using your potential to its full extent. You like to think for yourself and don't always take other people's word without thinking it through. You are not generally willing to disclose to others because it might lead to problems. You are a natural introvert, cautious, and careful around others, although there are times when you can be an extrovert who is the "life of the party."

Does this describe your personality? A psychologist read a similar summary individually to college students who had taken a personality test. Only 5 students out of 79 felt that the description was inaccurate. Another classic study found that people rated the "personality profile" as more accurate than their actual horoscopes (French et al., 1991).

Reread the description and you will see that it contains both sides of several personality dimensions ("You are a natural introvert . . . although there are times when you can be an extrovert . . ."). Its apparent accuracy is an illusion based on **confirmation bias**, in which we remember or notice things that confirm our expectations

**Pseudopsychology** Any false and unscientific system of beliefs and practices that is offered as an explanation of behavior.

**Superstition** Unfounded belief held without evidence or in spite of falsifying evidence.

**Uncritical acceptance** The tendency to believe claims because they seem true or because it would be nice if they were true.

**Confirmation bias** The tendency to remember or notice information that fits one's expectations but to forget discrepancies.



and forget the rest (Lilienfeld, Ammirati, & Landfield, 2009). The pseudopsychologies thrive on this effect. For example, you can always find “Aquarius characteristics” in an Aquarius. If you looked, however, you could also find “Gemini characteristics,” “Scorpio characteristics,” or whatever. Perhaps this explains why, in an ironic twist, 94 percent of those sent the full 10-page horoscope of a famous mass murderer accepted it as their own (Gauquelin, 1970).

Confirmation bias is also relied on by various “psychic mediums” who claim that they can communicate with the deceased friends and relatives of audience members. An analysis shows that the number of “hits” (correct statements) made by these people tends to be very low. Nevertheless, many viewers are impressed because of our natural tendency to remember apparent hits and ignore misses. Of course, particularly embarrassing misses are often edited out before such shows appear on television (Nickell, 2001).

## The Barnum Effect

Pseudopsychologies also take advantage of the **Barnum effect**, which is a tendency to consider personal descriptions accurate if they are stated in general terms (Kida, 2006). P. T. Barnum, the famed circus showman, had a formula for success: “Always have a little something for everybody.” Like the all-purpose personality profile, palm readings, fortunes, horoscopes, and other products of pseudopsychology are stated in such general terms that they can hardly miss. There is always “a little something for everybody.” To observe the Barnum effect, read *all 12* of the daily horoscopes found in newspapers for several days. You will find that predictions for other signs fit events as well as those for your own sign do. Try giving a friend the wrong horoscope sometime. Your friend may still be quite impressed with the “accuracy” of the horoscope.

Astrology’s popularity shows that many people have difficulty separating valid psychology from systems that seem valid but are not. The goal of this discussion, then, has been to make you a more critical observer of human behavior and to clarify what is, and what is not, psychology. Here is what the “stars” say about your future:

Emphasis now on education and personal improvement. A learning experience of lasting value awaits you. Take care of scholastic responsibilities before engaging in recreation. The word *psychology* figures prominently in your future.

Pseudopsychologies may seem like no more than a nuisance, but they can do harm. For instance, people seeking treatment for psychological disorders may become the victims of self-appointed “experts” who offer ineffective, pseudoscientific “therapies” (Kida, 2006; Lilienfeld, Ruscio, & Lynn, 2008). Valid psychological principles are based on scientific theory and evidence, not fads, opinions, or wishful thinking.

## Non Sequitur



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## Scientific Research—How to Think Like a Psychologist

**Gateway Question 1.4:** How is the scientific method applied in psychological research?

Thinking critically about psychology begins with the careful recording of facts and events, the heart of all sciences. To be *scientific*, our observations must be *systematic*, so that they reveal something reliable about behavior (Stanovich, 2010). To use an earlier example, if you are interested in the relationship between heat and aggression, you will learn little by driving around and making haphazard observations of aggressive behavior. To be of value, your observations must be planned and systematic.

## The Scientific Method

The **scientific method** is a form of critical thinking based on careful collection of evidence, accurate description and measurement, precise definition, controlled observation, and repeatable results



Dan McCoy/Rainbow

Applying the scientific method to the study of behavior requires careful observation. Here, a psychologist videotapes a session in which a child’s thinking abilities are being tested.

(Jackson, 2011; Yanchar, Slife, & Warne, 2008). In its ideal form, the scientific method has six elements:

1. Making observations
2. Defining a problem
3. Proposing a hypothesis
4. Gathering evidence/testing the hypothesis
5. Theory building
6. Publishing results

Let's take a closer look at some elements of the scientific method. Earlier we ran across the commonsense belief that women are chattier than men. How might a psychologist seek to confirm or disconfirm this belief? All the basic elements of the scientific method are found in this example, from University of Arizona psychologist Mathias Mehl and his colleagues (2007).

### Making Observations

The commonsense belief under examination is that women are more talkative than men. Is there any truth to this belief? The researchers reviewed previously published studies and noted that a few reports do seem to support this stereotype.

### Defining a Problem

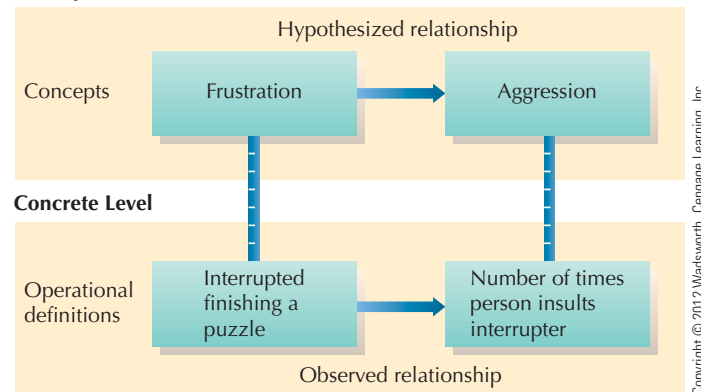
However, the researchers also noticed that none of the studies had actually recorded men's and women's normal conversations over long time periods. Thus, they defined their problem as, "Will women talk more than men if we record natural conversations over longer time spans without bothering people and perhaps biasing our observations?"

### Proposing a Hypothesis

*What exactly is a "hypothesis"?* A **hypothesis** (hi-POTH-eh-sis) is a tentative statement about, or explanation of, an event or relationship. In common terms, a hypothesis is a *testable* hunch or educated guess about behavior. For example, you might hypothesize "Frustration encourages aggression." How could you test this hypothesis? First you would have to decide how you are going to frustrate people. (This part might be fun.) Then you will need to find a way to measure whether they become more aggressive. (Not so much fun if you plan to be nearby.) Your observations would then provide evidence to confirm or disconfirm your hypothesis.

Because we cannot see or touch frustration, we must define it operationally. An **operational definition** states the exact procedures used to represent a concept. Operational definitions allow unobservable ideas, such as covert behaviors, to be tested in real-world terms (see ● Figure 1.2). For example, since you can't measure frustration directly, you might define frustration as "interrupting an adult before he or she can finish a puzzle and win a free movie pass." And aggression might be defined as "the number of times a frustrated individual insults the person who prevented work on the puzzle." In other words, covert behaviors are operationally defined in terms of overt behavior so they can be observed and studied scientifically.

#### Conceptual Level



● **Figure 1.2** Operational definitions are used to link concepts with concrete observations. Do you think the examples given are reasonable operational definitions of frustration and aggression? Operational definitions vary in how well they represent concepts. For this reason, many different experiments may be necessary to draw clear conclusions about hypothesized relationships in psychology.

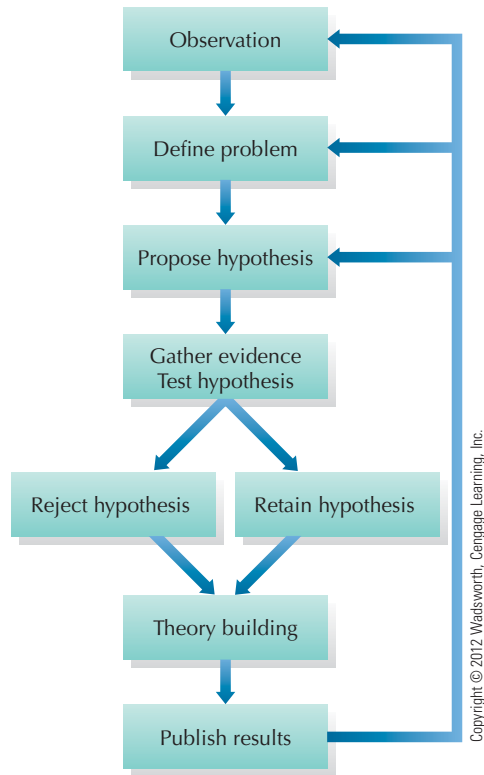
### Gathering Evidence/Testing the Hypothesis

Now let's return to the question of whether women talk more than men do. To gather data, the researchers used an electronically activated recorder to track people's conversations. This device automatically recorded sounds for 30 seconds every 12.5 minutes. Since participants could not tell when they were being recorded, they soon got used to wearing the recorders and acted and spoke normally. The number of words recorded was counted and used to estimate the total number of words spoken each day. On average, women spoke 16,215 words a day, with men close behind at 15,699. Since this difference is too small to be meaningful, we can conclude, as the researchers did, that this study provides no evidence in support of the hypothesis that women talk more than men do (Mehl et al., 2007).

### Theory Building

*What about theory building?* In research, a **theory** is a system of ideas designed to interrelate concepts and facts in a way that summarizes existing data and predicts future observations. Good theories summarize observations, explain them, and guide further research (● Figure 1.3). Without theories of forgetting, personal-

- Barnum effect** The tendency to consider a personal description accurate if it is stated in very general terms.
- Scientific method** A form of critical thinking based on careful measurement and controlled observation.
- Hypothesis** A statement of the predicted outcome of an experiment or an educated guess about the relationship between variables.
- Operational definition** Defining a scientific concept by stating the specific actions or procedures used to measure it. For example, "hunger" might be defined as "the number of hours of food deprivation."
- Theory** A system of ideas designed to interrelate concepts and facts in a way that summarizes existing data and predicts future observations.



● **Figure 1.3** Psychologists use the logic of science to answer questions about behavior. Specific hypotheses can be tested in a variety of ways, including naturalistic observation, correlational studies, controlled experiments, clinical studies, and the survey method. Psychologists revise their theories to reflect the evidence they gather. New or revised theories then lead to new observations, problems, and hypotheses.

ity, stress, mental illness, and the like, psychologists would drown in a sea of disconnected facts (Stanovich, 2010).

### BRIDGES

One of the major limitations of Freudian personality theory is that many of its concepts are not testable or falsifiable. **See Chapter 12, pages 414–415.**

Although Mehl and his colleagues did not present a theory of why some people talk more or less, they did discuss how their findings might affect such a theory. For instance, they pointed out that they studied only university students, and that older men and women might differ in how much they talk each day. Such findings invite others to study talkativeness in other age groups and to propose theories to explain any differences that might be observed.

## Publishing Results

Because scientific information must always be *publicly available*, the results of psychological studies are usually published in professional journals (see ■ Table 1.1). That way, other researchers can read about the results and make their own observations if they doubt the study's findings (Jackson, 2011). If others are able to *replicate* (repeat) the results of a study, those results become more credible.

■ **TABLE 1.1** Outline of a Research Report

- **Abstract** Research reports begin with a very brief summary of the study and its findings. The abstract allows you to get an overview without reading the entire article.
- **Introduction** The introduction describes the question to be investigated. It also provides background information by reviewing prior studies on the same or related topics.
- **Method** This section tells how and why observations were made. It also describes the specific procedures used to gather data. That way, other researchers can repeat the study to see if they get the same results.
- **Results** The outcome of the investigation is presented. Data may be graphed, summarized in tables, or statistically analyzed.
- **Discussion** The results of the study are discussed in relation to the original question. Implications of the study are explored and further studies may be proposed.

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In a scholarly article published in the journal *Science*, Mehl and his colleagues (2007) describe the question they investigated, the methods they used, and the results of their study on male and female talkativeness.

## Research Ethics

*Aren't there also rules about how scientists have to treat the people they study?* You are absolutely right. Psychology experiments sometimes raise *ethical* questions. Three areas of ethical concern in behavioral research are the use of *deception*, *invasion of privacy*, and the risk of *lasting harm*. Deception and potential harm are illustrated by a classic study of obedience. Participants were ordered to give what they thought were painful electric shocks to another person (no shocks were actually given) (Milgram, 1963). Believing that they had hurt someone, many people left the experiment shaken and upset. A few suffered guilt and distress for some time afterward.

### BRIDGES

Stanley Milgram undertook his infamous studies to better understand just how willing people are to obey an authority. **See Chapter 16, pages 564–567.**

Such experiments raise serious ethical questions. Did the information gained justify the emotional costs? Was deception really necessary? As a reply to such questions, American Psychological Association guidelines state that “Psychologists must carry out investigations with respect for the people who participate and with concern for their dignity and welfare” (see ■ Table 1.2). Similar guidelines apply to animals—investigators are expected to “ensure the welfare of animals and treat them humanely” (American Psychological Association, 2002, 2010a). To assure this, most university psychology departments have ethics committees that oversee research. Nevertheless, no easy answers exist for the ethical questions raised by psychology, and debate about specific experiments is likely to continue.

**Knowledge Builder**

## Critical Thinking and the Scientific Method in Psychology

**RECITE**

1. Most of psychology can rightfully be called common sense because psychologists prefer informal observation to systematic observation. T or F?
2. *Confirmation bias* refers to graphology's accepted value for the detection of forgeries. T or F?
3. Personality descriptions provided by pseudopsychologies are stated in general terms, which provide "a little something for everybody." This fact is the basis of the
  - a. palmist's fallacy
  - b. uncritical acceptance pattern
  - c. confirmation bias
  - d. Barnum effect
4. A psychologist does a study to see whether exercising increases sense of well-being. In the study, he will be testing an
  - a. experimental hypothesis
  - b. operational definition
  - c. empirical definition
  - d. anthropomorphic theory
5. \_\_\_\_\_ behaviors are operationally defined in terms of \_\_\_\_\_ behavior
  - a. Overt, covert
  - b. Observable, overt
  - c. Covert, overt
  - d. Covert, abstract

**REFLECT**

**Think Critically**

6. Can you think of some "commonsense" statements that contradict each other?
7. Try constructing a few "Barnum statements," personality statements that are so general that virtually everyone will think they apply to themselves. Can you string them together to make a "Barnum profile"? Can you adapt the same statements to construct a "Barnum horoscope"?
8. Each New Year's Day, phony "psychics" make predictions about events that will occur during the coming year. The vast majority of these predictions are wrong, but the practice continues each year. Can you explain why?

**Self-Reflect**

It is nearly impossible to get through a day without encountering people who believe in pseudopsychologies or who make unscientific or unfounded statements. How stringently do you evaluate your own beliefs and the claims made by others?

How might you scientifically test the old saw that you can't teach an old dog new tricks? Follow the steps of the scientific method to propose a testable hypothesis and decide how you would gather evidence. (Well, OK, you don't have to publish your results.)

**Answers:** 1. F 2. F 3. C 4. a 5. c 6. There are many examples. Here are a few more to add to the ones you thought of: "He (or she) who hesitates is lost" versus "Haste makes waste"; "Never too old to learn" versus "You can't teach an old dog new tricks"; "7. The term 'Barnum statements' comes from Levy (2003); but see also Rogers & Soule (2009), who offers the following examples: You are afraid of being hurt. You are trying to find a balance between autonomy and closeness. You don't like being overly dependent. You just want to be understood. 8. Because of confirmation bias, people only remember predictions that seemed to come true and forget all the errors. Incidentally, 'predictions' that appear to be accurate are usually easily deduced from current events or are stated in general terms to take advantage of the Barnum effect.

**TABLE 1.2 Basic Ethical Guidelines for Psychological Researchers**

- Do no harm.
- Accurately describe risks to potential participants.
- Ensure that participation is voluntary.
- Minimize any discomfort to participants.
- Maintain confidentiality.
- Do not unnecessarily invade privacy.
- Use deception only when absolutely necessary.
- Remove any misconceptions caused by deception (debrief).
- Provide results and interpretations to participants.
- Treat participants with dignity and respect.

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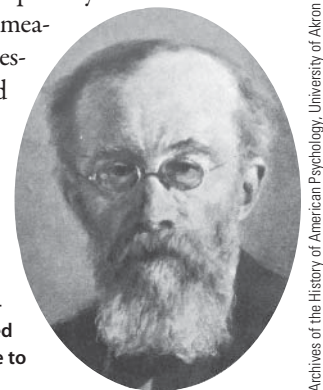
## A Brief History of Psychology— Psychology's Family Album

**Gateway Question 1.5:** *How did the field of psychology emerge?*

As we noted previously, people have been informally observing human behavior and philosophizing about it for thousands of years. In contrast, psychology's history as a science dates back only about 130 years to Leipzig, Germany. There, Wilhelm Wundt (VILL-helm Voont), the "father of psychology," set up a laboratory in 1879 to study conscious experience.

What happens, Wundt wondered, when we experience sensations, images, and feelings? To find out, he systematically observed and measured stimuli of various kinds (lights, sounds, weights). A **stimulus** is any physical energy that affects a person and evokes a response (stimulus: singular; stimuli [STIM-you-lie]: plural). Wundt then used **introspection**, or "looking inward," to probe his reactions to various stimuli. (Stop reading, close your eyes, carefully examine your thoughts, feelings, and sensations, and you will be introspecting.)

Over the years, Wundt studied vision, hearing, taste, touch, memory, time perception, and many other topics. By insisting on systematic observation and measurement, he asked some interesting questions and got psychology off to a good start (Schultz & Schultz, 2012).



**Wilhelm Wundt, 1832–1920.** Wundt is credited with making psychology an independent science, separate from philosophy. Wundt's original training was in medicine, but he became deeply interested in psychology. In his laboratory, Wundt investigated how sensations, images, and feelings combine to make up personal experience.

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**Stimulus** Any physical energy sensed by an organism.  
**Introspection** To look within; to examine one's own thoughts, feelings, or sensations.

## Structuralism

Wundt's ideas were carried to the United States by Edward Titchener (TICH-in-er). Titchener called Wundt's ideas **structuralism** and tried to analyze the structure of mental life into basic "elements" or "building blocks."

*How could he do that? You can't analyze experience like a chemical compound, can you?* Perhaps not, but the structuralists tried "mental chemistry," mostly by using introspection. For instance, an observer might hold an apple and decide that she had experienced the elements "hue" (color), "roundness," and "weight." Another example of a question that might have interested a structuralist is "What basic tastes mix together to create complex flavors as different as broccoli, lime, bacon, and strawberry cheesecake?"

Introspection proved to be a poor way to answer most questions (Benjafield, 2010). Why? Because no matter how systematic the observations, the structuralists frequently *disagreed*. And when they did, there was no way to settle differences. Think about it. If you and a friend both introspect on your perceptions of an apple and end up listing different basic elements, who would be right? Despite such limitations, "looking inward" is still used as one source of insight in studies of hypnosis, meditation, problem solving, moods, and many other topics.

## Functionalism

American scholar William James broadened psychology to include animal behavior, religious experience, abnormal behavior, and other interesting topics. James's brilliant first book, *Principles of Psychology* (1890), helped establish the field as a separate discipline (Hergenhahn, 2009).

The term **functionalism** comes from James's interest in how the mind functions to help us adapt to the environment. James regarded consciousness as an ever-changing *stream* or *flow* of images and sensations—not a set of lifeless building blocks, as the structuralists claimed.

The functionalists admired Charles Darwin, who deduced that creatures evolve in ways that favor survival. According to Darwin's principle of **natural selection**, physical features that help plants and animals adapt to their environments are retained in evolution. Similarly, the functionalists wanted to find out how the mind, perception, habits, and emotions help us adapt and survive.

*What effect did functionalism have on modern psychology?* Functionalism brought

**William James, 1842–1910.** William James was the son of philosopher Henry James, Sr., and the brother of novelist Henry James. During his long academic career, James taught anatomy, physiology, psychology, and philosophy at Harvard University. James believed strongly that ideas should be judged in terms of their practical consequences for human conduct.



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**John B. Watson, 1878–1958.** Watson's intense interest in observable behavior began with his doctoral studies in biology and neurology. Watson became a psychology professor at Johns Hopkins University in 1908 and advanced his theory of behaviorism. He remained at Johns Hopkins until 1920, when he left for a career in the advertising industry!



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the study of animals into psychology. It also promoted educational psychology (the study of learning, teaching, classroom dynamics, and related topics). Learning makes us more adaptable, so the functionalists tried to find ways to improve education. For similar reasons, functionalism spurred the rise of industrial/organizational psychology, the study of people at work.

### BRIDGES

Today, educational psychology and industrial/organizational psychology remain two major applied specialties (Coolican et al., 2007). **See Chapter 18 for more information about applied psychology.**

## Behaviorism

Functionalism and structuralism were soon challenged by **behaviorism**, the study of observable behavior. Behaviorist John B. Watson objected strongly to the study of the "mind" or "conscious experience." He believed that introspection is unscientific precisely because there is no way to settle disagreements between observers. Watson realized that he could study the overt behavior of animals even though he couldn't ask them questions or know what they were thinking (Benjafield, 2010). He simply observed the relationship between *stimuli* (events in the environment) and an animal's **responses** (any muscular action, glandular activity, or other identifiable aspect of behavior). These observations were objective because they did not involve introspecting on subjective experience. Why not, he asked, apply the same objectivity to study human behavior?

Watson soon adopted Russian physiologist Ivan Pavlov's (ee-VAHN PAV-lahv's) concept of *conditioning* to explain most behavior. (A *conditioned response* is a learned reaction to a particular stimulus.) Watson claimed, "Give me a dozen healthy infants, well-formed, and my own special world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant-chief, and yes, beggarman and thief" (Watson, 1913/1994).

*Would most psychologists agree with Watson's claim?* No. The behaviorists believed that all responses are *determined* by stimuli. Today, this is regarded as an overstatement. Just the same, behaviorism helped make psychology a natural science, rather than a branch of philosophy (Benjamin, 2009).

## Radical Behaviorism

The best-known behaviorist, B. F. Skinner (1904–1990), believed that our actions are controlled by rewards and punishments. To study learning, Skinner created his famous conditioning chamber, or “Skinner box.” With it, he could present stimuli to animals and record their responses. Many of Skinner’s ideas about learning grew out of work with rats and pigeons. Nevertheless, he believed that the same laws of behavior apply to humans. As a “radical behaviorist,” Skinner also believed that mental events, such as thinking, are not needed to explain behavior (Schultz & Schultz, 2012).

### BRIDGES

See Chapter 6, pages 211–229, for more information about operant conditioning.

Behaviorists deserve credit for much of what we know about learning, conditioning, and the proper use of reward and punishment. Skinner was convinced that a “designed culture” based on positive reinforcement could encourage desirable behavior. (Skin-



B. F. Skinner, 1904–1990. Skinner studied simple behaviors under carefully controlled conditions. The “Skinner box” you see here has been widely used to study learning in simplified animal experiments. In addition to advancing psychology, Skinner hoped that his radical brand of behaviorism would improve human life.

ner opposed the use of punishment because it doesn’t teach correct responses.) Too often, he believed, punishment and misguided rewards lead to destructive actions that create problems such as overpopulation, pollution, and war.

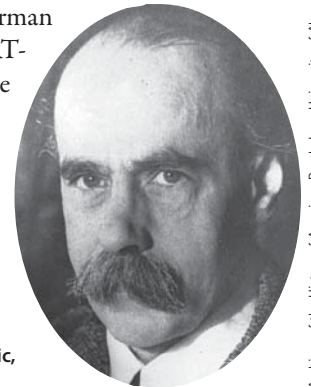
## Cognitive Behaviorism

Radical behaviorists have been criticized for ignoring the role that thinking plays in our lives. One critic even charged that Skinnerian psychology had “lost consciousness”! However, many criticisms have been answered by **cognitive behaviorism**, a view that combines cognition (thinking) and conditioning to explain behavior (Zentall, 2002). As an example, let’s say you frequently visit a particular website because it offers free streaming videos. A behaviorist would say you visit the site because you are rewarded by the pleasure of watching interesting videos each time you go there. A cognitive behaviorist would add that, in addition, you *expect* to find free videos at the site. This is the cognitive part of your behavior.

## Gestalt Psychology

Imagine that you just played “Happy Birthday” on a low-pitched tuba. Next, you play it on a high-pitched flute. The flute duplicates none of the tuba’s sounds. Yet we notice something interesting: The melody is still recognizable—as long as the *relationship* between notes remains the same. Now, what would happen if you played the notes of “Happy Birthday” in the correct order, but at a rate of one per hour? What would we have? Nothing! The separate notes would no longer be a melody. Perceptually, the melody is more than the individual notes that define it.

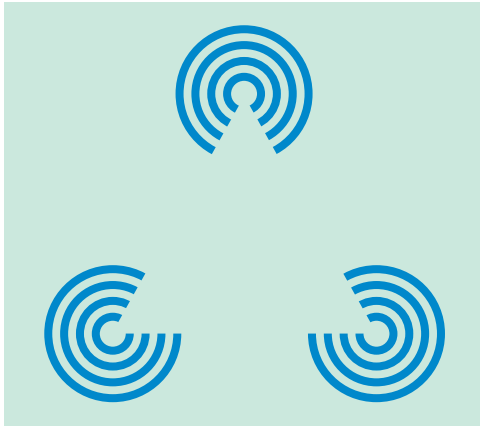
It was observations like these that launched the Gestalt school of thought. German psychologist Max Wertheimer (VERT-hi-mer) was the first to advance the Gestalt viewpoint. It is inaccurate, he



Max Wertheimer, 1880–1941. Wertheimer first proposed the Gestalt viewpoint to help explain perceptual illusions. He later promoted Gestalt psychology as a way to understand not only perception, problem solving, thinking, and social behavior, but also art, logic, philosophy, and politics.

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- Structuralism** The school of thought concerned with analyzing sensations and personal experience into basic elements.
- Functionalism** The school of psychology concerned with how behavior and mental abilities help people adapt to their environments.
- Natural selection** Darwin’s theory that evolution favors those plants and animals best suited to their living conditions.
- Behaviorism** The school of psychology that emphasizes the study of overt, observable behavior.
- Response** Any muscular action, glandular activity, or other identifiable aspect of behavior.
- Cognitive behaviorism** An approach that combines behavioral principles with cognition (perception, thinking, anticipation) to explain behavior.



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● **Figure 1.4** The design you see here is entirely made up of broken circles. However, as the Gestalt psychologists discovered, our perceptions have a powerful tendency to form meaningful patterns. Because of this tendency, you will probably see a triangle in this design, even though it is only an illusion. Your whole perceptual experience exceeds the sum of its parts.

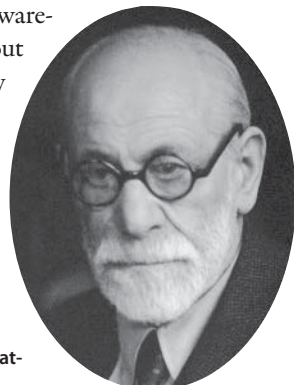
said, to analyze psychological events into pieces, or “elements,” as the structuralists did. Accordingly, **Gestalt psychologists** studied thinking, learning, and perception as whole units, not by analyzing experiences into parts. Their slogan was, “The whole is greater than the sum of its parts” (see ● Figure 1.4). In fact, the German word *Gestalt* means “form, pattern, or whole.”

Like a melody, many experiences cannot be broken into smaller units, as the structuralists proposed. For this reason, studies of perception and personality have been especially influenced by the Gestalt viewpoint.

## Psychoanalytic Psychology

As American psychology grew more scientific, an Austrian doctor named Sigmund Freud was developing radically different ideas that opened new horizons in art, literature, and history, as well as psychology (Chessick, 2010; Jacobs, 2003). Freud believed that mental life is like an iceberg: Only a small part is exposed to view. He called the area of the mind that lies outside of personal awareness the **unconscious**. According to Freud, our behavior is deeply influenced by unconscious thoughts, impulses, and desires—especially those concerning sex and aggression.

Freud theorized that many unconscious thoughts are **repressed**, or held out of awareness, because they are threatening. But sometimes, he said, they are revealed by



**Sigmund Freud, 1856–1939.** For more than 50 years, Freud probed the unconscious mind. In doing so, he altered modern views of human nature. His early experimentation with a “talking cure” for hysteria is regarded as the beginning of psychoanalysis. Through psychoanalysis, Freud added psychological treatment methods to psychiatry.

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**Abraham Maslow, 1908–1970.** As a founder of humanistic psychology, Maslow was interested in studying people of exceptional mental health. Such self-actualized people, he believed, make full use of their talents and abilities. Maslow offered his positive view of human potential as an alternative to the schools of behaviorism and psychoanalysis.



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dreams, emotions, or slips of the tongue. (“Freudian slips” are often humorous, as when a student who is tardy for class says, “I’m sorry I couldn’t get here any later.”)

Like the behaviorists, Freud believed that all thoughts, emotions, and actions are *determined*. In other words, nothing is an accident: If we probe deeply enough, we will find the causes of every thought or action. Unlike the behaviorists, he believed that unconscious processes (not external stimuli) were responsible.

Freud was also among the first to appreciate that childhood affects adult personality (“The child is father to the man”). Most of all, perhaps, Freud is known for creating **psychoanalysis**, the first fully developed psychotherapy, or “talking cure.” Freudian psychotherapy explores unconscious conflicts and emotional problems.

It wasn’t very long before some of Freud’s students began to promote their own theories. Several who modified Freud’s ideas became known as neo-Freudians (*neo* means “new” or “recent”). **Neo-Freudians** accept much of Freud’s theory but revise parts of it. Many, for instance, place less emphasis on sex and aggression and more on social motives and relationships. Some well-known neo-Freudians are Alfred Adler, Anna Freud (Freud’s daughter), Karen Horney (HORN-eye), Carl Jung (yoong), Otto Rank (rahnk), and Erik Erikson. Today, Freud’s ideas have been altered so much that few strictly psychoanalytic psychologists are left. However, his legacy is still evident in various **psychodynamic theories**, which continue to emphasize internal motives, conflicts, and unconscious forces (Gedo, 2002; Moran, 2010).

## Humanistic Psychology

**Humanism** is a view that focuses on subjective human experience. Humanistic psychologists are interested in human potentials, ideals, and problems.

*How is the humanistic approach different from others?* Carl Rogers, Abraham Maslow, and other humanists rejected the Freudian idea that we are ruled by unconscious forces. They were also uncomfortable with the behaviorist emphasis on conditioning. Both views have a strong undercurrent of **determinism**—the idea that behavior is determined by forces beyond our control. In contrast, the humanists stressed **free will**, our ability to make voluntary choices. Of course, past experiences do affect us. Nevertheless, humanists believe that people can freely *choose* to live more creative, meaningful, and satisfying lives.

Humanists are interested in psychological needs for love, self-esteem, belonging, self-expression, creativity, and spirituality. Such needs, they believe, are as important as our biological urges for food and water. For example, newborn infants deprived of human love may die just as surely as they would if deprived of food.

*How scientific is the humanistic approach?* Initially, humanists were less interested in treating psychology as a science. They stressed subjective factors, such as one's self-image, self-evaluation, and frame of reference. (*Self-image* is your perception of your own body, personality, and capabilities. *Self-evaluation* refers to appraising yourself as good or bad. A *frame of reference* is a mental perspective used to interpret events.) Today, humanists still seek to understand how we perceive ourselves and experience the world. However, most now do research to test their ideas, just as other psychologists do (Schneider, Bugental, & Pierson, 2001).

Maslow's concept of self-actualization is a key feature of humanism. **Self-actualization** refers to developing one's potential fully and becoming the best person possible. According to humanists, everyone has this potential. Humanists seek ways to help it emerge.

■ Table 1.3 presents a summary of psychology's early development.

TABLE 1.3 The Early Development of Psychology		
Perspective	Date	Notable Events
Experimental psychology	1875	• First psychology course offered by William James
	1878	• First American Ph.D. in psychology awarded
	1879	• Wilhelm Wundt opens first psychology laboratory in Germany
Structuralism	1883	• First American psychology lab founded at Johns Hopkins University
	1886	• First American psychology textbook written by John Dewey
Functionalism	1898	• Edward Titchener advances psychology based on introspection
	1890	• William James publishes <i>Principles of Psychology</i>
Psychodynamic psychology	1892	• American Psychological Association founded
	1895	• Sigmund Freud publishes first studies
Behaviorism	1900	• Freud publishes <i>The Interpretation of Dreams</i>
	1906	• Ivan Pavlov reports his research on conditioned reflexes
	1913	• John Watson presents behaviorist view
Gestalt psychology	1912	• Max Wertheimer and others advance Gestalt viewpoint
Humanistic psychology	1942	• Carl Rogers publishes <i>Counseling and Psychotherapy</i>
	1943	• Abraham Maslow publishes "A Theory of Human Motivation"

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## The Role of Diversity in Psychology

*Were all early psychologists Caucasian men?* Although women and ethnic minorities were long underrepresented among psychologists (Minton, 2000), there were pioneers. In 1894, Margaret Washburn became the first woman to be awarded a Ph.D.

in psychology. By 1906 in America, about 1 psychologist in 10 was a woman. In 1920, Francis Cecil Sumner became the first African American man to earn a doctoral degree in psychology. Inez Beverly Prosser, the first African American female psychologist, was awarded her Ph.D. in 1933.



Margaret Washburn, 1871–1939. In 1908 Margaret Washburn published an influential textbook on animal behavior, titled *The Animal Mind*.

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Francis Cecil Sumner, 1895–1954. Francis Sumner served as chair of the Psychology Department at Howard University and wrote articles critical of the underrepresentation of African Americans in American colleges and universities.

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Inez Beverly Prosser, ca. 1895–1934. Inez Beverly Prosser was one of the early leaders in the debate about how to best educate African American children.

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- Gestalt psychology** A school of psychology emphasizing the study of thinking, learning, and perception in whole units, not by analysis into parts.
- Unconscious** Contents of the mind that are beyond awareness, especially impulses and desires not directly known to a person.
- Repression** The unconscious process by which memories, thoughts, or impulses are held out of awareness.
- Psychoanalysis** A Freudian approach to psychotherapy emphasizing the exploration of unconscious conflicts.
- Neo-Freudian** A psychologist who accepts the broad features of Freud's theory but has revised the theory to fit his or her own concepts.
- Psychodynamic theory** Any theory of behavior that emphasizes internal conflicts, motives, and unconscious forces.
- Humanism** An approach to psychology that focuses on human experience, problems, potentials, and ideals.
- Determinism** The idea that all behavior has prior causes that would completely explain one's choices and actions if all such causes were known.
- Free will** The idea that human beings are capable of freely making choices or decisions.
- Self-actualization** The ongoing process of fully developing one's personal potential.



## Human Diversity

## Who's WEIRD?

**As you read** through this book, you may find yourself wondering whether a particular concept, theory, or research finding applies equally well to women and men, to members of various races or ethnic groups, or to people of different ages or sexual orientations. “Human Diversity” boxes like this one will help you be more reflective about our multicultural, multifaceted world.

Biases concerning the race, ethnicity, age, and sexual orientation of researchers and participants in psychological research have definitely limited our understanding (Denmark, Rabinowitz, & Sechzer, 2005; Guthrie, 2004). Far too many conclusions have been created by and/or based on small groups of people who do not represent the rich tapestry of humanity. For example, to this day, the vast majority of human participants in psychology experiments are recruited from introductory psychology courses. This fact led

the distinguished psychologist Edward Tolman to note that much of psychology is based on two sets of subjects—rats and college sophomores—and to joke that rats are certainly not people and that some college sophomores may not be either! Further, most of these participants have, over the years, been Caucasian members of the middle class, and most of the researchers themselves have been Caucasian males (Guthrie, 2004). Although none of this automatically invalidates the results of psychology experiments, it may place limitations on their meanings.

Perhaps the most general research bias of all becomes clear when you ask about people who live in the oddest societies in the world. The answer is just plain WEIRD (Western, Educated, Industrialized, Rich, and Democratic). According to Henrich, Heine, and Norenzayan (2010), we have a strongly in-

grained tendency to assume that what Western researchers discover studying Western research participants is the norm in human behavior and that the behavior of those in other societies is unusual. However, after a careful review of studies comparing Westerners with people from other societies, Henrich, Heine, and Norenzayan concluded that exactly the opposite is the case. We are WEIRD and should be careful to assume that what we learn from studying behavior in our society illuminates the behavior of people in non-Western societies.

Fortunately, the solution to problems of bias is straightforward: We need to encourage a much wider array of people to become researchers and, when possible, researchers need to include a much wider array of people in their studies. In recognition of human diversity, many researchers are doing just that (Lum, 2011; Reid, 2002).

The predominance of early Caucasian male psychologists is worrisome because it inadvertently introduced a narrowness into psychological theory and research. As one example, Laurence Kohlberg (1969) proposed a theory about how we develop moral values. His studies suggested that women were morally “immature” because they were not as concerned with justice as men were. However, few women were involved in doing the studies, and Kohlberg merely *assumed* that theories based on men also apply to women. In response, Carol Gilligan (1982) provided evidence that women were more likely to make moral choices based on caring, rather than justice. From this point of view, it was men who were morally immature.

### BRIDGES

Today, we recognize that both justice and caring perspectives may be essential to adult wisdom. **See Chapter 3, pages 110–111, for more details.**

Kohlberg’s oversight is just one form of **gender bias in research**. This term refers to the tendency for females to be underrepresented as research subjects and female topics to be ignored by many investigators. Consequently, investigators assume that conclusions based on men also apply to women. But without directly studying women, it is impossible to know how often this assumption is wrong. A related problem occurs when researchers combine results from men and women. Doing so can hide important male–female differences. An additional problem is that unequal numbers of men and women may volunteer for some kinds of research. For

example, in studies of sexuality, more male college students volunteer to participate than females (Wiederman, 1999). What a surprise! What shouldn’t surprise you is that the same charge of bias also arises when it comes to people of different ages, sexual orientations, races, and ethnic groups. To find out more, see the nearby “Who’s WEIRD?” box.

Fortunately, since 2000, over 70 percent of all undergraduate and graduate degrees in psychology have been awarded to women. Similarly, 25 percent of all undergraduate degrees and 16 percent of doctorates in psychology were awarded to persons of color (American Psychological Association, 2003a). Increasingly, psychology is coming to reflect the rich diversity of humanity (Hyde, 2007).

## ▶ Psychology Today—Three Complementary Perspectives on Behavior

**Gateway Question 1.6:** *What are the contemporary perspectives in psychology?*

At one time, loyalty to each school of thought in psychology was fierce, and clashes were common. Now, some early systems, such as structuralism, have disappeared entirely, whereas new ones have gained prominence. Also, viewpoints such as functionalism and Gestalt psychology have blended into newer, broader perspectives. The three broad views that shape modern psychology are the *biological*, *psychological*, and *sociocultural* perspectives (■ Table 1.4).

**TABLE 1.4** Contemporary Ways to Look at Behavior

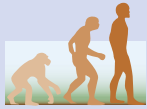
**Biological Perspective**



**Biopsychological View**

*Key Idea: Human and animal behavior is the result of internal physical, chemical, and biological processes.*

Seeks to explain behavior through activity of the brain and nervous system, physiology, genetics, the endocrine system, and biochemistry; neutral, reductionistic, mechanistic view of human nature.



**Evolutionary View**

*Key Idea: Human and animal behavior is the result of the process of evolution.*

Seeks to explain behavior through evolutionary principles based on natural selection; neutral, reductionistic, mechanistic view of human nature.

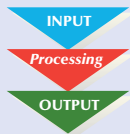
**Psychological Perspective**



**Behavioral View**

*Key Idea: Behavior is shaped and controlled by one's environment.*

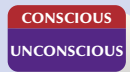
Emphasizes the study of observable behavior and the effects of learning; stresses the influence of external rewards and punishments; neutral, scientific, somewhat mechanistic view of human nature.



**Cognitive View**

*Key Idea: Much human behavior can be understood in terms of the mental processing of information.*

Concerned with thinking, knowing, perception, understanding, memory, decision making, and judgment; explains behavior in terms of information processing; neutral, somewhat computer-like view of human nature.



**Psychodynamic View**

*Key Idea: Behavior is directed by forces within one's personality that are often hidden or unconscious.*

Emphasizes internal impulses, desires, and conflicts—especially those that are unconscious; views behavior as the result of clashing forces within personality; somewhat negative, pessimistic view of human nature.



**Humanistic View**

*Key Idea: Behavior is guided by one's self-image, by subjective perceptions of the world, and by needs for personal growth.*

Focuses on subjective, conscious experience, human problems, potentials, and ideals; emphasizes self-image and self-actualization to explain behavior; positive, philosophical view of human nature.

**Sociocultural Perspective**



**Sociocultural View**

*Key Idea: Behavior is influenced by one's social and cultural context.*

Emphasizes that behavior is related to the social and cultural environment within which a person is born, grows up, and lives from day to day; neutral, interactionist view of human nature.

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**The Biological Perspective**

The **biological perspective** seeks to explain our behavior in terms of biological principles such as brain processes, evolution, and genetics. By using new techniques, *biopsychologists* are producing exciting insights about how the brain relates to thinking, feelings, perception, abnormal behavior, and other topics. Biopsychologists and others who study the brain and nervous system, such as biologists and biochemists, together form the broader field of **neuroscience**. **Evolutionary psychologists** look at how human evolution and genetics might explain our current behavior.

**The Psychological Perspective**

The **psychological perspective** views behavior as the result of psychological processes within each person. This view continues to emphasize objective observation, just as the early behaviorists did.

However, the psychological perspective now includes cognitive psychology, which seeks to explain how mental processes affect our thoughts, actions, and feelings (Goldstein, 2011). Cognitive psychology has gained prominence in recent years as researchers have devised ways to objectively study covert behaviors, such as thinking,

- Gender bias in research** A tendency for females and female issues to be underrepresented in research, psychological or otherwise.
- Biological perspective** The attempt to explain behavior in terms of underlying biological principles.
- Neuroscience** The broader field of biopsychologists and others who study the brain and nervous system, such as biologists and biochemists.
- Evolutionary psychology** The study of how human evolution and genetics might explain our current behavior.
- Psychological perspective** The traditional view that behavior is shaped by psychological processes occurring at the level of the individual.

memory, language, perception, problem solving, consciousness, and creativity. With a renewed interest in thinking, it can be said that psychology has finally “regained consciousness” (Robins, Gosling, & Craik, 1998).

Freudian psychoanalysis continues to evolve into the broader *psychodynamic view*. Although many of Freud’s ideas have been challenged or refuted, psychodynamic psychologists continue to trace our behavior to unconscious mental activity. They also seek to develop therapies to help people lead happier, fuller lives. The same is true of humanistic psychologists, although they stress subjective, conscious experience and the positive side of human nature, rather than unconscious processes.

## Positive Psychology

Psychologists have always paid attention to the negative side of human behavior. This is easy to understand because of the pressing need to solve human problems. However, more and more psychologists, some of them inspired by the humanists, have begun to ask, “What do we know about love, happiness, creativity, well-being, self-confidence, and achievement?” Together, such topics make up **positive psychology**, the study of human strengths, virtues, and optimal behavior (Compton, 2005; Seligman & Csikszentmihalyi, 2000). Many topics from positive psychology can be found in this book. Ideally, they will help make your own life more positive and fulfilling (Simonton & Baumeister, 2005).

## The Sociocultural Perspective

As you can see, it is helpful to view human behavior from more than one perspective. This is also true in another sense. The **sociocultural perspective** stresses the impact that social and cultural contexts have on our behavior. We are rapidly becoming a multicultural society, made up of people from many nations. How has this affected psychology? Meet Jerry, who is Japanese American and is married to an Irish-Catholic American. Here is what Jerry, his wife, and their children did one New Year’s Day:

We woke up in the morning and went to Mass at St. Brigid’s, which has a black gospel choir. . . . Then we went to the Japanese-American Community Center for the Oshogatsu New Year’s program and saw Buddhist archers shoot arrows to ward off evil spirits for the year. Next, we ate traditional rice cakes as part of the New Year’s service and listened to a young Japanese-American storyteller. On the way home, we stopped in Chinatown and after that we ate Mexican food at a taco stand (Njeri, 1991).

Jerry and his family reflect a new social reality: Cultural diversity is becoming the norm. Over 100 million Americans are now African American, Hispanic, Asian American, Native American, or Pacific Islander (U.S. Census Bureau, 2007). In

As illustrated by this photo from the inauguration of President Barack Obama in 2009, America is becoming more diverse. To fully understand human behavior, personal differences based on age, race, culture, ethnicity, gender, and sexual orientation must be taken into account.

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some large cities, such as Detroit and Baltimore, “minority” groups are already the majority.

## Cultural Relativity

Imagine that you are a psychologist. Your client, Linda, who is a Native American, tells you that spirits live in the trees near her home. Is Linda suffering from a delusion? Is she abnormal? Obviously, you will misjudge Linda’s mental health if you fail to take her cultural beliefs into account. **Cultural relativity**—the idea that behavior must be judged relative to the values of the culture in which it occurs—can greatly affect the diagnosis and treatment of mental disorders (Lum, 2011). Cases like Linda’s teach us to be wary of using narrow standards when judging others or comparing groups.

### BRIDGES

Psychotherapy can be less effective if a therapist and client come from different cultures. See Chapter 15, pages 533–534, for a discussion of the impact of culture on therapy.

## A Broader View of Diversity

In addition to cultural differences, age, ethnicity, gender, religion, disability, and sexual orientation all affect the **social norms** that guide behavior. Social norms are rules that define acceptable and expected behavior for members of various groups. As we mentioned earlier, often, the unstated standard for judging what is “average,” “normal,” or “correct” has been the behavior of white, middle-class Western males (Henrich, Heine, & Norenzayan, 2010). To fully understand human behavior, psychologists need to know how people differ, as well as the ways in which we are all alike. To be effective, psychologists must be sensitive to people who are ethnically and culturally different from themselves (American Psychological Association, 2003b). For the same reason, an appreciation of human diversity can enrich your life, as well as your understanding of psychology (Denmark, Rabinowitz, & Sechzer, 2005).

## The Whole Human

Today, many psychologists realize that a single perspective is unlikely to fully explain complex human behavior. As a result, they are *eclectic* (ek-LEK-tik) and draw insights from a variety of perspectives. As we will see throughout this book, insights from one perspective often complement insights from the others, as we seek to better understand the whole human. In a moment, we will further explore what psychologists do. First, here are some questions to enhance your learning.

### Knowledge Builder

## History and Contemporary Perspectives

### RECITE

Match:

- |                        |  |
|------------------------|--|
| 1. ____ Philosophy     | A. Against analysis; studied whole experiences             |
| 2. ____ Wundt          | B. "Mental chemistry" and introspection                    |
| 3. ____ Structuralism  | C. Emphasizes self-actualization and personal growth       |
| 4. ____ Functionalism  | D. Interested in unconscious causes of behavior            |
| 5. ____ Behaviorism    | E. Interested in how the mind aids survival                |
| 6. ____ Gestalt        | F. Studied stimuli and responses, conditioning             |
| 7. ____ Psychodynamic  | G. Part of psychology's "long past"                        |
| 8. ____ Humanistic     | H. Concerned with thinking, language, problem solving      |
| 9. ____ Cognitive      | I. Used introspection and careful measurement              |
| 10. ____ Biopsychology | J. Relates behavior to the brain, physiology, and genetics |
11. A psychotherapist is working with a person from an ethnic group other than her own. She should be aware of how cultural relativity and \_\_\_\_\_ affect behavior.  
a. the anthropomorphic error b. operational definitions c. biased sampling d. social norms
12. Studying the behavior of American undergraduates and then drawing conclusions about how people around the world might behave  
a. is scientifically appropriate b. is an example of cognitive behaviorism c. could easily result in misleading generalizations d. is an example of multiculturalism

### REFLECT

#### Think Critically

13. Modern sciences like psychology are built on observations that can be verified by two or more independent observers. Did structuralism meet this standard? Why or why not?

#### Self-Reflect

Which school of thought most closely matches your own view of behavior? Do you think any of the early schools offers a complete explanation of why we behave as we do? What about the three broad contemporary perspectives? Can you explain why so many psychologists are eclectic?

A group of psychologists were asked to answer this question: "Why did the chicken cross the road?" Their answers are listed next. Can you identify their theoretical orientations?

The chicken had been rewarded for crossing road in the past.

The chicken had an unconscious wish to become a pancake.  
The chicken was trying to solve the problem of how to reach the other side of the road.  
The chicken felt a need to explore new possibilities as a way to actualize its potentials.  
The chicken's motor cortex was activated by messages from its hypothalamus.

Answers: 1. G 2. I 3. B 4. E 5. F 6. A 7. D 8. C 9. H 10. J 11. D 12. C 13. No, it did not. The downfall of structuralism was that each observer examined the contents of his or her own mind—which is something that no other person can observe.

## Psychologists—Guaranteed Not to Shrink

**Gateway Question 1.7:** *What are the major specialties in psychology?*

*Do all psychologists do therapy and treat abnormal behavior?* Only about 59 percent are clinical and counseling psychologists. Regardless, all **psychologists** are highly trained in the methods, knowledge, and theories of psychology. They usually have earned a master's degree or a doctorate, typically requiring several years of postgraduate training. Twenty-nine percent are employed full-time at colleges or universities, where they teach and do research, consulting, or therapy. The remainder give psychological tests, do research in other settings, or serve as consultants to business, industry, government, or the military (see ● Figure 1.5).

At present, the American Psychological Association (APA) consists of more than 50 divisions, each reflecting special skills or areas of interest. No matter where they are employed or what their area of specialization, many psychologists do research. Some do *basic research*, in which they seek knowledge for its own sake. For example, a psychologist might study memory simply to understand how it works. Others do *applied research* to solve immediate practical problems, such as finding ways to improve athletic performance (Coolican et al., 2007). Some do both types of research. Some of the major specialties are listed in ■ Table 1.5.

Have you ever wondered what it takes to become a psychologist? See "Is a Career in Psychology Right for You?"

**Positive psychology** The study of human strengths, virtues, and effective functioning.

**Sociocultural perspective** The focus on the importance of social and cultural contexts in influencing the behavior of individuals.

**Cultural relativity** The idea that behavior must be judged relative to the values of the culture in which it occurs.

**Social norms** Rules that define acceptable and expected behavior for members of a group.

**Psychologist** A person highly trained in the methods, factual knowledge, and theories of psychology.

**TABLE 1.5** Kinds of Psychologists and What They Do

Specialty		Typical Activities	Sample Research Topic
Biopsychology	B*	Does research on the brain, nervous system, and other physical origins of behavior.	"I've been doing some exciting research on how the brain controls hunger."
Clinical	A	Does psychotherapy; investigates clinical problems; develops methods of treatment.	"I'm curious about the relationship between early childhood trauma and their adult relationships so that I can help adults be more successful in their marriages."
Cognitive	B	Studies human thinking and information processing abilities.	"I want to know how reasoning, problem solving, memory, and other mental processes relate to computer game playing."
Community	A	Promotes community-wide mental health through research, prevention, education, and consultation.	"How can we prevent the spread of sexually transmitted diseases more effectively? That's what I want to better understand."
Comparative	B	Studies and compares the behavior of different species, especially animals.	"Personally, I'm fascinated by the communication abilities of porpoises."
Consumer	A	Researches packaging, advertising, marketing methods, and characteristics of consumers.	"My job is to improve the marketing of products that are environment friendly."
Counseling	A	Does psychotherapy and personal counseling; researches emotional disturbances and counseling methods.	"I am focused on better understanding why people become hoarders and how to help them stop."
Cultural	B	Studies the ways in which culture, subculture, and ethnic group membership affect behavior.	"I am interested in how culture affects human eating behavior, especially the foods we eat and whether we eat with a spoon, chopsticks, or our fingers."
Developmental	A, B	Conducts research on infant, child, adolescent, and adult development; does clinical work with disturbed children; acts as consultant to parents and schools.	"I'm focusing on transitions from the teenage years to early adulthood."
Educational	A	Investigates classroom dynamics, teaching styles, and learning; develops educational tests, evaluates educational programs.	"My passion is to figure out how to help people with different learning styles be effective learners."
Engineering	A	Does applied research on the design of machinery, computers, airlines, automobiles, and so on, for business, industry, and the military.	"I'm studying how people use movement-based computer interfaces, like the Kinect."
Environmental	A, B	Studies the effects of urban noise, crowding, attitudes toward the environment, and human use of space; acts as a consultant on environmental issues.	"I am concerned about global warming and want to understand what impact rising temperatures have on human culture."
Evolutionary	B	Studies how behavior is guided by patterns that evolved during the long history of humankind.	"I am studying some interesting trends in male and female mating choices."
Forensic	A	Studies problems of crime and crime prevention, rehabilitation programs, prisons, courtroom dynamics; selects candidates for police work.	"I am interested in improving the reliability of eyewitness testimony during trials."
Gender	B	Does research on differences between males and females, the acquisition of gender identity, and the role of gender throughout life.	"I want to understand how young boys and girls are influenced by gender stereotypes."
Health	A, B	Studies the relationship between behavior and health; uses psychological principles to promote health and prevent illness.	"How to better help people overcome drug addictions is my field of study."
Industrial-organizational	A	Selects job applicants; does skills analysis; evaluates on-the-job training; improves work environments and human relations in organizations and work settings.	"Which plays a greater role in successful management styles, intelligence or emotion? That is my question."
Learning	B	Studies how and why learning occurs; develops theories of learning.	"Right now I'm investigating how patterns of reinforcement affect learning. I am especially interested in superstitious conditioning."
Medical	A	Applies psychology to manage medical problems, such as the emotional impact of illness, self-screening for cancer, and compliance in taking medicine.	"I want to know how to help people take better charge of their own health."
Personality	B	Studies personality traits and dynamics; develops theories of personality and tests for assessing personality traits.	"I am especially interested in the personality profiles of people willing to take extreme risks."
School	A	Does psychological testing, referrals, emotional and vocational counseling of students; detects and treats learning disabilities; improves classroom learning.	"My focus is finding out how to keep students in school instead of having them drop out."
Sensation and perception	B	Studies the sense organs and the process of perception; investigates the mechanisms of sensation; develops theories about how perception occurs.	"I am using a perceptual theory to study how we are able to recognize faces in a crowd."
Social	B	Investigates human social behavior, including attitudes, conformity, persuasion, prejudice, friendship, aggression, helping, and so forth.	"My own interest is interpersonal attraction. I place two strangers in a room and analyze how strongly they are attracted to each other."

\*Research in this area is typically applied (A), basic (B), or both (A, B).

## Discovering Psychology

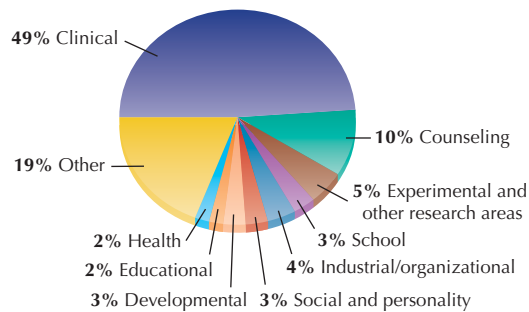
## Is a Career in Psychology Right for You?

**As you read this book**, we encourage you to frequently reflect on new ideas by relating them to your own life in order to better understand and remember them. “Discovering Psychology” boxes like this one are designed to help you be more reflective about how psychology relates to your own life. Answer the following questions to explore whether you would enjoy becoming a psychologist:

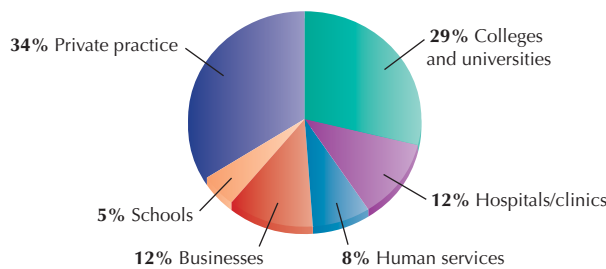
1. I have a strong interest in human behavior. True or False?
2. I am good at recognizing patterns, evaluating evidence, and drawing conclusions. True or False?
3. I am emotionally stable. True or False?
4. I have good communication skills. True or False?
5. I find theories and ideas challenging and stimulating. True or False?
6. My friends regard me as especially sensitive to the feelings of others. True or False?
7. I enjoy planning and carrying out complex projects and activities. True or False?
8. Programs and popular books about psychology interest me. True or False?
9. I enjoy working with other people. True or False?
10. Clear thinking, objectivity, and keen observation appeal to me. True or False?

If you answered “True” to most of these questions, a career in psychology might be a good choice. And remember that many psychology majors also succeed in occupations such as management, public affairs, social services, business, sales, and education (Kuther & Morgan, 2010).

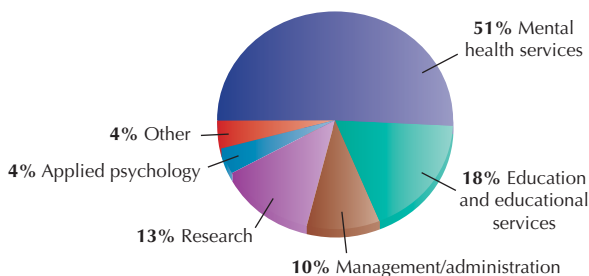
(a) Specialties in Psychology



(b) Where Psychologists Work



(c) What Psychologists Do (Primary Activity)



● **Figure 1.5** (a) Specialties in psychology (American Psychological Association, 2007a). Percentages are approximate. (b) Where psychologists work (Cheal et al., 2009). (c) This chart shows the main activities psychologists do at work. Any particular psychologist might do several of these activities during a work week. As you can see, most psychologists specialize in applied areas and work in applied settings (Cheal et al., 2009).

## Animals and Psychology

Research involving animals was mentioned in some of the preceding examples in Table 1.5. Why is that? You may be surprised to learn that psychologists are interested in the behavior of *any* living creature—from flatworms to humans. Indeed, some comparative psychologists spend their entire careers studying rats, cats, dogs, parrots, or chimpanzees.

Although only a small percentage of psychological studies involve animals, they include many different types of research (Ord et al., 2005). Some psychologists use **animal models** to discover principles that apply to humans. For instance, animal studies have



Killer whales living along the Pacific coast near the border between the United States and Canada are listed as endangered. Studies of their social behavior are enhancing our efforts to conserve these magnificent creatures (Parsons et al., 2009).

**Animal model** In research, an animal whose behavior is used to derive principles that may apply to human behavior.

helped us understand stress, learning, obesity, aging, sleep, and many other topics. Psychology can also benefit animals. Behavioral studies can help us better care for domestic animals and those in zoos, as well as conserve endangered species in the wild.

## Helping People

Although most psychologists help people in one way or another, those interested in emotional problems usually specialize in clinical or counseling psychology (see ■ Table 1.5). **Clinical psychologists** treat psychological problems or do research on therapies and mental disorders. In contrast, **counseling psychologists** tend to treat milder problems, such as troubles at work or school. However, such differences are fading, and many counseling psychologists now work full time as therapists.

To become a clinical psychologist, it is best to have a doctorate (Ph.D., Psy.D., or Ed.D.). Most clinical psychologists have a Ph.D. degree and follow a scientist-as-practitioner model. That is, they are trained to do either research or therapy. Many do both. Other clinicians earn the Psy.D. (Doctor of Psychology) degree, which emphasizes therapy skills rather than research (Peterson, 2001).

*Does a psychologist have to have a license to offer therapy?* At one time it was possible in many states for anyone to “hang out a shingle” as a “psychologist.” Now psychologists must not only meet rigorous educational requirements, they must meet stringent legal requirements as well. To work as a clinical or counseling psychologist, you must have a license issued by a state examining board. However, the law does not prevent you from calling yourself anything else you choose—therapist, rebirther, primal feeling facilitator, cosmic aura balancer, or life skills coach—or from selling your “services” to anyone willing to pay. Beware of people with self-proclaimed titles. Even if their intentions are honorable, they may have little training. A licensed psychologist who chooses to use a particular type of therapy is not the same as someone “trained” solely in that technique.

Psychologists are often inaccurately portrayed in the media as incompetent therapists. Some films have featured psychologists who are more disturbed than their patients (such as Jack Nicholson’s character in *Anger Management*) or psychologists who are bumbling buffoons (such as Billy Crystal’s character in *Analyze This*). In the movie comedy *Prime*, a therapist listens to a patient describe intimate details of her relationship with a man but fails to tell the patient that the man is her son. Such characters may be dramatic and entertaining, but they seriously distort public perceptions of responsible and hardworking psychologists (Schultz, 2004).

Real clinical and counseling psychologists follow an ethical code that stresses (1) high levels of competence, integrity, and responsibility; (2) respect for people’s rights to privacy, dignity, confidentiality, and personal freedom; and, above all, (3) protection of the client’s welfare (American Psychological Association, 2002, 2010a; Barnett et al., 2007). Psychologists are also expected to use their knowledge to contribute to society. Many do volunteer work in the communities in which they live.

## Other Mental Health Professionals

Clinical psychologists are not the only people who work in the field of mental health. Often they coordinate their efforts with other specially trained professionals. What are the differences among psychologists, psychiatrists, psychoanalysts, counselors, and other mental health professionals? Each has a specific blend of training and skills.

*Psychologists are all shrinks, right?* Nope. “Shrinks” (a slang term derived from “head shrinkers”) are **psychiatrists**, medical doctors who treat mental disorders, often by doing psychotherapy. Psychiatrists can also prescribe drugs, which is something psychologists usually cannot do. However, this is changing. Psychologists in New Mexico and Louisiana can now legally prescribe drugs. It will be interesting to see whether other states grant similar privileges (Munsey, 2008).

To be a psychoanalyst, you must have a moustache and goatee, spectacles, a German accent, and a well-padded couch—or so the media stereotype goes. Actually, to become a **psychoanalyst** you must have an M.D. or Ph.D. degree plus further training in Freudian psychoanalysis. In other words, either a physician or a psychologist may become an analyst by learning a specific type of psychotherapy.

In many states, counselors also do mental health work. A **counselor** is an adviser who helps solve problems with marriage, career, school, work, or the like. To be a licensed counselor (such as a marriage and family counselor, a child counselor, or a school counselor) typically requires a master’s degree plus 1 or 2 years of full-time supervised counseling experience. Counselors learn practical helping skills and do not treat serious mental disorders.

**Psychiatric social workers** play an important role in many mental health programs where they apply social science principles to help patients in clinics and hospitals. Most hold an M.S.W. (Master of Social Work) degree. Often, they assist psychologists and psychiatrists as part of a team. Their typical duties include evaluating patients and families, conducting group therapy, or visiting a patient’s home, school, or job to alleviate problems.

In a moment, we’ll take a closer look at how research is done. Before that, here’s a chance to do a little research on how much you’ve learned.

### Knowledge Builder

## Psychologists and Their Specialties

### RECITE

Match the following research areas with the topics they cover.

- |                                  |                                       |
|----------------------------------|---------------------------------------|
| 1. ____ Developmental psychology | A. Attitudes, groups, leadership      |
| 2. ____ Learning                 | B. Conditioning, memory               |
| 3. ____ Personality              | C. The psychology of law              |
| 4. ____ Sensation and perception | D. Brain and nervous system           |
| 5. ____ Biopsychology            | E. Child psychology                   |
| 6. ____ Social psychology        | F. Individual differences, motivation |
| 7. ____ Comparative psychology   | G. Processing sensory information     |
|                                  | H. Animal behavior                    |

8. In psychological research, animal \_\_\_\_\_ may be used to discover principles that apply to human behavior.
9. A psychologist who specializes in treating human emotional difficulties is called a \_\_\_\_\_ psychologist.
10. Which of the following can always prescribe drugs to treat mental disorders?
  - a. a psychologist
  - b. a psychiatrist
  - c. a psychotherapist
  - d. a counselor

**REFLECT**

**Think Critically**

11. If many psychologists work in applied settings, why is basic research still of great importance?

**Self-Reflect**

Which specialty in psychology is most interesting to you? What is it about that specialty that most attracts you?

**Answers:** 1. E, 2. B, 3. F, 4. G, 5. D, 6. A, 7. H, 8. models, 9. clinical or counseling, 10. b, 11. Practitioners benefit from basic psychological research in the same way that physicians benefit from basic research in biology. Discoveries in basic science form the knowledge base that leads to useful applications.

## The Psychology Experiment— Where Cause Meets Effect

### Gateway Question 1.8: How is an experiment performed?

To get beyond description and fully understand behavior, psychologists must be able explain *why* we act the way we do. To discover the *causes* of behavior, we must usually conduct an **experiment**. An experiment is a formal trial undertaken to confirm or disconfirm a hypothesis about the causes of behavior (although causes are sometimes revealed by naturalistic observation or correlations). Experiments allow psychologists to carefully control conditions and bring cause-and-effect relationships into sharp focus. Hence, they are generally accepted as the most powerful scientific research tool. To perform an experiment you would do the following:

1. Directly vary a condition you think might affect behavior.
2. Create two or more groups of subjects. These groups should be alike in all ways *except* the condition you are varying.
3. Record whether varying the condition has any effect on behavior.

Suppose you want to find out if using cell phones while driving a car affects the likelihood of having an accident. First, you would form two groups of people. Then you could give the members of one group a test of driving ability while they are using a cell phone. The second group would take the same test without using a cell phone. By comparing average driving ability scores for the two groups, you could tell if cell phone use affects driving ability.

As you can see, the simplest psychological experiment is based on two groups of **experimental subjects**—animals or people whose behavior is investigated. Human subjects are also called **participants**. One group is called the *experimental group*; the other

becomes the *control group*. The experimental group and the control group are treated exactly alike except for the condition (or *variable*) you intentionally vary.

## Variables and Groups

*What are the different kinds of variables?* A **variable** is any condition that can change and that might affect the outcome of the experiment. Identifying causes and effects in an experiment involves three types of variables:

1. **Independent variables** are conditions that are altered or varied by the experimenter, who sets their size, amount, or value. Independent variables are suspected *causes* for differences in behavior.
2. **Dependent variables** measure the results of the experiment. That is, they reveal the *effects* that independent variables have on *behavior*. Such effects are often revealed by measures of performance, such as test scores.
3. **Extraneous variables** are conditions that a researcher wishes to prevent from affecting the outcome of the experiment.

We can apply these terms to our cell phone/driving experiment in this way:

1. Cell phone use is the independent variable—we want to know if cell phone use affects driving ability.
2. Driving ability (defined by scores achieved on a test of driving ability) is the dependent variable—we want to know if the ability to drive well depends on whether a person is using a cell phone.

- Clinical psychologist** A psychologist who specializes in the treatment of psychological and behavioral disturbances or who does research on such disturbances.
- Counseling psychologist** A psychologist who specializes in the treatment of milder emotional and behavioral disturbances.
- Psychiatrist** A medical doctor with additional training in the diagnosis and treatment of mental and emotional disorders.
- Psychoanalyst** A mental health professional (usually a medical doctor) trained to practice psychoanalysis.
- Counselor** A mental health professional who specializes in helping people with problems not involving serious mental disorder; for example, marriage counselors, career counselors, or school counselors.
- Psychiatric social worker** A mental health professional trained to apply social science principles to help patients in clinics and hospitals.
- Experiment** A formal trial undertaken to confirm or disconfirm a hypothesis about cause and effect.
- Experimental subjects** Humans (also referred to as **participants**) or animals whose behavior is investigated in an experiment.
- Variable** Any condition that changes or can be made to change; a measure, event, or state that may vary.
- Independent variable** In an experiment, the condition being investigated as a possible cause of some change in behavior. The values that this variable takes are chosen by the experimenter.
- Dependent variable** In an experiment, the condition (usually a behavior) that is affected by the independent variable.
- Extraneous variables** Conditions or factors excluded from influencing the outcome of an experiment.



3. All other variables that could affect driving ability are extraneous. Examples of extraneous variables are the number of hours slept the night before the test, driving experience, and familiarity with the car used in the experiment.

By the way, psychologist Davis Strayer and his colleagues have confirmed that almost all drivers talking on cell phones drive no better than people who are legally drunk, and that texters are even worse (Drews et al., 2009; Strayer, Drews, & Crouch, 2006; Watson & Strayer, 2010).

As you can see, an **experimental group** consists of participants exposed to the independent variable (cell phone use in the preceding example). Members of the **control group** are exposed to all conditions except the independent variable.

Let's examine another simple experiment. Suppose you notice that you seem to study better while listening to your iPod. This suggests the hypothesis that listening to music improves learning. We could test this idea by forming an experimental group that studies with music. A control group would study without music. Then we could compare their scores on a test.

*Is a control group really needed? Can't people just study while listening to their iPods to see if they do better?* Better than what? The control group provides a *point of reference* for comparison with the scores in the experimental group. Without a control group, it would be impossible to tell whether music had any effect on learning. If the average test score of the experimental group is higher than the average of the control group, we can conclude that music improves learning. If there is no difference, it's obvious that the independent variable had no effect on learning.

In this experiment, the amount learned (indicated by scores on the test) is the *dependent variable*. We are asking, Does the inde-

pendent variable *affect* the dependent variable? (Does listening to music affect or influence learning?)

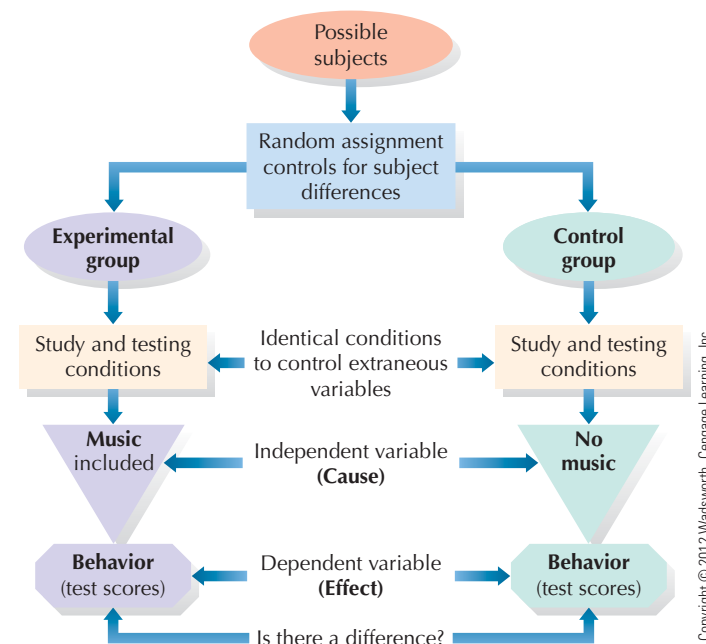
## Experimental Control

*How do we know that the people in one group aren't more intelligent than those in the other group?* It's true that personal differences might affect the experiment. However, they can be controlled by randomly assigning people to groups. **Random assignment** means that a participant has an equal chance of being in either the experimental group or the control group. Randomization evenly balances personal differences in the two groups. In our musical experiment, this could be done by simply flipping a coin for each participant: Heads, and the participant is in the experimental group; tails, it's the control group. This would result in few average differences in the number of people in each group who are women or men, geniuses or dunces, hungry, hung over, tall, music lovers, or whatever.

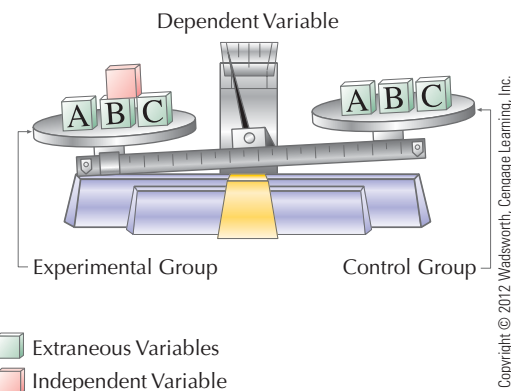
Other *extraneous*, or outside, variables—such as the amount of study time, the temperature in the room, the time of day, the amount of light, and so forth—must also be prevented from affecting the outcome of an experiment. But how? Usually this is done by making all conditions (except the independent variable) *exactly* alike for both groups. When all conditions are the same for both groups—*except* the presence or absence of music—then any difference in the amount learned *must* be caused by the music (● Figure 1.6).

## Cause and Effect

Now let's summarize. In an experiment, two or more groups of subjects are treated differently with respect to the independent variable. In all other ways they are treated the same. That is, extraneous variables are equated for all groups. The effect of the independent variable (or variables) on some behavior (the dependent variable) is then measured. In a carefully controlled experiment, the independent variable is the only possible *cause* for any *effect* noted in the dependent variable. This allows clear cause-and-effect connections to be identified (● Figure 1.7).



● **Figure 1.6** Elements of a simple psychological experiment to assess the effects of music during study on test scores.



● **Figure 1.7** Experimental control is achieved by balancing extraneous variables for the experimental group and the control group. For example, the average age (A), education (B), and intelligence (C) of group members could be made the same for both groups. Then we could apply the independent variable to the experimental group. If their behavior (the dependent variable) changes (in comparison with the control group), the change must be caused by the independent variable.

## Evaluating Results

How can we tell if the independent variable really made a difference? This problem is handled statistically. Reports in psychology journals almost always include the statement, “Results were **statistically significant**.” What this means is that the obtained results would occur very rarely by chance alone. To be statistically significant, a difference must be large enough so that it would occur by chance in less than 5 experiments out of 100. Of course, findings also become more convincing when they can be *replicated* (repeated) by other researchers.

### BRIDGES

See the Statistics Appendix for more information on inferential statistics.

## Meta-Analysis

As you might guess, numerous studies are done on important topics in psychology. Although each study adds to our understanding, the results of various studies don’t always agree. Let’s say we are interested in whether males or females tend to be greater risk takers, like our skydiver friend, Henry. A computer search would reveal that more than 100 studies have investigated various types of risk-taking (for example, smoking, fast driving, or unprotected sex).

*Is there a way to combine the results of the studies?* Yes, a statistical technique called **meta-analysis** can be used to combine the results of many studies as if they were all part of one big study (Cooper, 2010). In other words, a meta-analysis is a study of the results of other studies. In recent years, meta-analysis has been used to summarize and synthesize mountains of psychological research. This allows us to see the big picture and draw conclusions that might be missed in a single, small-scale study. Oh, and about that risk-taking question: A meta-analysis showed that males do tend to take more risks than females (Byrnes, Miller, & Schafer, 1999). (The most frequent last words uttered by deceased young males is rumored to be, “Hey, watch this!”)

## Double Blind—On Placebos and Self-Fulfilling Prophecies

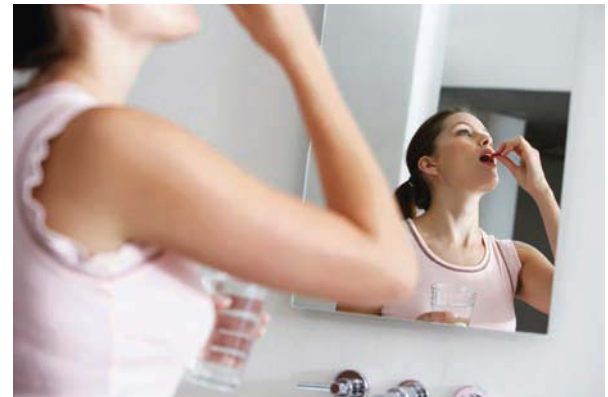
### Gateway Question 1.9: What is a double-blind experiment?

Suppose a researcher hypothesizes that the drug amphetamine (a stimulant) improves learning. She explains her hypothesis to her participants and gives experimental group participants an amphetamine pill before they begin studying. Control group members get nothing. Later, she assesses how much each participant learned. Does this experiment seem valid? Actually, it is seriously flawed for several reasons.

*Why? The experimental group took the drug and the control group didn’t. Differences in the amount they learned must have been caused by the drug, right?* No, because the drug wasn’t the only difference between the groups. For a start, because of what they were told, participants in the experimental group likely *expected* to learn more. Any observed differences between groups then may reflect differences in expectation, not the actual effect of the drug.

## Research Participant Bias

In a well-designed experiment, you must be careful about what you tell participants. Small bits of information might create **research participant bias**, or changes in participants’ behavior caused by the influence of their expectations. Notice also that experimental group participants swallowed a pill, and control participants did not. This is another form of research participant bias. It could be that those who swallowed a pill unconsciously *expected* to do better. After all, pills are medicine, aren’t they? This alone might have created a **placebo** (plah-SEE-bo) **effect**—changes in behavior caused by belief that one has taken a drug or received some other treatment. Suppose the researcher had not given the experimental group an amphetamine pill and instead had given them a **placebo**, or fake drug. Inactive substances such as sugar pills and saline (salt-water) injections are commonly used as placebos. If a placebo has any effect, it must be based on suggestion, rather than chemistry (McBurney & White, 2010). Placebo effects can be quite powerful. For instance, a saline injection is 70 percent as effective as morphine in reducing pain. That’s why doctors sometimes



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The placebo effect is a major factor in medical treatments. Would you also expect the placebo effect to occur in psychotherapy? (It does, which complicates studies on the effectiveness of new psychotherapies.)

- Experimental group** In a controlled experiment, the group of subjects exposed to the independent variable or experimental condition.
- Control group** In a controlled experiment, the group of subjects exposed to all experimental conditions or variables *except* the independent variable.
- Random assignment** The use of chance (for example, flipping a coin) to assign subjects to experimental and control groups.
- Statistical significance** Experimental results that would rarely occur by chance alone.
- Meta-analysis** A statistical technique for combining the results of many studies on the same subject.
- Research participant bias** Changes in the behavior of research participants caused by the unintended influence of their own expectations.
- Placebo effect** Changes in behavior due to participants’ expectations that a drug (or other treatment) will have some effect.
- Placebo** An inactive substance given in the place of a drug in psychological research or by physicians who wish to treat a complaint by suggestion.

prescribe placebos—especially for complaints that seem to have no physical basis. Placebos have been shown to affect pain, anxiety, depression, alertness, tension, sexual arousal, cravings for alcohol, and many other processes (Wampold et al., 2005).

*How could an inert substance have any effect?* Placebos alter our expectations, both conscious and unconscious, about our own emotional and physical reactions. Because we associate taking medicine with feeling better, we expect placebos to make us feel better, too (Benedetti, 2009). After a person takes a placebo, there is a reduction in brain activity linked with pain, so the effect is not imaginary (Wager et al., 2004).

## Controlling Research Participant Bias

*How can you avoid research participant bias?* To control for research participant bias, we could use a **single-blind experiment**. In this case, participants do not know whether they are in the experimental or the control group or whether they are receiving a real drug or a placebo. All participants are given the same instructions and everyone gets a pill or injection. People in the experimental group get a real drug, and those in the control group get a placebo. Because participants are *blind* as to the hypothesis under investigation and whether they received the drug, their expectations (conscious and unconscious) are the same. Any difference in their behavior must be caused by the drug. However, even this arrangement is not enough, because researchers themselves sometimes affect experiments by influencing participants. Let's see how this occurs.

## Researcher Bias

*How could a researcher influence participants?* As we saw above, when the experimenter explained her hypothesis to the participants, she likely biased the results of the study. But even if a researcher uses a single-blind procedure to avoid deliberately biasing participants, **researcher bias**—changes in behavior caused by the unintended influence of a researcher—remains a problem. In essence, experimenters run the risk of finding what they expect to find. This occurs because humans are very sensitive to hints about what is expected of them (Rosenthal, 1994).

Researcher bias even applies outside the laboratory. Psychologist Robert Rosenthal (1973) reports an example of how expectations influence people: At the U.S. Air Force Academy Preparatory School, 100 airmen were randomly assigned to five different math classes. Their teachers did not know about this random placement. Instead, each teacher was told that his or her students had unusually high or low ability. Students in the classes labeled “high ability” improved much more in math scores than those in “low ability” classes. Yet, initially, all of the classes had students of equal ability.

Although the teachers were not conscious of any bias, apparently they subtly communicated their expectations to students. Most likely, they did this through tone of voice, body language, and by giving encouragement or criticism. Their “hints,” in turn, created a self-fulfilling prophecy that affected the students. A **self-fulfilling prophecy** is a prediction that prompts people to act in

ways that make the prediction come true. For instance, many teachers underestimate the abilities of ethnic minority children, which hurts the students' chances for success (Weinstein, Gregory, & Strambler, 2004). In short, people sometimes become what we prophesy for them. It is wise to remember that others tend to live *up* or *down* to our expectations for them (Jussim & Harber, 2005).

## The Double-Blind Experiment

Because of research participant bias and researcher bias, it is common to keep both participants and researchers “blind.” In a **double-blind experiment**, neither subjects nor researchers know who is in the experimental group or the control group, including who received a drug and who took a placebo. This not only controls for research participant bias, it also keeps researchers from unconsciously influencing participants.

*How can the researchers be “blind”; it's their experiment, isn't it?* The researchers who designed the experiment, including preparing the pills or injections, typically hire research assistants to collect data from the participants. Even the research assistants are blinded in that they do not know which pill or injection is drug or placebo or whether any particular participant is in the experimental or control group.

Double-blind testing has shown that about 50 percent of the effectiveness of antidepressant drugs, such as the “wonder drug” Prozac, is due to the placebo effect (Kirsch & Sapirstein, 1998). Much of the popularity of herbal health remedies is also based on the placebo effect (Seidman, 2001).

### BRIDGES

For more information about how psychologists study placebos see Chapter 13, pages 464–465.

### Knowledge Builder

## The Psychology Experiment

### RECITE

- To understand cause and effect, a simple psychological experiment is based on creating two groups: the \_\_\_\_\_ group and the \_\_\_\_\_ group.
- There are three types of variables to consider in an experiment: \_\_\_\_\_ variables (which are manipulated by the experimenter); \_\_\_\_\_ variables (which measure the outcome of the experiment); and \_\_\_\_\_ variables (factors to be excluded in a particular experiment).
- A researcher performs an experiment to learn whether room temperature affects the amount of aggression displayed by college students under crowded conditions in a simulated prison environment. In this experiment, the independent variable is which of the following?
  - room temperature
  - the amount of aggression
  - crowding
  - the simulated prison environment
- A procedure used to control both research participant bias and researcher bias in psychological experiments is the
  - correlation method
  - controlled experiment
  - double-blind experiment
  - random assignment of subjects

**REFLECT**

**Think Critically**

5. There is a loophole in the statement, "I've been taking vitamin C tablets, and I haven't had a cold all year. Vitamin C is great!" What is the loophole?
6. People who believe strongly in astrology have personality characteristics that actually match, to a degree, those predicted by their astrological signs. Can you explain why this occurs?

**Self-Reflect**

In a sense, we all conduct little experiments to detect cause-and-effect connections. If you are interested in cooking, for example, you might try adding a particular spice to a meal on one occasion but not another. The question then becomes, "Does the use of the spice (the independent variable) affect the appeal of the meal (the dependent variable)?" By comparing a spiced meal (the control group) with an unspiced meal (the experimental group) you could find out if that spice is worth using. Can you think of at least one informal experiment you've run in the last month? What were the variables? What was the outcome?

**Answers:** 1. experimental, control 2. independent, dependent, extraneous 3. a 4. c 5. The statement implies that vitamin C prevented colds. However, not getting a cold could just be a coincidence. A controlled experiment with a group given vitamin C and a control group not taking vitamin C would be needed to learn whether vitamin C actually has any effect on susceptibility to colds. 6. Belief in astrology can create a self-fulfilling prophecy in which people alter their behaviors and self-concepts to match their astrological signs (van Rooij, 1994).

**Nonexperimental Research Methods—Different Strokes**

**Gateway Question 1.10:** *What nonexperimental research methods do psychologists use?*

Determining cause-and-effect relationships between variables lies at the heart of discovering not just *what* we do, but explaining *why* we do it. For this reason, psychologists place a special emphasis on controlled experimentation (**experimental method**). However, because it is not always possible to conduct experiments, psychologists gather evidence and test hypotheses in many other ways (Jackson, 2011). They observe behavior as it unfolds in natural settings (**naturalistic observation**); they make measurements to discover relationships between events (**correlational method**); they study psychological problems and therapies in clinical settings (**clinical method**); and they use questionnaires to poll large groups of people (**survey method**). Let's see how each of these is used to advance psychological knowledge.

**Naturalistic Observation**

Psychologists sometimes rely on *naturalistic observation*, the active observation of behavior in a *natural setting* (the typical environment in which a person or animal lives). For example, in 1960, Jane Goodall first observed a chimpanzee use a grass stem as a tool to remove termites from a termite mound (Van Lawick-Goodall, 1971). Notice that naturalistic observation provides only *descrip-*

*tions* of behavior. In order to *explain* observations, we may need information from other research methods. Just the same, Goodall's discovery showed that humans are not the only tool-making animals (Rutz et al., 2010).

*Chimpanzees in zoos use objects as tools. Doesn't that demonstrate the same thing?* Not necessarily. Naturalistic observation allows us to study behavior that hasn't been tampered with or altered by outside influences. Only by observing chimps in their natural environment can we tell whether they use tools without human interference.

**Limitations**

*Doesn't the presence of human observers affect the animals' behavior?* Yes. The observer effect is a major problem. The **observer effect** refers to changes in a subject's behavior caused by an awareness of being observed. Naturalists must be very careful to keep their distance and avoid "making friends" with the animals they are watching. Likewise, if you are interested in why automobile drivers have traffic accidents, you can't simply get in people's cars and start taking notes. As a stranger, your presence would probably change the drivers' behaviors. When possible, the observer effect can be minimized by concealing the observer.

Another solution is to use hidden recorders. One naturalistic study of traffic accidents was done with video cameras installed in 100 cars (Dingus et al., 2006). It turns out that most accidents are caused by failing to look at the traffic in front of the car (eyes forward!). Hidden stationary video cameras have also provided valuable observations of many animal species. As recording devices have become miniaturized, it has even become possible to attach "critter cams" directly to many species, allowing observations to be in a wide range of natural environments (● Figure 1.8). For example, zoologist Christian Rutz and his colleagues outfitted shy New Caledonian crows with "crow cams" to better understand their use

- Single-blind experiment** An arrangement in which participants remain unaware of whether they are in the experimental group or the control group.
- Researcher bias** Changes in participants' behavior caused by the unintended influence of a researcher's actions.
- Self-fulfilling prophecy** A prediction that prompts people to act in ways that make the prediction come true.
- Double-blind experiment** An arrangement in which both participants and experimenters are unaware of whether participants are in the experimental group or the control group, including who might have been administered a drug or a placebo.
- Experimental method** Investigating causes of behavior through controlled experimentation.
- Naturalistic observation** Observing behavior as it unfolds in natural settings.
- Correlational method** Making measurements to discover relationships between events.
- Clinical method** Studying psychological problems and therapies in clinical settings.
- Survey method** Using questionnaires and surveys to poll large groups of people.
- Observer effect** Changes in a subject's behavior brought about by an awareness of being observed.



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● **Figure 1.8** New Caledonian crows wearing tiny “crow cams” barely half the weight of a silver dollar have been recorded using twigs to forage for food (Rutz et al., 2007).

of tools to forage for food (Rutz et al., 2007, 2010). Not only can these clever crows use twigs to reach food, they can use a shorter twig to get a longer twig to get food (Wimpenny et al., 2009). Apparently, humans and other primates are not the only tool-using species.

**Observer bias** is a related problem in which observers see what they expect to see or record only selected details (Jackson, 2011). For instance, teachers in one classic study were told to watch normal elementary school children who had been labeled (for the study) as “learning disabled,” “mentally retarded,” “emotionally disturbed,” or “normal.” Sadly, teachers gave the children very different ratings, depending on the labels used (Foster & Ysseldyke, 1976). In some situations, observer bias can have serious consequences (Spano, 2005). For example, a police officer expecting criminal behavior might shoot a person who is reaching for his wallet because he appears to be reaching for a gun.

A special mistake to avoid when observing animals is the **anthropomorphic** (AN-thro-po-MORE-fik) **error**. This is the error of attributing human thoughts, feelings, or motives to animals—especially as a way of explaining their behavior (Waytz, Epley, & Cacioppo, 2010). The temptation to assume that an animal is “angry,” “jealous,” “bored,” or “guilty” can be strong. If you have pets at home, you probably already know how difficult it is to avoid anthropomorphizing, but it can lead to false conclusions. For example, if your dog growls at your date, you might assume the dog doesn’t like your companion. But it’s possible that your date is merely wearing a cologne or perfume that irritates the dog’s nose.

Psychologists doing naturalistic studies make a special effort to minimize bias by keeping an **observational record**, or detailed summary of data and observations. As suggested by the study of traffic accidents and the use of “critter cams,” video recording often provides the most objective record of all. Despite its problems, naturalistic observation can supply a wealth of information and raise many interesting questions. In most scientific research it is an excellent starting point.

## Correlational Studies

Let’s say a psychologist notes an association between the IQs of parents and their children, or between beauty and social popularity, or between anxiety and test performance, or even between crime and the weather. In each case, two observations or events are **correlated**, or linked together in an orderly way. The Los Angeles study of crime and temperature mentioned earlier in this chapter is an example of a **correlational study**. First, two factors are measured. Then, a statistical technique is used to find their degree of correlation. For example, we could find the correlation between the number of hours spent practicing and sports performance during competitions. If the correlation is large, knowing how much a person practices would allow us to predict his or her success in competition. Likewise, success in competition could be used to predict how much an athlete practiced.

## Correlation Coefficients

*How is the degree of correlation expressed?* The strength and direction of a relationship can be expressed as a **coefficient of correlation**. This can be calculated as a number falling somewhere between  $+1.00$  and  $-1.00$ . Drawing graphs of relationships can also help clarify their nature (see ● Figure 1.9). If the number is zero or close to zero, the association between two measures is weak or nonexistent (see ● Figure 1.9c). For example, the correlation between shoe size and intelligence is zero. (Sorry, size 12 readers.) If the correlation is  $+1.00$ , a perfect positive relationship exists (see ● Figure 1.9e); if it is  $-1.00$ , a perfect negative relationship has been discovered (see ● Figure 1.9a).

### BRIDGES

For more detail about calculating and graphing correlations see the **Statistics Appendix**.

Correlations in psychology are rarely perfect. But the closer the coefficient is to  $+1.00$  or  $-1.00$ , the stronger the relationship. For example, identical twins tend to have almost identical IQs. In contrast, the IQs of parents and their children are only generally similar. The correlation between the IQs of parents and children is  $.35$ ; between identical twins, it’s  $.86$ .

### BRIDGES

Correlations between the IQs of family members are used to estimate the degree to which intelligence is affected by heredity and environment.

See **Chapter 9, pages 317–318**.

What do the terms “positive” and “negative” correlation mean? In a **positive correlation**, higher scores on one measure are matched by higher scores on the other. For example, there is a moderate positive correlation between high school grades and college grades; students who do well in high school tend to do well in college (and the reverse) (see ● Figure 1.9d). In a **negative correlation**, higher scores on one measure are associated with lower scores on the other. We might observe, for instance, a moderate negative correlation between the number of hours that students play computer games and their grades. That is, more play is associated with lower grades. (This is the well-known computer-game-zombie effect.) (● Figure 1.9b).

Wouldn't that show that playing computer games too much causes lower grades? It might seem so, but as we saw previously, the best way to be confident that a cause-and-effect relationship exists is to perform a controlled experiment.

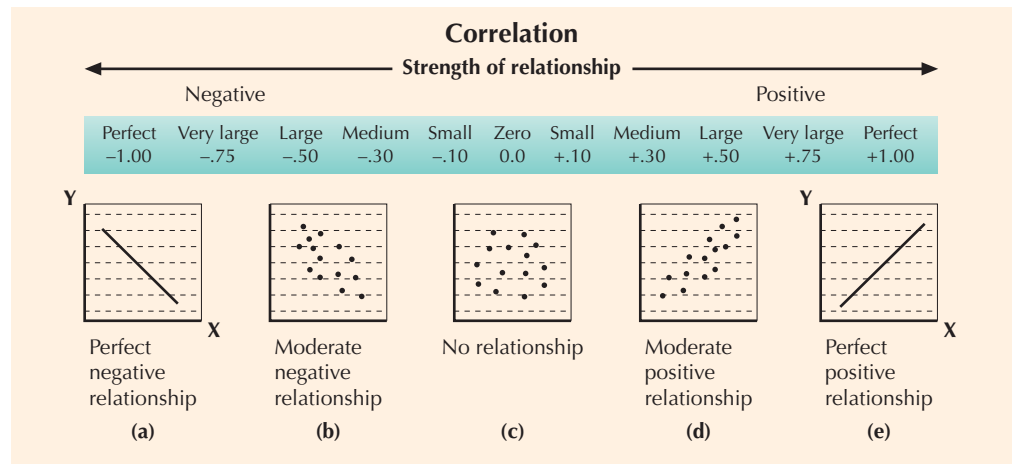
### Correlation and Causation

Correlational studies help us discover relationships and make predictions. However, correlation *does not* demonstrate **causation** (a cause-effect relationship) (Jackson & Newberry, 2012). It could be, for instance, that students who aren't interested in their classes have more time for computer games. If so, then their lack of study and lower grades would be the result of disinterest, and not excessive game playing (which would be another result of disinterest in classes). Just because one thing *appears* to be directly related to another does not mean that a cause-and-effect connection exists.

Here is another example of mistaking correlation for causation: What if a psychologist discovers that the blood of patients with schizophrenia contains a certain chemical not found in the general population? Does this show that the chemical *causes* schizophrenia? It may seem so, but schizophrenia could cause the chemical to form. Or both schizophrenia and the chemical might be caused by some unknown third factor, such as the typical diet in mental hospitals (see ● Figure 1.10). To reiterate, just because one thing *appears* to cause another does not *confirm* that it does. The best way to be confident that a cause-and-effect relationship exists is to perform a controlled experiment.

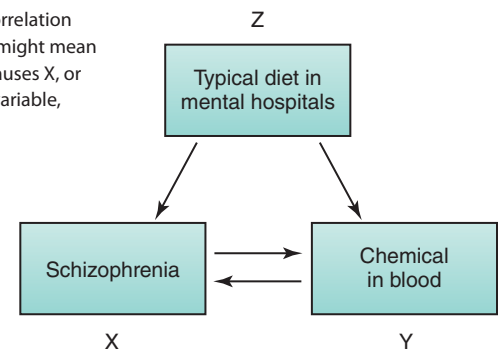
### The Clinical Method

It may be impractical, unethical, or impossible to use the experimental method to study rare events, such as unusual mental disorders, childhood “geniuses,” or “rampage” school shootings (Harding, Fox, & Mehta, 2002). In such instances, a **case study**—an



● **Figure 1.9** The correlation coefficient tells how strongly two measures are related. These graphs show a range of relationships between two measures, X and Y. If a correlation is negative (a), increases in one measure are associated with decreases in the other. (As Y gets larger, X gets smaller.) In a positive correlation (e), increases in one measure are associated with increases in the other. (As Y gets larger, X gets larger.) The center-left graph (b “moderate negative relationship”) might result from comparing time spent playing computer games (Y) with grades (X): More time spent playing computer games is associated with lower grades. The center graph (c “no relationship”) would result from plotting a person’s shoe size (Y) and his or her IQ (X). The center-right graph (d “moderate positive relationship”) could be a plot of grades in high school (Y) and grades in college (X) for a group of students: Higher grades in high school are associated with higher grades in college.

● **Figure 1.10** A correlation between two variables might mean that X causes Y, that Y causes X, or that some other, third, variable, Z causes both X and Y.



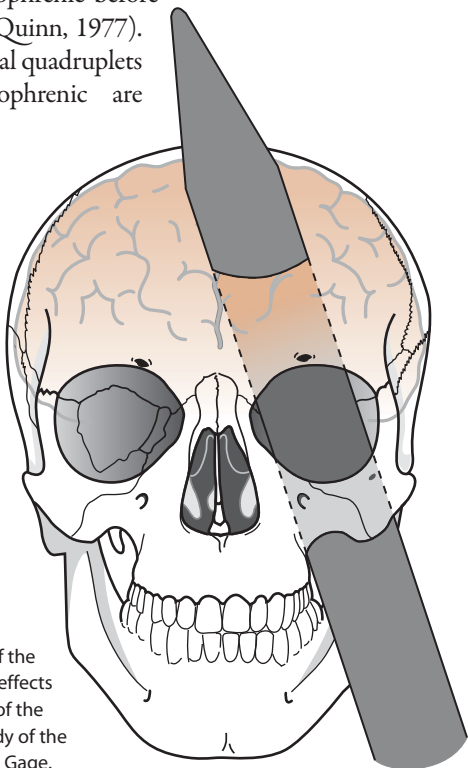
- Observer bias** The tendency of an observer to distort observations or perceptions to match his or her expectations.
- Anthropomorphic error** The error of attributing human thoughts, feelings, or motives to animals, especially as a way of explaining their behavior.
- Observational record** A detailed summary of observed events or a videotape of observed behavior.
- Correlation** The existence of a consistent, systematic relationship between two events, measures, or variables.
- Correlational study** A nonexperimental study designed to measure the degree of relationship (if any) between two or more events, measures, or variables.
- Coefficient of correlation** A statistical index ranging from  $-1.00$  to  $+1.00$  that indicates the direction and degree of correlation.
- Positive correlation** A statistical relationship in which increases in one measure are matched by increases in the other (or decreases correspond with decreases).
- Negative correlation** A statistical relationship in which increases in one measure are matched by decreases in the other.
- Causation** The act of causing some effect.
- Case study** An in-depth focus on all aspects of a single person.

in-depth focus on a single subject—may be the best source of information. Clinical psychologists rely heavily on case studies, especially as a way to investigate mental disorders, such as depression or psychosis. Also, case studies of psychotherapy have provided many useful ideas about how to treat emotional problems (Wedding & Corsini, 2011).

Case studies may sometimes be thought of as **natural clinical tests**—accidents or other natural events that provide psychological data. Gunshot wounds, brain tumors, accidental poisonings, and similar disasters have provided much information about the human brain. One remarkable case from the history of psychology was reported by Dr. J. M. Harlow (1868). Phineas Gage, a young foreman on a work crew, had a 13-pound steel rod impaled into the front of his brain by a dynamite explosion (● Figure 1.11). Amazingly, he survived the accident. Within 2 months Gage could walk, talk, and move normally, but the injury forever changed his personality. Instead of the honest and dependable worker he had been before, Gage became a surly, foul-mouthed liar. Dr. Harlow carefully recorded all details of what was perhaps the first in-depth case study of an accidental frontal lobotomy (the destruction of front brain matter).

When a Los Angeles carpenter named Michael Melnick suffered a similar injury, he recovered completely, with no lasting ill effects. Melnick's very different reaction to a similar injury shows why psychologists prefer controlled experiments and often use lab animals for studies of the brain. Case studies lack formal control groups. This, of course, limits the conclusions that can be drawn from clinical observations.

Nevertheless, case studies can provide special opportunities to answer interesting questions. For instance, a classic case study in psychology concerns identical quadruplets, known as the Genain sisters. In addition to having identical genes, all four women became schizophrenic before age 25 (Rosenthal & Quinn, 1977). The chances of identical quadruplets all becoming schizophrenic are about 1 in 1.5 billion.



● **Figure 1.11** Some of the earliest information on the effects of damage to frontal areas of the brain came from a case study of the accidental injury of Phineas Gage.

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The Genains, who have been studied for more than 40 years, were in and out of mental hospitals most of their lives. The fact that they share identical genes suggests that mental disorders are influenced by heredity. The fact that some of the sisters are more disturbed than others suggests that environmental conditions also affect mental illness. Indeed, Myra, the least ill of the four, was the only sister who was able to avoid her father, an alcoholic who terrorized, spied on, and sexually molested the girls. Thus, cases such as this one provide insights that can't be obtained by any other means (Mirsky et al., 2000).

### BRIDGES

See Chapter 14, pages 488–491, for more information about the causes of schizophrenia.

## Survey Method

Sometimes psychologists would like to ask everyone in the world a few well-chosen questions: “Do you sky dive? Why would you say you do this?” “What form of discipline did your parents use when you were a child?” “What is the most dishonest thing you've done?” Honest answers to such questions can reveal much about people's behavior. But, because it is impossible to question everyone, doing a survey is often more practical.

**Surveys**, or public polling techniques, are often used to answer psychological questions (Tourangeau, 2004). Typically, people in a representative sample are asked a series of carefully worded questions. A **representative sample** is a small group that accurately reflects a larger population. A good sample must include the same proportion of men, women, young, old, professionals, blue-collar workers, Republicans, Democrats, whites, African Americans, Native Americans, Latinos, Asians, and so on as found in the population as a whole.

A **population** is an entire group of animals or people belonging to a particular category (for example, all college students or all single women). Ultimately, we are interested in entire populations. But, by selecting a smaller sample we can draw conclusions about the larger group without polling each and every person. Representative samples are often obtained by *randomly* selecting who will be included (● Figure 1.12). (Notice that this is similar to randomly assigning participants to groups in an experiment.)

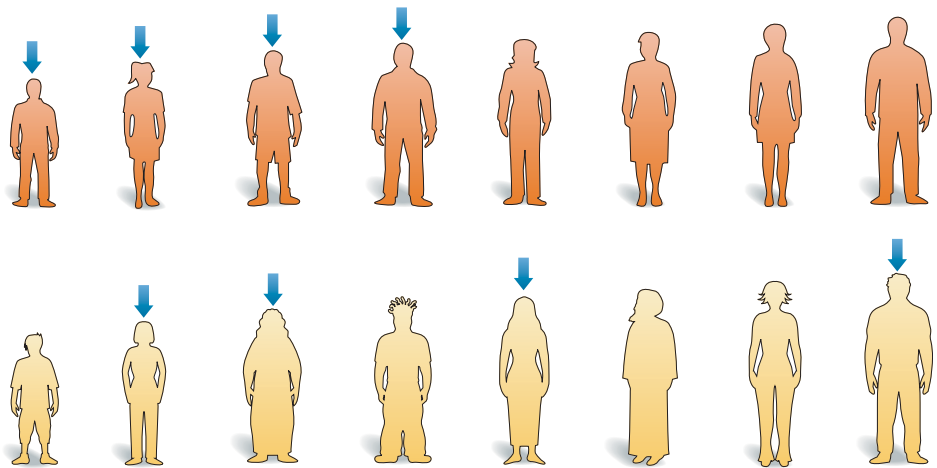
*How accurate is the survey method?* Modern surveys like the Gallup and Harris polls are quite accurate. The Gallup poll has erred in its election predictions by only 1.5 percent since 1954. However, if a survey is based on a biased sample, it may paint a false picture. A **biased sample** does not accurately reflect the population from which it was drawn. Surveys done by magazines, websites, and online information services can be quite biased. Surveys on the use of guns done by *O: The Oprah Magazine* and *Guns and Ammo* magazine would probably produce very different results—neither of which would represent the general population. That's why psychologists using the survey method go to great lengths to ensure that their samples are representative. Fortunately, people can often be polled by telephone or the Internet, which makes it easier to obtain large samples. Even if one person out of three refuses to answer survey questions, the results are still likely to be valid (Hutchinson, 2004).

**TABLE 1.6** Comparison of Psychological Research Methods

	Advantages	Disadvantages
Experimental Method	Clear cause-and-effect relationships can be identified; powerful controlled observations can be staged; no need to wait for natural event.	May be somewhat artificial; some natural behavior not easily studied in laboratory (field experiments may avoid these objections).
Naturalistic Observation	Behavior is observed in a natural setting; much information is obtained, and hypotheses and questions for additional research can be formed.	Little or no control is possible; observed behavior may be altered by the presence of the observer; observations may be biased; causes cannot be conclusively identified.
Correlational Method	Demonstrates the existence of relationships; allows prediction; can be used in lab, clinic, or natural setting.	Little or no control is possible; relationships may be coincidental; cause-and-effect relationships cannot be confirmed.
Clinical Method	Takes advantage of “natural clinical trials” and allows investigation of rare or unusual problems or events.	Little or no control is possible; does not provide a control group for comparison; subjective interpretation is often necessary; a single case may be misleading or unrepresentative.
Survey Method	Allows information about large numbers of people to be gathered; can address questions not answered by other approaches.	Obtaining a representative sample is critical and can be difficult to do; answers may be inaccurate; people may not do what they say or say what they do.

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● **Figure 1.12** If you were conducting a survey in which a person's height might be an important variable, the upper, nonrandom sample would be very unrepresentative. The lower sample, selected using a table of random numbers, better represents the group as a whole.



### Internet Surveys

Recently, psychologists have started doing surveys and experiments on the Internet. Web-based research can be a cost-effective way to reach very large groups of people, especially people who are not easy to survey any other way (Smyth et al., 2010). Internet studies have provided interesting information about topics such as anger, decision making, racial prejudice, what disgusts people, religion, sexual attitudes, and much more. Biased samples can limit web-based research (because it isn't easy to control who actually answers your online questionnaire), but psychologists are getting better at gathering valid information with it (Birnbaum, 2004; Lewis, Watson, & White, 2009).

### Social Desirability

Even well-designed surveys may be limited by another problem. If a psychologist were to ask you detailed questions about your sexual history and current sexual behavior, how accurate would your replies be? Would you exaggerate? Would you be embarrassed? Replies to survey questions are not always accurate or truthful. Many people show a distinct *courtesy bias* (a tendency to give “polite” or socially desirable answers). For example, answers to questions concerning sex, drinking or drug use, income, and church attendance tend to be less than truthful. Likewise, the week after an election, more people will say they voted than actually did (Hutchinson, 2004).

### Summary

Despite their limitations, surveys frequently produce valuable information. For instance, one survey explored the vulnerability of U.S. retail malls to terrorist attacks with the goal of improving our

capacity to prevent and respond to an attack (Rigakos et al., 2009). To sum up, the survey method can be a powerful research tool. Like other methods, it has limitations, but new techniques and strategies are providing valuable information about our behavior (Kahneman et al., 2004).

*Is so much emphasis on science really necessary in psychology?* In a word, yes. As we have seen, science is a powerful way of asking questions about the world and getting trustworthy answers. (Table 1.6 summarizes many of the important ideas we have covered.)

- Natural clinical test** An accident or other natural event that allows the gathering of data on a psychological phenomenon of interest.
- Survey** In psychology, a public polling technique used to answer psychological questions.
- Representative sample** A small, randomly selected part of a larger population that accurately reflects characteristics of the whole population.
- Population** An entire group of animals or people belonging to a particular category (for example, all college students or all married women).
- Biased sample** A subpart of a larger population that does not accurately reflect characteristics of the whole population.



## A Look Ahead

To help you get the most out of psychology, each chapter of this text includes a “Psychology in Action” section like the one that follows. There you will find ideas you can actually use, now or in

the future. To complete the topics we have been discussing, let’s take a critical look at information reported in the popular press. You should find this an interesting way to conclude our opening tour of psychology and its methods.

### Knowledge Builder

## Nonexperimental Research Methods

### RECITE

- Two major problems in naturalistic observation are the effects of the observer and observer bias. T or F?
- The \_\_\_\_\_ error involves attributing human feelings and motives to animals.
- Correlation typically does not demonstrate causation. T or F?
- Which correlation coefficient represents the strongest relationship?  
a.  $-0.86$  b.  $+0.66$  c.  $+0.10$  d.  $+0.09$
- Case studies can often be thought of as natural tests and are frequently used by clinical psychologists. T or F?
- For the survey method to be valid, a representative sample of people must be polled. T or F?
- A problem with the survey method is that answers to questions may not always be \_\_\_\_\_ or \_\_\_\_\_.

### REFLECT

#### Think Critically

- A psychologist conducting a survey at a shopping mall (The Gallery of Wretched Excess) flips a coin before stopping passersby. If the coin shows heads, he interviews the person; if it shows tails, he skips that person. Has the psychologist obtained a random sample?

- Attributing mischievous motives to a car that is not working properly is a thinking error similar to anthropomorphizing. T or F?

### Self-Reflect

Google “critter cam” and find one you can watch. What species are you watching? What behaviors might you observe and record?

See if you can identify at least one positive correlation and one negative correlation that involves human behavior.

Have you ever known someone who suffered a brain injury or disease? How did his or her behavior change? Was the change clear-cut enough to serve as a natural clinical test?

Have you ever been asked to complete a survey? Did you do it or did you refuse? If you refused, do you think your refusal influenced the final results of the survey? What would it say about accuracy if lots of people refused to complete the survey? If you completed the survey, were you honest about your answers? What would it say about accuracy if lots of people refused to answer accurately?

**Answers:** 1. T 2. anthropomorphizing 3. T 4. a 5. T 6. T 7. accurate, truthful 8. The psychologist’s coin flip might produce a reasonably good sample of people at the mall. The real problem is that people who go to the mall may be mostly from one part of town, from upper income groups, or from some other nonrepresentative group. The psychologist’s sample is likely to be seriously flawed. 9. Yes. It appears to be difficult for humans to resist thinking of other species and even machines in human terms.

## Psychology in Action



## Psychology in the Media—Are You Fluent in Klingon?

**Gateway Question 1.11:** *How good is psychological information found in the popular media?*

Psychology is a popular topic in contemporary media. Unfortunately, much of what you encounter is based on entertainment value rather than critical thinking or science. Here are some suggestions for separating high-quality information from misleading fiction.

**Suggestion 1: Be skeptical.** Have you ever played the game called “telephone” or “pass it down”? One person whispers a sentence to someone else who, in turn, whispers it on down the line. Usually, when the person at the end of the line repeats the message it has been humorously distorted. Similarly, modern

media—especially the Internet—function as a giant “echo chamber” awash with rumors, hoaxes, half-truths, and urban legends like the one about giant alligators living in New York sewers (Hughes, 2008).

One of our all-time favorites was a story about the health department in Oregon seeking a Klingon interpreter for mental health patients who only spoke in the fictional language used on the *Star Trek* television series. This tale started when a newspaper reported that Klingon was on a list of languages that some psychiatric patients claimed they could speak. The article specifically noted that “in reality, no patient has yet tried to communicate in Klingon.” Nevertheless, as the story echoed around the web, the idea that Oregon

was looking for someone fluent in Klingon had become a “fact” (O’Neill, 2003).

Reports in the popular media tend to be made uncritically and with a definite bias toward reporting “astonishing” findings and telling interesting stories. Remember, saying, “That’s incredible” means, “That’s not believable”—which is often true.

**Suggestion 2: Consider the source of information.** It should come as no surprise that information used to sell a product often reflects a desire for profit rather than the objective truth. Here is a typical advertising claim: “Government tests prove that no sleep medicine is stronger or more effective than Coma.” A statement like this usually means that there

was *no difference* between Coma and the other products tested. No other sleep aid was stronger or more effective. But none was weaker either.

Remember that psychological services may be merchandised as well. Keep the source in mind when reading the claims of makers of home biofeedback machines, sleep-learning devices, subliminal CDs, and the like. Be wary of expensive courses that promise instant mental health and happiness, increased efficiency, memory, extrasensory perception (ESP) or psychic ability, control of the unconscious mind, an end to smoking, and so on. Usually they are promoted with a few testimonials and many unsupported claims (Lilienfeld, Ruscio, & Lynn, 2008).

Psychic claims should be viewed with special caution. Google magician James Randi's Million Dollar Challenge. Randi has long offered \$1,000,000 to anyone demonstrating such abilities under controlled conditions. Did you know that no one has even passed the preliminary tests yet?

Stage mentalists make a living by deceiving the public. Understandably, they are highly interested in promoting belief in their nonexistent powers. The same is true of the so-called psychic advisers promoted in TV commercials. These charlatans make use of the Barnum effect (the tendency to consider personal descriptions accurate if they are stated in general terms) to create an illusion that they know private information about the people who call them (Nickell, 2001).

**Suggestion 3: Beware of oversimplifications, especially those motivated by monetary gain.** Courses or programs that offer a “new personality in three sessions,” “six steps to love and fulfillment in marriage,” or some newly discovered “secret for unlocking the powers of the mind and the universe” should be immediately suspect.

An excellent example of oversimplification is provided by websites devoted to a video that promises to reveal “the secret to unlimited joy, health, money, relationships, love, youth: everything you have ever wanted.” According to these sites, all you need to do is put your desires out to the universe and the universe must respond by granting your wishes. And all it will cost you is the price of ordering the video. (It's no secret that the promoters are the real winners in this game.)

**Suggestion 4: Remember, “for example” is no proof.** After reading this chapter you should be sensitive to the danger of selecting single examples. If you read, “Law student passes state bar exam using sleep-learning device,” don't rush out to buy one. Systematic research showed long ago that these devices are of little or no value (Druckman & Bjork, 1994). A corollary to this suggestion is to ask: Are the reported observations important or widely applicable? Similarly, in 2002, baseball pitcher Randy Johnson began wearing a particular metal-impregnated twisted rope necklace designed to “stabilize the electricity flow through the body.” By the 2010 World Series, hundreds of players were superstitiously wearing one, all without any scientific explanation of, or evidence for, their efficacy (Carroll, 2010).

Examples, anecdotes, single cases, and testimonials are all potentially deceptive. According to numerous testimonials, believers in the power of the “secret” described above have been showered with money, success, and happiness immediately after viewing the video. Unfortunately, such *individual cases* (or even several) tell us nothing about what is true *in general* (Stanovich, 2010). How many people *didn't* win the lottery after buying the video? How many people bought the “magic necklace” to no avail? Similarly, studies of large groups of people show that smoking increases the likelihood of lung cancer. It is less relevant if you know a lifelong heavy smoker who is 95 years old. The general finding is the one to remember.

**Suggestion 5: Ask yourself if there was a control group.** The key importance of a control group in any experiment is frequently overlooked by the unsophisticated—an error to which you are no longer susceptible. The popular media are full of reports of “experiments” performed without control groups: “Talking to Plants Speeds Growth,” “Special Diet Controls Hyperactivity in Children,” “Graduates of Firewalking Seminar Risk Their Soles.”

Consider the last example for a moment. Expensive commercial courses have long been promoted to teach people to walk barefoot on hot coals. (Why anyone would want to do this is itself an interesting question.) Firewalkers supposedly protect their feet with a technique called “neurolinguistic programming.” Many people have paid good money to learn the technique, and most do manage a quick

walk on the coals. But is the technique necessary? And is anything remarkable happening? We need a comparison group.

Fortunately, physicist Bernard Leikind has provided one. Leikind showed with volunteers that anyone (with reasonably callused feet) can walk over a bed of coals without being burned. The reason is that the coals, which are light, fluffy carbon, transmit little heat when touched. The principle involved is similar to briefly putting your hand in a hot oven. If you touch a pan, you will be burned because metal transfers heat efficiently. But if your hand stays in the heated air you'll be fine because air transmits little heat (Kida, 2006; Mitchell, 1987). Mystery solved.



Felix Odonez/Reuters/Landov

Firewalking is based on simple physics, not on any form of supernatural psychological control. The temperature of the coals may be as high as 1,200°F. However, coals are like the air in a hot oven: They are very inefficient at transferring heat during brief contact.

**Suggestion 6: Look for errors in distinguishing between correlation and causation.** As you now know, it is dangerous to presume that one thing *caused* another just because they are correlated. In spite of this, you will see many claims based on questionable correlations. Here's an example of mistaking correlation for causation: Jeanne Dixon, a well-known astrologer, once answered a group of prominent scientists—who had declared that there is no scientific foundation for astrology—by saying, “They would do well to check the records at their local police stations, where they will learn that the rate of violent crime rises and falls with lunar cycles.” Dixon, of course, believes that the moon affects human behavior.

*If it is true that violent crime is more frequent at certain times of the month, doesn't that prove her point?* Far from it. Increased

crime could be due to darker nights, the fact that many people expect others to act crazier, or any number of similar factors. Besides, direct studies of the alleged “lunar effect” have shown that it doesn't occur (Dowling, 2005). Moonstruck criminals, influenced by “a bad moon rising,” are a fiction (Iosif & Ballon, 2005).

**Suggestion 7: Be sure to distinguish between observation and inference.** If you see a person *crying*, is it correct to assume that she or he is *sad*? Although it seems reasonable to make this assumption, it could easily be wrong. We can observe objectively that the person is crying, but to *infer* sadness may be in error. It could be that the individual has just peeled 5 pounds of onions. Or maybe he or she just won a million-dollar lottery or is trying contact lenses for the first time.

Psychologists, politicians, physicians, scientists, and other experts often go far beyond the available facts in their claims. This does not mean that their inferences, opinions, and interpretations have no value; the opinion of an expert on the causes of mental illness, criminal behavior, learning problems, or whatever can be revealing. But be careful to distinguish between fact and opinion.

## Summary

We are all bombarded daily with such a mass of new information that it is difficult to absorb it. The available knowledge in an area like psychology, biology, or medicine is so vast that no single person can completely know and comprehend it. With this situation in mind, it becomes increasingly important that you become a critical, selective, and informed consumer of information (Lilienfeld et al., 2010).

## Knowledge Builder

### Psychology in the Media

#### RECITE

1. Popular media reports usually stress objective accuracy. T or F?
2. Stage mentalists and psychics often use deception in their “acts.” T or F?
3. Blaming the lunar cycle for variations in the rate of violent crime is an example of mistaking correlation for causation. T or F?
4. If a psychology student uses a sleep-learning device to pass a midterm exam, it proves that the device works. T or F?

#### REFLECT

##### Think Critically

5. Mystics have shown that fresh eggs can be balanced on their large ends during the vernal equinox when the sun is directly over the equator, day and night are equal in length, and the world is in perfect balance. What is wrong with their observation?

6. Many parents believe that children become “hyperactive” when they eat too much sugar, and some early studies seemed to confirm this connection. However, we now know that eating sugar rarely has any effect on children. Why do you think that sugar appears to cause hyperactivity?

#### Self-Reflect

How actively do you evaluate and question claims found in the media? Could you be a more critical consumer of information? *Should* you be a more critical consumer of information?

**Answers:** 1. F, 2. T, 3. T, 4. F, 5. The mystics have neglected to ask if eggs can be balanced at other times. They can be balanced any time you like. The lack of a control group gives the illusion that something amazing is happening, but the equinox has nothing to do with egg balancing (Half-ern, 2003). 6. This is another case of mistaking correlation for causation. Children who are hyperactive may eat more sugar (and other foods) to fuel their frenetic activity levels.



## Chapter in Review Gateways to Psychology

### Gateway QUESTIONS REVISITED

#### 1.1 What is psychology and what are its goals?

**1.1.1** Psychology is the science of behavior and mental processes.

**1.1.2** Psychologists are professionals who create and apply psychological knowledge.

**1.1.3** Psychologists engage in critical thinking as they systematically gather and analyze empirical evidence to answer questions about behavior.

**1.1.4** Psychologists gather scientific data in order to describe, understand, predict, and control behavior.

## 1.2 What is critical thinking?

**1.2.1** Critical thinking is central to the scientific method, to psychology, and to the everyday understanding of behavior.

**1.2.2** Critical thinking in psychology is a type of open-minded reflection involving the support of beliefs with scientific explanation and observation.

**1.2.3** The validity of beliefs can be judged through logical analysis, evaluating evidence *for* and *against* the claim, and evaluating the *quality* of the evidence.

**1.2.4** Critical thinkers seek to falsify claims by making up their own minds rather than automatically taking the word of “experts.”

## 1.3 How does psychology differ from false explanations of behavior?

**1.3.1** Pseudopsychologies are unfounded systems that are frequently confused with valid psychology.

**1.3.2** Unlike psychology, pseudopsychologies change little over time because followers seek evidence that appears to confirm their beliefs and avoid evidence that contradicts their beliefs.

**1.3.3** Belief in pseudopsychologies is based in part on uncritical acceptance, confirmation bias, and the Barnum effect.

## 1.4 How is the scientific method applied in psychological research?

**1.4.1** In the scientific method, systematic observation is used to test hypotheses about behavior and mental events. A powerful way to observe the natural world and draw valid conclusions, scientific research provides the highest quality information about behavior and mental events.

**1.4.2** Psychological research begins by defining problems and proposing hypotheses. Concepts must be defined operationally before they can be studied empirically.

**1.4.3** Next, researchers gather evidence to test hypotheses. The results of scientific studies are made public so that others can evaluate them, learn from them, and use them to suggest new hypotheses, which lead to further research.

**1.4.4** Psychological research must be done ethically, in order to protect the rights, dignity, and welfare of participants.

## 1.5 How did the field of psychology emerge?

**1.5.1** The field of psychology emerged 130 years ago when researchers began to directly study and observe psychological events.

**1.5.2** The first psychological laboratory was established in Germany in 1879 by Wilhelm Wundt, who studied conscious experience.

**1.5.3** The first school of thought in psychology was structuralism, a kind of “mental chemistry” based on introspection.

**1.5.4** Structuralism was followed by functionalism, behaviorism, and Gestalt psychology.

**1.5.5** Psychodynamic approaches, such as Freud’s psychoanalytic theory, emphasize the unconscious origins of behavior.

**1.5.6** Humanistic psychology accentuates subjective experience, human potentials, and personal growth.

**1.5.7** Because most of the early psychologists were Caucasian men, bias was inadvertently introduced into psychological research. Today, more women and minorities are becoming psychologists and being studied as research participants.

## 1.6 What are the contemporary perspectives in psychology?

**1.6.1** Three complementary streams of thought in modern psychology are the biological perspective, including biopsychology and evolutionary psychology; the psychological perspective, including behaviorism, cognitive psychology, the psychodynamic approach, and humanism; and the sociocultural perspective.

**1.6.2** Psychologists have recently begun to formally study positive aspects of human behavior, or positive psychology.

**1.6.3** Most of what we think, feel, and do is influenced by the social and cultural worlds in which we live.

**1.6.4** Today, there is an eclectic blending of many viewpoints within psychology.

## 1.7 What are the major specialties in psychology?

**1.7.1** There are dozens of specialties in psychology including biopsychology, clinical, cognitive, community, comparative, consumer, counseling, cultural, developmental, educational, engineering, environmental, evolutionary, forensic, gender, health, industrial-organizational, learning, medical, personality, school, sensation and perception, and social psychology.

**1.7.2** Psychological research may be basic or applied.

**1.7.3** Psychologists may be directly interested in animal behavior, or they may study animals as models of human behavior.

**1.7.4** Although psychologists, psychiatrists, psychoanalysts, counselors, and psychiatric social workers all work in the field of mental health, their training and methods differ considerably.

## 1.8 How is an experiment performed?

**1.8.1** Experiments involve two or more groups of subjects that differ only with regard to the independent variable. Effects on the dependent variable are then measured. All other conditions (extraneous variables) are held constant.

**1.8.2** Since the independent variable is the only difference between the experimental group and the control group, it is the only possible cause of a change in the dependent variable.

**1.8.3** The design of experiments allows cause-and-effect connections to be clearly identified.

**1.8.4** To be taken seriously, the results of an experiment must be statistically significant (they would occur very rarely by chance alone). It also strengthens a result if the research can be replicated or if it contributes to the conclusions of a meta-analysis.

## 1.9 What is a double-blind experiment?

**1.9.1** Research participant bias is a problem in some studies; the placebo effect is a source of research participant bias in experiments involving drugs.

**1.9.2** A related problem is researcher bias. Researcher expectations can create a self-fulfilling prophecy, in which a participant changes in the direction of the expectation.

**1.9.3** In a double-blind experiment, neither the research participants nor the researchers collecting data know who was in the experimental group or the control group, allowing valid conclusions to be drawn.

**1.10** *What nonexperimental research methods do psychologists use?*

**1.10.1** Psychologists also rely on naturalistic observation, the correlational method, case studies, and the survey method.

**1.10.2** Unlike controlled experiments, nonexperimental methods usually cannot demonstrate cause-and-effect relationships.

**1.10.3** Naturalistic observation is a starting place in many investigations. Two problems with naturalistic observation are the effects of the observer on the observed and observer bias.

**1.10.4** In the correlational method, relationships between two traits, responses, or events are measured and a correlation coefficient is computed to gauge the strength of the relationship. Relationships in psychology may be positive or negative. Correlations allow prediction but do not demonstrate cause and effect.

**1.10.5** Case studies provide insights into human behavior that can't be gained by other methods.

**1.10.6** In the survey method, people in a representative sample are asked a series of carefully worded questions. Obtaining a representative sample of people is crucial when the survey method is used to study large populations.

**1.11** *How good is psychological information found in the popular media?*

**1.11.1** Information in the mass media varies greatly in quality and accuracy and should be approached with skepticism and caution.

**1.11.2** It is essential to critically evaluate information from popular sources (or from any source, for that matter) in order to separate facts from fallacies.

**1.11.3** Problems in media reports are often related to biased or unreliable sources of information, uncontrolled observation, misleading correlations, false inferences, oversimplification, use of single examples, and unrepeatability of results.

## MEDIA RESOURCES

### Web Resources

*Internet addresses frequently change. To find an up-to-date list of URLs for the sites listed here, visit your Psychology CourseMate.*

**Definition of "Psychology"** Provides definitions of *psychology* and *psychologist*.

**Self-Quiz on Psychology and Science.** A 10-item online test (with answers) about psychology and science.

**What is Psychology?** Discusses psychology as a science, with links to other articles about various branches of psychology.

**Critical Thinking in Everyday Life: 9 Strategies.** Some useful critical thinking strategies, along with many other articles on aspects of critical thinking.

**Skeptic's Dictionary** Check out Robert Carroll's skeptical view of all things pseudoscientific.

**The Power of Belief** Streaming video of Dr. Michael Shermer, of the Skeptics Society, discussing skepticism and explaining why we are vulnerable to believing weird things.

**Today in the History of Psychology** Events in the history of psychology by the date, including podcasts.

**Classics in the History of Psychology** Original articles by a wide range of psychologists from Allport to Yerkes, including Sigmund Freud, B. F. Skinner, and Carl Rogers.

**Women's Intellectual Contributions to the Field of Psychology** Information about women's contributions to the field of psychology from a historical perspective.

**Divisions of the American Psychological Association** The difference specialties in psychology.

**Careers in Psychology Page** Marky Lloyd's Careers in Psychology Page.

**For Students of Psychology** Information for students interested in psychology from the American Psychological Association.

**The Simple Experiment** Description of a basic two-group experimental design.

**Ethical Principles of Psychologists and Code of Conduct** The full text of the ethical principles that guide professional psychologists.

**Placebo Effects** Read more about the power of placebo effects.

**Psychological Research on the Net** Find and complete a survey study.

**The Jane Goodall Institute** Information about Goodall's work at Gombe, in Tanzania, where she has studied and protected wild chimpanzees for over 40 years.

**Research Methods and the Correlation** Explore different research methods in psychology.

**That's Infotainment!** Article about sensationalism in the news media.

**The Oregon UFO Wave That Wasn't** A discussion of the role of media in a wave of UFO sightings in 1896-1897.

**Psychology and the News Media: Reflections on a Ten Year Initiative** Article on the presentation of psychology in the news media.

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