chapter **one**

# The Science of Psychology

## CHAPTER OUTLINE

## Myth or Reality?

**When Taking Tests, Stick with Your First Instinct (page 8)**

Psychology is a science that directly applies to your life. Read how researchers have critically examined this popular test-taking advice, and use what you learn the next time you take an exam.

Let's begin our exploration of psychology with a quick exercise. Please read the paragraph below, unscrambling the words as you proceed.

Aoccdrnig to a rscheearch at Cmabrigde Uinervtisy, it deosn't mttaer waht oredr the ltteers in a wrod are, the olny iprmoatnt tihng is taht the frist and lsat ltteres are at the rghit pclae. The rset can be a toatl mses and you can sitll raed it wouthit a porbelm. Tihs is bcuseae we do not raed ervey lteter by istlef but the wrod as a wlohe.

Type "jumbled words," "jumbled paragraph," or "scrambled letters" into a Web browser, dig around, and you'll find multiple sites and blogs about this paragraph. Back in 2003 it was all the rage, and it has been in the news since then (*Daily Telegraph*, 2009, April 1). The paragraph spread across the Internet (with the misspelling, "rscheearch") and reached countless e-mail inboxes as people—amazed by how easily they could read it—passed it along. When we showed the paragraph to our students, most breezed through it, though some struggled (if you had trouble, that's OK; see the unscrambled version on page 30). Show the paragraph to people you know, and see how they do.

Do you accept the claim that if the first and last letters of a word remain intact, "The rset can be a toatl mses and you can sitll raed it wouthit a porbelm"? From the paragraph's immense popularity, we speculate that many people did. After all, the evidence is concrete; it's right before our eyes. Well, whether you do or don't accept it, here's a challenge: can you think of reasons why this particular jumbled paragraph is easy to read? Even better, can you create a short jumbled paragraph—keeping the first and last letters of words intact—that people would find hard to read? We'll return to this challenge on page 6.

So what does a jumbled paragraph have to do with psychology? If you personally view *psychology* as synonymous with *therapy*, *shrinks*, or *couches*, then your answer might be "not much." But as we'll see, psychologists study a tremendous diversity of topics, and language—including how we recognize words—is one of them (Mousikou et al., 2010).

The paragraph raises other key psychological issues, such as how we acquire knowledge and form beliefs about our world that we'll discuss shortly. Among the countless beliefs we hold and claims we hear about human nature and behavior, how do we separate fact from fiction, myth from reality? The science of psychology leads us to engage these questions.

## THE NATURE OF PSYCHOLOGY

**Psychology** *is the scientific study of behavior and the mind.* The term *behavior* refers to actions and responses that we can directly observe, whereas the term *mind* refers to internal states and processes—such as thoughts and feelings—that cannot be seen directly and that must be inferred from observable, measurable responses. For example, we cannot directly see a person's feeling of love or admiration for someone else, but we can infer how the person feels based on observable verbal statements ("I love you," "I really admire you").

To many people, when you say the word *psychologist*, the first image that comes to mind is that of a therapist. This reaction is understandable, as a large number of psychologists work in a subfield called **clinical psychology:** *the study and treatment of mental disorders*. Many clinical psychologists diagnose and treat people with psychological problems in clinics, hospitals, and private practice. Some also are scientists who

conduct research on the causes of mental disorders and the effectiveness of various treatments. Yet many psychologists have no connection with therapy and instead conduct research in other subfields (Figure 1.1). For example, **cognitive psychology** *specializes in the study of mental processes, especially from a model that views the mind as an information processor*. Cognitive psychologists examine topics such as consciousness, attention, memory, decision making, and problem solving. An area within cognitive psychology, called *psycholinguistics*, focuses on the psychology of language. The jumbled-word exercise relates directly to psycholinguistics.

To illustrate psychology's diversity, here are a few other subfields:

- **Biopsychology** *focuses on the biological underpinnings of behavior*. Biopsychologists examine how brain processes, genes, and hormones influence our actions, thoughts, and feelings. Some biopsychologists seek to explain how evolution has shaped our psychological capabilities (e.g., our capacity for advanced thinking and language) and behavioral tendencies (e.g., acting aggressively or altruistically).

- **Developmental psychology** *examines human physical, psychological, and social development across the life span*. For example, some developmental psychologists explore the infant's emotional world, while others study how different parenting styles psychologically affect children or how our mental abilities change during adolescence and adulthood.

- **Experimental psychology** *focuses on basic processes such as learning, sensory systems (e.g., vision, hearing), perception, and motivational states (e.g., sexual motivation, hunger, thirst)*. Most research in this subfield involves laboratory experiments, often with nonhuman animals. Although this subfield is called "experimental" psychology, be aware that researchers in many psychological subfields conduct experiments.

- **Industrial-organizational (I/O) psychology** *examines people's behavior in the workplace*. I/O psychologists study leadership, teamwork, and factors that influence employees' job satisfaction, work motivation, and performance. They develop tests to help employers identify the best job applicants and design systems that companies use to evaluate employee performance.



**Figure 1.1**

Psychologists study diverse topics. Subfields that may not immediately occur to you include aviation and space psychology, educational psychology, and psychology and the law.

- **Personality psychology** *focuses on the study of human personality*. Personality psychologists seek to identify core personality traits and the way different traits relate to one another and influence behavior. They also develop tests to measure personality.

- **Social psychology** *examines people's thoughts, feelings, and behavior pertaining to the social world:* the world of other people. Social psychologists study how people influence one another, behave in groups, and form impressions and attitudes. They study social relationships involving attraction and love, prejudice and discrimination, helping, and aggression.

Note that topics studied in different subfields often overlap. Consider decision making, which is examined in all of the areas mentioned above. For example, a cognitive psychologist might study how wording the same information in different ways affects people's decisions, a social psychologist might study decision making in groups, and a developmental psychologist could examine how children's decision-making strategies change with age (Joslyn et al., 2009; Toma & Butera, 2009). Moreover, many psychologists have interests that bridge different subfields. Thus a clinical

psychologist might be interested in the biological bases of how adolescents with anxiety disorders make decisions. She could have adolescents who do and who don't have an anxiety disorder perform decision-making tasks, and use brain-imaging techniques to compare the neural activity of the two groups (Krain et al., 2008).

We'll encounter other branches of psychology throughout the chapter, but we hope you already get the picture. Psychologists do study the causes of mental disorders, provide therapy, and evaluate therapy effectiveness, but their interests and research span the entire realm of behavior. Indeed, the scope of modern psychology stretches from the borders of medicine and the biological sciences to those of the social sciences (Figure 1.2).

## Psychology's Scientific Approach

Across psychology's diverse subfields, researchers share a common underlying scientific approach to studying behavior. *Science* is a process that involves systematically gathering and evaluating empirical evidence to answer questions and test beliefs about the natural world. *Empirical evidence* is evidence gained through experience and observation; it includes evidence obtained from manipulating or "tinkering around" with things and then observing what happens (this is the essence of experimentation). For example, if we want to know how people's intellectual abilities change as they age, we don't rely on intuition, pure reasoning, or folk wisdom to obtain an answer. Rather, we collect empirical data by exposing people to intellectual tasks and observing how they perform. Moreover, in science these observations need to be *systematic* (i.e., performed according to a system of rules or conditions) so that they will be as objective and precise as possible (Shaughnessy et al., 2010).

### Understanding Behavior: Some Pitfalls of Everyday Approaches

Science is only one of many ways that we learn about human behavior. Family and friends, great works of literature, secular and religious teachings, the Internet and popular media—all provide us with messages about human nature. Mix in our own intuitions, the knowledge that each of us acquires from years of personal experience interacting with people, and so-called conventional or folk wisdom, and we have potent ingredients for generating our personal beliefs about what makes people tick.
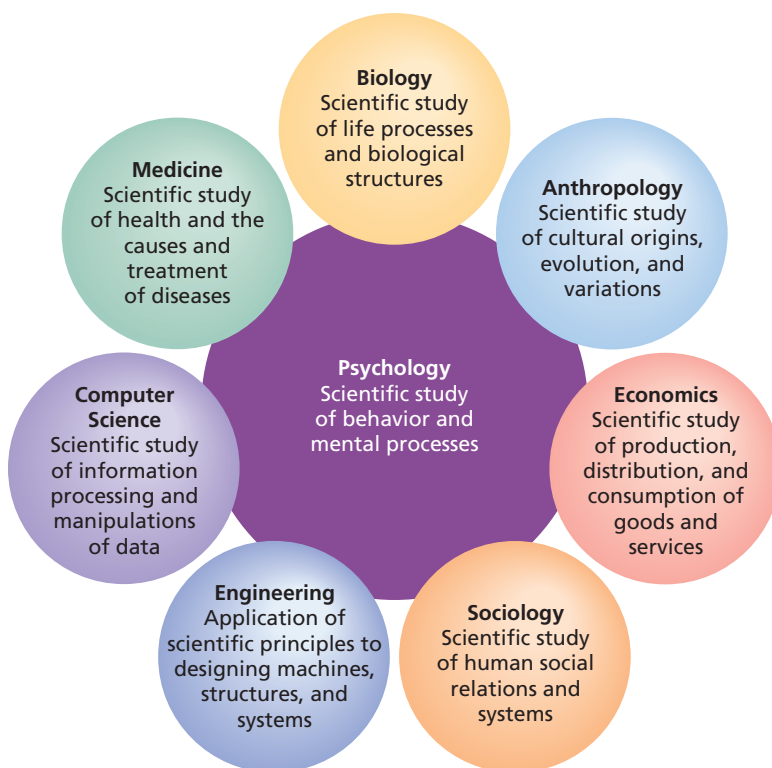


**Figure 1.2**

**Psychology as a scientific hub.**
Psychology links with and overlaps many sciences.

Problem is, in everyday life there are many ways in which these sources can end up promoting misconceptions. Other people—via conversations, books, the Internet, and popular media—may provide us with information and insights that they believe to be accurate but which really are not. Even personal experiences can lead us to form inaccurate beliefs. Although our experiences and everyday observations provide us with empirical information, unlike scientific observations, everyday observations are usually casual rather than systematic. Our own experiences also may be atypical and not representative of what most people experience.

As we'll explore in later chapters, misconceptions also can result from our own faulty thinking. For example:

- We often take *mental shortcuts* when forming judgments, shortcuts that sometimes serve us poorly (White, 2009). Judging someone's personality based solely on stereotypes about his or her physical appearance would be an example of a mental shortcut.
- Because many factors in real life may operate simultaneously to influence behavior, we may *fail to consider alternative explanations* for a behavior and assume that one factor has caused it when in fact some less obvious factor was the major cause (Lassiter et al., 2007).
- Once our beliefs are established, we often fail to test them further. In this vein, we tend to display a *confirmation bias* by selectively paying attention to information that is consistent with our beliefs and downplaying or ignoring information that is inconsistent with them (Hart et al., 2009).

### Using Science to Minimize Everyday Pitfalls

Yes, scientists are human too and may fall victim to all these pitfalls and to others that we'll discuss in the next chapter. But by adopting a scientific approach, psychologists can take concrete steps to avoid or at least minimize biases and problems that can lead to inaccurate conclusions. For example, rather than relying on imprecise casual observations, psychologists use various instruments (e.g., video recorders, questionnaires, brain-imaging devices) to objectively and precisely record people's responses. When directly watching people, several researchers can independently observe the same behaviors and compare their findings to ensure that their observations were reliable. To further reduce subjectivity psychologists typically use statistics to analyze their data.

To minimize erroneous conclusions about what has caused what, psychologists often are able to examine behavior under highly controlled experimental conditions in which they intentionally manipulate one factor, try to keep other factors constant, and see how the manipulated factor influences behavior.

Science also is a public affair, as occurs when psychologists publish their findings. This enables scientists to scrutinize and challenge each other's findings if they wish. Collectively, this reduces the risk of confirmation bias. As new studies are conducted, the original findings are put to the test and may be contradicted, forcing scientists to modify their beliefs and to conduct further research to sort out the reason for the contradictory results.

To be sure, science has limitations and its own pitfalls. It is ideally suited to examining testable questions about the natural world. Psychologists can study questions such as "Do happy people differ from unhappy people in their degree of religiousness or spirituality?" and "What do people believe gives their life meaning?" But science cannot answer questions such as "Does God exist?" and "What is the meaning of life?" The former is a question of faith that is beyond scientific measurement; the latter is a question answered by personal values. As for pitfalls, poorly designed or poorly executed studies can produce misleading data that lead to invalid conclusions.

Even when studies are designed well and conducted properly, "false starts" can occur in which other researchers later are unable to duplicate the original researchers' findings. Additionally, over time, new research often modifies or completely overturns existing scientific beliefs. But it's important to realize that these aren't weaknesses of the scientific approach. Rather, they reveal one of its great strengths: *in principle, science ultimately is a self-correcting process*. At any point in history, scientific knowledge represents a best estimate of how the world operates. As better or more complete information is gathered, that best estimate may continue to be supported, or it may need to be changed. Understandably, to many people such change can be frustrating or confusing, as illustrated by the public uproar in 2009 when an expert medical panel issued new breast-cancer screening guidelines (Kolata, 2009). The panel stated that most women should start having regular mammogram tests at age 50, not at age 40 as recommended by prior, long-standing guidelines. To scientists, however, such change represents an evolution of knowledge called "scientific progress."

## Thinking Critically about Behavior

Because behavior is so complex, its scientific study poses special challenges. As you become familiar with the kinds of evidence necessary to validate scientific conclusions, you will become a better-informed consumer of the many claims made in the name of psychology. For one thing, this course will teach you that many widely held beliefs about behavior are inaccurate. Can you distinguish the valid claims from the invalid ones in Table 1.1?

Perhaps more important than the concepts you learn in this course will be the habits of thought that you acquire—habits that involve *critical thinking.* Critical thinking involves taking an active role in understanding the world around you, rather than merely receiving information. It's important to reflect on what that information means, how it fits in with your experiences, and what implications it has for your life and society. Critical thinking also means evaluating the validity of something presented to you as fact (Levy, 2010). For example, when someone makes a claim or asserts a new "fact," ask yourself the following questions, just as a scientist would:

- What, exactly, is the claim or assertion?
- Who is making the claim? Is the source credible and trustworthy?
- What's the evidence, and how good is it?
- Are other explanations possible? If so, can I evaluate them?
- What is the most appropriate conclusion?

Table **1.1** | **Widely Held Beliefs about Behavior: Fact or Fiction?**

*Directions:* Decide whether each statement is true or false.

1. Most people with exceptionally high IQs are well adjusted in other areas of their life.
2. In romantic relationships, opposites usually attract.
3. Overall, married adults are less happy than adults who aren't married.
4. Graphology (handwriting analysis) is a valid method for measuring people's personality.
5. A person who is innocent of a crime has nothing to fear from a lie detector test.
6. People who commit suicide usually have signaled to others their intention to do so.
7. When you negatively reinforce someone's behavior, the person becomes more likely to behave that way.
8. On some types of mental tasks, people perform as well or better when they are 70 years old than when they are 20 years old.
9. Usually it is safe to awaken someone who is sleepwalking.
10. A schizophrenic is a person who has two or more distinct personalities, hence the term *split personality.*

ANSWERS: Items 1, 6, 8, and 9 are supported by psychological research. Item 7 is true by definition. The remaining items are false. (If you correctly answered nine or ten of these items, you've done significantly better than random guessing.)

## The Jumbled-Word Challenge

Let's think critically about the jumbled-word paragraph presented earlier. First, *what's the claim?* There are three, actually: (1) that people can read jumbled words without a problem as long as the first and last letters stay in the same place, (2) that this occurs because we read "words as a whole" rather than read each letter by itself, and (3) that this finding is based on research at Cambridge University.

Second, *who is making the claim?* Unfortunately, the jumbled-paragraph's author is anonymous, which is *caution flag #1.* We can't evaluate the author's credibility and trustworthiness.

Third, *what's the evidence, and how good is it?* The evidence begins with a claim implying that research was conducted at Cambridge. No reference information (researchers' names, publication location or date) is given: this is *caution flag #2.* Indeed, it seems that there was no such research done at Cambridge, although unpublished research at another university may have been the source (Davis, 2003; Rawlinson, 1999).

There's also the dramatic evidence of your own experience: reading the jumbled paragraph easily. But this is only one short paragraph. Also, overall, the transposition (i.e., switched ordering) of letters is minimal. This is *caution flag #3* and leads to the next question.

Fourth, *are other explanations possible* for why the paragraph is easy to read? We'll discuss reading more fully in Chapter 9. For now, consider this:

- Sixty-five percent of the words either aren't jumbled (because they have only one to three letters), or—with four-letter words—there is only one possible transposition (switching the second and third letters), which makes unscrambling them easy.

- For the words with five or six letters, in all but one case, the transposition is minor because only a single letter is out of sequence (e.g., for "mttaer," only the "a" is out of order).

- Thus, in total, 83 percent of the words are either unjumbled or have only minor transpositions. This preserves much of the way the words sound when we read them. Further, these words provide contextual information that makes it easier to anticipate the meaning of some of the few longer scrambled words.

In everyday life, you're unlikely to conduct a scientific study to test these alternative explanations, but you can gather additional evidence

by constructing sentences with longer words and more complex transpositions and having some people try to read them. Try reading this paragraph (page 30 reveals the unjumbled version), and see if it changes your belief about the ease of reading jumbled words.

> A plciaiiotn dieend the mtnaalueghsr of a clgaloeue, but was coincetvd and dlepoeevd sreeve macedil cdointonis in posirn, wrhee he deid. Arnodiistitman of agctannloauit dgurs ptttnaioeed the eefctfs of atehonr durg, and rprsoiearty frliaue rleeutsd.

Lastly, *what is the most appropriate conclusion to draw?* The claim that it's relatively easy to read words as long as the first and last letters are intact appears to be too broad, too absolute. Stated as such, it's clearly wrong. Stated in qualified terms of "under some conditions," the claim has support, although one study found that even minor transpositions of interior letters slowed reading speed by 11 percent (Rayner et al., 2006). In some languages, however, such interior transpositions may make words very difficult, if not impossible, to read (Davis, 2003).

### Of Astrology and Asstrology: Potential Costs of Uncritical Thinking

Suppose someone swallows the bait of the original jumbled-word paragraph and now erroneously believes that it's always easy to read words with transposed letters. Unless it's a smart-aleck student or worker who plans to turn in jumbled school papers or work reports (citing "scientific justification" for doing so), what's the harm in holding this little false belief? Perhaps the immediate personal consequences are minimal, but misconceptions can add up and contribute to an increasingly misguided view of how the world operates.

Unfortunately, people uncritically accept many misconceptions that do have concrete harmful consequences. For example, in the hope of making their babies smarter, consumers shelled out about 200 million dollars annually to purchase Baby Einstein videos that the Walt Disney Company advertised as educational, despite a lack of scientific support for such educational claims (Zimmerman et al., 2007). Under government and consumer-group pressure, Disney eventually dropped the "educational" claim and later agreed to partially refund consumers (Lewin, 2009).

Despite a lack of scientific evidence, people spend untold amounts of their hard-earned money to have their personalities analyzed and their futures forecasted by astrologers,



**Figure 1.3**

**The popularity of pseudoscience.**
SOURCE: http://www.sciencecartoonsplus.com/gallery/literature/index.php#, column B, second from top, "Science/Pseudoscience."

graphologists (handwriting analyzers), tea-leaf readers, and other so-called fortune tellers—including "rumpologists" (sometimes referred to as "asstrologers"), who "read" people's buttocks to obtain their presumed psychic insights (Wyman & Vyse, 2008). Money aside, it's impossible to estimate how many people have made major life decisions based on fortune tellers' bogus advice. It's also hard to know how many people have not only wasted money on bogus therapies for ailments, diseases, and mental disorders but also experienced needless continued distress or further bodily harm by failing to employ scientifically validated treatments. Unfortunately, *pseudoscience*—fields such as astrology, graphology, rumpology, and so on that are dressed up to look like science but which lack credible scientific evidence—appears to attract many believers (Figure 1.3).

Each chapter of this textbook contains a special section called "Myth or Reality?" in which we'll examine a popular psychological claim in depth. We've already discussed the jumbled-words claim, but now let's examine a claim that may be familiar to you and perhaps is already influencing your behavior—with potential costs. See the facing page.

### Goals of Psychology

As a science, psychology has four central goals: *description, explanation, control,* and *application*. Description is the most basic goal; psychologists seek to describe how people behave, think, and feel. Second, psychologists strive to explain—to understand—why people act as they do. Explanations typically take the form of hypotheses and theories that specify the causes of behavior. Third,

# Myth or Reality?

## When Taking Tests, Stick with Your First Instinct

Double-check your answers, but only change an answer if you misread the question or found something in the test that indicates your first answer was incorrect. Otherwise, stick with your first guess because research shows it's usually the right answer. (Hutton, 2009; education.com, 2009)

Does this advice sound familiar? Many test-taking tips Web sites offer similar advice: if you're unsure about your initial answer, "stick with your first instinct." In other words, if you change answers, you're more likely to switch a right answer to a wrong one than a wrong answer to a right one. Most students and many instructors agree with this claim: they believe that changing answers will more likely lower than raise exam scores (Kruger et al., 2005).

### What Happens When Students Switch Answers?

In 1929, C. O. Mathews analyzed almost 40,000 answers that college students marked on multiple-choice and true-false tests. Of the answers students had changed, switching from wrong to right was far more common (59 percent of switches) than switching from right to wrong (27 percent of switches). The remaining switches were from one wrong answer to another wrong answer. Decades later, psychologists reviewed 33 studies on this topic and concluded that in every study "(a) the majority of answer changes are from incorrect to correct and (b) most students who change their answers improve their test scores" (Benjamin et al., 1984).

More recently, psychologists Justin Kruger, Derrick Wirtz, and Dale Miller (2005) obtained similar findings in a study of 1,561 college students. By a 2:1 ratio, more changed answers went from wrong to right than from right to wrong, and by nearly a 3:1 ratio more students who changed answers ended up with higher rather than lower exam scores (Figure 1.4). Yet most students still believed that as a general test-taking strategy, changing answers was harmful. Kruger et al. called this "the first instinct fallacy."

### The First Instinct Fallacy

Before concluding that the first instinct strategy is indeed a fallacy, let's think critically. Benjamin et al. (1984) note two cautions. First, in some instances students may have changed answers (and gone from wrong to right) because they simply misread the question or mismarked their answer. Researchers typically can't tell why students changed exam answers, so this means that analyzing students' changed answers on exams isn't a pure test of the "stick with your first hunch" strategy. Second, scrutinizing exam forms for changed answers doesn't tell us about the answers that students thought about changing but didn't change. Perhaps by following the first instinct strategy, students got most of those items right. Last, we'll add that if the first instinct strategy is a myth, it would help to have a convincing psychological explanation for why so many people believe it to be reality.

Fortunately, Kruger, Wirtz, and Miller's research (2005) addressed these issues. In three studies, they tested and found support for an explanation of why people perceive the first instinct fallacy to be true. Imagine that on an exam item you thought about switching answers, decided not to, and would have gotten it right if you had switched. On another item, you had the right answer but switched to a wrong answer. As the researchers predicted, given these two outcomes,
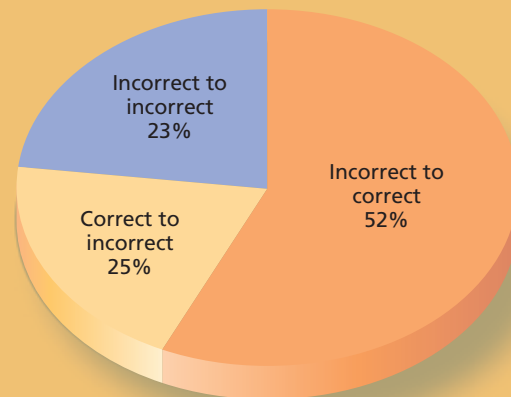


**Figure 1.4**

**Changing answers on multiple-choice tests.**
Researchers analyzed the eraser marks on 6,412 exams taken by introductory psychology students. Contrary to popular wisdom, changing one's answer was twice as likely to result in gaining points than in losing points. Source: Based on Kruger et al., 2005.

many more students said that switching from right to wrong would be the more frustrating outcome. "Geez I had it right. If only I hadn't switched!" This frustration then leads to a memory bias in which we are more likely to remember instances of right-to-wrong switches than instances when we should have switched but didn't. In turn, the memory bias leads students to believe that sticking with one's first instinct generally is the best strategy. This four-stage model appears below:



Moreover, in one of their studies, Kruger et al. (2005) were able to identify instances in which students were unsure of their multiple-choice answers but stuck with their initial choices rather than switching to a second choice they thought might be correct. Indeed, students stuck with their first instinct most of the time, and it cost them: their "first instinct answers" were almost twice as likely to be wrong as they were to be right.

### Conclusions

Based on available evidence, "stick with your first instinct" appears to be more myth than reality. If upon reflection you have doubts about an initial exam answer and think that another answer is more likely to be correct, don't be afraid to change it. This doesn't guarantee that on any single exam, or even over the long haul, you'll be better off switching answers. Guarantees like that don't exist. Odds are that being willing to switch answers will benefit you in the long run, but some students do obtain lower scores by switching. What you can do is gather your own evidence from several exams. Act like a scientist. For exam items you were unsure about, note whether you "stayed" or "switched." How often did each strategy help or hurt your score? Keep a tally of the outcomes, and then you'll have some personal evidence to guide your future test-taking strategy.

psychologists exert control by designing experiments or other types of research to test whether their proposed explanations are accurate. Finally, many psychologists apply psychological knowledge in ways that enhance human welfare.

Consider Kruger et al.'s (2005) research on the first instinct fallacy. They first determined that although students are more likely to change multiple-choice answers from wrong to right than from right to wrong, they still erroneously believe that the best exam strategy is to "go with your first instinct" (description). Next, they proposed a model to explain why many students hold this belief (explanation). To test each part of their model, Kruger et al. conducted additional studies in which they carefully controlled the situations and questions to which participants were exposed (control). Their findings supported the model. The knowledge gained has already led other psychologists and educators to offer correct advice to students about answer-switching strategies (Social Psychology Network, 2010). Now you can apply this knowledge to your own test-taking behavior as well.

### Basic and Applied Research

Science involves **basic research,** *which reflects the quest for knowledge for its own sake,* and **applied research,** *which is designed to solve specific, practical problems.* For psychologists, most basic research examines how and why people behave, think, and feel the way they do. Kruger et al.'s (2005) research on the first instinct fallacy represents basic research. Their main intent was to test a hypothetical model and thereby increase our understanding of why the first instinct fallacy exists. Although the knowledge gained from their study has obvious applied relevance, the purpose of their study was not to apply that knowledge or directly modify students' beliefs or behavior. Basic research may be carried out in laboratories or real-world settings, with human participants or other species. Psychologists who study other species usually attempt to discover principles that ultimately will shed light on human behavior, but some study animal behavior for its own sake.

In applied research, psychologists often use basic scientific knowledge to design interventions. For example, we could use the basic knowledge obtained from Kruger et al.'s (2005) research to design and test the effectiveness of an intervention program aimed at altering college students' misconceptions about changing exam answers. Similarly, researchers have used basic research findings—such as principles concerning

how people learn by observing the behavior of others—to design and implement HIV/AIDS-prevention programs in North America, Africa, and Asia (Lerdboon et al., 2008).

### Psychology's Broad Scope: A Simple Framework

Because we are biological creatures living in a complex social world, psychologists study an amazing array of factors to understand why people behave, think, and feel as they do. At times, this diversity of factors may seem a bit overwhelming, but we would like to provide you with a framework that will greatly simplify matters. We call it *levels of analysis:* behavior and its causes can be examined at the *biological level* (e.g., brain processes, genetic influences), the *psychological level* (e.g., our thoughts, feelings, and motives), and the *environmental level* (e.g., past and current physical and social environments to which we are exposed).

Here is a brief example of how the framework can be applied. Consider a behavior that you engage in every day: eating (Figure 1.5). At the biological level, various chemicals, neural circuits, and structures in your brain respond to bodily signals and help regulate whether you feel hungry or full. At the psychological level, your moods, food preferences, and motives affect eating. Do you ever eat when you're not hungry, perhaps because you feel stressed or bored? The environmental level of analysis calls attention to specific stimuli (such as the appearance or aroma of different foods) that may trigger eating and to cultural customs that influence our food preferences. Does the aroma of freshly baked treats ever make your stomach growl? How about the sight of duck feet or a mound of fish gills on a plate? To most Westerners, duck feet and fish gills may not be appetizing, but during a stay in China we discovered that our hosts considered them delicious.

### Mind-Body and Nature-Nurture Interactions

Form a mental picture of a favorite food, and you may trigger a hunger pang. Focus on positive thoughts when facing a challenging situation, and you may keep your bodily arousal in check; dwell instead on negative thoughts, and you can rapidly stimulate the release of stress hormones (Borod, 2000). These examples illustrate what traditionally have been called *mind-body interactions*—the relations between mental processes in the brain and the functioning of other bodily systems. Mind-body interactions focus our attention on the fascinating interplay between the psychological

**The Biological Level**

**The Psychological Level**

**The Environmental Level**



### Figure 1.5

(*left*) **Biological level.** This rat weighs about triple the weight of a normal rat. As we (or rats) eat, hunger decreases as certain brain regions regulate the sensation of becoming full. Those regions in this rat's brain have been damaged, causing it to overeat and become obese. (*center*) **Psychological level.** At times we may eat out of habit, stress, or boredom. With candy bar in hand and other candies lined up, this student is ready for some autopilot munching. (*right*) **Environmental level.** Does a plateful of insect-topped crackers sound appetizing to you? Cultural norms influence food preferences.



### Figure 1.6

**Youth and beauty? Or maturity and wisdom?**
What we perceive depends on our perspective. If you examine this drawing, you will see either a young woman or an old one. Now try changing your perspective. The ear and necklace of the young woman are the left eye and mouth of the old woman.

and biological levels of analysis. This topic has a long history within psychology, and as you will see throughout the textbook, it remains one of psychology's most exciting frontiers.

The levels-of-analysis framework also addresses an issue that has been debated since antiquity: is our behavior primarily shaped by nature (our biological endowment) or by nurture (our environment and learning history)? The pendulum has swung toward one end or the other at different times in history, but today, growing interest in cultural influences and advances in genetics and brain research keep the nature-nurture pendulum in a more balanced position.

Perhaps most important, modern research increasingly reveals that nature and nurture interact (Moffitt et al., 2006). Just as our biological capacities affect how we behave and experience the world, our experiences influence our biological capacities. For humans and rats alike, continually depriving a newborn of physical contact, or providing a newborn with an enriched environment in which to grow, can influence its brain functioning and biological development (Rosenzweig, 1984). Thus, while it may be tempting to take sides, "nature *or*

nurture?" usually is the wrong question. As the levels-of-analysis framework implies, nature, nurture, and psychological factors must all be taken into account to gain the fullest understanding of behavior. Later in the chapter, we'll provide a more detailed example of how looking at behavior from multiple levels enhances our understanding.

## PERSPECTIVES ON BEHAVIOR

Psychologists' focus on the biological, psychological, and environmental factors that influence behavior is not new; it has been an integral part of psychology's history. But just how did psychology's scope become so broad? In part, it happened because psychology has roots in such varied disciplines as philosophy, medicine, and the biological and physical sciences. As a result, different ways of viewing people, called *perspectives*, became part of psychology's intellectual traditions (Figure 1.6).

In science, new perspectives are engines of progress. Advances occur as existing beliefs are challenged, a debate ensues, and scientists seek

## test yourself   The Nature of Psychology

The titles of five research articles from psychological journals are listed below. Based on the title, identify whether each study is most likely to represent *basic* or *applied* research.

1. Two forms of spatial imagery: Neuroimaging evidence
2. The prevention of depressive symptoms in low-income minority children: Two-year follow-up
3. Increasing seat belt use on a college campus: An evaluation of two prompting procedures
4. Facial structure is a reliable cue of aggressive behavior
5. Recognizing speech under a processing load: Dissociating energetic from informational factors

ANSWERS: 1-basic, 2-applied, 3-applied, 4-basic, 5-basic

new evidence to resolve the debate. Sometimes, the best-supported elements of contrasting perspectives are merged into a new framework, which in turn will be challenged by still newer viewpoints.

If you have ever met someone who views the world differently from the way you do, you know that perspectives matter. Similarly, perspectives serve as lenses through which psychologists examine and interpret behavior. To illustrate this point, consider the case of Ray, a shy student when he first entered college. Ray knew he was shy, especially around women, yet he wasn't sure why. He had been nervous on the few dates he had gone on in high school. During his first college semester, Ray met some women he liked but was afraid to ask them out. He didn't make male friends either. By winter, he was depressed and his schoolwork suffered. After a good spring-break visit with his family, Ray turned things around. He studied hard, did well in class, and made friends with some guys in the dorm. His mood improved, and soon thereafter he met Kira. Kira was attracted to Ray but sensed his shyness, so she asked Ray out. They've been dating for a year, and Ray is happy. He and Kira have even discussed marriage.

Soon we'll briefly look at Ray's case through the lens of six psychological perspectives. But first, to better understand how these perspectives evolved, let's examine psychology's roots and two of its earliest schools of thought.

### Psychology's Intellectual Roots

Humans have long sought to understand themselves, and for ages the *mind-body problem* has occupied the center of this quest. Is the mind—the inner agent of consciousness and thought—a spiritual entity separate from the body, or is it a part of the body's activities?

Many early philosophers held a position of *mind-body dualism,* the belief that the mind is a spiritual entity not subject to physical laws that govern the body. But if the mind is not composed of physical matter, how could it become aware of bodily sensations, and how could its thoughts exert control over bodily functions? French philosopher and scientist René Descartes (1596–1650) proposed that the mind and body interact through the brain's tiny pineal gland. Although Descartes placed the mind within the brain, he maintained that the mind was a spiritual, non-material entity. Dualism implies that no amount of research on the physical body (including the brain) could ever hope to unravel the mysteries of the nonphysical mind.

Another view, *monism* (from the Greek word *monos,* meaning "one"), holds that mind and body are one and that the mind is not a separate spiritual entity. To monists, mental events correspond to physical events in the brain, a position advocated by English philosopher Thomas Hobbes (1588–1679). Monism helped set the stage for psychology because it implied that the mind could be studied by measuring physical processes within the brain. The stage was further set by John Locke (1632–1704) and other philosophers from the school of **British empiricism,** *which held that all ideas and knowledge are gained empirically—that is, through the senses.* According to empiricists, observation is a more valid approach to knowledge than is pure reason, because reason is fraught with the potential for error. This idea bolstered the development of modern science, whose methods are rooted in empirical observation.

Discoveries in physiology (an area of biology that examines bodily functioning) and medicine also paved the way for psychology's emergence. By 1870, European researchers were electrically stimulating the brains of laboratory animals and

**Figure 1.7**

At the University of Leipzig in 1879, Wilhelm Wundt (*far right*) established the first laboratory of experimental psychology to study the structure of the mind.
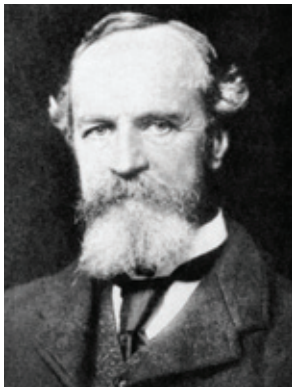
**Figure 1.8**

William James, a leader of functionalism, helped establish psychology in North America. His multivolume book, *Principles of Psychology* (1890/1950), greatly expanded the scope of psychology.

**Figure 1.9**

Mary Whiton Calkins founded a psychology laboratory at Wellesley College, where she taught for over 30 years. She studied memory and dreams and, in 1905, became the first female president of the American Psychological Association.

mapping the surface areas that controlled various body movements. Additionally, medical reports were linking damage in different areas of patients' brains with various behavioral and mental impairments. This mounting evidence of the relation between brain and behavior supported the view that empirical methods of the natural sciences could be used to study mental processes. Indeed, in the mid-1800s German scientists had already established a new field called *psychophysics,* the study of how psychologically experienced sensations depend on the characteristics of physical stimuli (e.g., how the perceived loudness of a sound changes as its physical intensity increases).

Around this time, Charles Darwin's (1809–1882) theory of evolution was generating societal shock waves. Opponents attacked his theory because it seemed to contradict philosophical and religious beliefs about the exalted nature of human beings. Evolution implied that the mind was not a spiritual entity but rather the product of biological continuity between humans and other species. Darwin's theory also implied that scientists might gain insight about human behavior by studying other species. By the late 1800s, a convergence of intellectual forces provided the impetus for psychology's birth.

## Early Schools: Structuralism and Functionalism

The infant science of psychology emerged in 1879, when Wilhelm Wundt (1832–1920) established the first experimental psychology laboratory at the University of Leipzig in Germany (Figure 1.7). One of his graduate students, Englishman Edward Titchener (1867–1927), later established a psychology laboratory in the United States at Cornell University. Wundt and Titchener believed that the mind could be studied by breaking it down into its basic components, as a chemist might break down a complex chemical compound. Their approach came to be known as **structuralism,** *the analysis of the mind in terms of its basic elements.*

In their experiments, structuralists used the method of *introspection* ("looking within") to study sensations, which they considered the basic elements of consciousness. They exposed participants to all sorts of sensory stimuli—lights, sounds, tastes—and trained them to describe their inner experiences. Although this method of studying the mind was criticized as being too subjective and died out after a few decades, the structuralists left an important mark by establishing a scientific tradition for studying cognitive processes.

In the United States, structuralism eventually gave way to **functionalism,** *which held that psychology should study the functions of consciousness rather than its elements.* Here's a rough analogy to explain the difference between structuralism and functionalism: Consider your hands. A structuralist would try to explain their movement by studying how muscles, tendons, and bones operate. In contrast, a functionalist would ask, "Why do we have hands? How do they help us adapt to our environment?" The functionalists asked similar questions about mental processes and behavior. They were influenced by Darwin's evolutionary theory, which stressed the importance of adaptation in helping organisms survive and reproduce in their environment.

William James (1842–1910), a leader in the functionalist movement, taught courses in physiology, psychology, and philosophy at Harvard University (Figure 1.8). James helped widen the scope of psychology to include the study of various biological and mental processes and overt behavior. Like Wundt, James trained psychologists who went on to distinguished careers. Among them was Mary Whiton Calkins (1863–1930), who became the first female president of the American Psychological Association in 1905 (Figure 1.9). Although functionalism no longer exists as a school of thought within psychology, its tradition endures in two modern-day fields: *cognitive psychology,* which studies mental processes, and *evolutionary psychology,* which emphasizes the adaptiveness of behavior.

## The Psychodynamic Perspective: The Forces Within

Have you ever been mystified by why you behaved or felt a certain way? Recall the case of Ray, the student described earlier in the chapter who could not understand why he was so shy. The **psychodynamic perspective** *searches for the causes of behavior within the inner workings of our personality (our unique pattern of traits, emotions, and motives), emphasizing the role of unconscious processes.* Sigmund Freud (1856–1939) developed the first and most influential psychodynamic theory (Figure 1.10).

### Psychoanalysis: Freud's Great Challenge

In late 19th-century Vienna, Freud was a young physician intrigued by the brain's mysteries. Some of his patients experienced symptoms such as blindness, pain, paralysis, and phobias (intense unrealistic fears) that were not caused by any apparent bodily malfunction or disease. Thus Freud

reasoned that the causes must be psychological. Moreover, if patients were not producing their symptoms consciously, Freud reasoned that the causes must be hidden from awareness—they must be unconscious. Freud eventually treated his patients by using a technique called *free association,* in which the patient expressed any thoughts that came to mind. To Freud's surprise, patients eventually described painful and long-"forgotten" childhood experiences, often sexual in nature. After patients remembered and mentally "relived" these traumatic experiences, their symptoms often improved.

Freud became convinced that an unconscious part of the mind profoundly influences behavior, and he developed a theory and a form of psychotherapy called **psychoanalysis**—*the analysis of internal and primarily unconscious psychological forces.* He also proposed that humans have powerful inborn sexual and aggressive drives and that because these desires are punished in childhood, we learn to fear them and become anxious when we are aware of their presence. This leads us to develop *defense mechanisms,* which are psychological techniques that help us cope with anxiety and the pain of traumatic experiences. *Repression,* a primary defense mechanism, protects us by keeping unacceptable impulses, feelings, and memories in the unconscious depths of the mind. All behavior, whether normal or "abnormal," reflects a largely unconscious and inevitable conflict between the defenses and internal impulses. This ongoing psychological struggle between conflicting forces is dynamic in nature, hence the term *psychodynamic.* To explain Ray's extreme shyness around women, Freud might have explored whether Ray is unconsciously afraid of his sexual impulses and therefore avoids putting himself into dating situations where he would have to confront those hidden impulses.

Freud's theory stirred great controversy. Even some of his followers disagreed with aspects of the theory, especially its heavy emphasis on childhood sexuality. Other psychologists viewed the theory as difficult to test. Nevertheless, Freud's ideas stimulated research on topics such as dreams, memory, aggression, and mental disorders. One review of over 3,000 scientific studies examining Freud's ideas found support for some aspects of his theory, whereas other aspects were unsupported or contradicted (Fisher & Greenberg, 1996). But even where Freud's theory wasn't supported, it ultimately led to important discoveries. Additionally, Freud's work forever broadened the face of psychology to include the study and treatment of psychological disorders.

### Modern Psychodynamic Theory

Modern psychodynamic theories continue to explore how unconscious and conscious aspects of personality influence behavior. However, they downplay the role of hidden sexual and aggressive motives and focus more on how early relationships with family members and other caregivers shape the views that people form of themselves and others (Kernberg, 2000; Levine, 2010). In turn, these views can unconsciously influence a person's relationships with other people throughout life.

To explain Ray's shyness, a modern psychodynamic psychologist might examine Ray's conceptions of himself and his parents. Ray's shyness may stem from a fear of rejection of which he is unaware. This fear may be based on conceptions that he developed of his parents as being rejecting and disapproving, views that now unconsciously shape his expectations of how relationships with women and men will be.

The psychodynamic perspective dominated thinking about personality, mental disorders, and psychotherapy for the first half of the 20th century, and it continues to influence psychology and the practice of psychotherapy (Ryle, 2010). Although most contemporary psychological scientists reject Freud's particular version of the unconscious mind, modern psychological research has identified brain mechanisms that produce unconscious emotional reactions and has shown that many aspects of information processing occur outside of awareness (Bargh & Morsella, 2010; Debiec & LeDoux, 2009).

## The Behavioral Perspective: The Power of the Environment

The **behavioral perspective** *focuses on the role of the external environment in governing our actions.* From this perspective, our behavior is jointly determined by habits learned from previous life experiences and by stimuli in our immediate environment.

### Origins of the Behavioral Perspective

The behavioral perspective has roots in the philosophical school of British empiricism. According to the early empiricist John Locke, at birth the human mind is a *tabula rasa*—a "blank tablet" or "slate"—upon which experiences are written. In this view, human nature is shaped purely by the environment.

In the early 1900s, experiments by Russian physiologist Ivan Pavlov (1849–1936) revealed how learning occurs when events are associated
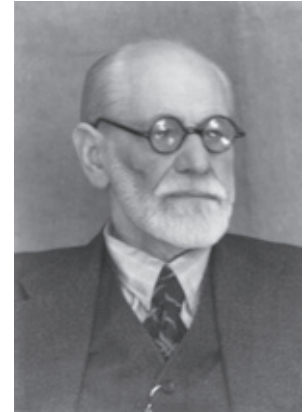


**Figure 1.10**

Sigmund Freud founded psychoanalysis. For more than 50 years, he probed the hidden recesses of the mind.

**Figure 1.11**

John B. Watson founded the school of behaviorism. He published *Psychology as a Behaviorist Views It* in 1913.

with one another. Pavlov found that dogs automatically learned to salivate to the sound of a new stimulus, such as a tone, if that stimulus was repeatedly paired with food. Meanwhile, American psychologist Edward Thorndike (1874–1949) examined how organisms learn through the consequences of their actions. According to Thorndike's (1911) *law of effect,* responses followed by satisfying consequences become more likely to recur, and those followed by unsatisfying consequences become less likely to recur. Thus learning is the key to understanding how experience molds behavior.

## Behaviorism

**Behaviorism,** *a school of thought that emphasizes environmental control of behavior through learning,* began to emerge in 1913. John B. Watson (1878–1958), who led the new movement, strongly opposed the "mentalism" of the structuralists, functionalists, and psychoanalysts (Figure 1.11). He argued that the proper subject matter of psychology was observable behavior, not unobservable inner consciousness. Humans, he said, are products of their learning experiences, and he issued the following challenge:

> Give me a dozen healthy infants, well-formed, and my own specialized world to bring them up in and I'll guarantee you to take any one of them at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors. (1925, p. 82)

Behaviorists sought to discover laws that govern learning, and they believed that the same basic principles of learning applied to all organisms. B. F. Skinner (1904–1990) was a leading 20th-century behaviorist (Figure 1.12). Although Skinner didn't deny that people have thoughts and feelings, he maintained that "no account of what is happening inside the human body, no matter how complete, will explain the origins of human behavior" (1989a, p. 18). Skinner believed that the real causes of behavior reside in the outer world: "A person does not act upon the world, the world acts upon him" (1971, p. 211). His research, based largely on studying rats and pigeons under controlled laboratory conditions, examined how behavior is influenced by the rewarding and punishing consequences that it produces.

In the case of Ray, our shy college student, a behaviorist might focus on Ray's past dating experiences. In high school, the first time Ray invited



**Figure 1.12**

B. F. Skinner, a leading behaviorist, argued that mentalistic concepts were not necessary to explain behavior and that learning principles could be used to enhance human welfare.

a girl to a dance he was turned down. Later, he had a crush on a girl and they went out once, after which she turned him down. Though nervous, he asked out a few girls after that but was turned down each time. Such punishing consequences decreased the likelihood that Ray would ask someone out in the future. Fortunately, Kira asked Ray out, and the positive consequences they experienced on their first date reinforced their behavior, increasing the odds that they would go out again.

Skinner believed that through "social engineering," society could harness the power of the environment to change behavior in beneficial ways. His approach, known as *radical behaviorism,* was considered extreme by many psychologists, but he was esteemed for his scientific contributions and for focusing attention on how environmental forces could be used to enhance human welfare. In the 1960s, behaviorism inspired powerful techniques known collectively as *behavior modification.* These techniques, aimed at decreasing problem behaviors and increasing positive behaviors by manipulating environmental factors, are still used widely today (Eldevik et al., 2010).

Behaviorism's insistence that psychology should focus only on observable stimuli and responses resonated with many who wanted psychology to model itself on the natural sciences. Behaviorism dominated North American research on learning into the 1960s, challenged psychodynamic views about the causes of psychological disorders, and led to effective treatments for some disorders. But radical behaviorism's influence

waned after the 1970s as interest in studying mental processes expanded (Robins et al., 1999). Still, behaviorists continue to make important contributions, and their discovery of basic laws of learning was one of the greatest contributions made by 20th-century American psychology.

### Cognitive Behaviorism

In the 1960s and 1970s, a growing number of psychologists showed that cognitive processes such as attention and memory could be rigorously studied by using sophisticated experiments. This led some behaviorists to challenge radical behaviorism's view that mental life was off-limits as a topic for scientific study. They developed a modified view called **cognitive behaviorism,** *which proposes that learning experiences and the environment influence our expectations and other thoughts and, in turn, that our thoughts influence how we behave* (Bandura, 1969, 2008). Cognitive behaviorism remains an influential viewpoint to this day (Figure 1.13).

A cognitive behaviorist might say that Ray's past dating rejections were punishing and led him to expect that further attempts at romance would be doomed. In turn, these expectations of social rejection inhibited him from asking women out and even from making male friends.



**Figure 1.13**

Albert Bandura has played a key role in developing cognitive behaviorism, which merges the behavioral and cognitive perspectives.

as mere reactors to the environment. Instead, humanistic theorists such as Abraham Maslow (1908–1970) proposed that each of us has an inborn force toward *self-actualization,* the reaching of one's individual potential (Figure 1.14). When people develop in a supportive environment, their positive inner nature emerges. In contrast, misery and pathology occur when environments frustrate people's innate tendency toward self-actualization. Humanists emphasized the importance of personal choice, responsibility, personality growth, and positive feelings of self-worth. To humanists, the meaning of our existence resides squarely in our own hands.

Thinking about Ray's shyness and loneliness, a humanist might say that no matter how often Ray was rejected in the past, he must take personal responsibility for turning things around. A humanist also might wonder whether, in his freshman year, Ray's happiness and sense of self-worth were resting too heavily on his hope for a good romantic relationship. By focusing on building a few friendships, Ray wisely found another way to satisfy what Maslow (1954) called "belongingness," our basic human need for social acceptance and companionship.

Few early humanists were scientists, and, historically, humanism has had a more limited impact on mainstream psychological science than have other perspectives. Still, it has inspired important areas of research. Humanist Carl Rogers (1902–1987) identified key aspects of psychotherapy that led to constructive changes in clients. Humanistic concepts have also stimulated research on self-esteem and self-concept (Verplanken & Holland, 2002).

### The Humanistic Perspective: Self-Actualization and Positive Psychology

In the mid-20th century, as the psychodynamic and behavioral perspectives vied for dominance within psychology, a new viewpoint called *humanism* arose to challenge them both. The **humanistic perspective (humanism)** *emphasized free will, personal growth, and the attempt to find meaning in one's existence.*

Humanists rejected psychodynamic concepts of humans as being controlled by unconscious forces and rejected behaviorism's view of humans



**Figure 1.14**

The humanistic perspective emphasizes the human ability to surmount obstacles in the drive toward self-actualization.

Humanism's focus on self-actualization and growth is seen in today's growing **positive psychology movement,** *which emphasizes the study of human strengths, fulfillment, and optimal living* (Park et al., 2010). Rather than focusing on "what's wrong with our world" (e.g., mental disorders, conflict, prejudice), positive psychology examines how we can nurture what is best within ourselves and society to create a happy and fulfilling life.

## The Cognitive Perspective: The Thinking Human

The **cognitive perspective** *examines the nature of the mind and how mental processes influence behavior.* In this view, humans are information processors whose actions are governed by thought.

### Origins of the Cognitive Perspective

Two of psychology's earliest schools of thought, structuralism and functionalism, reflected the cognitive perspective. Recall that structuralists attempted to identify the basic elements of consciousness, while functionalists explored the purposes of consciousness. Other pioneering cognitive psychologists, such as Hermann Ebbinghaus (1850–1909), studied memory.

By the 1920s, German scientists had formed a school of thought known as *Gestalt psychology*, which examined how the mind organizes elements of experience into a unified or "whole" perception (*Gestalt* roughly translates as "whole" or "organization"). They argued that perceptions are organized so that "the whole is greater than the sum of its parts." Consider the painting in Figure 1.15. Many people initially perceive it as a whole—as a portrait of a strange-looking person—rather than as a mosaic of individual sea creatures. Gestalt psychology stimulated interest in topics such as perception and problem solving, but like structuralism and functionalism, it eventually disappeared as a scientific school. As behaviorism's antimentalistic stance strengthened in North America during the 1920s and 1930s, the study of the mind was relegated to the back burner.

### Renewed Interest in the Mind

In the 1950s, interest in studying cognitive processes regained ground. In part, this interest stemmed from psychologists' involvement during World War II in designing information displays, such as gauges in airplane cockpits, that enabled military personnel (e.g., pilots) to recognize and interpret that information quickly and accurately. Computer technology, in its infancy at that time, provided new information-processing concepts



**Figure 1.15**

This painting illustrates the Gestalt principle that the whole is greater than the sum of its parts. The individual elements are sea creatures, but the whole is perceived as a portrait of a face. *The Water*, by Arcimboldo, from Kunsthistorisches Museum, Vienna.

and terminology that psychologists adapted to the study of memory and attention (Broadbent, 1958). A new metaphor developed—the mind as a system that processes, stores, and retrieves information—and it remains influential today.

On another front in the 1950s, behaviorists and linguists debated how children acquire language. The behaviorists, led by Skinner, claimed that language is acquired through basic principles of learning. The linguists, led by Noam Chomsky (b. 1928), argued that humans are biologically "preprogrammed" to acquire language and that children come to understand language as a set of "mental rules." This heated debate convinced many psychologists that language was too complex to be explained by behavioral principles and instead needed to be examined from a cognitive perspective.

Interest in cognition grew in other areas. For example, a theory by Swiss psychologist Jean Piaget (1896–1980), which explained how children's thinking becomes more sophisticated with age, gained widespread recognition in North America. Overall, psychologists' interest in mental processes swelled in the 1960s and 1970s—a period that sometimes is referred to as the "cognitive revolution."

### The Modern Cognitive Perspective

*Cognitive psychology*, which focuses on the study of mental processes, embodies the cognitive perspective. Cognitive psychologists study the processes by which people reason, make decisions, solve problems, form perceptions, and produce and understand language. Many, such as Elizabeth Loftus, study memory and factors that distort it (Figure 1.16). Cognitive psychologists explore the nature of attention and consciousness and have increasingly studied how unconscious processes influence behavior.

**Cognitive neuroscience,** *which uses sophisticated electrical recording and brain-imaging techniques to examine brain activity while people engage in cognitive tasks*, is a rapidly growing area that represents the intersection of cognitive psychology and the biological perspective within psychology. Cognitive neuroscientists seek to determine how the brain goes about its business of learning language, acquiring knowledge, forming memories, and performing other cognitive activities (Nyhus & Curran, 2010).

From a cognitive perspective, we can examine Ray's shyness in terms of how he processes information. The few times he went on dates, Ray's nervousness may have caused him to focus

**Figure 1.16**

Cognitive psychologist Elizabeth Loftus studies the nature of memory and how memories become distorted.

you look), and imagined presence (e.g., driving a car, you slow down because you incorrectly think the car behind you is an unmarked police car). The social psychological approach overlaps with many other perspectives. For example, like behaviorism, social psychology pays special attention to how the environment influences our behavior, but its emphasis is narrowed to the social environment. Consistent with a cognitive perspective, much social psychological research examines social cognition: how people form impressions of one another, how attitudes form and can be changed, how our expectations affect our behavior, and so forth. Intersecting the biological perspective (which we discuss next), social psychologists have increasingly examined the biological bases of social thinking and behavior. For example, it appears that social pain—as can occur when people reject or ostracize us—shares many of the same brain circuits that underlie physical pain (Lieberman & Eisenberger, 2009).

## The Cultural Component

*Culture* refers to the enduring values, beliefs, behaviors, and traditions that are shared by a large group of people and passed from one generation to the next. All cultural groups develop their own social **norms,** *which are rules (often unwritten) that specify what behavior is acceptable and expected for members of that group.* Norms exist for all types of social behaviors, such as how to dress, respond to people of higher status, or act as a woman or man (Figure 1.17). For culture to endure, each new generation must internalize, or adopt, the norms and values of the group as their own. *Socialization* is the process by which culture is transmitted to new members and internalized by them.

Throughout much of the 20th century, psychological research largely ignored non-Western groups. Even within Western societies, for decades participants in psychological research typically were White and came from middle- or upper-class backgrounds. There were important exceptions, however, such as Kenneth Clark (1914–2005), Mamie Clark (1917–1983), and others, who examined how discrimination and prejudice influenced the personality development of African American children (Clark & Clark, 1947; Figure 1.18).

Over time, psychologists increasingly began to study diverse ethnic and cultural groups. Today the growing field of **cultural psychology** (sometimes called **cross-cultural psychology**) *explores how culture is transmitted to its members and examines psychological similarities and differences among people from diverse cultures* (Norenzayan et al., 2010).

on the slightest things that weren't going well, while failing to notice other cues that suggested his date was having a good time. Ray also may be remembering those events as much more unpleasant than they actually were, and his interpretation of past dating failures may be based on faulty reasoning. Ray believes he was rejected because of his personal qualities ("I'm not interesting enough") and therefore expects that future dates will also be unsuccessful. If Ray correctly attributed the rejections to some situational factor ("Clarissa was already interested in someone else"), then he would not necessarily expect other women to reject him in the future.

## The Sociocultural Perspective: The Embedded Human

Humans are social creatures. Embedded within a culture, each of us encounters ever changing social settings that shape our actions and values, our sense of identity, our very conception of reality. The **sociocultural perspective** *examines how the social environment and cultural learning influence our behavior, thoughts, and feelings.*

## The Social Psychological Component

For over a century, *social psychologists* have studied how the presence of other people influences our behavior, thoughts, and feelings (Rubin & Badea, 2010; Triplett, 1898). The word *presence* connotes actual physical presence (e.g., you're in a group), implied presence (e.g., you're dressing for a party, aware that at the party people will evaluate how

**Figure 1.17**

Social norms differ across cultures and over time within cultures. The idea of women engaging in aggressive sports or military combat is unthinkable in many cultures. A few generations ago, it was also unthinkable in the United States.



**Figure 1.18**

Psychologists Kenneth B. Clark and Mamie P. Clark studied the development of racial identity among African American children. Kenneth Clark also wrote books on the psychological impact of prejudice and discrimination.

One important difference among cultures is the extent to which they emphasize individualism versus collectivism (Triandis & Suh, 2002). Most industrialized cultures of northern Europe and North America promote *individualism,* an emphasis on personal goals and self-identity based primarily on one's own attributes and achievements. In contrast, many Asian, African, and South American cultures nurture *collectivism,* in which individual goals are subordinated to those of the group and personal identity is defined largely by the ties that bind one to the extended family and other social groups. This difference is created by social learning experiences that begin in childhood and continue in the form of social customs.

Thinking about Ray's lonely first year in college, the sociocultural perspective again leads us to Ray's expectations of social rejection and beliefs about why it occurred before. We also can ask how his cultural upbringing and other social factors contributed to his shy behavior. Throughout his teen years, cultural norms for male assertiveness may have put pressure on Ray. His shyness may have evoked teasing and other negative reactions from his high school peers, increasing his feelings of inadequacy by the time he reached college. As for Ray and Kira's dating relationship, we might examine how norms regarding courtship and marriage differ across cultures.

In each chapter of this book, a "Research Close-up" provides you with a highly condensed, in-depth look at an important study, paralleling the format of research articles published in psychological journals. We give you background information about the study, describe its method and key results, and discuss (evaluate) key aspects of the study. On the next page, our first "Research Close-up" examines cross-cultural attitudes about love and marriage.

## The Biological Perspective: The Brain, Genes, and Evolution

The **biological perspective** *examines how brain processes and other bodily functions regulate behavior.* Biological psychology has always been a prominent part of the field, but its influence has increased dramatically over recent decades.

### Behavioral Neuroscience

Ray and Kira are in love. They study and eat together. They hold hands and kiss. Yet a year earlier, Ray was depressed. What brain regions, neural circuits, and bodily chemicals enable us to feel love, pleasure, and depression; to read, study, and feel hunger? These questions pertain to **behavioral neuroscience** (also called *physiological psychology*), *which examines brain processes and other physiological functions that underlie our behavior, sensory experiences, emotions, and thoughts* (Rolls, 2010).

An early pioneer of biological psychology, American Karl Lashley (1890–1958), trained rats

# Research Close-up

## Would You Marry Someone You Didn't Love?

### INTRODUCTION

Would you marry someone you did not love? According to one theory, people in individualistic cultures are more likely to view romantic love as a requirement for marriage, because love is a matter of personal choice (Goode, 1959). In collectivistic cultures, concern for the extended family plays a larger role in marriage decisions.

Psychologist Robert Levine and his colleagues (1995) examined college students' views about love and marriage. Whereas previous research focused on American students, these authors studied students from 11 countries. They also examined whether students from collectivistic and economically poorer countries would be less likely to view love as a prerequisite to marriage.

### METHOD

The researchers administered language-appropriate versions of the same questionnaire to 1,163 female and male college students from 11 countries. The key question was, "If someone had all the other qualities you desired, would you marry this person if you were not in love with him/her?" The students responded "No," "Yes," or "Not Sure." The researchers determined each country's economic status and collectivistic versus individualistic orientation from data gathered by previous cross-cultural investigators.

### RESULTS

Within each country, the views of female and male students did not differ significantly. In contrast, beliefs across countries varied strongly (Table 1.2). In India, Thailand, and Pakistan, most students said they would marry or at least consider marrying someone they did not love. In the Philippines and Japan, a sizable minority—just over a third—felt the same way. In contrast, students from the other countries overwhelmingly rejected the notion of marrying somebody they did not love. Overall, students from collectivistic and economically poorer countries were less likely to view love as a prerequisite to marriage.

Table **1.2** | Love and Marriage in Eleven Cultures

If someone had all the other qualities you desired, would you marry this person if you were not in love with him/her?

| Country | Percentage | | |
|---|---|---|---|
| | No | Yes | Not Sure |
| India | 24 | 49 | 27 |
| Thailand | 34 | 19 | 47 |
| Pakistan | 39 | 50 | 11 |
| Philippines | 64 | 11 | 25 |
| Japan | 64 | 2 | 34 |
| Hong Kong | 78 | 6 | 16 |
| Australia | 80 | 5 | 15 |
| Mexico | 83 | 10 | 7 |
| England | 84 | 7 | 9 |
| Brazil | 86 | 4 | 10 |
| United States | 86 | 4 | 10 |

SOURCE: Levine et al., 1995.

### DISCUSSION

Among most of our own students, the notion that you marry someone you love is a truism. They are surprised—as perhaps you are—that many students in other countries would consider marrying someone they did not love. This study reminds us that as members of a particular culture, it is easy to mistakenly assume that "our way" is the "normal way."

As in all research, we must think critically and interpret the results carefully. For example, among those students who said they would marry someone without being in love, would it be accurate to conclude that they view love as irrelevant to marriage? Not necessarily, because other research has found that "mutual attraction/love" is viewed across most cultures as a desirable quality in a mate (Buss, 1989). Thus the results of this study suggest only that in some cultures love is not viewed as an *essential prerequisite* to enter into marriage.

to run mazes and then measured how surgically produced lesions (damage) to various brain areas affected the rats' learning and memory. His research inspired other psychologists to map brain regions involved in specific psychological functions (Figure 1.19). Another pioneer, Canadian Donald O. Hebb (1904–1985), proposed that changes in the connections between nerve cells in the brain provide the biological basis for learning, memory, and perception. His influential theory inspired research that eventually led to the discovery of **neurotransmitters,** *which are chemicals released by nerve cells that allow them to communicate with one another.*

**Figure 1.19**

Karl Lashley was a pioneer of physiological psychology (behavioral neuroscience). He examined how damage to various brain regions affected rats' ability to learn and remember.
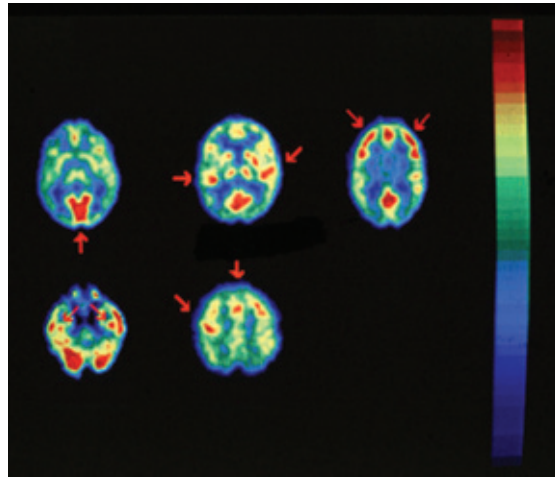


**Figure 1.20**

Behavioral neuroscientists use positron-emission tomography (PET) scans to measure brain activity as people perform various tasks. Viewed from above, each image pictures a horizontal slice of the brain with the front of the brain at the top. Yellow and red indicate regions of greatest activity: (*top left*) visual task, (*top center*) auditory task, (*top right*) cognitive task, (*bottom left*) memory task, and (*bottom right*) motor task.

Today, modern brain-imaging techniques allow psychologists to watch activity in specific brain areas as people experience emotions, perceive stimuli, and perform tasks (Figure 1.20). These advances have led to new areas of study that link various psychological perspectives. For example, *cognitive neuroscience*—the study of brain processes that underlie thinking and information processing—represents an intersection of cognitive psychology and behavioral neuroscience.

### Behavior Genetics

Psychologists have had a long-standing interest in **behavior genetics,** *the study of how behavioral tendencies are influenced by genetic factors* (Plomin & Haworth, 2009). Animals can be selectively bred not only for physical traits but also for behavioral traits such as aggression. This is done over generations by mating highly aggressive males and females. In Thailand, where gambling on fish fights is a national pastime, selective breeding has produced the highly aggressive Siamese fighting fish. The male of this species will instantly attack his own image in a mirror.

Identical human twins, who result from the splitting of a fertilized egg and therefore have the same genetic makeup, are more similar to one another on many behavioral traits than are fraternal twins, who result from two different fertilized eggs and therefore are no more similar genetically than are nontwin siblings. This greater behavioral similarity is found even when identical twins



**Figure 1.21**

Charles Darwin, a British naturalist, formulated a theory of evolution that revolutionized scientific thinking.

have been reared in different homes and dissimilar environments (Lykken, 2006).

Thinking about Ray, perhaps he inherited a tendency to be shy. Some infants display an extremely shy, inhibited emotional style that seems to be biologically based and persists into adulthood (Kagan, 1989; Newman et al., 1997). Dating rejections may have reinforced Ray's natural reluctance to ask women out.

### Evolutionary Psychology

In his theory of evolution, Darwin (1859) noted that within a species some members possess specific traits to a greater extent than do other members (Figure 1.21). Through a process he called **natural selection,** *if an inherited trait gives certain members an advantage over others* (such as increasing their ability to attract mates or escape from danger), *these members will be more likely to survive and pass these characteristics on to their offspring.* In this way, species evolve as the presence of adaptive traits increases within the population over generations. Traits that put certain members at a disadvantage tend to become less common within a species over time, because members having those traits will be less likely to survive and reproduce. As environments change, the adaptiveness of a trait may increase or decrease. Thus, through natural selection, a species' biology evolves in response to environmental conditions (Figure 1.22).

**Evolutionary psychology** *seeks to explain how evolution shaped modern human behavior* (Simpson & Beckes, 2010). Evolutionary psychologists stress that human mental abilities and behavioral tendencies evolved along with a changing body (Tooby & Cosmides, 2005). According to one theory, as our humanlike ancestors developed new physical abilities (such as the ability to walk upright, thus freeing the use of the arms and hands), they began to use tools and weapons and live in social groups (Pilbeam, 1984). Certain psychological abilities—thought, language, the capacity to learn and solve problems—became more important to survival as our ancestors had to adapt to new ways of living.

Within any generation, genetically based variations in brain structure and functioning occur among individuals. Ancestors whose brain characteristics better supported adaptive mental abilities were more likely to survive and reproduce. Thus, through natural selection, adaptations to new environmental demands contributed to the development of the brain, just as brain growth contributed to the further development of human behavior.

Evolutionary psychologists also attempt to explain human social behavior. Recall that Ray and Kira are contemplating marriage. Why is it that across the world, on average, men desire a younger mate and women tend to seek an older mate? As we'll discuss more fully in Chapter 3, whereas sociocultural psychologists argue that socialization and economic gender inequality cause most sex differences in mate preferences, some evolutionary psychologists propose that through natural selection, men and women have become biologically predisposed to seek somewhat different qualities in a mate (Buss, 1989, 2007).



**Figure 1.22**

Natural-selection pressures result in physical changes. The peppered moth's natural color is that of the lighter insect. However, over many generations, peppered moths that live in polluted urban areas have become darker, not from the pollution but because moths that inherited slightly darker coloration blended better into their grimy environment. Thus, they were more likely to survive predators and pass their "darker" genes on to their offspring. However, a trip into the countryside to visit their light-colored relatives could easily prove fatal for these darker urban insects.

## test yourself — Perspectives on Behavior

Match each numbered psychological perspective to the most appropriate primary emphasis on the right.

| Perspective | Primary Emphasis (i.e., major causes of behavior) |
|---|---|
| 1. behavioral | a. brain processes; genes; evolution |
| 2. biological | b. social norms; socialization; presence of other people |
| 3. cognitive | c. unconscious motives, conflicts, and defenses |
| 4. humanistic | d. thinking and information processing; memory |
| 5. psychodynamic | e. learning, rewarding/punishing consequences of behavior |
| 6. sociocultural | f. choice and free will; search for personal meaning |

ANSWERS: 1-e, 2-a, 3-d, 4-f, 5-c, 6-b

## USING LEVELS OF ANALYSIS TO INTEGRATE THE PERSPECTIVES

As summarized in Table 1.3, psychology's six major perspectives (presented in the order we discussed them) provide differing conceptions of human nature. Fortunately, we can distill their essence into the simple three-part framework that we introduced earlier. Behavior can be examined at biological, psychological, and environmental levels. At the *biological level of analysis,* we can study behavior and its causes in terms of brain functioning, hormones, and genetic factors shaped over the course of evolution. At the *psychological level of analysis,* we might look to the cognitive perspective and analyze how thought, memory, and planning influence behavior. Borrowing from the psychodynamic and humanistic perspectives, we can examine how motives and personality traits influence behavior. Finally, at the *environmental*

## Table 1.3 | Comparison of Six Major Perspectives on Human Behavior

| | Psychodynamic | Behavioral | Humanistic | Cognitive | Sociocultural | Biological |
|---|---|---|---|---|---|---|
| **Conception of human nature** | The human as controlled by inner forces and conflicts | The human as reactor to the environment | The human as free agent, seeking self-actualization | The human as thinker | The human as social being embedded in a culture | The human animal |
| **Major causal factors in behavior** | Unconscious motives, conflicts, and defenses; early childhood experiences and unresolved conflicts | Past learning experiences and the stimuli and behavioral consequences that exist in the current environment | Free will, choice, and innate drive toward self-actualization; search for personal meaning of existence | Thoughts, anticipations, planning, perceptions, attention, and memory processes | Social forces, including norms, social interactions, and group processes in one's culture and social environment | Genetic and evolutionary factors; brain and biochemical processes |
| **Predominant focus and methods of discovery** | Intensive observations of personality processes in clinical settings; some laboratory research | Study of learning processes in laboratory and real-world settings, with an emphasis on precise observation of stimuli and responses | Study of meaning, values, and purpose in life; study of self-concept and its role in thought, emotion, and behavior | Study of cognitive processes, usually under highly controlled laboratory conditions | Study of behavior and mental processes of people in different cultures; experiments examining people's responses to social stimuli | Study of brain-behavior relations; role of hormones and biochemical factors in behavior; behavior genetics research |

*level of analysis,* the behavioral and sociocultural perspectives lead us to examine how stimuli in the physical and social environment shape our behavior, thoughts, and feelings.

Realize that a full understanding of behavior often moves us back and forth between these three levels. Consider Ray and Kira. When we describe the culture in which they were raised, such as its religious values and social customs, we are operating at the environmental level of analysis. However, if Ray and Kira adopt those cultural values and make them part of their identities, this represents the psychological level of analysis. Similarly, we might describe a family environment as abusive, but an abused child's tendency to worry and feel anxious—and the chemical changes in the brain that underlie this anxiety—move us to the psychological and biological levels of analysis.

## An Example: Understanding Depression

To appreciate how the levels-of-analysis framework can help us understand behavior, let's briefly examine a common but complex psychological problem: depression. Most people experience sadness, grief, or the blues at some time in their lives. These feelings often are normal responses to significant negative events or losses that we experience. However, when these emotions are intense, persist over a long period, and are accompanied by thoughts of hopelessness and an inability to experience pleasure, we have crossed the boundary between a normal reaction and clinical depression.

Looking first at the biological level, genetic factors appear to predispose some people toward developing depression (Edvardsen et al., 2009). In one study, relatives of people who had developed major depression before age 20 were 8 times more likely to become depressed at some point than were relatives of nondepressed people (Weissman et al., 1984). Biochemical factors also play a role. For many depressed people, certain neurotransmitter systems that send signals between the brain's nerve cells do not operate normally, and the most effective antidepressant drugs restore neurotransmitter activity to more normal levels.

Moving to a psychological level, cognitive viewpoints emphasize that depression is associated with a pessimistic thinking style (Strunk & Adler, 2009). Depressed people can find the black cloud surrounding every silver lining. They tend to blame themselves for negative things that occur in their lives, take little credit for the good things, view the future as bleak, and may have perfectionistic expectations that make them overly sensitive to how other people evaluate

them (Bieling et al., 2004). Psychodynamic theorists believe that severe loss, rejection, or trauma in childhood helps create a personality style that causes people to overreact to setbacks, setting the stage for future depression (Bowlby, 2000).

At the environmental level, behaviorists propose that depression often begins as a reaction to an environment that provides fewer rewards for the person. As depression intensifies, some people stop doing things that ordinarily give them pleasure. They also may complain a lot and seek excessive social support, eventually causing other people to avoid them. The net result is a viscious cycle: an environment with even fewer rewards, reduced support from other people, and worsening depression (Hopko & Mullane, 2008; Lewinsohn et al., 1985). Sociocultural factors also affect depression. Although depression is found across cultures and ethnic groups, its symptoms, causes, and prevalence may reflect cultural differences (Jackson & Williams, 2006). For example, in North America, feelings of sadness typically are a major component of depression. In some regions of China, however, many depressed people report feelings of boredom or internal pressure but not sadness (Kleinman, 2004).

We'll discuss depression more fully in Chapter 15. For now, let's summarize the causal factors in depression that we've discussed by grouping them into the three levels of analysis, as shown in the figure on the next page.

## Summary of Major Themes

Our excursion through psychology's major perspectives and levels of analysis reveals several principles that you will encounter repeatedly as we explore the realm of behavior:

- As a science, psychology relies on *systematic empiricism* to study behavior.

- Although committed to studying behavior objectively, psychologists recognize that our personal experience of the world is *subjective.*

- Behavior is determined by *multiple causal factors,* including our biological endowment ("nature"), the environment and our past learning experiences ("nurture"), and psychological factors that include our thoughts and motives.

- Behavior is a means of *adapting* to environmental demands; capacities have evolved over each species' history because they facilitated adaptation and survival.

- Behavior and mental processes are affected by the *social and cultural environments* in which we develop and live.
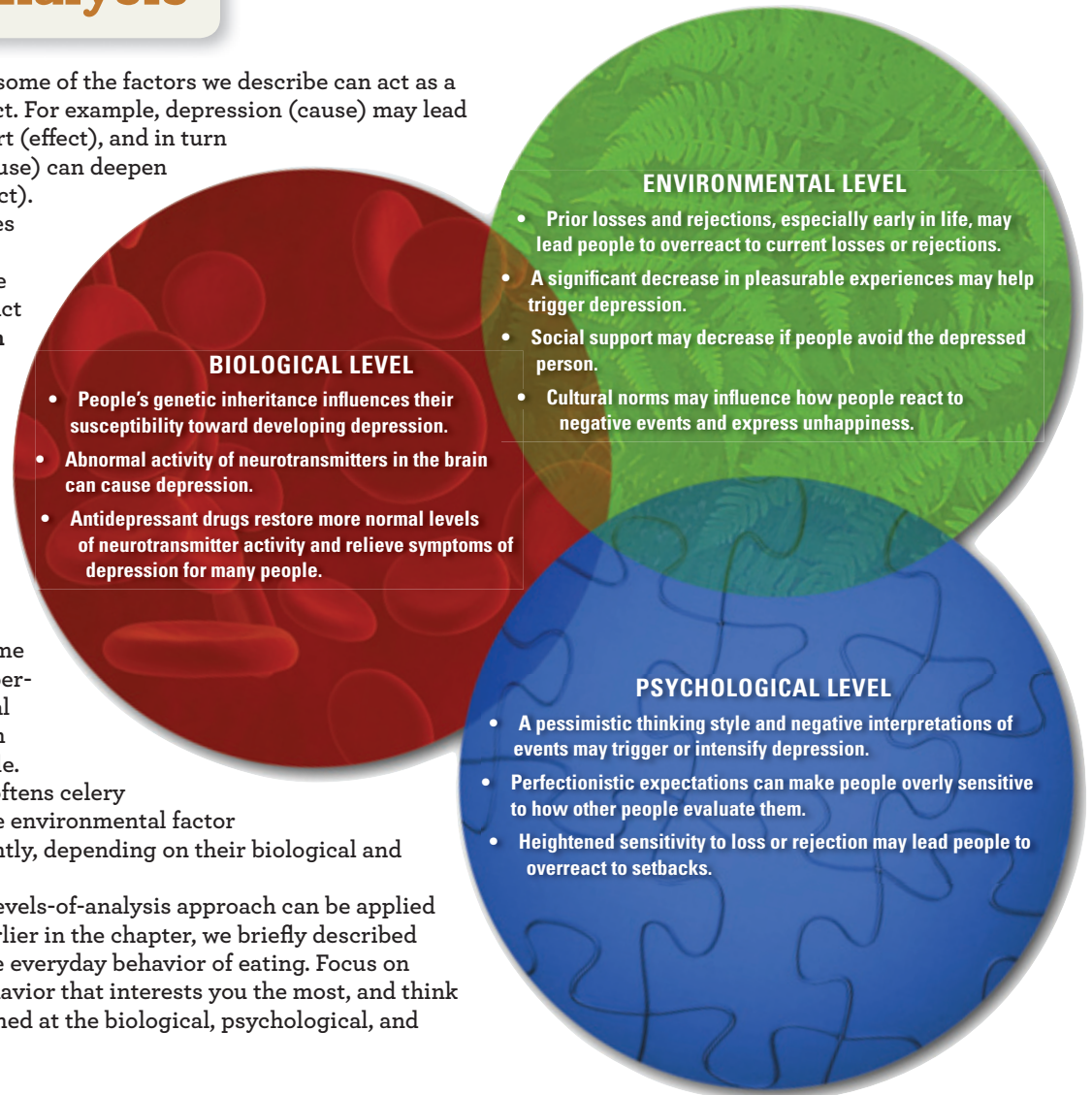
# Levels of **Analysis**

## Causal Factors in Depression

It's important to realize that some of the factors we describe can act as a cause but also can be an effect. For example, depression (cause) may lead to a decrease in social support (effect), and in turn decreased social support (cause) can deepen the person's depression (effect). Also recognize that the causes of depression may vary from case to case and that multiple causes can combine or interact with one another. **Interaction** *means that the way in which one factor influences behavior depends on the presence of another factor.* For example, someone who experiences a minor setback may become depressed if she or he has a strong biological predisposition for depression or a highly pessimistic thinking style. The same setback might barely faze a person who has a weak biological predisposition for depression or an optimistic thinking style. Thus, just as boiling water softens celery and hardens an egg, the same environmental factor can affect two people differently, depending on their biological and psychological makeup.

You've now seen how a levels-of-analysis approach can be applied to examining depression. Earlier in the chapter, we briefly described how it could be applied to the everyday behavior of eating. Focus on another aspect of human behavior that interests you the most, and think about how it might be examined at the biological, psychological, and environmental levels.

**BIOLOGICAL LEVEL**
- People's genetic inheritance influences their susceptibility toward developing depression.
- Abnormal activity of neurotransmitters in the brain can cause depression.
- Antidepressant drugs restore more normal levels of neurotransmitter activity and relieve symptoms of depression for many people.

**ENVIRONMENTAL LEVEL**
- Prior losses and rejections, especially early in life, may lead people to overreact to current losses or rejections.
- A significant decrease in pleasurable experiences may help trigger depression.
- Social support may decrease if people avoid the depressed person.
- Cultural norms may influence how people react to negative events and express unhappiness.

**PSYCHOLOGICAL LEVEL**
- A pessimistic thinking style and negative interpretations of events may trigger or intensify depression.
- Perfectionistic expectations can make people overly sensitive to how other people evaluate them.
- Heightened sensitivity to loss or rejection may lead people to overreact to setbacks.

## test yourself

### Levels of Analysis

Each of the following psychologists is studying factors related to depression from which level of analysis: *biological, psychological,* or *environmental*?

1. Dr. Rios studies whether the odds of developing depression depends on being an only child or having siblings.
2. Dr. Todd hypothesizes that, as compared to nondepressed people, when depressed people fail at a task they will be more likely to attribute their failure to a lack of ability.
3. Dr. Ito compares the brain activity of depressed and nondepressed people while they perform the same task. She finds that certain brain areas in depressed people are underactive.

ANSWERS: 1-environmental, 2-psychological, 3-biological

# PSYCHOLOGY TODAY

As a science and profession, psychology today is more diversified and robust than ever before. Because of psychology's enormous breadth, no psychologist can be an expert on all aspects of behavior. You have already encountered some of psychology's major subfields throughout the chapter, and Table 1.4 introduces six more. Remember, however, that psychological research often cuts across subfields. For example, psychologist Shelley Taylor (Figure 1.23) explores how people's biological responses to stress and illness vary depending on their beliefs, values, and social relationships. Her work draws on several traditional subfields of psychology—including social psychology, personality psychology, and biopsychology—as well as a newer subfield, called *health psychology*, that she helped pioneer (and that you will learn about in Chapter 14).

## A Global Science and Profession

Modern psychology is diversified in terms of geography, ethnicity, and gender. A century ago, psychological research was conducted almost entirely in Europe, North America, and Russia by White males. Today these regions remain scientific powerhouses, but you will find women and men from diverse backgrounds conducting psychological research and providing psychological services around the globe. Founded in 1951 to support psychology worldwide, the International Union of Psychological Science consists of major psychological organizations from 71 countries (IUPsyS, 2009). Moreover, across the world,

college students are eagerly studying psychology. In the United States, psychology ranks among the top five fields in the number of undergraduate degrees and doctoral degrees awarded annually (National Center for Education Statistics, 2008).

The American Psychological Association (APA), founded in 1892, is the largest individual psychological association in the world. Its 150,000 members and 56 divisions represent not only the subfields we've already discussed and those shown in Table 1.4 but also areas that focus on psychology's relation to the arts, religion, the military, the environment, sports, social policy issues, public service, and the media (APA, 2010a). The American Psychological Society (APS), a newer organization consisting primarily of researchers, has grown to 20,000 members in just two decades (APS, 2010). Both APA and APS have international members in dozens of countries.

A career in most psychological subfields requires a doctoral degree based on four to six years of training beyond the bachelor's degree. Graduate training includes broad exposure to knowledge in psychology, concentrated study in one or more subfields, and extensive training in research methods. In some areas (such as clinical, counseling, school, and industrial-organizational psychology), additional supervised practical experience in a hospital, clinic, school, or workplace setting is generally required. Please note, however, that psychologists who perform mental health services are not the same as psychiatrists. *Psychiatrists* are medical doctors who, after completing their general training in medicine, receive additional training in diagnosing and treating mental disorders.

Besides its fascinating subject matter, psychology attracts many people with its rich variety of career options. Figure 1.24 shows the major settings in which psychologists work. Many psychologists teach, engage in research, or apply psychological principles and techniques to help solve personal or social problems. For more information on careers in psychology, visit the Online Learning Center (OLC) that accompanies this book.

## Psychology, Society, and Your Life

Most Americans have a positive view of psychology and are at least somewhat aware that beyond providing therapy, psychologists contribute to solving other societal problems (Mills, 2009). Still, many people don't realize the range and depth of psychology's applied contributions or how they affect our lives. Many people also fail to recognize that such contributions are rooted in scientific research. Let's consider some examples.



**Figure 1.23**

Shelley Taylor studies people's biological responses to stress and illness. She is a leading researcher in health psychology and social psychology.

Table **1.4** | **Some Additional Subfields within Psychology**

| Specialty | Major Focus |
|---|---|
| Animal behavior (comparative psychology) | Study of nonhuman species in natural or laboratory environments; includes genetics, brain processes, social behavior, evolutionary processes |
| Counseling psychology | Consultation with clients on issues of personal adjustment; vocational and career planning; interest and aptitude testing |
| Educational psychology | Study of psychological aspects of the educational process; curriculum and instructional research; teacher training |
| Forensic psychology | Application and study of psychological principles pertaining to the criminal justice system, including law enforcement and the courts |
| Health psychology | Study of psychological and behavioral aspects of physical health and illness, and mental health and well-being; development of programs that promote healthy behavior |
| Quantitative psychology | Study of measurement and data-analysis issues; development of mathematical models of behavior |

## Fly the Friendly Skies . . . Safely

The next time you board an airplane or know someone who does, you might reflect for a moment on the work of several types of research psychologists who have made air travel safer, but who you've probably never heard about: *aviation psychologists* and *human factors psychologists* (*human factors* is the study of human-machine interfaces). They've helped develop and assess training programs to improve the teamwork of cockpit crews, and as you'll read in Chapter 5, years ago they identified a nighttime visual illusion that led pilots to misjudge their plane's altitude while landing and resulted in several fatal crashes. For decades, these psychologists also have helped design instrument displays so that pilots can quickly and accurately process the information provided by the many dials, gauges, and digital readouts crammed into the cockpits of commercial and military planes (Casner, 2009). Because these contributions partly rest on the shoulders of experimental, cognitive, and social psychologists who for decades have studied the basic nature of human vision, information processing, and social interaction, we all might tip our proverbial hats to them as well (Monk et al., 2008). We're guessing that most people would appreciate psychological science's contribution to air safety, if only they knew about it.

## President Obama's "Behavioral Dream Team"

If you live in the United States, and perhaps even if not, the outcome of U.S. presidential elections can affect your life through the president's domestic and international policies (Figure 1.25). In 2008, Barack Obama's presidential-election campaign team secretly assembled a group, called the Consortium of Behavioral Scientists, to provide advice on issues such as fund-raising and increasing voter turnout. This "behavioral dream team," as *Time* magazine reporter Michael Grunwald (2009) called it, included social psychologist Robert Cialdini, an expert who has conducted basic and applied research on persuasion. The team also included Nobel Prize–winning cognitive psychologist Daniel Kahneman, an expert in the thought processes and biases that affect people's decision making.

When dream team members provided Obama's campaign with recommendations, they included reference citations to the scientific research on which that advice was based. Mike Moffo, a field director in the campaign, noted that "it was amazing to have these bullet points telling us what to do and the science behind it. . . . These guys really know what makes people tick" (Grunwald, 2009, p. 29).
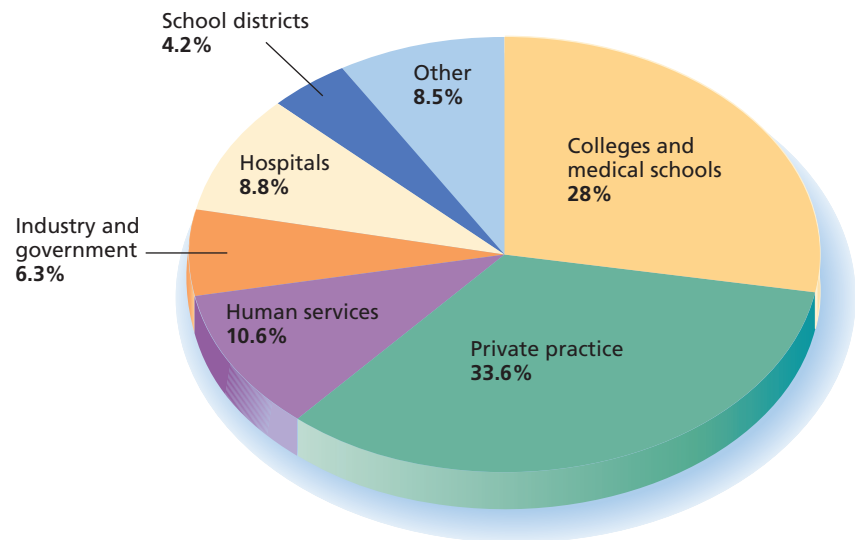


**Figure 1.24**

**Work settings of psychologists.**
SOURCE: Adapted from data in Table 4, American Psychological Association Research Office, 2001.

President Obama's reliance on behavioral science didn't end with his election. In trying to get people to "go green," for example, the Obama administration (like other administrations before it) is dealing with the fundamental issue of changing people's habits. As you'll see in upcoming chapters, psychological science has a lot to say about behavior change.



**Figure 1.25**

President Barack Obama speaking to an audience in Virginia.

### Psychology and Public Policy

Modern society faces a host of complex social problems, many of which may affect you directly or indirectly. Psychology, as a science and profession, is poised to help solve them. Through basic research, psychologists provide fundamental knowledge about behavior. In applied research, they use this knowledge to design, implement, and assess intervention programs. Together, basic research and applied research are pillars for *evidence-based public policies* that affect the lives of millions of people.

Increasingly, psychologists are being called on to tackle social issues and shape public policy. Consider these examples:

- *Education:* From grade school through college, how can we best teach students? In 2002, psychologist Grover Whitehurst became the first director of the U.S. Institute of Education Sciences, a new research unit within the U.S. Department of Education. The institute's mission "is to provide rigorous and relevant evidence on which to ground education practice and policy" (Institute of Education Sciences, 2010).
- *Violence prevention:* Based on decades of aggression research, the APA and other organizations are conducting a program to provide children with nonviolent role models and to improve the violence-prevention skills of teachers, parents, and other caregivers (APA, 2009b). Training sessions are held nationally and in local communities.
- *Mental health:* When research indicated that college students needed greater access to on-campus mental health care, the APA

crafted the Campus Care and Counseling Act to help meet this need. Some provisions of this act were incorporated into legislation that was passed by the U.S. Congress in 2004.

Psychologists also influence national policy by helping politicians craft legislation dealing with a host of other social issues, from preventing AIDS and obesity to enhancing child care and homeland security. Moreover, their influence is not limited to the United States. School bullying, for example, is a serious problem in several countries. Norwegian psychologist Dan Olweus, a leading researcher on bullying, developed a prevention program that the Norwegian government makes available to all of its public schools (Olweus, 2004). Some American schools also have adopted it.

### Applying Psychology to Your Life

We're biased, of course, but to us, psychology is the most fascinating subject around, and we hope that some of this enthusiasm rubs off on you. Beyond the immensely important goals of satisfying people's intellectual curiosity about human behavior and helping to solve societal problems, psychological research yields many principles that you can actively apply to enhance your own life. You've already seen that the truism to "trust your first instinct" on multiple-choice and true-false exams is actually more myth than reality, and may be harming your exam performance if you follow it blindly. Other research by behavioral, cognitive, and educational psychologists on learning and memory provides additional guidelines that can improve your academic performance. To conclude this chapter, our first "Applying Psychological Science" feature describes some of these guidelines.

## Applying Psychological Science

### How to Enhance Your Academic Performance

College life presents many challenges, and working smart can be as important as working hard. The following strategies can help you increase your learning and academic performance (Figure 1.26).

#### EFFECTIVE TIME MANAGEMENT

If you efficiently allocate study time, you will have a clear conscience when it's time for recreational activities and relaxation. First, *develop a written schedule;* this forces you to decide how to allocate time and increases your commitment to the plan. Write down your class schedule and other responsibilities. Then block in periods for study, avoiding times you are likely to be tired.

Distribute study times throughout the week. Schedule some study times immediately before enjoyable activities, which you can use as rewards for studying.

Second, *prioritize your tasks.* Don't procrastinate by working on simple tasks while putting off the toughest tasks. This can result in never getting to the major tasks (e.g., writing term papers, studying for exams) until too little time remains. Each day, ask "What is the most important thing to get done?" Do that first, then move to the next most important task, and so on.

Third, *break large tasks into smaller parts.* Important tasks often are too big to complete all at once. Break them down into a set of specific and realistic goals (e.g., number of pages to be read).
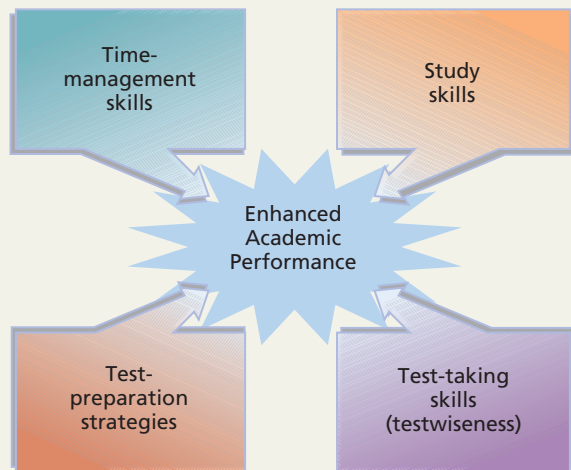
**Figure 1.26**

**Improving academic performance.**
Academic performance-enhancement methods include strategies for managing time, studying more effectively, preparing for tests, and taking tests.

Successfully completing each goal is rewarding, strengthens your study skills, and increases your feelings of mastery.

### STUDYING MORE EFFECTIVELY

After planning your study time, use that time effectively. *Choose a study place where there are no distractions and where you do nothing but study,* say, a quiet library rather than a busy cafeteria. In time, you will learn to associate that location with studying, and studying there will become even easier (Watson & Tharp, 1997). To enhance your memory of the material, distribute your studying over multiple sessions (Rohrer & Taylor, 2006).

How you study is vital to your academic success. Don't read material passively and hope that it will just soak in. Instead, *use an active approach to learning.* For example, when reading a textbook chapter, first look over the chapter outline, which will give you a good idea of the information you are going to be processing. As you read the material, think about how it applies to your life or how it relates to other information that you already know (Higbee, 2001).

### PREPARING FOR TESTS AND ASSESSING YOUR UNDERSTANDING

Contrary to what many students believe, introductory psychology is not an easy course. It covers a lot of diverse material, and many new concepts must be mastered. Many students entering college don't realize that the academic demands far exceed those of high school. Moreover, many students don't realize how hard high achievers actually work. In one study, researchers found that failing students spent only one third as many hours studying as did A-students (who studied about two hours for every hour spent in class). Yet the failing students *thought* they were studying as much as anyone else, and many wondered why they were not doing well (Watson & Tharp, 1997).

As we noted earlier, a written study schedule helps spread your test preparation over time and helps avoid last-minute cramming. Cramming is less effective because it is fatiguing, taxes your memory, and may increase test anxiety, which interferes with learning and test performance (Chapell et al., 2005).

As you prepare for tests, it's also vital to repeatedly assess how well you understand the material. Unfortunately, research suggests that, in general, students are not highly accurate in judging how well they comprehend textbook material that they've just read (Dunlosky & Lipko, 2007). This can lead to overconfidence as you prepare for tests. You should try to answer the study questions provided for each chapter in the textbook's Online Learning Center and complete the "Test Yourself" quizzes within the chapters. More importantly, you should assess your understanding later on, after a time delay (Thiede & Anderson, 2003). For example, after completing all the readings for your upcoming test, try to answer the study questions again. Don't just look at them and say "Yeah, I know the answers," but actually verbalize or write out each answer and then refer back to the textbook to see whether your answer is accurate. The same goes for using the list of key terms at the chapter's end: test yourself on a delayed basis, and actually check the accuracy of your answers.

### TEST-TAKING STRATEGIES

Some students are more effective test takers than others. They know how to approach different types of tests (e.g., multiple choice or essay) to maximize their performance. Such skills are called *testwiseness* (Fagley, 1987). Here are some strategies that testwise students use:

- Use time wisely. Check your progress occasionally during the test. Answer the questions you know first (and, on essay exams, the ones worth the most points). Do not get bogged down on a question you find difficult. Mark it, and come back to it later.
- On essay exams, outline the points you want to make before you begin writing, then cover the key points in enough detail to communicate what you know.
- On multiple-choice tests, read each question and try to answer it before reading the answer options. If you find your answer among the alternatives, that alternative is probably the correct one. Still, read all the other alternatives to make sure that you choose the best one.
- As the "Myth or Reality?" feature discussed, don't be reluctant to change an answer if you believe that the alternative is better.
- Some multiple-choice questions have "all of the above" as an alternative. If one of the answer choices is clearly incorrect, eliminate the "all of the above" option; if you are sure that at least two of the answer choices are correct but are not sure about the third, choose "all of the above."

Time management, study skills, test-preparation strategies, and testwiseness are not acquired overnight; they require effort and practice. Look ahead to the "Applying Psychological Science" and "Research Close-up" features in the following chapters; they discuss additional principles that can help you enhance your academic performance:

## test yourself

### Psychology Today

True or False?

1.  A career in most subfields of psychology requires a doctoral degree.
2.  Psychiatry is a subfield of medicine—not a subfield of psychology—that specializes in studying and treating mental disorders.
3.  As scientists, psychologists strictly avoid providing input about matters of public policy.
4.  On multiple-choice tests, if you start to think that another answer to a question might be better than your original answer, don't switch. Usually, you're better off sticking with your first instinct.

ANSWERS: 1-true, 2-true, 3-false, 4-false

# Chapter Summary

## THE NATURE OF PSYCHOLOGY

- Psychology is the scientific study of behavior and the mind. Psychologists systematically gather and evaluate empirical evidence to answer questions about how people behave, think, and feel.
- Psychology's systematic approach yields more accurate knowledge about behavior than do everyday casual observations and conventional folk wisdom, which have generated many misconceptions and myths about human nature.
- Description, explanation, control, and application are the main goals of psychological science. Basic research reflects the quest for knowledge for its own sake. Applied research focuses on solving practical problems.
- Because psychologists study biological, psychological, and environmental factors that affect a wide array of behaviors, psychological science intersects with many other disciplines.

## PERSPECTIVES ON BEHAVIOR

- Several major perspectives have shaped psychology's scientific growth. In the late 1800s, Wundt and James helped found psychology. Structuralism, which examined the basic components of consciousness, and functionalism, which focused on the purposes of consciousness, were psychology's earliest schools of thought.
- The psychodynamic perspective proposes that unconscious motives, conflicts, and defense mechanisms influence our behavior. Freud emphasized how unconscious sexual and aggressive impulses and childhood experiences shape personality. Modern psychodynamic theories focus

on how early family relationships and our sense of self unconsciously influence our behavior.

- The behavioral perspective emphasizes how the external environment and learning shape behavior. Watson and Skinner believed that psychology should study only observable stimuli and responses, not unobservable mental processes. Cognitive behaviorists believe that learning experiences influence our thoughts, which in turn influence our behaviors.
- The humanistic perspective emphasizes personal freedom and choice, psychological growth, and self-actualization. Humanism has contributed to research on the self, the process of psychotherapy, and today's positive psychology movement.
- The cognitive perspective, embodied by the subfield of cognitive psychology, views humans as information processors who think, judge, and solve problems. Cognitive neuroscience examines brain processes that occur as people perform mental tasks.
- The sociocultural perspective examines how the social environment and cultural learning influence our behavior and thoughts. Cultural psychologists study how culture is transmitted to its members and examine similarities and differences among people from various cultures.
- The biological perspective examines how bodily functions regulate behavior and psychological characteristics. Behavioral neuroscientists study brain activity and hormonal influences, behavior geneticists examine the role of heredity, and evolutionary psychologists seek to explain how evolution has biologically predisposed modern humans toward certain ways of behaving.

**USING LEVELS OF ANALYSIS TO INTEGRATE THE PERSPECTIVES**

- Factors that influence behavior can be organized into three levels of analysis. The biological level examines brain processes, hormonal and genetic influences, and evolutionary adaptations. The psychological level focuses on mental processes and psychological motives. The environmental level examines physical and social stimuli, including cultural factors, that shape our behavior and thoughts.
- Biological, psychological, and environmental factors contribute to depression and also interact with one another. Interaction means that the way in which one factor (e.g., a personal setback) influences behavior depends on the presence of another factor (e.g., a weak or strong biological vulnerability to develop depression).

**PSYCHOLOGY TODAY**

- Modern psychologists work in many settings. They teach, conduct research, perform therapy and counseling, apply psychological principles to enhance human welfare, and help shape public policy.
- To enhance your learning and chances of performing well on tests, you can apply scientific psychological principles regarding time management, strategies for studying more effectively, test-preparation strategies, and techniques for taking tests.

## KEY TERMS AND CONCEPTS

*Each term has been boldfaced and defined in the chapter on the page indicated in parentheses.*

applied research (p. 9)
basic research (p. 9)
behavioral neuroscience (p. 18)
behavioral perspective (p. 13)
behavior genetics (p. 20)
behaviorism (p. 14)
biological perspective (p. 18)
biopsychology (p. 3)
British empiricism (p. 11)
clinical psychology (p. 2)
cognitive behaviorism (p. 15)
cognitive neuroscience (p. 16)

cognitive perspective (p. 16)
cognitive psychology (p. 3)
cultural (cross-cultural)
  psychology (p. 17)
developmental psychology (p. 3)
evolutionary psychology (p. 20)
experimental psychology (p. 3)
functionalism (p. 12)
humanistic perspective
  (humanism) (p. 15)
industrial-organizational (I/O)
  psychology (p. 3)

interaction (p. 23)
natural selection (p. 20)
neurotransmitters (p. 19)
norms (p. 17)
personality psychology (p. 4)
positive psychology movement (p. 16)
psychoanalysis (p. 13)
psychodynamic perspective (p. 12)
psychology (p. 2)
social psychology (p. 4)
sociocultural perspective (p. 17)
structuralism (p. 12)

# thinking **critically**

### ARE THE STUDENTS LAZY? (Page 15)

It may be tempting to blame the students' unresponsiveness on laziness, but a radical behaviorist would not focus on internal mental states to explain their inaction. First, to say that students are unresponsive *because* they're lazy doesn't explain anything. Consider this reasoning: How do we know that the students are lazy? Answer: because they are unresponsive. Therefore, if we say that students are lazy because they're unresponsive and then turn around and conclude that students are unresponsive because they are lazy, all we are really saying is that "students are unresponsive because they are unresponsive." This is not an explanation at all but rather an example of circular reasoning.

From a behavioral perspective, people's actions are shaped by the environment and learning experiences. Put yourself in the hypothetical role of the high school teacher: You may not realize it, but when students sit quietly, you smile and seem more relaxed. When students participate in class discussions, you are quick to criticize their ideas. In these ways you may have taught your students to behave passively.

To change their behavior, you can modify their educational environment so that they will learn new responses. Reward behaviors that you want to see (raising hands, correctly answering questions, and so on). For example, praise students not only for giving correct answers but also for participating. If an answer is incorrect, point this out in a nonpunitive way while still reinforcing the student's participation.

Modifying the environment to change behavior is often not as easy as it sounds, but this example illustrates one way a behaviorist might try to rearrange the environmental consequences rather than jump to the conclusion that the situation is hopeless.

### Jumbled-Word Paragraphs: Unscrambled Versions

Jumbled Paragraph 1 (page 2): According to a researcher at Cambridge University, it doesn't matter what order the letters in a word are, the only important thing is that the first and last letters are at the right place. The rest can be a total mess and you can still read it without a problem. This is because we do not read every letter by itself but the word as a whole. (*NOTE:* in the jumbled version, the author of original the paragraph misspelled *researcher* by adding an extra "ch" and omitting an "er".)

Jumbled Paragraph 2 (page 7): A politician denied the manslaughter of a colleague, but was convicted and developed severe medical conditions in prison, where he died. Administration of anticoagulant drugs potentiated the effects of another drug, and respiratory failure resulted.