

Summary

1 UNDERSTANDING STRESS

68

- **Stress** is the interpretation of specific events, called **stressors**, as threatening or challenging. The resulting physical and psychological reactions to these stressors are known as the *stress response*. There are several sources of stress, and three basic types of conflict: **approach–approach**, **avoidance–avoidance**, and **approach–avoidance**.
- The **general adaptation syndrome (GAS)** is a pattern of non-specific adaptational responses to a continuing stressor. It was first identified by Selye, and it includes three stages—alarm, resistance, and exhaustion.
- The **SAM system** and the **HPA axis** control significant physiological responses to stress. The SAM system prepares us for immediate action; the HPA axis responds more slowly but lasts longer. A new interdisciplinary field, called **psychoneuroimmunology**, studies the effects of psychological and other factors on the immune system.

2 STRESS AND ILLNESS

76

- Stress increases the risk of developing *gastric ulcers* among people who have the *H. pylori* bacterium in their stomachs.
- Stress makes the immune system less able to resist infection and cancer development.
- Stress hormones can cause fat to adhere to blood vessel walls, increasing the risk of heart attack. Having a **Type A** behavior pattern (hostile, aggressive) versus a **Type B** pattern (relaxed, easy-going) increases the risk of stress-related heart disease. People with a **positive affect** also tend to deal better with stress.
- Exposure to extraordinary stress can cause **posttraumatic stress disorder (PTSD)**, a type of trauma- and stressor-related

disorder characterized by the persistent re-experiencing of traumatic events, which resulted from directly or indirectly experiencing actual or threatened death, serious injury, or violence.

3 HEALTH PSYCHOLOGY AND STRESS MANAGEMENT

82

- **Health psychology**, a subfield of psychology, studies how people stay healthy, why they become ill, and how they respond when they become ill.
- Our level of stress generally depends on both our interpretation of and our reaction to stressors. **Emotion-focused** forms of coping involve emotional or cognitive strategies that help us manage our reactions to a stressful situation. Some emotion-focused **defense mechanisms**, such as rationalization, can be destructive because they distort reality and prevent us from developing valuable skills or qualities. It is often more effective to use **problem-focused** forms of coping, which deal directly with a stressor to decrease or eliminate it.
- Positive beliefs, a good sense of humor, and having an **internal locus of control** (believing that we control our own fate), as opposed to having an **external locus of control** (believing that chance or outside forces beyond our control determine our fate) are all effective personal strategies for stress management. External resources include **mindfulness-based stress reduction (MBSR)**, as well as social support, exercise, social skills, behavior change, stressor control, material resources, and relaxation.

🌀 applying real world psychology

We began this chapter with five intriguing Real World Psychology questions, and you were asked to revisit these questions at the end of each section. Questions like these have an important and lasting impact on all of our lives. See if you can answer these additional critical thinking questions related to real world examples.

- 1 How might the child in this photo be affected biologically, psychologically, and socially (the biopsychosocial model) by her mother's drinking?
- 2 Are you more of a Type A or Type B person? What are the advantages and disadvantages to each type?
- 3 What could a health psychologist do to improve the well-being of the mother and child in this photo?
- 4 Health psychologists often advise us to make lifestyle changes to improve our health and longevity. Do you think this is important? If so, what do you plan to change in your own life?
- 5 Would you like to be a health psychologist? Why or why not?



Dennis MacDonald/PhotoEdit

TABLE 3.4

SIX ADDITIONAL EXTERNAL STRESS RESOURCES

Exercise

Exercising and keeping fit help minimize anxiety and depression, which are associated with stress. Exercise also helps relieve muscle tension; improves cardiovascular efficiency; and increases strength, flexibility, and stamina.



© RichVintage/iStockphoto

Social skills

People who acquire social skills (such as knowing appropriate behaviors for certain situations, having conversation starters up their sleeves, and expressing themselves well) suffer less anxiety than people who do not. Social skills not only help us interact with others but also communicate our needs and desires, enlist help when we need it, and decrease hostility in tense situations.



NewsCom

Behavior change

When under stress, do you smoke, drink, overeat, zone out in front of the TV or computer, sleep too much, procrastinate, or take your stress out on others? If so, substitute these activities with healthier choices.

© Hill Street Studios/
Blend Images/Corbis**Stressor control**

While not all stress can be eliminated, it helps to recognize and avoid unnecessary stress by: analyzing your schedule and removing nonessential tasks, and controlling your environment (by avoiding people and topics that stress you, or finding a less stressful job. It's also important to give yourself permission to say "no" to extra tasks and responsibilities.



© PK-Photos/iStockphoto

Material resources

Money increases the number of options available for eliminating sources of stress or reducing the effects of stress. When faced with the minor hassles of everyday living, chronic stressors, or major catastrophes, people with more money and the skills to effectively use it generally fare better and experience less stress than people with less money.



© Juanmonino/iStockphoto/

Relaxation

There are a variety of relaxation techniques. *Biofeedback* is often used in the treatment of chronic pain, but it is also useful in teaching people to relax and manage their stress. *Progressive relaxation* helps reduce or relieve the muscular tension commonly associated with stress (see *Psychology and You*).

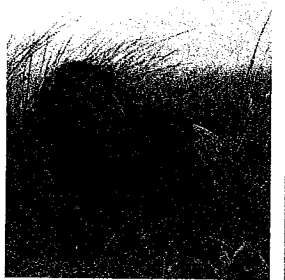
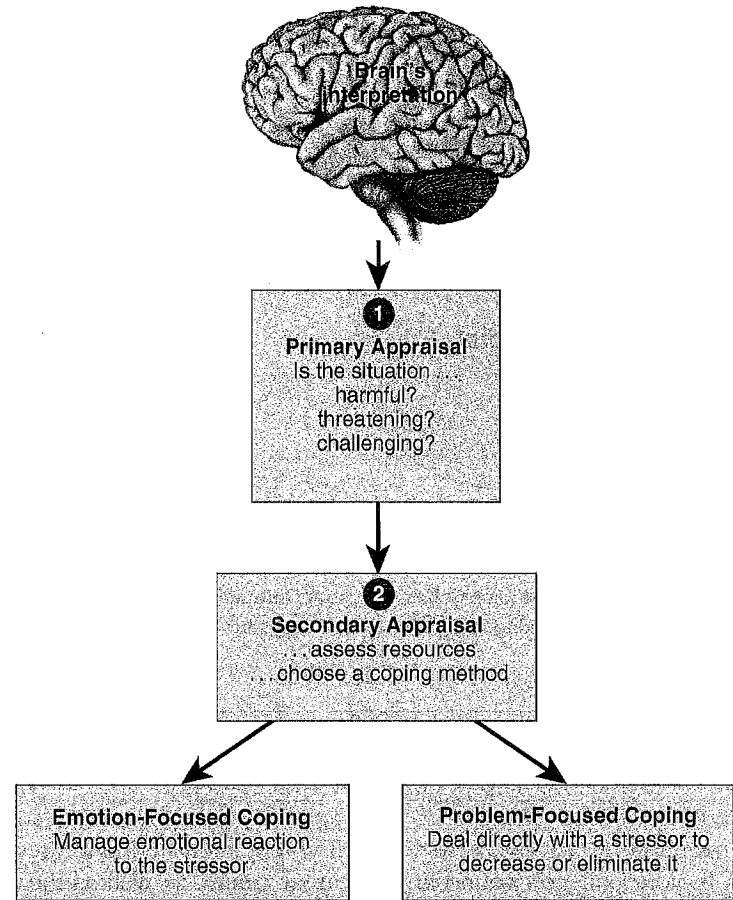
Dynamic Graphics Value/
SUPERSTOCK

FIGURE 3.11 COGNITIVE APPRAISAL AND COPING

Research suggests that our emotional response to an event depends largely on how we interpret the event. First, we go through a *primary appraisal* process to evaluate the threat. Next, during the *secondary appraisal*, we assess our resources for coping with the stress. Then, we generally choose either *emotion-* or *problem-focused* methods of coping, or a combination of the two.



may block us from seeing a situation more clearly and realistically, which in turn can prevent us from developing valuable skills.

Q5 Note that emotion-focused forms of coping can't change the problem, but they do make us feel better about the stressful situation. For example, teenagers who are asked to think about the benefits of a recent stressful event—such as having a fight or losing a loved one—show increases in positive mood and decreases in negative mood (Rood et al., 2012). Interestingly, instant messaging (IM) also helps distressed teenagers share their emotions and receive immediate social support and advice (Dolev-Cohen & Barak, 2013).

Keep in mind that emotion-focused coping can be beneficial, as long it reflects fairly accurate reappraisals of stressful situations, is not overused, and does not distort reality (Giacobbi et al., 2004; Hoar et al., 2012; Völlink et al., 2013).

Resources for Healthy Living

A person's ability to cope effectively with stress depends in large part on his or her own personality and internal resources. Having a positive attitude with an optimistic outlook on life can be especially helpful (Seligman, 2007, 2011). For example, people who see stress as enhancing, not debilitating, show more adaptive – healthier – cortisol responses (Crum et al., 2013). Hope can sustain a person in the face of

HEALTH PSYCHOLOGY AND STRESS MANAGEMENT

LEARNING OBJECTIVES

RETRIEVAL PRACTICE While reading the upcoming sections, respond to each Learning Objective in your own words. Then compare your responses with those found at www.wiley.com/college/huffman.

- 1 EXPLAIN** what health psychologists do.
- 2 COMPARE** emotion-focused and problem-focused forms of coping.
- 3 REVIEW** the major resources for stress management.

Health psychology A subfield of psychology that studies how people stay healthy, why they become ill, and how they respond when they become ill.

How people stay healthy, why they become ill, and how they respond when they become ill is the focus of **health psychology**. In this section, we will first discuss the work of health psychologists and then explore how we cognitively appraise potential stressors, cope with perceived threats, and make use of eight resources for stress management.

What Does a Health Psychologist Do?

Health psychologists are interested in how people's lifestyles and activities, emotional reactions, ways of interpreting events, and personality characteristics influence their physical health and well-being.

As researchers, health psychologists are particularly interested in how changes in behavior can improve health outcomes (Belar et al., 2013; Suls et al., 2010). They also emphasize the relationship between stress and the immune system. As we discovered earlier, a normally functioning immune system helps defend against disease. On the other hand, a suppressed immune system leaves the body susceptible to a number of illnesses.

As practitioners, health psychologists can work as independent clinicians or as consultants alongside physicians, physical and occupational therapists, and other health care workers. The goal of health psychologists is to reduce psychological distress or unhealthy behaviors. They also help patients and families make critical decisions and prepare psychologically for surgery and other treatment. Health psychologists have become so involved with health and illness that medical centers are one of their major employers (Considering a Career, 2011).

Health psychologists also educate the public about health *maintenance*. They provide information about the effects of stress, smoking, alcohol, lack of exercise, and other health issues. For example, tobacco use endangers both smokers and those who breathe secondhand smoke, so it's not surprising that health psychologists are concerned with preventing smoking and getting those who already smoke to stop.

The first puff on a cigarette is rarely pleasant. So why do people start smoking? The answer can be found in the biopsychosocial model (**Figure 3.9**). From a biological perspective, nicotine is highly addictive. So once a person begins to smoke, there is a biological need to continue (**Figure 3.10**). Nicotine addiction appears to be very similar to heroin, cocaine, and alcohol addiction (David et al., 2013; Wang et al., 2011).

From a psychological and social perspective, smokers learn to associate smoking with pleasant things, such as good food, friends, and sex. People also form such associations from seeing smoking in the movies, which is one reason researchers believe that requiring all movies with characters who smoke to be rated R would reduce smoking in teenagers by 20% (Sargent et al., 2012).



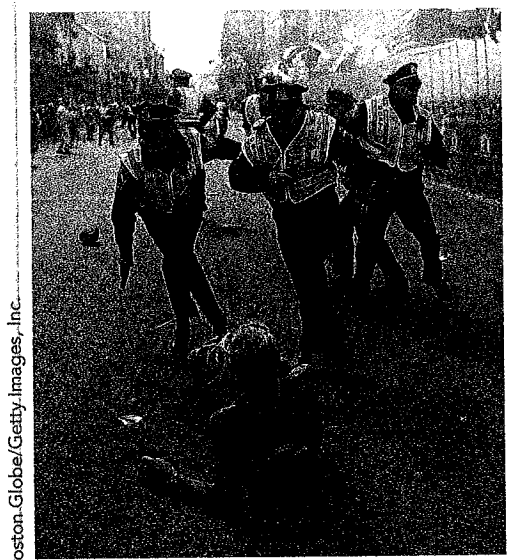
Warner Bros. Pictures/Photofest

HOLLYWOOD AND NICOTINE ADDICTION

Does watching movie stars smoke encourage others to follow suit? Researchers say "Yes!"

Posttraumatic stress disorder (PTSD)

A trauma- and stressor-related disorder that develops from directly or indirectly experiencing actual or threatened death, serious injury, or violence.

**FIGURE 3.8 STRESS AND PTSD**

People who experience traumatic events, such as the survivors of the bombing attack during the Boston Marathon on April 15, 2013, may develop symptoms of PTSD.

Posttraumatic Stress Disorder (PTSD)

One of the most powerful examples of the effects of severe stress is **posttraumatic stress disorder (PTSD)** (American Psychiatric Association, 2013; Baker et al., 2011; Pace & Heim, 2011; Ruzek et al., 2011).

Research shows that approximately 40% of all children and teens will experience a traumatic stressor and that the lifetime prevalence for trauma is between 50 to 90% (Brown et al., 2013). However, the vast majority will not go on to develop PTSD, which is a long-lasting, trauma and stressor-related disorder occurring in both men and women, adults, and children.

PTSD's essential feature is the development of characteristic symptoms (**Table 3.2**) following exposure to one or more traumatic events (American Psychiatric Association, 2013). These symptoms may continue for months or even years after the event. Unfortunately, some victims of PTSD turn to alcohol and other drugs to cope, which generally compounds the problem (Cougle et al., 2011; McCauley et al., 2012; Simpson et al., 2012).

Many people think PTSD results only from direct experiences in military combat, but victims of natural disasters, physical or sexual assault, terrorist attacks, and rescue workers facing overwhelming situations may also develop PTSD. Sadly, research shows that simply watching television coverage of major natural disasters, such as hurricanes, earthquakes and tornados, can increase the number of PTSD symptoms, especially in children who are already experiencing some symptoms (Weems et al., 2012).

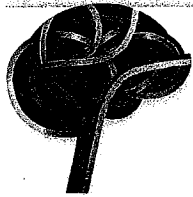
PTSD is not a new problem. During the Industrial Revolution, workers who survived horrific railroad accidents sometimes developed a condition very similar to PTSD. It was called "railway spine" because experts thought the problem resulted from a twisting or concussion of the spine. Later, doctors working with combat veterans referred to the disorder as "shell shock" because they believed it was a response to the physical concussion caused by exploding artillery. Today, we know that PTSD is caused by exposure to extraordinary stress (**Figure 3.8**).

What can we do to help? Professionals have had success with various forms of therapy and medication for PTSD (Foa et al., 2013). They've also offered several constructive tips for the general public (**Table 3.3**).

TABLE 3.2 KEY CHARACTERISTICS OF PTSD

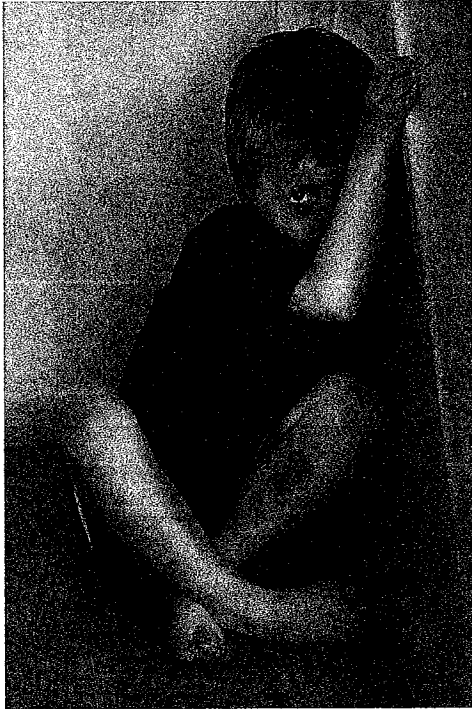
1. Exposure to serious trauma by directly experiencing it, witnessing it happen to others, learning that it happened to close family or friends, recurring exposure to the event (e.g., police and other first responders).
2. Presence of trauma-related intrusive symptoms, such as recurrent memories and/or dreams, dissociative reactions (e.g., flashbacks), intense or prolonged psychological or physiological distress over cues associated with traumatic event.
3. Persistent avoidance of stimuli associated with traumatic event.
4. Negative and persistent changes in thoughts or moods, including forgetting important aspects of traumatic event, negative beliefs ("I'm bad," "The world is completely dangerous"), negative emotions (fear, anger, guilt), feeling detached from others, inability to experience positive emotions.
5. Marked changes in arousal and reactivity, such as irritability, angry outbursts, reckless or self-destructive behavior, exaggerated startle response, sleep disturbances.

Source: Adapted from American Psychiatric Association (2013), *Diagnostic and statistical manual of mental disorders* (DSM-5).



PSYCHSCIENCE

THE SAD AND LASTING IMPACT OF CHILD ABUSE ON HEALTH



© Agostinosangel/iStockphoto

Researchers interested in examining the long-term consequences of childhood abuse on health surveyed 2,101 adults across the United States (Morton et al., 2012). Participants were questioned about their childhood experiences, including poverty, their parents' highest level of education, and how frequently their parents had exhibited behaviors, such as:

- Refusing to talk to them,
- Threatening to hit them,
- Pushing, grabbing, or shoving them,

- Throwing something at them,
- Kicking, biting, or hitting them with a fist,
- Choking them, and
- Burning or scalding them.

Sadly, children who experienced frequent emotional and/or physical abuse were found to be at much higher risk of developing cancer as adults than children who had not experienced such abuse. Boys who experienced both types of abuse were 6 times more likely to report developing cancer as adults, and girls who experienced both types of abuse were 15 times more likely to develop cancer. Given your new understanding of the link between stress and health outcomes, how would you explain these findings?

RESEARCH CHALLENGE

- 1 Based on the information provided, did the study (Morton et al., 2012) use descriptive, correlational, and/or experimental research?
- 2 If you chose:
 - descriptive research, is this a naturalistic observation, survey/interview, case study, or archival research?
 - correlational research, is this a positive, negative, or zero correlation?
 - experimental research, label the IV, DV, experimental group(s), and control group.

>>CHECK YOUR ANSWERS IN APPENDIX B.

NOTE: The information provided in this study is admittedly limited, but the level of detail is similar to what is presented in most textbooks and public reports of research findings. Answering these questions, and then comparing your answers to those in the Appendix, will help you become a better critical thinker and consumer of scientific research.

(Andersen et al., 2010). In fact, women who receive this intervention are 45% less likely to have a cancer recurrence than those without this training.

Cardiovascular Disorders

Cardiovascular disorders contribute to over half of all deaths in the United States (American Heart Association, 2012). Understandably, health psychologists are concerned because stress is a major contributor to these deaths (Emery et al., 2013; Landsbergis et al., 2011; Montoro-Garcia et al., 2011; Steptoe & Kivimäki, 2013).

Heart disease is a general term for all disorders that eventually affect the heart muscle and lead to heart failure. *Coronary heart disease* occurs when the walls of the coronary arteries thicken, reducing or blocking the blood supply to the heart.

RETRIEVAL PRACTICE: UNDERSTANDING STRESS

Self-Test

Completing this self-test and comparing your answers with those in Appendix B provides immediate feedback and helpful practice for exams. Additional interactive, self-tests are available at www.wiley.com/college/huffman.

- When John saw his girlfriend kissing another man at a party, he became very upset. In this situation, watching someone you love kiss a potential competitor is _____, and becoming upset is _____.
 - a stressor; a biological imperative
 - distressing; a life change event
 - a cataclysmic event; evidence of a burnout
 - a stressor; a stress response
- A state of physical, emotional, and mental exhaustion due to persistent emotionally demanding situations is called _____.
 - primary conflict
 - technostress
 - burnout
 - secondary conflict
- In an approach–approach conflict, we must choose between two or more goals that will lead to _____, whereas in an avoidance–avoidance conflict, we must choose between two or more goals that will lead to _____.
 - less conflict; more conflict
 - frustration; hostility
 - a desirable result; an undesirable result
 - effective coping; ineffective coping
- As Michael watches his instructor pass out papers, he suddenly realizes that this is the first major exam, and he is unprepared. Which phase of the GAS is he most likely experiencing?
 - resistance
 - alarm
 - exhaustion
 - phase out

Think Critically

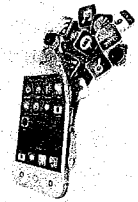
- What are the major sources of stress in your life?
- How does chronic stress threaten our immune system?

realworldpsychology

Does the use of social media lead to stress?

Can loneliness make you sick?

HINT: LOOK IN THE MARGIN FOR  AND 



STRESS AND ILLNESS

LEARNING OBJECTIVES

RETRIEVAL PRACTICE While reading the upcoming sections, respond to each Learning Objective in your own words. Then compare your responses with those found at www.wiley.com/college/huffman.

- EXPLAIN** how biological and psychological factors can jointly influence the development of gastric ulcers.
- DESCRIBE** the relationship between stress and cancer.
- DEFINE** the personality patterns that can influence how we respond to stress.
- IDENTIFY** the cause and key symptoms of posttraumatic stress disorder (PTSD).

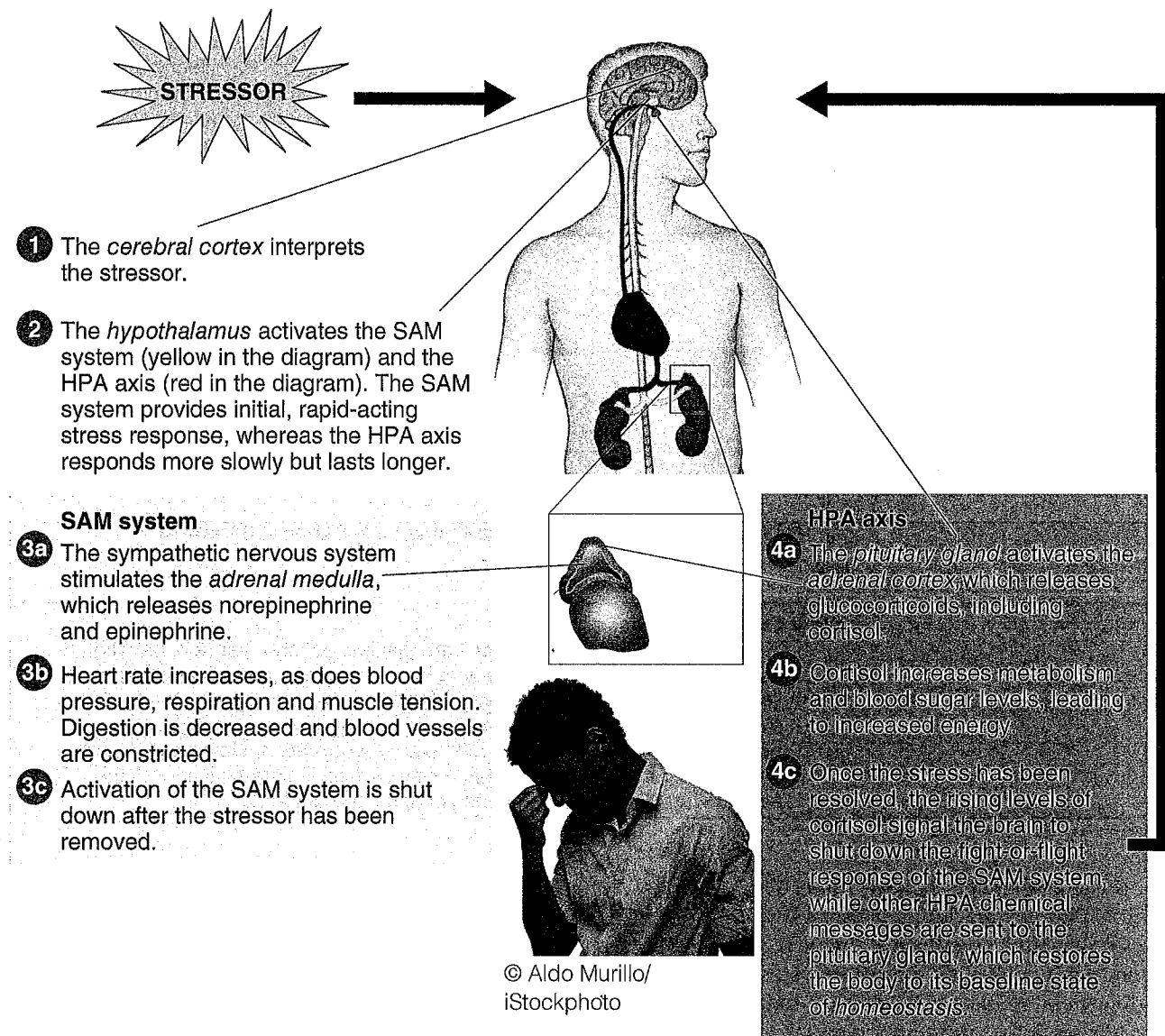
As we've just seen, stress has dramatic effects on our bodies. This section explores how stress is related to four serious illnesses—gastric ulcers, cancer, cardiovascular disorders, and posttraumatic stress disorder (PTSD).

Gastric Ulcers

Gastric ulcers are lesions to the lining of the stomach (and duodenum—the upper section of the small intestine) that can be quite painful. In extreme cases, they may even be life-threatening. Beginning in the 1950s, psychologists reported strong

FIGURE 3.4 THE STRESS RESPONSE—AN INTERRELATED SYSTEM

Faced with stress, our sympathetic nervous system prepares us for immediate action—to “fight or flee.” Our slower-acting HPA axis maintains our arousal. Here’s how it happens:



periodontal disease, and even the common cold (Carroll et al., 2011; Cohen et al., 2002, 2012; Cohen & Lemay, 2007; Dantzer et al., 2008; Gasser & Raulet, 2006; Segerstrom & Miller, 2004).

Prolonged, excessive, and/or chronic stress also contributes to hypertension, memory problems, depression, posttraumatic stress disorder (PTSD), drug and alcohol abuse, and even low birth weight (Bagley et al., 2011; Johnson et al., 2008; Stalder et al., 2010; Straub, 2011; Yuen et al., 2012).

Interestingly, the relationship between stress and depression has even been shown in rats. For example, researchers in one study caused stress in rats by restricting their food and play time, isolating them from other rats, and switching around their sleep and awake times for three weeks (Son et al., 2012). After experiencing this stress, the rats showed clear signs of depression, including having little interest in eating or drinking tasty sugar water and showing immobility instead of swimming when placed in water.

As if the long list of ill effects for both human and nonhuman animals weren't enough, severe or prolonged stress can also produce premature aging, faster growth of cancer cells, and even death (Ahola et al., 2012; Cohen et al., 2012; Russ et al., 2012; Wikgren et al., 2011).

Burnout A state of psychological and physical exhaustion that results from chronic exposure to high levels of stress, with little personal control.

Frustration Unpleasant tension, anxiety, and heightened sympathetic activity that results from a blocked goal.

mental, and emotional exhaustion known as **burnout** (Chen & Kao, 2013; Jung & Kim, 2012; Kumar & Mellso, 2013). This is particularly true for some people in chronically stressful professions, such as firefighters, police officers, doctors, and nurses. Their exhaustion and “burnout” then lead to more work absences, reduced productivity, and increased risk of illness.

Some authorities believe hassles can be more significant than major life events in creating stress (Kubiak et al., 2008; Stefanek et al., 2012). Divorce is extremely stressful, but it may be so because of the increased number of hassles it brings—changes in finances, child-care arrangements, longer working hours, and so on.

Like hassles, **frustration**, a negative emotional state resulting from a blocked goal, can cause stress. And the more motivated we are, the more frustrated we become when our goals are blocked.

Voices from the Classroom

Frustration and Grades When talking about stress, arousal, and coping, I try to select real world events to which my students can relate, such as a frustrating bad exam score and how they responded and coped with it. I ask them, “Is stress in the eye of the beholder?” “Did you allow the low score to question your ability in the class—high and irrational stress?” “Or did you see it as an opportunity to reassess your studying habits and class participation—moderate, and most importantly, manageable stress?” I want my students to think about their own role in assessing stress and then become proactive about it. Not surprisingly, my office hours are significantly busier from this point of the semester forward!

Professor David W. Steitz,
Nazareth College
Rochester, New York

General adaptation syndrome (GAS)

Selye’s three-stage (alarm, resistance, exhaustion) reaction to chronic stress; a pattern of nonspecific, adaptational response to a continuing stressor.

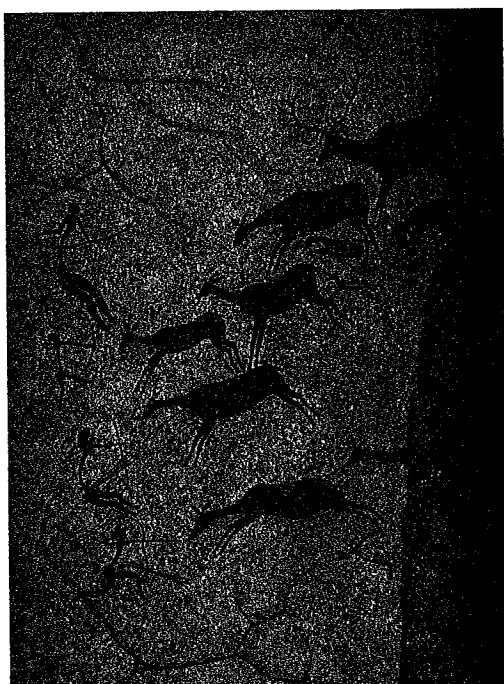
Effects of Stress

When mentally or physically stressed, our bodies undergo several biological changes that can be detrimental to health. In 1936, Canadian physician Hans Selye (SELL-yay) described a generalized physiological reaction to stress that he called the **general adaptation syndrome (GAS)**. The GAS occurs in three phases—*alarm*, *resistance*, and *exhaustion*—activated by efforts to adapt to any stressor, whether physical or psychological (**Figure 3.3**).

Most of Selye’s ideas about the GAS pattern of stress response have proven to be correct, but we now know that different stressors evoke different responses and that people vary widely in their reactions to them. For example, one of the most interesting differences has to do with gender. Men more often choose “fight or flight.” In contrast, women are more likely to “tend and befriend,” which means that they more often take care of themselves and their children (tending) and form strong social bonds with others (befriending) (Taylor, 2006, 2012; von Dawans et al., 2012).

Stress in Ancient Times

As shown in these ancient cave drawings, the automatic fight-or-flight response was adaptive and necessary for early human survival. However, in modern society, it occurs as a response to ongoing situations where we often cannot fight or flee. This repeated arousal can be detrimental to our health.



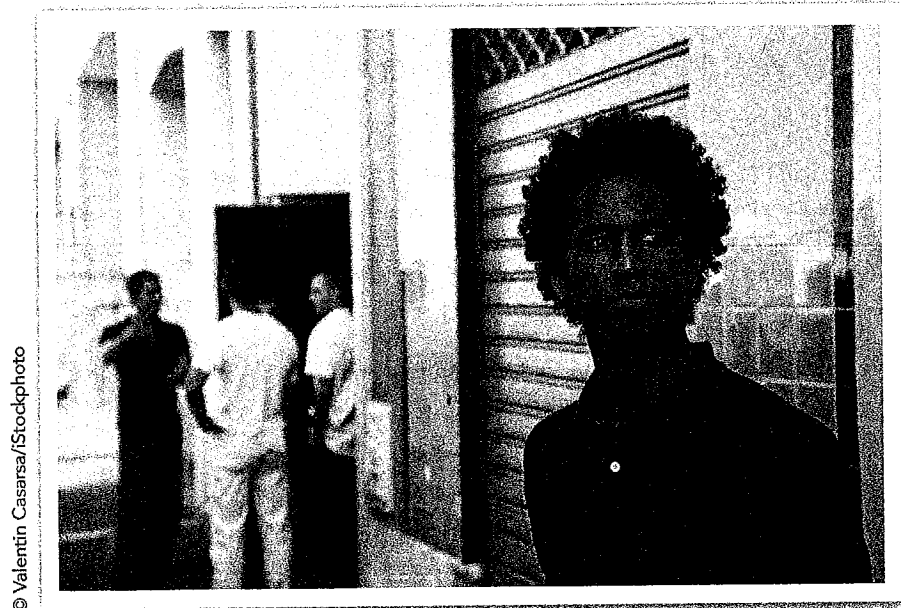


FIGURE 3.2 DISCRIMINATION AS A CHRONIC STRESSOR

One type of stressful event that some people experience is discrimination based on their race or social class, which can lead to higher levels of dangerous health-related behaviors, including substance abuse and risky sexual choices (Stock et al., 2013). Discrimination also is linked with negative health consequences, such as high blood pressure, cardiovascular disease, and diabetes (Bratter & Gorman, 2011; Fuller-Rowell et al., 2012; Szanton et al., 2011).

Our social lives can also be chronically stressful because making and maintaining friendships requires considerable thought and energy (Sias et al., 2004). For example, although people often use Facebook to maintain friendships, research suggests that your stress level increases with the more Facebook “friends” you have and the more time you spend on the site. In addition, an online survey of college students’ attitudes about Facebook revealed the following (Charles, 2011):

- 12% reported that Facebook made them feel anxious,
- 63% reported delaying responses to friend requests,
- 32% reported that rejecting friend requests made them feel guilty and uncomfortable, and
- 10% reported disliking receiving friend requests (perhaps because they may lead to guilt and discomfort).

What is stressful about Facebook? People may feel excluded from social events that are often described and photographed on Facebook, experience pressure to be entertaining when they post, and fear that they are missing important information if they don’t check in repeatedly. These findings suggest that keeping in touch with friends through Facebook may have some disadvantages as well as some advantages.

Given the recent global economic downturn, one of our most pressing concerns is *job stress*, which can result from unemployment, job change, worries about job performance, and so on (Halbesleben et al., 2013; Hoppe, 2011; O’Neill & Davis, 2011). One study found that leaders—including military officers and government officials—experience lower levels of stress than nonleaders, presumably because they have higher levels of control in their work environments (Sherman et al., 2012). The most stressful jobs are those that make great demands on performance and concentration but allow little creativity or opportunity for advancement (Quick et al., 2013; Sanderson, 2013).

Stress at work can also cause serious stress at home, not only for the worker but for other family members as well. In our private lives, divorce, child and spousal

chapteroverview

Do you recall the 2013 dramatic rescue of the three women held hostage in a suburban house in Cleveland, Ohio? Despite having been raped, beaten, and caged under horrific conditions for over a decade, these women apparently survived with their physical and emotional health relatively intact. As you might expect, stress exists on a continuum, and it's largely in the eye of the beholder. We would all agree that what these women endured was extreme, unimaginable stress. In comparison, if you've done poorly on previous exams and are only just now reading this chapter at the last minute before an exam, you may be experiencing personally high levels of stress. But, if you're a student who's generally well prepared and performs well on exams, you're probably experiencing little or no stress. In short, stress is largely dependent on our interpretations of events and our perceived resources for coping with them.

In this chapter, we'll focus on a general understanding of stress, its relationship with major illness, and healthy ways to manage it. ■■■

UNDERSTANDING STRESS

LEARNING OBJECTIVES

RETRIEVAL PRACTICE While reading the upcoming sections, respond to each Learning Objective in your own words. Then compare your responses with those found at www.wiley.com/college/huffman.

- 1 IDENTIFY** the major sources of stress.
- 2 REVIEW** the three phases of the general adaptation syndrome (GAS).
- 3 DESCRIBE** the SAM system and the HPA axis.

Stress The interpretation of specific events, called *stressors*, as threatening or challenging; the physical and psychological reactions to stress, known as the *stress response*.

Stressor A trigger or stimulus that induces stress.

Everyone experiences **stress**, and we generally know what a person means when he or she speaks of being “stressed.” But scientists generally define stress as *the interpretation of specific events, called stressors, as threatening or challenging*. The resulting physical and psychological reactions to stressors are known as the *stress response* (Cardena et al., 2013; Sanderson, 2013). Using these definitions, can you see how an upcoming exam on this material could be called a stressor, whereas your physical and psychological reactions are your stress response? In the following section, we'll discuss the key sources of stress and how it affects us.

Sources of Stress

Although literally hundreds of things can cause stress in all our lives, psychological science has focused on seven major sources (**Figure 3.1**). For example, early stress researchers, Thomas Holmes and Richard Rahe (1967), believed that any *life change* that required some adjustment in behavior or lifestyle could cause some degree of stress. They also believed that exposure to numerous stressful events in a short period could have a direct, detrimental effect on health.

To investigate the relationship between change and stress, Holmes and Rahe created the Social Readjustment Rating Scale (SRRS), which asks people to check off all the life events they have experienced in the previous year (see *Psychology and You*).

The SRRS is an easy and popular tool for measuring stress (e.g., Fabre et al., 2013), and cross-cultural studies have shown that most people rank the magnitude of their stressful events similarly (Hashimoto et al., 2012; Thoits, 2010).

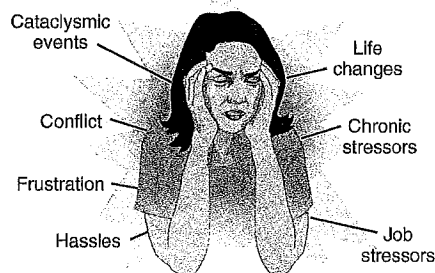


FIGURE 3.1 SEVEN MAJOR SOURCES OF STRESS
realworldpsychology

chapterthree

Stress and Health Psychology

CHAPTER OUTLINE

UNDERSTANDING STRESS 68

- Sources of Stress
- Voices from the Classroom: Frustration and Grades
- Effects of Stress

STRESS AND ILLNESS 76

- Gastric Ulcers
- Cancer
- **PsychScience:** The Sad and Lasting Impact of Child Abuse on Health
- Cardiovascular Disorders
- Posttraumatic Stress Disorder (PTSD)

HEALTH PSYCHOLOGY AND STRESS MANAGEMENT 82

- What Does a Health Psychologist Do?
- Coping with Stress
- Resources for Healthy Living



very fragile, recent research shows that the brain is capable of lifelong **neuroplasticity** and **neurogenesis**. Neurogenesis is made possible by **stem cells**.

- The **peripheral nervous system (PNS)** includes all the nerves outside the brain and spinal cord. It links the brain and spinal cord to the body's sense receptors, muscles, and glands. The PNS is subdivided into the **somatic nervous system (SNS)**, which controls voluntary movement, and the **autonomic nervous system (ANS)**, which is responsible for automatic behavior.
- The ANS includes the **sympathetic nervous system** and the **parasympathetic nervous system**. The sympathetic nervous system mobilizes the body's "fight or flight" response. The parasympathetic nervous system returns the body to its normal functioning.

4 A TOUR THROUGH THE BRAIN

52

- Neuroscientists have developed several tools to explore the human brain and nervous system. Early researchers used dissection and other methods like clinical observation and case studies of living people. Recent scientific advances include newer brain imaging scans, which have improved scientists' ability to examine these processes and to do so noninvasively.
- The brain is divided into the **hindbrain**, the **midbrain**, and the **forebrain**. The brainstem includes parts of each of these.

Certain brain structures are specialized to perform certain tasks thanks to *localization of function*.

- The hindbrain, including the **medulla**, **pons**, and **cerebellum**, controls automatic behaviors and survival responses.
- The midbrain helps us orient our eye and body movements, helps control sleep and arousal, and is involved with the neurotransmitter dopamine. The **reticular formation (RF)** runs through the core of the hindbrain, midbrain, and brainstem, and is responsible for screening information and managing our levels of alertness.
- Forebrain structures, including the **cerebral cortex**, **hypothalamus**, **limbic system**, and **thalamus**, integrate input from the senses, control basic motives, regulate the body's internal environment, and regulate emotions, learning, and memory.
- The **cerebral cortex**, part of the forebrain, governs most higher processing and complex behaviors. It is divided into two hemispheres, each controlling the opposite side of the body. The **corpus callosum** links the hemispheres. Each hemisphere is divided into **frontal**, **parietal**, **temporal**, and **occipital lobes**. Each lobe specializes in somewhat different tasks, but a large part of the cortex is devoted to integrating actions performed by different brain regions.
- **Split-brain** research shows that each hemisphere performs somewhat different functions, although they work in close communication.

🌀 applyingrealworldpsychology

We began this chapter with five intriguing Real World Psychology questions, and you were asked to revisit these questions at the end of each section. Questions like these have an important and lasting impact on all of our lives. See if you can answer these additional critical thinking questions related to real world examples.

- 1 Most traits are polygenic, meaning they are controlled by more than one gene. Given that tongue curling is one of the few traits that depends on only one dominant gene, can you explain why both of the parents of the three boys in this photo are "curlers"?
- 2 Why might humans and other animals have evolved to possess complex traits such as tongue curling?
- 3 If neuroscientists were able to use brain scans to determine what a person is thinking, what might be the ethical considerations of this type of research?
- 4 Imagine that your friend "John" has suffered a major automobile accident, and now has right-sided paralysis. Given that he has lost his ability to speak, can you identify the specific section of the brain and which hemisphere was most likely damaged in the accident?
- 5 Some research suggests that women are better than men at multitasking. What part(s) of the brain would explain this possible difference?



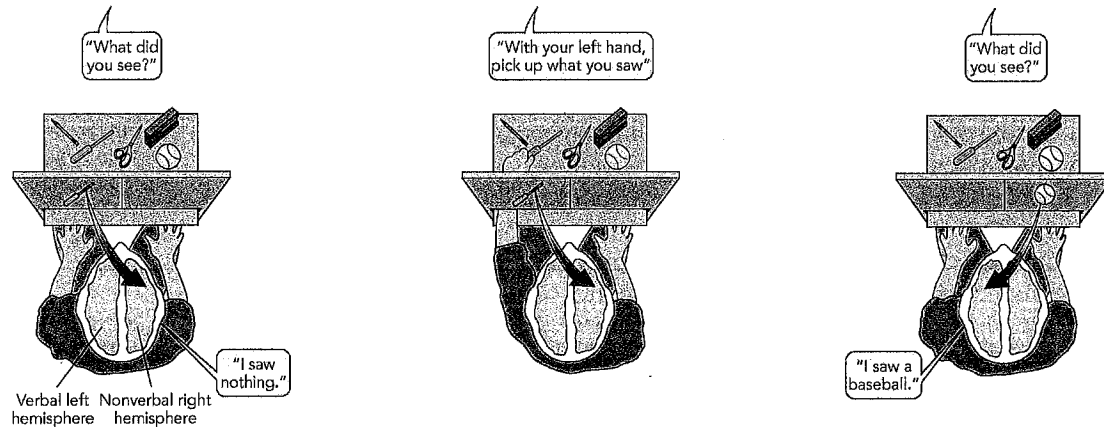
Courtesy Karen Huffman

appear only with specialized testing. See **Figure 2.27** for an illustration and description of this type of specialized test. Keep in mind that in actual split-brain surgery on live patients, only some fibers within the corpus callosum are cut (*not* the lower brain structures), and this surgery is performed only in rare cases of intractable epilepsy.

In our tour of the nervous system, the principles of localization of function, lateralization, and specialization recur: Dendrites receive information, the occipital lobes specialize in vision, and so on. Keep in mind, however, that all parts of the brain and nervous system also play overlapping and synchronized roles.

FIGURE 2.27 SPLIT-BRAIN RESEARCH

Experiments on split-brain patients often present visual information to only the patient's left or right hemisphere, which leads to some intriguing results.

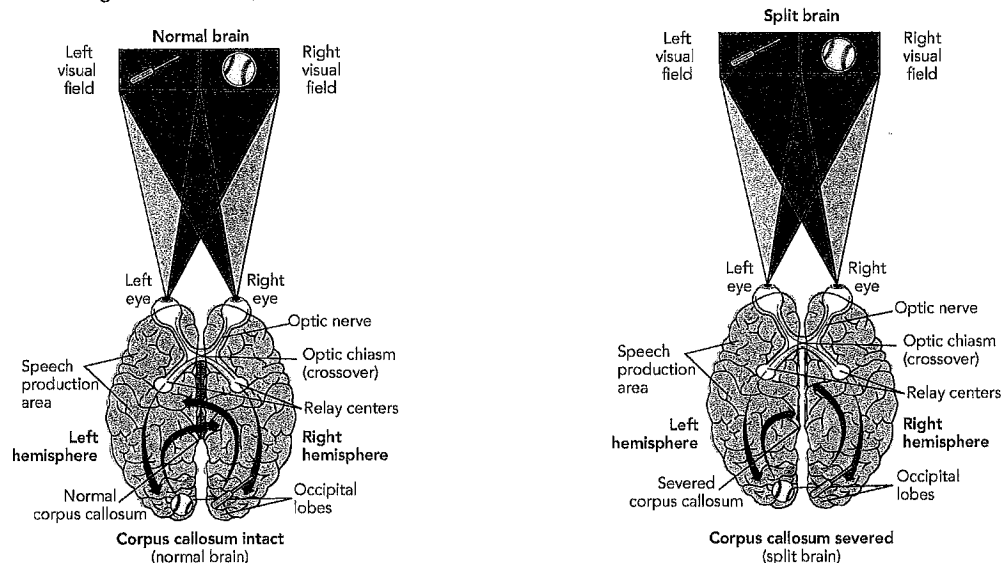


A When a split-brain patient is asked to stare straight ahead while a photo of a screwdriver is flashed only to the right hemisphere, he will report that he "saw nothing."

B However, when asked to pick up with his left hand what he saw, he can reach through and touch the items hidden behind the screen and easily pick up the screwdriver.

C When the left hemisphere receives an image of a baseball, the split-brain patient can easily name it.

Assuming you have an intact, nonsevered corpus callosum, if the same photos were presented to you in the same way, you could easily name both the screwdriver and the baseball. Can you explain why? The answers lie in our somewhat confusing visual wiring system (as shown in drawings d and e below).



D As you can see, our eyes normally connect to our brains in such a way that, when we look straight ahead, information from the left visual field travels to our right hemisphere (the blue line). In contrast, information from the right visual field travels to our left hemisphere (the red line). The messages received by either hemisphere are then quickly sent to the other across the corpus callosum (the red and blue arrows).

E When the corpus callosum is severed (note the white line down the middle of the two hemispheres), a split-brain patient cannot verbalize what he sees. This is because in this particular task the visual information is presented only to the right hemisphere and the information cannot travel to the opposite (verbal) hemisphere.

Occipital lobes The two lobes at the back of the brain that are primarily responsible for vision and visual perception.

Parietal lobes The two lobes located at the top of the brain, in which bodily sensations are received and interpreted.

Association areas The “quiet” areas in the cerebral cortex involved in interpreting, integrating, and acting on information processed by other parts of the brain.

or heard, but they could speak quickly and easily. However, their speech was often unintelligible because it contained made-up words, sound substitutions, and word substitutions. This syndrome is now referred to as *Wernicke's aphasia*.

Occipital Lobes

The **occipital lobes** are responsible for, among other things, vision and visual perception. Damage to the occipital lobes can produce blindness, even if the eyes and their neural connection to the brain are perfectly healthy.

Parietal Lobes

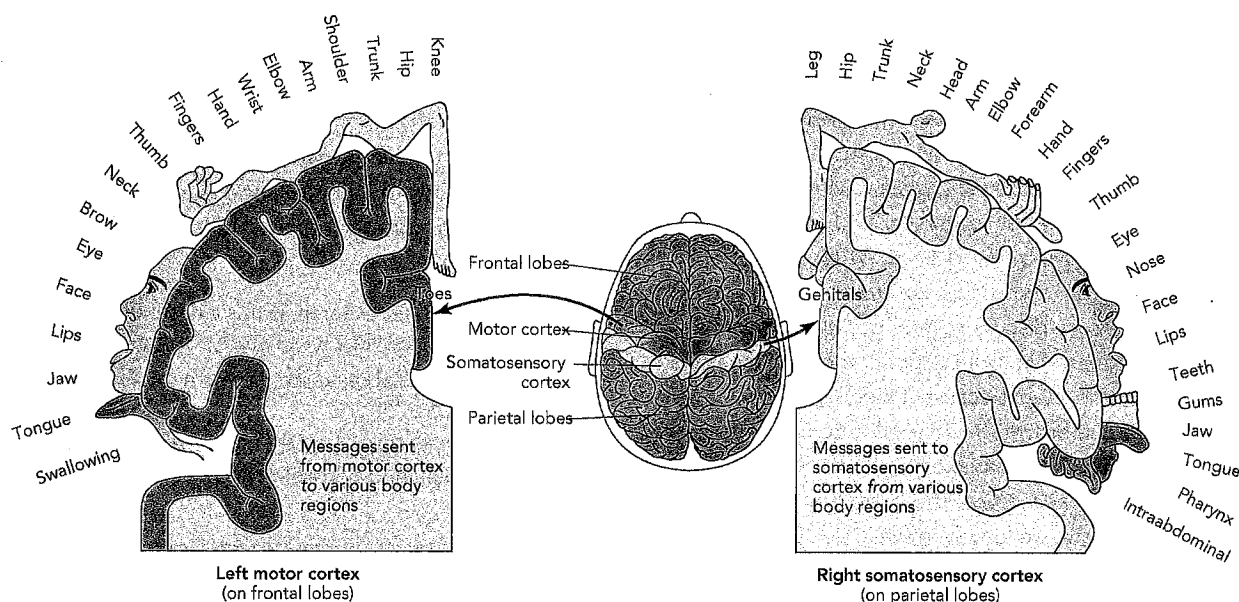
The **parietal lobes** receive and interpret bodily sensations including pressure, pain, touch, temperature, and location of body parts. A band of tissue on the front of the parietal lobes, called the *somatosensory cortex*, receives information about touch in different body areas. Areas of the body with more somatosensory and motor cortex devoted to them (such as the hands and face) are most sensitive to touch and have the most precise motor control (**Figure 2.25**).

Association Areas

One of the most popular myths in psychology is that we use only 10% of our brain. This myth might have begun with early research which showed that approximately three-fourths of the cortex is “quiet” (with no precise, specific function responsive to electrical brain stimulation). These areas are not dormant, however. They are clearly engaged in interpreting, integrating, and acting on information processed by other parts of the brain. They are called **association areas** because they associate, or connect, various areas and functions of the brain. The association areas in the frontal lobes, for example, help in decision making and planning. Similarly, the association area right in front of the motor cortex aids in the planning of voluntary movement.

FIGURE 2.25 BODY REPRESENTATION OF THE MOTOR CORTEX AND SOMATOSENSORY CORTEX

This drawing shows a vertical cross section taken from the left hemisphere's motor cortex and right hemisphere's somatosensory cortex. If body areas were truly proportional to the amount of tissue on the motor and somatosensory cortices that affect them, our bodies would look like the oddly shaped human figures draped around the outside edge of the cortex.



A Note how larger areas of the motor cortex are devoted to body parts that need to be controlled with great precision, such as the hands, face, and tongue.

B Similar areas of the somatosensory cortex are also disproportionately large because these body parts contain a high number of sensory receptors, which makes them particularly sensitive.

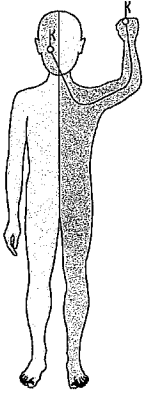


FIGURE 2.23
INFORMATION
CROSSOVER

Our brain's right hemisphere controls the left side of our body, whereas the left hemisphere controls the right side.

Frontal lobes The two lobes at the front of the brain that govern motor control, speech production, and higher functions, such as thinking, personality, emotion, and memory.

The full cerebral cortex and the two cerebral hemispheres beneath it closely resemble an oversized walnut. The division, or *fissure*, down the center marks the separation between the left and right *hemispheres* of the brain, which make up about 80% of the brain's weight. The hemispheres are mostly filled with axon connections between the cortex and the other brain structures. Each hemisphere controls the opposite side of the body (**Figure 2.23**).

The cerebral hemispheres are each divided into four distinct areas, or lobes (**Figure 2.24**). Like the lower-level brain structures, each lobe specializes in somewhat different tasks, another example of localization of function. However, some functions overlap two or more lobes.

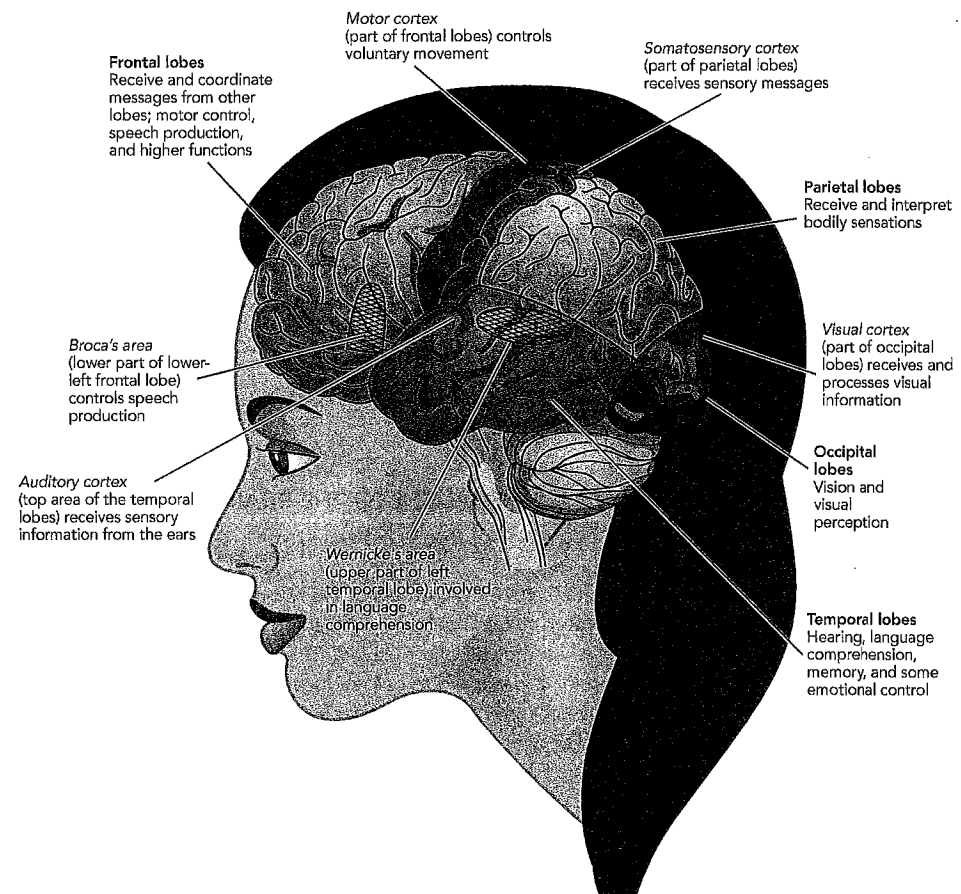
Frontal Lobes

Our two large **frontal lobes** coordinate messages received from all the other lobes. An area at the very back of these frontal lobes, known as the *motor cortex*, instigates all voluntary movement. In the lower-left frontal lobe lies *Broca's area*. In 1865, French physician Paul Broca discovered that damage to this area causes difficulty in speech, but not in language comprehension. This type of impaired language ability is known as *Broca's aphasia*.

Finally, the frontal lobes control most of our higher functions—the functions that distinguish humans from other animals, such as thinking, personality, emotion, and memory. Abnormalities in the frontal lobes are often observed in patients with schizophrenia (Chapter 13). For example, teenagers with schizophrenia often show loss of gray matter, as well as increases in cerebrospinal fluid in the frontal lobes (Arango et al., 2012). Research also shows that damage to the frontal lobes affects personality, motivation, drives, creativity, self-awareness, initiative, reasoning, and emotional behavior. But as you'll see in the *Psych Science* feature, updated information about the classic case of Phineas Gage indicates that our brains are remarkably flexible and

FIGURE 2.24 LOBES OF THE BRAIN

This is a view of the brain's left hemisphere showing its four lobes—*frontal*, *parietal*, *temporal*, and *occipital*. The right hemisphere has the same four lobes. Divisions between the lobes are marked by visibly prominent folds. Keep in mind that Broca's and Wernicke's areas occur only in the left hemisphere.



Forebrain The collection of upper-level brain structures including the thalamus, hypothalamus, limbic system, and cerebral cortex.

Thalamus The forebrain structure at the top of the brainstem that serves as the brain's switchboard, relaying sensory messages to the cerebral cortex.

Hypothalamus The small brain structure beneath the thalamus that helps govern drives (hunger, thirst, sex, and aggression) and hormones.

Forebrain

The **forebrain** is the largest and most prominent part of the human brain. It includes the cerebral cortex, hypothalamus, limbic system, and thalamus (**Figure 2.20**). The last three structures are located near the top of the brainstem. The cerebral cortex (discussed separately, in the next section) is wrapped above and around them. (*Cerebrum* is Latin for “brain,” and *cortex* is Latin for “covering” or “bark.”)

The **thalamus** integrates input from the senses, and it may also function in learning and memory (Barnes, 2013). It receives input from nearly all sensory systems, except smell, and then directs the information to the appropriate cortical areas. The thalamus also transmits some higher brain information to the cerebellum and medulla. Think of the thalamus as the switchboard in an air traffic control center that receives information from all aircraft and directs them to landing or takeoff areas.

Because the thalamus is the brain's major sensory relay center to the cerebral cortex, damage or abnormalities in the thalamus might cause the cortex to misinterpret or not receive vital sensory information. As you'll discover in Chapter 12, brain-imaging research links thalamus abnormalities to schizophrenia, a serious psychological disorder characterized by problems with sensory filtering and perception (Bor et al., 2011; Hazlett et al., 2012; Kubota et al., 2013).

Beneath the thalamus lies the kidney bean–sized **hypothalamus**. (*Hypo-* means “under.”) This organ has been called the “master control center” for emotions and for many basic motives such as hunger, thirst, sex, and aggression (Feinstein, 2013; Hull, 2011; Moll et al., 2012). It regulates the body's internal environment, including temperature control, which it accomplishes by regulating the endocrine system.

FIGURE 2.20 STRUCTURES OF THE FOREBRAIN

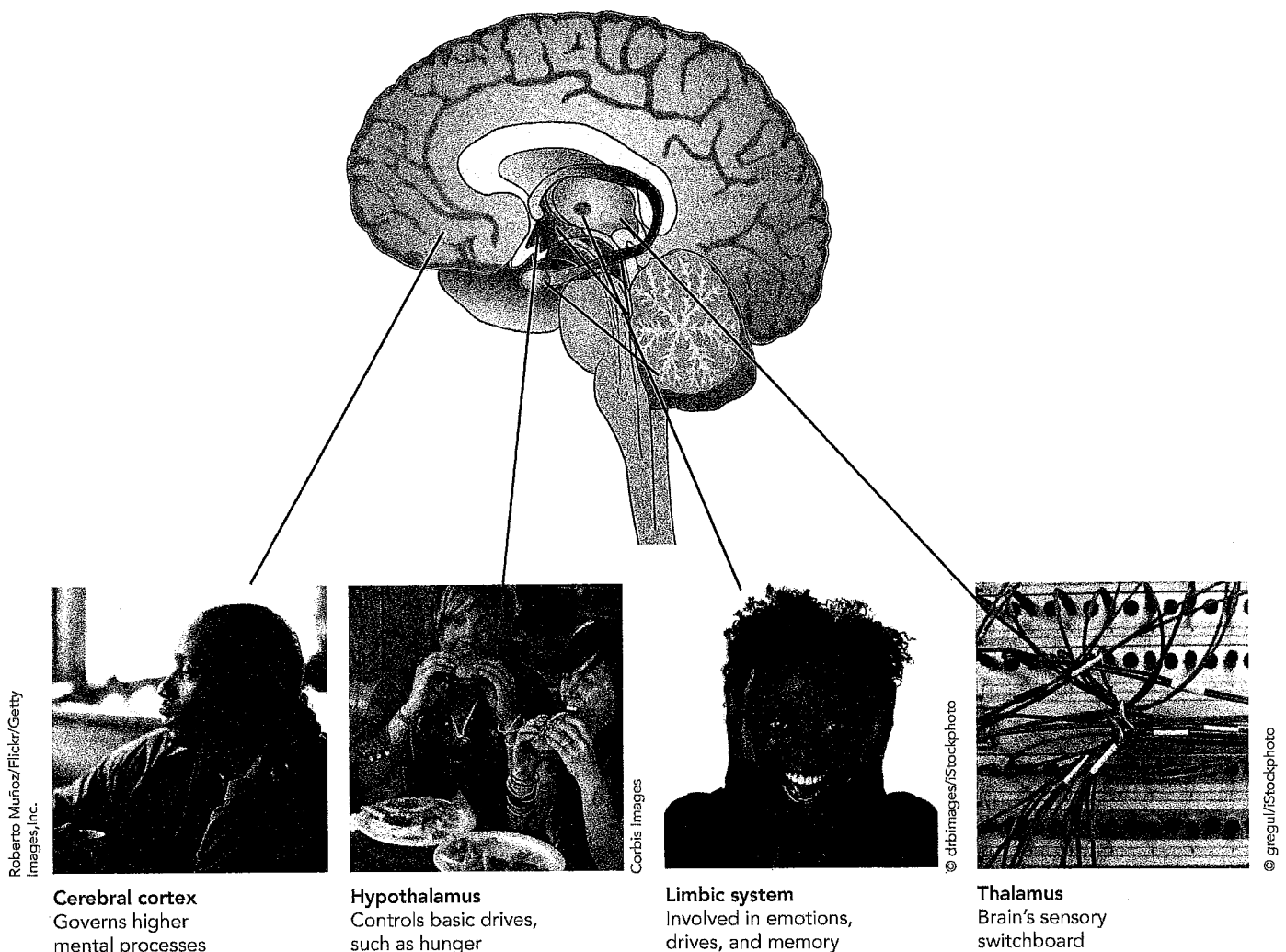
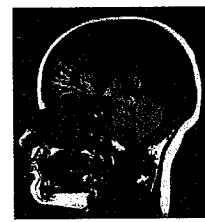
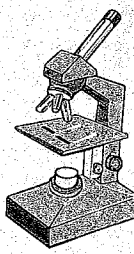


TABLE 2.2 SAMPLE TOOLS FOR BIOLOGICAL RESEARCH

Tool	Description	Purpose	
Electrical recordings Electrical activity throughout the brain sweeps in regular waves across its surface, and the electroencephalogram (EEG) is a read out of this activity.	Using electrodes attached to the skin or scalp, brain activity is detected and recorded on an EEG.	Reveals areas of the brain most active during particular tasks or mental states such as reading or sleeping; also traces abnormal brain waves caused by brain malfunctions, such as epilepsy or tumors.	 Larry Mulvehill/Photo Researchers, Inc.
CT (computed tomography) scan This CT scan used X-rays to locate a brain tumor, which is the deep purple mass at the top left.	Computer-created cross-sectional X-rays of the brain or other parts of the body produce 3-D images. Least expensive type of imaging and widely used in research.	Reveals the effects of strokes, injuries, tumors, and other brain disorders.	 Mehau Kuyk/Photo Researchers, Inc.
PET (positron emission tomography) scan The left PET scan shows brain activity when the eyes are open, whereas the one on the right is with the eyes closed. Note the increased activity, red and yellow, in the left photo when the eyes are open.	A radioactive form of glucose is injected into the bloodstream; a scanner records the amount of glucose used in particularly active areas of the brain and produces a computer-constructed picture of the brain.	Originally designed to detect abnormalities, now used to identify brain areas active during ordinary activities (such as reading or singing).	 N.J. H/Photo Researchers, Inc.
MRI (magnetic resonance imaging) Note the fissures and internal structures of the brain. The throat, nasal airways, and fluid surrounding the brain are dark.	Powerful electromagnets produce a high-frequency magnetic field that is passed through the brain.	Produces high-resolution 3-D pictures of the brain useful for identifying abnormalities and mapping brain structures and function.	 Scott Camazine/Photo Researchers, Inc.
fMRI (functional magnetic resonance imaging)	Newer, faster version of MRI that detects blood flow by picking up magnetic signals from blood, which has given up its oxygen to activate brain cells.	Measures blood flow, which indicates areas of the brain that are active and inactive during ordinary behaviors or responses (like reading or talking); also shows changes associated with various disorders.	 Science Photo Library/Photo Researchers, Inc.
Other methods: (a) Cell body or tract (myelin) staining, (b) Microinjections, and (c) Intrabrain electrical recordings	(a) Colors/stains selected neurons or nerve fibers. (b) Injects chemicals into specific areas of the brain. (c) Records activity of one or a group of neurons inside the brain.	Increases overall information of structure and function through direct observation and measurement. Intrabrain wire probes allow scientists to "see" individual neuron activity.	

RETRIEVAL PRACTICE: NERVOUS SYSTEM ORGANIZATION

Self-Test

Completing this self-test and comparing your answers with those in Appendix B provides immediate feedback and helpful practice for exams. Additional interactive, self-tests are available at www.wiley.com/college/huffman.

- The _____ nervous system is responsible for fight or flight, whereas the _____ nervous system is responsible for maintaining calm.
 - central; peripheral
 - parasympathetic; sympathetic
 - sympathetic; parasympathetic
 - autonomic; somatic
- The peripheral nervous system is _____.
 - composed of the spinal cord and peripheral nerves
 - less important than the central nervous system
 - contained within the skull and spinal column
 - a combination of all the nerves and neurons outside the brain and spinal cord
- If you are startled by the sound of a loud explosion, the _____ nervous system will become dominant.
 - semiautomatic
 - afferent
 - parasympathetic
 - sympathetic
- The central nervous system _____.
 - consists of the brain and spinal cord
 - is responsible for the “fight or flight” response
 - includes the automatic and other nervous systems
 - all these options

Think Critically

- Some stem cell research comes from tissue taken from aborted fetuses, which has led to great controversy and severe restrictions in some states. Do you believe this specific form of research should be limited? If so, how and why?
- What are some everyday examples of neuroplasticity—that is, of the way the brain is changed and shaped by experience?

realworldpsychology

How can stem cell injections lead to restored vision and improved recovery from strokes?



HINT: LOOK IN THE MARGIN FOR



A TOUR THROUGH THE BRAIN

LEARNING OBJECTIVES

RETRIEVAL PRACTICE While reading the upcoming sections, respond to each Learning Objective in your own words. Then compare your responses with those found at www.wiley.com/college/huffman.

- DESCRIBE** how neuroscientists study the brain and nervous system.
- IDENTIFY** the major structures of the hindbrain, midbrain, and forebrain.
- SUMMARIZE** the major roles of the lobes of the cerebral cortex.
- DESCRIBE** how the brain is divided into two specialized hemispheres.

We begin our exploration of the brain with a discussion of the tools that neuroscientists use to study it. Then we offer a quick tour of the brain, beginning at its lower end, where the spinal cord joins the base of the brain, and then move upward, all the way to the top of the skull. As we move from bottom to top, “lower,” basic processes, such as breathing, generally give way to more complex mental processes (Figure 2.18).

Biological Tools for Research

How do we know how the brain and nervous system work? Beginning in early times, scientists have *dissected* the brains and other body parts of human and nonhuman animals. They’ve also used *lesioning* techniques (systematically destroying bodily

Autonomic nervous system (ANS) The subdivision of the peripheral nervous system (PNS) that controls the body's involuntary motor responses by connecting the sensory receptors to the central nervous system (CNS) and the CNS to the smooth muscle, cardiac muscle, and glands.

Sympathetic nervous system The subdivision of the autonomic nervous system (ANS) that is responsible for arousing the body and mobilizing its energy during times of stress; also called the “fight-or-flight” system.

Parasympathetic nervous system The subdivision of the autonomic nervous system (ANS) that is responsible for calming the body and conserving energy.

The other subdivision of the PNS is the **autonomic nervous system (ANS)**. The ANS is responsible for involuntary tasks, such as heart rate, digestion, pupil dilation, and breathing. Like an automatic pilot, the ANS can sometimes be consciously overridden. But as its name implies, the autonomic system normally operates on its own (autonomously).

The autonomic nervous system is further divided into two branches, the sympathetic and parasympathetic, which tend to work in opposition to each other to regulate the functioning of such target organs as the heart, the intestines, and the lungs. Like two children on a teeter-totter, one will be up while the other is down, but they essentially balance each other out. **Figure 2.16** illustrates a familiar example of the interaction between the sympathetic and parasympathetic nervous systems.

During stressful times, either mental or physical, the **sympathetic nervous system** mobilizes bodily resources to respond to the stressor. This emergency response is often called the “fight or flight” response. If you noticed a dangerous snake coiled and ready to strike, your sympathetic nervous system would increase your heart rate, respiration, and blood pressure; stop your digestive and eliminative processes; and release hormones, such as cortisol, into the bloodstream. The net result of sympathetic activation is to get more oxygenated blood and energy to the skeletal muscles, thus allowing you to cope with the stress—to either fight or flee.

In contrast to the sympathetic nervous system, the **parasympathetic nervous system** is responsible for calming our bodies and conserving energy. It returns our normal bodily functions by slowing our heart rate, lowering our blood pressure, and increasing our digestive and eliminative processes.

The sympathetic nervous system provides an adaptive, evolutionary advantage. At the beginning of human evolution, when we faced a dangerous bear or an aggressive human intruder, there were only two reasonable responses—fight or flight. The automatic mobilization of bodily resources can still be critical, even in modern times. However, less life-threatening events, such as traffic jams, also activate our sympathetic nervous system. As the next chapter discusses, ongoing sympathetic system response to such chronic, daily stress can become detrimental to our health. For a look at how the autonomic nervous system affects our sexual lives, see **Figure 2.17**.

FIGURE 2.16 ACTIONS OF THE AUTONOMIC NERVOUS SYSTEM (ANS)

The ANS is responsible for a variety of independent (autonomous) activities, such as salivation and digestion. It exercises this control through its two divisions—the sympathetic and parasympathetic branches.

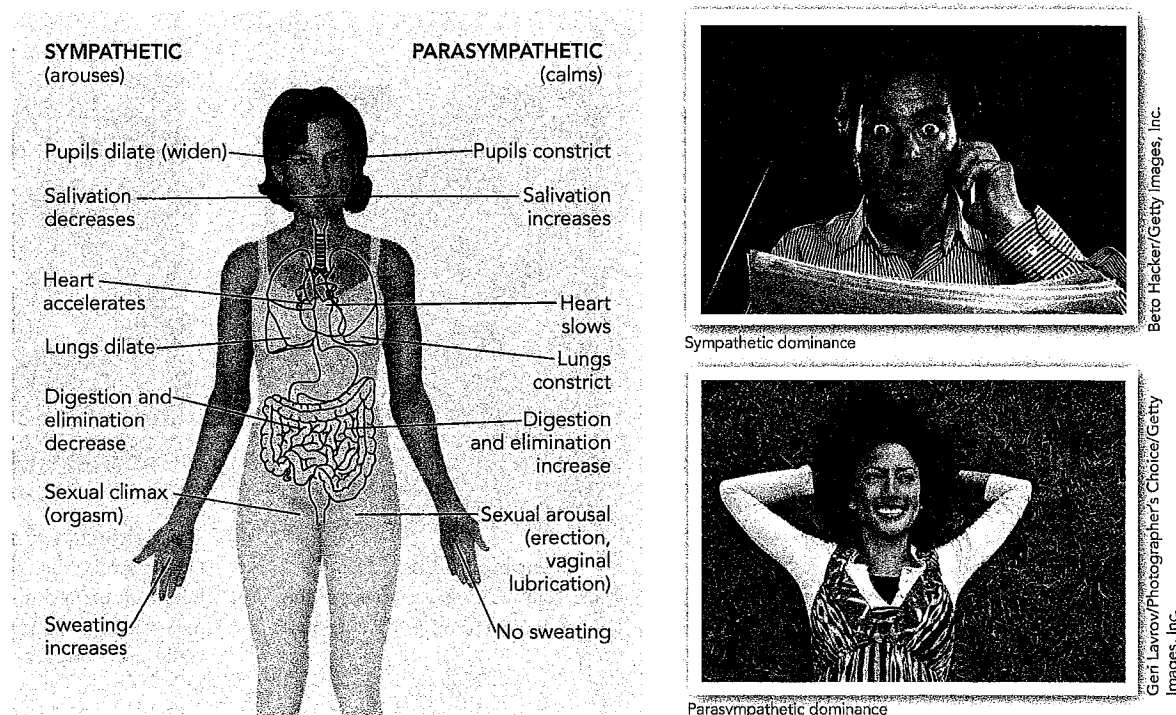
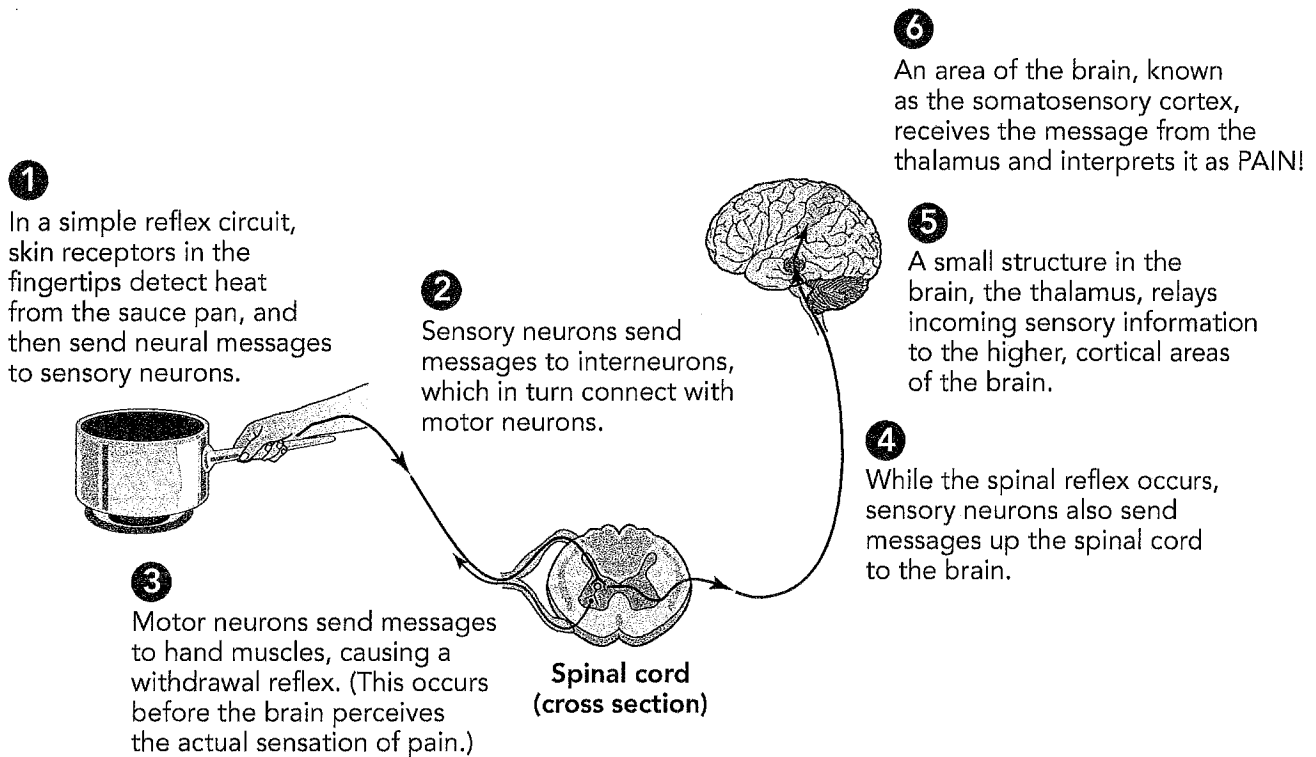


FIGURE 2.14 HOW THE SPINAL REFLEX OPERATES

In a simple reflex arc, a sensory receptor responds to stimulation and initiates a neural impulse that travels to the spinal cord. This signal then travels back to the appropriate muscle, which then contracts. The response is automatic and immediate in a reflex because the signal only travels as far as the spinal cord before action is initiated, not all the way to the brain. The brain is later “notified” of the action when the spinal cord sends along the message. What might be the evolutionary advantages of the reflex arc?



Now that we have discussed neuroplasticity and neurogenesis within the central nervous system (CNS), let's take a closer look at the spinal cord. Because of its central importance for psychology and behavior, we'll discuss the brain in more detail in the next major section.

Spinal Cord

Beginning at the base of our brains and continuing down our backs, the spinal cord carries vital information from the rest of the body into and out of the brain. But the spinal cord doesn't simply relay messages. It can also initiate some automatic behaviors on its own. We call these involuntary, automatic behaviors **reflexes**, or *reflex arcs*, because the response to the incoming stimuli is automatically “reflected” back to the spinal cord, which allows an immediate action response without the delay of routing signals directly to the brain.

As you can see in the simple reflex arc depicted in **Figure 2.14**, a sensory receptor first responds to stimulation and initiates a neural impulse that travels to the spinal cord. This signal then travels back to the appropriate muscle, which contracts. The response is automatic and immediate in a reflex because the signal travels only as far as the spinal cord before action is initiated, not all the way to the brain. The brain is later “notified” of the action when the spinal cord sends along the message.

Reflex An innate, automatic response to a stimulus that has a biological relevance for an organism (for example, knee-jerk reflex).

NERVOUS SYSTEM ORGANIZATION

LEARNING OBJECTIVES

RETRIEVAL PRACTICE While reading the upcoming sections, respond to each Learning Objective in your own words. Then compare your responses with those found at www.wiley.com/college/huffman.

- 1 IDENTIFY** the major elements of the nervous system.
- 2 EXPLAIN** the role of the central nervous system (CNS).
- 3 DESCRIBE** the components of the peripheral nervous system (PNS).

Have you heard the expression “Information is power”? Nowhere is this truer than in the human body. Without information, we could not survive. Neurons within our nervous system must take in sensory information from the outside world and then pass along this information to the entire human body. Just as the circulatory system handles blood, which conveys chemicals and oxygen, our nervous system uses chemicals and electrical processes to convey information.

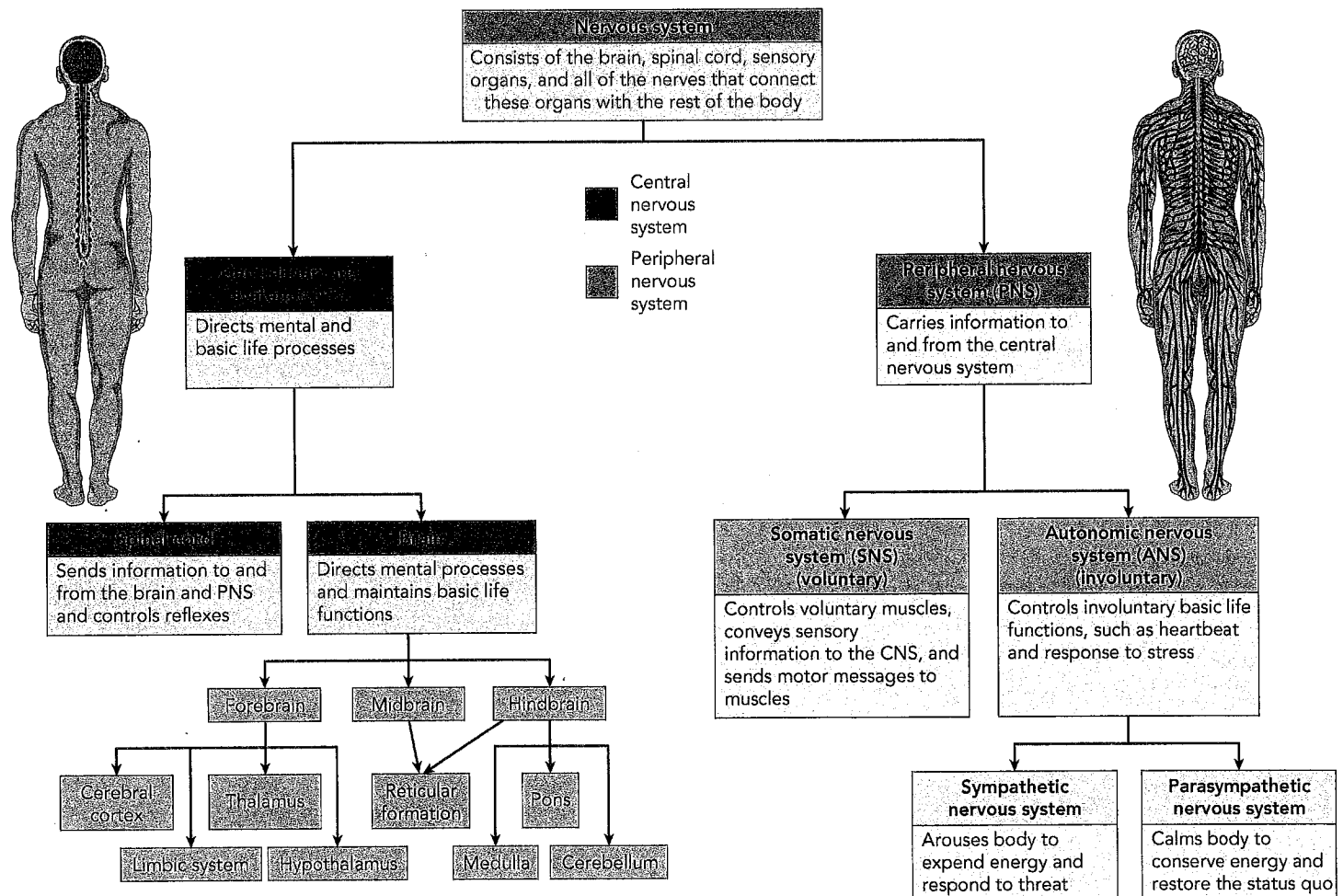
The nervous system is divided and subdivided into several branches (**Figure 2.12**). The main branch includes the brain and a bundle of nerves that form the *spinal cord*. Because this system is located in the center of our body (within our skull and spine), it is called the **central nervous system (CNS)**. The CNS is primarily responsible for processing and organizing information.

The second major branch of our nervous system includes all the nerves outside the brain and spinal cord. This **peripheral nervous system (PNS)** carries messages (action potentials) to and from the central nervous system to the periphery of the body. Now, let's take a closer look at the CNS and the PNS.

Central nervous system (CNS) The part of the nervous system consisting of the brain and spinal cord.

Peripheral nervous system (PNS) The part of the nervous system composed of the nerves and neurons connecting the central nervous system (CNS) to the rest of the body.

FIGURE 2.12 THE NERVOUS SYSTEM



Endorphin A chemical substance in the nervous system similar in structure and action to opiates; involved in pain control, pleasure, and memory.

Perhaps the best-known neurotransmitters are the endogenous opioid peptides, commonly known as **endorphins** (a contraction of *endogenous* [self-produced] and *morphine*). These chemicals mimic the effects of opium-based drugs such as morphine: They elevate mood and reduce pain. In fact, drinking alcohol causes endorphins to be released in parts of the brain that are responsible for feelings of reward and pleasure (Mitchell et al., 2012).

Endorphins also affect memory, learning, blood pressure, appetite, and sexual activity. For example, rats that are injected in the brain with an endorphin-like chemical eat considerably more M&Ms than they would under normal conditions, even consuming as much as 17 grams (more than 5% of their body weight; DiFeliceantonio et al., 2012). Although this may not seem like a lot of chocolate to you, it is the equivalent of a normal-sized adult eating 7.5 pounds of M&Ms in a single session!

Endocrine system A network of glands located throughout the body that manufacture and secrete hormones into the bloodstream.

Hormone Chemical messengers manufactured and secreted by the endocrine glands, which circulate in the bloodstream to produce bodily changes or maintain normal bodily functions.

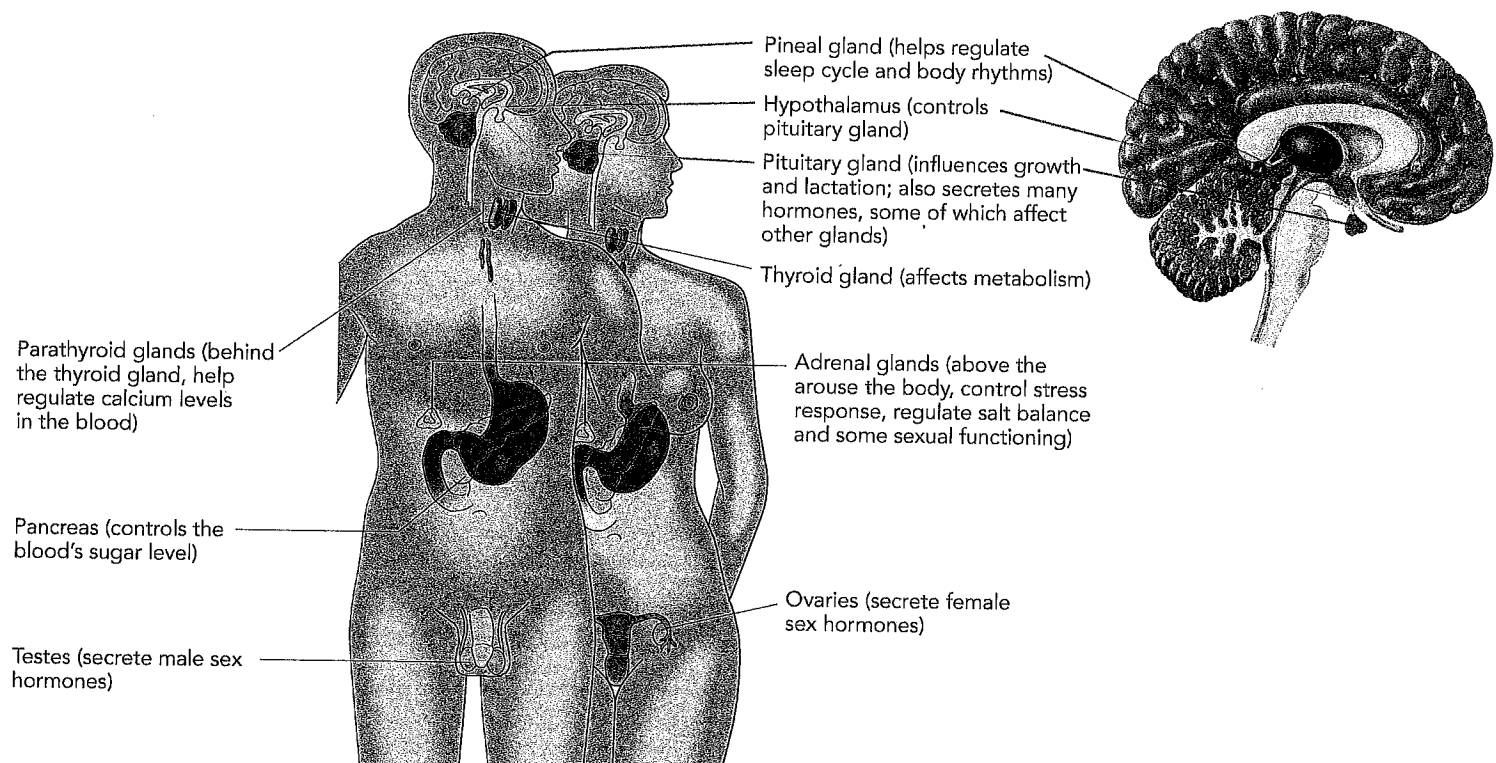
Hormones and the Endocrine System

We've just seen how the nervous system uses neurotransmitters to transmit messages throughout the body. A second type of communication system also exists. This second system is made up of a network of glands, called the **endocrine system**, which uses **hormones** to carry its messages (Figure 2.11).

Why do we need two communication systems? Like e-mails we send to particular people, neurotransmitters deliver messages to specific receptors, which other neurons nearby probably don't "overhear." Hormones, in contrast, are like a global e-mail message that we send to everyone in our address book.

FIGURE 2.11 THE ENDOCRINE SYSTEM

This figure shows the major endocrine glands, along with some internal organs to help you locate the glands.



Myelin sheath The layer of fatty insulation wrapped around the axon of some neurons that increases the rate at which neural impulses travel along the axon.

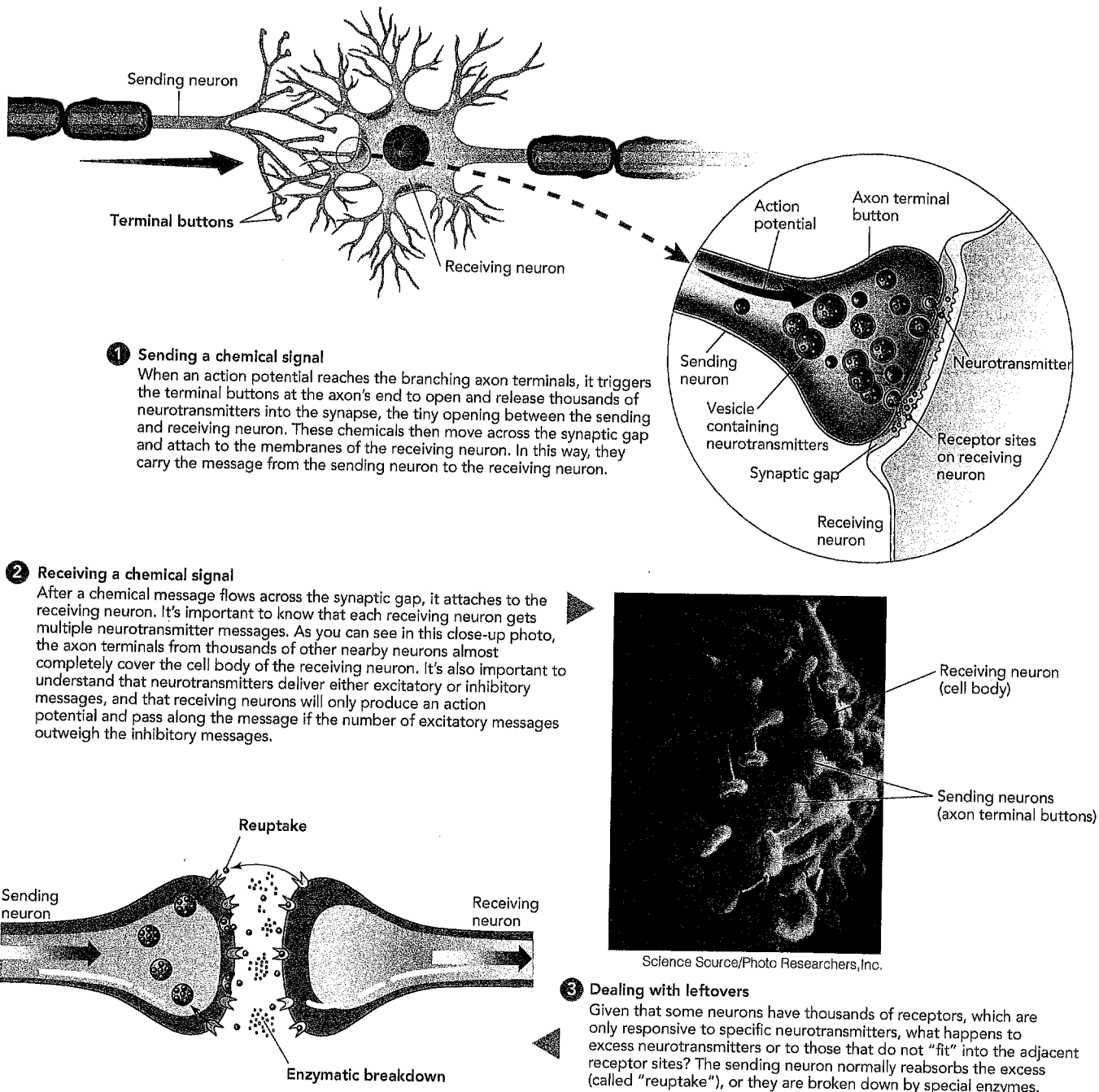
Neural impulses move much more slowly than electricity moves through a wire. A neural impulse travels along a bare axon at only about 10 meters per second. (Electricity moves at 36 million meters per second.)

Some axons, however, are enveloped in fatty insulation, the **myelin sheath**. This sheath blankets the axon, with the exception of periodic *nodes*, points at which the myelin is very thin or absent. In a myelinated axon, the neural impulse moves about 10 times faster than in a bare axon because the action potential jumps from node to node rather than travel along the entire axon. Sadly, research shows that social isolation during the early weeks and months of life (as occurs for babies who are in orphanages) prevents cells from producing the right amount of myelin, which leads to long-term problems in cognitive functioning (Makinodan et al., 2012).

Communication *within* the neuron (Figure 2.8) is not the same as communication *between* neurons (Figure 2.9). Within the neuron, messages travel electrically,

FIGURE 2.9 COMMUNICATION BETWEEN NEURONS

Within the neuron (see Figure 2.8), messages travel electrically. Between neurons, messages are transmitted chemically. The three steps shown here summarize this chemical transmission.



NEURAL BASES OF BEHAVIOR

LEARNING OBJECTIVES

Neuron The basic building block (nerve cell) of the nervous system, responsible for receiving, processing, and transmitting electrochemical information.

Glial cells The cells that provide structural, nutritional, and other support for neurons, as well as communication within the nervous system; also called glia or neuroglia.

Dendrites The branching fibers of neurons that receive neural impulses from other neurons and convey impulses toward the cell body.

Cell body The part of a neuron that contains the cell nucleus and other structures that help the neuron carry out its functions; also known as the soma.

Axon A long, tube-like structure that conveys impulses away from a neuron's cell body toward other neurons or to muscles or glands.

Action potential A neural impulse, or brief electrical charge, that carries information along the axon of a neuron; movement is generated when positively charged ions move in and out through channels in the axon's membrane.

RETRIEVAL PRACTICE While reading the upcoming sections, respond to each Learning Objective in your own words. Then compare your responses with those found at www.wiley.com/college/huffman.

- 1 IDENTIFY** the key role and features of neurons.
- 2 EXPLAIN** how neurons communicate throughout the body.
- 3 DESCRIBE** the role of hormones and the endocrine system.

Our brain and the rest of our nervous system essentially consist of **neurons**. Each neuron is a tiny information-processing system with thousands of connections for receiving and sending electrochemical signals to other neurons. Each human body may have as many as 1 *trillion* neurons.

Neurons are held in place and supported by **glial cells**, which make up about 90% of the brain's total cells. They also supply nutrients and oxygen, perform cleanup tasks, and insulate one neuron from another so that their neural messages are not scrambled. In addition, they play a direct role in nervous system communication (Burnstock, 2013; Thyssen et al., 2013; Weaver, 2012). However, the “star” of the communication show is still the neuron.

No two neurons are alike, but most share three basic features: **dendrites**, the **cell body**, and an **axon** (Figure 2.7). To remember how information travels through the neuron, think of these three in reverse alphabetical order: *Dendrite* → *Cell Body* → *Axon*.

How Do Neurons Communicate?

A neuron's basic function is to transmit information throughout the nervous system. Neurons “speak” in a type of electrical and chemical language. The process of neural communication begins within the neuron itself, when the dendrites and cell body receive electrical messages. These messages move along the axon in the form of a neural impulse, or **action potential** (Figure 2.8). Note that this is an “all-or-nothing” event, which means that once the electrical impulse reaches its threshold, it fires. Like a light switch that's either on or off, there is no partial firing.

FIGURE 2.7 KEY PARTS OF A NEURON

Red arrows in the figure on the left indicate direction of information flow: dendrites → cell body → axon → terminal buttons of axon.

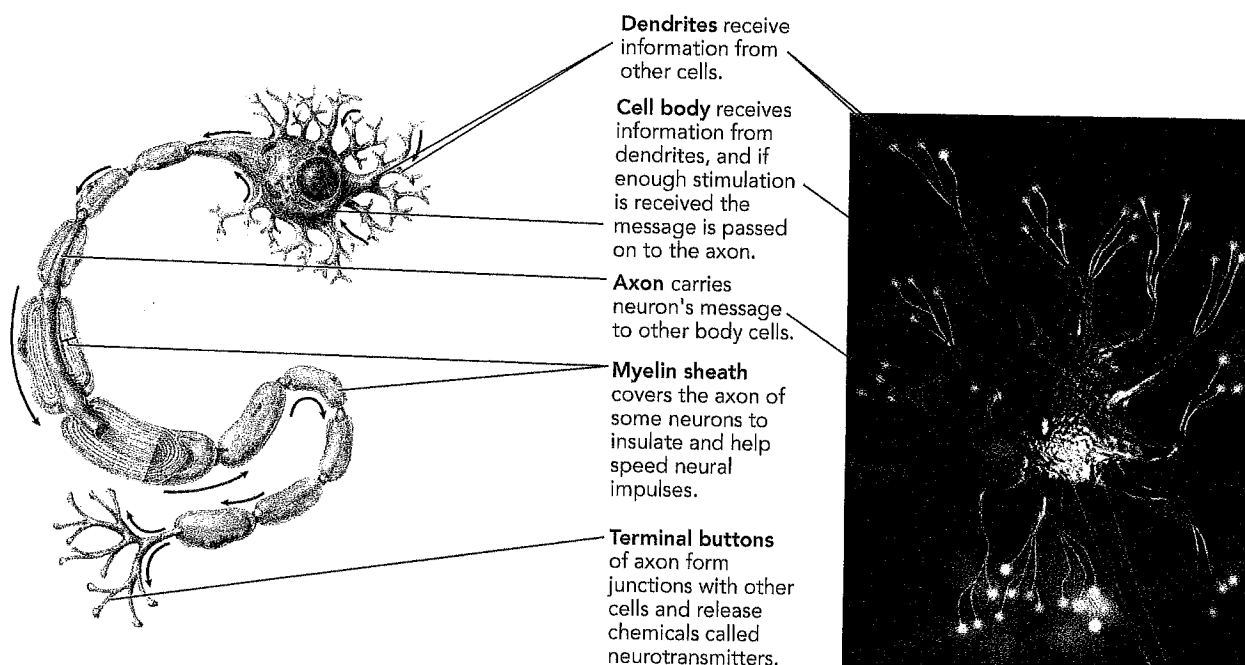
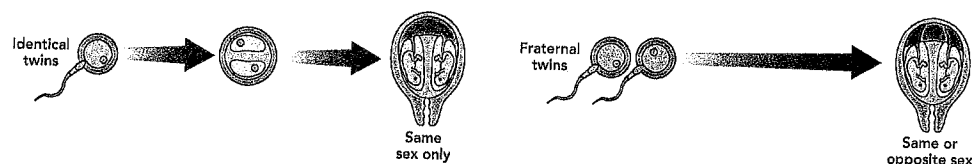


FIGURE 2.4 IDENTICAL VERSUS FRATERNAL TWINS



A Identical (monozygotic—one egg) twins share 100% of the same genes because they develop from a single egg fertilized by a single sperm. They also share the same placenta and have the same sex and same genetic makeup.

B Fraternal (dizygotic—two eggs) twins share, on average, 50% of their genes because they are formed when two separate sperm fertilize two separate eggs. Although they share the same general environment within the womb, they are no more genetically similar than nontwin siblings. They're simply nine-month "womb mates."

Can you see why this makes the study of identical and fraternal twins a top priority? Identical twins share all their genes, whereas fraternal twins share only about half of their genes (Figure 2.4). Also, both sets of twins share the same parents and develop in relatively the same environment, thereby providing an invaluable "natural experiment." If heredity influences a trait or behavior to some degree, identical twins should be more alike than fraternal twins. For example, studies of intelligence show that identical twins have more similar intelligence test scores than fraternal twins (Plomin & Spinath, 2004; Trzaskowski et al., 2013), which suggests a genetic influence on intelligence.

In addition to twin studies, researchers also study families with biological and adopted children to determine whether adopted children are more like their adoptive parents (who controlled the home environment) or their biological parents (who controlled the genetic inheritance, Figure 2.5). Research using these family studies has found that many traits and mental disorders, such as intelligence, sociability, and depression, are most strongly influenced by genetics (Davies et al., 2011; Kang et al., 2012; Stein et al., 2012).

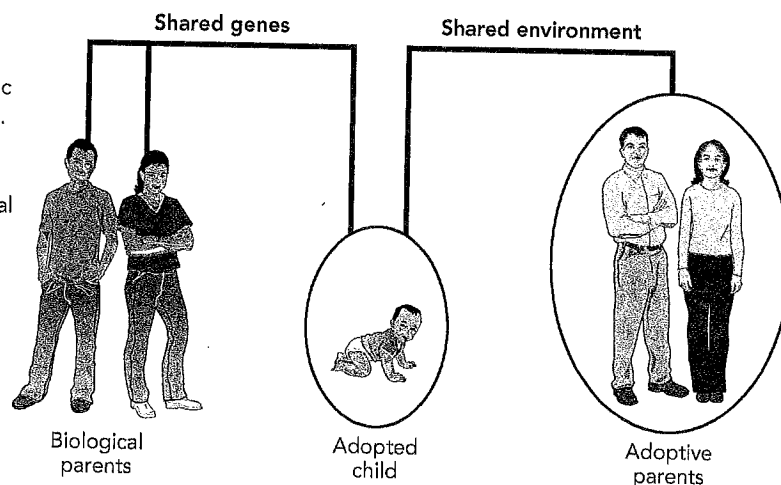
Findings from research studies like these have allowed behavioral geneticists to estimate the **heritability** of various traits, which is the percentage of variation in a population attributable to heredity. If genetics contributed nothing to a trait, it would have a heritability estimate of 0%. If a trait is completely due to genetics, it would have a heritability estimate of 100%.

Before going on, it's very important to emphasize that *heritability estimates do not apply to individuals*. Height has one of the highest heritability estimates—around 90% (Plomin, 1990). But, it's impossible to predict with certainty an individual's height from a heritability estimate (Figure 2.6). Furthermore, *heritability does not trump environment*. For example, if you inherited a gene known to increase your chances of developing emphysema from smoking, you should not overreact. Smoking is an environmental factor, and if you never smoke you have little or no chance of developing emphysema.

Heritability A statistical formula that provides a percentage of variation in a population attributable to genetic factors rather than to differences in the environment.

FIGURE 2.5 ADOPTION STUDIES

If adopted children are more like their biological family in some trait, then genetic factors probably had the greater influence. Conversely, if adopted children resemble their adopted family, even though they do not share similar genes, then environmental factors may predominate.



chapteroverview

The brain is the last and grandest biological frontier, the most complex thing we have yet discovered in our universe. It contains hundreds of billions of cells interlinked through trillions of connections. The brain boggles the mind.

—James Watson
(Nobel Prize Winner)

Ancient cultures, including the Egyptian, Indian, and Chinese, believed the heart was the center of all thoughts and emotions. Today we know that the brain and the rest of the nervous system are the power behind our psychological life and much of our physical being. This chapter introduces you to the important and exciting field of *neuroscience* and *biopsychology*, the scientific study of the *biology* of behavior and mental processes, while also providing a foundation for understanding several fascinating discoveries and essential biological processes discussed throughout the text.

OUR GENETIC INHERITANCE

LEARNING OBJECTIVES

RETRIEVAL PRACTICE While reading the upcoming sections, respond to each Learning Objective in your own words. Then compare your responses with those found at www.wiley.com/college/huffman.

- 1 DESCRIBE** how genetic material passes from one generation to the next.
- 2 OUTLINE** the approaches scientists take to explore human genetic inheritance.
- 3 EXPLAIN** the process of natural selection.

Behavioral genetics The study of the relative effects of heredity and the environment on behavior and mental processes.

Evolutionary psychology The branch of psychology that studies the application of the principles of evolution to explain behavior and mental processes.

Gene A segment of DNA (deoxyribonucleic acid) that occupies a specific place on a particular chromosome and carries the code for hereditary transmission.

Millions of years of evolution have contributed to what we are today. Our ancestors foraged for food, fought for survival, and passed on traits that were selected and transmitted down through the generations. How do these transmitted traits affect us today? For answers, psychologists often turn to **behavioral genetics**, the study of how heredity and environment affect us, and **evolutionary psychology**, the application of the principles of evolution to explain behavior and mental processes.

Behavioral Genetics

Genes are the most important and basic building blocks of our biological inheritance (Barnes, 2013; **Figure 2.1**). Each of our human characteristics and behaviors is

FIGURE 2.1 HEREDITARY CODE

The genes we inherit from our biological parents help determine many of our physical traits (like height and hair color) and also are possible contributors to numerous behaviors (such as aggression, sensation-seeking, and sociability).

A Conception

At the moment of conception, a father's sperm and a mother's egg each contribute 23 chromosomes, for a total of 46.

B Cell nucleus

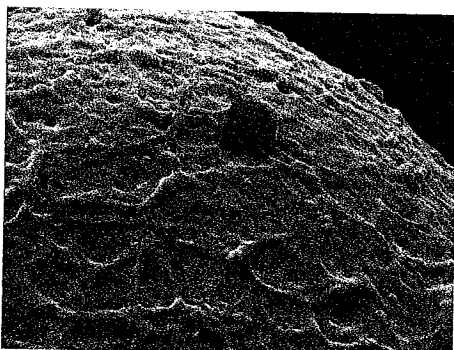
Each cell in the human body (except red blood cells) contains a nucleus.

C Chromosomes

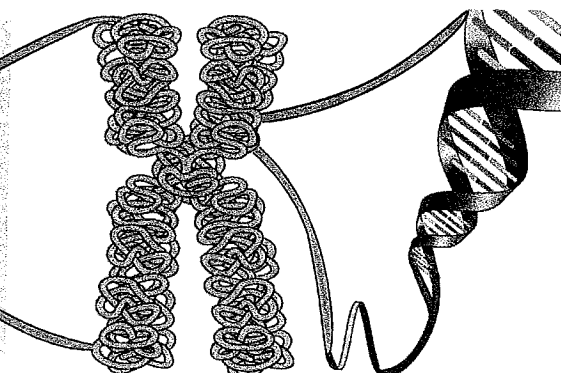
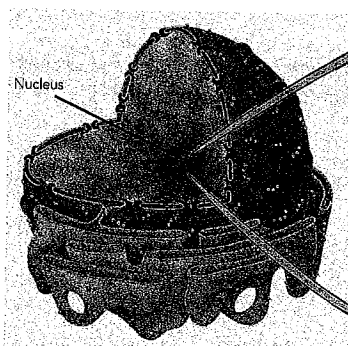
Each cell nucleus contains 46 chromosomes, which are threadlike molecules of DNA (deoxyribonucleic acid).

D Genes

Each DNA molecule contains thousands of genes, which are the most basic units of heredity.



Thierry Berrod, Mona Lisa Production/Photo Researchers



chapter two



Neuroscience and Biological Foundations

CHAPTER OUTLINE

OUR GENETIC INHERITANCE 36

- Behavioral Genetics
- Evolutionary Psychology

NEURAL BASES OF BEHAVIOR 40

- How Do Neurons Communicate?
- Hormones and the Endocrine System

NERVOUS SYSTEM ORGANIZATION 46

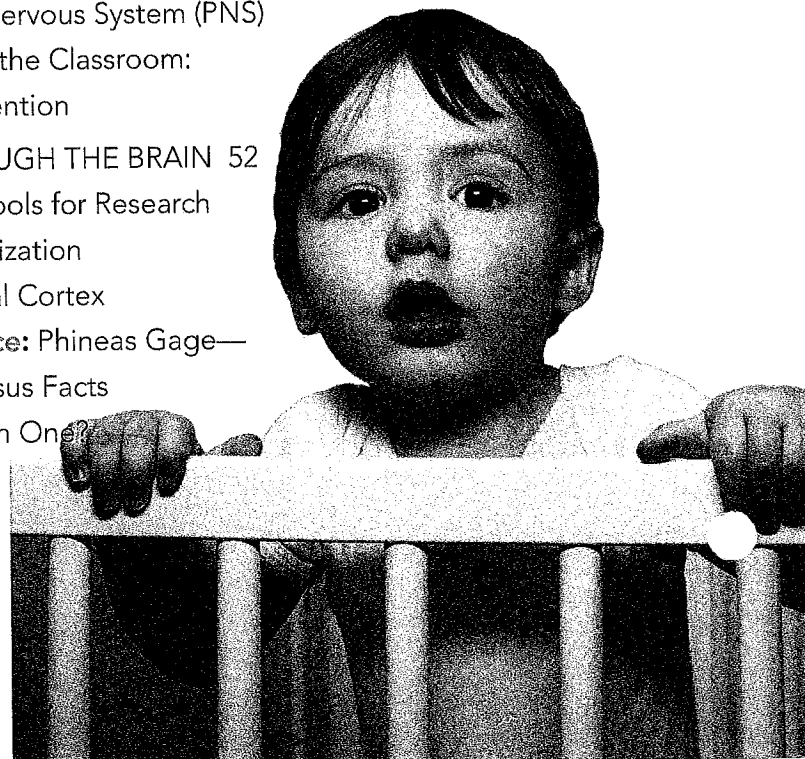
- Central Nervous System (CNS)
- Peripheral Nervous System (PNS)

- Voices from the Classroom:
Burn Prevention

A TOUR THROUGH THE BRAIN 52

- Biological Tools for Research
- Brain Organization
- The Cerebral Cortex

- **PsychScience:** Phineas Gage—
Myths Versus Facts
- Two Brains in One?



Think Critically

- 1 Identify how you might improve your current time management.
- 2 What do you think prevents you, or other students you know, from fully employing the strategies for student success presented in this chapter?

realworldpsychology

How do spreading your study sessions and practice testing improve test scores?

HINT: LOOK IN THE MARGIN FOR Q5



Summary

1 INTRODUCING PSYCHOLOGY

4

- **Psychology** is the scientific study of *behavior* and *mental processes*. The discipline places high value on *empirical evidence* and **critical thinking**. *Pseudopsychologies*, such as belief in psychic powers, are not based on scientific evidence.
- Wilhelm Wundt, considered the father of psychology, and his followers, including Edward Titchener, were interested in studying conscious experience. Their approach, *structuralism*, sought to identify the basic structures of mental life through introspection.
- The *functionalism* school, led by William James, studied the way the mind functions to enable humans and other animals to adapt to their environment.
- The **psychoanalytic perspective**, founded by Sigmund Freud, emphasized the influence of the unconscious mind, which lies outside personal awareness.
- Contemporary psychology reflects the ideas of seven major perspectives: **psychodynamic**, **behavioral**, **humanistic**, **cognitive**, **biological**, **evolutionary**, and **sociocultural**. Most contemporary psychologists embrace a unifying perspective known as the **biopsychosocial model**.
- Despite early societal limitations, women and minorities have made important contributions to psychology. Pioneers include Margaret Floy Washburn, Mary Calkins, Francis Cecil Sumner, and Kenneth and Mamie Clark.
- Psychologists work as therapists, researchers, teachers, and consultants, in a wide range of settings.

2 THE SCIENCE OF PSYCHOLOGY

13

- **Basic research** is aimed at advancing general scientific understanding, whereas **applied research** works to address real world problems.
- Most scientific investigations consist of six basic steps, collectively known as the **scientific method**. Scientific progress comes from repeatedly challenging and revising existing **theories** and building new ones.
- Psychology's four basic goals are to *describe*, *explain*, *predict*, and *change* behavior and mental processes through the use of

scientific methods. One of the most enduring debates in science is the **nature–nurture controversy**.

3 RESEARCH METHODS

18

- **Descriptive research** systematically observes and records behavior and mental processes without manipulating variables. The four major types of descriptive research are **naturalistic observation**, **survey/interview**, **case study**, and **archival research**.
- **Correlational research** measures the relationship between two variables. Researchers analyze their results using a **correlation coefficient**. Correlations can be positive or negative. A correlation between two variables does not necessarily mean that one causes the other.
- **Experimental research** manipulates and controls variables to determine cause and effect. An experiment has five critical components: **hypothesis**, **independent** and **dependent variables** and **experimental** and **control groups**. A good scientific experiment protects against potential sources of error from both the researcher and the participants through means such as **random assignment**, **placebos**, **single-blind studies** and **double-blind studies**.
- Psychologists must maintain high ethical standards. This includes respecting the rights of therapy clients and research participants (both human and nonhuman). **Informed consent** and **debriefing** are critical elements of any research that includes human participants. Researchers and clinicians are held professionally responsible for their actions by the APA and APS, their research institutions, and local and state agencies.

4 STRATEGIES FOR STUDENT SUCCESS

29

- Several well-documented techniques will help you understand and absorb written material most completely. They include familiarization, active reading through the **SQ4R method**, distributed practice, and practice testing.
- Additional techniques include effective time management (while studying and during an exam), avoiding highlighting and rereading, taking notes, improving general test-taking skills, overlearning, and study skills courses.

SQ4R method A study technique based on six steps: Survey, Question, Read, Recite, Review, and wRite.

One of the best ways to read actively is to use the **SQ4R method**, which was developed by Francis Robinson (1970). The initials stand for six steps in effective reading: **S**urvey, **Q**uestion, **R**ead, **R**ecite, **R**evue, and **w**Rite. As you might have guessed, *Real World Psychology* was designed to incorporate each of these steps (Figure 1.17).

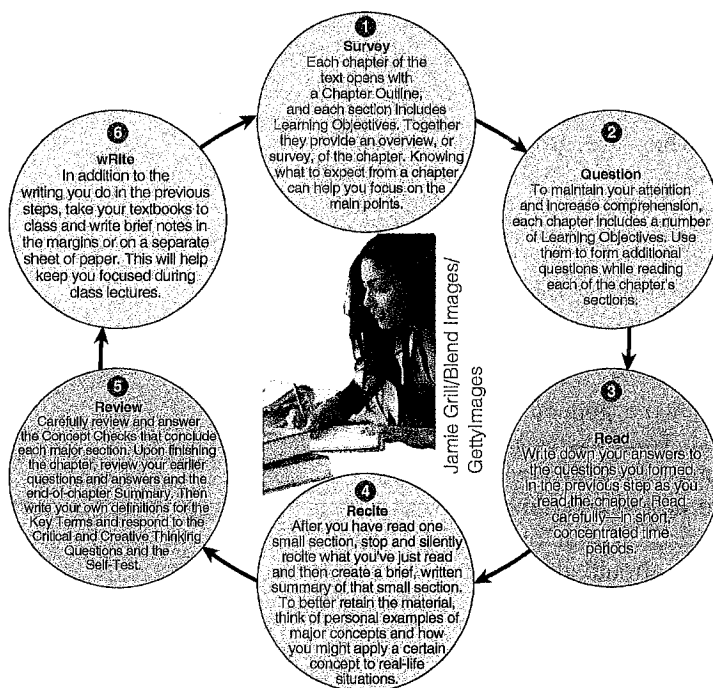


FIGURE 1.17 USING THE SQ4R METHOD

Follow these steps to improve your reading efficiency.

Time Management

If you find that you can't always strike a good balance between work, study, and social activities or that you aren't always good at budgeting your time, here are five basic time-management strategies:

- **Establish a baseline.** Before attempting any changes, simply record your day-to-day activities for one to two weeks. You may be surprised at how you spend your time.
- **Set up a realistic schedule.** Make a daily and weekly "to do" list, including all required activities, basic maintenance tasks (like laundry, cooking, child care, and eating), and a reasonable amount of down time. Then create a daily schedule of activities that includes time for each of these. To make permanent time-management changes, shape your behavior, starting with small changes and building on them.
- **Reward yourself.** Give yourself immediate, tangible rewards for sticking with your daily schedule.
- **Maximize your time.** To increase your efficiency, begin by paying close attention to the amount time you spend on true, focused studying versus the time you waste worrying, complaining, and/or fiddling around getting ready to study ("fretting and prepping"). Also be alert for hidden "time opportunities"—spare moments that normally go to waste that you might instead use productively.

psychology and you **Improving Your Grade** Here are five additional strategies for grade improvement and test taking that can further improve your success as a student:

- **Avoid highlighting and rereading** Marking with a yellow highlighter, or underlining potentially important portions of material, as well as rereading text material after initial reading, are common techniques students use while studying. Unfortunately, they are a waste of time! Research clearly shows that they are among the LEAST effective of all the major study techniques (Dunlosky et al., 2013). As previously discussed, you need to actively focus on your reading and these techniques encourage passive reading.
- **Take notes** While reading and listening to classroom lectures, ask yourself, "What is the main idea?" Write down key ideas and supporting details and examples. Effective note taking depends on active reading and active listening. Also, pay attention to the amount of pages and lecture time your text or instructors spend on various topics. It's generally a good indication of what is considered important for you to know.



©Chris Schmidt/Stockphoto

maintain the highest ethical standards. Therapists must also uphold their clients' trust. All personal information and therapy records must be kept confidential, and records can be made available only to authorized persons and with the client's permission. However, therapists are legally required to break confidentiality if a client threatens violence to him- or herself or to others, if a client is suspected of abusing a child or an elderly person, and in other limited situations (Fisher, 2013; Kress et al., 2013; Tyson et al., 2011).

RETRIEVAL PRACTICE: RESEARCH METHODS

Self-Test

Completing this self-test and comparing your answers with those in Appendix B provides immediate feedback and helpful practice for exams. Additional interactive, self-tests are available at www.wiley.com/college/huffman.

- In a case study, a researcher is most likely to _____.
 - interview many research participants who have a single problem or disorder
 - conduct an in-depth study of a single research participant
 - choose and investigate a single topic
 - use any of these options, which describe different types of case studies
- When a researcher observes or measures two or more variables to find relationships between them, without directly manipulating them or implying a causal relationship, he or she is conducting _____.
 - experimental research
 - a correlational study
 - non-causal metrics
 - a meta-analysis
- If researchers gave participants varying amounts of a new memory drug and then gave them a story to read and measured their scores on a quiz, the _____ would be the IV, and the _____ would be the DV.
 - response to the drug; amount of the drug
 - experimental group; control group
 - amount of the drug; quiz scores
 - researcher variables; extraneous variables
- A participant's agreement to take part in a study after being told what to expect is known as _____.
 - unethical pre-briefing
 - an experimental contract
 - a participant contract
 - informed consent
- Debriefing is _____.
 - interviewing participants after a study to find out what they were thinking during their participation
 - explaining the design and purpose of the study when it is over and revealing any deception used
 - disclosing potential physical and emotional risks and the nature of the study before it begins
 - interviewing participants after a study to determine whether any deception used was effective in preventing them from learning the true purpose of the study

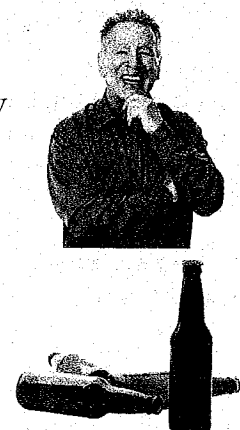
Think Critically

- What is meant by the axiom "correlation is not causation"?
- Cigarette companies have suggested that there is no scientific evidence that smoking causes lung cancer. How would you refute this claim?

realworldpsychology

Are older people happier than younger people?

Why do heavy drinkers misreport their alcohol use?



HINT: LOOK IN THE MARGIN FOR **Q3** AND **Q4**



PSYCHSCIENCE

POLITICS AND DATING RELATIONSHIPS

Are you more likely to date a person if his or her political preference (conservative, moderate, liberal, or none) matches your own? To scientifically test this question, participants were brought into a research lab and shown profiles of fictional people, which were made to look like those on popular online dating websites. However, they were manipulated in several ways, including religion, education, and political preference (Huber & Malhotra, 2012).

The researchers were somewhat surprised that compatibility in political views significantly affected how much participants stated they would like to date someone. But they were even more surprised to find that participants also rated the fictional person as more physically attractive when they believed they shared similar political beliefs!

To see whether this artificial laboratory study would accurately predict behavior in a real-life situation, the researchers then conducted a second study, using data from an existing dating website called *OkCupid*. Given that online messages sent from one person and replied to by another generally indicate a shared interest in dating, the researchers reported that shared political views increased interest by 9.5%.

Why is this research important? *Similarity* is one of the best predictors of satisfaction in long-term relationships (Chapter 14). But what happens if we restrict our dating (and friendship) partners to

those we already agree with? Aren't we more likely to fall victim to *groupthink* (Chapter 14) and *confirmation bias* (Chapter 8)?

RESEARCH CHALLENGE

❶ Based on the information provided, did these two studies (Huber & Malhotra, 2012) use descriptive, correlational, and/or experimental research? (Tip: Be sure to look for two separate answers for the two different studies.)

❷ If you chose:

- descriptive research, is this a naturalistic observation, survey/interview, case study, or archival research?
- correlational research, is this a positive, negative, or zero correlation?
- experimental research, label the IV, DV, experimental group(s), and control group.

>> CHECK YOUR ANSWERS IN APPENDIX B.

NOTE: The information provided in this study is admittedly limited, but the level of detail is similar to what is presented in most textbooks and public reports of research findings. Answering these questions, and then comparing your answers to those in the Appendix, will help you become a better critical thinker and consumer of scientific research.

controlled experiments that would prove true cause and effect in these situations? Instead, we often have to rely on the accumulating weight of the evidence from nonexperimental studies and nonhuman animal experiments. If you'd like additional information about research methods and statistical analyses, see Appendix A at the back of this text. In addition, each chapter of this text offers an in-depth analysis of a hot topic in research (*Psych Science*), along with a self-grading *Research Challenge* (see the first example above).

Ethical Guidelines

So far, we've discussed how psychologists conduct research and analyze their data. Now we need to examine the general ethics that guide their research. The two largest professional organizations of psychologists, the American Psychological Association (APA) and the Association for Psychological Science (APS), both recognize the importance of maintaining high ethical standards in research, therapy, and all other areas of professional psychology. The preamble to the APA's publication *Ethical Principles of Psychologists and Code of Conduct* (2002, 2010) requires psychologists to maintain their competence, to retain objectivity in applying their skills, and to preserve the dignity and best interests of their clients, colleagues, students, research participants, and society.

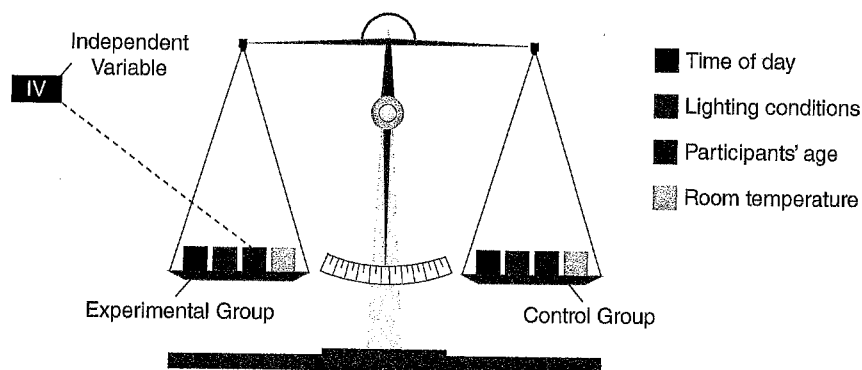


FIGURE 1.14 CONTROLLING FOR CONFOUNDING VARIABLES

Recognizing that certain outside variables may affect their experiment, researchers strive for balance between the experimental and control groups, making sure the variables are the same for both. Once balance is achieved, and the independent variable (IV) is added to the experimental group, the experimenters check to see if the scale's balance is significantly disrupted. If so, they can then say that the IV *caused* the change. However, if the IV is not "heavy" enough to make a significant difference, then the experiment "failed," and experimenters go back to further refine their approach—or start over.

Experimenter bias Bias that occurs when a researcher influences research results in the expected direction.

Ethnocentrism The belief that one's culture is typical of all cultures; also, viewing one's own ethnic group (or culture) as central and "correct" and judging others according to this standard.

Participant bias Bias that can occur when experimental conditions influence the participant's behavior or mental processes.

Single-blind study An experiment where only the researcher, and not the participants, knows who is in either the experimental or control group.



Runzelkorn/Shutterstock

Double-blind study An experimental technique in which both the researcher and the participants are unaware of (blind to) who is in the experimental or control groups.

Placebo An inactive substance or fake treatment used as a control technique, usually in drug research, or given by a medical practitioner to a patient.

both the researcher and the participants. For example, if experimenters' beliefs and expectations are not controlled for, they can affect participants' responses, producing flawed results. Imagine what might happen if an experimenter breathed a sigh of relief when a participant gave a response that supported the researcher's hypothesis. One way to prevent such **experimenter bias** from destroying the validity of participants' responses is to establish objective methods for collecting and recording data, such as using computers to present stimuli and record responses.

Experimenters also can skew their results if they assume that behaviors typical in their own culture are typical in all cultures—a bias known as **ethnocentrism**. One way to avoid this problem is to have researchers from two cultures each conduct the same study twice, once with their own culture and once with at least one other culture. This kind of *cross-cultural sampling* isolates group differences in behavior that stem from researchers' ethnocentrism.

Just as researchers can inadvertently introduce error (the experimenter bias), participants also can produce a similar error, called **participant bias**. For example, research measuring accuracy of reports of alcohol consumption demonstrates that heavy drinkers tend to under-report how much alcohol they are consuming (Northcote & Livingston, 2011). In this case, participants may try to present themselves in a good light—called the *social desirability response*—or deliberately attempt to mislead the researcher.

psychology and you **Understanding Social Desirability** Imagine you're participating in a study that asks you about sensitive and highly personal behaviors, such as whether you've ever abused drugs, cheated on a test, or shoplifted. Can you see why participants might give dishonest answers to such questions, either due to fear of the consequences or personal embarrassment?

Researchers attempt to control for both *experimenter* and *participant* bias by offering anonymous participation and other guarantees of privacy and confidentiality. **Single-blind studies**, **double-blind studies**, and **placebos** offer additional safeguards (Figure 1.15).

Finally, one of the most effective (and controversial) ways of preventing participant bias is to temporarily deceive participants about the true nature of the research project. For example, in studies examining when and how people help others,

Experimental research A carefully controlled scientific procedure that involves the manipulation of variables to determine cause and effect.

Independent variable (IV) The variable that is manipulated to determine its causal effect on the dependent variable; also called the treatment variable.

Dependent variable (DV) The variable that is observed and measured for change; the factor that is affected by (or dependent on) the independent variable.

Experimental group The group that is manipulated (i.e., receives treatment) in an experiment.

Control group The group that is not manipulated (i.e., receives no treatment) during an experiment.

Sample bias A bias that may occur when research participants are unrepresentative of the larger population.

Random assignment A research technique that involves using chance to assign participants to experimental or control conditions, thus minimizing the possibility of biases or preexisting differences in the group.

Confounding variable A stimulus inadvertently introduced into a research setting that, unless controlled, may affect the outcome of the study and lead to erroneous conclusions.

Experimental Research

As you've just seen, correlational studies are important because they reveal *associations* between variables. However, to determine *causation* (what causes what), we need **experimental research**. In Chapter 4, you'll discover how experiments were used to test the influence of pregnant women's food choices on taste preferences in their infants (Mennella et al., 2001). Similarly, in Chapter 13, you'll learn how experiments can help test the effectiveness of a particular psychotherapy approach at helping a spider-phobic person become comfortable enough to touch a tarantula (Hauner et al., 2012).

Experiments are considered the “gold standard” for scientific research because only through an experiment can researchers isolate and then examine a single factor's effect on a particular behavior (Goodwin, 2011). To accomplish this type of isolation and examination, an experiment has five critical components: a hypothesis (discussed earlier), an **independent variable (IV)**, a **dependent variable (DV)**, one or more **experimental group(s)**, and a **control group** (Figure 1.13).

How can we prevent bias and errors when creating and setting up our experiments? Sample bias may occur when a particular group of participants does not accurately reflect the composition of the larger population from which they are drawn. For example, critics suggest that some psychological literature is biased because it too often uses college students as participants. A way to minimize sample bias is to select participants who constitute a representative sample of the entire population of interest.

Even if we avoid **sample bias** with representative sampling, we can still introduce bias when assigning participants to the experimental or control group. As you can see in Step 2 of Figure 1.13, using a chance or random system, such as a coin toss, guarantees that each participant is equally likely to be assigned to any particular group, a technique called **random assignment**. This type of assignment also helps control for extraneous, **confounding variables** (such as time of day, lighting conditions, and room temperature), which must be held constant across experimental and control groups so that they do not affect the different groups' results (Figure 1.14).

©terex/iStockphoto



realworldpsychology Do Aesthetics Affect Eating Behavior?

To answer this question, a group of researchers modified the environment in one section of a fast food restaurant by dimming the lights and adding relaxing music, plants, candles, and tablecloths. They then randomly assigned customers to sit in either the original section of the restaurant or this new section (Wansink & Van Ittersum, 2012). All participants freely ordered whatever food they preferred, but those in the more relaxing part of the restaurant took longer to eat their meal and ate 18% fewer calories.

Can you see how the *random assignment* of the customers controlled for any potential *confounding variables*? All participants freely entered the same restaurant, and each individual was equally likely to be assigned to either section in the restaurant. Thanks to these controls, the researchers can legitimately conclude that the *independent variable (IV)* (relaxing versus standard restaurant condition) caused the change in the *dependent variables (DVs)* (time spent eating and number of calories consumed).

In addition to the controls mentioned above, a good scientific experiment has other invaluable techniques for protecting against potential sources of error from

Correlational research Research that measures the degree of relationship (if any) between two or more variables in order to determine how well one variable predicts another.

Correlation coefficient A number from -1.00 to $+1.00$ that indicates the direction and strength of the relationship between two variables.

Correlational Research

Data collected from descriptive research provides invaluable information on behavior and mental processes. However, when researchers are interested in examining more than one variable, they can take a further step and calculate the degree and type of relationship between the variables. As the name **correlational research** implies, when any two variables are co-related, a change in one is accompanied by a change in the other. For example, researchers in one study examined the link between happiness and age in a sample of more than 5,000 people across the United States (Sutin et al., 2013). This study revealed that, contrary to common stereotypes, happiness actually increases with age!

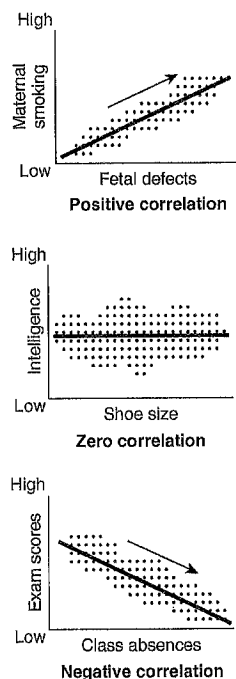
Another important advantage of correlational studies is that they allow us to make predictions about one variable based on knowledge of another. For instance, suppose scientists notice a relationship between the use of cell phones and the number of traffic accidents, or between the hours of television viewing and performance on exams. First, they would carefully measure the two factors. Next, they would analyze their measurements using a statistical formula that gives a **correlation coefficient** (Figure 1.10).

FIGURE 1.10 INTERPRETING A CORRELATION COEFFICIENT

A correlation coefficient is a number from -1.00 to $+1.00$ that represents the direction and strength of a relationship between two variables. Understanding it is crucial to becoming an educated consumer of research.

- **Direction of the correlation** (left-hand column) The $+$ or $-$ sign in the correlation coefficient indicates the *direction* of the correlation, either positive or negative, which is often depicted in graphs called *scatterplots*. Each dot on these graphs represents one participant's score on both variables.
- **Strength of the correlation** (right-hand column) A correlation of $+1.00$ and a -1.00 magnitude both indicate the strongest possible relationship. As the number decreases and gets closer to 0.00 , the relationship weakens. We interpret correlations close to zero as representing no relationship between the variables—like the “relationship” between broken mirrors and years of bad luck.

Direction of the correlation



Strength of the Correlation

$+1.00$	Perfect positive relationship (100% of the variance)
$+0.80$ to $+0.99$	Very strong positive relationship (64–98% of the variance)
$+0.60$ to $+0.79$	Strong positive relationship (36–62% of the variance)
$+0.40$ to $+0.59$	Moderate positive relationship (16–35% of the variance)
$+0.20$ to $+0.39$	Weak positive relationship (4–15% of the variance)
0.00	No relationship (0% of the variance)
-0.20 to -0.39	Weak negative relationship (4–15% of the variance)
-0.40 to -0.59	Moderate negative relationship (16–35% of the variance)
-0.60 to -0.79	Strong negative relationship (36–62% of the variance)
-0.80 to -0.99	Very strong negative relationship (64–98% of the variance)
-1.00	Perfect negative relationship (100% of the variance)

Think Critically

Can you identify whether each of the following pairs most likely has a positive, negative, or zero correlation?

- 1 Health and exercise
- 2 Hours of TV viewing and student grades
- 3 Happiness and helpfulness
- 4 Hours of sleep and number of friends
- 5 Extraversion and loneliness

Answers: 1. positive, 2. negative, 3. positive, 4. zero, 5. negative

RESEARCH METHODS

LEARNING OBJECTIVES

RETRIEVAL PRACTICE While reading the upcoming sections, respond to each Learning Objective in your own words. Then compare your responses to those found at www.wiley.com/college/huffman.

- 1 DESCRIBE** the four key types of descriptive research.
- 2 EXPLAIN** how to interpret a correlation coefficient.
- 3 IDENTIFY** the key components of experimental research.
- 4 DESCRIBE** the ethical guidelines for psychological research.

Having studied the scientific method and psychology's four main goals, we can now examine how psychologists conduct their research. Psychologists generally draw on three major research methods—*descriptive*, *correlational*, and *experimental* (**Table 1.5**). Each of these approaches has advantages and disadvantages, and psychologists often use variations of all three methods to study a single problem. In fact, when multiple approaches lead to similar conclusions, scientists have an especially strong foundation for concluding that one variable does affect another in a particular way.

Descriptive Research

Descriptive research A research method in which the researcher observes and records behavior and mental processes without manipulating variables.

Naturalistic observation The process of observing and recording a research participant's behavior and mental processes in his or her natural setting, without interfering.

Almost everyone observes and describes others in an attempt to understand them, but in conducting **descriptive research**, psychologists do so systematically and scientifically. The key types of descriptive research are *naturalistic observation*, *survey/interview*, *case study*, and *archival research*.

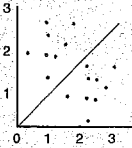
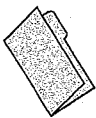
Naturalistic Observation

When conducting **naturalistic observation**, researchers systematically observe and record participants' behavior in their natural setting, without interfering. Many settings lend themselves to naturalistic observation, from supermarkets to airports to outdoor settings. For example, Jane Goodall's classic naturalistic observations of wild chimpanzees provided invaluable insights into their everyday lives, such as their use of tools, acts of aggression, demonstrations of affection, and, sadly, even the killing of other chimps' babies (infanticide). In Chapter 5 you'll read about a study in which researchers used naturalistic observation to examine whether drivers

TABLE 1.5 PSYCHOLOGY'S THREE MAJOR RESEARCH METHODS

Method	Purpose	Advantages	Disadvantages
Descriptive (naturalistic observation, survey/interview, case study, archival research)	Observe, collect, and record data (meets psychology's goal of description)	Minimizes artificiality, makes data collection easier, allows description of behavior and mental processes as they occur	Little or no control over variables, researcher or participant biases, cannot identify cause and effect
Correlational (statistical analyses of relationships between variables)	Identify relationships and assess how well one variable predicts another (meets psychology's goal of prediction)	Helps clarify relationships between variables that cannot be examined by other methods and allows prediction	Little or no control over variables, cannot identify cause and effect
Experimental (manipulation and control of variables)	Identify cause and effect (meets psychology's goal of explanation)	Allows researchers to have precise control over variables, helps identify cause and effect	Ethical concerns, practical limitations, artificiality of lab conditions, uncontrolled variables may confound results, researcher and participant biases

Note that the three methods are not mutually exclusive. Researchers may use one, two, or all three methods to explore the same topic.



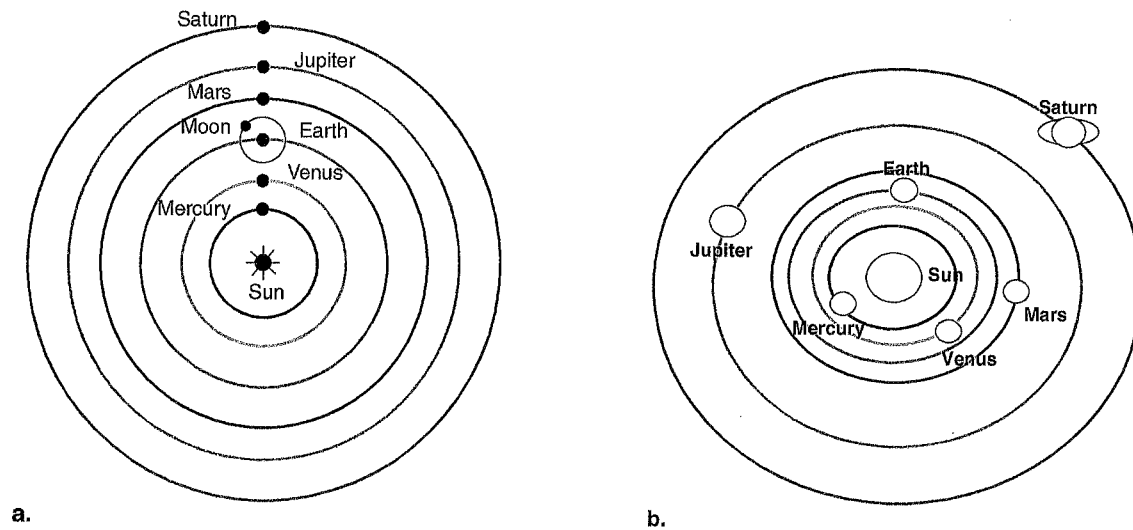


FIGURE 1.8 OPINIONS VERSUS FACTS—SCIENCE TO THE RESCUE!

Early experiments, conducted primarily by *Nicolaus Copernicus* (1473–1543), led to a collection of facts and the ultimate theory that the Earth was not the center of the universe (as generally assumed at the time) (**Figure a**). Instead, it rotated around the sun with the other planets in concentric circles. Later scientists (astronomers Johannes Kepler and Tycho Brahe) built on this Copernican (heliocentric) theory with additional experiments that led to a revised theory, in which the orbits were not circular, but rather elliptical. (**Figure b**). Today, researchers have expanded the theory even further by demonstrating that our sun is not the center of the universe, but only a part of a galaxy that in turn is only one of many billions. Can you see how these incremental changes illustrate the value of scientific theories and their ever changing, and self-correcting nature?

concepts. In common usage, the term *theory* is often assumed to mean something is only a hunch or someone's personal opinion. In reality, scientific theories are evidence based, rigorously tested, and self-correcting (**Figure 1.8**).

Psychology's Four Main Goals

In contrast to *pseudopsychologies*, which we discussed earlier and which rely on unsubstantiated beliefs and opinions, psychology is based on rigorous scientific methods. When conducting their research, psychologists have four major goals—to *describe*, *explain*, *predict*, and *change* behavior and mental processes:

- 1. Description** Description tells what occurred. In some studies, psychologists attempt to *describe*, or name and classify, particular behaviors by making careful scientific observations. Description is usually the first step in understanding behavior. For example, if someone says, “Boys are more aggressive than girls,” what does that mean? The speaker's definition of aggression may differ from yours. Science requires specificity.
- 2. Explanation** An explanation tells why a behavior or mental process occurred. *Explaining* a behavior or mental process requires us to discover and understand its causes. One of the most enduring debates in science is the **nature–nurture controversy** (Gruber, 2013; Tyson et al., 2011). Are we controlled by biological and genetic factors (the nature side) or by the environment and learning (the nurture side)? As you will see throughout the text, psychology (like all other sciences) generally avoids “either or” positions and focuses instead on *interactions*. Today, almost all scientists agree that most psychological, and even physical, traits reflect an interaction between nature and nurture. For example, research suggests numerous interacting causes or explanations for aggression, including culture, learning, genes, brain damage, and testosterone (Garfield et al.; 2011; Longino, 2013; Pournaghash-Tehrani, 2011).
- 3. Prediction** Psychologists generally begin with description and explanation (answering the “whats” and “whys”). Then they move on to the higher-level goal

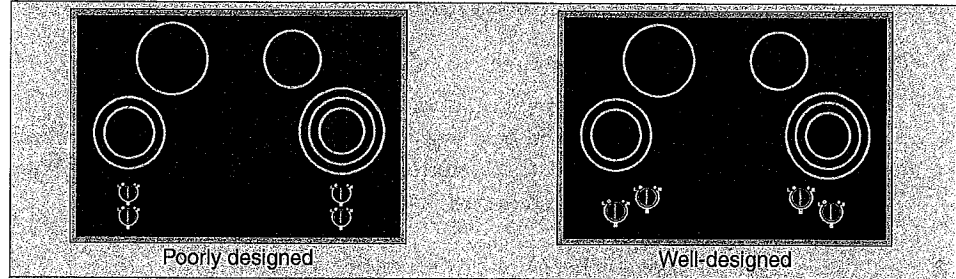
Nature–nurture controversy An ongoing dispute about the relative contributions of nature (heredity) and nurture (environment) in determining the development of behavior and mental processes.

FIGURE 1.6 APPLIED RESEARCH IN PSYCHOLOGY

Note how psychological research has helped design safe and more reliable appliances, machinery, and instrument controls (*Psychology Matters*, 2006).

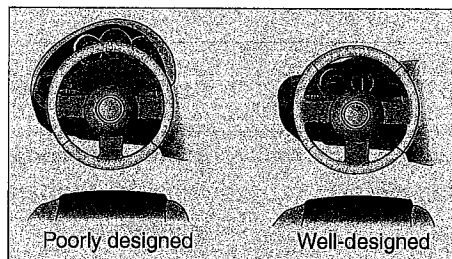
A Spatial correspondence

Controls for stovetops should be arranged in a pattern that corresponds to the placement of the burners.



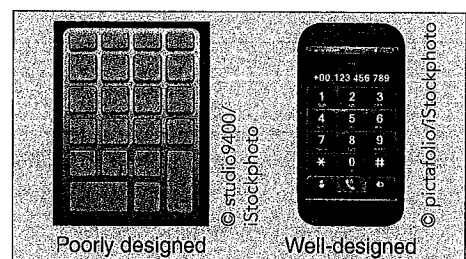
B Visibility

Automobile gauges for fuel, temperature, and speed should be easily visible to the driver.



C Arrangement of numbers

A top-down arrangement of numbers on a cell phone is more efficient than the bottom-up arrangement on a computer's key board.



Keep in mind that basic and applied research approaches are not polar opposites. Instead, they frequently share similar goals, and their outcomes interact, with one building on the other.

The Scientific Method

Like scientists in any other field, psychologists follow strict, standardized procedures so that others can understand, interpret, and repeat or test their findings. Most scientific investigations consist of six basic steps, collectively based on the **scientific method** (Figure 1.7).

Have you wondered whether completing the Retrieval Practice exercises that follow the Learning Objectives, Self-Test, and Key Terms in each chapter of this text is worth your time? Have you thought, “Will I get a better grade on my exams if I do these exercises?” How would you use the scientific method to answer these general questions? Starting with Step 1, you could go to professional journals and read up on the research about retrieval practice that already exists on this topic. To complete Step 2, you would first form an educated guess based on your literature review in Step 1. You would then turn this guess into a statement, called a **hypothesis**, which provides predictions that can be tested in some way. You would then need to explicitly state how each of your variables in your hypothesis will be **operationally defined** (observed, manipulated, and measured). For example, a better grade on my exams might be operationally defined as earning one letter grade higher than the letter grade on my previous exam.

Using your initial question about the value of the Retrieval Practice exercises, your hypothesis and operational definitions might be: “Students who spend two hours studying Chapter 1 in this text and one hour completing the three Retrieval Practice exercises will earn higher scores on a standard academic exam than students who spend three hours using free-choice study techniques without completing the Retrieval Practice exercises.”

Scientific method The cyclical and cumulative research process used for gathering and interpreting objective information in a way that minimizes error and yields dependable results.

Hypothesis A tentative and testable explanation (or “educated guess”) about the relationship between two or more variables; a testable prediction or question.

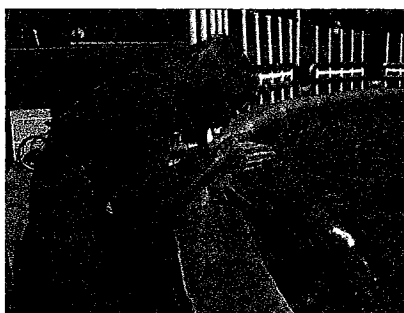
Operational definition A precise description of how the variables in a study will be observed, manipulated, and measured.

TABLE 1.4

SAMPLE CAREERS AND SPECIALTIES IN PSYCHOLOGY | real world psychology



Zigy Kaluzny/Getty Images, Inc.



Dolphin Inst./Photo Researchers

CAREER/SPECIALTY	DESCRIPTION
Biopsychologist/neuroscientist	Investigates the relationship between biology, behavior, and mental processes, including how physical and chemical processes affect the structure and function of the brain and nervous system
Clinical psychologist	Specializes in the evaluation, diagnosis, and treatment of psychological disorders
Cognitive psychologist	Examines "higher" mental processes, including thought, memory, intelligence, creativity, and language
Comparative psychologist	Studies the behavior and mental processes of nonhuman animals; emphasizes evolution and cross-species comparisons
Counseling psychologist	Overlaps with clinical psychology, but generally works with less seriously disordered individuals and focuses more on social, educational, and career adjustment
Cross-cultural psychologist/psychological anthropologist	Studies similarities and differences in and across various cultures and ethnic groups
Developmental psychologist	Studies the course of human growth and development from conception to death
Educational psychologist	Studies the processes of education and works to promote the academic, intellectual, social, and emotional development of children in the school environment
Environmental psychologist	Investigates how people affect and are affected by the physical environment
Experimental psychologist	Examines processes such as learning, conditioning, motivation, emotion, sensation, and perception in humans and other animals (Note that psychologists working in almost all other areas of specialization also conduct research.)
Forensic psychologist	Applies principles of psychology to the legal system, including jury selection, psychological profiling, assessment, and treatment of offenders
Gender and/or cultural psychologist	Investigates how men and women and different cultures vary from one another and how they are similar
Health psychologist	Studies how biological, psychological, and social factors affect health and illness
Industrial/organizational psychologist	Applies principles of psychology to the workplace, including personnel selection and evaluation, leadership, job satisfaction, employee motivation, and group processes within the organization
Personality psychologist	Studies the unique and relatively stable patterns in a person's thoughts, feelings, and actions
Positive psychologist	Examines factors related to optimal human functioning
School psychologist	Collaborates with teachers, parents, and students within the educational system to help children with needs related to a disability and/or their academic and social progress; also provides evaluation and assessment of a student's functioning and eligibility for special services
Social psychologist	Investigates the role of social forces in interpersonal behavior, including aggression, prejudice, love, helping, conformity, and attitudes
Sports psychologist	Applies principles of psychology to enhance physical performance

FIGURE 1.5 THE BIOPSYCHOSOCIAL MODEL

realworldpsychology

When we consider people as individuals (**Figure a**), we don't always get a complete picture of their emotions and motivations. Stepping back to see the same individuals in a broader context (**Figure b**) can provide new insights. With this "bigger picture" (the child's immediate surroundings and his or her group's behavior) in mind, can you better understand why each child might be feeling and acting as he or she is? The biopsychosocial model recognizes that there is usually no single cause for our behavior or our mental states (**Figure c**). For example, our moods and feelings are often influenced by genetics and neurotransmitters (biological), our learned responses and patterns of thinking (psychological), and our socioeconomic status and cultural views of emotion (sociocultural).



people from individualistic cultures tend to respond with personality traits ("I am shy"; "I am outgoing") or their occupation ("I am a teacher"; "I am a student").

In *collectivistic cultures*, however, the person is defined and understood primarily by looking at his or her place in the social unit (Berry et al., 2011; Dierdorff et al., 2011; Greenfield & Quiroz, 2013; McCrae, 2004, 2011). Relatedness, connectedness, and interdependence are valued, as opposed to separateness, independence, and individualism. When asked to complete the statement "I am . . .," people from collectivistic cultures tend to mention their families or nationality ("I am a daughter"; "I am Chinese"). Keep in mind, however, that these sample countries and their sample values exist on a continuum, and that within each country there is a wide range of individual differences.

Looking back at the photos from the cultures in Figure 1.5, can you see how learning more about the biopsychosocial model offers increased understanding of ourselves, our friends, and our families, and how it may improve our understanding and sensitivity to other cultures? For example, North Americans generally define *sincerity* as behaving in accordance with our inner feelings, whereas people from collectivist cultures tend to see their equivalent word for sincerity as behavior that conforms to a person's role expectations and duties. (Yamada, 1997). This explains why collectivistic behaviors might appear insincere to a North American.

Careers in Psychology

Many people think of psychologists only as therapists, and it's true that the fields of clinical and counseling psychology do make up the largest specialty areas. However, many psychologists have no connection with therapy. Instead, we work as researchers, teachers, or consultants in academic, business, industry, and government



FIGURE 1.3 WHAT MAKES US HAPPY? | realworldpsychology

Research in positive psychology finds that our happiness increases when we give to others. When adults are given money and told to spend it on others, they experience higher levels of happiness than do those who are told to spend it on themselves (Dunn et al., 2008). Amazingly enough, even children as young as 2 years of age are happier when they give treats such as Goldfish crackers to other children than when they keep the treats for themselves (Aknin et al., 2012). Other research finds that those who experience more positive emotions also live longer than those with more negative emotions (Diener & Chan, 2011).

Humanistic perspective An approach to understanding behavior and mental processes that perceives human nature as naturally positive and growth seeking; it emphasizes free will and self-actualization.

Positive psychology The study of optimal human functioning; it emphasizes positive emotions, traits, and institutions.

Cognitive perspective An approach to understanding behavior and mental processes that focuses on thinking, perceiving, and information processing.

Biological perspective An approach to understanding behavior and mental processes that focuses on genetics and biological processes in the brain and other parts of the nervous system.

Evolutionary perspective An approach to understanding behavior and mental processes that stresses natural selection, adaptation, and evolution; it assumes that mental capabilities evolved over millions of years to serve particular adaptive purposes.

Although the psychoanalytic and behavioral perspectives dominated U.S. psychology for some time, in the 1950s a new approach emerged—the **humanistic perspective**, which stresses *free will* (voluntarily chosen behavior) and *self-actualization* (an inborn drive to develop all one's talents and capabilities). According to Carl Rogers and Abraham Maslow, two central figures with this perspective, all individuals naturally strive to develop and move toward self-actualization. Like psychoanalysis, humanistic psychology developed an influential theory of personality, and its own form of psychotherapy (Chapters 11 and 13). The humanistic approach also led the way to a contemporary research specialty known as **positive psychology**—the study of optimal human functioning (**Figure 1.3**) (Cummins, 2013; Diener, 2008; Seligman, 2003, 2011; Taylor & Sherman, 2008).

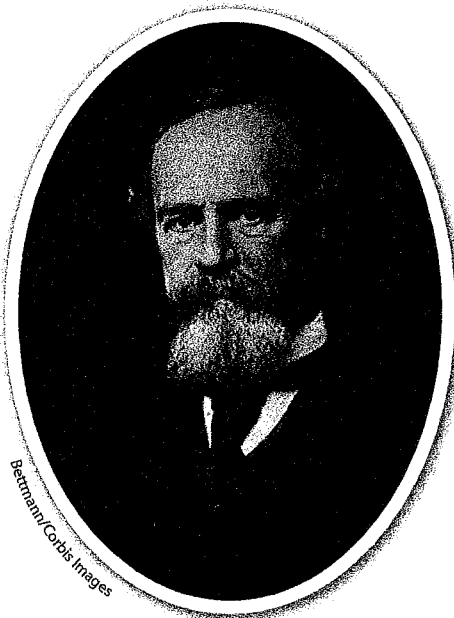
One of the most influential modern approaches, the **cognitive perspective**, recalls psychology's earliest days in that it emphasizes thoughts, perception, and information processing (Kellogg, 2011; Sternberg, 2012). Modern cognitive psychologists study the ways we gather, encode, and store information using a vast array of mental processes. These include perception, memory, imagery, concept formation, problem solving, reasoning, decision making, and language. Many cognitive psychologists also use an *information-processing approach*, likening the mind to a computer that sequentially takes in information, processes it, and then produces a response.

During the past few decades, scientists have explored the role of biological factors in almost every area of psychology. Using sophisticated tools and technologies, scientists who adopt this **biological perspective** examine behavior through the lens of genetics and biological processes in the brain and other parts of the nervous system. For example, research shows that genes influence many aspects of our behavior, including whether we finish high school and college, how kind we are to other people, and even whom we vote for in elections (Beaver et al., 2011; Hatemi & McDermott, 2012; Poulin et al., 2012).

The **evolutionary perspective** stresses natural selection, adaptation, and evolution of behavior and mental processes (Buss, 2011; Durrant & Ellis, 2013; Maner & Menzel, 2013). Its proponents argue that natural selection favors behaviors that enhance an organism's reproductive success. According to the evolutionary

**FIGURE 1.1 WILLIAM JAMES
(1842–1910)**

William James broadened psychology to include animal behavior and biological processes. In the late 1870s, James established the first psychology laboratory in the United States, at Harvard University.



Psychoanalytic perspective An approach to understanding behavior and mental processes developed by Freud, which focuses on unconscious processes and unresolved conflicts.

Psychodynamic perspective An approach to understanding behavior and mental processes that emphasizes unconscious dynamics, internal motives, conflicts, and past experiences; actions are viewed as stemming from inherited instincts, biological drives, and attempts to resolve conflicts between personal needs and social requirements.

Behavioral perspective An approach to understanding behavior and mental processes that emphasizes objective, observable environmental influences on overt behavior.

Psychology's Past

Although people have long been interested in human nature, it was not until the first psychological laboratory was founded in 1879 that psychology as a science officially began. As interest in the new field grew, psychologists adopted various perspectives on the “appropriate” topics for psychological research and the “proper” research methods. These diverse viewpoints and subsequent debates molded and shaped modern psychological science.

Psychology's history as a science began in 1879, when Wilhelm Wundt [VILL-helm Voont], generally acknowledged as the “father of psychology,” established the first psychological laboratory in Leipzig, Germany. Wundt and his followers were primarily interested in how we form sensations, images, and feelings. Their chief methodology was termed “introspection,” and it relied on self-monitoring and reporting on conscious experiences (Freedheim & Weiner, 2013; Goodwin, 2012).

A student of Wundt's, Edward Titchener, brought his ideas to the United States. Titchener's approach, now known as *structuralism*, sought to identify the basic building blocks, or “structures,” of mental life through introspection and then to determine how these elements combine to form the whole of experience. Because introspection could not be used to study animals, children, or more complex mental disorders, however, structuralism failed as a working psychological approach. Although short-lived, it did establish a model for studying mental processes scientifically.

Structuralism's intellectual successor, *functionalism*, studied the way the mind functions to enable humans and other animals to adapt to their environment. William James was the leading force in the functionalist school (**Figure 1.1**). Although functionalism also eventually declined, it expanded the scope of psychology to include research on emotions and observable behaviors, initiated the psychological testing movement, and influenced modern education and industry.

During the late 1800s and early 1900s, while functionalism was prominent in the United States, the **psychoanalytic perspective** was forming in Europe. Its founder, Austrian physician Sigmund Freud, believed that a part of the human mind, the unconscious, contains thoughts, memories, and desires that lie outside personal awareness yet still exert great influence. For example, according to Freud, a man who is cheating on his wife might slip up and say, “I wish you were her,” when he consciously planned to say, “I wish you were here.” Such seemingly meaningless, so-called “Freudian slips” supposedly reveal a person's true unconscious desires and motives.

Freud also believed many psychological problems are caused by unconscious sexual or aggressive motives and conflicts between “acceptable” and “unacceptable” behaviors (Chapter 11). His theory led to a system of therapy known as *psychoanalysis* (Chapter 13).

Modern Psychology

As summarized in **Table 1.1**, contemporary psychology reflects seven major perspectives: *psychodynamic*, *behavioral*, *humanistic*, *cognitive*, *biological*, *evolutionary*, and *sociocultural*. Although there are numerous differences among these seven perspectives, most psychologists recognize the value of each orientation and agree that no one view has all the answers.

Freud's nonscientific approach and emphasis on sexual and aggressive impulses have long been controversial, and today there are few strictly Freudian psychoanalysts left. However, the broad features of his theory remain in the modern **psychodynamic perspective**. The general goal of psychodynamic psychologists is to explore unconscious *dynamics*—internal motives, conflicts, and past experiences.

In the early 1900s, another major perspective appeared that dramatically shaped the course of modern psychology. Unlike earlier approaches, the **behavioral perspective** emphasizes objective, observable environmental influences on overt

chapteroverview

Welcome to **Real World Psychology**! As our title suggests, we believe psychology's unique contributions to the scientific world are best shown through every day, real-life examples. Our innermost thoughts, our relationships, our politics, our "gut" feelings, and our deliberate decisions are all shaped by a complex psychological system that affects us at every level, from the cellular to the cultural. Psychology encompasses not only humankind but our nonhuman compatriots as well—from rats and pigeons to cats and chimps.

We invite you to let us know how your study of psychology (and this text) affects you and your life. You can reach us at khuffman@palomar.edu and casanderson@amherst.edu. We look forward to hearing from you.

Warmest regards,



courtesy of Karen Huffman



courtesy of Catherine Sanderson

Karen R. Huffman

Catherine A. Sanderson

INTRODUCING PSYCHOLOGY

LEARNING OBJECTIVES

RETRIEVAL PRACTICE While reading the upcoming sections, respond to each Learning Objective in your own words. Then compare your responses to those found at www.wiley.com/college/huffman.

- 1 **DEFINE** psychology.
- 2 **IDENTIFY** modern psychology's seven major perspectives.
- 3 **SUMMARIZE** psychology's major career options.

Psychology The scientific study of behavior and mental processes.

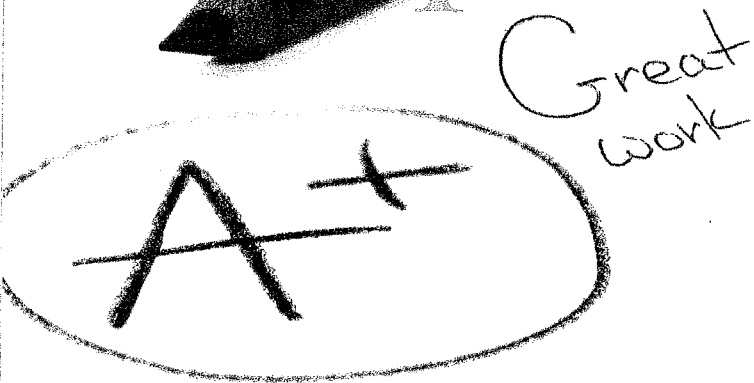
The term **psychology** derives from the roots *psyche*, meaning "mind," and *logos*, meaning "word." Modern psychology is most commonly defined as the *scientific study of behavior and mental processes*. *Scientific* is a key feature of the definition because psychologists follow strict scientific procedures to collect and analyze their data. *Behavior* (such as crying, hitting, and sleeping) can be directly observed. *Mental processes* are private, internal experiences that cannot be directly observed (like feelings, thoughts, and memories).

For many psychologists, the most important part of the definition of psychology is the word *scientific*. Psychology places high value on *empirical evidence* that can be objectively tested and evaluated. Psychologists also emphasize **critical thinking**, *the process of objectively evaluating, comparing, analyzing, and synthesizing information* (Forshaw, 2013).

Critical thinking The process of objectively evaluating, comparing, analyzing, and synthesizing information.

Be careful not to confuse psychology with *pseudopsychologies*, which are based on common beliefs, folk wisdom, or superstitions. (*Pseudo* means "false.") These sometimes give the appearance of science, but they do not follow the basics of the scientific method. Examples include purported psychic powers, horoscopes, mediums, and self-help and "pop psych" statements such as "I'm mostly right-brained" or "We use only 10% of our brain." Given the popularity of these misleading beliefs, be sure to test your own possible myths in the *Psychology and You* section.

chapterone



Introduction and Research Methods

CHAPTER OUTLINE

INTRODUCING PSYCHOLOGY 4

Voices from the Classroom: The Joys of Teaching Intro Psych

- Psychology's Past
- Modern Psychology
- Careers in Psychology

THE SCIENCE OF PSYCHOLOGY 13

- The Scientific Method
- Psychology's Four Main Goals

RESEARCH METHODS 18

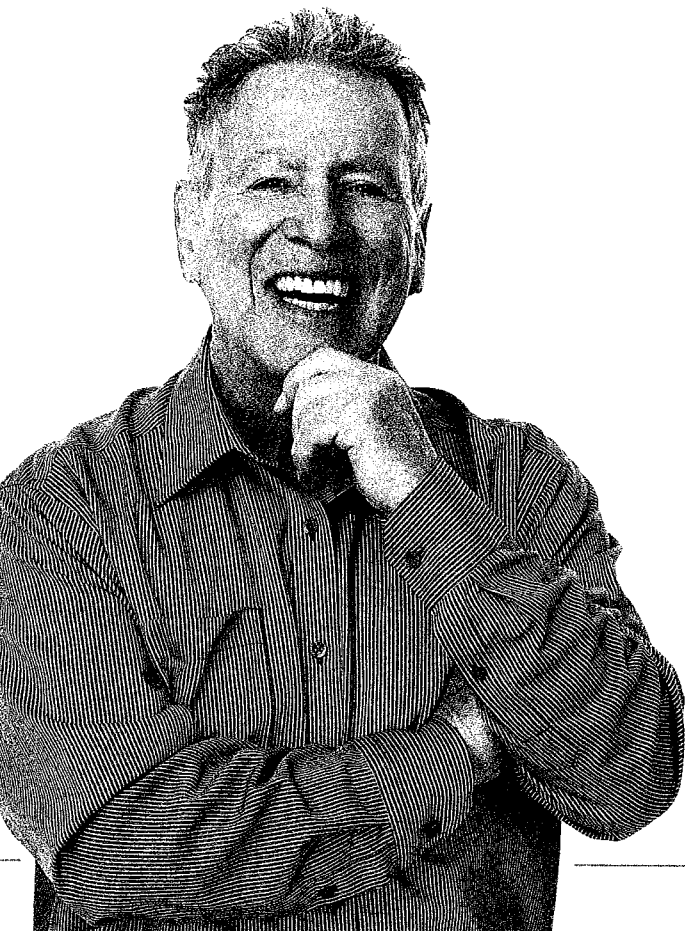
- Descriptive Research
- Correlational Research
- Experimental Research

PsychScience: Politics and Dating Relationships

- Ethical Guidelines

STRATEGIES FOR STUDENT SUCCESS 29

- Study Habits
- Time Management



- Our deepest gratitude also goes out to Chris Johnson, Executive Editor. We're continually impressed by, and eternally grateful for, his invaluable feedback and suggestions, thoughtful guidance from beginning to end, and tremendous support for our vision of this new book. He's also a fun guy and delightful work partner!
- We're deeply indebted to Margaret Barrett, Senior Marketing Manager, who handles all the ins and outs of marketing. She was instrumental in the creative ideas for the cover design, and captured the "voice" of our book.
- ***Real World Psychology*** also could not exist without a great ancillary author team. We gratefully acknowledge the expertise and immense talents of our Video Tutorials director, Katherine Dowdell, and her teammates; Test Bank author, Mike Majors, Delgado Community College; Instructor's Resource Guide author, Vicki Ritts of St. Louis Community College; PowerPoint author, Katherine Williams of Tri-County Technical College; and Practice Test author, Paulina Mulhaupt of Macomb Community College.
- The staff at Furino Production deserves a special note of thanks. Their careful and professional approach was critical to the successful production of this book. Jeanine Furino, the Project Manager, should be particularly commended for her infinite patience, gracious handholding, and personal support. Even during the sad, personal loss of her father during one of the heaviest times in production, Jeanine maintained her professionalism and incredible work ethic—never missing a single date in the schedule!
- We'd also like to express our heartfelt appreciation to the hundreds of faculty across the country who contributed their constructive ideas to this first edition and to our many students over all the years. They've taught us what students want to know and inspired us to write this book.
- All the writing, producing, and marketing of this book would be wasted without an energetic and dedicated sales staff. We wish to sincerely thank all the publishing representatives for their tireless efforts and good humor. It's a true pleasure to work with such a remarkable group of people.

Personal Acknowledgments

- The writing of this text has been a group effort involving the input and support of all our wonderful families, friends, and colleagues. To each person we offer our sincere thanks: Haydn Davis, Tom Frangicetto, Mike Garza, Teresa Jacob, Jim Matiya, Lou Milstein, Kandis Mutter, Tyler Mutter, Roger Morrisette, Katie Townsend-Merino, Maria Pok, Fred Rose, and Kathy Young. They provided careful editing of this text, library research, and a unique sense of what should and should not go into an introduction to psychology text. A special note of appreciation goes to Taylor Penzel, who carefully checked and edited all the references for each chapter of the text.
- From Catherine Sanderson: Thank you to my husband, Bart Hollander, who supported me in taking on this immense challenge, even though he understood it would require considerable late night writing, a (very) messy study, and even more take-out dinners. I also want to express my appreciation to my children—Andrew, Robert, and Caroline—who sometimes allowed me peace and quiet with which to write.
- From Karen Huffman: A big hug and continuing appreciation to my family, friends, and students who supported and inspired me. I also want to offer my deepest gratitude to two very special people, Richard Hosey and Rita Jeffries. Their careful editing, constructive feedback, professional research skills, and shared authorship were essential to this revision. Having saved the truly best for last, I want to thank my dear friend and beloved husband, Bill Barnard—may the magic continue.

ACKNOWLEDGMENTS

Voices from the Classroom: We wish to thank the following professors who provided us with real-life examples they use in class to illustrate psychological concepts. These examples, found within each chapter, enrich the content, and we are very grateful for the contributions of these individuals.

DAVID BASKIND	Delta College, University Center, Michigan	JAN MENDOZA	Golden West College, Huntington Beach, California
AMY BEEMAN	San Diego Mesa College, San Diego, California	PAULINA MULTHAUP	Macomb Community College, Clinton Township, Michigan
CHARLES DUFOUR	University of Maine, Orono, Maine	Ronnie Naramore	Angelina College, Lufkin, Texas
Brett Heintz	Delgado Community College, New Orleans, Louisiana	VICKI RITTS	St. Louis Community College, Meramec, Missouri
JEFFREY HENRIQUES	University of Wisconsin, Madison, Wisconsin	DAVID STEITZ	Nazareth College, Rochester, New York
CARMON WEAVER HICKS	Ivy Tech Community College, Madison, Indiana	Keith W. Swain	Red Rocks Community College, Lakewood, Colorado
BARBARA KENNEDY	Brevard Community College, Palm Bay, Florida	KATE TOWNSEND-MERINO	Palomar College, San Marcos, California
R. D. LANDIS	Weatherford Community College, Weatherford, Texas	REBEKAH WANIC	UNIVERSITY OF CALIFORNIA, San Diego, California
Mike Majors	Delgado Community College, New Orleans, Louisiana		

Class Testers: A number of professors class tested chapters with their students and provided us with invaluable feedback and constructive recommendations. We benefitted greatly from this class testing and offer our sincere appreciation to these individuals for their helpful feedback.

ROXANNA ANDERSON	Palm Beach State College	MONICA MARSEE	University of New Orleans
CHRISTINE BACHMAN	University of Houston-Downtown	ROBERT MARTINEZ	University of the Incarnate Word
AMY BEEMAN	San Diego Mesa College	T. DARIN MATTHEWS	The Citadel, The Military College of South Carolina
SHANNON BENTZ	Northern Kentucky University	JASON MCCOY	Cape Fear Community College
VIVIAN BERGAMOTTO	Manhattan College	VALERIE MELBURG	SUNY Onondaga Community College
JAMIE BORCHARDT	Tarleton State University	JAN MENDOZA	Golden West College
AMBER CHENOWETH	Hiram College	DAN MUHWEZI	Butler Community College, Andover Campus
JENNIFER COHEN	Metropolitan Community College of Omaha, Nebraska	PAULINA MULTHAUP	Macomb Community College
LISA CONNOLLY	Ivy Tech Community College-Bloomington	JENNIFER ORTIZ-GARZA	University of Houston-Victoria
KATRINA COOPER	Bethany College	ALEXANDR PETROU	CUNY Medgar Evers College
KRISTI CORDELL-McNULTY	Angelo State University	SANDRA PRINCE-MADISON	Delgado Community College
MAUREEN DONEGAN	Delta College	SADHANA RAY	Delgado Community College
LAUREN DONINGER	GateWay Community College	VICKI RITTS	St. Louis Community College, Meramec
DENISE DUNOVANT	Hudson County Community College	BRENDAN ROWLANDS	College of Southern Idaho
DANIELLA ERRETT	Pennsylvania Highlands Community College	SPRING SCHAFER	Delta College
LENORE FRIGO	Shasta College	KELLY SCHULLER	Bethany College
KIM GLACKIN	Metropolitan Community College-Blue River	RANDI SHEDLOSKY-SHOEMAKER	York College of Pennsylvania
JONATHAN GOLDING	University of Kentucky	BARRY SILBER	Hillsborough Community College-Dale Mabry
JUSTIN HACKETT	University of Houston-Downtown	JONATHAN SPARKS	Vance-Granville Community College
BRETT HEINTZ	Delgado Community College	LAURA THORNTON	University of New Orleans
AMY HOULIHAN	Texas A&M University-Corpus Christi	VIRGINIA TOMPKINS	The Ohio State University at Lima
MILDRED HUFFMAN	Virginia Western Community College	REBEKAH WANIC	University of California, San Diego
ANDREW JOHNSON	Park University	MARK WATMAN	South Suburban College
JAMES JOHNSON	Illinois State University	MOLLY WERNLI	College of Saint Mary
DEANA JULKA	University of Portland	KHARA WILLIAMS	University of Southern Indiana
MARVIN LEE	Tennessee State University	CARL WILSON	Ranken Technical College
WADE LUECK	Mesa Community College	STACY WYLLIE	Delgado Community College
CLAIRE MANN	Coastline Community College	GARY YARBROUGH	Arkansas Northeastern College

course more effectively with assessment, assignments, grade tracking, and more. Powered by a proven technology, *WileyPLUS* has enriched the education of millions of students in over 20 countries around the world.

WileyPLUS is now equipped with a NEW interactive teaching and learning module called ORION. Based on the latest findings in cognitive science, *WileyPLUS* with ORION, provides students with a personal, *adaptive* learning experience, which personalizes (adapts) the educational material according to their specific learning needs. With this individualized, immediate feedback, students can build on their strengths, overcome their weaknesses, and maximize their study time.

***WileyPLUS* with ORION** is great as:

- an adaptive **pre-lecture tool** that assesses your students' conceptual knowledge so they to come to class better prepared;
- a **personalized study guide** that helps students understand their strengths, as well as areas where they need to invest more time, especially in preparation for quizzes and exams.

Unique to ORION, students begin their study of each chapter with a quick diagnostic test. This test provides invaluable feedback to each student regarding his or her current level of mastery for the chapter's key terms and contents, while also identifying specific areas where they need to do additional study.

Additional Instructor Resources Available with WileyPLUS with Orion

WileyPLUS with Orion provides reliable, customizable resources that reinforce course goals inside and outside of the classroom as well as instructor visibility into individual student progress.

Powerful multimedia resources for classroom presentations:

- **More than 50 Wiley Psychology Videos** are available, which connect key psychology concepts and themes to current issues in the news.
- **15 Wiley Psychology Animations** have been developed around key concepts and themes in psychology. The animations go beyond what is presented in the book, providing additional visual examples and descriptive narration.
- **More than 30 Tutorial Videos**, featuring author Karen Huffman and Katherine Dowdell of Des Moines Area Community College, provide students with explanations and examples of some of the most challenging concepts in psychology. These 3 to 5 minute videos reflect the richness and diversity of psychology, from the steps of the experimental method to the interaction of genes and our environment, to the sources of stress.
- **20 Virtual Field Trips** allow students to view psychology concepts in the real world as they've never seen them before. These 5 to 10 minute virtual field trips include visits to places such as a neuroimaging center, a film studio where 3-D movies are created, and a sleep laboratory, to name only a few.
- **More than 20 Visual Drag-and-Drop Exercises** that allow students a different, and more interactive, way to visualize and label key structures and important concepts.

Ready-to-go teaching materials and assessments help instructors optimize their time:

- The **Instructor's Manual**, prepared by Vicki Ritts, St. Louis Community College is carefully crafted to help instructors maximize student learning. It provides teaching suggestions for each chapter of the text, including lecture starters, lecture extensions, classroom discussions and activities, out of the classroom assignments, Internet and print resources, and more! Every chapter contains a **Lecture PowerPoint Presentation**, prepared by Katherine Williams, Tri-County Technical College, with a combination of key concepts, figures and tables, and examples from the textbook.

For instance, many students have difficulty understanding the differences between positive and negative reinforcement and/or positive and negative punishment. This is how **RWP** handles these topics:

TABLE 6.2 HOW REINFORCEMENT INCREASES (OR STRENGTHENS) BEHAVIOR		psychology and you
PRIMARY REINFORCERS Satisfy biological needs	POSITIVE REINFORCEMENT Stimulus added (+) and behavior increases You hug your baby and he smiles at you. The "addition" of his smile increases the likelihood that you will hug him again. You do a favor for a friend and she buys you lunch in return, which makes it more likely that you'll do more favors for your friend in the future.	NEGATIVE REINFORCEMENT Stimulus taken away (-) and behavior increases Your baby is crying, so you hug him and he stops crying. The "removal" of crying increases the likelihood that you will hug him again when he cries. You take an aspirin for your headache, which takes away the pain, and makes it more likely that you'll take an aspirin again when you have future pains.
	SECONDARY REINFORCERS Satisfy learned needs You increase profits and receive \$200 as a bonus. The "addition" of the bonus increases the likelihood that you'll work hard in the future to increase profits. You study hard and receive a good grade on your psychology exam, which makes it more likely that you'll study hard in the future.	

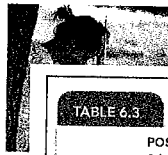


TABLE 6.3 HOW PUNISHMENT DECREASES (OR WEAKENS) BEHAVIOR		psychology and you
PRIMARY PUNISHERS Unlearned, biological needs are not met	POSITIVE PUNISHMENT Stimulus added (+) and behavior decreases (or weakens) A rat receives an electric shock when it crosses an electric grid. The "addition" of the shock decreases the likelihood that the rat will cross the electric grid in the future. You must run four extra laps on a hot day because you were late to your gym class. Adding the four extra laps makes it less likely that you'll be late for gym class in the future.	NEGATIVE PUNISHMENT Stimulus taken away (-) and behavior decreases (or weakens) A hungry child is denied dessert because she refused to eat her dinner. The "removal" of the dessert option decreases the likelihood of the child refusing to eat her dinner in the future. You lose sleep for several nights because you didn't study ahead of time in order to prepare for your final exams. The loss of sleep makes it less likely that you'll be unprepared for future final exams.
	SECONDARY PUNISHERS Learned needs are not met A parent adds extra chores following a child's bad report card. The "addition" of the extra chores decreases the likelihood that the child will get a bad report card in the future. You study hard and still receive a low grade on your psychology exam. The "addition" of the low grade after studying hard decreases the likelihood that you will study hard in the future.	



We also scatter numerous *Real World Psychology* and *Psychology and You* examples, like these throughout our text because research shows that tying everyday examples to new material not only provides the scaffolding necessary for mastering complex topics, it also helps today's busy students see how the terms and concepts they're learning in this text can help improve their everyday lives.

realworldpsychology Short-Term Stress Just as flashbulb memories affect our memories for highly emotional events, short-term stress can affect the retrieval of existing memories, the laying down of new memories, and general information processing (Almela et al., 2011; Guenzel et al., 2013; Pechtel & Pizzagalli, 2011; Schwabe & Wolf, 2013). This interference with cognitive functioning helps explain why you may forget important information during a big exam and why people may become dangerously confused during a fire and be unable to find the fire exit. The good news is that once the cortisol washes out, memory performance generally returns to normal levels.



psychology and you Spontaneous Recovery Have you ever felt renewed excitement at the sight of a former girlfriend or boyfriend, even though years have passed, you have a new partner, and extinction has occurred? This may be an example of spontaneous recovery. It also may help explain why people might misinterpret a sudden flare-up of feelings and be tempted to return to unhappy relationships. To make matters worse, when a conditioned stimulus is reintroduced after extinction, the conditioning occurs much faster the second time around—a phenomenon known as *reconditioning*. The good news is that those who have taken general psychology (or read this book) are far less likely to make this mistake. Looking at Figure 6.5, you can see that even if you experience spontaneous recovery, your sudden peak of feelings for the old love partner will gradually return to their previously extinguished state. So don't overreact.



Chapter Fourteen Social Psychology 396



SOCIAL COGNITION 399

Attributions 399

Attitudes 400

Psych Science: Would You Lie for \$1.00? 402

SOCIAL INFLUENCE 404

Conformity 404

Voices from the Classroom: Santa and Informational Social Influence 406

Obedience 406

Group Processes 409

SOCIAL RELATIONS 413

Prejudice and Discrimination 413

Voices from the Classroom: Learning and Gender Role Stereotypes 414

Aggression 417

Altruism 418

Interpersonal Attraction 420

CHAPTERS 15 AND 16 AVAILABLE SEPARATELY UPON REQUEST.

Chapter Fifteen Gender and Human Sexuality 428



STUDYING HUMAN SEXUALITY 430

Early Studies 430

Modern Research 430

Psych Science: Media Sex Versus Real World Sex 431

Sexuality Across Cultures 432

SEXUAL IDENTITY 434

Describing Sex and Gender 434

Understanding Sex and Gender 435

SEX PROBLEMS 437

Paraphilic Disorders 437

Other Sexual Dysfunctions 438

Sex Therapy 442

Sexually Transmitted Infections (STIs) 443

SEX AND MODERN LIFE 446

Sexual Victimization 446

Sexual Communication 449

Chapter Sixteen Industrial/Organizational Psychology 458



INTRODUCING I/O PSYCHOLOGY 460

What Is I/O Psychology? 460

The Evolution of I/O Psychology 461

MANAGEMENT PERSPECTIVE 464

Recruitment and Selection 464

Training and Evaluation 466

WORKER PERSPECTIVE 470

Leadership 470

Psych Science: Personality and Presidential Leadership 472

Power 476

Worker Motivation 477

Job Satisfaction 479

Organizational Communication 481

Appendix A Statistics and Psychology A-1

**Appendix B Answers to Review Questions
and Other Activities B-1**

Glossary G-1

References R-1

Name Index NI-1

Subject Index SI-1

Hormonal Changes and Emotional Arousal 195

Where Are Memories Located? 195

Biological Causes of Memory Loss 196

MEMORY DISTORTIONS 199

Memory and the Criminal Justice System 201

 **Psych Science:** Do We “Remember” What We Want to Remember? 202

False Versus Repressed Memories 203

Chapter Eight

Thinking, Language, and Intelligence 206



THINKING 208

Cognitive Building Blocks 208

Solving Problems 209

Barriers to Problem Solving 211

Creativity 213

LANGUAGE 215

Language and Thought 217

Language Development 218

Can Human Animals Talk with Nonhuman Animals? 219

INTELLIGENCE 221

The Nature of Intelligence 221

 **Voices from the Classroom:** Multiple Intelligences and Being “Word Smart” 222

Measuring Intelligence 224

 **Voices from the Classroom:** The Value of IQ Testing 226

Nature, Nurture, and IQ 227

Between Versus Within Group Differences 229

 **Psych Science:** The Impact of Exposure to Homicide on Intelligence 231

Chapter Nine

Life Span Development 236



STUDYING DEVELOPMENT 238

Theoretical Issues 238

 **Psych Science:** Deprivation and Development 239

Research Approaches 240

PHYSICAL DEVELOPMENT 242

Prenatal Development 242

Early Childhood Development 246

Adolescence 248

Adulthood 249

COGNITIVE DEVELOPMENT 251

Stages of Cognitive

Development 252

 **Voices from the Classroom:** Egocentrism and a Dump Truck! 254

Vygotsky Versus Piaget 257

SOCIAL-EMOTIONAL DEVELOPMENT 259

Attachment 259

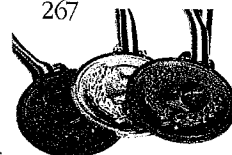
Parenting Styles 262

Moral Development 263

Personality Development 265

Sex and Gender Influences on Development 267

 **Voices from the Classroom:** Erikson and a 90% Pay Cut! 267



Chapter Ten

Motivation and Emotion 272

THEORIES OF MOTIVATION 274

Biological Theories 275

Psychological Theories 277

Biopsychosocial Theories 278

MOTIVATION AND BEHAVIOR 279

Hunger and Eating 280

Eating Disorders 282

Achievement 285

Sexuality 286

 **Psych Science:** Do Initial Sexual Experiences Have a Lasting Impact? 286

Extrinsic Versus Intrinsic Motivation 288

 **Voices from the Classroom:** When Extrinsic Motivation Becomes Intrinsic 289

COMPONENTS AND THEORIES

OF EMOTION 290

Three Components of Emotion 291

Three Major Theories of Emotion 292

 **Voices from the Classroom:** Two-Factor Theory and “No Fear” Skiing 295

Evolution, Culture, and Emotion 295

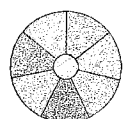
The Polygraph as a Lie Detector 297

contents

Preface xi

Teaching and Learning Program xiii

Acknowledgments xvi



Chapter One

Introduction and Research Methods 2

INTRODUCING PSYCHOLOGY 4

Voices from the Classroom: The Joys of Teaching

Intro Psych 5

Psychology's Past 6

Modern Psychology 6

Careers in Psychology 10

THE SCIENCE OF PSYCHOLOGY 13

The Scientific Method 14

Psychology's Four Main Goals 16

RESEARCH METHODS 18

Descriptive Research 18

Correlational Research 20

Experimental Research 22

Psych Science: Politics and Dating

Relationships 26

Ethical Guidelines 26

STRATEGIES FOR STUDENT SUCCESS 29

Study Habits 29

Time Management 30



Chapter Two

Neuroscience and Biological Foundations 34

OUR GENETIC INHERITANCE 36

Behavioral Genetics 36

Evolutionary Psychology 39

NEURAL BASES OF BEHAVIOR 40

How Do Neurons Communicate? 40

Hormones and the Endocrine System 44

NERVOUS SYSTEM ORGANIZATION 46

Central Nervous System (CNS) 47

Peripheral Nervous System (PNS) 49

Voices from the Classroom:

Burn Prevention—Thanks to the CNS and PNS 51

A TOUR THROUGH THE BRAIN 52

Biological Tools for Research 52

Lower-Level Brain Structures 53

The Cerebral Cortex 57

Psych Science: Phineas Gage—Myths Versus Facts 59

Two Brains in One? 61



Chapter Three

Stress and Health Psychology 66

UNDERSTANDING STRESS 68

Sources of Stress 68

Voices from the Classroom: Frustration and Grades 72

Effects of Stress 72

STRESS AND ILLNESS 76

Gastric Ulcers 76

Cancer 77

Psych Science: The Sad and Lasting Impact of Child Abuse on Health 78

Cardiovascular Disorders 78

Posttraumatic Stress Disorder (PTSD) 80

HEALTH PSYCHOLOGY AND

STRESS MANAGEMENT 82

What Does a Health Psychologist Do? 82

Coping with Stress 83

Resources for Healthy Living 84

VICE PRESIDENT AND EXECUTIVE PUBLISHER
EXECUTIVE EDITOR
PRODUCT DESIGNER
EDITORIAL ASSISTANT
SENIOR CONTENT MANAGER
SENIOR PRODUCTION EDITOR
SENIOR PHOTO EDITOR
MEDIA SPECIALIST
CREATIVE DIRECTOR
SENIOR DESIGNER
SENIOR MARKETING MANAGER
PRODUCTION SERVICES
PRODUCTION ASSISTANT

George Hoffman
Christopher Johnson
Beth Tripmacher
Kristen Mucci
Micheline Frederick
Janet Foxman
Mary Ann Price
Anita Castro
Harry Nolan
Maureen Eide
Margaret Barrett
Furino Production
John Du Val

Cover photos: Chameleon © GlobalP/iStockphoto, Footprints © TPopova/iStockphoto

This book was set in Garamond 10/12 pts by MPS Limited, and printed and bound by Quad Graphics/Versailles.

This book is printed on acid-free paper. ∞

Founded in 1807, John Wiley & Sons, Inc. has been a valued source of knowledge and understanding for more than 200 years, helping people around the world meet their needs and fulfill their aspirations. Our company is built on a foundation of principles that include responsibility to the communities we serve and where we live and work. In 2008, we launched a Corporate Citizenship Initiative, a global effort to address the environmental, social, economic, and ethical challenges we face in our business. Among the issues we are addressing are carbon impact, paper specifications and procurement, ethical conduct within our business and among our vendors, and community and charitable support. For more information, please visit our website: www.wiley.com/go/citizenship.

© 2014 John Wiley & Sons, Inc. All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, website www.copyright.com. Requests to the Publisher for permission should be addressed to the Permissions Department, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030-5774, (201) 748-6011, fax (201) 748-6008, website www.wiley.com/go/permissions.

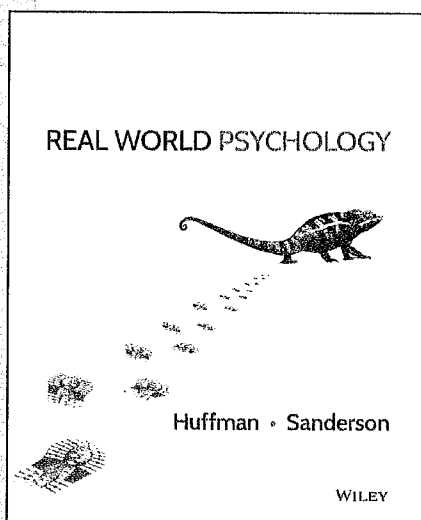
Evaluation copies are provided to qualified academics and professionals for review purposes only, for use in their courses during the next academic year. These copies are licensed and may not be sold or transferred to a third party. Upon completion of the review period, please return the evaluation copy to Wiley. Return instructions and a free-of-charge return shipping label are available at www.wiley.com/go/returnlabel. If you have chosen to adopt this textbook for use in your course, please accept this book as your complimentary desk copy. Outside of the United States, please contact your local representative.

978-1-118-79777-8 (Binder-Ready Version ISBN)

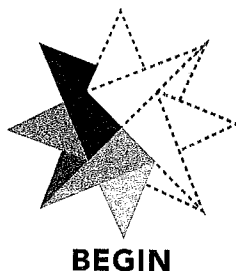
Printed in the United States of America

10 9 8 7 6 5 4 3 2

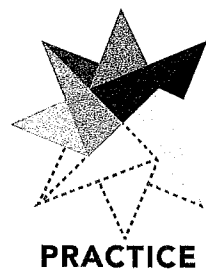
WileyPLUS with ORION



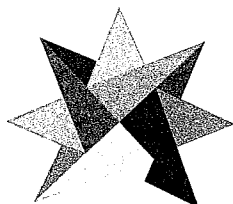
Based on cognitive science, *WileyPLUS* with ORION provides students with a personal, adaptive learning experience so they can build their proficiency on topics and use their study time most effectively.



Unique to ORION, students **BEGIN** by taking a quick diagnostic for any chapter. This will determine each student's baseline proficiency on each topic in the chapter. Students see their individual diagnostic report to help them decide what to do next with the help of ORION's recommendations.



For each topic, students can either **STUDY**, or **PRACTICE**. Study directs students to the specific topic they choose in *WileyPLUS*, where they can read from the e-textbook or use the variety of relevant resources available there. Students can also practice, using questions and feedback powered by ORION's adaptive learning engine. Based on the results of their diagnostic and ongoing practice, ORION will present students with questions appropriate for their current level of understanding, and will continuously adapt to each student to help build proficiency.



MAINTAIN

ORION includes a number of reports and ongoing recommendations for students to help them **MAINTAIN** their proficiency over time for each topic.

Students can easily access ORION from multiple places within *WileyPLUS*. It does not require any additional registration, and there will not be any additional charge for students using this adaptive learning system.

ABOUT THE ADAPTIVE ENGINE

ORION includes a powerful algorithm that feeds questions to students based on their responses to the diagnostic and to the practice questions. Students who answer questions correctly at one difficulty level will soon be given questions at the next difficulty level. If students start to answer some of those questions incorrectly, the system will present questions of lower difficulty. The adaptive engine also takes into account other factors, such as reported confidence levels, time spent on each question, and changes in response options before submitting answers.

The questions used for the adaptive practice are numerous and are not found in the *WileyPLUS* assignment area. This ensures that students will not be encountering questions in ORION that they may also encounter in their *WileyPLUS* assessments.

ORION also offers a number of reporting options available for instructors, so that instructors can easily monitor student usage and performance.

WileyPLUS with ORION helps students learn by learning about them.™

