

- Maslow saw personality as the quest to fulfill basic physiological needs and to move toward the highest level of **self-actualization**.

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- Cognition is central to Bandura's concept of **self-efficacy**. According to Bandura, self-efficacy affects which challenges we choose to accept and the effort we expend in reaching goals. His concept of **reciprocal determinism** states that self-efficacy beliefs will also affect others' responses to us.
- Rotter's theory says that learning experiences create *cognitive expectancies* that guide behavior and influence the environment. Rotter believed that having an internal versus external *locus of control* affects personality and achievement.

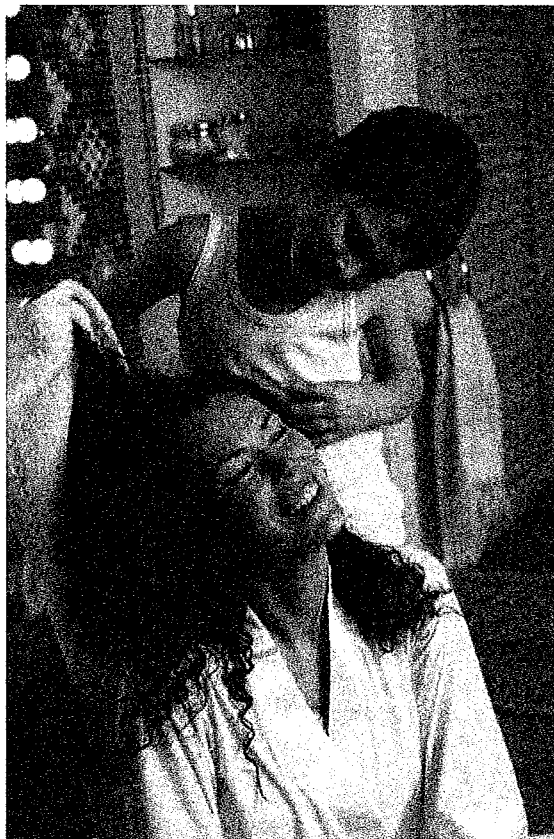
5 BIOLOGICAL THEORIES 320

- Certain brain areas may contribute to personality. However, neurochemistry seems to offer more precise data on how biology influences personality. Research in *behavioral genetics* indicates that genetic factors also strongly influence personality.

- Instead of adhering to any one theory of personality, many psychologists believe in the biopsychosocial approach—the idea that several factors overlap in their contributions to personality.

6 PERSONALITY ASSESSMENT 323

- In an unstructured interview format, interviewers get impressions and pursue hunches or let the interviewee expand on information that promises to disclose personality characteristics. In structured interviews, interviewers ask specific predetermined questions so they can evaluate and compare multiple interviewee's responses more objectively. Psychologists also assess personality by directly observing behavior.
- **Objective personality tests** are widely used because we can administer them broadly and relatively quickly and evaluate them in a standardized fashion. To assess a range of personality traits, psychologists use multitrait inventories, such as the **MMPI**.
- **Projective tests** use unstructured stimuli that can be perceived in many ways. Projective tests, such as the **Rorschach Inkblot Test**, supposedly allow each person to project his or her own unconscious conflicts, psychological defenses, motives, and personality traits onto the test materials.



Cameron/Corbis Images

◎ applying real world psychology

We began this chapter with six 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. As first discussed in Chapter 9 and throughout this chapter, early childhood relationships, particularly between parent and child, are very important to our personality development and overall psychological health. According to the five psychosexual stages of development, how might Freud interpret this woman and her son's obvious attachment to one another? Can you think of an alternative, more logical, explanation for their attachment?
2. How would Rogers's emphasis on unconditional positive regard and Bandura's social-cognitive concept of self-efficacy relate to this mother's display of pleasure at her son's attempt to dry her hair?
3. Can you identify one or more defense mechanisms that you use in your life? If you find them to be unhealthy, what can you do to change them?
4. If you agree that self-actualization is a worthy goal, what are you doing to move in that direction?
5. Which theory of personality discussed in this chapter do you find most useful in understanding yourself and others? Why?

WHAT'S WRONG WITH PSEUDO-PERSONALITY QUIZZES?

psychology and you

The personality horoscope presented in the chapter opener (p. 302) contains several logical fallacies. Using your critical thinking skills, can you see how the following three factors help explain why so many people believe in phony personality descriptions and predictions?

BARNUM EFFECT

We often accept pseudo-personality descriptions and horoscope predictions because we think they are accurate. We tend to believe these tests have somehow tapped into our unique selves. In fact, they are ambiguous, broad statements that fit just about anyone (e.g., "You have a strong need for other people to like and admire you"). The existence of such generalities led to the term the *Barnum effect*, named for the legendary circus promoter P.T. Barnum, who said, "Always have a little something for everyone" (Wyman & Vyse, 2008).

CONFIRMATION BIAS/FALLACY OF POSITIVE INSTANCES

Look again at the introductory personality profile and count the number of times you agree with the statements. According to the *confirmation bias* (Chapter 8), we tend to notice and remember events that confirm our expectations and ignore those that are nonconfirming. If we see ourselves as independent thinkers, for example, we ignore the "needing to be liked by others" part and vice versa.

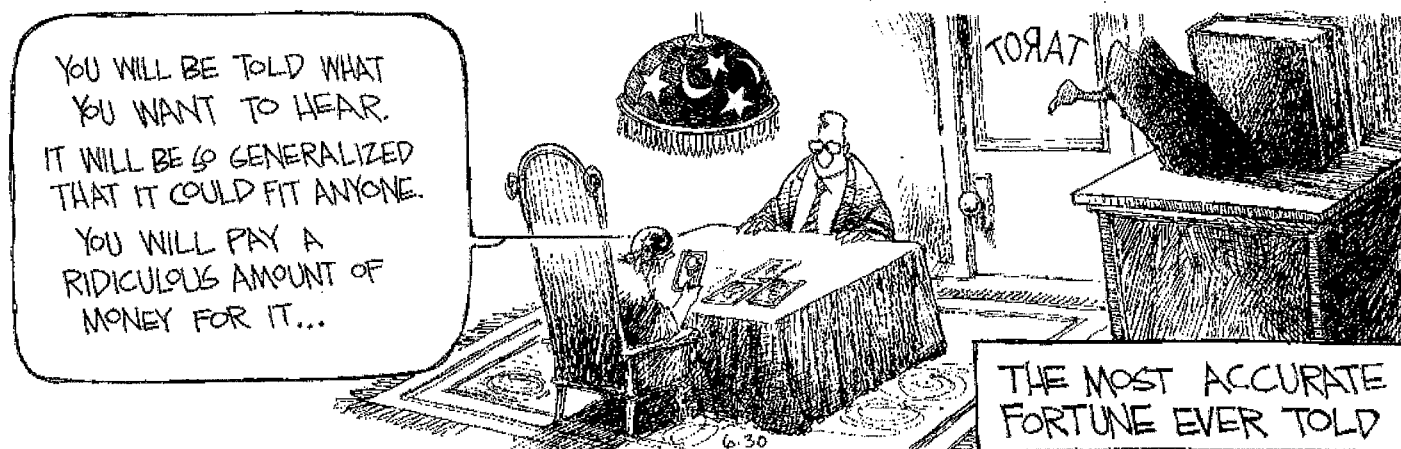
SELF-SERVING BIAS

Now check the overall tone of the bogus personality profile. Can you see how the traits are generally positive and flattering—or at least neutral? According to the *self-serving bias*, we tend to prefer information that maintains our positive self-image (Krusemark et al., 2008; Shepperd et al., 2008). In fact, research shows that the more favorable a personality description is, the more people believe it, and the more likely they are to believe it is personally unique (Guastello et al., 1989).

Taken together, these three logical fallacies help explain the common support for pop-psych personality tests and newspaper horoscopes. They offer something for everyone (*Barnum effect*). We pay attention only to what confirms our expectations (*confirmation bias*). And we like flattering descriptions (*self-serving bias*). You can test your understanding of these three biases in the following:

TESTING YOUR CRITICAL THINKING

Using the information in this *Psychology and You* section, can you identify the two major fallacies in this cartoon?



Answer: The self-serving bias and the Barnum effect.

FIGURE 11.17 SAMPLE PROJECTIVE TESTS

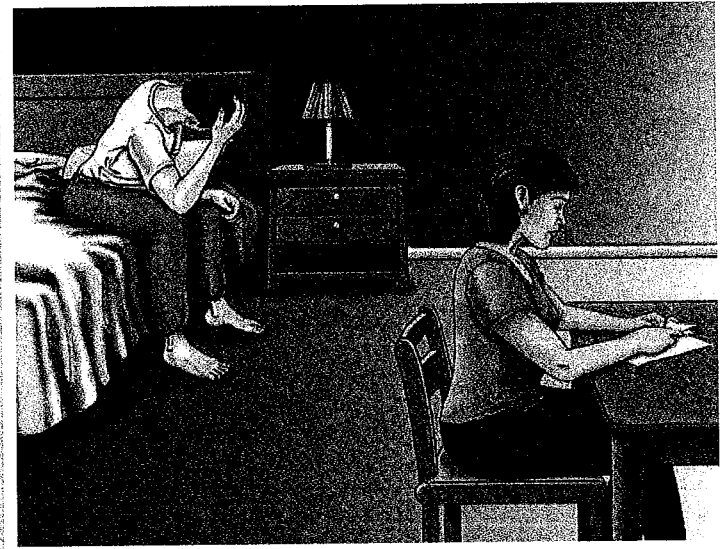
The verbal or written responses participants make to projective tests reportedly reflect unconscious, hidden parts of their personalities that they unintentionally “project” onto the stimuli.

A The *Rorschach Inkblot Test* was introduced in 1921 by Swiss psychiatrist Hermann Rorschach. With this technique, individuals are shown 10 inkblots like the one shown here, one at a time, and are asked to report what figures or objects they see in each of them.



Photobry/Getty Images

B Created by personality researcher Henry Murray in 1938, the *Thematic Apperception Test (TAT)* consists of a series of ambiguous black-and-white pictures that are shown to the test taker, who is asked to create a story related to each one.



Are Personality Measurements Accurate?

Let's evaluate the strengths and the challenges of each of the four methods of personality assessment: *interviews*, *observation*, *objective tests*, and *projective tests*.

Interviews and Observations

Both interviews and observations can provide valuable insights into personality, but they are time-consuming and expensive. Furthermore, raters of personality tests frequently disagree in their evaluations of the same individuals. Interviews and observations also take place in unnatural settings, and, in fact, the very presence of an observer can alter a person's behavior.

Objective Tests

Tests like the MMPI-2 provide specific, objective information about a broad range of personality traits in a relatively short period. However, they are also subject to at least three major criticisms:

- 1. Deliberate deception and social desirability bias** Some items on personality inventories are easy to see through, so respondents may fake particular personality traits. In addition, some respondents want to look good and will answer questions in ways that they perceive are socially desirable. To avoid these problems, the MMPI-2 has built-in validity scales described earlier. In addition, personality researchers and some businesses avoid self-reports. Instead, they rely on other people, such as friends or coworkers, to rate an individual's personality, as well as how their personality influences their work performance (Connelly & Hülshager, 2012). In fact, three meta-analyses, involving over 44,000 participants, found that ratings from others were better predictors of actual behavior, academic achievement, and job performance than those based on self-reports (Connelly & Ones, 2010).
- 2. Diagnostic difficulties** In addition to the problems with all self-report inventories, when they are used for diagnosis, overlapping items sometimes make it difficult to pinpoint a disorder (Ben-Porath, 2013; Graham, 1991). Clients with severe disorders also sometimes score within the normal range, and normal clients sometimes score within the elevated range (Borghans et al., 2011; Morey, 2013).

impressions and pursue hunches or let the interviewee expand on information that promises to disclose personality characteristics. In structured interviews, the interviewer asks specific questions in order to evaluate the interviewee's responses more objectively and compare them with others' responses.

In addition to conducting interviews, psychologists also assess personality by directly and methodically observing behavior. They look for examples of specific behaviors and follow a careful set of evaluation guidelines. For instance, a psychologist might arrange to observe a troubled client's interactions with his or her family. Does the client become agitated by the presence of certain family members and not others? Does he or she become passive and withdrawn when asked a direct question? Through careful observation, the psychologist gains valuable insights into the client's personality as well as family dynamics (**Figure 11.16**).

Objective Tests

Objective personality tests, or inventories, are the most widely used method of assessing personality, for two reasons: They can be administered to a large number of people relatively quickly, and they can be evaluated in a standardized fashion. Some objective tests measure one specific personality trait, such as sensation seeking (Chapter 10) or locus of control. However, psychologists in clinical, counseling, and industrial settings often wish to assess a range of personality traits. To do so, they generally use multitrait, or *multiphasic*, inventories.

The most widely studied and clinically used multitrait test is the **Minnesota Multiphasic Personality Inventory (MMPI)**—or its revision, the MMPI-2 (Butcher, 2000, 2011; Butcher & Perry, 2008; Silverstein, 2013; Tennen et al., 2013). This test consists of more than 500 statements to which participants respond with *True*, *False*, or *Cannot Say*. The following are examples of the kinds of statements found on the MMPI:

My stomach frequently bothers me.

I have enemies who really wish to harm me.

I sometimes hear things that other people can't hear.

I would like to be a mechanic.

I have never indulged in any unusual sex practices.

Minnesota Multiphasic Personality Inventory (MMPI) The most widely researched and clinically used self-report personality test. (MMPI-2 is the revised version.)

FIGURE 11.16 BEHAVIORAL OBSERVATION

How might careful observation help a psychologist better understand a troubled client's personality and family dynamics?



David De Loss/Getty Images

Evaluating Biological Theories

Modern research in biological theories has provided exciting insights, and established clear links between some personality traits and various brain areas, neurotransmitters, and/or genetics. However, it's important to keep in mind that personality traits are never the result of a single biological process. For example, studies do show a strong inherited basis for personality, but researchers are careful not to overemphasize genetics (Ahmetoglu & Chamorro-Premuzic, 2013; Beauchamp et al., 2011; Chadwick, 2011; Cook, 2013). Some believe the importance of the unshared environment—aspects of the environment that differ from one individual to another, even within a family—has been overlooked. Others fear that research on “genetic determinism” could be misused to “prove” that an ethnic or a racial group is inferior, that male dominance is natural, or that social progress is impossible.

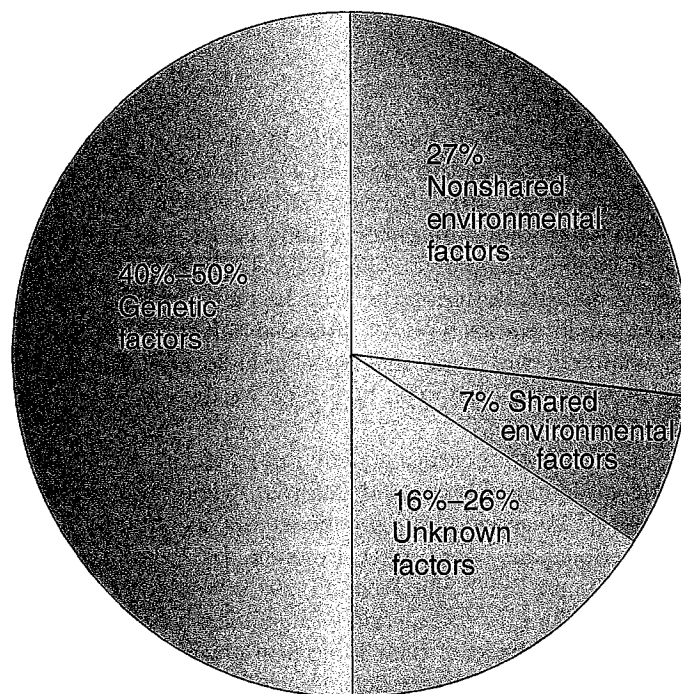
In sum, there is no doubt that biological studies have produced valuable results. However, as is true for all the theories discussed in this chapter, no single personality theory explains everything we need to know about personality. Each theory offers different insights into how a person develops the distinctive set of characteristics we call “personality.” That's why instead of adhering to any one theory, many psychologists believe in the *biopsychosocial approach*, or the idea that several factors—biological, psychological, and social—overlap in their contributions to personality (Figure 11.14).

FIGURE 11.14 MULTIPLE INFLUENCES ON PERSONALITY

In addition to unknown factors, research has identified three other factors believed to influence personality: genetic (inherited) factors, nonshared environmental factors (the way each individual's genetic factors react and adjust to his or her environment), and shared environmental factors (parental and family experiences).



Rosanne Olson/Stone/Getty Images



Source: Bouchard, 1997, 2004; Eysenck, 1967, 1990; Jang et al., 2006; McCrae et al., 2004; Plomin, 1990; Weiss et al., 2008

RETRIEVAL PRACTICE: SOCIAL-COGNITIVE THEORIES

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.

- According to Bandura, _____ relies on a person's belief about whether he or she can successfully engage in behaviors related to personal goals.
 - self-actualization
 - self-esteem
 - self-efficacy
 - self-congruence
- Bandura's theory of _____ suggests that the person, behavior, and environment all interact to produce personality.
 - self-actualization
 - self-esteem maximization
 - self-efficacy
 - reciprocal determinism
- According to Rotter, people with a(n) _____ believe the environment and external forces control events, whereas those with a(n) _____ believe in personal control.
 - self-actualized personality; efficacy personality
 - external locus of control; internal locus of control
 - fatalistic view; humanistic opinion
 - global locus of control; selfish locus of control
- Walter Mischel, a social-cognitive theorist, ignited the classic person-situation debate when he suggested that _____.
 - our personalities change according to a given situation
 - our personalities change according to prenatal nutrition
 - our personalities seldom change over our lifetimes
 - our personalities change according to our horoscope

Think Critically

- How would Bandura's social-cognitive concept of self-efficacy explain why bright students sometimes don't do well in college?
- Do you have an internal or external locus of control? How might this affect your academic and lifetime achievement?

realworldpsychology

Does helping parents prepare a meal increase a child's preference for healthy foods?



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

BIOLOGICAL THEORIES

LEARNING OBJECTIVES

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

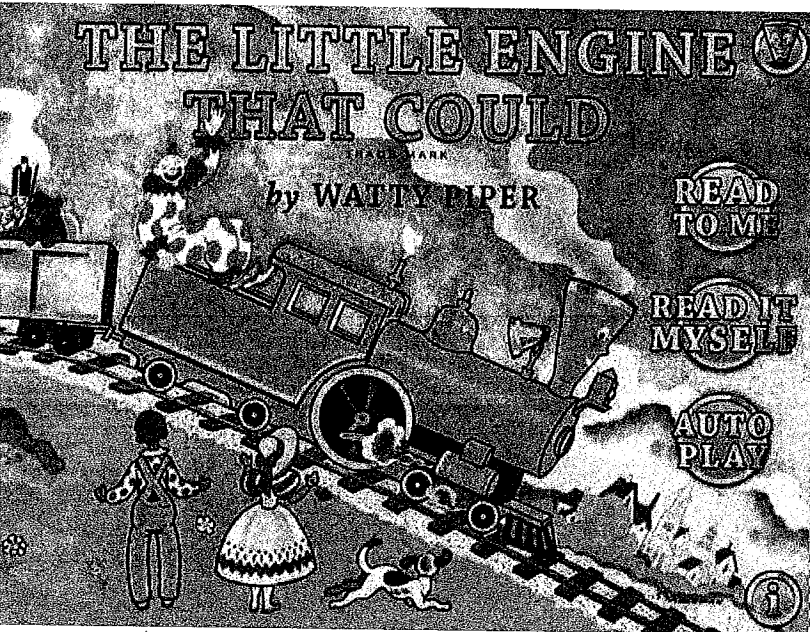
- SUMMARIZE** the roles that brain structures, neurochemistry, and genetics play in personality.
- EXPLAIN** the contributions and limitations of biological theories.
- DESCRIBE** how the biopsychosocial model integrates different theories of personality.

In this section, we explore how biological factors influence our personalities. We conclude with a discussion of how all theories of personality ultimately interact in the *biopsychosocial model*.

Three Major Contributors to Personality

Hans Eysenck, the trait theorist mentioned earlier in the chapter, was one of the first to propose that personality traits are biologically based—at least in part.

- Q4 According to Bandura, if you have a strong sense of self-efficacy, you believe you can generally succeed and reach your goals, regardless of past failures and current obstacles. Your self-efficacy will in turn affect which challenges you choose to accept and the effort you expend in reaching goals. For example, one study found that children who assisted their parents with meal preparation reported higher self-efficacy for selecting and eating healthy foods (Chu et al., 2013).



PRNewsFoto/Penguin Young Readers Group/AP Photo/AP/Wide World Photos

Reciprocal determinism Bandura's belief that a complex reciprocal interaction exists among the individual, his or her behavior, and environmental stimuli.

psychology and you Self-efficacy in Daily Life The classic children's story *The Little Engine That Could* illustrates how we learn self-efficacy through our personal experiences with success. The little engine starts up a steep hill, saying, "I think I can, I think I can." After lots of hard work and perseverance, he ends up at the top of the hill and says, "I know I can, I know I can."

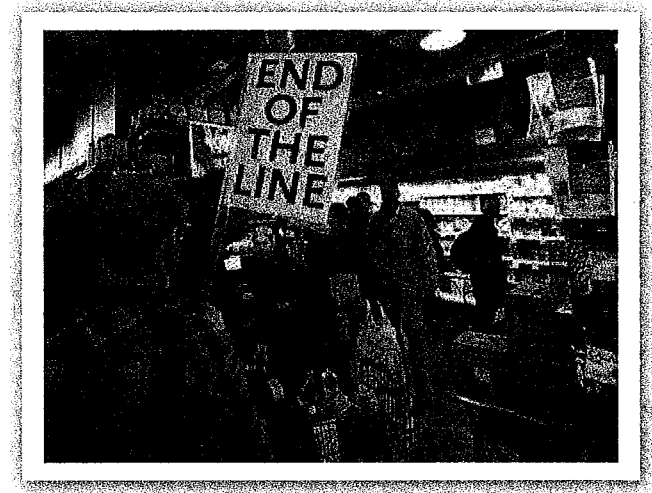
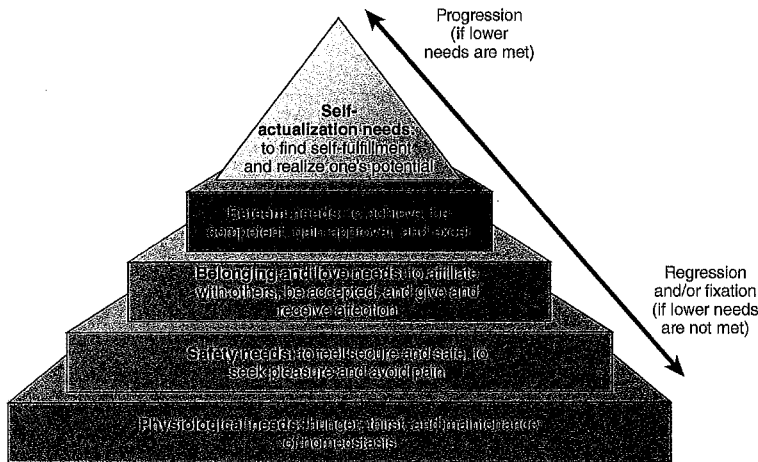
Bandura emphasized that self-efficacy is a *learned* expectation of success, but only in a given situation. It doesn't necessarily transfer to other circumstances. Bandura would suggest that the little engine's new-found self-efficacy will help him climb future hills. However, it wouldn't necessarily improve his overall speed or his ability to turn sharp corners. Similarly, self-defense training significantly affects a woman's belief that she can improve her odds of escaping from or disabling a potential assailant or rapist. But it does not lead her to feel more capable in all areas of her life (Weitlauf et al., 2001).

How then can we transfer self-efficacy to other parts of our everyday life? If you've experienced success as an athlete, a parent, or even a videogame player, consider how the skills you've demonstrated in these areas can be transferred to your academic life. Instead of saying, "I just can't find time to study" or "I never do well on tests," remind yourself of how your ongoing success in athletics, parenting, or videogames has resulted from good time management, hours of practice, patience, hard work, and perseverance. Applying skills that are the same as or similar to skills you've successfully used before will help move you from "I can't" to "I think I can." And then when you get your first high grade in a difficult course, you can move on to "I know I can, I know I can!"

How does self-efficacy affect personality? Bandura sees personality as being shaped by **reciprocal determinism**, how the *person* (his or her personality, thoughts, expectations, etc.), *environment*, and *behavior* interact and influence one another (**Figure 11.12**). Using Bandura's concept of self-efficacy, can you see how your own beliefs will affect how others respond to you and thereby influence your chance for success? Your belief ("I can succeed") will affect behaviors ("I'll work hard and ask for a promotion"), which in turn will affect the environment ("My employer recognized my efforts and promoted me").

Julian Rotter's theory is similar to Bandura's in that it suggests that learning experiences create *cognitive expectancies* that guide behavior and influence the environment (Rotter, 1954, 1990). According to Rotter, your behavior or personality is determined by (1) what you expect to happen following a specific action and (2) the reinforcement value attached to specific outcomes.

To understand your personality and behavior, Rotter would use personality tests that measure your internal versus external *locus of control* (Chapter 3). Rotter's tests ask participants to respond to statements such as, "People get ahead in this world primarily by luck and connections rather than by hard work and perseverance" and "When someone doesn't like you, there is little you can do about it." As you may suspect, people with an external locus of control think the environment and external



Timothy A Clary/AFP/Getty Images

FIGURE 11.11 MASLOW'S HIERARCHY OF NEEDS

Although our natural movement is upward from physical needs toward the highest level, *self-actualization*, Maslow also believed we sometimes “regress” toward a lower level—especially under stressful conditions. For example, during national disasters, people first rush to stockpile food and water (physiological needs) and then often clamor for a strong leader to take over, enforce the rules, and make things right (safety needs).

grow and develop, we move on through four higher levels (**Figure 11.11**). Cross-cultural support for Maslow's theory comes from recent surveys of people from 123 countries, which found that people from around the world do share a focus on the same basic needs, and when those needs are met, they report higher levels of happiness (Tay & Diener, 2011).

According to Maslow, self-actualization is the inborn drive to develop all our talents and capacities. It requires understanding our own potential, accepting ourselves and others as unique individuals, and taking a problem-centered approach to life (Maslow, 1970). Self-actualization is an ongoing process of growth rather than an end product or accomplishment.

Maslow believed that only a few, rare individuals, such as Albert Einstein, Mohandas Gandhi, and Eleanor Roosevelt, become fully self-actualized. However, he saw self-actualization as part of every person's basic hierarchy of needs. (See Chapter 10 for more information about Maslow's theory.)

Evaluating Humanistic Theories

Humanistic psychology was extremely popular during the 1960s and 1970s. It was seen as a refreshing new perspective on personality after the negative determinism of the psychoanalytic approach and the mechanical nature of learning theories (Chapter 6). Although this early popularity has declined, humanistic theories have provided valuable insights that are useful for personal growth and self-understanding. They also play a major role in contemporary counseling and psychotherapy, as well as in modern childrearing, education, and managerial practices (DeRobertis, 2013; Greenberg et al., 2013; Tennen et al., 2013).

However, humanistic theories have also been criticized (Cervone & Pervin, 2010; Chamorro-Premuzic, 2011; Funder, 2000; Schmid, 2013) for the following:

- 1. Naïve assumptions** Some critics suggest that humanistic theories are unduly optimistic and overlook the negative aspects of human nature. For example, how would humanists explain immoral politicians, the spread of terrorism, and humankind's ongoing history of war and murder?
- 2. Poor testability and inadequate evidence** Like many psychoanalytic terms and concepts, humanistic concepts such as unconditional positive regard and self-actualization are difficult to define operationally and to test scientifically.
- 3. Narrowness** Like trait theories, humanistic theories have been criticized for merely describing personality rather than explaining it. For example, where does the motivation for self-actualization come from? To say that it is an “inborn drive” doesn't satisfy those who favor using experimental research and hard data to learn about personality.

HUMANISTIC THEORIES

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** the importance of the self in Rogers's theory of personality.
- 2 DESCRIBE** how Maslow's hierarchy of needs affects personality.
- 3 IDENTIFY** the pros and cons of humanistic theories.

Self-actualization The humanistic term for the inborn drive to realize one's full potential and to develop all one's inherent talents and capabilities.

Self-concept A person's relatively stable self-perception, or mental model, based on life experiences, particularly the feedback and perception of others.

Humanistic theories of personality emphasize each person's internal feelings, thoughts, and sense of basic worth. In contrast to Freud's generally negative view of human nature, humanists believe that people are naturally good (or, at worst, neutral) and that they possess a natural tendency toward **self-actualization**, the inborn drive to develop all their talents and capabilities.

According to this view, our personality and behavior depend on how we perceive and interpret the world, not on traits, unconscious impulses, or rewards and punishments. Humanistic psychology was developed largely by Carl Rogers and Abraham Maslow.

Rogers's Theory

To psychologist Carl Rogers (1902–1987), the most important component of personality is our **self-concept**, the way we see and feel about ourselves. Rogers emphasized that mental health and adjustment reflect the degree of overlap (congruence) between our perceived real and ideal selves (see *Test Yourself*). This self-perception is relatively stable over time and develops from our life experiences, particularly the feedback and perception of others.

TEST YOURSELF: MEASURING YOUR PERSONAL SELF-CONCEPT

psychology and you

Stop for a moment and briefly describe yourself as you'd *ideally* like to be and as how you *actually* are. Now draw two circles, labeled "real self" and "ideal self," depicting how much your two perceived selves overlap. According to Carl Rogers, if your *real self* and *ideal self* are nearly the same, with considerable overlap in the two circles, you have congruence between your two "selves" and a positive self-concept. Unfortunately, many people have experienced negative life events and feedback from others that have led to negative self-concepts. In Rogers's view, poor mental health and personality maladjustment develop from a mismatch, or *incongruence*, between our ideal and real selves.

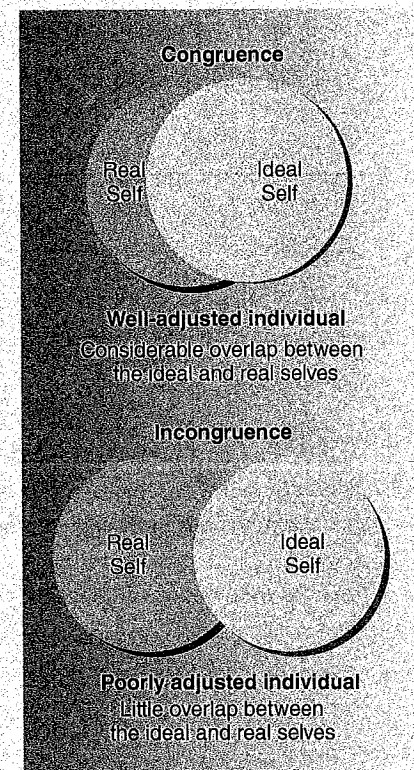


TABLE 11.2

MATE PREFERENCES AND THE FIVE-FACTOR MODEL (FFM)

realworldpsychology

What Men Want in a Mate

1. Mutual attraction—love
2. Dependable character
3. Emotional stability and maturity
4. Pleasing disposition
5. Good health
6. Education and intelligence
7. Sociability
8. Desire for home and children
9. Refinement, neatness
10. Good looks

What Women Want in a Mate

1. Mutual attraction—love
2. Dependable character
3. Emotional stability and maturity
4. Pleasing disposition
5. Education and intelligence
6. Sociability
7. Good health
8. Desire for home and children
9. Ambition and industriousness
10. Refinement, neatness

Source: Based on Buss et al., 1990.



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Q2 In addition to having strong cross-cultural support, trait theories, like the FFM, allow us to predict real-life preferences and behaviors. For example, using the FFM, people who are extraverted have been found to prefer upbeat, energetic, and rhythmic types of music, such as rap and hip-hop. People who are open to experience prefer complex, intense, and rebellious music, such as classical and rock (Langemeyer et al., 2012). As you might expect, personality may also affect your career choice and job satisfaction (see *Test Yourself*).

TEST YOURSELF: MATCHING YOUR PERSONALITY WITH YOUR CAREER

psychology and you

Are some people better suited for certain jobs than others? According to psychologist John Holland's *personality-job-fit theory*, a match (or "good fit") between our individual personality and our career choice is a major factor in determining job satisfaction (Holland, 1985, 1994). Research shows that a good fit between personality and occupation helps increase subjective

well-being, job success, and job satisfaction. In other words, people tend to be happier and like their work when they're well matched to their jobs (Joeng et al., 2013; Perkmen & Sahin, 2013; Williamson & Lounsbury, 2013). Check this table to see what job would be a good match for your personality.

Personality Characteristics	Holland Personality Type	Matching/Congruent Occupations
Shy, genuine, persistent, stable, conforming, practical	1. <i>Realistic</i> : Prefers physical activities that require skill, strength, and coordination	Mechanic, drill press operator, assembly-line worker, farmer
Analytical, original, curious, independent	2. <i>Investigative</i> : Prefers activities that involve thinking, organizing, and understanding	Biologist, economist, mathematician, news reporter
Sociable, friendly, cooperative, understanding	3. <i>Social</i> : Prefers activities that involve helping and developing others	Social worker, counselor, teacher, clinical psychologist
Conforming, efficient, practical, unimaginative, inflexible	4. <i>Conventional</i> : Prefers rule-regulated, orderly, and unambiguous activities	Accountant, bank teller, file clerk, manager
Imaginative, disorderly, idealistic, emotional, impractical	5. <i>Artistic</i> : Prefers ambiguous and unsystematic activities that allow creative expression	Painter, musician, writer, interior decorator
Self-confident, ambitious, energetic, domineering	6. <i>Enterprising</i> : Prefers verbal activities with opportunities to influence others and attain power	Lawyer, real estate agent, public relations specialist, small business manager

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Five-factor model (FFM) A comprehensive descriptive personality system that includes openness, conscientiousness, extroversion, agreeableness, and neuroticism; informally called the Big Five.

toward insecurity, anxiety, guilt, and moodiness), and *psychoticism* (being out of touch with reality).

Modern Trait Theory

Factor analysis was also used to develop the **five-factor model (FFM)**, which is the most promising modern trait theory, (Costa & McCrae, 2011; McCrae & Costa, 2013; Soto et al., 2011). A handy way to remember this model is to note that the first letters of the five words spell *ocean* (Figure 11.9).

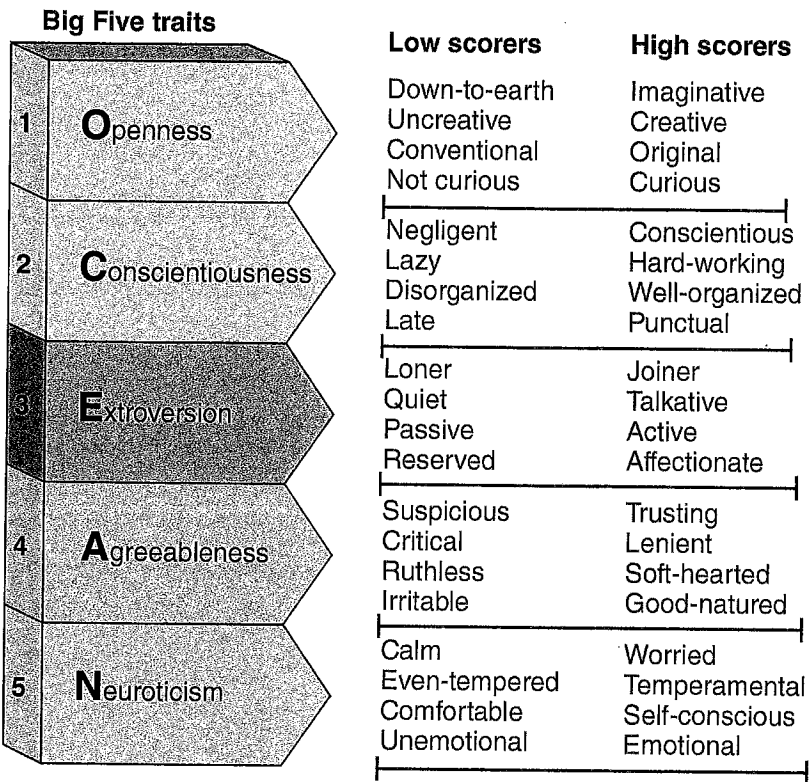
Combining previous research findings and the long list of possible personality traits, researchers discovered that these five traits came up repeatedly, even when different tests were used:

- O Openness** People who rate high in this factor are original, imaginative, curious, open to new ideas, artistic, and interested in cultural pursuits. Low scorers tend to be conventional, down-to-earth, narrower in their interests, and not artistic. Interestingly, critical thinkers tend to score higher than others on this factor (Clifford et al., 2004).
- C Conscientiousness** This factor ranges from responsible, self-disciplined, organized, and achieving at the high end to irresponsible, careless, impulsive, lazy, and undependable at the other.
- E Extroversion** This factor contrasts people who are sociable, outgoing, talkative, fun loving, and affectionate at the high end with introverted individuals who tend to be withdrawn, quiet, passive, and reserved at the low end.
- A Agreeableness** Individuals who score high in this factor are good-natured, warm, gentle, cooperative, trusting, and helpful, whereas low scorers are irritable, argumentative, ruthless, suspicious, uncooperative, and vindictive.

N Neuroticism (or emotional stability) People who score high in neuroticism are emotionally unstable and prone to insecurity, anxiety, guilt, worry, and moodiness. People at the other end are emotionally stable, calm, even-tempered, easygoing, and relaxed.

FIGURE 11.9 THE FIVE-FACTOR MODEL (FFM)

Different adjectives may describe your personality, depending on whether you score high or low in each of the “Big Five” traits. Note that the lines on the right, below each of the five factors, indicate that scores on each factor exist on a continuum from low scorers to high scorers.



This five-factor model (FFM) has led to numerous research follow-ups and intriguing insights about personality. For example, researchers who examined personality traits in 243 people age 95 and older discovered that these older adults were more likely to show particular traits, such as optimism, extraversion, and conscientiousness. They also were less likely to show other traits, such as negative affect (Kato et al., 2012). Can you see how these findings indicate that personality traits may help predict how long we live?

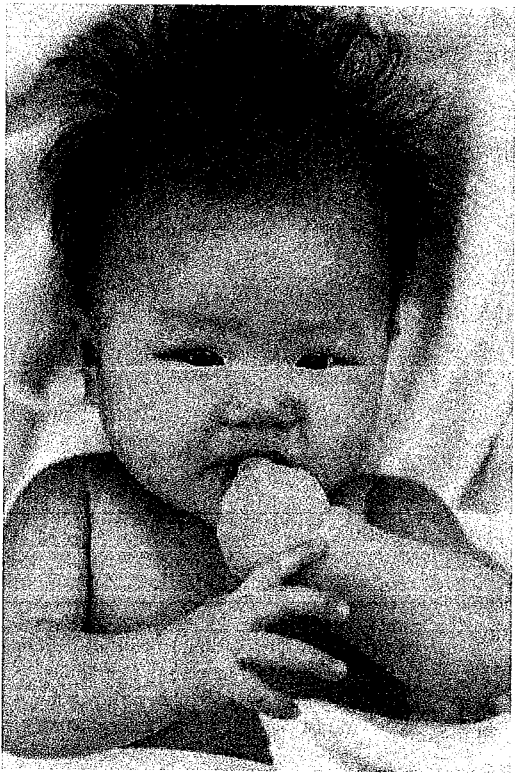
What about nonhuman animals? Do you think they have distinct personalities? If so, do they also have specific personality traits that might be associated with a longer life span? (See *Psych Science*.)

Evaluating Trait Theories

The five-factor model (FFM) is the first model to achieve the major goal of trait theory—to describe and organize personality characteristics using the smallest number of traits. There also is strong cross-cultural research support for the FFM. Psychologist David Buss and his colleagues (1989, 1990, 2003) surveyed more than 10,000 men and women from 37

FIGURE 11.8 ORAL FIXATION OR SIMPLE SELF-SOOTHING?

Is this an example of Freud's earliest stage of psychosexual development, or just a part of all infants' normal sucking behaviors?



© PonyWang/iStockphoto

three ways—we move toward, away from, or against other people—and that psychological health requires a balance among these three styles.

In sum, Horney proposed that our adult personalities are shaped by our childhood relationship with our parents—not by fixation or regression at some stage of psychosexual development, as Freud argued.

Evaluating Psychoanalytic Theories

Before going on, let's consider the major criticisms of Freud's psychoanalytic theories:

- **Inadequate empirical support** Many psychoanalytic concepts—such as the psychosexual stages—cannot be empirically tested.
- **Overemphasis on sexuality, biology, and unconscious forces** Modern psychologists believe Freud underestimated the role of learning and culture in shaping personality (**Figure 11.8**).
- **Sexism** Many psychologists, beginning with Karen Horney, reject Freud's theories as derogatory toward women.

In contrast to the claim of inadequate empirical support, numerous modern studies have supported certain Freudian concepts like the defense mechanisms and the belief that a lot of our information processing occurs outside our conscious awareness (*automatic processing*, Chapter 5, and *implicit memories*, Chapter 7). In addition, a recent study found that people who identify as having a heterosexual orientation but show a strong sexual attraction to same-sex people in psychological tests tend to have more homophobic attitudes and higher levels of hostility toward gay people (Weinstein et al., 2012). Can you see how Freud's theory might suggest that these negative attitudes and beliefs spring from unconscious repression of same-sex desires? Moreover, many contemporary clinicians still value Freud's insights about childhood experiences and unconscious influences on personality development (Bornstein et al., 2013; Celes, 2010; De Sousa, 2011; Kring et al., 2012; Siegel, 2010).

Today there are few Freudian purists. Instead, modern psychodynamic theorists and psychoanalysts tend to place less emphasis on sexual instincts and more on sociocultural influences on personality development.

RETRIEVAL PRACTICE: PSYCHOANALYTIC/PSYCHODYNAMIC THEORIES**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.

- _____ is defined as a unique and relatively stable pattern of thoughts, feelings, and actions.
 - Character
 - Trait
 - Temperament
 - Personality
- In Freudian terms, the _____ operates on the pleasure principle, seeking immediate gratification. The _____ operates on the reality principle, and the _____ contains the conscience and operates on the morality principle.
 - psyche; ego; id
 - id; ego; superego
 - conscious; preconscious; unconscious
 - oral stage; anal stage; phallic stage
- According to Freud, when anxiety slips into our conscious awareness, we tend to avoid it through the use of _____.
 - latency overcompensation
 - the Oedipus complex
 - regression to the oral stage
 - defense mechanisms

FIGURE 11.5 FREUD'S FIVE PSYCHOSEXUAL STAGES OF DEVELOPMENT

	Name of stage (Approximate age)	Erogenous zone (Key conflict or developmental task)	Supposed symptoms of fixation and/or regression
1	Oral (0–18 months)	Mouth (Weaning from breast or bottle)	Overindulgence reportedly contributes to gullibility (“swallowing” anything), dependence, and passivity. Underindulgence leads to aggressiveness, sadism, and a tendency to exploit others. Freud also believed orally fixated adults may orient their lives around their mouths—overeating, becoming alcoholics, smoking, or talking a great deal.
2	Anal (18 months–3 years)	Anus (Toilet training)	Fixation or regression supposedly leads to highly controlled and compulsively neat (anal-retentive) personality or messy, disorderly, rebellious, and destructive (anal-expulsive) personality.
3	Phallic (3–6 years)	Genitals (Overcoming the Oedipus complex by identifying with same-sex parent)	According to Freud, boys develop an Oedipus complex, or attraction to their mothers. Freud also believed young girls develop an attachment to their fathers and harbor hostile feelings toward their mothers, whom they blame for their lack of a penis. Unresolved sexual longing for the opposite-sex parent reportedly can lead to long-term resentment and hostility toward the same-sex parent. Furthermore, Freud believed most girls never overcome penis envy or give up their rivalry with their mothers, which supposedly leads to enduring moral inferiority.
4	Latency (6 years–puberty)	None (Interacting with same-sex peers)	The latency stage is a reported period of sexual “dormancy.” Children do not have particular psychosexual conflicts that must be resolved during this period.
5	Genital (puberty–adult)	Genitals (Establishing intimate relationships with the opposite sex)	Unsuccessful outcomes at this stage supposedly may lead to sexual relationships based only on lustful desires, not on respect and commitment.

Inferiority complex Adler's idea that feelings of inferiority develop from early childhood experiences of helplessness and incompetence.

Freud held that if a child's needs are not met or are overindulged at one particular psychosexual stage, the child may become *fixated*, and a part of his or her personality will remain stuck at that stage. Furthermore, under stress, individuals supposedly may return, or *regress*, to a stage at which earlier needs were frustrated or overly gratified. Obviously, Freud's theory does not imply that children should engage in sexual activity with each other, or with adults; such activity is clearly abuse and can have lasting consequences.

FIGURE 11.6 AN UPSIDE TO FEELINGS OF INFERIORITY?

Adler suggested that the will-to-power could be positively expressed through social interest—by identifying with others and cooperating with them for the social good. Can you explain how these volunteers might be fulfilling their will-to-power interest?



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Psychodynamic/Neo-Freudian Theories

Some initial followers of Freud later rebelled and proposed theories of their own; they became known as *neo-Freudians*.

Alfred Adler (1870–1937) was the first to leave Freud's inner circle. Instead of seeing behavior as motivated by unconscious forces, Adler believed it is purposeful and goal directed. According to his *individual psychology*, we are motivated by our goals in life—especially our goals of obtaining security and overcoming feelings of inferiority (Carlson & Englar-Carlson, 2013).

Adler believed that almost everyone suffers from an **inferiority complex**, or deep feelings of inadequacy and incompetence that arise from our feelings of helplessness as infants. According to Adler, these early feelings result in a “will-to-power” that can take one of two paths. It can lead children to strive to develop superiority over others through dominance, aggression, or expressions of envy. Or, on a more positive note, it can encourage them to develop their full potential and creativity and to gain mastery and control in their lives (Adler, 1964, 1998) (**Figure 11.6**).

FIGURE 11.2 FREUDIAN SLIPS

Freud believed that a small slip of the tongue (now known as a *Freudian slip*) can reflect unconscious feelings that we normally keep hidden.

© The New Yorker Collection 1979. Dana Fradon from cartoonbank.com. All Rights Reserved



"Good morning, beheaded—uh, I mean beloved."

Id According to Freud, the primitive, unconscious component of personality that operates irrationally and acts on the pleasure principle.

Pleasure principle In Freud's theory, the principle on which the id operates—seeking immediate gratification.

Ego In Freud's theory, the rational, decision-making component of personality that operates according to the reality principle; from the Latin term *ego*, meaning "I."

Reality principle According to Freud, the principle on which the conscious ego operates as it seeks to delay gratification of the id's impulses until appropriate outlets and situations can be found.

Superego In Freud's theory, the aspect of personality that operates on the morality principle; the "conscience" that internalizes society's values, standards, and morals.

Morality principle In Freudian terms, the principle on which the superego operates; feelings of guilt result if its rules are violated.

Defense mechanisms In Freudian theory, the ego's protective method of reducing anxiety by self-deception and distorting reality.

In addition to proposing that the mind functions at three levels of consciousness, Freud also believed personality was composed of three mental structures: *id*, *ego*, and *superego* (**Figure 11.3**).

According to Freud, the **id** is made up of innate biological instincts and urges. It is immature, impulsive, and irrational. The id is also completely unconscious and serves as the reservoir of mental energy. When its primitive drives build up, the id seeks immediate gratification to relieve the tension—a concept known as the **pleasure principle**. In other words, the id is like a newborn baby. It wants what it wants when it wants it!

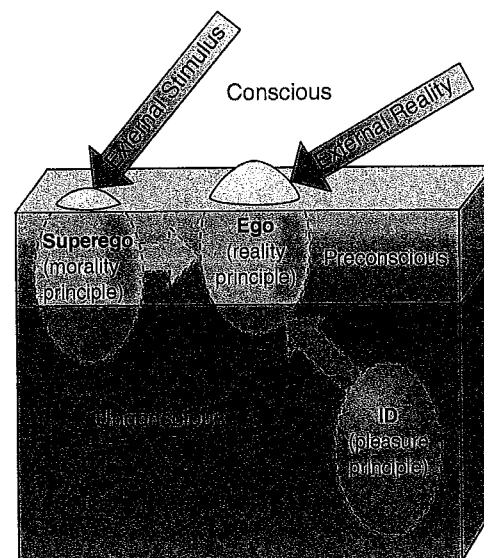
Freud further believed that the second part of the psyche, the **ego**, is responsible for planning, problem solving, reasoning, and controlling the potentially destructive energy of the id. In Freud's system, the ego corresponds to the *self*—our conscious identity of ourselves as persons.

One of the ego's tasks is to channel and release the id's energy in ways that are compatible with the external world. Thus, the ego is responsible for delaying gratification when necessary. Contrary to the id's pleasure principle, the ego operates on the **reality principle** because it can understand and deal with objects and events in the real world.

The final part of the psyche to develop is the **superego**, a set of ethical rules for behavior. The superego develops from internalized parental and societal standards. It constantly strives for perfection and is therefore as unrealistic as the id. Some Freudian followers have suggested that the superego operates on the **morality principle** because violating its rules results in feelings of guilt. When the ego fails to satisfy both the id and the superego, anxiety slips into our conscious awareness. Because anxiety is uncomfortable, we avoid it through **defense mechanisms** (**Figure 11.4**).

FIGURE 11.3 FREUD'S PERSONALITY STRUCTURE

According to Freud, personality is composed of three structures—the id, ego, and superego. Note how the ego is primarily conscious and preconscious, whereas the id is entirely unconscious.



chapter overview

You have a strong need for other people to like and admire you. You tend to be critical of yourself. Although you have some personality weaknesses, you are generally able to compensate for them. At times, you have serious doubts about whether you have made the right decision or done the right thing.

—Adapted from Ulrich et al., 1963

Does this sound like you? A high percentage of research participants who read a similar personality description reported that the description was “very accurate”—even after they were informed that it was a *phony* horoscope (Hyman, 1981). Other research shows that about three-quarters of adults read newspaper horoscopes and that many of them believe astrological horoscopes were written especially for them (Sugarman et al., 2011; Wyman & Vyse, 2008).

Why are such spurious personality assessments so popular? One reason is that they seem to tap into our unique selves. Supporters of these horoscopes, however, ignore the fact that the traits they supposedly reveal are characteristics that almost everyone shares. Do you know anyone who doesn’t “have a strong need for other people to like and admire” them? The traits in horoscopes are also generally flattering, or at least neutral.

Unlike the pseudopsychologies such as these newspaper horoscopes and Chinese fortune cookies, the descriptions presented by personality researchers are based on empirical studies. In this chapter, we examine the most prominent theories and up-to-date findings in personality research. We also explore professional techniques that psychologists use to assess personality.



Voices from the Classroom

Personality in the Dating World I once went on a date with someone who had the personality of an annoyed Chihuahua. What’s weird about that statement is you know exactly what I mean. That’s right, she was the woman with the high-pitched voice, angrily barking at the waiter, and shivering because she didn’t wear enough clothes, right? And then there’s me, the golden retriever sitting across the table from her, smiling away at the waiter, reassuring him that he’s doing a great job, nervously drinking from everyone’s water glasses, and despite not liking her very much, deeply hoping she still liked me. Of course, the key word here is *personality*. One’s personality is that impression we give ourselves, (and others), of who we are: a unique pattern created from a combination of our typical thoughts, feelings, and behaviors. But I don’t want to leave you with the wrong impression. While I may think that it would feel good to have strangers scratch my head in public, I tend to not do that.

Professor Keith W. Swain
Red Rocks Community College
Arvada, Colorado

PSYCHOANALYTIC/PSYCHODYNAMIC THEORIES

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 DISCUSS** the major concepts of psychoanalytic/psychodynamic theories of personality.
- 2 EXPLAIN** how Adler’s, Jung’s, and Horney’s theories differ from Freud’s thinking.
- 3 EXPLORE** the major contributions and criticisms of Freud’s psychoanalytic theories.

chapter eleven

Personality



CHAPTER OUTLINE

🎧 **Voices from the Classroom:** Personality in the Dating World

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- Psychodynamic/Neo-Freudian Theories
- Evaluating Psychoanalytic Theories

TRAIT THEORIES 309

- Early Trait Theorists
- Modern Trait Theory
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🐾 **PsychScience:** Do Animals Have Unique Personalities?

HUMANISTIC THEORIES 314

- Rogers's Theory
- Maslow's Theory
- Evaluating Humanistic Theories

SOCIAL-COGNITIVE THEORIES 317

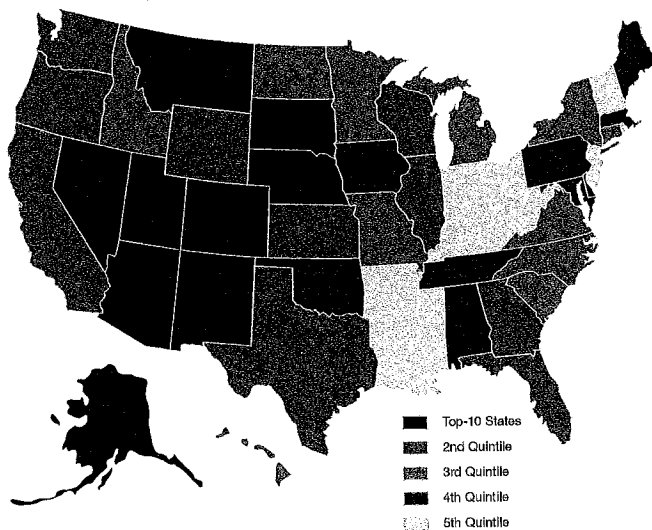
- Bandura's and Rotter's Approaches
- Evaluating Social-Cognitive Theories

BIOLOGICAL THEORIES 320

- Three Major Contributors to Personality
- Evaluating Biological Theories

PERSONALITY ASSESSMENT 323

- Interviews and Observation
- Objective Tests
- Projective Tests
- Are Personality Measurements Accurate?



techniques (Kluger & Masters, 2006). Perhaps the most promising is the use of brain scans like the *functional magnetic resonance imaging (fMRI)*. Unfortunately, each of these new lie-detection techniques has potential problems and researchers have questioned their reliability and validity, while civil libertarians and judicial scholars question their ethics and legality (Ganis et al., 2011; Gómez-Restrepo, 2007; Roskies et al., 2013; Schweitzer & Saks, 2011).

For these reasons, legal and scientific research suggests caution in using the polygraph as a lie detector (DeClue, 2003; Handler et al., 2013; Tomash & Reed, 2013; Van Iddekinge et al., 2012).

RETRIEVAL PRACTICE: COMPONENTS AND THEORIES OF EMOTION

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 three components of emotion are _____.
 - cognitive, biological, and behavioral
 - perceiving, thinking, and acting
 - positive, negative, and neutral
 - active/passive, positive/negative, and direct/indirect
- According to the _____, emotions and physiological changes occur simultaneously.
 - Cannon-Bard theory
 - James-Lange theory
 - facial-feedback hypothesis
 - two-factor theory
- The _____ suggests that we look to external rather than internal cues to understand emotions.
 - Cannon-Bard theory
 - James-Lange theory
 - facial feedback hypothesis
 - two-factor theory
- The polygraph, or lie detector, measures primarily the _____ component of emotions.
 - physiological
 - articulatory
 - cognitive
 - subjective

Think Critically

- If you were going on a date with someone or applying for an important job, how might you use the three key theories of emotion to increase the chances that things will go well?
- Why do you think people around the world experience and express the same basic emotions, and what evolutionary advantages might help explain these similarities?
- After reading the section on polygraph tests, would you be willing to take a "lie detector" test if you were accused of a crime? Why or why not?

realworldpsychology

How can a simple smile reduce stress?

Why do emotional expressions of Olympic athletes appear the same across all cultures?



HINT: LOOK IN THE MARGIN FOR Q4 AND Q5

Summary

1 THEORIES OF MOTIVATION

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- The three major biological theories of **motivation** provide roles for **instincts**, drives (produced by the body's need for **homeostasis**), and arousal (the need for novelty, complexity, and stimulation).
- Psychological theories emphasize the role of incentives, attributions, and expectancies in cognition.
- Maslow's **hierarchy of needs** theory takes a biopsychosocial approach. It prioritizes needs, with survival needs at the bottom and social and spiritual needs at the top. Although the theory has made important contributions, some critics argue that it is poorly researched and biased toward Western individualism.

2 MOTIVATION AND BEHAVIOR

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- Hunger is one of the strongest motivational drives, and both biological factors (the stomach, biochemistry, the brain) and psychosocial factors (stimulus cues and cultural conditioning) affect hunger and eating. These factors play a similar role in **obesity**, **anorexia nervosa**, **bulimia nervosa**, and **binge-eating disorder**.
- A high need for achievement (nAch), or **achievement motivation**, is generally learned in early childhood primarily through interactions with parents.
- The human motivation for sex is extremely strong. Masters and Johnson first studied and described the **sexual response cycle**,



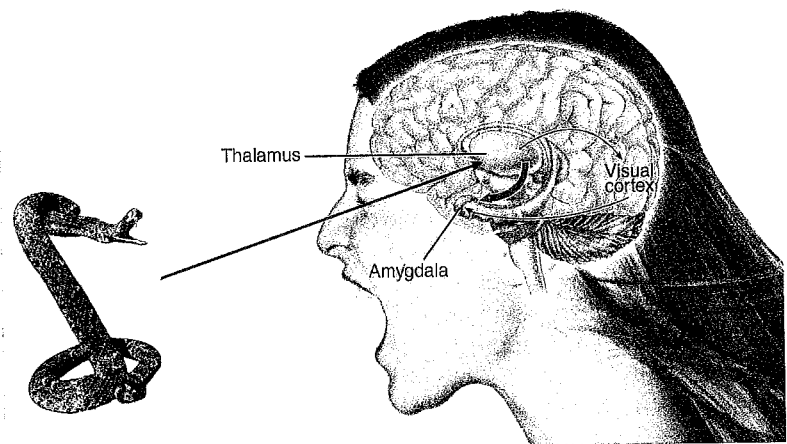
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© Kevork Djiansezian/AP Photo

FIGURE 10.19 CAN YOU IDENTIFY THESE EMOTIONS?

Most people easily recognize the emotional expression of happiness, such as the man and woman in the photo on the top. However, on occasion, our facial expressions don't seem to match our presumed emotions, as is the case in the photo on the bottom. In this case, Halle Berry was the first black actress to win the highly-coveted Best Actress award, yet she looks sad rather than happy.



© Jack Goldarb/Design Pics/Corbis

Masterfile

FIGURE 10.18 FAST AND SLOW PATHWAYS FOR FEAR

When sensory input arrives at the thalamus, the thalamus sends it along a fast route directly to the amygdala (the red arrow), as well as along a slower, more indirect route to the visual cortex (the blue arrow). This speedy, direct route allows us to quickly respond to a feared stimulus (like the snake) even before we're consciously aware of our emotions or behaviors. In contrast, the indirect route, engaging the visual cortex, provides more detailed information that allows us to consciously evaluate the danger of this particular snake and our most appropriate response.

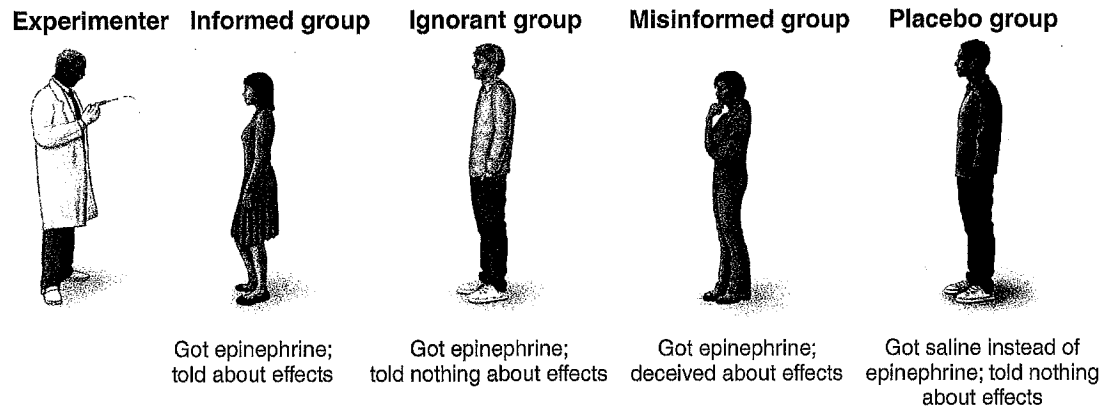
Interestingly, researchers in one study asked participants from both the United States and South Korea to select from a list of options the emotions portrayed by Olympic athletes who had just won a medal (Matsumoto & Hwang, 2012). Across both countries, participants rated faces that showed grimaces or yelling, clenched fists, and arms raised above the shoulders as indicating "triumph." Similarly, participants in both cultures rated faces with a small smile and heads tilted back, and arms sticking out away from the body with hands open as showing "pride."

From an evolutionary perspective, the idea of universal facial expressions makes adaptive sense because such expressions signal others about our current emotional state (Ekman & Keltner, 1997). Charles Darwin first advanced the evolutionary theory of emotion in 1872. He proposed that expression of emotions evolved in different species as a part of survival and natural selection. For example, fear helps animals avoid danger, whereas expressions of anger and aggression are useful when fighting for mates or resources. Modern evolutionary theory suggests that basic emotions originate in the *limbic system*. Given that higher brain areas like the cortex developed later than the subcortical limbic system, evolutionary theory proposes that basic emotions evolved before thought.

Studies with infants provide further support for an evolutionary basis for emotions. For example, infants only a few hours old show distinct expressions of emotion that closely match adult facial expressions, and by the age of 7 months they can reliably interpret and recognize emotional information across both face and voice (Field et al., 1982; Grossman, 2013; Meltzoff & Moore, 1977, 1985, 1994). And all infants, even those who are born deaf and blind, show similar facial expressions in similar situations (Field et al., 1982; Gelder et al., 2006). In addition, a study showed that families may have characteristic facial expressions, shared even by family members who have been blind from birth (Peleg et al., 2006). This collective evidence points to a strong biological, evolutionary basis for emotional expression and decoding.

In contrast to the evolutionary approach, other researchers suggest that emotions are much more complex than originally thought (Fernández-Dols, 2013; Mead, 1928; Miyamoto & Ryaff, 2011; Nelson & Russell, 2013; Ortony & Turner, 1990). For example, although we may all share similar facial expressions for some emotions, each culture has its own *display rules* governing how, when, and where to express them (De Leersnyder et al., 2013; Ekman, 1993, 2004; Fok et al., 2008; Glikson & Erez, 2013; Koopmann-Holm & Matsumoto, 2011; Matsumoto & Hwang, 2011). In addition to culture, gender, family background, norms, and individual differences also affect our emotions and their expression (Figure 10.19).

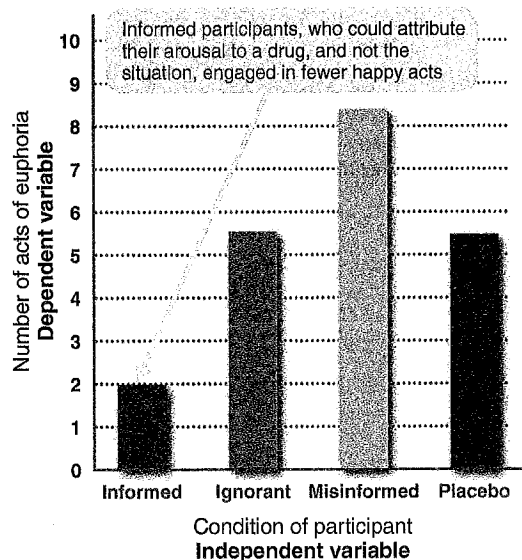
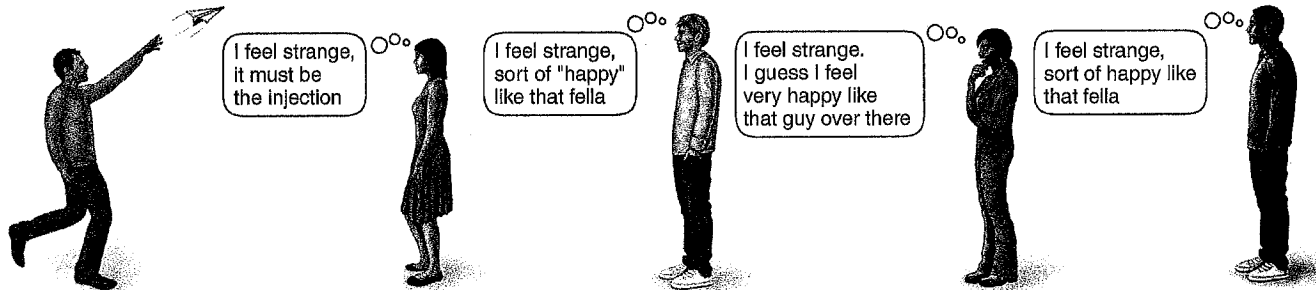
FIGURE 10.17 SCHACHTER AND SINGER'S CLASSIC STUDY



A Participants in this study were first told that this was a study of how certain vitamins affect visual skills, and then they were asked for permission to be injected with a small shot of the vitamin "Suproxin." (This injection actually was a shot of the hormone/neurotransmitter epinephrine [or adrenaline], which triggers feelings of arousal such as racing heart, flushed skin,

and trembling hands.) Those participants who gave permission were then divided into four groups and given injections. Those in the three groups who received the shot of epinephrine were correctly informed about the drug's effects, ignorant of the effects, or misinformed about the effects. Those in the fourth placebo group received a neutral, saline solution.

Happy confederate



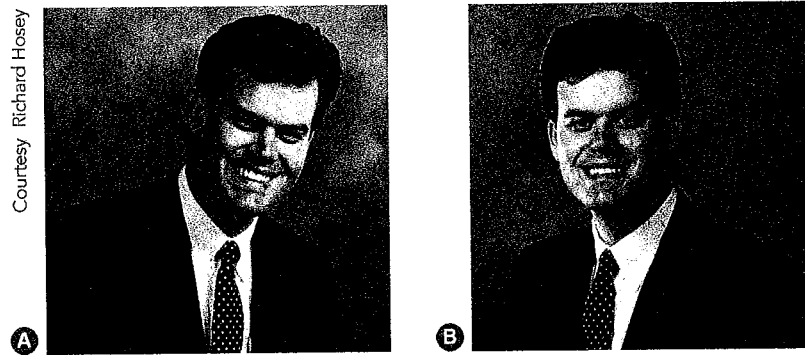
B Each participant was then placed in a room with either a "happy" or an "angry" trained confederate (who was actually an accomplice of the experimenter). Both the participants and confederate were told that before they could take the supposed vision test, they needed to complete a questionnaire and allow time for the drug to take effect. The confederate was instructed in each condition to behave in line with his supposed emotion: He acted joyously in the happy condition—flying paper airplanes, bouncing a ball, etc.—and acted irate in the angry condition—complaining about the experiment, refusing to answer some items on the questionnaire, etc. As predicted, when participants were placed in a room with the happy confederate, they rated themselves as happy. They also behaved in a more joyous way, engaging in more "happy" acts, just like the confederate had modeled. When placed with the angry, irritated confederate, they reported feeling angry and behaved more irately. Although the participants were feeling similar effects of the epinephrine, they labeled those effects differently (happy or angry), depending on the external cues in their environment, and acted accordingly.

C This effect on emotions was most apparent in the groups that were misinformed about the true effects of the injections. Why? Those in the informed group correctly attributed their arousal to the drug rather than to the environment.

FIGURE 10.15 DUCHENNE SMILE

People who show a Duchenne, or real, smile (a) and laughter elicit more positive responses from strangers and enjoy better interpersonal relationships and personal adjustment than those who use a social smile (b) (Keltner et al., 1999; Platt et al., 2013; Prkachin & Silverman, 2002).

Courtesy Richard Hosey

**Behavioral (Expressive) Component**

Emotional expression is a powerful form of communication, and facial expressions may be our most important form of emotional communication. Researchers have developed sensitive techniques to measure subtleties of feeling and to differentiate honest expressions from fake ones. Perhaps most interesting is the difference between the *social smile* and the *Duchenne smile* (named after French anatomist Duchenne de Boulogne, who first described it in 1862). See **Figure 10.15**. In a false, social smile, our voluntary cheek muscles are pulled back, but our eyes are unsmiling. Smiles of real pleasure, on the other hand, use the muscles not only around the cheeks but also around the eyes.

The Duchenne smile illustrates the importance of nonverbal means of communicating emotion. We all know that people communicate in ways other than speaking or writing. However, few people recognize the full importance of nonverbal signals.



psychology and you **The Power of Nonverbal Cues** Imagine yourself as a job interviewer. Your first applicant greets you with a big smile, full eye contact, a firm handshake, and an erect, open posture. The second applicant doesn't smile, looks down, offers a weak handshake, and slouches. Whom do you think you will hire?

Psychologist Albert Mehrabian would say that you're much less likely to hire the second applicant due to his or her "mixed messages." Mehrabian's research suggests that when we're communicating feelings or attitudes and our verbal and nonverbal dimensions don't match, the receiver trusts the predominant form of communication, which is about 93% nonverbal and consists of the way the words are said and the facial expression rather than the literal meaning of the words (Mehrabian, 1968, 1971, 2007).

Unfortunately, Mehrabian's research is often overgeneralized, and many people misquote him as saying that "over 90% of communication is nonverbal." Clearly, if a police officer says, "Put your hands up," his or her verbal words might carry 100% of the meaning. However, when we're confronted with a mismatch between verbal and nonverbal communication, it is safe to say that we pay far more attention to the nonverbal because we believe it more often tells us what someone is really thinking or feeling. The importance of nonverbal communication, particularly facial expressions, is further illustrated by the popularity of smileys and other emoticons in our everyday e-mail and text messages.

Three Major Theories of Emotion

Researchers generally agree that emotion has biological, cognitive, and behavioral components, but there is less agreement about *how* we become emotional (Christenfeld & Mandler, 2013). The major competing theories are the *James-Lange*, *Cannon-Bard*, and *Schachter and Singer's two-factor theories* (**Figure 10.16**).

RETRIEVAL PRACTICE: MOTIVATION AND BEHAVIOR

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.

1. Maria appears to be starving herself and has obviously lost a lot of weight in just a few months. You suspect she might be suffering from _____.
 - a. anorexia nervosa
 - b. bulimia nervosa
 - c. obesity phobia
 - d. none of these options
2. The desire to excel, especially in competition with others, is known as _____.
 - a. drive-reduction theory
 - b. intrinsic motivation
 - c. achievement motivation
 - d. all these options
3. _____ is a term for negative attitudes toward someone based on his or her sexual orientation.
 - a. Heterophobia
 - b. Heterosexism
 - c. Sexual prejudice
 - d. Sexual phobia
4. A high school began paying students \$5 for each day they attended school. Overall rates of attendance increased in the first few weeks and then fell below the original starting point. The most likely reason is that _____.
 - a. the students felt going to school wasn't worth \$5
 - b. money is a secondary reinforcer, not a primary one
 - c. extrinsic rewards decreased the intrinsic value of attending school
 - d. the students' expectancies changed to fit the situation

Think Critically

- 1 Most adults (and many children) find it difficult to control their weight. Using information from this chapter, can you identify the factors or motives that best explain your experience?
- 2 How can you restructure elements of your personal, work, or school life to increase intrinsic motivation over extrinsic?

realworldpsychology

How can just looking at pictures of high-fat foods make you feel hungry?

Is motivation a better predictor of math success in children than IQ?



HINT: LOOK IN THE MARGIN FOR Q2 AND Q3

COMPONENTS AND THEORIES OF EMOTION

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** the biological, cognitive, and behavioral components of emotion.
- 2 **COMPARE** the three major theories of emotion.
- 3 **EXPLAIN** cultural similarities and differences in emotion.
- 4 **REVIEW** the problems with relying on polygraph testing as a lie detector.

Emotion A complex pattern of feelings that includes arousal (heart pounding), cognitions (thoughts, values, and expectations), and expressive behaviors (smiles, frowns, and gestures).

Emotions play an important role in our lives. They color our dreams, memories, and perceptions. When they are disordered, they contribute significantly to psychological problems (Christenfeld & Mandler, 2013; Whalen et al., 2013). But what do we really mean by the term **emotion**? In everyday usage, we use it to describe feeling states; we feel “thrilled” when our political candidate wins an election, “dejected” when our candidate loses, and “miserable” when our loved ones

TABLE 10.3 SEXUAL ORIENTATION MYTHS



Patsy Lynch/Retna Ltd/Corbis

On June 26, 2013, the U.S. Supreme Court ruled the federal Defense of Marriage Act (DOMA), which defined marriage as a union between one man and one woman, unconstitutional. This decision, along with other judicial and legislative action and changing societal views surrounding gay marriage, has brought attitudes about sexual orientation into full public debate.

Myth #1: Seduction theory: Gays and lesbians were seduced as children by adults of their own sex.

Myth #2: "By default" theory: Gays and lesbians were unable to attract partners of the other sex or have experienced unhappy heterosexual experiences.

Myth #3: Poor parenting theory: Sons become gay because of domineering mothers and weak fathers. Daughters become lesbians because their mothers were weak or absent or their fathers were their primary role model.

Myth #4: Modeling theory: Children raised by gay and lesbian parents usually end up adopting their parents' sexual orientation.

Scientific research has disproved several widespread myths and misconceptions about homosexuality (Asley, 2013; Bergstrom-Lynch, 2008; Drucker, 2010; LeVay, 2003, 2011). **Table 10.3.** Although mental health authorities long ago discontinued labeling homosexuality as a mental illness, homosexuality continues to be a divisive societal issue, in some parts of our country. Gays, lesbians, bisexuals, and transgendered people often confront **sexual prejudice**, and some still experience verbal and physical attacks, disrupted family and peer relationships, and high rates of anxiety, depression, and suicide (Johns et al., 2013; Nadal, 2013; Plöderl et al., 2013; Rivers, 2011). Sexual prejudice is a socially reinforced phenomenon, not an individual pathology (as the older term *homophobia* implies).

Sexual prejudice A negative attitude toward an individual because of her or his sexual orientation.

Extrinsic Versus Intrinsic Motivation

Should parents reward children for getting good grades? There is an ongoing controversy within psychological research over whether giving external, or extrinsic, rewards increases or decreases motivation (e.g., Anderman & Dawson, 2011; Anik et al., 2011; Babula, 2013; Deci & Moller, 2005; Deci & Ryan, 2012; Gunderman & Kamer, 2011; Kerr et al., 2013). Some researchers are concerned that providing such **extrinsic motivation** will seriously affect the individual's internal, **intrinsic motivation**. When we perform a task for no ulterior purpose, we are intrinsically motivated ("because I like it" or "because it's fun"). In contrast, when we perform a task for a reward, such as praise or money, we are extrinsically motivated.

Extrinsic motivation Motivation for a task or activity based on external rewards or threats of punishment.

Intrinsic motivation Motivation for a task or activity based on internal, personal satisfaction.



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realworldpsychology **Problems with Extrinsic Rewards** Some research has shown that people who are given extrinsic rewards like money or praise for an intrinsically satisfying activity, such as watching TV or playing cards, often lose enjoyment and interest and may decrease the time they spend on the activity (Hennessey & Amabile, 1998; Kohn, 2000; Moneta & Siu, 2002). For example, one study of visitors to a national park found that those who were intrinsically motivated had measurably higher positive feelings and higher life-satisfaction levels than those who were extrinsically motivated (Cini et al., 2013). Similarly, 2-year-olds who receive rewards for helping someone else—which, like going to a national park, should be an intrinsically rewarding activity—are later less likely to offer help than are those who receive no reward (Warneken & Tomasello, 2008).

Sexuality

Obviously, there is strong motivation to engage in sexual behavior: It's essential for the survival of our species, and it's also pleasurable. But *sexuality* includes much more than reproduction. For most people, a sexual relationship fulfills many needs, including the need for connection, intimacy, pleasure, and the release of sexual tension. Given the large role sex plays throughout our lives, can you predict how the quality of the first sexual experience might affect later relationships? See the *Psych Science* box.



PSYCHSCIENCE

DO INITIAL SEXUAL EXPERIENCES HAVE A LASTING IMPACT?

To study this question, researchers asked 331 young men and women to anonymously complete a questionnaire measuring their level of anxiety, regret, and contentment surrounding their first sexual act. They were also asked to evaluate their current sex life (Smith & Shaffer, 2013).

As you might expect, those who reported more positive first-time experiences also reported higher levels of physical and emotional satisfaction in their subsequent and current relationships. Specifically, those who felt loved and respected by their partner during their first sexual experience found later encounters more emotionally satisfying. Sadly, people who described feelings of anxiety and negativity during their first sexual experience reported lower sexual satisfaction with their current sex lives.

Why is this research important? Some people may believe that the first sexual experience is “no big deal” or something you just have to get out of the way. However, this research reveals that it may have a lasting impact.

RESEARCH CHALLENGE

1 Based on the information provided, did this study (Smith & Shaffer, 2013) 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.

Sexual response cycle Masters and Johnson's description of the four-stage bodily response to sexual arousal, which consists of excitement, plateau, orgasm, and resolution.

Sexual orientation A primary erotic attraction toward members of the same sex (homosexual, gay, lesbian), both sexes (bisexual), or the other sex (heterosexual).

William Masters and Virginia Johnson (1966) were the first to conduct laboratory studies on what happens to the human body during sexual activity. They attached recording devices to male and female volunteers and monitored or filmed their physical responses as they moved from nonarousal to orgasm and back to nonarousal. They labeled the bodily changes during this series of events a **sexual response cycle** (Figure 10.10). Researchers have further characterized differences between sexual response patterns in men and women (Figure 10.11).

Sexual Orientation

Of course, an important part of people's sexuality is the question of to whom they are sexually attracted. What leads some people to be sexually interested in members of their own sex, the opposite sex, or both sexes? The roots of human **sexual orientation** are poorly understood. However, most studies suggest that genetics and biology play the dominant role (Ashley, 2013; Bao & Swaab, 2011; Hines, 2013; LeVay, 2011; Segal, 2013). For example, studies on identical twins find that if one identical twin is gay, the second twin is also gay 48 to 65% of the time, whereas

Binge-eating disorder An eating disorder characterized by recurrent episodes of consuming large amounts of food in a discrete period of time, while feeling a lack of control, but not followed by purge behaviors.

Fischer et al., 2013; Vaz-Leal et al., 2011). The vomiting associated with bulimia nervosa causes severe damage to the teeth, throat, and stomach. It also leads to cardiac arrhythmia, metabolic deficiencies, and serious digestive disorders.

Note that bulimia is similar to but not the same as **binge-eating disorder**. This disorder involves recurrent episodes of consuming large amounts of food in a discrete period of time, while feeling a lack of control over eating. However, the individual does not try to purge (American Psychiatric Association, 2013). Individuals with binge-eating disorder generally eat more rapidly than normal, eat until they are uncomfortably full and eat when not feeling physically hungry. They also tend to eat alone because of embarrassment at the large quantities they are consuming, and they feel disgusted, depressed, or very guilty after bingeing.

There are many suspected causes of anorexia nervosa, bulimia nervosa, and binge-eating disorder. Some theories focus on physical causes, such as hypothalamic disorders, low levels of various neurotransmitters, and genetic or hormonal disorders. Other theories emphasize psychosocial factors, such as a need for perfection, a perceived loss of control, teasing about body weight, destructive thought patterns, depression, dysfunctional families, distorted body image, and emotional or sexual abuse (e.g., American Psychiatric Association, 2013; Caqueo-Uribe et al., 2011; Friederich et al., 2013; Heaner & Walsh, 2013; Jenkins et al., 2013; Kaye et al., 2013; Kreipe et al., 2012; Steiger et al., 2013).

Culture and ethnicity also play important roles in eating disorders (George & Franko, 2010; Pilecki et al., 2012; Swanson et al., 2012). For instance, African Americans report fewer eating and dieting disorders and greater body satisfaction than do Caucasian and European Americans (Taylor et al., 2013; Watson et al., 2013; Whaley et al., 2011). Interestingly, binge-eating disorder appears to be equally represented across racial/ethnic minority groups in the United States (Franko et al., 2013; Taylor et al., 2013). This research suggests that both culture and biology help explain eating disorders. Regardless of the causes, it is important to recognize the symptoms of anorexia, bulimia, and binge-eating disorder (**Table 10.2**) and to seek therapy if the symptoms apply to you.

TABLE 10.2 DSM-5 SYMPTOMS OF ANOREXIA NERVOSA, BULIMIA NERVOSA, AND BINGE-EATING DISORDER

Anorexia Nervosa	Bulimia Nervosa	Binge-Eating Disorder
• Body mass index equal to or below 17 • Intense fear of becoming fat or gaining weight, or persistent behavior that interferes with weight gain, even though underweight • Disturbance in one's body image or perceived weight • Denial of seriousness of abnormally low body weight • Self-evaluation unduly influenced by body shape or weight	• Recurrent episodes of binge eating • During the episode of binge eating, consuming, in a discrete period of time, an amount of food that is much larger than most people would consume • Feeling a lack of control over eating during the episode of binge eating • Purging behavior (self-induced vomiting; misuse of laxatives, diuretics, or other medications) • Fasting and/or excessive exercise to prevent weight gain • Self-evaluation unduly influenced by body shape or weight	• Recurrent episodes of binge eating • During the episode of binge eating, consuming, in a discrete period of time, an amount of food that is much larger than most people would consume • Feeling a lack of control over eating during the episode of binge eating • No compensatory purging behavior (self-induced vomiting; misuse of laxatives, diuretics, or other medications) • During the episode of binge eating; eating more rapidly than normal eating until uncomfortably full and when not feeling physically hungry; eating alone because of embarrassment; feeling disgusted, depressed, or very guilty after bingeing



Chris Wolf/Getty Images

Many celebrities, like Lady Gaga, have publicly shared their battles with eating disorders. But does this type of publicity increase or decrease the chance that their fans will suffer similar problems?

Source: American Psychiatric Association, 2013.

Eating Problems and Disorders

The same biopsychosocial forces that explain hunger and eating also play a role in four serious eating problems and disorders: *obesity*, *anorexia nervosa*, *bulimia nervosa*, and *binge-eating disorder*.

Obesity

Imagine yourself being born and living your life on another planet, but you could receive all the Earth's normal television channels. Given that almost all the television stars, newscasters, and commercial spokespeople you've ever seen are very thin, would you wonder why there are so many ads promoting weight loss? How would you explain the recent news that obesity has reached epidemic proportions in the United States and other developed nations?

Obviously, there is a large gap between the select few appearing on television and the real world. In fact, according to the latest 2013 data, more than one-third of adults in the United States are considered to be overweight, and another third are considered to be medically obese (American Heart Association, 2013; Corsica & Perri, 2013; Gallup Well-Being, 2013). In 2013, obesity was officially classified as a disease in the DSM-5 (American Psychiatric Association, 2013). (See Chapter 12 for a discussion of the DSM-5.)

What is **obesity**? The most widely used measure of weight status is *body mass index (BMI)*, which is a single numerical value that calculates height in relation to weight (see *Psychology and You*). Sadly, obesity is one of our greatest health threats because of its significant contribution to serious illnesses like heart disease, diabetes, stroke and certain cancers (American Heart Association, 2013; Corsica & Perri, 2013). In addition, each year, billions of dollars are spent treating serious and life-threatening medical problems related to obesity, with consumers spending billions more on largely ineffective weight-loss products and services.

Controlling weight is a particularly difficult task for people in the United States. We are among the most sedentary people of all, and we've become accustomed to "supersized" cheeseburgers, "Big Gulp" drinks, and huge servings of dessert (Duffey & Popkin, 2013; Fisher et al., 2013; Herman & Polivy, 2008). We've also learned that we should eat three meals a day, whether we're hungry or not; that "tasty" food requires lots of salt, sugar, and fat; and that food is an essential part of the workplace and all social gatherings (**Figure 10.8**).

Obesity Having a body mass index of 30 or above, based on height and weight.

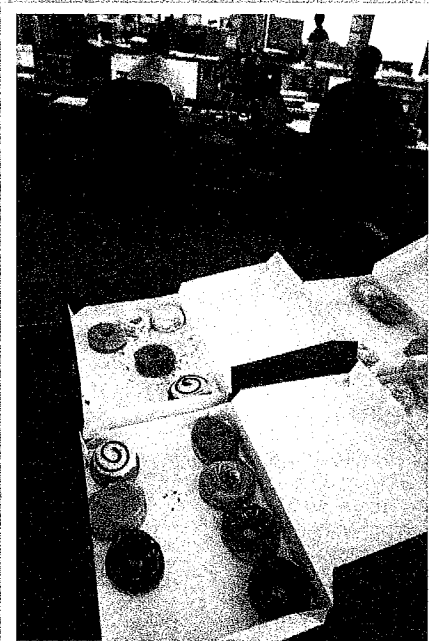
FIGURE 10.8 A FATTENING ENVIRONMENT

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One of the most popular television programs, *The Biggest Loser*, shows how difficult it is for contestants to lose weight. Even more difficult, and seldom shown, is how hard it is to maintain weight loss. To make it permanent, we need to make permanent lifestyle changes regarding exercise and the amount and types of foods we eat and when we eat them. Can you see how our everyday environments, such as in the workplace shown here, might make it harder for a person who wants to make healthier lifestyle changes?



Dave Kotinsky/Getty Images



Christian Thomas/Getty Images

Hunger and Eating

What motivates hunger? Is it your growling stomach? Or is it the sight of a juicy hamburger or the smell of a freshly baked cinnamon roll?

The Stomach

Early hunger researchers believed that the stomach controlled hunger, contracting to send hunger signals when it was empty. Today, we know it's more complicated. As dieters who drink lots of water to keep their stomachs feeling full have been disappointed to discover, sensory input from an empty stomach is not essential for feeling hungry. In fact, humans and nonhuman animals without stomachs continue to experience hunger.

However, there is a connection between the stomach and feeling hungry. Receptors in the stomach and intestines detect levels of nutrients, and specialized pressure receptors in the stomach walls signal feelings of either emptiness or *satiety* (fullness). The stomach and other parts of the gastrointestinal tract also release chemical signals that play a role in hunger (Hellström, 2013; Moran & Daily, 2011; Nicolaidis, 2011).

Biochemistry

Like the stomach, the brain and other parts of the body produce numerous neurotransmitters, hormones, enzymes, and other chemicals that affect hunger and satiety (Arumugam et al., 2008; Cooper et al., 2011; Hellström, 2013; Stadlbauer et al., 2013). Research in this area is complex because of the large number of known (and unknown) bodily chemicals and the interactions among them. It's unlikely that any one chemical controls our hunger and eating. Other internal factors, such as *thermogenesis*—the heat generated in response to food ingestion—also play a role (Acheson et al., 2011; Drapeau & Gallant, 2013; Ping-Delfos & Soares, 2011).

The Brain

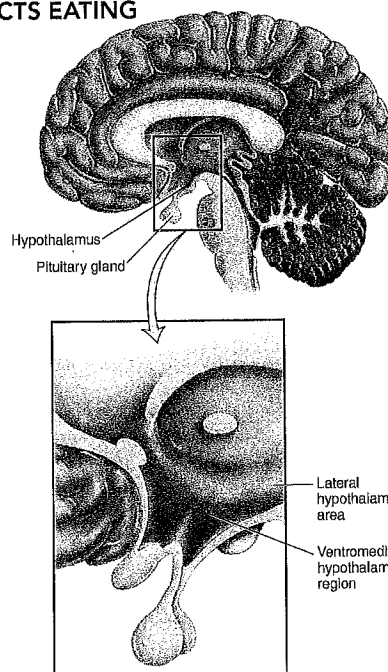
In addition to its chemical signals, particular brain structures also influence hunger and eating. Let's look at the *hypothalamus*, which helps regulate eating, drinking, and body temperature.

Early research suggested that one area of the hypothalamus, the lateral hypothalamus (LH), stimulates eating, while another area, the ventromedial hypothalamus (VMH), creates feelings of satiation, signaling the animal to stop eating. When the VMH area was destroyed in rats, researchers found that the rats overate to the point of extreme obesity (Figure 10.6). In contrast, when the LH area was destroyed, the animals starved to death if they were not force-fed.

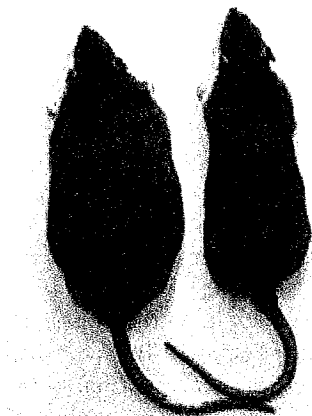
FIGURE 10.6 HOW THE BRAIN AFFECTS EATING

Several areas of the brain are active in the regulation of hunger.

A This diagram shows a section of the human brain, including the ventromedial hypothalamus (VMH) and the lateral hypothalamus (LH), which are involved in the regulation of hunger.



B After the ventromedial area of the hypothalamus of the rat on the left was destroyed, its body weight tripled. A rat of normal weight is shown on the right for comparison.



Olivier Voisin/Photo Researchers



Don Smetzer/PhotoEdit

FIGURE 10.4 EXPECTANCIES AS PSYCHOLOGICAL MOTIVATORS

What expectations might these students have that would motivate them to master a new language?

Hierarchy of needs Maslow's view that basic human motives form a hierarchy; the lower motives (such as physiological and safety needs) must be met before advancing to higher needs (such as belonging and self-actualization).

Self-actualization The humanistic term for the inborn drive to develop all one's talents and capabilities.

Biopsychosocial Theories

Research in psychology generally emphasizes either biological or psychosocial factors (nature or nurture). But biopsychosocial factors almost always provide the best explanation, and theories of motivation are no exception. One researcher who believed in biopsychosocial factors as predictors of motivation was Abraham Maslow (1954, 1970, 1999). Maslow believed we all have numerous needs that compete for fulfillment but that some needs are more important than others. For example, your need for food and shelter is generally more important than your need for good grades.

Maslow's **hierarchy of needs** prioritizes human needs, starting with survival needs (which must be met before others) at the bottom and social, esteem needs at the top (**Figure 10.5**).

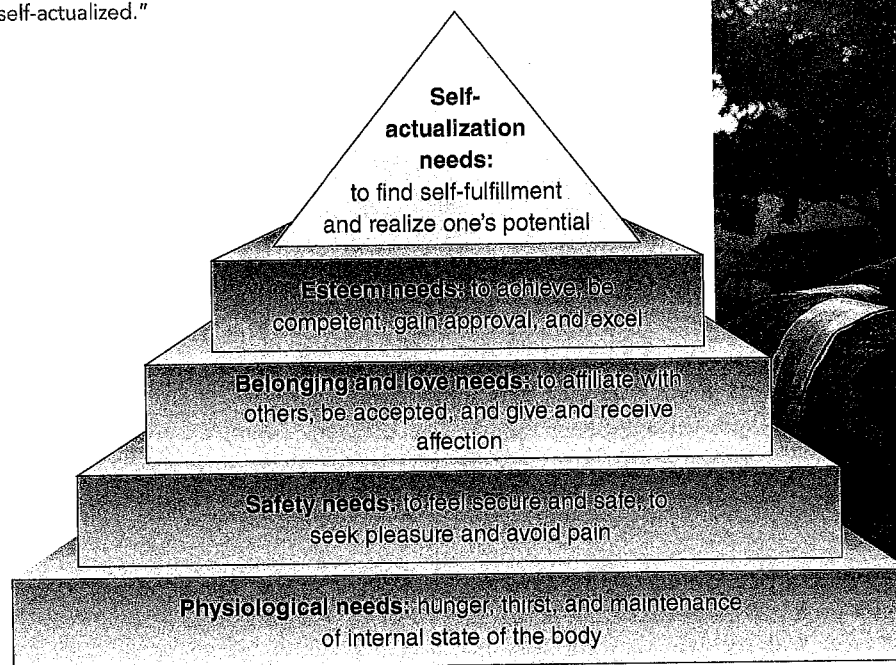
Maslow's hierarchy of needs seems intuitively correct: A starving person would first look for food, then love and friendship, and then self-esteem. This prioritizing and the concept of **self-actualization**, the inborn drive to develop all our talents and capabilities, are important factors in motivation, and Maslow's work has had a major impact on psychology, economics, and other related fields (Brink & van Bronswijk, 2013; Serlin, 2011; Stoll & Ha-Brookshire, 2012). For example, standard marketing texts often use Maslow's hierarchy of needs to imply that brand consumption is

a natural, driving force in shopping behaviors. Ironically, Maslow's work and humanistic ideals would emphasize less, not more, consumption (Hackley, 2007).

Maslow's critics argue that parts of Maslow's theory are poorly researched and biased toward Western preferences for individualism. Furthermore, his theory presupposes that the lower needs must be satisfied before someone can achieve self-actualization, but people sometimes seek to satisfy higher-level needs even when their lower-level needs have not been met (Cullen & Gotell, 2002; Kress et al., 2011; Neher, 1991). For example, protestors all over the world have used starvation as a way to protest unfair laws and political situations.

FIGURE 10.5 MASLOW'S HIERARCHY OF NEEDS

Maslow's theory of motivation suggests that we all share a compelling need to "move up"—to grow, improve ourselves, and ultimately become "self-actualized."



Nam Y Huh/AP/Wide World Photos

Which of Maslow's five levels of need are on display in this photo? Can you see how the needs of the rescuer clearly differ from those of the person who is being rescued?

Optimal-arousal theory The theory that organisms are motivated to achieve and maintain an optimal level of arousal.

In addition to having obvious biological needs, humans and other animals are innately curious and require a certain amount of novelty and complexity from the environment.

According to **optimal-arousal theory**, organisms are motivated to achieve and maintain an optimal level of arousal that maximizes their performance. Both too much and too little arousal diminish performance (**Figure 10.3**). The desired amount of arousal also may vary from person to person (see *Test Yourself*).

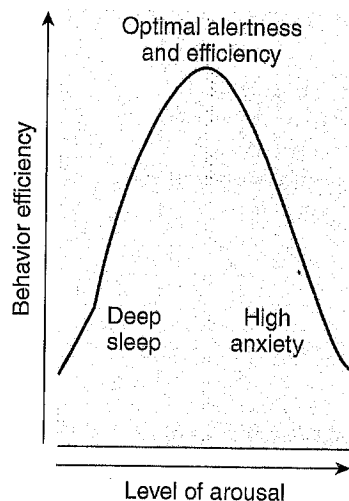


FIGURE 10.3 OPTIMAL LEVEL OF AROUSAL
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Our need for stimulation (the arousal motive) suggests that behavior efficiency increases as we move from deep sleep to increased alertness. However, once we pass the maximum level of arousal, our performance declines.

TEST YOURSELF: SENSATION SEEKING psychology and you

What motivates people to bungee jump over deep canyons or white-water raft down dangerous rivers? According to research, these “high-sensation seekers” may be biologically “prewired” to need a higher-than-usual level of stimulation (Zuckerman, 1979, 1994, 2013).

To sample the kinds of questions asked on tests of levels of sensation seeking, circle the choice (a or b) that best describes you:

1. a. I would like a job that requires a lot of traveling.
b. I would prefer a job in one location.
2. a. I get bored seeing the same old faces.
b. I like the comfortable familiarity of everyday friends.
3. a. The most important goal of life is to live it to the fullest and experience as much as possible.
b. The most important goal of life is to find peace and happiness.
4. a. I would like to try parachute jumping.
b. I would never want to try jumping out of a plane, with or without a parachute.
5. a. I prefer people who are emotionally expressive even if they are a bit unstable.
b. I prefer people who are calm and even-tempered.

Source: Zuckerman, M. (1978, February). The search for high sensation, *Psychology Today*, pp. 38–46.



Imagemore/Getty Images

Think Critically

1. If your answers to the brief quiz above indicate that you are a high-sensation seeker, what do you do to satisfy that urge, and what can you do to make sure it doesn't get out of control?
2. If you are low in sensation seeking, has this trait interfered with some aspect of your life? If so, what could you do to improve your functioning in this area?

chapteroverview

What motivates you? Why are you in college and struggling to achieve your lifetime dreams? How do you feel about some of the chronic anxieties and frustrations that generally come with being in college?

Research in *motivation* and *emotion* attempts to answer such “what,” “why,” and “how” questions. *Motivation* refers to a set of factors that activate, direct, and maintain behavior, usually toward some goal. *Emotion*, on the other hand, refers to a subjective feeling that includes arousal (heart pounding), cognitions (thoughts, values, and expectations), and expressive behaviors (smiles, frowns, and running). In other words, motivation energizes and directs behavior, whereas emotion is the “feeling” response. (Both *motivation* and *emotion* come from the Latin *movere*, meaning “to move.”)

In this chapter, we begin with the major theories and concepts of motivation, followed by several important sources of motivation—hunger, eating, achievement, and sexuality. Then we turn to the basic components and theories related to emotion. We conclude with a look at how culture and evolution affect emotion.

THEORIES OF MOTIVATION

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 SUMMARIZE** the three biologically based theories of motivation.
- 2 EXPLAIN** how incentives and cognitions affect motivation.
- 3 DESCRIBE** how biopsychosocial theories apply to motivation.

Years of research on motivation has created six major theories, which fall into three general categories—*biological*, *psychological*, and *biopsychosocial* (**Table 10.1**). While studying these theories, try to identify which theory best explains your personal behaviors, such as going to college or choosing a lifetime partner. This type of personal focus will not only improve your exam performance but also may lead to increased self-knowledge and personal motivation!

TABLE 10.1 SIX MAJOR THEORIES OF MOTIVATION

Mattias Klum/NG Image Collection

What Theory

Curiosity is an important aspect of both human and nonhuman experience. Which of the six theories of motivation best explains this behavior?

Theory

Biological

1. Instinct
2. Drive reduction
3. Optimal arousal

Description

Motivation results from innate, biological instincts, which are unlearned responses found in almost all members of a species.

Motivation begins with a biological need (a lack or deficiency) that elicits a *drive* toward behavior that will satisfy the original need and restore homeostasis.

Organisms are motivated to achieve and maintain an optimal level of arousal.

Psychological

4. Incentive
5. Cognitive

Motivation results from external stimuli that “pull” the organism in certain directions.

Motivation is affected by expectations and attributions, or how we interpret or think about our own or others’ actions.

Biopsychosocial

6. Maslow's hierarchy of needs

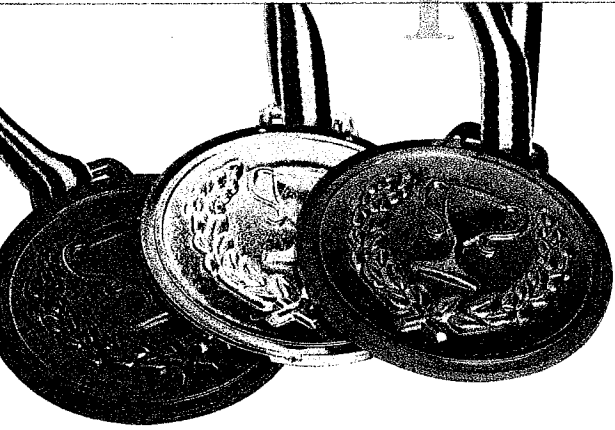
Lower needs like hunger and safety must be satisfied before advancing to higher needs (such as belonging and self-actualization).



Mattias Klum/NG Image Collection

Name That Theory
Curiosity is an important aspect of both human and nonhuman experience. Which of the six theories of motivation best explains this behavior?

chapter ten



Motivation and Emotion



CHAPTER OUTLINE

THEORIES OF MOTIVATION 274

- Biological Theories
- Psychological Theories
- Biopsychosocial Theories

MOTIVATION AND BEHAVIOR 279

- Hunger and Eating
- Eating Problems and Disorders
- Achievement
- Sexuality

 **PsychScience:** Do Initial Sexual Experiences Have a Lasting Impact?

- Extrinsic Versus Intrinsic Motivation

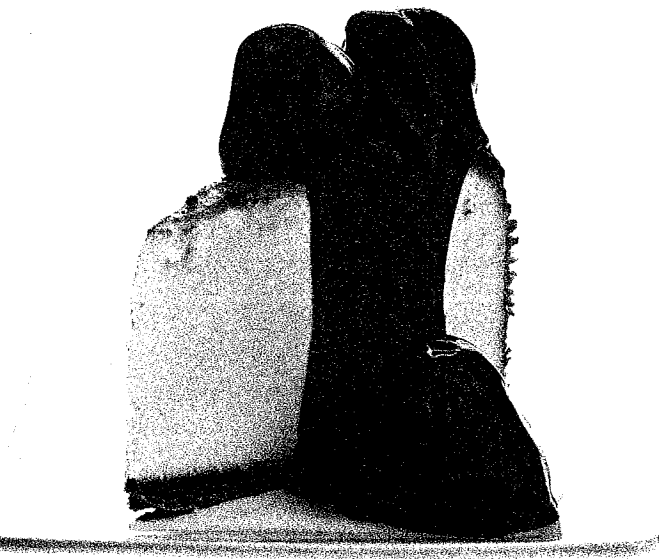
 **Voices from the Classroom:** When Extrinsic Motivation Becomes Intrinsic

COMPONENTS AND THEORIES OF EMOTION 290

- Three Components of Emotion
- Three Major Theories of Emotion

 **Voices from the Classroom:** Two-Factor Theory and "No Fear" Skiing

- Evolution, Culture, and Emotion
- The Polygraph as a Lie Detector



3. Calvin would like to wear baggy, torn jeans and a nose ring, but he is concerned that others will disapprove. Calvin is at Kohlberg's _____ level of morality.
- a. conformity b. approval seeking
c. conventional d. preconventional
4. According to Erikson, industry is the result of the successful completion of the _____ stage of development.
- a. infancy and toddlerhood b. ages 6 through 12
c. young adulthood d. middle adulthood

Think Critically

- 1 Describe how attachment has influenced your social development. Which of Ainsworth's attachment styles best describes you?
- 2 What stage of moral development do you think you would qualify for, according to Kohlberg? Do you agree or disagree with this categorization?
- 3 How have your sex and gender affected your social development?

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Do today's college students want women to propose marriage?



HINT: LOOK IN THE MARGIN FOR **Q5**

Summary

1 STUDYING DEVELOPMENT

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- **Developmental psychology** is the study of age-related changes in behavior and mental processes from conception to death. Development is an ongoing, lifelong process.
- The three most important debates or questions in human development are about *nature versus nurture* (including studies of **maturation** and **critical periods**), *stages versus continuity*, and *stability versus change*.
- Developmental psychologists use two special techniques in their research: **cross-sectional design** and **longitudinal design**. Although both have valuable attributes, each also has disadvantages. Cross-sectional studies can confuse genuine age differences with *cohort effects*. On the other hand, longitudinal studies are expensive and time-consuming, and their results are restricted in generalizability.

2 PHYSICAL DEVELOPMENT

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- Prenatal development begins at conception and is divided into three stages: the **germinal period**, the **embryonic period**, and the **fetal period**. During pregnancy, the *placenta* serves as the link for food and the excretion of wastes, and it screens out some harmful substances—but not **teratogens**, such as alcohol and nicotine.
- Early childhood is a time of rapid physical development, including brain, motor, and sensory/perceptual development. During *adolescence*, both boys and girls undergo dramatic changes in appearance and physical capacity. **Puberty** is the period of adolescence when a person becomes capable of reproduction. During adulthood, most individuals experience only minor physical changes until middle age. Around age 45–55, women experience *menopause*, the cessation of the menstrual cycle. At the same time, men experience a gradual decline in the production of sperm and testosterone, as well as other physical changes, known as the *male climacteric*.
- After middle age, most physical changes in development are gradual and occur in the heart and arteries and in the sensory receptors. One of the greatest problems for the elderly is

the various negative stereotypes that contribute to our society's widespread **ageism**.

3 COGNITIVE DEVELOPMENT

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- Three major concepts are central to Piaget's theory: **schemas**, **assimilation**, and **accommodation**. According to Piaget, all children progress through four stages of cognitive development: the **sensorimotor stage**, the **preoperational stage**, the **concrete operational stage**, and the **formal operational stage**. As they move through these stages, children acquire progressively more sophisticated ways of thinking.
- Piaget's account of cognitive development has been enormously influential, but it has also received significant criticisms. For example, Vygotsky emphasized the sociocultural influences on a child's cognitive development, rather than Piaget's internal schemas. He also believed that adults play an important instructor role in development and that this instruction is particularly helpful when it falls within a child's **zone of proximal development (ZPD)**. Piaget has also been criticized for underestimating children's abilities, as well as the genetic and cultural influences on cognitive development.

4 SOCIAL-EMOTIONAL DEVELOPMENT

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- Harlow's and his colleagues' research with monkeys raised by cloth or wire "mothers" found that *contact comfort* might be the most important factor in **attachment**.
- Using the strange situation procedure, Ainsworth found that children could be divided into three groups: Secure, anxious/avoidant, and anxious/ambivalent. Mary Main, later added a fourth category, disorganized/disoriented.
- In addition to attachment patterns, Baumrind's four parenting styles—*permissive-neglectful*, *permissive-indulgent*, *authoritarian*, and *authoritative*—also affect a child's social development.
- Kohlberg proposed three levels in the evolution of moral reasoning: the **preconventional level** (Stages 1 and 2), the **conventional level** (Stages 3 and 4), and the **postconventional level** (Stages 5 and 6).

TABLE 9.5 RESEARCH-SUPPORTED SEX AND GENDER DIFFERENCES

Behavior	More Often Shown by Men	More Often Shown by Women
Sexual	• Begin masturbating sooner in life cycle and higher overall occurrence rates • Start sexual life earlier and have first orgasm through masturbation • More likely to recognize their own sexual arousal • More orgasm consistency with sexual partner	• Begin masturbating later in life cycle and lower overall occurrence rates • Start sexual life later and have first orgasm from partner stimulation • Less likely to recognize their own sexual arousal • Less orgasm consistency with sexual partner
Touching	• Touched, kissed, and cuddled less by parents • Less physical contact with other men and respond more negatively to being touched • More likely to initiate both casual and intimate touch with sexual partner	• Touched, kissed, and cuddled more by parents • More physical contact with other women and respond more positively to being touched • Less likely to initiate either casual or intimate touch with sexual partner
Friendship	• Larger number of friends and express friendship by shared activities	• Smaller number of friends and express friendship by shared communication about self
Personality	• More aggressive from a very early age • More self-confident of future success • Attribute success to internal factors and failures to external factors • Achievement more task oriented; motives are mastery and competition • More self-validating • Higher self-esteem	• Less aggressive from a very early age • Less self-confident of future success • Attribute success to external factors and failures to internal factors • Achievement more socially directed, with emphasis on self-improvement; higher work motives • More dependent on others for validation • Lower self-esteem
Cognitive abilities	• Slightly superior in math and visuospatial skills	• Slightly superior in verbal skills

Sources: Blair & Lee, 2013; Bull et al., 2013; Casey, 2013; Crooks & Baur, 2013; King, 2012; Leaper, 2013; Masters & Johnson, 1961, 1966, 1970; Shibley Hyde & DeLamater, 2014; Wood, 2013.

(Bem, 1981, 1993; Hollander et al., 2011; Leaper, 2013). As children process information about the world, they also create internal rules governing correct behaviors for boys and for girls. On the basis of these rules, they form *gender schemas* (mental images) of how they should act.



realworldpsychology **Gender Roles and Teenagers** How do gender roles affect older children? Researchers in one study asked teenagers (ages 13 to 16) to describe two positive and two negative stories about themselves (Fivush et al., 2012). When the researchers examined the stories, they found striking differences. The stories told by girls were generally longer, more coherent, more detailed, and more descriptive of their own feelings and emotions. The boys' stories, in contrast, were more matter-of-fact and less self-reflective. What causes such differences? One factor may be that parents talk to boys and girls about emotions in different ways.

Androgyny

One way to overcome rigid or destructive gender-role stereotypes is to express both the “masculine” and “feminine” traits found in each individual—for example, being assertive and aggressive when necessary but also gentle and nurturing. Combining characteristics in this way is known as **androgyny** [an-DRAH-juh-nee]. Researchers

Androgyny [an-DRAH-juh-nee] Exhibiting both masculine and feminine traits; from the Greek *andro* for “male” and *gyn* for “female.”

FIGURE 9.23 ERIKSON'S EIGHT STAGES OF PSYCHOSOCIAL DEVELOPMENT

Erikson identified eight stages of development, each of which is associated with its own unique psychosocial crisis.



Steve Paymer/NG Image Collection

1 Trust versus mistrust (birth–age 1)

Infants learn to *trust* or *mistrust* their caregivers and the world based on whether or not their needs—such as food, affection, safety—are met.



Prof. Karen Huffman

2 Autonomy versus shame and doubt (ages 1–3)

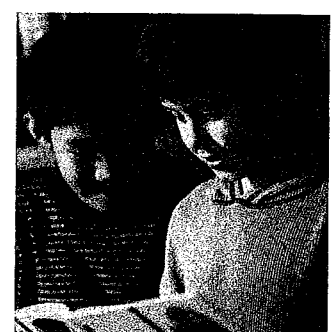
Toddlers start to assert their sense of independence (*autonomy*). If caregivers encourage this self-sufficiency, the toddler will learn to be independent versus feeling *shame* and *doubt*.



Dynamic Graphics, Inc./Creatas

3 Initiative versus guilt (ages 3–6)

Preschoolers learn to *initiate* activities and develop self-confidence and a sense of social responsibility. If not, they feel irresponsible, anxious, and *guilty*.



PhotoDisc/Getty Images, Inc.

4 Industry versus inferiority (ages 6–12)

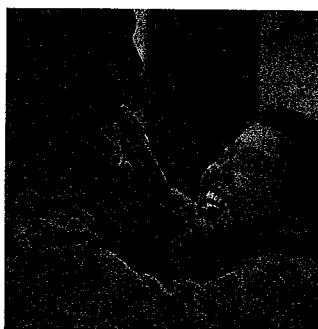
Elementary school-aged children who succeed in learning new, productive life skills develop a sense of pride and competence (*industry*). Those who fail to develop these skills feel inadequate and unproductive (*inferior*).



Randy Olson/NG Image Collection

5 Identity versus role confusion (ages 12–20)

Adolescents develop a coherent and stable self-definition (*identity*) by exploring many roles and deciding who or what they want to be in terms of career, attitudes, and so on. Failure to resolve this *identity crisis* may lead to apathy, withdrawal, and/or *role confusion*.



Pablo Corral Vega/NG Image Collection

6 Intimacy versus isolation (early adulthood)

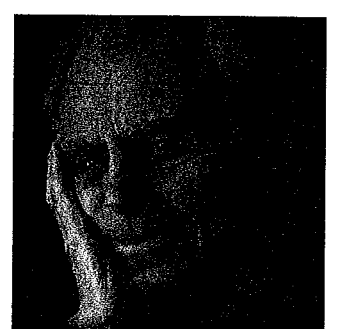
Young adults form lasting, meaningful relationships, which help them develop a sense of connectedness and *intimacy* with others. If not, they become psychologically *isolated*.



IT Stock

7 Generativity versus stagnation (middle adulthood)

The challenge for middle-aged adults is in nurturing the young, and making contributions to society through their work, family, or community activities. Failing to meet this challenge leads self-indulgence and a sense of *stagnation*.



Richard Olsenius/NG Image Collection

8 Ego integrity versus despair (late adulthood)

During this stage, older adults reflect on their past. If this reflection reveals a life well-spent, the person experiences self-acceptance and satisfaction (*ego integrity*). If not, he or she experiences regret and deep dissatisfaction (*despair*).

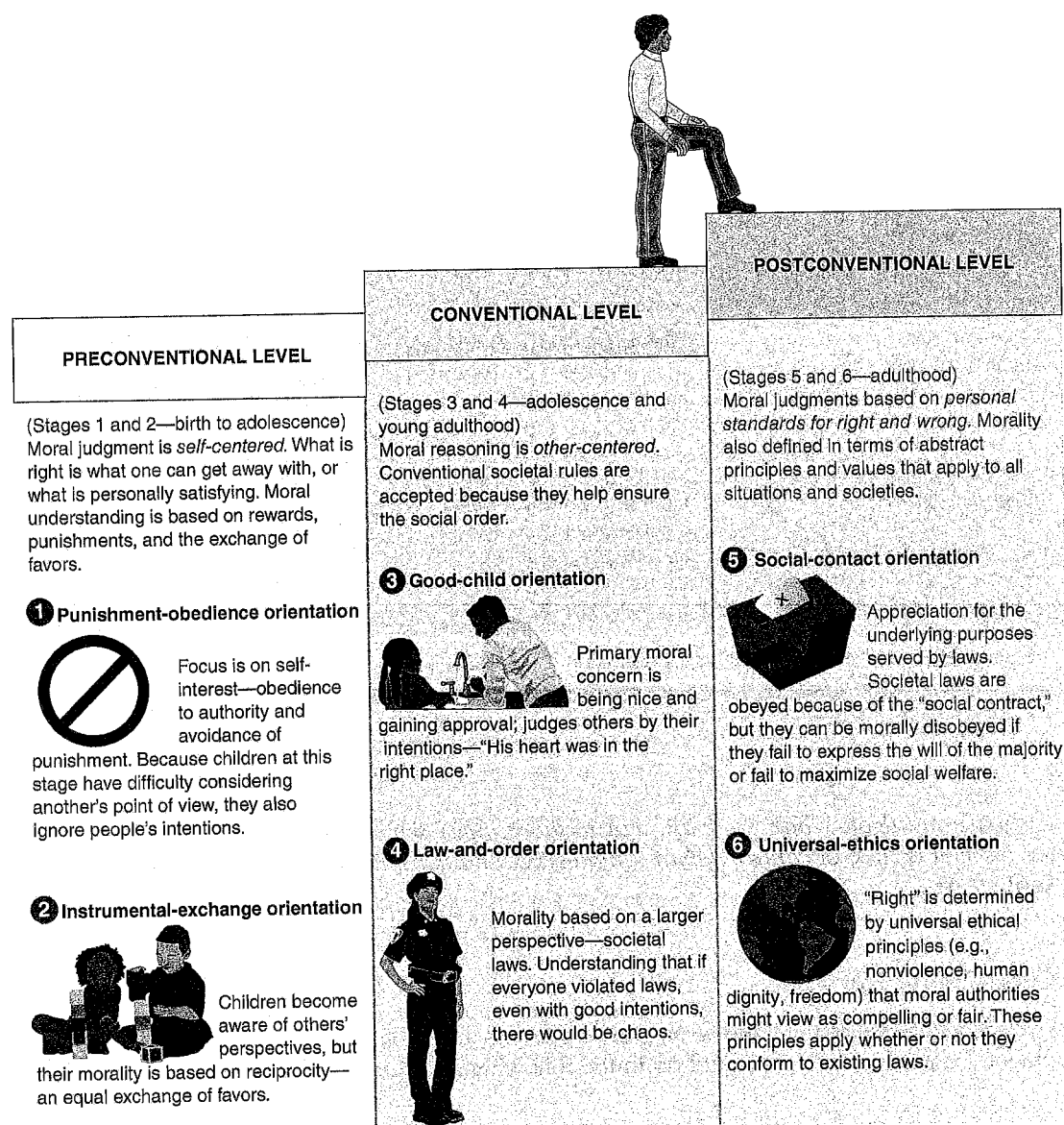
FIGURE 9.22 KOHLBERG'S STAGES OF MORAL DEVELOPMENT

Lawrence Kohlberg believed that individuals progress through three levels and six stages of moral development.

Preconventional level The first level of Kohlberg's theory of moral development, where morality is based on rewards, punishment, and exchange of favors.

Conventional level The second level of Kohlberg's theory of moral development, where moral judgments are based on compliance with the rules and values of society.

Postconventional level The highest level of Kohlberg's theory of moral development, where individuals develop personal standards for right and wrong and define morality in terms of abstract principles and values that apply to all situations and societies.



Sources: Based on Kohlberg, L. "Stage and Sequence: The Cognitive Developmental Approach to Socialization," in D. A. Goslin, *The handbook of socialization theory and research*. Chicago: Rand McNally, 1969, p. 376 (Table 6.2).

Assessing Kohlberg's Theory

Kohlberg's ideas have led to considerable research on how we think about moral issues (Carlo et al., 2013; Krettenauer et al., 2013; Malti, 2013; Mitchell & Ziegler, 2013; Paciello et al., 2013). But his theories have also been the focus of three major areas of criticism:

1. *Moral reasoning versus behavior* Are people who achieve higher stages on Kohlberg's scale really more moral than others? Or do they just "talk a good game"?

Some researchers have shown that a person's sense of moral identity, meaning the use of moral principles to define oneself, is often a good predictor of his or her behavior in real-world situations (Johnston et al., 2013; Stets & Carter, 2012). But others have found that situational factors are better predictors of moral behavior (Bandura, 1986, 1991, 2008; Minnameier & Schmidt, 2013; van

TEST YOURSELF: WHAT'S YOUR ROMANTIC ATTACHMENT STYLE?

psychology and you

Thinking of your current and past romantic relationships, place a check next to the statement that best describes your feelings about relationships.

- ☐ 1. *I find it relatively easy to get close to others and am comfortable depending on them and having them depend on me. I don't often worry about being abandoned or about someone getting too close.*
- ☐ 2. *I am somewhat uncomfortable being close. I find it difficult to trust partners completely or to allow myself to depend on them. I am nervous when anyone gets close, and love partners often want me to be more intimate than is comfortable for me.*
- ☐ 3. *I find that others are reluctant to get as close as I would like. I often worry that my partner doesn't really love me or won't stay with me. I want to merge completely with another person, and this desire sometimes scares people away.*

According to research, 55% of adults agree with item 1 (secure attachment), 25% choose number 2 (anxious/avoidant attachment), and 20% choose item 3 (anxious/ambivalent attachment) (adapted from Fraley & Shaver, 1997; Hazan & Shaver, 1987). Note that the percentages for these adult attachment styles do not perfectly match those in Figure 9.21, partly because the disorganized/disoriented attachment pattern was not included in this measurement of adult romantic attachments.

Think Critically

- 1** Do your responses as an adult match your childhood attachment experiences?
- 2** Does your romantic attachment style negatively affect your present relationship? If so, how might you use this new information to make positive changes?



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Parenting Styles

How much of our personality comes from the way our parents treat us as we're growing up? Researchers since the 1920s have studied the effects of different methods of childrearing on children's behavior, development, and mental health. For example, when researchers did follow-up studies of children with the various levels of attachment we just discussed, they found that infants with a secure attachment style had caregivers who were sensitive and responsive to their signals of distress, happiness, and fatigue (Ainsworth, 1967; Ainsworth et al., 1978; Gini et al., 2007; Higley, 2008; Völker, 2007). Anxious/avoidant infants had caregivers who were aloof and distant, and anxious/ambivalent infants had inconsistent caregivers who alternated between strong affection and indifference. Follow-up studies found that, over time, securely attached children were the most sociable, emotionally aware, enthusiastic, cooperative, persistent, curious, and competent (Flaherty & Sadler, 2011; Friedman et al., 2013; Johnson et al., 2007).

Other studies by Diana Baumrind (1980, 1995, 2013) found that parenting styles could be reliably divided into four broad patterns—*permissive-neglectful*,

nonverbal behaviors (such as crying, clinging, and smiling) and imprinting (“following”) behaviors (such as crawling and walking after the caregiver) that elicit instinctive nurturing responses from the caregiver (Bowlby, 1969, 1989, 2000).

Touch

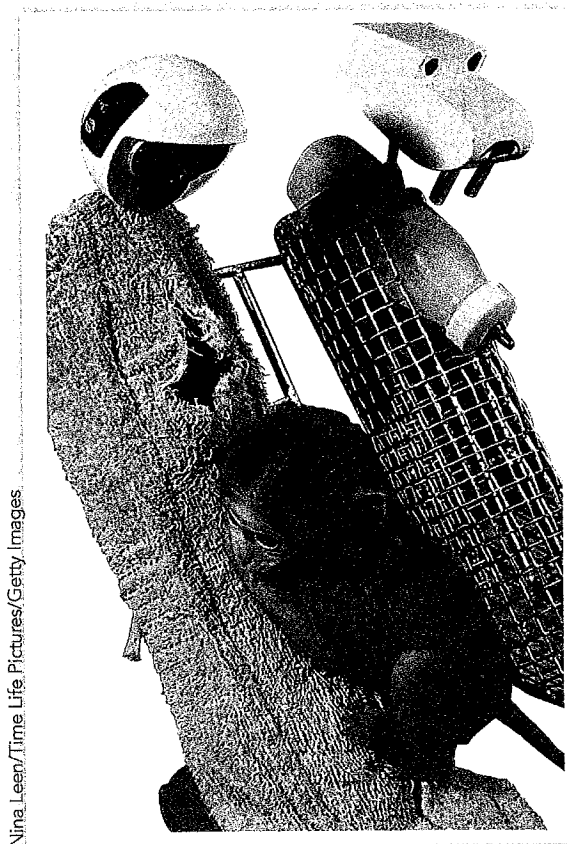
Harry Harlow and his colleagues (1950, 1966, 1971) also investigated the variables that might affect attachment. They created two types of wire-framed surrogate (substitute) “mother” monkeys: one covered by soft terry cloth and one left uncovered (**Figure 9.19**). The infant monkeys were fed by either the cloth or the wire mother, but they otherwise had access to both mothers. The researchers found that monkeys “reared” by a cloth mother clung frequently to the soft material of their surrogate mother and developed greater emotional security and curiosity than did monkeys assigned to the wire mother.

Thanks in part to Harlow’s research, psychologists discovered that *contact comfort*, the pleasurable, tactile sensations provided by a soft and cuddly “parent,” is a powerful contributor to attachment (**Figure 9.20**). Further support comes from a study described in Chapter 4, which shows that touch is an essential part of normal human infant development. This is why hospitals now encourage premature babies to receive “kangaroo care,” in which babies have skin-to-skin contact with a parent (Schneider et al., 2012).

Although physical contact between caregiver and child appears to be an innate, biological part of attachment, Mary Ainsworth and her colleagues (1967, 1978) discovered several interesting differences in the type and level of human attachment (**Figure 9.21**). Note, however, that while Ainsworth studied

FIGURE 9.19 HARLOW’S STUDY AND CONTACT COMFORT

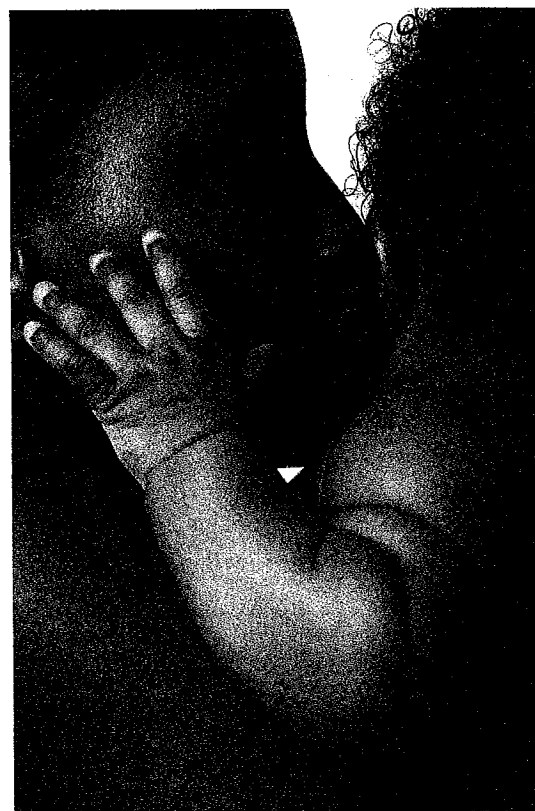
Although Harlow’s studies of attachment in infant monkeys would be considered unethical today, it did clearly demonstrate that *touch*, and not *feeding*, is crucial to an infant’s attachment.



Nina Leen/Time Life Pictures/Getty Images

FIGURE 9.20 THE POWER OF TOUCH

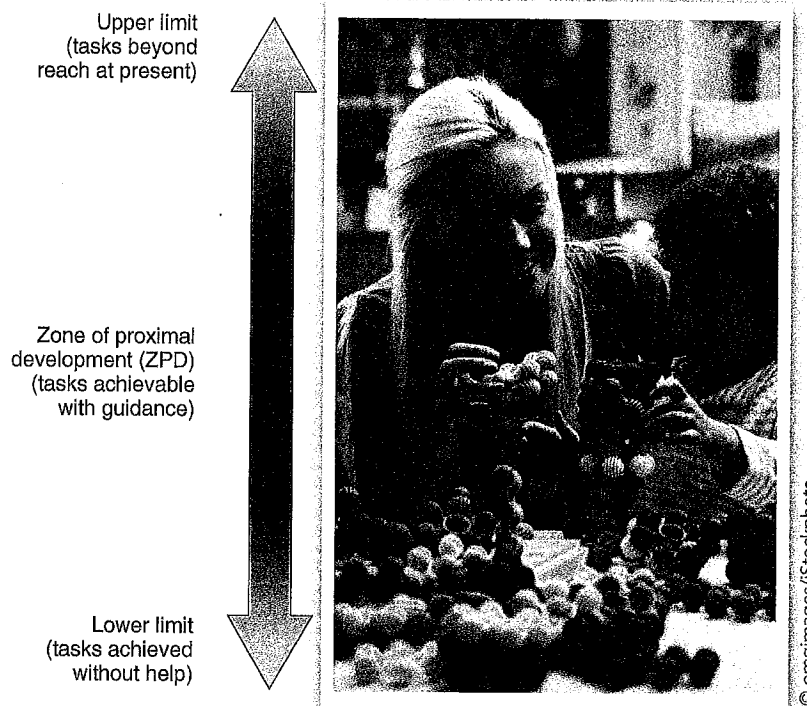
Parents around the world tend to kiss, nuzzle, comfort, and respond to their children with lots of physical contact, which points out its vital role in infant development. It also provides support for the biological, nature argument for attachment.



Marli Forastieri/Digital Vision/Getty Images

FIGURE 9.17 VYGOTSKY'S ZONE OF PROXIMAL DEVELOPMENT (ZPD)

Have you heard of “instructional scaffolding”? This term refers to providing support during the learning process that is tailored to the needs of the student. Vygotsky was one of the first to apply the general idea of scaffolding to early cognitive development. He proposed that the most effective teaching focuses on tasks between those a learner can do without help (the lower limit) and those he or she cannot do even with help (the upper limit). In this *zone of proximal development (ZPD)*, tasks and skills can be “stretched” to higher levels with the guidance and encouragement of a more knowledgeable person.



Zone of proximal development (ZPD) In Vygotsky's theory of cognitive development, the area between what children can accomplish on their own and what they can accomplish with the help of others who are more competent.

instructor role in development and that this instruction is particularly helpful when it falls within a child's **zone of proximal development (ZPD)**, see **Figure 9.17**.

Having briefly discussed Vygotsky's alternative theory, let's consider two major criticisms of Piaget—*underestimated abilities* and *underestimated genetic and cultural influences*. Research shows that Piaget may have underestimated young children's cognitive development. As you've just seen, Piaget believed that infancy and early childhood were a time of extreme egocentrism, in which children have little or no understanding of the perspective of others. However, later research finds that empathy develops at a relatively young age (**Figure 9.18**). For example, even newborn babies tend to cry in response to the cry of another baby (Diego & Jones, 2007; Geangu et al., 2010). Also, preschoolers will adapt their speech by using shorter, simpler expressions when talking to 2-year-olds as compared to talking with adults. Piaget's model, like other stage theories, has also been criticized for not sufficiently taking into account genetic and cultural differences (Cole & Gajdamaschko, 2007; Shweder, 2011; Zelazo et al., 2010).

Despite criticisms, however, Piaget's contributions to psychology are enormous. As one scholar put it, “assessing the impact of Piaget on developmental psychology is like assessing the impact of Shakespeare on English literature or Aristotle on philosophy—impossible” (Beilin, 1992, p. 191).

FIGURE 9.18 ARE PREOPERATIONAL CHILDREN ALWAYS EGOCENTRIC?

Some toddlers and preschoolers clearly demonstrate empathy for other people. How does this ability to take another's perspective contradict Piaget's beliefs about egocentrism in very young children?



For example, before filling out applications for part-time jobs, adolescents may think about possible conflicts with school and friends, the number of hours they want to work, and the kind of work for which they are qualified. Formal operational thinking also allows the adolescent to construct a well-reasoned argument based on hypothetical concepts and logical processes. Consider the following argument:

1. If you hit a glass with a feather, the glass will break.
2. You hit the glass with a feather.

What is the logical conclusion? The correct answer, “The glass will break,” is contrary to fact and direct experience. Therefore, the child in the concrete operational stage would have difficulty with this task, whereas the formal operational thinker understands that this problem is about abstractions that need not correspond to the real world.

Along with the benefits of this cognitive style come several problems. Adolescents in the early stages of the formal operational period demonstrate a type of egocentrism different from that of the preoperational child. Adolescents certainly recognize that others have unique thoughts and perspectives. However, they may fail to differentiate between what they are thinking and what others are thinking. For example, if they get a new haircut or fail to make the sports team, they may be overly concerned about how others will react. Instead of considering that everyone is equally wrapped up in his or her own appearance, concerns, and plans, they tend to believe that they are the center of others’ thoughts and attentions. David Elkind (1967, 2000, 2007) referred to this as the *imaginary audience*.

In sharp, ironic contrast to believing that others are always watching and evaluating them (the imaginary audience), Piaget believed that adolescents also often feel that they are special and unique. They alone are having insights or difficulties that no one else understands or experiences. Elkind described this as the *personal fable*.

In sum, the imaginary audience apparently results from an inability to differentiate the self from others, whereas the personal fable may be a product of differentiating too much. Thankfully, these two forms of adolescent egocentrism tend to decrease during later stages of the formal operational period.



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psychology and you Understanding Your Own Adolescent Egocentrism

Do these descriptions of the imaginary audience and personal fable ring true for you? If so, do you now understand how these beliefs might help explain some of the problems and challenges you faced in adolescence? As implied in this photo, many teens have difficulty accepting comfort and support from parents due to their belief that no one has ever felt or experienced what they have. One young woman remembered being very upset in middle school when her mother tried to comfort her over the loss of an important relationship. “I felt like she couldn’t possibly know how it felt—no one could. I couldn’t believe that anyone had ever suffered like this or that things would ever get better.”

The most important danger of adolescent egocentrism is undoubtedly the fact that several forms of risk taking, such as engaging in sexual intercourse without protection, driving dangerously, and experimenting with drugs, seem to arise from the personal fable (Alberts et al., 2007; Flavell et al., 2002; Hill & Lapsley, 2011; Moshman, 2011). Adolescents have a sense of uniqueness, invulnerability, and immortality. They do recognize the dangers of risky activities, but given their adolescent egocentrism and personal fable, they believe the rules and statistical dangers just don’t apply to them.

As a critical thinker, can you see how these Piagetian concepts of the imaginary audience and personal fable meet psychology’s goal of *description* (Chapter 1)? If so, you’ll also note how **Figure 9.16** and the following *Real World Psychology* offer biological insights toward the goal of *explanation*.

Preoperational stage Piaget's second stage of cognitive development (roughly ages 2 to 7), characterized by the ability to employ significant language and to think symbolically, but the child lacks operations (reversible mental processes), and thinking is egocentric and animistic.

Egocentrism In cognitive development, the inability to take the perspective of another person; a hallmark of Piaget's preoperational stage.

Preoperational Stage

During the **preoperational stage** (roughly ages 2 to 7), language advances significantly, and the child begins to think symbolically—using symbols, such as words, to represent concepts. Three other qualities characterize this stage: *lack of operations*, *egocentrism*, and *animism*.

Piaget labeled this period “preoperational” because the child *lacks operations*, or reversible mental processes. For instance, a preoperational child would be upset when her favorite plastic swimming pool deflates. She would not understand that it can be filled again with air and water so that she can still swim in it.

Children at this stage have difficulty understanding that there are points of view other than their own, which is known as **egocentrism**. The preschooler who moves in front of you to get a better view of the TV, or repeatedly asks questions while you are talking to someone else on the telephone, is demonstrating egocentrism. Children of this age assume that others see, hear, feel, and think exactly as they do.



Voices from the Classroom

Egocentrism and a Dump Truck! It was getting close to my brother's birthday, and I called him up. After we chatted, he put his 4-year-old son Josh on the phone. I asked Josh, “What do you think we should get your dad for his birthday?” It took him very little time to blurt out, “A dump truck!” Being aware of Josh's personal love of bulldozers and dump trucks, which obviously wouldn't be my brother's choice for a birthday present, I realized that my nephew was in Piaget's preoperational stage and demonstrating egocentrism.

Professor David Baskind

Delta College

University Center, Michigan

Children in the preoperational stage also believe that objects such as the sun, trees, clouds, and bars of soap have motives, feelings, and intentions (for example, “dark clouds are angry” and “soap sinks because it is tired”). *Animism* refers to the belief that all things are living (or animated).

Concrete Operational Stage

At approximately age 7, children enter the **concrete operational stage**. During this time, many important thinking skills emerge. However, as the name implies, thinking tends to be limited to *concrete*, tangible objects and events. Unlike preoperational children, youngsters in this stage are less egocentric in their thinking and become capable of true logical thought. As most parents know, children now stop believing in Santa Claus because they logically conclude that one man can't deliver presents to everyone in one night.

Because they understand the concept of *reversibility*, concrete operational children also can now successfully perform “operations.” They recognize that certain physical attributes (such as volume) remain unchanged, although the outward appearance is altered, in a process known as **conservation**. Tests for conservation can identify whether a child is in the preoperational or the concrete operational stage (see *Putting Piaget to the Test*).

Concrete operational stage Piaget's third stage of cognitive development (roughly ages 7 to 11), in which the child can perform mental operations on concrete objects and understand reversibility and conservation, but thinking is tied to concrete, tangible objects and events.

Conservation According to Piaget, the understanding that certain physical characteristics (such as volume) remain unchanged, even though appearances may change.



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FIGURE 9.14 ACCOMMODATION

An infant uses accommodation to make the transition from milk to solid foods.

Assimilation In Piaget's theory, applying existing mental patterns (schemas) to new information; new information is incorporated (assimilated) into existing schemas; works in tandem with accommodation.

Accommodation According to Piaget, the process of adjusting (accommodating) existing mental patterns (schemas) or developing new ones to better fit with new information; works in tandem with assimilation.

Sensorimotor stage Piaget's first stage of cognitive development (birth to approximately age 2), in which schemas are developed through sensory and motor activities.

Object permanence The Piagetian term for an infant's recognition that objects (and people) continue to exist even when they cannot be seen, heard, or touched directly.

FIGURE 9.15 OBJECT PERMANENCE

Prior to about 8 months of age, infants tend to lack object permanence, as shown by the child in the first two photos, who apparently believes the toy no longer exists once it is blocked from sight. In contrast, the older child in the third photo knows that the object still exists even if it is hidden—as shown by her attempt to seek out the toy that is hidden under the sofa. This child is demonstrating that she has formed a mental representation (a schema) of the object and has acquired a recognition of object permanence.



Doug Goodman/Photo Researchers/Getty Images



Doug Goodman/Photo Researchers/Getty Images



Heleen Sitter/The Image Bank/Getty Images

In the first few weeks of life, for example, the infant apparently has several *schemas* based on the innate reflexes of sucking, grasping, and so on. These schemas are primarily motor and may be little more than stimulus-and-response mechanisms (for example, the nipple is presented, and the baby sucks). Soon, other schemas emerge. The infant develops a more detailed schema for eating solid food, a different schema for the concepts of “mother” and “father,” and so on.

Assimilation and *accommodation* are the two major processes by which schemas grow and change over time. **Assimilation** is the process of absorbing new information into existing schemas. For instance, infants use their sucking schema not only in sucking nipples, but also in sucking blankets and fingers. In **accommodation**, existing ideas are modified to fit new information. Accommodation generally occurs when new information or stimuli cannot be assimilated. New schemas are developed or old schemas are changed to better fit with the new information. An infant's first attempt to eat solid food with a spoon is a good example of accommodation (**Figure 9.14**).

Interestingly, researchers in one study found that babies who sat upright in infant seats while they explored different objects were much better at distinguishing between those objects than babies who were lying down while they explored (Woods & Wilcox, 2013). Although the researchers weren't exactly sure why sitting up helped babies learn more about different objects, it may be that a sitting position allows babies to better reach for, hold, and manipulate objects.

Stages of Cognitive Development

According to Piaget, all children go through approximately the same four stages of cognitive development, regardless of the culture in which they live (**Table 9.3**). Piaget also believed that these stages cannot be skipped because skills acquired at earlier stages are essential to mastery at later stages.

Sensorimotor Stage

The **sensorimotor stage** lasts from birth until “significant” language acquisition (about age 2). During this time, children explore the world and develop their schemas primarily through their senses and motor activities—hence the term *sensorimotor*. One important concept that infants lack at the beginning of the sensorimotor stage is **object permanence**—an understanding that objects continue to exist even when they cannot be seen, heard, or touched (**Figure 9.15**).

In contrast to women, men experience a more gradual decline in hormone levels, and most men can father children until their seventies or eighties. Physical changes such as unexpected weight gain, decline in sexual responsiveness, loss of muscle strength, and graying or loss of hair may lead some men (and women as well) to feel depressed and to question their life progress. They often see these alterations as a biological signal of aging and mortality. Such physical and psychological changes in men are generally referred to as the *male climacteric* (or *andropause*). However, the popular belief that almost all men (and some women) go through a deeply disruptive midlife crisis, experiencing serious dissatisfaction with their work and personal relationships, is largely a myth.

After middle age, most physical changes in development are gradual and occur in the heart and arteries, and in the sensory receptors. For example, cardiac output (the volume of blood pumped by the heart each minute) decreases, whereas blood pressure increases, due to the thickening and stiffening of arterial walls. Visual acuity and depth perception decline, hearing acuity lessens (especially for high-frequency sounds), smell sensitivity decreases, and there is some decline in cognitive and memory skills (Baldwin & Ash, 2011; Edelstein et al., 2013; Fletcher & Rapp, 2013; Heinrich & Schneider, 2011; Siegler et al., 2013).

Sadly, television, magazines, movies, and advertisements too often present aging as a time for endless attempts at hiding gray hair, preventing or hiding wrinkles, avoiding or restoring thin or balding hair, and recovering lost sexual potency. Such negative portrayals contribute to our society's widespread **ageism**—prejudice or discrimination based on physical age. However, a recent survey of more than 1,000 older adults revealed an increase in well-being with age, contrary to what negative stereotypes about aging might predict (Jeste et al., 2012). Furthermore, as advertising companies consider the huge number of aging baby boomers, there has been a recent shift toward more positive and accurate portrayals of aging as a time of vigor, interest, and productivity.

Ageism Prejudice or discrimination based on physical age; similar to racism and sexism in its negative stereotypes.

Mark Wilson/Getty Images



realworldpsychology

Achievement in Later Years Our cognitive abilities generally grow and improve throughout our life span, as demonstrated by the achievements of people like Ruth Bader Ginsburg. Justice Ginsburg worked tirelessly as a staunch courtroom advocate for many years, and now in her eighties continues to serve as a Supreme Court Justice for the United States—only the second of four women to be appointed to this high honor.

RETRIEVAL PRACTICE: PHYSICAL DEVELOPMENT

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.

1. Teratogens are _____

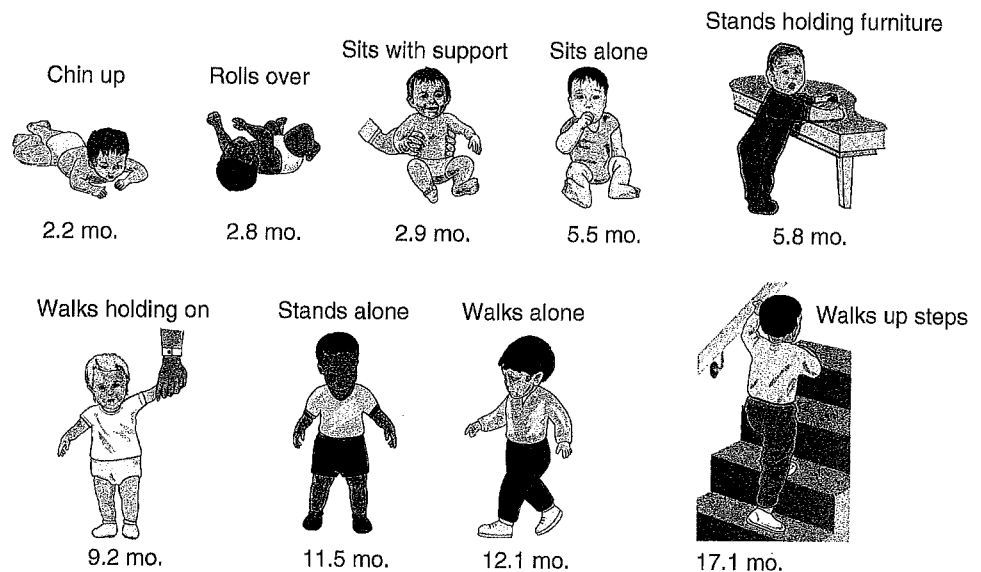
- | | |
|---|---|
| a. maternal defects that cause damage during neo-natal development. | b. environmental agents that cause damage during prenatal development. |
| c. popular children's toys that studies have shown cause damage during early childhood development. | d. environmental diseases that cause damage during early childhood development. |

2. The _____ is the first stage of prenatal development, which begins with ovulation and ends with implantation in the uterus (the first two weeks).

- | | |
|---------------------|--------------------|
| a. embryonic period | b. zygote stage |
| c. critical period | d. germinal period |

FIGURE 9.10 MILESTONES IN MOTOR DEVELOPMENT

The acquisition and progression of motor skills, from chin up to walking up steps, is generally the same for all children, but each child will follow his or her own personal timetable (Adolph & Berger, 2012; Atun-Einy et al., 2012; Benjamin Neelon et al., 2012; Mitchell & Ziegler, 2013).



Adolescence

Changes in height and weight, breast development and menstruation for girls, and a deepening voice and beard growth for boys, are important milestones for adolescents. **Puberty**, the period of adolescence when a person becomes capable of reproduction, is a major physical milestone for everyone. It is a clear biological signal of the end of childhood.

Adolescence is the loosely defined psychological period of development between childhood and adulthood, commonly associated with puberty. In the United States, it roughly corresponds to the teenage years. However, the concept of adolescence and its meaning vary greatly across cultures (Figure 9.11).

Puberty The biological changes during adolescence that lead to an adult-sized body and sexual maturity.

FIGURE 9.11 READY FOR RESPONSIBILITY? realworldpsychology

Adolescence is not a universal concept. Unlike the United States and other Western nations, some non-industrialized countries have no need for a slow transition from childhood to adulthood; children simply assume adult responsibilities as soon as possible.



John Miles/The Image Bank /Getty Images, Inc.

Early Childhood Development

Like the prenatal period, early childhood is also a time of rapid physical development. Let's explore three key areas of change in early childhood: *brain*, *motor*, and *sensory/perceptual development*.

Brain Development

Our brain and other parts of the nervous system grow faster than any other part of the body during both prenatal development and the first two years of life, as illustrated in **Figure 9.9**. This brain development and learning occur primarily because neurons grow in size and because the number of axons and dendrites, as well as the extent of their connections, increases (DiPietro, 2000; Gilles & Nelson, 2012).

Motor Development

Compared to the hidden, internal changes in brain development, the orderly emergence of active movement skills, known as *motor development*, is easily observed and measured. A newborn's first motor abilities are limited to *reflexes*, or involuntary responses to stimulation. For example, the rooting reflex occurs when something touches a baby's cheek: The infant will automatically turn its head, open its mouth, and root for a nipple.

In addition to simple reflexes, the infant soon begins to show voluntary control over the movement of various body parts (**Figure 9.10**). Thus, a helpless newborn, who cannot even lift her head, is soon transformed into an active toddler capable of crawling, walking, and climbing. In fact, babies are highly motivated to begin walking because they can move faster than when crawling, and they get better with practice (Adolph et al., 2012). Keep in mind that motor development is largely due to natural maturation, but, like brain development, it can also be affected by environmental influences such as disease and neglect.

Sensory and Perceptual Development

At birth, and during the final trimester of pregnancy, the developing child's senses are quite advanced (Colombo et al., 2013; Shaffer & Kipp, 2013). For example, research shows that a newborn infant prefers his or her mother's voice, providing evidence that the developing fetus can hear sounds outside the mother's body (Von Hofsten, 2013). In addition, a newborn can smell most odors and distinguish between sweet, salty, and bitter tastes. Breast-fed newborns also recognize the odor of their mother's milk compared to other mother's milk, formula, and other substances (Allam et al., 2010; Aoyama et al., 2010; Nishitani et al., 2009). Similarly, the newborn's sense of touch and pain is highly developed, as evidenced by reactions to circumcision and to heel pricks for blood testing, and by the fact that their pain reactions are lessened by the smell of their own mother's milk (Nishitani et al., 2009; Rodkey & Riddell, 2013; Williamson, 1997).

The newborn's sense of vision, however, is poorly developed. At birth, an infant is estimated to have vision between 20/200 and 20/600 (Haith & Benson, 1998). Imagine what the infant's visual life is like: The level of detail you see at 200 or 600 feet (if you have 20/20 vision) is what an infant sees at 20 feet. Within the first few months, vision quickly improves, and by 6 months it is 20/100 or better. At 2 years, visual acuity is nearly at the adult level of 20/20 (Courage & Adams, 1990).

One of the most interesting findings in infant sensory and perceptual research concerns hearing. Not only can the newborn hear quite well at birth, but also, during the last few months in the womb, the fetus can hear sounds outside the mother's body. This raises the interesting possibility of fetal learning, and some have advocated special stimulation for the fetus as a way of increasing intelligence, creativity, and general alertness (Muenssinger et al., 2013; Partanen et al., 2013; Van de Carr & Lehrer, 1997).

Germinal period The first stage of prenatal development, beginning with ovulation and followed by conception and implantation in the uterus; the first two weeks of pregnancy.

Embryonic period The second stage of prenatal development, which begins after uterine implantation and lasts through the eighth week.

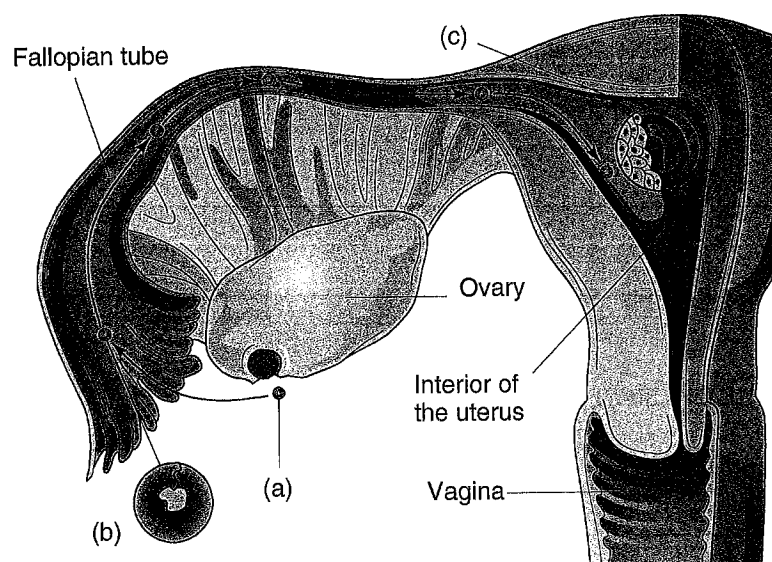
Fetal period The third, and final, stage of prenatal development (eight weeks to birth); characterized by rapid weight gain in the fetus and the fine detailing of bodily organs and systems.

a single cell barely 1/175 of an inch in diameter—smaller than the period at the end of this sentence. This new cell, called a *zygote*, then began a process of rapid cell division that resulted in a multimillion-celled infant (you) some nine months later.

The vast changes that occur during the nine months of a full-term pregnancy are usually divided into three stages: the **germinal period**, the **embryonic period**, and the **fetal period** (Figure 9.7).

During pregnancy, the *placenta* connects the fetus to the mother's uterus and serves as the link for delivery of food and excretion of wastes. It also screens out some, but not all, harmful substances. Environmental hazards such as X-rays and toxic waste, drugs, and diseases can still cross the placental barrier (Table 9.2).

FIGURE 9.7 PRENATAL DEVELOPMENT



1 Germinal period: From conception to implantation

After discharge from either the left or right ovary (a), the ovum travels to the opening of the fallopian tube.

If fertilization occurs (b), it normally takes place in the first third of the fallopian tube. The fertilized ovum is referred to as a zygote.

When the zygote reaches the uterus, it implants itself in the wall of the uterus (c) and begins to grow tendril-like structures that intertwine with the rich supply of blood vessels located there. After implantation, the organism is known as an embryo.

3 Fetal period: From eight weeks to birth

At four months, all the actual body parts and organs are established. The fetal stage is primarily a time for increased growth and "fine detailing."

2 Embryonic period: From implantation to eight weeks

At eight weeks, the major organ systems have become well differentiated. Note that at this stage, the head grows at a faster rate than other parts of the body.



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Pettit Format/Nestle/Photo Researchers

RETRIEVAL PRACTICE: STUDYING DEVELOPMENT

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.

- _____ studies age-related changes in behavior and mental processes from conception to death.
 - Thanatology
 - Teratogenology
 - Human development
 - Developmental psychology
- _____ is governed by automatic, genetically predetermined signals.
 - The cohort effect
 - Secondary aging
 - Thanatology
 - Maturation
- What three major questions are studied in developmental psychology?
 - nature versus nurture, stages versus continuity, and stability versus change
 - nature versus nurture, "chunking" versus continuity, and instability versus change
 - nature versus nurture, stages versus continuity, and stagnation versus instability
 - none of these
- _____ studies are the most time-efficient method, whereas _____ studies provide the most in-depth information per participant.
 - Latitudinal; longitudinal
 - Neo-gerontology; longitudinal
 - Cross-sectional; longitudinal
 - Class-racial; longitudinal

Think Critically

- Which of the three important debates or questions in developmental psychology do you find most valuable? Why?
- Based on what you have learned about critical periods, can you think of a circumstance in your own development, or that of your friends, when a critical period might have been disrupted or lost?

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Are our childhood friends' predictions of our adult personality better than our own self-ratings?



HINT: LOOK IN THE MARGIN FOR 

PHYSICAL DEVELOPMENT

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.

- IDENTIFY** the three phases of prenatal physical development.
- SUMMARIZE** physical development during early childhood.
- DESCRIBE** the physical changes that occur during adolescence and adulthood.

After studying the photos of your two authors as they've aged over the life span **Figure 9.5**, or after reviewing your own similar photos, you may be amused and surprised by all the dramatic changes in physical appearance. But have you stopped to appreciate the incredible underlying process that transforms all of us from birth to death? In this section, we will explore the fascinating processes of physical development from conception through childhood, adolescence, and adulthood.

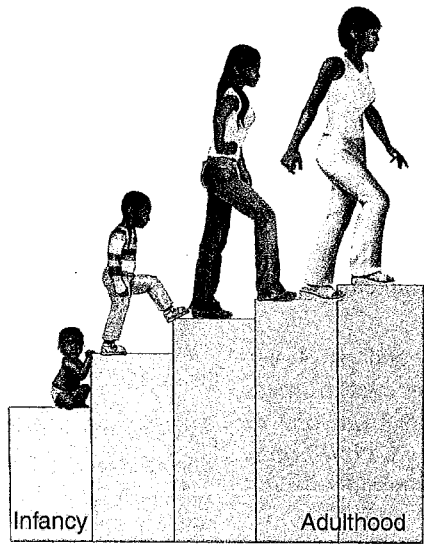
Prenatal Development

Your prenatal development began at conception, when your mother's egg, or ovum, united with your father's sperm cell (**Figure 9.6**). At that time, you were

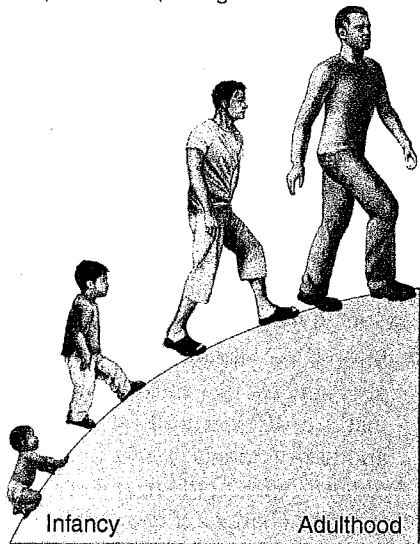
FIGURE 9.2 STAGES VERSUS CONTINUITY IN DEVELOPMENT

There is an ongoing debate about whether development is better characterized by discrete stages or by gradual, continuous development.

A Stage theorists think development results from discrete, qualitative changes.



B Continuity theorists believe development results from gradual, quantitative (incremental) changes.



3. Stability or change? Which of our traits are stable and present throughout our life span, and what aspects will change? Psychologists who emphasize *stability* hold that measurements of personality taken during childhood are important predictors of adult personality; those who emphasize *change* disagree.

Research Approaches

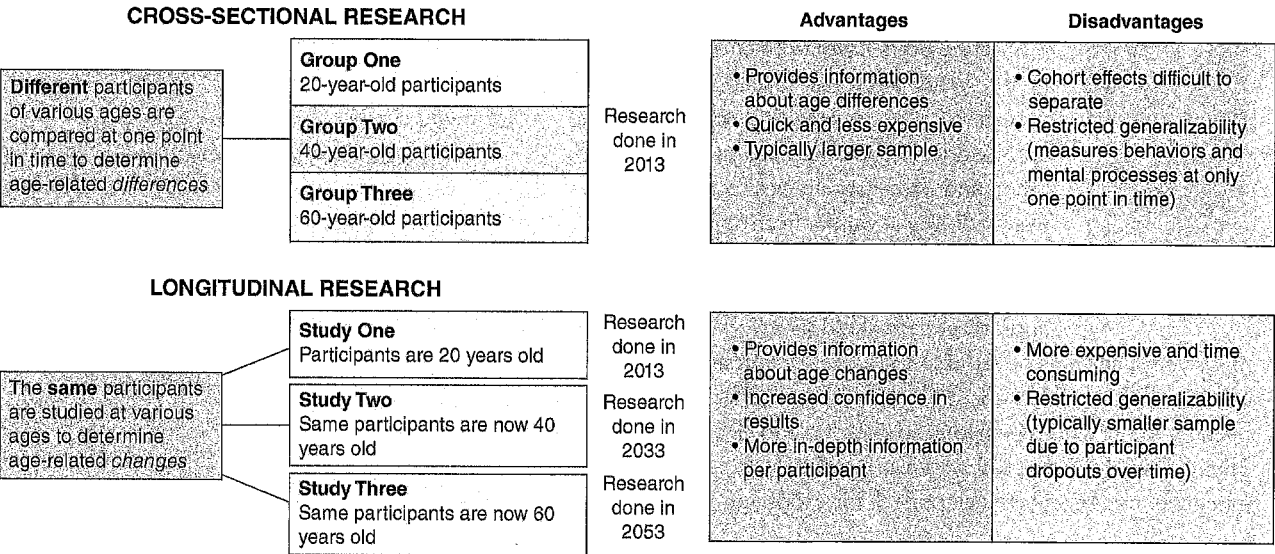
To answer these three controversies and other questions, developmental psychologists typically use all the research methods discussed in Chapter 1. To study the entire human life span, they also need two additional techniques—*cross sectional* and *longitudinal* (Figure 9.3).

Cross-sectional design A research technique that measures individuals of various ages at one point in time and provides information about age differences.

The **cross-sectional design** examines people of various ages (such as 20, 40, 60, and 80) all at the same time to see how each age differs at that one specific time of measurement. For example, one cross-sectional study examined women in

FIGURE 9.3 CROSS-SECTIONAL VERSUS LONGITUDINAL RESEARCH

To study development, psychologists may use either a cross-sectional or longitudinal design for their research.



chapteroverview

Are you one of the lucky ones who grew up with loving parents who documented every stage of your development with photos, videos, and/or journals—starting with your birth, first smile, first day of school, and all the way to your high school graduation? If so, you have a head start on the material in this chapter. As you might expect, studying development across the entire life span is a monumental task, so we've organized this chapter into three major sections—*physical*, *cognitive*, and *social-emotional development*. Before we begin, we need to briefly examine the research issues and methods psychologists use to study development.

STUDYING DEVELOPMENT

LEARNING OBJECTIVES

Developmental psychology The study of age-related changes in behavior, mental processes, and stages of growth, from conception to death.

Maturation The continuing influence of heredity throughout development; age-related physical and behavioral changes characteristic of a species.

Critical period A time of special sensitivity to specific types of learning, which shapes the capacity for future development.

Imprinting An inherited, primitive form of rapid learning (within a critical period) in which some infant animals physically follow and form an attachment to the first moving object they see and/or hear.

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 SUMMARIZE** the three most important debates or questions in developmental psychology.
- 2 CONTRAST** the cross-sectional research design with the longitudinal research design.

Just as some parents carefully document their child's progress throughout his or her life span, the field of **developmental psychology** studies growth and change throughout the eight major stages of life—from conception to death, or “womb to tomb” (**Table 9.1**). Their studies have led to three key theoretical issues.

Theoretical Issues

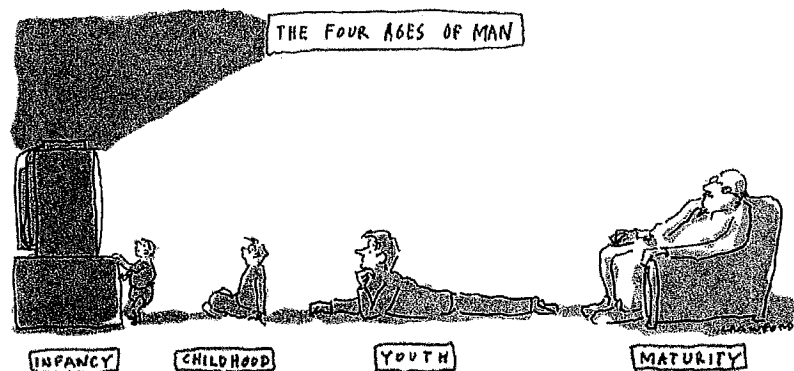
Almost every area of research in human development frames questions around three major issues:

- 1. Nature or nurture?** How do both genetics (nature) and life experiences (nurture) influence development? According to the *nature position*, development is largely governed by automatic, genetically predetermined signals in a process known as **maturation**. Just as a flower unfolds in accord with its genetic blueprint, humans crawl before we walk, and walk before we run.

In addition, naturists believe there are **critical periods**, or windows of opportunity, that occur early in life when exposure to certain stimuli or experiences is necessary for proper development. For example, many newborn animals form rigid attachments to particular stimuli shortly after birth, a process called **imprinting** (**Figure 9.1**).

TABLE 9.1 LIFE SPAN DEVELOPMENT

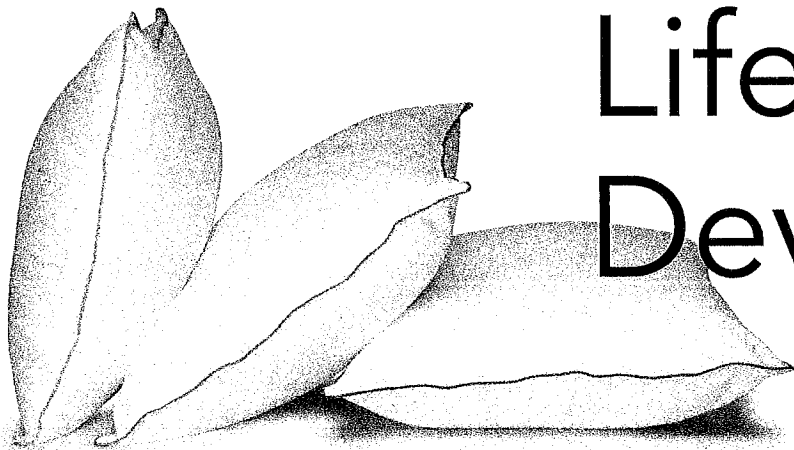
Stage	Approximate Age
Prenatal	Conception to birth
Infancy	Birth to 18 months
Early childhood	18 months to 6 years
Middle childhood	6 to 12 years
Adolescence	12 to 20 years
Young adulthood	20 to 45 years
Middle adulthood	45 to 60 years
Late adulthood	60 years to death



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Life Span Development



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PsychScience: Deprivation and Development

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- Attachment
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- Personality Development
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-  **Voices from the Classroom:** Erikson and a 90% Pay Cut!



Summary

1 THINKING

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- Thinking is a central aspect of **cognition**. Thought processes are distributed throughout the brain in neural networks. **Mental images** and **concepts** aid our thought processes. There are three major building blocks for concepts—**prototypes**, **artificial concepts**, and hierarchies.
- **Problem solving** usually has three steps: *preparation*, *production*, and *evaluation*. **Algorithms** and **heuristics** help us produce solutions.
- Barriers to problem solving include **mental sets**, **functional fixedness**, **confirmation bias**, **availability heuristic**, and the **representativeness heuristic**.
- **Creativity** is the ability to produce valued outcomes in a novel way. Tests of creativity usually focus on **divergent thinking**.

2 LANGUAGE

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- **Language** supports thinking and enables us to communicate. To produce language, we use **phonemes**, **morphemes**, and **grammar** (syntax and semantics). Several different parts of our brain are involved in producing and listening to language.
- According to Whorf's **linguistic relativity hypothesis**, language determines thought. Generally, Whorf's hypothesis is not supported. However, language does strongly influence thought.
- Children communicate nonverbally from birth. Their verbal communication proceeds in stages: *prelinguistic*, which includes crying, **cooing**, and **babbling**, and *linguistic*, which includes single utterances, **telegraphic speech**, and acquisition of rules of grammar.
- According to Chomsky, humans are "prewired" with a **language acquisition device (LAD)** that enables language development. Nurturists hold that children learn language through rewards, punishments, and imitation. Most psychologists hold an intermediate view.
- Research with chimpanzees, gorillas, and dolphins suggests that these animals can learn and use basic rules of language.

However, critics suggest nonhuman animal language is less complex, less creative, and not as rule-laden as human language.

3 INTELLIGENCE

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- There is considerable debate over the meaning of **intelligence**. Here it is defined as the global capacity to think rationally, act purposefully, and deal effectively with the environment.
- Spearman proposed that intelligence is a single factor, which he termed **general intelligence (g)**. Thurstone and Guilford argued that intelligence included numerous distinct abilities. Cattell proposed two subtypes of *g*: **fluid intelligence (gf)** and **crystallized intelligence (gc)**. Many contemporary cognitive theorists, including Gardner and Sternberg, believe that intelligence is a collection of many separate specific abilities. Goleman believes that **emotional intelligence (EI)**, the ability to empathize and manage our emotions and relationships, is just as important as any other kind of intelligence.
- Early intelligence tests computed a person's mental age to arrive at an **intelligence quotient (IQ)**. Today, two of the most widely used intelligence tests are the *Stanford-Binet Intelligence Scale* and the *Wechsler Adult Intelligence Scale (WAIS)*. Intelligence tests commonly compare the performance of an individual with other individuals of the same age. To be scientifically acceptable, all psychological tests must fulfill three basic requirements: **standardization**, **reliability**, and **validity**.
- Intelligence tests provide one of the major criteria for assessing **intellectual disability** and **mental giftedness**, both of which exist on a continuum. Studies of people who are intellectually gifted found that they had more intellectual opportunities and tended to excel professionally. However, a high IQ does not guarantee success in every endeavor.
- Most recent research on the biology of intelligence has focused on brain functioning, not size. Research indicates that intelligent people's brains respond especially quickly and efficiently.
- In answer to the question of how race affects IQ, heredity and intelligence are interacting, inseparable factors.

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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.



TK Wanstal/The Image Works

- 1 Jerry Levy and Mark Newman, the two men shown in this photo, are identical twins who were separated at birth and first met as adults at a firefighter's convention. Research shows that IQ tends to be highly correlated for identical twins, but do you believe identical twins share a special connectedness? Why or why not?
- 2 Does the brothers' choosing the same uncommon profession seem like a case of special "twin-telepathy"? If so, how might *confirmation bias* contribute to the perception of twin-telepathy?
- 3 What is the role of emotional intelligence (EI) in business? Should it be a factor in hiring and promotions? What might be the advantages and drawbacks if it did?
- 4 Should preschools and elementary schools be required to teach children multiple languages? Why or why not?
- 5 Which of the barriers to problem solving described in this chapter are the biggest problems for you? How will you work to overcome them?

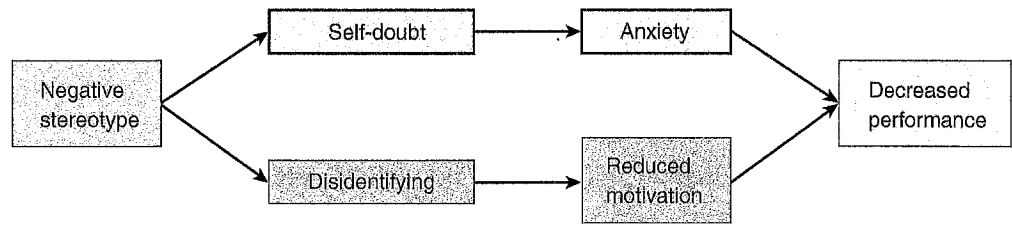


FIGURE 8.19 HOW STEREOTYPE THREAT LEADS TO DECREASED PERFORMANCE

test scores (Major et al., 1998). Unfortunately, this attitude reduces motivation and also leads to decreased performance (Figure 8.19).

Stereotype threat affects many social groups, including African Americans, women, Native Americans, Latinos, low-income people, elderly people, and white male athletes (Joanisse et al., 2013; Keller & Bless, 2008; Owens & Massey, 2011). This research helps explain some group differences in intelligence and achievement tests. As such, it underscores why relying solely on such tests to make critical decisions affecting individual lives—for example, in hiring, college admissions, or clinical application—is unwarranted and possibly even unethical.

What's the good news? First, some early research suggested that having Barack Obama as a positive role model improved academic performance by African Americans—thus offsetting the stereotype threat (Marx et al., 2009). See Figure 8.20. Second, people who have the opportunity to self-affirm, or validate, their identities in some type of meaningful way do not show the negative effects of stereotype threat. For example, African American first-year college students who receive information about how to feel more connected to their college or university show higher

FIGURE 8.20 "OBAMA EFFECT" VERSUS STEREOTYPE THREAT | realworldpsychology

Preliminary research found a so-called "Obama effect," which promised to offset problems related to the stereotype threat (Dillon, 2009). However, later studies found either no relationship between test performance and positive thoughts about Obama, or mixed results (Aronson et al., 2009; Smith, 2012).

Reuters/Larry Downing/Landov

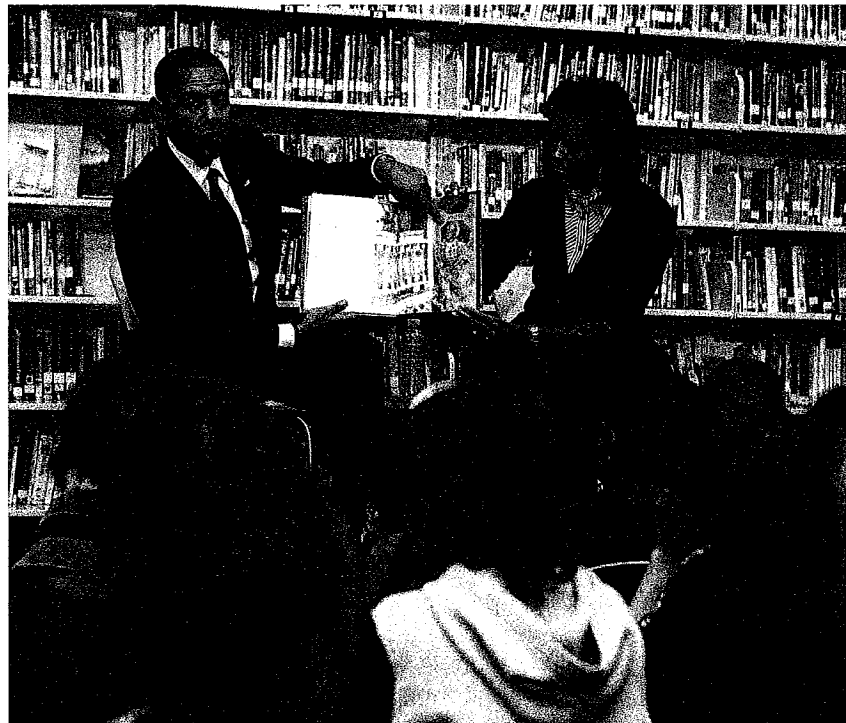
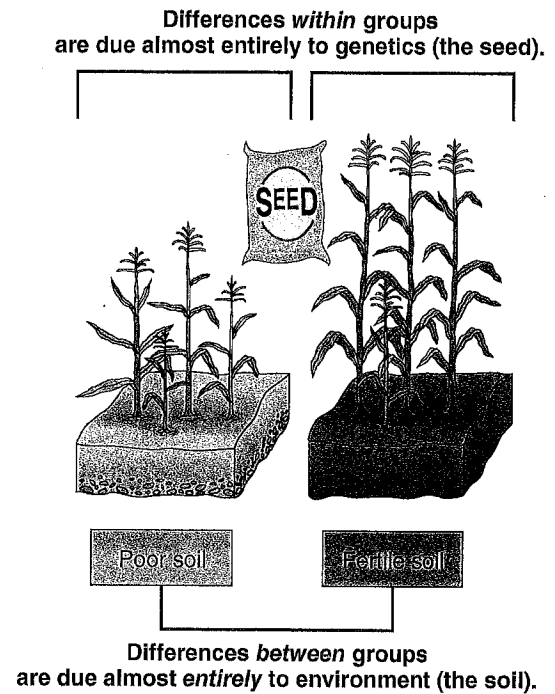


FIGURE 8.18 GENETICS VERSUS ENVIRONMENT

Note that even when you begin with the same package of seeds (genetic inheritance), the average height of corn plants in the fertile soil will be greater than the average height of corn plants in the poor soil (environmental influences). Therefore, no valid or logical conclusions can be drawn about the overall genetic differences between the two groups of plants because the two environments (soil) are so different. Similar logic must be applied to intelligence scores between ethnic groups.



the left and those on the right in **Figure 8.18**. Just as we cannot say that the difference *between* these two groups of plants is due to heredity, we similarly cannot say that differences in IQ *between* any two groups of people are due to heredity.

Note also the considerable variation in height *within* the group of plants on the left and those *within* the group on the right. Just as some plants are taller than others, there are individuals who score high on IQ tests and others who score low. Always remember that the greatest differences in IQ scores occur when we compare individuals *within* groups—not *between* groups.

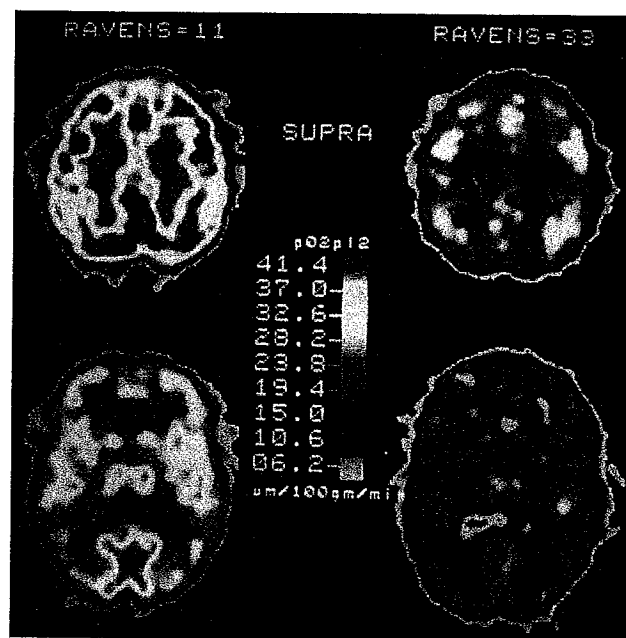
Why are we calling such attention to this *between*- and *within*-group distinction? In 1969, Arthur Jensen sparked a heated debate when he argued that genetic factors are “strongly implicated” as the cause of ethnic differences in intelligence. A book by Richard J. Herrnstein and Charles Murray titled *The Bell Curve: Intelligence and Class Structure in American Life* reignited this debate in 1994, when the authors claimed that African Americans score below average in IQ because of their “genetic heritage.”

Unfortunately, some of the strongest proponents of the “heritability of intelligence” argument seem to ignore the “fertile soil” background of the groups who score highest on IQ tests. As an open-minded, critical thinker, carefully consider these important research findings:

- Environmental and cultural factors may override genetic potential and later affect IQ test scores. Like plants that come from similar seeds, but are placed in poor versus enriched soil, minority children are more likely to grow up in lower socioeconomic conditions, which may hamper their true intellectual potential. Also, in some ethnic groups and economic classes, a child who excels in school may be ridiculed for trying to be different from his or her classmates. Moreover, if children’s own language and dialect do not match their education system or the IQ tests they take, they are obviously at a disadvantage (Cathers-Schiffman & Thompson, 2007; García & Náñez, 2011; Johnson et al., 2010; Sidhu et al., 2010; Sternberg & Grigorenko, 2008). Furthermore, environmental stress can also lead to short-term decreases in test scores (see *Psych Science*).
- Traditional IQ tests may be culturally biased. If standardized IQ tests contain questions that reflect American middle-class culture, they will discriminate against test takers whose language, knowledge, and experience differ from those of the white majority (Abedi, 2013; Suzuki et al., 2013). Researchers have attempted to create a *culture-fair* or *culture-free* IQ test, but they have found it

FIGURE 8.15 DO INTELLIGENT BRAINS WORK MORE EFFICIENTLY?

In PET scan images, red and yellow indicate more activity in relevant brain areas. Note how during problem-solving tasks, low-IQ brains (left) show more activity than high-IQ brains (right). This research suggests that lower-IQ brains actually work harder, although less efficiently, than higher-IQ brains.



Courtesy Richard J. Haier, University of California-Irvine

Does size matter? It makes logical sense that bigger brains would be smarter; after all, humans have larger brains than less intelligent species, such as dogs. (Some animals, such as whales and dolphins, have larger brains than humans, but our brains are larger relative to our body size.) In fact, brain-imaging studies have found a significant correlation between brain size (adjusted for body size) and intelligence (Christensen et al., 2008; Colom et al., 2013; Deary et al., 2007). On the other hand, Albert Einstein's brain was no larger than normal (Witelson et al., 1999). In fact, some of Einstein's brain areas were actually smaller than average, but the area responsible for processing mathematical and spatial information was 15% larger than average.

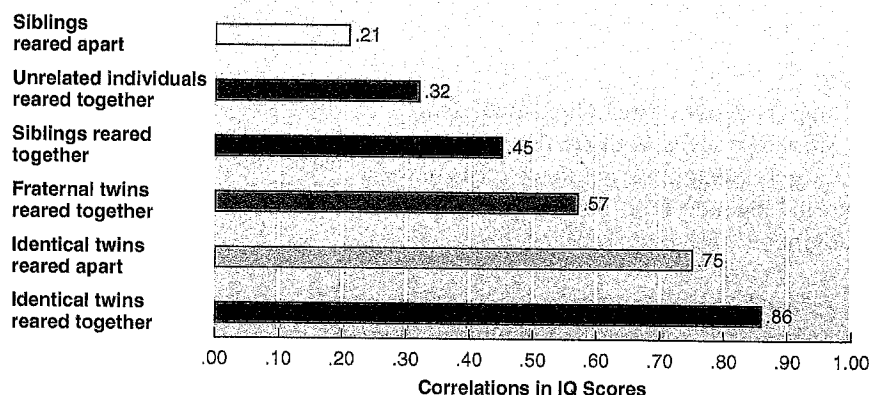
Genetic and Environmental Influences on Intelligence

Similarities in intelligence between family members are due to a combination of hereditary (shared genetic material) and environmental factors (similar living arrangements and experiences). Researchers who are interested in the role of heredity in intelligence often focus on identical (monozygotic) twins because they share 100% of their genetic material, as shown in Figure 8.16.

Why are some people intellectually gifted, whereas others struggle? As identical twin studies demonstrate, genetics play an important role. In Figure 8.16, note the

FIGURE 8.16 GENETIC AND ENVIRONMENTAL INFLUENCES ON IQ

Note the higher correlations between identical twins' IQ test scores compared to correlations between all other pairs. Genes no doubt play a significant role in intelligence, but these effects are difficult to separate from environmental influences. (Based on Bouchard & McGue, 1981; Bouchard et al., 1998; Molenaar et al., 2013).



PhotoDisc, Inc./Getty Images

Reliability The degree to which a test produces similar scores each time it is used; stability or consistency of the scores produced by an instrument.

Validity The degree to which a test measures what it is intended to measure.

by giving the test to a representative sample of people (a diverse group of people who resemble those for whom the test is intended). Second, testing procedures must be standardized. All test takers must be given the same instructions, questions, and time limits, and all test administrators must follow the same objective score standards.

- **Reliability** is usually determined by retesting subjects to see whether their test scores change significantly (Geisinger, 2013; Gregory, 2011). Retesting can be done via the *test-retest method*, in which participants' scores on two separate administrations of the same test are compared, or via the *split-half method*, which splits a test into two equivalent parts (such as odd and even questions) and determines the degree of similarity between the two halves.
- **Validity** is the ability of a test to measure what it is designed to measure. The most important type of validity is *criterion-related validity*, or the accuracy with which test scores can be used to predict another variable of interest (known as the criterion). Criterion-related validity is expressed as the *correlation* (Chapter 1) between the test score and the criterion. If two variables are highly correlated, then one can be used to predict the other. Thus, if a test is valid, its scores will be useful in predicting an individual's behavior in some other specified situation. One example is using intelligence test scores to predict grades in college.



Voices from the Classroom

The Value of IQ Testing Intelligence tests, given under the appropriate circumstances, can be very valuable. If a student is struggling in school and the reasons are not obvious, an intelligence test can offer insight into that student's struggle. If the test results indicate a learning disability, such as dyslexia, then that student has a right to accommodations in school, which can ultimately help that student succeed.

Another example of the usefulness of intelligence tests is a personal one. My youngest son has significant facial paralysis and speech articulation difficulties due to a rare genetic condition. His school thought it best to place him in a special education classroom. I vehemently disagreed and had a psychologist test his intellectual level. When the results came back that his intelligence was completely normal, the school had no choice but to place him in a general education classroom, right where I knew he belonged all along!

Professor Paulina Multhaupt
Macomb Community College
Clinton Township, Michigan

Can you see why a test that is standardized and reliable but not valid is worthless? For example, a test for skin sensitivity may be easy to standardize (the instructions specify exactly how to apply the test agent), and it may be reliable (similar results are obtained on each retest). But it certainly would not be valid for predicting college grades.

Extremes in Intelligence

One of the best methods for judging the validity of a test is to compare people who score at the extremes. Despite the uncertainties discussed in the previous section, intelligence tests provide one of the major criteria for assessing mental ability at the extremes—specifically, for diagnosing *intellectual disability* and *mental giftedness*.

The clinical label *intellectually disabled* (previously referred to as *mentally retarded*) is applied when someone has significant deficits in general mental abilities, such as reasoning, problem solving, and academic learning. And these deficits result in impairments of adaptive functioning including communication, social participation, and personal independence (American Psychiatric Association, 2013).

Fewer than 3% of people are classified as having an intellectual disability (Table 8.6). Of this group, 85% have only mild intellectual disability, and many become self-supporting, integrated members of society. Furthermore, people can score low on some measures of intelligence and still be average or even gifted in others (Armstrong et al., 2013; Kreger Silverman, 2013; Meyer, 2011; Olson, 2010). The most dramatic examples are people with **savant syndrome**. People with savant syndrome generally score very low on IQ tests (usually between 40 and 70), yet they demonstrate exceptional skills or brilliance in specific areas, such as rapid calculation, art, memory, or musical ability (Figure 8.14).

Some forms of intellectual disability stem from genetic abnormalities, such as Down syndrome, fragile-X syndrome, and phenylketonuria (PKU). Other causes are environmental, including prenatal exposure to alcohol and other drugs, extreme

Savant syndrome A condition in which a person with generally limited mental abilities exhibits exceptional skill or brilliance in a specific area.

FIGURE 8.11 HOW DO WE DEVELOP EMOTIONAL INTELLIGENCE?

The mother in this photo appears to be empathizing with her young daughter and helping her to recognize and manage her own emotions. According to Goleman, this type of modeling and instruction is vital to the development of emotional intelligence.



Digital Vision/Getty Images



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Should We Teach EI in Schools? Popular accounts such as Goleman's have suggested that traditional measures of human intelligence ignore a crucial range of abilities that characterize people who excel in real life: self-awareness, impulse control, persistence, zeal and self-motivation, empathy, and social deftness. Goleman also proposes that many societal problems, such as domestic abuse and youth violence, can be attributed to low EI. Therefore, he argues, EI should be fostered and taught to everyone. In line with this belief, researchers in one study found that elementary schools in which emotional intelligence is taught show higher levels of warmth between students and teachers, more leadership among students, and teachers with a greater focus on students' interests and motivations (Rivers et al., 2012).

Critics fear that a handy term like EI invites misuse, but their strongest reaction is to Goleman's proposals for teaching EI. For example, Paul McHugh, director of psychiatry at Johns Hopkins University, suggests that Goleman is "presuming that someone has the key to the right emotions to be taught to children. We don't even know the right emotions to be taught to adults" (cited in Gibbs, 1995, p. 68).

Measuring Intelligence

Different IQ tests approach the measurement of intelligence from different perspectives. However, most are designed to predict grades in school. Let's look at the most commonly used IQ tests.

The *Stanford-Binet Intelligence Scale* is loosely based on the first IQ tests developed in France around the turn of the twentieth century by Alfred Binet. In the United States, Lewis Terman (1916) developed the Stanford-Binet (at Stanford University) to test the intellectual ability of U.S.-born children ages 3 to 16. The test is revised periodically—most recently in 2003. The test is administered individually and consists of such tasks as copying geometric designs, identifying similarities, and repeating number sequences.

In the original version of the Stanford-Binet, results were expressed in terms of a mental age. For example, if a 7-year-old's score equaled that of an average 8-year-old, the child was considered to have a mental age of 8. To determine the child's

General intelligence (g) Spearman's term for overall, general intellectual ability.

Fluid intelligence (gf) The ability to think speedily and abstractly, and to solve novel problems; gf tends to decrease over the life span.

Crystallized intelligence (gc) Knowledge and skills gained through experience and education; gc tends to increase over the life span.

Emotional intelligence (EI) The ability to perceive, appraise, express, and regulate emotions accurately and appropriately.

(1923) thus proposed that intelligence is a single factor, which he termed **general intelligence (g)**. He believed that *g* underlies all intellectual behavior, including reasoning, solving problems, and performing well in all areas of cognition. Spearman's work laid the foundations for today's standardized intelligence tests (Matlin, 2013; Wright, 2011).

About a decade later, L. L. Thurstone (1938) proposed 7 primary mental abilities: verbal comprehension, word fluency, numerical fluency, spatial visualization, associative memory, perceptual speed, and reasoning. J. P. Guilford (1967) later expanded this number, proposing that as many as 120 factors are involved in the structure of intelligence.

Around the same time, Raymond Cattell (1963, 1971) reanalyzed Thurstone's data and argued against the idea of multiple intelligences. He believed that two subtypes of *g* exist:

- **Fluid intelligence (gf)** refers to the ability to think speedily and abstractly, and to solve novel problems. Fluid intelligence is relatively independent of education and experience, and like most biological capacities, it declines with age (Jost et al., 2011; Murray et al., 2011; Rozencajg et al., 2005).
- **Crystallized intelligence (gc)** refers to the store of knowledge and skills gained through experience and education (Hunt, 2011; Sternberg, 2013). Crystallized intelligence tends to increase over the life span.

Today there is considerable support for the concept of *g* as a measure of academic smarts. However, many contemporary cognitive theorists believe that intelligence is not a single general factor, but a collection of many, separate, specific abilities.

One of these cognitive theorists, Howard Gardner, believes that people have many kinds of intelligences. The fact that brain-damaged patients often lose some intellectual abilities while retaining others suggests to Gardner that different intelligences are located in discrete areas throughout the brain. According to *Gardner's theory of multiple intelligences* (1983, 1999, 2008, 2011), people have different profiles of intelligence because they are stronger in some areas than others (**Table 8.4**). They also use their intelligences differently to learn new material, perform tasks, and solve problems.

Robert Sternberg's *triarchic theory of successful intelligence* also assumes multiple abilities. As shown in **Table 8.5**, Sternberg theorized that three separate, learned aspects of intelligence exist: (1) *analytic*, (2) *creative*, and (3) *practical* (Sternberg, 1985, 2007, 2012).

Sternberg (1985, 1999, 2013) emphasizes the process underlying thinking rather than just the product. He also stresses the importance of applying mental abilities to real-world situations rather than testing mental abilities in isolation. In short, Sternberg avoids the traditional idea of intelligence as an innate form of "book smarts" and instead emphasizes successful intelligence as the learned ability to adapt to, shape, and select environments in order to accomplish personal and societal goals.

Finally, in addition to the multiple intelligences proposed by Gardner and Sternberg, Daniel Goleman's research (1995, 2000, 2008) and best-selling books have popularized the concept of **emotional intelligence (EI)**, based on original work by Peter Salovey and John Mayer (1990).



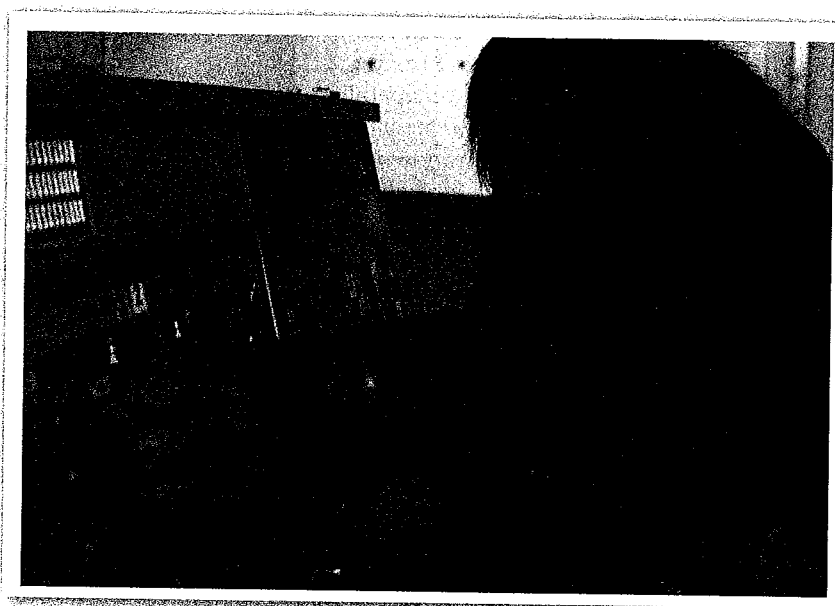
Voices from the Classroom

Multiple Intelligences and Being "Word Smart" When discussing Gardner's multiple intelligences to identify our strengths and weaknesses, I remind students of the 2012 Olympics winner Gabby Douglas's physical genius as she flies through the air or Louis Sullivan's spatial wizardry in his architectural skyscrapers in Chicago. Then I share my personal example. I am "word" smart, which served me well in earning a doctoral degree. But I never got the basketball in the hoop, never hit the softball with the bat, and even today, quickly move when I see a Ping Pong ball headed my way. Yes, I'm kinesthetically challenged. Gardner's theory is a beneficial tool for recognizing our strengths and weaknesses.

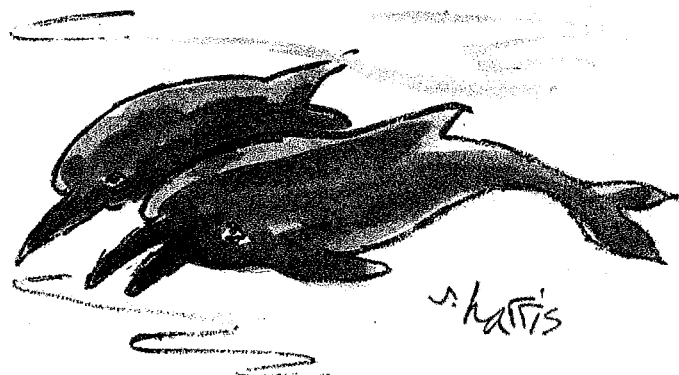
Professor Carmon Weaver Hicks
Ivy Tech Community College
Madison, Indiana

FIGURE 8.10 COMPUTER-AIDED COMMUNICATION

Apes lack the necessary anatomical structures to vocalize the way humans do. For this reason, language research with chimps and gorillas has focused on teaching the animals to use sign language or to “speak” by pointing to symbols on a keyboard. Do you think this amounts to using language the same way humans do?



Michael Nichols/NG Image Collection



"ALTHOUGH HUMANS MAKE SOUNDS WITH THEIR MOUTHS AND OCCASIONALLY LOOK AT EACH OTHER, THERE IS NO SOLID EVIDENCE THAT THEY ACTUALLY COMMUNICATE WITH EACH OTHER."

Sidney Harris/ScienceCartoonPlus.com

In another well-known study, a chimp named Lana learned to use symbols on a computer to get things she wanted, such as food, a drink, and a tickle from her trainers, and to have her curtains opened (Rumbaugh et al., 1974). See **Figure 8.10**.

Dolphins also are often the subject of interesting language research (May-Collado, 2010). Communication with dolphins is done by means of hand signals or audible commands transmitted through an underwater speaker system. In one typical study, trainers gave dolphins commands made up of two- to five-word sentences, such as “Big ball—square—return,” which meant that they should go get the big ball, put it in the floating square, and return to the trainer (Herman et al., 1984). By varying the syntax (for example, the order of the words) and specific content of the commands, the researchers showed that dolphins are sensitive to these aspects of language.

Psychologists disagree about how to interpret the findings on apes and dolphins. Most believe that nonhuman animals communicate but that their ideas are severely limited. For example, some critics claim that apes and dolphins are unable to convey subtle meanings, use language creatively, or communicate at an abstract level (Jackendoff, 2003; Siegala & Varley, 2008).

Others propose that these animals do not truly understand language but are simply operantly conditioned (Chapter 6) to imitate symbols to receive rewards (Savage-Rumbaugh, 1990; Terrace, 1979). Finally, still others suggest that data regarding animal language has not always been well documented (Font & Carazo, 2010; Willingham, 2001; Wynne, 2007).

Proponents of animal language respond that apes can use language creatively and have even coined some words of their own. For example, Koko signed “finger bracelet” to describe a ring and “eye hat” to describe a mask (Patterson & Linden, 1981). Proponents also argue that, as demonstrated by the dolphin studies, animals can be taught to understand basic rules of sentence structure.

Still, the gap between human and nonhuman animals’ language is considerable. Current evidence suggests that, at best, nonhuman animal language is less complex and less creative, and has fewer rules than any language used by humans.

FIGURE 8.8 CAN YOU IDENTIFY THIS EMOTION?

Infants as young as 2.5 months can nonverbally express emotions, such as joy, surprise, or anger.



Myrleen Ferguson Cafe/PhotoEdit

Cooing The vowel-like sounds infants produce beginning around 2 to 3 months of age.

Babbling The vowel/consonant combinations that infants begin to produce at about 4 to 6 months of age.

Overextension The overly broad use of a word to include objects that do not fit the word's meaning (for example, calling all men "Daddy").

Telegraphic speech The two- or three-word sentences of young children that contain only the most necessary words.

Overgeneralization The grammatical error of applying the basic rules of grammar even to cases that are exceptions to the rule (for example, saying "mans" instead of "men"); also known as overregularization.

Language Development

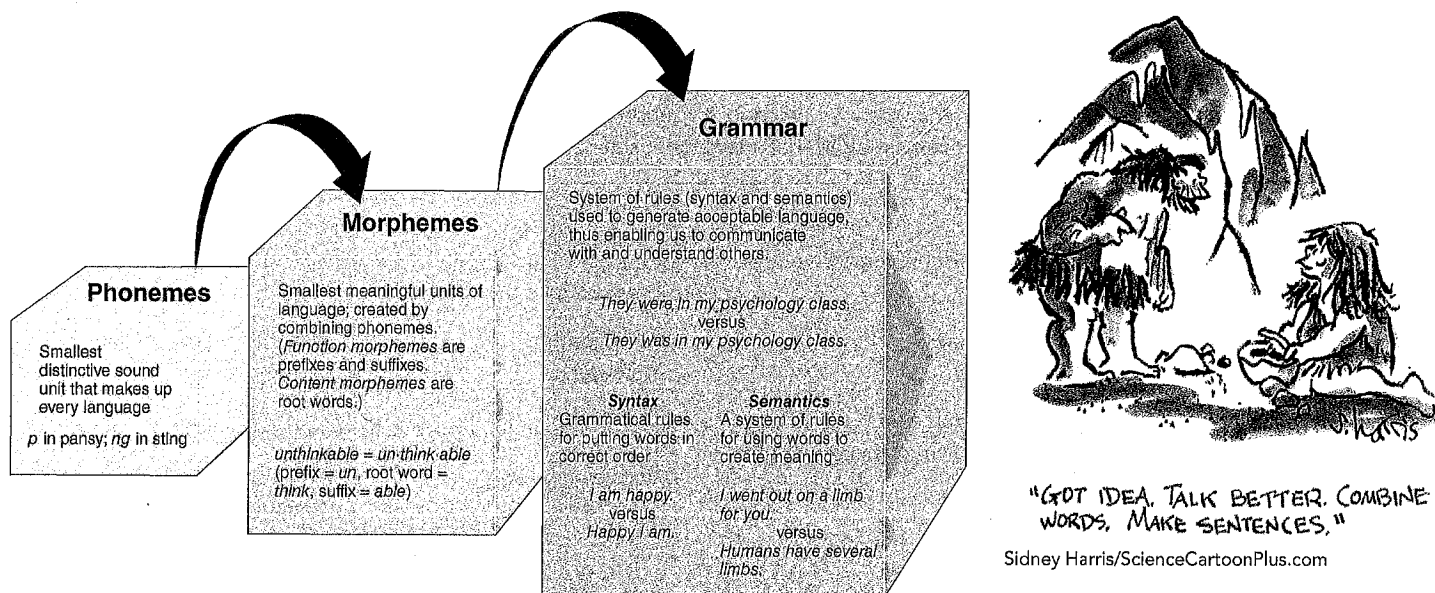
From birth, a child communicates through facial expressions, eye contact, and body gestures (Figure 8.8). Babies only hours old begin to "teach" their caregivers when and how they want to be held, fed, and played with. Babies even start to learn language before they are born. For example, researchers in one study played sounds from two different languages—English and Swedish—for babies at hospitals in both the United States and Sweden shortly after birth (Moon et al., 2012). These babies were given special pacifiers that were hooked up to a computer, and the more times they sucked on the pacifier, the more times they heard the vowels. Half the babies heard sounds from the language they'd been exposed to in utero, whereas the others heard vowels from a different language. In both countries, the babies who heard the foreign vowels sucked more frequently than those who heard sounds from their native language, suggesting that babies have already become familiar—through listening to their mother's voice—with the sounds in their native language and are now more interested in hearing novel sounds!

Eventually, children also communicate verbally, progressing through several distinct stages of language acquisition. These stages are summarized in Table 8.3. By age 5, most children have mastered basic grammar and typically use about 2,000 words (a level of mastery considered adequate for getting by in any given culture). Past

TABLE 8.3 LANGUAGE ACQUISITION

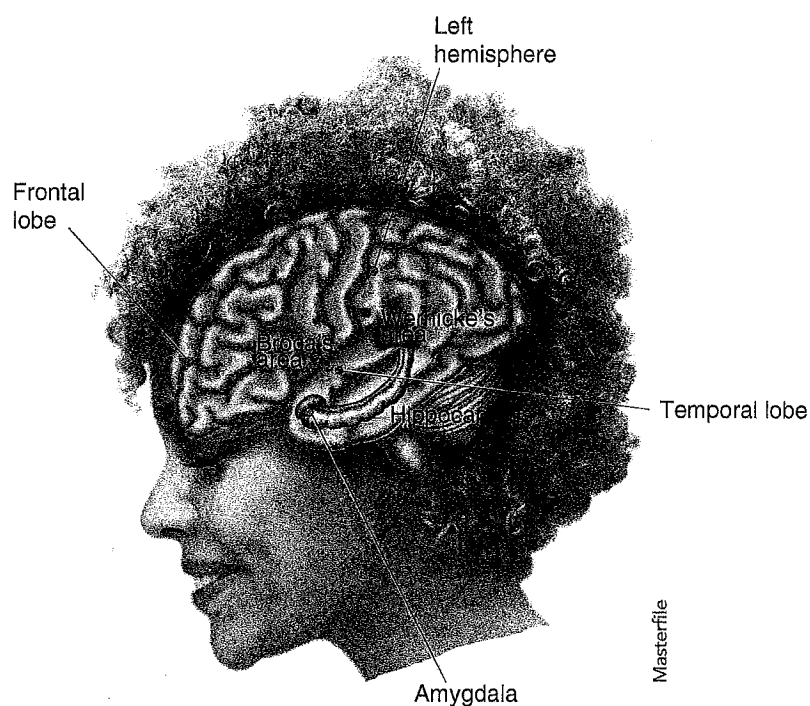
Birth to 12 months	
FEATURES	EXAMPLES
Crying (reflexive in newborns) becomes more purposeful	hunger cry, anger cry, and pain cry
Cooing (vowel-like sounds) at 2–3 months	"ooooh," "aaaah"
Babbling (consonants added) at 4–6 months	"bahbahbah," "dahdahdah"
12 months to 2 years	
FEATURES	EXAMPLES
Babbling resembles language of the environment, and child understands sounds relate to meaning	"Mama," "Da Da"
Speech consists of one-word utterances	"Juice," "Up"
Expressive ability more than doubles once words are joined into short phrases	"Daddy milk," "no night-night!"
Overextension (using words to include objects that do not fit the word's meaning)	all men = "Daddy" all furry animals = "doggy"
2 years to 5 years	
FEATURES	EXAMPLES
Telegraphic speech (like telegrams, omits nonessential connecting words)	"Me want cookie" "Grandma go bye-bye?"
Vocabulary increases at a phenomenal rate	
Child acquires a wide variety of grammar rules	adding -ed for past tense, adding s to form plurals
Overgeneralization (applying basic rules of grammar even to cases that are exceptions to the rule)	"I goed to the zoo" "Two mans"

FIGURE 8.5 BUILDING BLOCKS OF LANGUAGE



throughout our brain (Figure 8.6). For example, the amygdala is active when we engage in a special type of language—cursing or swearing. Why? Recall from Chapter 2 that the amygdala is linked to emotions, especially fear and rage. So it's logical that the brain regions activated by swearing or hearing swear words would be the same as those for fear and aggression. As shown in Figure 8.6, other parts of the brain are also involved in language, including *Broca's area* (which is responsible for speech generation) and *Wernicke's area* (which controls language comprehension). Keep in mind that several additional areas, not shown on this figure, of the brain also are activated during different types of language generation and listening.

FIGURE 8.6 LANGUAGE AND THE BRAIN



Divergent thinking An aspect of creativity characterized by an ability to produce unusual but appropriate alternatives from a single starting point.

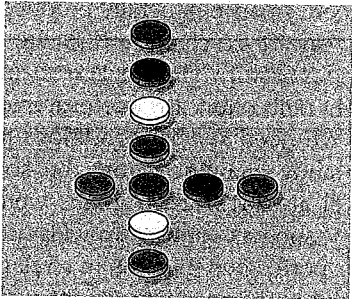
How do we measure creativity? Most tests focus on **divergent thinking**, a type of thinking in which we develop many possibilities from a single starting point (Baer, 1994, 2013). In contrast to *convergent thinking*, in which we work to solve a specific problem, divergent thinking is open-ended and focused on generating unusual, novel solutions. For example, when assigned a research paper, many students have trouble coming up with something on their own. They're thinking "inside the box" when they focus on the specific problem of completing the assignment in a way that will please the professor. This is convergent thinking. Instead, most professors want to develop creative, divergent thinking and encourage (force?) their students to dig deeper to come up with their own unique ideas.

Psychologists have developed several methods to test for divergent thinking. For example, the Unusual Uses Test requires you to think of as many uses as possible for an object, such as a brick. In the Anagrams Test, you're asked to reorder the letters in a word to make as many new words as possible. To test your overall creativity, try the activities in *Are You Creative?*

TEST YOURSELF: ARE YOU CREATIVE?

psychology and you

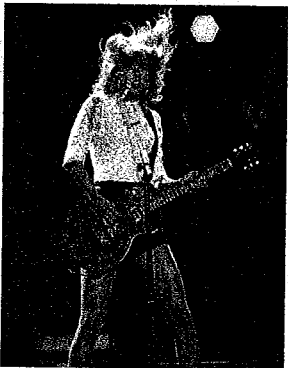
- Find 10 coins and arrange them in the configuration shown here. By moving only 2 coins, form two rows that each contain 6 coins. The solution is at the end of the chapter.
- In five minutes, see how many words you can make using the letters in the word *hippopotamus*.
- In five minutes, list all the things you can do with a paper clip.



How did you do? If you'd like help increasing your score, research suggests that creativity requires the coming together of six interrelated resources, as shown in **Table 8.2**. You can study this list and then strengthen yourself in the areas in which you need improvement.

TABLE 8.2 RESOURCES OF CREATIVE PEOPLE

Intellectual ability	Enough intelligence to see problems in a new light
Knowledge	Sufficient basic knowledge of the problem to effectively evaluate possible solutions
Thinking style	Novel ideas and ability to distinguish between the worthy and worthless
Personality	Willingness to grow and change, take risks, and work to overcome obstacles
Motivation	Sufficient motivation to accomplish the task and more internal than external motivation
Environment	An environment that supports creativity



Kevin Mazur/TAS/Getty Images

Which resources best explain Taylor Swift's phenomenal success?

Sources: Mieg, 2011; Sternberg, 2010; Sternberg & Lubart, 1996.



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realworldpsychology Sports Fans and Superstitious Beliefs

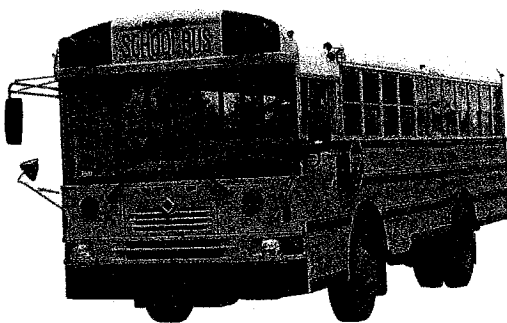
Have you heard of the *Sports Illustrated* magazine's "cover jinx"? The belief is that once a team or person appears on the cover of this magazine, something bad will soon befall them. For example, on November 20, 2012, the previously winning Notre Dame football team was on the cover and then lost 42–14 to Alabama in the National Championship Game on January 7, 2013. Can you see how people who believe in the "jinx" might tend to look for examples to support it but fail to see examples that don't? For example, the New York Yankees and Michael Jordan have had the most covers by a team and individual, respectively; and their exceptional winning histories were anything but "jinxed."

On a similar note, researchers in one study asked participants to compare two handwriting samples for a supposed note written by a bank robber and handed to a bank teller. Participants were told that one handwriting sample was from the supposed bank robber, whereas the other sample was supposedly from a suspect who had been arrested for committing the crime (Kukucka & Kassir, 2012). Participants who were also informed that the suspect had already confessed to the crime judged his handwriting sample as more similar than participants who were not given this additional information.

Just as some people used their superstitious beliefs in the *Sports Illustrated* "cover jinx," these research participants used the suspect's supposed confession to search for confirming evidence. However, while sports fans' misplaced beliefs are relatively unimportant, this research suggests the confirmation bias may have serious repercussions in actual legal judgments.

Another barrier to problem solving sometimes results from our improper use of heuristics (see again Figure 8.2). For example, when we use the **availability heuristic**, we take a mental shortcut and judge something based on the information that is readily available in our memories. In other words, we give greater credence to information and examples that readily spring to mind (Fortune & Goodie, 2012; Kahneman & Tversky, 1973; Miller et al., 2012; Tversky & Kahneman, 1974, 1993).

Availability heuristic A cognitive strategy (or shortcut) that involves making judgments based on information that is readily available in our memory.



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psychology and you The Pros and Cons of Heuristics

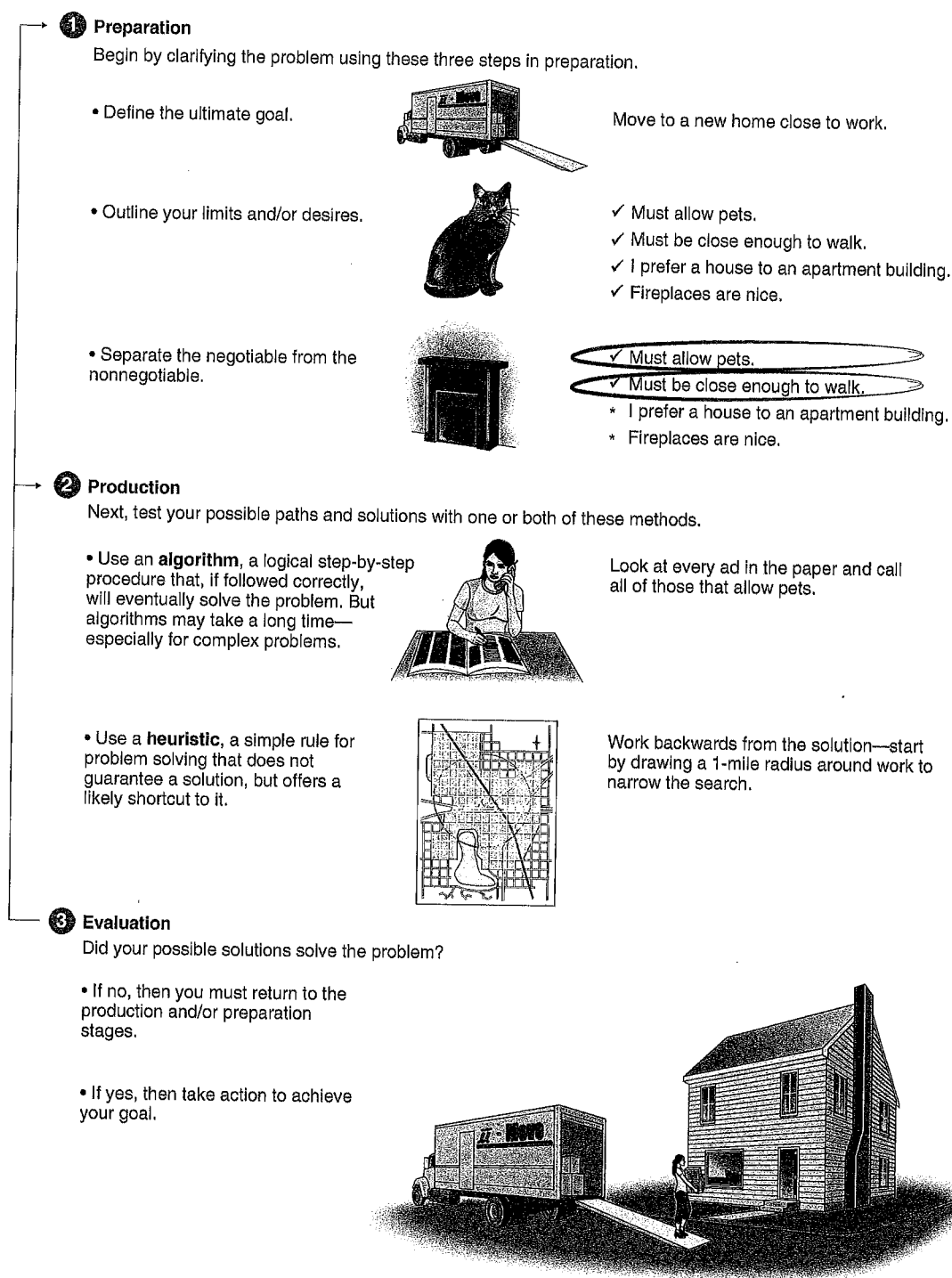
Thankfully, the availability heuristic as a mental shortcut is often appropriate and helpful. If you note that your professor consistently lowers points on assignments that are turned in late, you'll be more likely to turn in your paper on time. However, when a rare event makes a vivid impression on us, we sometimes erroneously overestimate its likelihood. For example, horrific images of plane crashes easily come to mind, and we tend to think such crashes are more common than they actually are. Similarly, if you easily recall images of your grandfather smoking cigarettes his entire life and living to be 100, you may fail to recognize the uniqueness of this one personal example. More importantly, you may ignore or distort the larger and factually based serious dangers of smoking. In addition, sensationalistic media coverage of rare instances of children being kidnapped while walking to school, or occasional bullying on a school bus, may create an erroneous availability heuristic, and parents may needlessly drive their children to and from school.

Representativeness heuristic A cognitive strategy (or shortcut) that involves making judgments based on how well an object or event matches (represents) an existing prototype in our minds.

Like the availability heuristic, the **representativeness heuristic** both helps and hinders good decision making. Using this heuristic, we estimate the probability of an event based on how well an individual or event matches (or *represents*) an existing prototype in our minds (Fisk et al., 2006; Pachur et al., 2013; Read & Grushka-Cockayne, 2011). When we see a dark, cloudy sky, we decide to carry an umbrella because these circumstances match our mind's prototype of "signs of impending rain." In this case, the umbrella decision is likely correct.

FIGURE 8.2 THREE STEPS TO THE GOAL

There are three stages of problem solving that help you attain a goal, such as moving to a new home.



Algorithm A logical, step-by-step procedure that, if followed correctly, will always eventually solve the problem.

Heuristic A cognitive strategy, or “rule of thumb,” often used as a shortcut for problem solving; does not guarantee a solution to a problem but does narrow the alternatives.

hypotheses, by using *algorithms* and *heuristics*. **Algorithms**, as problem-solving strategies, are guaranteed to lead to an eventual solution. But they are not practical in many situations. **Heuristics**, or simplified rules based on experience, are much faster but do not guarantee a solution. Finally, during the evaluation stage we judge the hypotheses generated during the production stage against the criteria established in the preparation stage.

In addition, we also sometimes solve problems with a sudden flash of *insight*, like Köhler’s chimps that stacked boxes to reach the bananas (Chapter 6). On other occasions, we may mentally set our problem aside for a while, in an *incubation period*, and then find that the solution comes to mind without further conscious thought.

chapteroverview

Intellectual growth should commence at birth and cease only at death.

—Albert Einstein

You've undoubtedly heard of Albert Einstein, the German-born physicist who developed the theory of relativity and the well-known equation $E = mc^2$, which foreshadowed the development of nuclear power. But did you know that, as a young child Einstein, spoke so rarely and slowly that his parents feared that something was seriously wrong with him? Their concerns were obviously unfounded. Einstein is considered to be a true genius—one of the smartest people of all time—and we now know that many brilliant people were “late talkers” in childhood.

In this chapter, we focus on thinking, language, and intelligence—each of which was central to Einstein's achievements. These topics are also key to understanding how we think about, describe, and successfully navigate the world around us. We begin with the first topic—*thinking*.

THINKING

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** the roles of mental images and concepts in thinking.
- 2 DESCRIBE** the three stages of problem solving.
- 3 IDENTIFY** the barriers to problem solving.
- 4 EXPLAIN** the characteristics associated with creativity.

Cognition The mental activities involved in acquiring, storing, retrieving, and using knowledge.

If you go on to major in psychology, you'll discover that researchers often group thinking, language, and intelligence under the larger umbrella of **cognition**, the mental activities of acquiring, storing, retrieving, and using knowledge. And, technically, we discuss cognition throughout this text (for example, chapters on sensation and perception, consciousness, learning, and memory). However, in this section we limit our discussion to *thinking*—what it is and where it's located.

Every time we take in information and mentally act on it, we're thinking. These thought processes are both localized and distributed throughout our brains in networks of neurons. For example, during problem solving or decision making, our brains are most active in the *prefrontal cortex*. This region associates complex ideas; makes plans; forms, initiates, and allocates attention; and supports multitasking. In addition to the localization of thinking processes, the prefrontal cortex also links to other areas of the brain, such as the limbic system (Chapter 2), to synthesize information from several senses (Anderson et al., 2011; Collins & Adams, 2013). Now that we know where thinking occurs, we need to discuss its basic components.

Cognitive Building Blocks

Imagine yourself lying, relaxed, in the warm, gritty sand on an ocean beach. Do you see palms swaying in the wind? Can you smell the salty sea and taste the dried salt on your lips? Can you hear children playing in the surf? What you've just created is a **mental image**, a mental representation of a previously stored sensory experience, which includes visual, auditory, olfactory, tactile, motor, and gustatory imagery (McKellar, 1972). We all have a mental space where we visualize and manipulate our sensory images (Borst et al., 2011; Ganis & Schendan, 2013; Weisberg & Reeves, 2013; Zvyagintsev et al., 2013).

In addition to mental images, our thinking also includes forming **concepts**, or mental representations of a group or category (Goldstone et al., 2013; Jern & Kemp, 2013). Concepts can be concrete (like car and concert) or abstract (like intelligence and beauty). They are essential to thinking and communication because they simplify and organize information. Normally, when you see a new object or encounter a new situation, you relate it to your existing conceptual structure and categorize it according to where it fits. For example, if you see a metal box with four wheels driving on

Mental image The mental representation of a previously stored sensory experience, including visual, auditory, olfactory, tactile, motor, or gustatory imagery (for example, visualizing a train and hearing its horn).

Concept The mental representation of a group or category.

- Six factors that contribute to forgetting are the **misinformation effect**, the **serial-position effect** (primacy and recency effects), **source amnesia**, the **sleeper effect**, spacing of practice as in **distributed** versus **massed practice**, and culture.

3 BIOLOGICAL BASES OF MEMORY 194

- Learning modifies the brain's neural networks through **long-term potentiation (LTP)**, strengthening particular synapses and affecting the ability of neurons to release their neurotransmitters.
- Stress hormones affect the amygdala, which stimulates brain areas that are important for memory storage. Heightened arousal from these hormones also can increase the encoding and storage of new information and the formation of **flashbulb memories (FBMs)**.
- Research using advanced techniques, such as fMRI, has indicated that several brain regions are involved in memory storage.

- Two major types of amnesia are **retrograde** and **anterograde amnesia**. Traumatic brain injuries and disease, such as **Alzheimer's disease (AD)**, can cause memory loss.

4 MEMORY DISTORTIONS 199

- People shape, rearrange, and distort memories in order to create logic, consistency, and efficiency. Despite all their problems and biases, our memories are normally fairly accurate and usually serve us well.
- When memory errors occur in the context of the criminal justice system, they can have serious legal and social consequences. Problems with eyewitness recollections are well established. Judges often allow expert testimony on the unreliability of eyewitnesses.
- False memories are well-established phenomenon, which are relatively common and easy to create. However, memory *repression* (especially of childhood sexual abuse) is a complex and controversial topic.

◎ 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 Many people think they can perfectly recall elaborate memories about how they felt or what they said when they first learned about devastating events, like the Boston Marathon bombings. What do you recall about this particular event? Do your memories fit with what flashbulb memory (FBM) research suggests?
- 2 Despite documented errors with FBMs, most people are very confident in their personal accuracy. What problems might result from this overconfidence?
- 3 Human memory is often compared to the workings of a computer. Based on your own experience, what are the advantages and limits of this comparison?
- 4 Amnesia is a common theme for Hollywood movies and television. How might these portrayals, which are often inaccurate, negatively influence the public's perception?
- 5 What memory improvement techniques described in this chapter have you found to be helpful in your everyday life? What new strategies do you plan to try?



Boston Globe/Getty Images

Key Terms

RETRIEVAL PRACTICE Write a definition for each term before turning back to the referenced page to check your answer.

- | | | |
|--|--------------------------------------|--|
| • Alzheimer's disease (AD) 198 | • flashbulb memory (FBM) 195 | • retroactive interference 189 |
| • anterograde amnesia 197 | • implicit/nondeclarative memory 184 | • retrograde amnesia 197 |
| • chunking 182 | • long-term memory (LTM) 184 | • semantic memory 184 |
| • consolidation 197 | • long-term potentiation (LTP) 194 | • sensory memory 182 |
| • constructive process 180 | • maintenance rehearsal 183 | • serial-position effect 192 |
| • distributed practice 192 | • massed practice 192 | • short-term memory (STM) 182 |
| • elaborative rehearsal 185 | • memory 180 | • sleeper effect 192 |
| • encoding 180 | • misinformation effect 191 | • source amnesia 192 |
| • encoding-specificity principle 187 | • mnemonic 185 | • storage 180 |
| • encoding, storage, and retrieval (ESR) model 180 | • priming 185 | • three-stage memory model 181 |
| • episodic memory 184 | • proactive interference 190 | • tip-of-the-tongue (TOT) phenomenon 191 |
| • explicit/declarative memory 184 | • retrieval 181 | • working memory 183 |
| | • retrieval cue 187 | |