
MODULE 33 Basic Motivational Concepts
MODULE 34 Hunger
MODULE 35 Sexual Motivation
MODULE 36 Affiliation and Achievement
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What Drives Us: Hunger, Sex, Friendship, and Achievement

How well I [DM] remember the response to my first discussion question in a new introductory psychology class. Several hands rose, along with one left foot. The foot belonged to Chris Klein, who was the unlikeliest person to have made it to that class. At birth, Chris suffered oxygen deprivation that required 40 minutes of CPR. "One doctor wanted to let him go," recalls his mother.

The result was severe cerebral palsy. With damage to the brain area that controls muscle movement, Chris is unable to control his constantly moving hands (on which he wears protective padded gloves). He cannot feed, dress, or care for himself. And he cannot speak. But what Chris does have is a keen mind and a mobile left foot. With that blessed foot he controls the joystick on his motorized wheelchair. Using his big toe, he can type sentences, which his communication system can store, e-mail, or speak. And Chris has motivation, lots of motivation.

When Chris was a high school student in suburban Chicago, three teachers doubted he would be able to leave home for college. Yet he persisted, and, with lots of support, he ventured out to my college called Hope. Five years later, as his left foot drove him across the stage to receive his diploma, his admiring classmates honored his achievement with a spontaneous standing ovation.

Today, Chris is an inspirational speaker for schools, churches, and community events, giving "a voice to those that have none, and a helping hand to those with disabilities." He is president of the United States Society of Augmentative Alternative Communication. He is writing a book, *Lessons from the Big Toe*. And he has found love and married.

Although few of us face Chris Klein's challenges, we all seek to direct our energy in ways that will produce satisfaction and success. We are pushed by biological motives, such as hunger and sex (Modules 34 and 35). And we are pulled by social motives, such as affiliation and achievement (Module 36). Chris Klein's brute will to live, learn, and love highlight the essence of our own *motivations*, which energize and direct our lives.

Module 33 examines how psychologists have approached the study of motivation.

Katie Green/MLIVE.COM/Landov

A motivated man: Chris Klein To see and hear Chris presenting his story, visit tinyurl.com/ChrisPsychStudent.

MODULE 33 Basic Motivational Concepts

33-1 How do psychologists define *motivation?* From what perspectives do they view motivated behavior?

Psychologists define **motivation** as a need or desire that energizes and directs behavior. Our motivations arise from the interplay between nature (the bodily "push") and nurture (the "pulls" from our thought processes and culture). Consider four perspectives for viewing motivated behaviors:

- *Instinct theory* (now replaced by the *evolutionary perspective*) focuses on genetically predisposed behaviors.
- *Drive-reduction theory* focuses on how we respond to our inner pushes.
- *Arousal theory* focuses on finding the right level of stimulation.
- And Abraham Maslow's *hierarchy of needs* focuses on the priority of some needs over others.

Instincts and Evolutionary Psychology

Early in the twentieth century, as Charles Darwin's influence grew, it became fashionable to classify all sorts of behaviors as instincts. If people criticized themselves, it was because of their "self-abasement instinct." If they boasted, it reflected their "self-assertion instinct." After scanning 500 books, one sociologist compiled a list of 5759 supposed human instincts! Before long, this instinct-naming fad collapsed under its own weight. Rather than *explaining* human behaviors, the early instinct theorists were simply *naming* them. It was like "explaining" a bright child's low grades by labeling the child an "underachiever." To name a behavior is *not* to explain it.

motivation a need or desire that energizes and directs behavior.

instinct a complex behavior that is rigidly patterned throughout a species and is unlearned.

To qualify as an **instinct,** a complex behavior must have a fixed pattern throughout a species and be unlearned (Tinbergen, 1951). Such behaviors are common in other species (think of imprinting in birds and the return of salmon to their birthplace). Some human behaviors, such as infants' innate reflexes for rooting and sucking, also exhibit unlearned fixed patterns, but many more are directed by both physiological needs and psychological wants.

Instinct theory failed to explain most human motives, but its underlying assumption continues in evolutionary psychology: Genes do predispose some species-typical behavior. Psychologists might apply this perspective, for example, to explain our human similarities, animals' biological predispositions, and the influence of evolution on our phobias, our helping behaviors, and our romantic attractions.

Annika Erickson/Blend Images/Getty Images

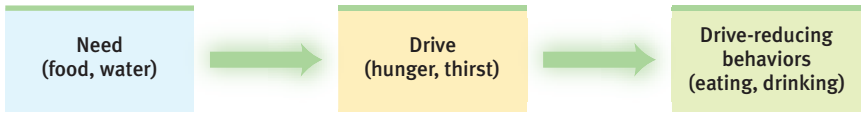
James Warwick/Science Source

Same motive, different wiring The more complex the nervous system, the more adaptable the organism. Both humans and weaverbirds satisfy their need for shelter in ways that reflect their inherited capacities. Human behavior is flexible; we can learn whatever skills we need to build a house. The bird's behavior pattern is fixed; it can build only this kind of nest.

Drives and Incentives

When the original instinct theory of motivation collapsed, it was replaced by **drive-reduction theory**—the idea that a physiological need (such as for food or water) creates an aroused state that drives the organism to reduce the need. With few exceptions, when a physiological need increases, so does a psychological *drive*—an aroused, motivated state.

The physiological aim of drive reduction is **homeostasis**—the maintenance of a steady internal state. An example of homeostasis (literally "staying the same") is the body's temperature-regulation system, which works like a room's thermostat. Both systems operate through feedback loops: Sensors feed room temperature to a control device. If the room's temperature cools, the control device switches on the furnace. Likewise, if our body's temperature cools, our blood vessels constrict to conserve warmth, and we feel driven to put on more clothes or seek a warmer environment (**FIGURE 33.1**).



▼ FIGURE 33.1
Drive-reduction theory Drive-reduction motivation arises from *homeostasis*—an organism's natural tendency to maintain a steady internal state. Thus, if we are water deprived, our thirst drives us to drink and to restore the body's normal state.

Not only are we *pushed* by our need to reduce drives, we also are *pulled* by **incentives**—positive or negative environmental stimuli that lure or repel us. This is one way our individual learning histories influence our motives. Depending on our learning, the aroma of good food, whether fresh roasted peanuts or toasted ants, can motivate our behavior. So can the sight of those we find attractive or threatening.

When there is both a need and an incentive, we feel strongly driven. The food-deprived person who smells pizza baking feels a strong hunger drive and the baking pizza becomes a compelling incentive. For each motive, we can therefore ask, "How is it pushed by our inborn physiological needs and pulled by incentives in the environment?"

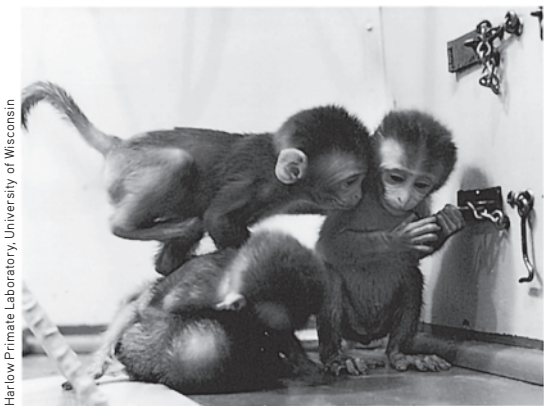
drive-reduction theory the idea that a physiological need creates an aroused tension state (a drive) that motivates an organism to satisfy the need.

homeostasis a tendency to maintain a balanced or constant internal state; the regulation of any aspect of body chemistry, such as blood glucose, around a particular level.

incentive a positive or negative environmental stimulus that motivates behavior.

Optimum Arousal

We are much more than homeostatic systems, however. Some motivated behaviors actually *increase* arousal. Well-fed animals will leave their shelter to explore and gain information, seemingly in the absence of any need-based drive. Curiosity drives monkeys to monkey around trying to figure out how to unlock a latch that opens nothing or how to open a window that allows them to see outside their room (Butler, 1954). It drives the 9-month-old infant to investigate every accessible corner of the house. It drives the scientists whose work this text discusses. And it drives explorers and adventurers such as George Mallory. Asked why he wanted to climb Mount Everest, the *New York Times* reported that Mallory answered, "Because it is there." Those who, like Mallory, enjoy


Harlow Primate Laboratory, University of Wisconsin


Glenn Swier

Driven by curiosity Young monkeys and children are fascinated by the unfamiliar. Their drive to explore maintains an optimum level of arousal and is one of several motives that do not fill any immediate physiological need.

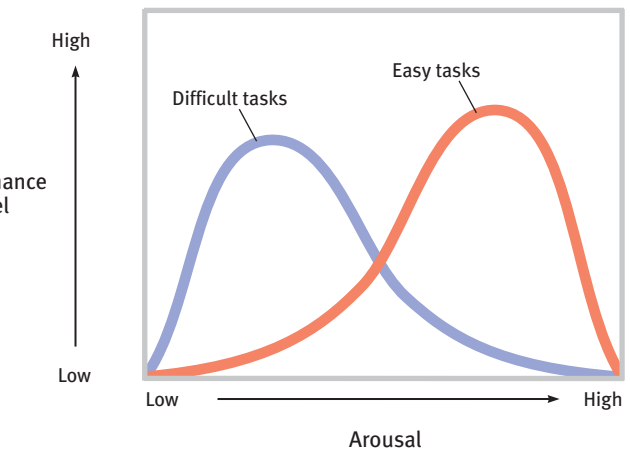
Yerkes-Dodson law the principle that performance increases with arousal only up to a point, beyond which performance decreases.

hierarchy of needs Maslow's pyramid of human needs, beginning at the base with physiological needs that must first be satisfied before higher-level safety needs and then psychological needs become active.

high arousal are most likely to seek out intense music, novel foods, and risky behaviors and careers (Roberti et al., 2004; Zuckerman, 1979, 2009). Although they have been called "sensation-seekers," many risk takers (such as mountaineers) also are motivated in other ways, such as by a drive to master their emotions and actions (Barlow et al., 2013).

So, human motivation aims not to eliminate arousal but to seek optimum levels of arousal. Having all our biological needs satisfied, we feel driven to experience stimulation and we hunger for information. Lacking stimulation, we feel bored and look for a way to increase arousal to some optimum level. However, with too much stimulation comes stress, and we then look for a way to decrease arousal.

Two early-twentieth-century psychologists studied the relationship of arousal to performance and identified the **Yerkes-Dodson law,** suggesting that moderate arousal would lead to optimal performance (Yerkes & Dodson, 1908). When taking an exam, for example, it pays to be moderately aroused—alert but not trembling with nervousness. Between depressed low arousal and anxious hyperarousal lies a flourishing life. But optimal arousal levels depend upon the task as well, with more difficult tasks requiring lower arousal for best performance (Hembree, 1988) (**FIGURE 33.2**). When anxious, it's better not to become further aroused with a caffeinated energy drink.



▼ FIGURE 33.2
Arousal and performance

RETRIEVAL PRACTICE

- Performance peaks at lower levels of arousal for difficult tasks, and at higher levels for easy or well-learned tasks. (1) How might this phenomenon affect runners? (2) How might this phenomenon affect anxious test-takers facing a difficult exam? (3) How might the performance of anxious students be affected by relaxation training?

ANSWER: (1) Runners tend to excel when aroused by competition. (2) High anxiety in test-takers may disrupt their performance. (3) Teaching anxious students how to relax before an exam can enable them to perform better (Hembree, 1988).

A Hierarchy of Motives

"Hunger is the most urgent form of poverty."

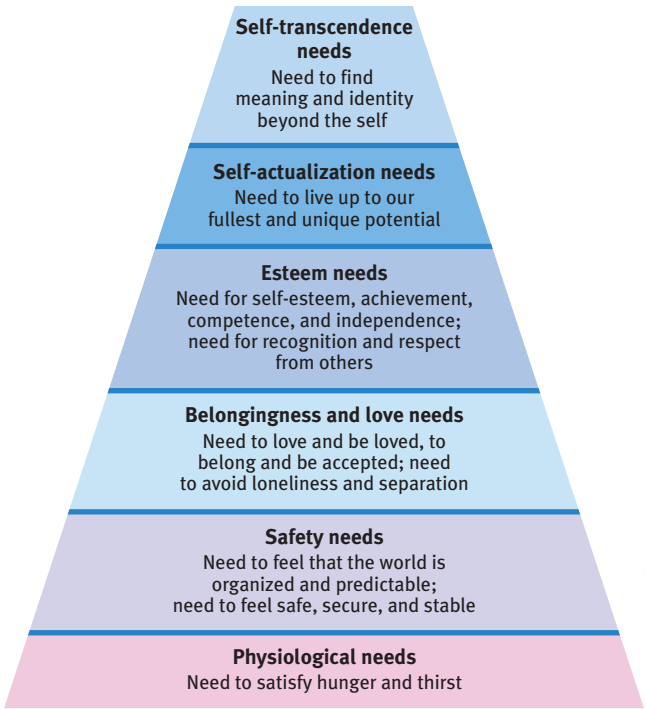
Alliance to End Hunger, 2002

Some needs take priority. At this moment, with your needs for air and water hopefully satisfied, other motives—such as your desire to achieve—are energizing and directing your behavior. Let your need for water go unsatisfied and your thirst will preoccupy you. Deprived of air, your thirst would disappear.

Small psychological world: Abraham Maslow was the first graduate student of the famed monkey attachment researcher, Harry Harlow. (Harlow, in turn, had been mentored at Stanford by the famed intelligence researcher, Lewis Terman.)

Abraham Maslow (1970) described these priorities as a **hierarchy of needs** (**FIGURE 33.3**). At the base of this pyramid are our physiological needs, such as those for food and water. Only if these needs are met are we prompted to meet our need for safety, and then to satisfy our human needs to give and receive love and to enjoy self-esteem. Beyond this, said Maslow (1971), lies the need to actualize one's full potential.

Near the end of his life, Maslow proposed that some people also reach a level of *self-transcendence*. At the self-actualization level, people seek to realize their own potential.



Lionsgate/Photofest © Lionsgate

▼ FIGURE 33.3
Maslow's hierarchy of needs Reduced to near-starvation by their rulers, inhabitants of Suzanne Collins' fictional nation, Panem, hunger for food and survival. *Hunger Games* heroine Katniss Everdeen expresses higher-level needs for actualization and transcendence, and in the process inspires the nation.

At the self-transcendence level, people strive for meaning, purpose, and communion that are transpersonal, beyond the self (Koltko-Rivera, 2006).

Maslow's hierarchy is somewhat arbitrary; the order of such needs is not universally fixed. People have starved themselves to make a political statement. Culture also matters: Self-esteem matters most in individualist nations, whose citizens tend to focus more on personal achievements than on family and community identity (Oishi et al., 1999). And, while agreeing with Maslow's basic levels of need, today's evolutionary psychologists note that gaining and retaining mates and parenting offspring are also universal human motives (Kenrick et al., 2010).

Nevertheless, the simple idea that some motives are more compelling than others provides a framework for thinking about motivation. Worldwide life-satisfaction surveys support this basic idea (Oishi et al., 1999; Tay & Diener, 2011). In poorer nations that lack easy access to money and the food and shelter it buys, financial satisfaction more strongly predicts feelings of well-being. In wealthy nations, where most are able to meet basic needs, home-life satisfaction is a better predictor.

Let's now consider four representative motives, beginning at the physiological level with hunger and working up through sexual motivation to the higher-level needs to belong and to achieve. At each level, we shall see how experience interacts with biology.

RETRIEVAL PRACTICE

- How do instinct theory, drive-reduction theory, and arousal theory contribute to our understanding of motivated behavior?

ANSWER: Instincts and evolutionary psychology help explain the genetic basis for our unlearned, species-typical behaviors. From drive-reduction theory, we know that our physiological needs (such as hunger) create an aroused state that drives us to reduce the need (for example, by eating). Arousal theory suggests we need to maintain an optimal level of arousal, which helps explain our motivation toward behaviors that meet no physiological need.

- After hours of driving alone in an unfamiliar city, you finally see a diner. Although it looks deserted and a little creepy, you stop because you are *really* hungry. How would Maslow's hierarchy of needs explain your behavior?

ANSWER: According to Maslow, our drive to meet the physiological needs of hunger and thirst take priority over safety needs, prompting us to take risks at times in order to eat.

MODULE 33 REVIEW Basic Motivational Concepts

LEARNING OBJECTIVES

RETRIEVAL PRACTICE Take a moment to answer each of these Learning Objective Questions (repeated here from within this module). Then turn to Appendix C, Complete Module Reviews, to check your answers. Research suggests that trying to answer these questions on your own will improve your long-term retention (McDaniel et al., 2009).

33-1 How do psychologists define *motivation?* From what perspectives do they view motivated behavior?

TERMS AND CONCEPTS TO REMEMBER

RETRIEVAL PRACTICE Test yourself on these terms by trying to write down the definition before flipping back to the page number referenced to check your answer.

motivation, p. 420
instinct, p. 420
drive-reduction theory, p. 421
homeostasis, p. 421
incentive, p. 421
Yerkes-Dodson law, p. 422
hierarchy of needs, p. 422

Use LearningCurve to create your personalized study plan, which will direct you to the resources that will help you most in LaunchPad.

MODULE 34 Hunger

A vivid demonstration of the supremacy of physiological needs came when Ancel Keys and his research team (1950) studied semistarvation among wartime conscientious objectors. After three months of normal eating, they cut in half the food intake of 36 men selected from 200 volunteers. The semistarved men became listless and apathetic as their bodies conserved energy. Eventually, their body weights stabilized at about 25 percent below their starting weights.

More dramatic were the psychological effects. Consistent with Abraham Maslow's idea of a *hierarchy of needs*, the men became food obsessed. They talked food. They daydreamed food. They collected recipes, read cookbooks, and feasted their eyes on delectable forbidden foods. Preoccupied with their unfulfilled basic need, they lost interest in sex and social activities. As one participant reported, "If we see a show, the most interesting part of it is contained in scenes where people are eating. I couldn't laugh at the funniest picture in the world, and love scenes are completely dull."

The semistarved men's preoccupations illustrate how powerful motives can hijack our consciousness. When you are hungry, thirsty, fatigued, or sexually aroused, little else may seem to matter. When you're not, food, water, sleep, or sex just don't seem like such big things in your life, now or ever.

"Nobody wants to kiss when they are hungry."

Journalist Dorothy Dix (1861-1951)

"Nature often equips life's essentials—sex, eating, nursing—with built-in gratification."

Frans de Waal, "Morals Without God?," 2010

Dave Coverly/Speed Bump

In University of Amsterdam studies, Loran Nordgren and his colleagues (2006, 2007) found that people in a motivational "hot" state (from fatigue, hunger, or sexual arousal) easily recalled such feelings in their own past and perceived them as driving forces in others' behavior. (Interestingly, there is a parallel effect of our current good or bad mood on our memories.) In another experiment, people were given $4 cash they could keep or draw from to bid for foods. Hungry people overbid for a snack they would eat later when sated, and sated people underbid for a snack they would eat later when hungry (Fisher & Rangel, 2014). Likewise, when sexually motivated, men more often perceive a smile as flirtation rather than simple friendliness (Howell et al., 2012). Grocery shop with an empty stomach and you are more likely to see those jelly-filled doughnuts as just what you've always loved and will be wanting tomorrow. *Motives matter mightily.*

"The full person does not understand the needs of the hungry."

Irish proverb

The Physiology of Hunger

34-1 What physiological factors produce hunger?

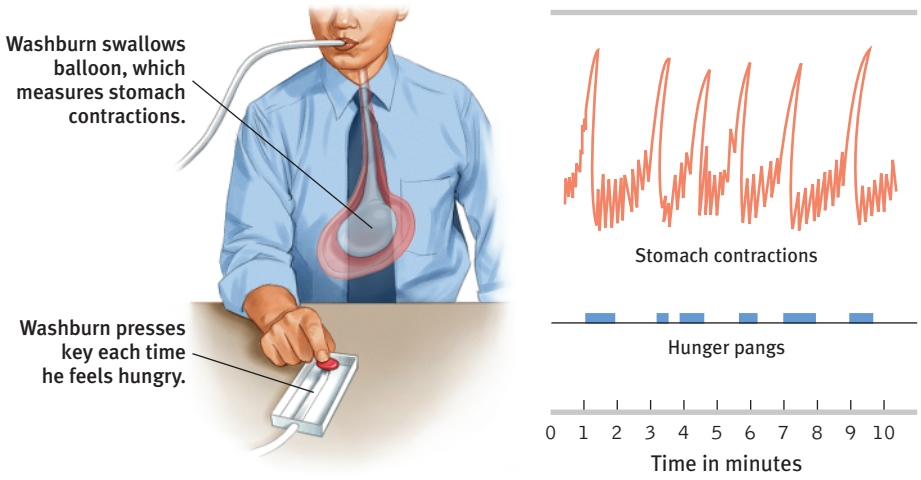
Keys' semistarved volunteers felt their hunger because of a *homeostatic* system designed to maintain normal body weight and an adequate nutrient supply. But what precisely triggers hunger? Is it the pangs of an empty stomach? So it seemed to A. L. Washburn. Working with Walter Cannon (Cannon & Washburn, 1912), Washburn agreed to swallow a balloon attached to a recording device (**FIGURE 34.1**). When inflated to fill his stomach, the balloon transmitted his stomach contractions. Washburn supplied information about his *feelings* of hunger by pressing a key each time he felt a hunger pang. The discovery: Washburn was indeed having stomach contractions whenever he felt hungry.

Can hunger exist without stomach pangs? To answer that question, researchers removed some rats' stomachs, creating a direct path to their small intestines (Tsang, 1938). Did the rats continue to eat? Indeed they did. Some hunger similarly persists in humans whose ulcerated or cancerous stomachs have been removed.

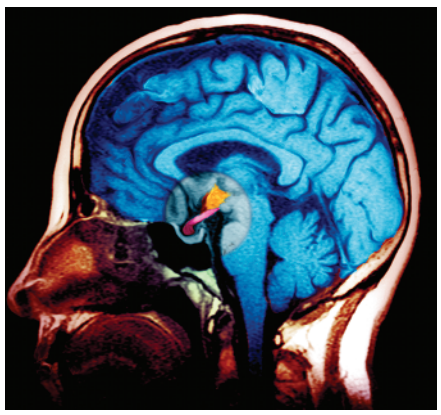
If the pangs of an empty stomach are not the only source of hunger, what else matters?

Body Chemistry and the Brain

People and other animals automatically regulate their caloric intake to prevent energy deficits and maintain a stable body weight. This suggests that somehow, somewhere, the body is keeping tabs on its available resources. One such resource is the blood



▼ FIGURE 34.1
Monitoring stomach contractions
Using this procedure, Washburn showed that stomach contractions (transmitted by the stomach balloon) accompany our feelings of hunger (indicated by a key press). (From Cannon, 1929.)



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▼ FIGURE 34.2
The hypothalamus The hypothalamus (colored orange) performs various body maintenance functions, including control of hunger. Blood vessels supply the hypothalamus, enabling it to respond to our current blood chemistry as well as to incoming neural information about the body's state.

sugar **glucose.** Increases in the hormone *insulin* (secreted by the pancreas) diminish blood glucose, partly by converting it to stored fat. If your blood glucose level drops, you won't consciously feel the lower blood sugar. But your brain, which is automatically monitoring your blood chemistry and your body's internal state, will trigger hunger. Signals from your stomach, intestines, and liver (indicating whether glucose is being deposited or withdrawn) all signal your brain to motivate eating or not.

How does the brain integrate these messages and sound the alarm? The work is done by several neural areas, some housed deep in the brain within the hypothalamus, a neural traffic intersection (**FIGURE 34.2**). For example, one neural arc (called the *arcuate nucleus*) has a center that secretes appetite-stimulating hormones. When stimulated electrically, well-fed animals begin to eat. If the area is destroyed, even starving animals have no interest in food. Another neural center secretes appetite-suppressing hormones. When electrically stimulated, animals will stop eating. Destroy this area and animals will eat and eat, and become extremely fat (Duggan & Booth, 1986; Hoebel & Teitelbaum, 1966).

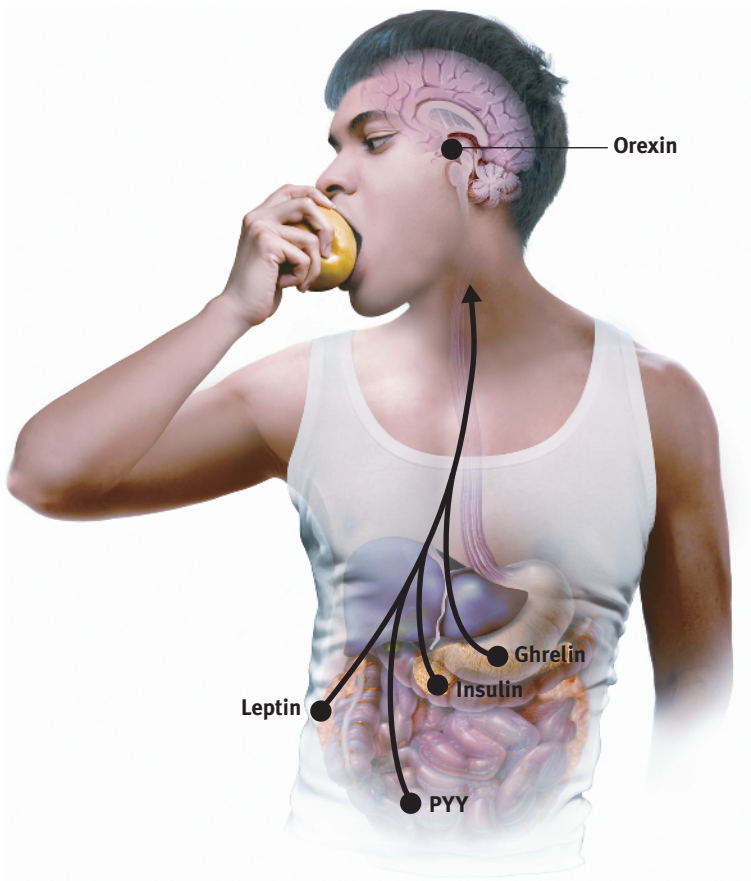
Blood vessels connect the hypothalamus to the rest of the body, so it can respond to our current blood chemistry and other incoming information. One of its tasks is monitoring levels of appetite hormones, such as *ghrelin*, a hunger-arousing hormone secreted by an empty stomach. During bypass surgery for severe obesity, surgeons seal off or remove part of the stomach. The remaining stomach then produces much less ghrelin, and the person's appetite lessens (Ammori, 2013; Lemonick, 2002). Besides insulin and ghrelin, other appetite hormones include *leptin*, *orexin*, and *PYY*; **FIGURE 34.3** describes how they influence our feelings of hunger.

Experimental manipulation of appetite hormones has raised hopes for an appetite-reducing medication. Such a nose spray or skin patch might counteract the body's hunger-producing chemicals or mimic (or even increase) the levels of hunger-dampening chemicals.

glucose the form of sugar that circulates in the blood and provides the major source of energy for body tissues. When its level is low, we feel hunger.

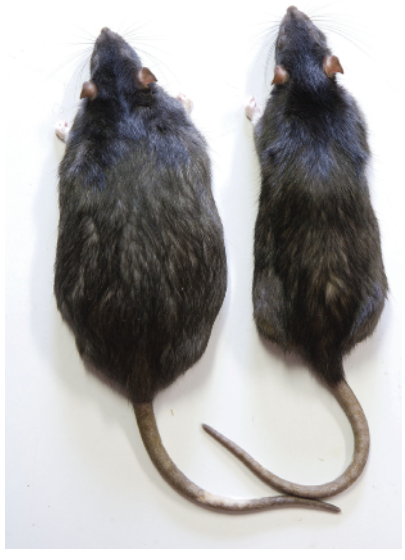
set point the point at which your "weight thermostat" is supposedly set. When your body falls below this weight, increased hunger and a lowered metabolic rate may combine to restore the lost weight.

basal metabolic rate the body's resting rate of energy expenditure.



▼ FIGURE 34.3
The appetite hormones
- *Ghrelin:* Hormone secreted by empty stomach; sends "I'm hungry" signals to the brain.
- *Insulin:* Hormone secreted by pancreas; controls blood glucose.
- *Leptin:* Protein hormone secreted by fat cells; when abundant, causes brain to increase metabolism and decrease hunger.
- *Orexin:* Hunger-triggering hormone secreted by hypothalamus.
- *PYY:* Digestive tract hormone; sends "I'm *not* hungry" signals to the brain.

The complex interaction of appetite hormones and brain activity may help explain the body's apparent predisposition to maintain itself at a particular weight. When semistarved rats fall below their normal weight, their "weight thermostat" signals the body to restore the lost weight. Fat cells cry out (so to speak) "Feed me!" and grab glucose from the bloodstream (Ludwig & Friedman, 2014). Thus, hunger increases and energy expenditure decreases. This stable weight toward which semistarved rats return is their **set point** (Keesey & Corbett, 1983). In rats and humans, heredity influences body type and approximate set point.



Voisin/Phanie/Science Source

Evidence for the brain's control of eating The fat mouse on the left has nonfunctioning receptors in the appetite-suppressing part of the hypothalamus.

LaunchPad For an interactive and visual tutorial on the brain and eating, visit LaunchPad's ***PsychSim 6: Hunger and the Fat Rat.***

Our bodies regulate weight through the control of food intake, energy output, and **basal metabolic rate**—the rate of energy expenditure for maintaining basic body functions when at rest. By the end of their 6 months of semistarvation, the men who participated in Keys' experiment had stabilized at three-quarters of their normal weight, while taking in *half* of their previous calories. How did their bodies achieve this dieter's nightmare? They reduced their energy expenditure, partly through inactivity but partly because of a 29 percent drop in their basal metabolic rate.

Some researchers, however, doubt that our bodies have a preset tendency to maintain optimum weight (Assanand et al., 1998). They point out that slow, sustained changes in body weight can alter one's set point, and that psychological factors also sometimes drive our feelings of hunger. Given unlimited access to a wide variety of tasty foods, people and other animals tend to overeat and gain weight (Raynor & Epstein, 2001). For these reasons, some researchers have abandoned the idea of a biologically fixed *set point*. They prefer the term *settling point* to indicate the level at which a person's weight settles in response to caloric intake and expenditure (which are influenced by environment as well as biology).

Over the next 40 years you will eat about 20 tons of food. If, during those years, you increase your daily intake by just .01 ounce more than required for your energy needs, you will gain an estimated 24 pounds (Martin et al., 1991).

RETRIEVAL PRACTICE

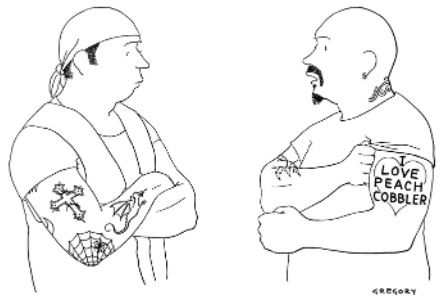
- Hunger occurs in response to _____ (low/high) blood glucose and _____ (low/high) levels of ghrelin.

ANSWERS: low; high

The Psychology of Hunger

34-2 What cultural and situational factors influence hunger?

Our internal hunger games are indeed pushed by our physiological state—our body chemistry and hypothalamic activity. Yet there is more to hunger than meets the stomach. This was strikingly apparent when Paul Rozin and his trickster colleagues (1998) tested two patients with amnesia who had no memory for events occurring more than a minute ago. If, 20 minutes after eating a normal lunch, the patients were offered another, both readily consumed it . . . and usually a third meal offered 20 minutes after the second was finished. This suggests that part of knowing when to eat is our memory of our last meal. As time passes since we last ate, we anticipate eating again and start feeling hungry.



The New Yorker Collection, 2002, Alex Gregory from cartoonbank.com. All Rights Reserved.

"Never get a tattoo when you're drunk and hungry."

RICHARD OLSENIUS/NGS Image Collection

© Mark Bowler/Alamy

An acquired taste People everywhere learn to enjoy the fatty, bitter, or spicy foods common in their culture. For these Alaska Natives (left), but not for most other North Americans, whale blubber is a tasty treat. For Peruvians (right), roasted guinea pig is similarly delicious.

Taste Preferences: Biology and Culture

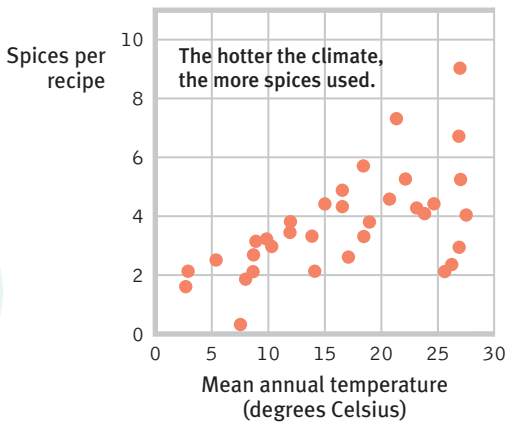
Body chemistry and environmental factors together influence not only the when of hunger, but also the what—our taste preferences. When feeling tense or depressed, do you crave starchy, carbohydrate-laden foods? Are you like ardent football fans who, after a big loss, tend to take solace in high-calorie foods (Cornil & Chandon, 2013)? Carbohydrates boost the neurotransmitter serotonin, which has calming effects. When stressed, both rats and many humans find it extra rewarding to scarf Oreos (Artiga et al., 2007; Sproesser et al., 2014).

Our preferences for sweet and salty tastes are genetic and universal. Other taste preferences are conditioned, as when people given highly salted foods develop a liking for excess salt (Beauchamp, 1987), or when people who have been sickened by a food develop an aversion to it. (The frequency of children's illnesses provides many chances for them to learn food aversions.)

Culture affects taste, too. Bedouins enjoy eating the eye of a camel, which most North Americans would find repulsive. Many Japanese people enjoy nattó, a fermented soybean dish that "smells like the marriage of ammonia and a tire fire," reports smell expert Rachel Herz (2012). Although many Westerners find this disgusting, Asians, she adds, are often repulsed by what Westerners love—"the rotted bodily fluid of an ungulate" (a.k.a. cheese, some varieties of which have the same bacteria and odor as stinky feet). Most North Americans and Europeans shun horse, dog, and rat meat, all of which are prized elsewhere.

Rats tend to avoid unfamiliar foods (Sclafani, 1995). So do we, especially animal-based foods. Such *neophobia* (dislike of things unfamiliar) surely was adaptive for our ancestors, protecting them from potentially toxic substances. Disgust works. Nevertheless, in experiments, people who repeatedly sample an initially novel fruit drink or unfamiliar food typically experience increasing appreciation for the new taste. Moreover, exposure to one set of novel foods increases our willingness to try another (Pliner, 1982, Pliner et al., 1993).

Other taste preferences also are adaptive. For example, the spices most commonly used in hot-climate recipes—where food, especially meat, is at risk of spoiling more quickly—inhibit bacteria growth (**FIGURE 34.4**). Pregnancy-related nausea and food aversions peak about the tenth week, when the developing embryo is most vulnerable to toxins. So there is biological wisdom to our taste preferences.



▼ FIGURE 34.4
Hot cultures like hot spices
Countries with hot climates, in which food historically spoiled more quickly, feature recipes with more bacteria-inhibiting spices (Sherman & Flaxman, 2001). India averages nearly 10 spices per meat recipe; Finland, 2 spices.

Situational Influences on Eating

To a surprising extent, situations also control our eating—a phenomenon psychologists have called the *ecology of eating*. Here are three situations you may have noticed but underestimated:

- Do you eat more when eating with others? Most of us do (Herman et al., 2003; Hetherington et al., 2006). After a party, you may realize you've overeaten. This happens because the presence of others tends to amplify our natural behavior tendencies. (We explore this *social facilitation* in the Social Psychology modules.)
- *Unit bias* occurs with similar mindlessness. At France's National Center for Scientific Research, Andrew Geier and his colleagues (2006) wondered why French waistlines are smaller than American waistlines. From soda drinks to yogurt sizes, the French offer foods in smaller portion sizes. Does it matter? (One could as well order two small sandwiches as one large one.) To find out, the investigators offered people varieties of free snacks. For example, in the lobby of an apartment house, they laid out either full or half pretzels, big or little Tootsie Rolls, or a big bowl of M&M's with either a small or large serving scoop. Their consistent result: Offered a supersized standard portion, people put away more calories. In another study, people offered pasta ate more when given a big plate (Van Ittersum & Wansink, 2012). Children also eat more when using adult-sized (rather than child-sized) dishware (DiSantis et al., 2013). Even nutrition experts helped themselves to 31 percent more ice cream when given a big bowl rather than a small one, and 15 percent more when scooping with a big rather than a small scoop (Wansink, 2006, 2007). People pour more into and drink more from short, wide than tall, narrow glasses. And they take more of easier-to-reach food on buffet lines (Marteau et al., 2012). Portion size matters.
- *Food variety* also stimulates eating. Offered a dessert buffet, we eat more than we do when choosing a portion from one favorite dessert. For our early ancestors, variety was healthy. When foods were abundant and varied, eating more provided a wide range of vitamins and minerals and produced fat that protected them during winter cold or famine. When a bounty of varied foods was unavailable, eating less extended the food supply until winter or famine ended (Polivy et al., 2008; Remick et al., 2009).

LaunchPad
HOW WOULD YOU KNOW?
Consider how researchers test some of these ideas with LaunchPad's ***How Would You Know If Larger Dinner Plates Make People Fat?***

LaunchPad **For a 7-minute video review of hunger, see LaunchPad's *Video: Hunger and Eating.***

RETRIEVAL PRACTICE

- After an eight-hour hike without food, your long-awaited favorite dish is placed in front of you, and your mouth waters in anticipation. Why?

ANSWER: You have learned to respond to the sight and aroma that signal the food about to enter your mouth. Both *physiological* cues (low blood sugar) and *psychological* cues (anticipation of the tasty meal) heighten your experienced hunger.

Obesity and Weight Control

34-3 What factors predispose some people to become and remain obese?

Obesity can be socially toxic, by affecting both how you are treated and how you feel about yourself. Obesity has been associated with lower psychological well-being, especially among women, and increased depression (de Wit et al., 2010; Luppino et al., 2010; Riffkin, 2014). Obese 6- to 9-year-olds are 60 percent more likely to suffer bullying (Lumeng et al., 2010). And obesity has physical health risks. Yet few overweight people win the battle of the bulge. Why? And why do some people gain weight while others eat the same amount and seldom add a pound?

Theo Wargo/Getty Images

Weight woes New Jersey Governor Chris Christie (on Nightline, July 3, 2012, before undergoing stomach lap-band surgery): "I think there's a fundamental misunderstanding among people regarding weight. I think folks say—yeah, well he must just not be disciplined, you know, or he must not have willpower . . . If it were easy, I'd already have it fixed."

"American men, on average, say they weigh 196 pounds and women say they weigh 160 pounds. Both figures are nearly 20 pounds heavier than in 1990."

Elizabeth Mendes, www.gallup.com, 2011

"Remember when we used to have to fatten the kids up first?"

The Physiology of Obesity

Our bodies store fat for good reason. Fat is an ideal form of stored energy—a high-calorie fuel reserve to carry the body through periods when food is scarce—a common occurrence in our prehistoric ancestors' world. No wonder people in developing societies have often found heavier bodies attractive: Obesity signals affluence and social status (Furnham & Baguma, 1994; Swami et al., 2011).

In parts of the world where food and sweets are now abundantly available, the rule that once served our hungry distant ancestors—*When you find energy-rich fat or sugar, eat it!*—has become dysfunctional. Pretty much everywhere this book is being read, people have a growing problem. A worldwide study of 188 countries (Ng et al., 2014) revealed that

- between 1980 and 2013 the proportion of overweight adults increased from 29 to 37 percent among the world's men, and from 30 to 38 percent among women.
- over the last 33 years, *no* country has reduced its obesity rate. Not one.
- national variations are huge, with the percentage overweight ranging from 85 percent in Tonga to 3 percent in Timor-Leste.

According to the World Health Organization (WHO), an overweight person has a *body mass index* (BMI) of 25 or more; someone obese has a BMI of 30 or more. (See www.tinyurl.com/GiveMyBMI to calculate your BMI and to see where you are in relation to others in your country and in the world.) In the United States, the adult obesity rate has more than doubled in the last 40 years, reaching 36 percent, and child-teen obesity has quadrupled (Flegal et al., 2010, 2012). In 1990, no U.S. state had an obesity rate greater than 15 percent. By 2010, no state had an obesity rate of *less* than 20 percent (CDC, 2012).

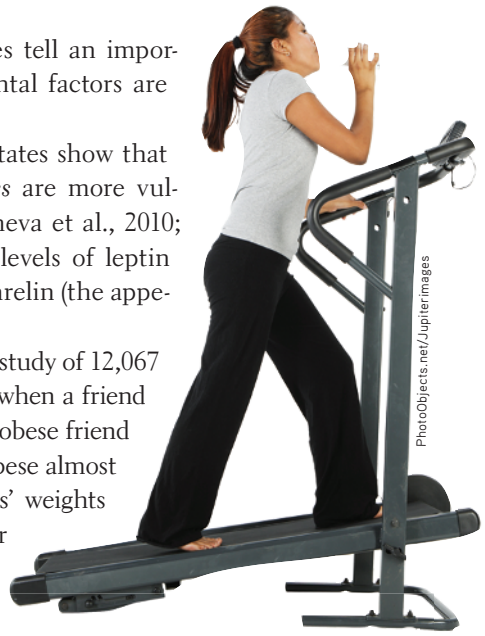
In one digest of 97 studies of 2.9 million people, being simply overweight was not a health risk, while being obese was (Flegal et al., 2013). Fitness matters more than being a little overweight. But significant obesity increases the risk of diabetes, high blood pressure, heart disease, gallstones, arthritis, and certain types of cancer, thus increasing health care costs and shortening life expectancy (de Gonzales et al., 2010; Jarrett et al., 2010; Sun et al., 2009). Extreme obesity increases risk of suicidal behaviors (Wagner et al., 2013). Research also has linked women's obesity to their risk of late-life cognitive decline, including Alzheimer's disease and brain tissue loss (Bruce-Keller et al., 2009; Whitmer et al., 2008). One experiment found improved memory performance 12 weeks after severely obese people had weight-loss surgery and lost significant weight. Those not having the surgery showed some further cognitive decline (Gunstad et al., 2011).

Set Point and Metabolism Research on the physiology of obesity challenges the stereotype of severely overweight people being weak-willed gluttons. Once we become fat, we require less food to maintain our weight than we did to attain it. Fat has a lower metabolic rate than does muscle—it takes less food energy to maintain. When an overweight person's body drops below its previous set (or settling) point, the brain triggers increased hunger and decreased metabolism. The body adapts to starvation by burning off fewer calories and seeking to restore lost weight. Blame your brain for weight regain (Cornier, 2011).

Lean people also seem naturally disposed to move about. They burn more calories than do energy-conserving overweight people, who tend to sit still longer (Levine et al., 2005). These individual differences in resting metabolism help explain why two people of the same height, age, and activity level can maintain the same weight, even if one of them eats much less than does the other.

The Genetic Factor Do our genes predispose us to eat more or less? To burn more calories by fidgeting or fewer by sitting still? Studies confirm a genetic influence on body weight. Consider two examples:

- Despite shared family meals, adoptive siblings' body weights are uncorrelated with one another or with those of their adoptive parents. Rather, people's weights resemble those of their biological parents (Grilo & Pogue-Geile, 1991).
- Identical twins have closely similar weights, even when raised apart (Hjelmborg et al., 2008; Plomin et al., 1997). Across studies, their weight correlates +.74. The much lower +.32 correlation among fraternal twins suggests that genes explain two-thirds of our varying body mass (Maes et al., 1997).


PhotoObjects.net/Jupiterimages

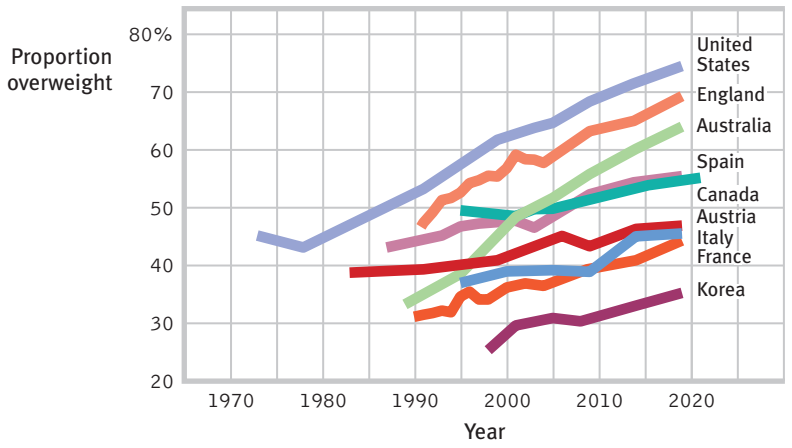
The Food and Activity Factors Genes tell an important part of the obesity story. But environmental factors are mighty important, too.

Studies in Europe, Japan, and the United States show that children and adults who suffer from *sleep loss* are more vulnerable to obesity (Keith et al., 2006; Nedeltcheva et al., 2010; Taheri, 2004a,b). With sleep deprivation, the levels of leptin (which reports body fat to the brain) fall, and ghrelin (the appetite-stimulating stomach hormone) rise.

Social influence is another factor. One 32-year study of 12,067 people found them most likely to become obese when a friend became obese (Christakis & Fowler, 2007). If the obese friend was a close one, the odds of likewise becoming obese almost tripled. Moreover, the correlation among friends' weights was not simply a matter of seeking out similar people as friends. Friends matter.

The strongest evidence that environment influences weight comes from *our fattening world* (**FIGURE 34.5**). What explains this growing problem? Changing *food consumption* and *activity levels* are at work. We are eating more and moving less, with lifestyles sometimes approaching those of animal feedlots (where farmers fatten inactive animals). In the United States, jobs requiring moderate physical activity declined from about 50 percent in 1960 to 20 percent in 2011 (Church et al., 2011). Worldwide, 31 percent of adults (including 43 percent of Americans and 25 percent of Europeans) are now sedentary, which means they average less than 20 minutes per day of moderate activity such as walking (Hallal et al., 2012). Sedentary occupations increase the chance of being overweight, as 86 percent of U.S. truck drivers reportedly are (Jacobson et al., 2007).

The "bottom" line: New stadiums, theaters, and subway cars—but not airplanes—are widening seats to accommodate the girth growth (Hampson, 2000; Kim & Tong, 2010).



▼ FIGURE 34.5
Past and projected overweight rates, by the Organization for Economic Cooperation and Development

"We put fast food on every corner, we put junk food in our schools, we got rid of [physical education classes], we put candy and soda at the check-out stand of every retail outlet you can think of. The results are in. It worked."

Harold Goldstein, Executive Director of the California Center for Public Health Advocacy, 2009, when imagining a vast U.S. national experiment to encourage weight gain

American idle: Couch potatoes beware—TV watching correlates with obesity Over time, lifestyles have become more sedentary and TV watching and other screen time has increased, and so has the percentage of overweight people in Britain, Canada, and the United States (Pagani et al., 2010). As televisions have become flatter, people have become fatter.

Washington State Ferries abandoned a 50-year-old standard: "Eighteen-inch butts are a thing of the past" (Shepherd, 1999). New York City, facing a large problem with Big Apple bottoms, has mostly replaced 17.5-inch bucket-style subway seats with bucketless seats (Hampson, 2000). In the end, today's people need more room.

These findings reinforce an important finding from psychology's study of intelligence: There can be high levels of heritability (genetic influence on individual differences) without heredity explaining group differences. Genes mostly determine why one person today is heavier than another. Environment mostly determines why people today are heavier than their counterparts 50 years ago. Our eating behavior also demonstrates the now-familiar interaction among biological, psychological, and social-cultural factors. For tips on shedding unwanted pounds, see **TABLE 34.1**.

▼ TABLE 34.1
Waist Management

People struggling with obesity are well advised to seek medical evaluation and guidance. For others who wish to take off a few pounds, researchers have offered these tips:

- ***Begin only if you feel motivated and self-disciplined.*** For most people, permanent weight loss requires a lifelong change in eating habits combined with increased exercise.
- ***Exercise and get enough sleep.*** Inactive people are often overweight. Especially when supported by 7 to 8 hours of sleep a night, exercise empties fat cells, builds muscle, speeds up metabolism, helps lower your settling point, and reduces stress and stress-induced craving for carbohydrate-rich comfort foods (Bennett, 1995; Kolata, 1987; Thompson et al., 1982).
- ***Minimize exposure to tempting food cues.*** Food shop on a full stomach. Keep tempting foods out of the house, and store other appealing foods out of sight.
- ***Limit variety and eat healthy foods.*** Given more variety, people consume more. So eat simple meals with whole grains, fruits, and vegetables. Water-rich foods such as veggies and broth soups can fill the stomach with few calories. Healthy fats, such as those found in olive oil and fish, help regulate appetite and artery-clogging cholesterol (Taubes, 2001, 2002). Better crispy greens than Krispy Kremes.
- ***Reduce portion sizes.*** Serve food with smaller bowls, plates, and utensils.
- **Don't starve all day and eat one big meal at night.** This eating pattern, common among overweight people, slows metabolism. Moreover, those who eat a balanced breakfast are, by late morning, more alert and less fatigued (Spring et al., 1992).
- ***Beware of the binge.*** Especially for men, eating slowly can lead to eating less (Martin et al., 2007). Among people who do consciously restrain their eating, drinking alcohol or feeling anxious or depressed can unleash the urge to eat (Herman & Polivy, 1980).
- ***Before eating with others, decide how much you want to eat.*** Eating with friends can distract us from monitoring our own eating (Ward & Mann, 2000).
- ***Remember, most people occasionally lapse.*** A lapse need not become a full collapse.
- ***Connect to a support group.*** Join with others, either face-to-face or online, with whom you can share your goals and progress (Freedman, 2011).

RETRIEVAL PRACTICE

- Why can two people of the same height, age, and activity level maintain the same weight, even if one of them eats much less than the other does?

ANSWER: Individuals have very different set points and genetically influenced metabolism levels, causing them to burn calories differently.

MODULE 34 REVIEW Hunger

LEARNING OBJECTIVES

RETRIEVAL PRACTICE Take a moment to answer each of these Learning Objective Questions (repeated here from within this module). Then turn to Appendix C, Complete Module Reviews, to check your answers. Research suggests that trying to answer these questions on your own will improve your long-term retention (McDaniel et al., 2009).

34-1 What physiological factors produce hunger?

34-2 What cultural and situational factors influence hunger?

34-3 What factors predispose some people to become and remain obese?

TERMS AND CONCEPTS TO REMEMBER

RETRIEVAL PRACTICE Test yourself on these terms by trying to write down the definition before flipping back to the page number referenced to check your answer.

glucose, p. 426

set point, p. 427

basal metabolic rate, p. 427

Use LearningCurve to create your personalized study plan, which will direct you to the resources that will help you most in LaunchPad.

MODULE 35 Sexual Motivation

Sex is a part of life. For all but the tiny fraction of us considered **asexual,** dating and mating become a high priority from puberty on. Physiological and psychological influences affect our sexual feelings and behaviors.

The Physiology of Sex

Sex is not like hunger, because it is not an actual *need*. (Without it, we may feel like dying, but we will not.) Yet sex motivates. Had this not been so for all your ancestors, you would not be reading this book. Sexual motivation is nature's clever way of making people procreate, thus enabling our species' survival. When two people feel an attraction, they hardly stop to think of themselves as guided by their ancestral genes. As the pleasure we take in eating is nature's method of getting our body nourishment, so the desires and pleasures of sex are our genes' way of preserving and spreading themselves. Life is sexually transmitted.

> "It is a near-universal experience, the invisible clause on one's birth certificate stipulating that one will, upon reaching maturity, feel the urge to engage in activities often associated with the issuance of more birth certificates."
>
> Science writer Natalie Angier, 2007

Hormones and Sexual Behavior

35-1 How do hormones influence human sexual motivation?

Among the forces driving sexual behavior are the *sex hormones*. The main male sex hormone is **testosterone.** The main female sex hormones are the **estrogens,** such as estradiol. Sex hormones influence us at many points in the life span:

- During the prenatal period, they direct our development as males or females.
- During puberty, a sex hormone surge ushers us into adolescence.
- After puberty and well into the late adult years, sex hormones activate sexual behavior.

In most mammals, nature neatly synchronizes sex with fertility. Females become sexually receptive (in other animals, "in heat") when their estrogens peak at ovulation. In experiments, researchers can cause female animals to become receptive by injecting them with estrogens. Male hormone levels are more constant, and hormone injection does not so easily manipulate the sexual behavior of male animals (Feder, 1984). Nevertheless, male rats that have had their testes (which manufacture testosterone) surgically removed will gradually lose much of their interest in receptive females. They slowly regain it if injected with testosterone.

asexual having no sexual attraction to others.

testosterone the most important of the male sex hormones. Both males and females have it, but the additional testosterone in males stimulates the growth of the male sex organs during the fetal period, and the development of the male sex characteristics during puberty.

estrogens sex hormones, such as estradiol, secreted in greater amounts by females than by males and contributing to female sex characteristics. In nonhuman female mammals, estrogen levels peak during ovulation, promoting sexual receptivity.

Hormones do influence human sexual behavior, but in a looser way. Among women with mates, sexual desire rises slightly at ovulation, when there is a surge of estrogens and a smaller surge of testosterone, a change that men can sometimes detect in women's behaviors and voices (Haselton & Gildersleeve, 2011). One study invited partnered women to keep a diary of their sexual activity. On the days around ovulation, intercourse was 24 percent more frequent (Wilcox et al., 2004).

Women have much less testosterone than men. And more than other mammalian females, women are responsive to their testosterone level (van Anders, 2012). If a woman's natural testosterone level drops, as happens with removal of the ovaries or adrenal glands, her sexual interest may wane. But as controlled experiments with hundreds of surgically or naturally menopausal women have demonstrated, testosterone-replacement therapy can often restore diminished sexual activity, arousal, and desire (Braunstein et al., 2005; Buster et al., 2005; Petersen & Hyde, 2011).

In human males with abnormally low testosterone levels, testosterone-replacement therapy often increases sexual desire and also energy and vitality (Yates, 2000). But normal fluctuations in testosterone levels, from man to man and hour to hour, have little effect on sexual drive (Byrne, 1982). Indeed, male hormones sometimes vary in *response* to sexual stimulation (Escasa et al., 2011). In one study, Australian skateboarders' testosterone surged in the presence of an attractive female, contributing to riskier moves and more crash landings (Ronay & von Hippel, 2010). Thus, sexual arousal can be a *cause* as well as a consequence of increased testosterone levels. At the other end of the mating spectrum, international studies have found that married fathers tend to have lower testosterone levels than do bachelors and married men without children (Gettler et al., 2013; Gray et al., 2006).

Large hormonal surges or declines affect men and women's desire in shifts that tend to occur at two predictable points in the life span, and sometimes at an unpredictable third point:

1. *The pubertal surge in sex hormones triggers the development of sex characteristics and sexual interest.* If the hormonal surge is precluded—as it was during the 1600s and 1700s for prepubertal boys who were castrated to preserve their soprano voices for Italian opera—sex characteristics and sexual desire do not develop normally (Peschel & Peschel, 1987).
2. *In later life, estrogen levels fall, and women experience menopause (the cessation of menstruation).* As sex hormone levels decline, sex remains a part of life, but the frequency of sexual fantasies and intercourse subsides (Leitenberg & Henning, 1995).
3. *For some, surgery or drugs may cause hormonal shifts.* When adult men were castrated, sex drive typically fell as testosterone levels declined sharply (Hucker & Bain, 1990). Male sex offenders who take Depo-Provera, a drug that reduces testosterone levels to that of a prepubertal boy, have similarly lost much of their sexual urge (Bilefsky, 2009; Money et al., 1983).

To summarize: We might compare human sex hormones, especially testosterone, to the fuel in a car. Without fuel, a car will not run. But if the fuel level is minimally adequate, adding more fuel to the gas tank won't change how the car runs. The analogy is imperfect, because hormones and sexual motivation interact. However, it correctly suggests that biology is a necessary but not sufficient explanation of human sexual behavior. The hormonal fuel is essential, but so are the psychological stimuli that turn on the engine, keep it running, and shift it into high gear.

RETRIEVAL PRACTICE

- The primary male sex hormone is _____. The primary female sex hormones are the _____.

ANSWERS: testosterone; estrogens

The Sexual Response Cycle

35-2 What is the human sexual response cycle, and how do sexual dysfunctions and paraphilias differ?

In the 1960s, gynecologist-obstetrician William Masters and his collaborator Virginia Johnson (1966) made headlines by recording the physiological responses of volunteers who came to their lab to masturbate or have intercourse. With the help of 382 female and 312 male volunteers—a somewhat atypical sample, consisting only of people able and willing to display arousal and orgasm while scientists observed—Masters and Johnson reported observing more than 10,000 sexual "cycles." Their description of the **sexual response cycle** identified four stages:

1. *Excitement:* The genital areas become engorged with blood, causing a woman's clitoris and a man's penis to swell. A woman's vagina expands and secretes lubricant; her breasts and nipples may enlarge.
2. *Plateau:* Excitement peaks as breathing, pulse, and blood pressure rates continue to increase. A man's penis becomes fully engorged—to an average length of 5.6 inches, among 1661 men who measured themselves for condom fitting (Herbenick, 2014). Some fluid—frequently containing enough live sperm to enable conception—may appear at its tip. A woman's vaginal secretion continues to increase, and her clitoris retracts. Orgasm feels imminent.
3. *Orgasm:* Muscle contractions appear all over the body and are accompanied by further increases in breathing, pulse, and blood pressure rates. A woman's arousal and orgasm facilitate conception: They help propel semen from the penis, position the uterus to receive sperm, and draw the sperm further inward, increasing retention of deposited sperm (Furlow & Thornhill, 1996). The pleasurable feeling of sexual release apparently is much the same for both sexes. One panel of experts could not reliably distinguish between descriptions of orgasm written by men and those written by women (Vance & Wagner, 1976). In another study, PET scans showed that the same subcortical brain regions were active in men and women during orgasm (Holstege et al., 2003a,b).
4. *Resolution:* The body gradually returns to its unaroused state as the genital blood vessels release their accumulated blood. This happens relatively quickly if orgasm has occurred, relatively slowly otherwise. (It's like the nasal tickle that goes away rapidly if you have sneezed, slowly otherwise.) Men then enter a **refractory period** that lasts from a few minutes to a day or more, during which they are incapable of another orgasm. A woman's much shorter refractory period may enable her, if restimulated during or soon after resolution, to have more orgasms.

A nonsmoking 50-year-old male has about a 1-in-a-million chance of a heart attack during any hour. This increases to merely 2-in-a-million in the two hours during and following sex (with no increase for those who exercise regularly). Compared with risks associated with heavy exertion or anger, this risk seems not worth losing sleep (or sex) over (Jackson, 2009; Muller et al., 1996).

Sexual Dysfunctions and Paraphilias

Masters and Johnson sought not only to describe the human sexual response cycle but also to understand and treat the inability to complete it. **Sexual dysfunctions** are problems that consistently impair sexual arousal or functioning. Some involve sexual motivation, especially lack of sexual energy and arousability. For men, others include **erectile disorder** (inability to have or maintain an erection) and *premature ejaculation*. For women, the problem may be pain or **female orgasmic disorder** (distress over infrequently or never experiencing orgasm). In separate surveys of some 3000 Boston women and 32,000 other American women, about 4 in 10 reported a sexual problem, such as orgasmic disorder or low desire, but only about 1 in 8 reported that this caused personal distress (Lutfey et al., 2009; Shifren et al., 2008). Most women who have experienced sexual distress have related it to their emotional relationship with the partner during sex (Bancroft et al., 2003).

sexual response cycle the four stages of sexual responding described by Masters and Johnson—excitement, plateau, orgasm, and resolution.

refractory period a resting period after orgasm, during which a man cannot achieve another orgasm.

sexual dysfunction a problem that consistently impairs sexual arousal or functioning.

erectile disorder inability to develop or maintain an erection due to insufficient bloodflow to the penis.

female orgasmic disorder distress due to infrequently or never experiencing orgasm.

paraphilias sexual arousal from fantasies, behaviors, or urges involving nonhuman objects, the suffering of self or others, and/or nonconsenting persons.

AIDS (acquired immune deficiency syndrome) a life-threatening, sexually transmitted infection caused by the *human immunodeficiency virus* (HIV). AIDS depletes the immune system, leaving the person vulnerable to infections.

Therapy can help men and women with sexual dysfunctions (Frühauf et al., 2013). In behaviorally oriented therapy, for example, men learn ways to control their urge to ejaculate, and women are trained to bring themselves to orgasm. Starting with the introduction of Viagra in 1998, erectile disorder has been routinely treated by taking a pill. Equally effective drug treatments for *female sexual interest/arousal disorder* are not yet available.

Sexual dysfunction involves problems with arousal or sexual functioning. People with **paraphilias** do experience sexual desire, but they direct it in unusual ways. The American Psychiatric Association (2013) only classifies such behavior as disordered if

- a person experiences distress from an unusual sexual interest *or*
- it entails harm or risk of harm to others.

The serial killer Jeffrey Dahmer had *necrophilia,* a sexual attraction to corpses. Those with *exhibitionism* derive pleasure from exposing themselves sexually to others, without consent. People with the paraphilic disorder *pedophilia* experience sexual arousal toward children who haven't entered puberty.

Sexually Transmitted Infections

35-3 How can sexually transmitted infections be prevented?

Worldwide, more than 1 million people acquire a *sexually transmitted infection* (*STI*; also called *STD* for *sexually transmitted disease*) every day (WHO, 2013). Teenage girls, because of their not yet fully mature biological development and lower levels of protective antibodies, are especially vulnerable (Dehne & Riedner, 2005; Guttmacher, 1994). A Centers for Disease Control and Prevention study of sexually experienced 14- to 19-year-old U.S. females found 39.5 percent had STIs (Forhan et al., 2008).

To comprehend the mathematics of infection transmission, imagine this scenario. Over the course of a year, Pat has sex with 9 people, each of whom over the same period has sex with 9 other people, who in turn have sex with 9 others. How many "phantom" sex partners (past partners of partners) will Pat have? The actual number—511—is more than five times the estimate given by the average student (Brannon & Brock, 1993).

Condoms offer only limited protection against certain skin-to-skin STIs, such as herpes, but they do reduce other risks (Medical Institute, 1994; NIH, 2001). The effects were clear when Thailand promoted 100 percent condom use by commercial sex workers. Over a four-year period, as condom use soared from 14 to 94 percent, the annual number of bacterial STIs plummeted from 410,406 to 27,362 (WHO, 2000).

Across the available studies, condoms also have been 80 percent effective in preventing transmission of *HIV* (*human immunodeficiency virus*—the virus that causes **AIDS**) from an infected partner (Weller & Davis-Beaty, 2002; WHO, 2003). Although AIDS can be transmitted by other means, such as needle sharing during drug use, its sexual transmission is most common. Women's AIDS rates are increasing fastest, partly because the virus is passed from man to woman much more often than from woman to man. A man's semen can carry more of the virus than can a woman's vaginal and cervical secretions. The HIV-infected semen can also linger for days in a woman's vagina and cervix, increasing the time of exposure (Allen & Setlow, 1991; WHO, 2004).

Most Americans with AIDS have been in midlife and younger—ages 25 to 44 (U.S. Centers for Disease Control and Prevention, 2011). Given AIDS' long incubation period, this means that many of these young people were infected as teens. In 2012, the death of 1.6 million people with AIDS worldwide left behind countless grief-stricken partners and millions of orphaned children (UNAIDS, 2013). Sub-Saharan Africa is home to two-thirds of those infected with HIV, and medical treatment that extends life and care for the dying are sapping the region's social resources.

Many people assume that oral sex falls in the category of "safe sex," but recent studies show a significant link between oral sex and transmission of STIs, such as the *human papilloma virus (HPV)*. Risks rise with the number of sexual partners (Gillison et al., 2012). Most HPV infections can now be prevented with a vaccination administered before sexual contact.

RETRIEVAL PRACTICE

- The inability to complete the sexual response cycle may be considered a _____ _____. Exhibitionism would be considered a _____.

ANSWERS: sexual dysfunction; paraphilia

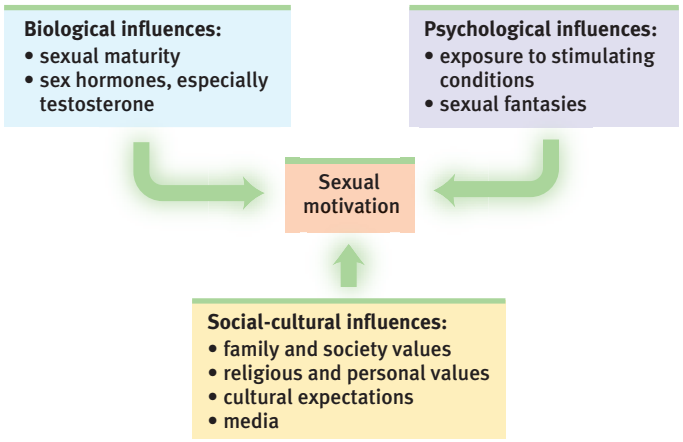
- From a biological perspective, AIDS is passed more readily from women to men than from men to women. True or false?

ANSWER: False. AIDS is transmitted more easily and more often from men to women.

The Psychology of Sex

35-4 How do external and imagined stimuli contribute to sexual arousal?

Biological factors powerfully influence our sexual motivation and behavior. Yet the wide variations over time, across place, and among individuals document the great influence of psychological factors as well (**FIGURE 35.1**). Thus, despite the shared biology that underlies sexual motivation, 281 expressed reasons for having sex ranged widely—from "to get closer to God" to "to get my boyfriend to shut up" (Buss, 2008; Meston & Buss, 2007).



Petrenko Andriy/Shutterstock

▼ FIGURE 35.1
Levels of analysis for sexual motivation Compared with our motivation for eating, our sexual motivation is less influenced by biological factors. Psychological and social-cultural factors play a bigger role.

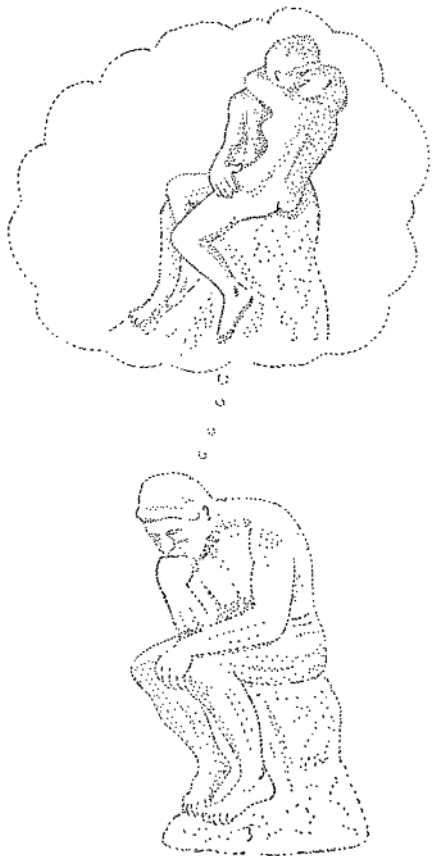
External Stimuli

Men and women become aroused when they see, hear, or read erotic material (Heiman, 1975; Stockton & Murnen, 1992). In 132 experiments, men's feelings of sexual arousal have much more closely mirrored their (more obvious) genital response than have women's (Chivers et al., 2010).

People may find sexual arousal either pleasing or disturbing. (Those who wish to control their arousal often limit their exposure to such materials, just as those wishing to control hunger limit their exposure to tempting cues.) With repeated exposure, the emotional response to any erotic stimulus often lessens, or *habituates*. During the 1920s, when Western women's rising hemlines first reached the knee, an exposed leg was a mildly erotic stimulus.

Can exposure to sexually explicit material have adverse effects? Research indicates that it can:

© Andy Singer



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- *Rape acceptance.* Depictions of women being sexually coerced—and liking it—have increased viewers' belief in the false idea that women enjoy rape, and have increased male viewers' willingness to hurt women (Malamuth & Check, 1981; Zillmann, 1989).
- *Devaluing partner.* Viewing images of sexually attractive women and men may also lead people to devalue their own partners and relationships. After male collegians viewed TV or magazine depictions of sexually attractive women, they often found an average woman, or their own girlfriend or wife, less attractive (Kenrick & Gutierres, 1980; Kenrick et al., 1989; Weaver et al., 1984).
- *Diminished satisfaction.* Viewing X-rated sex films has similarly tended to reduce people's satisfaction with their own sexual partner (Zillmann, 1989). Reading or watching erotica's unlikely scenarios may create expectations that few men and women can fulfill.

Imagined Stimuli

The brain, it has been said, is our most significant sex organ. The stimuli inside our heads—our imagination—can influence sexual arousal and desire. Lacking genital sensation because of a spinal-cord injury, people can still feel sexual desire (Willmuth, 1987).

Wide-awake people become sexually aroused not only by memories of prior sexual activities but also by fantasies, which in a few women can produce orgasms (Komisaruk & Whipple, 2011). About 95 percent of both men and women have said they have sexual fantasies. Men (whether gay or straight) fantasize about sex more often, more physically, and less romantically (Schmitt et al., 2012). They also prefer less personal and faster-paced sexual content in books and videos (Leitenberg & Henning, 1995). Fantasizing about sex does *not* indicate a sexual problem or dissatisfaction. If anything, sexually active people have more sexual fantasies.

RETRIEVAL PRACTICE

- What factors influence our sexual motivation and behavior?

ANSWER: Influences include biological factors such as sexual maturity and sex hormones, psychological factors such as environmental stimuli and fantasies, and social-cultural factors such as the values and expectations absorbed from family and the surrounding culture.

Teen Pregnancy

35-5 What factors influence teenagers' sexual behaviors and use of contraceptives?

Sexual attitudes and behaviors vary dramatically across cultures. "Sex between unmarried adults" is "morally unacceptable," agree 97 percent of Indonesians, 58 percent of Chinese, 30 percent of Americans, and 6 percent of Germans (Pew, 2014). We are all one species, but in some ways how differently we think. Compared with European teens, today's American teens have a higher pregnancy rate—but a lower rate than their parents' generation (CDC, 2011, 2012).

So, what produces these variations in teen sexuality and pregnancy? Twin studies show that genes influence teen sexual behavior—by influencing pubertal development and hormone levels, and also by influencing teen exposure to environments that stimulate sexual activity (Harden, 2014). Other influences include:

"Condoms should be used on every conceivable occasion."

Anonymous

Minimal communication about birth control Many teenagers are uncomfortable discussing contraception with their parents, partners, and peers. Teens who talk freely with parents, and who are in an exclusive relationship with a partner with whom they communicate openly, are more likely to use contraceptives (Aspy et al., 2007; Milan & Kilmann, 1987).

Guilt related to sexual activity In another survey, 72 percent of sexually active 12- to 17-year-old American girls said they regretted having had sex (Reuters, 2000). Sexual

inhibitions or ambivalence can restrain sexual activity, but also reduce planning for birth control (Gerrard & Luus, 1995; MacDonald & Hynie, 2008).

Alcohol use Most sexual hook-ups occur among people who are mildly to very intoxicated (Fielder et al., 2013; Garcia et al., 2013). Those who use alcohol prior to sex are less likely to use condoms (Kotchick et al., 2001). By depressing the brain centers that control judgment, inhibition, and self-awareness, alcohol disarms normal restraints—a phenomenon well known to sexually coercive males.

Mass media norms of unprotected promiscuity Media help write the "social scripts" that affect our perceptions and actions. So what sexual scripts do today's media write on our minds? Sexual content appears in approximately 85 percent of movies, 82 percent of television programs, 59 percent of music videos, and 37 percent of music lyrics (Ward et al., 2014). And sexual partners on TV shows rarely have communicated any concern for birth control or STIs (Brown et al., 2002; Kunkel, 2001; Sapolski & Tabarlet, 1991). The more sexual content adolescents and young adults view or read (even when controlling for other predictors of early sexual activity), the more likely they are to perceive their peers as sexually active, to develop sexually permissive attitudes, and to experience early intercourse (Escobar-Chaves et al., 2005; Kim & Ward, 2012; Parkes et al., 2014).

Media influences can either increase or decrease sexual risk taking. One study asked more than a thousand 12- to 14-year-olds what movies they had seen, and then after age 18 asked them about their teen sexual experiences (O'Hara et al., 2012). After controlling for various adolescent and family characteristics, the more the adolescents viewed movies with high sexual content, the greater was their sexual risk taking—with earlier debut, more partners, and inconsistent condom use. Another study analyzed the effect of MTV's series *16 and Pregnant*, which portrayed the consequences of unprotected sex and the challenges of having a child. By analyzing viewership and pregnancy rates over time in specific areas, the researchers concluded that the program led to a 6 percent reduction in the national teen pregnancy rate (Kearney & Levine, 2014).

Later sex may pay emotional dividends. One national study followed participants to about age 30. Even after controlling for several other factors, those who had later first sex reported greater relationship satisfaction in their marriages and partnerships (Harden, 2012). Several other factors also predict sexual restraint:

- *High intelligence* Teens with high rather than average intelligence test scores more often delayed sex, partly because they appreciated possible negative consequences and were more focused on future achievement than on here-and-now pleasures (Halpern et al., 2000).
- *Religious engagement* Actively religious teens have more often reserved sexual activity for adulthood (Hull et al., 2011; Lucero et al., 2008).
- *Father presence* In studies that followed hundreds of New Zealand and U.S. girls from age 5 to 18, a father's absence was linked to sexual activity before age 16 and to teen pregnancy (Ellis et al., 2003). These associations held even after adjusting for other adverse influences, such as poverty. Close family attachments—families that eat together and where parents know their teens' activities and friends—also predicted later sexual initiation (Coley et al., 2008).
- *Participation in service learning programs* Several experiments have found that teens volunteering as tutors or teachers' aides, or participating in community projects, had lower pregnancy rates than were found among comparable teens randomly assigned to control conditions (Kirby, 2002; O'Donnell et al., 2002). Researchers are unsure why. Does service learning promote a sense of personal competence, control, and responsibility? Does it encourage more future-oriented thinking? Or does it simply reduce opportunities for unprotected sex?

Apic/Moviepix/Getty Images

Keeping abreast of hypersexuality An analysis of the 60 top-selling video games found 489 characters, 86 percent of whom were males (like most of the game players). The female characters were much more likely than the male characters to be "hypersexualized"—partially nude or revealingly clothed, with large breasts and tiny waists (Downs & Smith, 2010). Such depictions can lead to unrealistic expectations about sexuality and contribute to the early sexualization of girls. The American Psychological Association suggests countering this by teaching girls to "value themselves for who they are rather than how they look" (APA, 2007).

RETRIEVAL PRACTICE

- Which THREE of the following five factors contribute to unplanned teen pregnancies?
  - a. Alcohol use
  - b. Higher intelligence level
  - c. Unprotected sex
  - d. Mass media models
  - e. Increased communication about options

ANSWERS: a., c., d.

Sexual Orientation

35-6 What has research taught us about sexual orientation?

To motivate is to energize and direct behavior. So far, we have considered the energizing of sexual motivation but not its direction, which is our **sexual orientation**—our enduring sexual attraction toward members of our own sex *(homosexual orientation)*, the other sex *(heterosexual orientation)*, or both sexes *(bisexual orientation)*. We experience this attraction in our interests, thoughts, and fantasies (who's that person in your imagination?). Cultures vary in their attitudes toward same-sex attractions. "Should society accept homosexuality?" *Yes*, say 88 percent of Spaniards, 80 percent of Canadians, 60 percent of Americans, 39 percent of South Koreans, 21 percent of Chinese, and 1 percent of Nigerians, with women everywhere being more accepting than men (Pew, 2013). Yet whether a culture condemns or accepts same-sex unions, heterosexuality prevails.

In one British survey, of the 18,876 people contacted, 1 percent were asexual, having "never felt sexually attracted to anyone at all" (Bogaert, 2004, 2006b; 2012). People identifying as asexual are, however, nearly as likely as others to report masturbating, noting that it feels good, reduces anxiety, or "cleans out the plumbing."

Sexual Orientation: The Numbers

How many people are exclusively homosexual? About 10 percent, as the popular press has often assumed? Or 20 percent, as the average American estimated in a 2013 survey (Jones et al., 2014)? According to more than a dozen national surveys that have explored sexual orientation in Europe and the United States, a better estimate is about 3 or 4 percent of men and 2 percent of women (Chandra et al., 2011; Herbenick et al., 2010a; Savin-Williams et al., 2012). When Gallup asked 121,290 Americans about their sexual identity—"Do you, personally, identify as lesbian, gay, bisexual, or transgender?"—3.4 percent answered *Yes* (Gates & Newport, 2012). When the National Center for Health Statistics asked 34,557 Americans about their sexual identity, they found essentially the same result: All but 3.4 percent answered "straight," with 1.6 percent answering "gay" or "lesbian" and 0.7 percent saying "bisexual" (Ward et al., 2014).

Survey methods that absolutely guarantee people's anonymity reveal another percent or two of gay people (Coffman et al., 2013). Moreover, people in less tolerant places are more likely to hide their sexual orientation. About 3 percent of California men express a same-sex preference on Facebook, for example, as do only about 1 percent in Mississippi. Yet about 5 percent of Google pornography searches in both states are for gay porn. And Craigslist ads for males seeking "casual encounters" with other men tend to be at least as large in less tolerant states, where there are also more Google searches for "Is my husband gay?" (Stephens-Davidowitz, 2013).

Fewer than 1 percent of people—for example, only 12 people out of 7076 Dutch adults in one survey (Sandfort et al., 2001)—reported being actively bisexual. A larger number of adults—13 percent of women and 5 percent of men in a U.S. National Center for Health Statistics survey—report some same-sex sexual contact during their lives (Chandra et al., 2011). And still more have had an occasional homosexual fantasy. In laboratory assessments, some self-identified bisexual men show a homosexual arousal pattern by responding with genital arousal mostly to male erotic images. Others exhibit increased viewing time and genital arousal to both male and female images (Cerny & Janssen, 2011; Lippa, 2013; Rieger et al., 2013; Rosenthal et al., 2012).

sexual orientation an enduring sexual attraction toward members of one's own sex (homosexual orientation), the other sex (heterosexual orientation), or both sexes (bisexual orientation).

What does it feel like to be homosexual in a heterosexual culture? If you are heterosexual, one way to understand is to imagine how you would feel if you were socially isolated for openly admitting or displaying your feelings toward someone of the other sex. How would you react if you overheard people making crude jokes about heterosexual people, or if most movies, TV shows, and advertisements portrayed (or implied) homosexuality? And how would you answer if your family members were pleading with you to change your heterosexual lifestyle and to enter into a homosexual marriage?

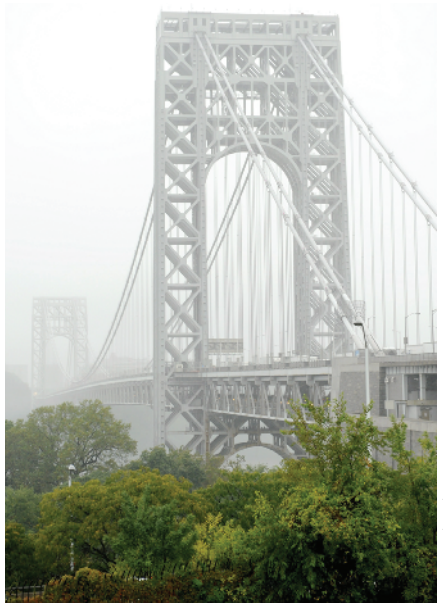
Facing such reactions, some individuals struggle with their sexual attractions, especially during adolescence and if feeling rejected by parents or harassed by peers. If lacking social support, the result may be lower self-esteem and higher anxiety and depression (Jager & Davis-Kean, 2011; Kwon, 2013; Oswalt & Wyatt, 2011), as well as an increased risk of contemplating suicide (Plöderl et al., 2013; Ryan et al., 2009; Wang et al., 2012). They may at first try to ignore or deny their desires, hoping they will go away. But they don't. Then they may try to change, through psychotherapy, willpower, or prayer. But the feelings typically persist, as do those of heterosexual people—who are similarly incapable of becoming homosexual (Haldeman, 1994, 2002; Myers & Scanzoni, 2005). Moreover, people's sexual orientation is so basic to who they are that it operates unconsciously, as seen in experiments that draw their attention toward particular flashed nude images not consciously perceived.

Today's psychologists therefore view sexual orientation as neither willfully chosen nor willfully changed. "Efforts to change sexual orientation are unlikely to be successful and involve some risk of harm," declared a 2009 American Psychological Association report. Sexual orientation in some ways is like handedness: Most people are one way, some the other. A very few are truly ambidextrous. Regardless, the way one is endures.

This conclusion is most strongly established for men. Women's sexual orientation tends to be less strongly felt and potentially more fluid and changing (Chivers, 2005; Diamond, 2008; Dickson et al., 2013). In general, men are sexually simpler. Their lesser sexual variability is apparent in many ways, notes Roy Baumeister (2000). Across time, across cultures, across situations, and across differing levels of education, religious observance, and peer influence, adult women's sexual drive and interests are more flexible and varying than are adult men's. Women, for example, more often prefer to alternate periods of high sexual activity with periods of almost none (Mosher et al., 2005). In their pupil dilation and genital responses to erotic videos, and in their implicit attitudes, heterosexual women exhibit more bisexual attraction than do men (Rieger & Savin-Williams, 2012; Snowden & Gray, 2013). Baumeister calls women's more varying sexuality a difference in *erotic plasticity*.

In men, a high sex drive is associated with increased attraction to women (if heterosexual), or men (if homosexual). In women, a high sex drive is generally associated with increased attraction to both men and women (Lippa, 2006, 2007a; Lippa et al., 2010). When shown sexually explicit film clips, men's genital and subjective sexual arousal is mostly to preferred sexual stimuli (for heterosexual viewers, depictions of women). Women respond more nonspecifically to depictions of sexual activity involving males or females (Chivers et al., 2007).

Is there truth to the homosexual-as-child-molester stereotype? *No.* Measuring men's genital response to various sexual images indicates that sexual orientation is unrelated to pedophilia (Blanchard et al., 2009; Herek, 2014). A Canadian research team led by Ray Blanchard (2012; Dreger, 2011) outfitted 2278 men (mostly sex offenders) with a device that measured their "phallometric response" to viewing nude photos of adults and children of both sexes, accompanied by sexual audio stories. Most of the men responded not to children, but to adult men (if gay) or to adult women (if straight). Some of the men exhibited pedophilia, by instead responding mostly to young boys or girls, and much less to adults.



Stan Honda/AFP/Getty Images

Driven to suicide In 2010, Rutgers University student Tyler Clementi jumped off this bridge after his intimate encounter with another man reportedly became known. Reports then surfaced of other gay teens who had reacted in a similarly tragic fashion after being taunted. Since 2010, Americans—especially those under 30—have been increasingly supportive of those with same-sex orientations.

Personal values affect sexual orientation less than they affect other forms of sexual behavior Compared with people who rarely attend religious services, for example, those who attend regularly are one-third as likely to have lived together before marriage, and they report having had many fewer sex partners. But (if male) they are just as likely to be homosexual (Smith, 1998).

Stephen J. Carrerra/AP Photo

Note that the scientific question is not "What causes homosexuality?" (or "What causes heterosexuality?") but "What causes differing sexual orientations?" In pursuit of answers, psychological science compares the backgrounds and physiology of people whose sexual orientations *differ.*

Origins of Sexual Orientation

So, our sexual orientation is something we do not choose and (especially for males) cannot change. Where, then, do these preferences come from? See if you can anticipate the conclusions that have emerged from hundreds of research studies by responding *Yes* or *No* to the following questions:

1. Is homosexuality linked with problems in a child's relationships with parents, such as with a domineering mother and an ineffectual father, or a possessive mother and a hostile father?
2. Does homosexuality involve a fear or hatred of people of the other sex, leading individuals to direct their desires toward members of their own sex?
3. Is sexual orientation linked with levels of sex hormones currently in the blood?
4. As children, were most homosexuals molested, seduced, or otherwise sexually victimized by an adult homosexual?

The answer to all these questions has been *No* (Storms, 1983). In a search for possible environmental influences on sexual orientation, Kinsey Institute investigators interviewed nearly 1000 homosexuals and 500 heterosexuals. They assessed nearly every imaginable psychological cause of homosexuality—parental relationships, childhood sexual experiences, peer relationships, dating experiences (Bell et al., 1981; Hammersmith, 1982). Their findings: Homosexuals are no more likely than heterosexuals to have been smothered by maternal love or neglected by their father. In one national survey of nearly 35,000 adults, those with a same-sex attraction were somewhat more likely to report having experienced child sexual abuse. But 86 percent of the men and 75 percent of the women with same-sex attraction reported no such abuse (Roberts et al., 2013).

And consider this: If "distant fathers" were more likely to produce homosexual sons, then shouldn't boys growing up in father-absent homes more often be gay? (They are not.) And shouldn't the rising number of such homes have led to a noticeable increase in the gay population? (It has not.) Most children raised by gay or lesbian parents grow up straight and well-adjusted (Gartrell & Bos, 2010).

So, what else might influence sexual orientation? One theory has proposed that people develop same-sex erotic attachments if segregated by sex at the time their sex drive matures (Storms, 1981). Indeed, gay men tend to recall going through puberty somewhat earlier, when peers are more likely to be all males (Bogaert et al., 2002). But even in tribal cultures in which homosexual behavior is expected of all boys before marriage, heterosexuality prevails (Hammack, 2005; Money, 1987). (As this illustrates, homosexual *behavior* does not always indicate a homosexual *orientation*.) Moreover, though peer network attitudes predict teens' sexual attitudes and behavior, they do not predict same-sex attraction. "Peer influence has little or no effect" on sexual orientation (Brakefield et al., 2014).

Juliet and Juliet Boston's beloved swan couple, "Romeo and Juliet," were discovered actually to be, as are many other animal partners, a same-sex pair.

John Tlumacki/The Boston Globe/Getty Images

The bottom line from a half-century's theory and research: If there are environmental factors that influence sexual orientation, we do not yet know what they are. This reality has motivated researchers to explore same-sex behaviors in animals and to consider gay-straight brain differences, genetics, and prenatal influences.

Same-Sex Attraction in Other Species In Boston's Public Gardens, caretakers solved the mystery of why a much-loved swan couple's eggs never hatched. Both swans were female. In New York City's Central Park Zoo, penguins Silo and Roy spent several years as devoted same-sex partners. Same-sex sexual behaviors

have also been observed in several hundred other species, including grizzlies, gorillas, monkeys, flamingos, and owls (Bagemihl, 1999). Among rams, for example, some 7 to 10 percent display same-sex attraction by shunning ewes and seeking to mount other males (Perkins & Fitzgerald, 1997). Homosexual behavior seems a natural part of the animal world.

Gay-Straight Brain Differences Researcher Simon LeVay (1991) studied sections of the hypothalamus taken from deceased heterosexual and homosexual people. As a gay scientist, LeVay wanted to do "something connected with my gay identity." To avoid biasing the results, he did a *blind study,* not knowing which donors were gay. For nine months he peered through his microscope at a cell cluster he thought might be important. Then, one morning, he broke the code: One cell cluster was reliably larger in heterosexual men than in women and homosexual men. "I was almost in a state of shock," LeVay said (1994). "I took a walk by myself on the cliffs over the ocean. I sat for half an hour just thinking what this might mean."

It should not surprise us that in other ways, too, brains differ with sexual orientation (Bao & Swaab, 2011; Savic & Lindström, 2008). Remember our maxim: *Everything psychological is simultaneously biological.* But when do such brain differences begin? At conception? In the womb? During childhood or adolescence? Does experience produce these differences? Or is it genes or prenatal hormones (or genes via prenatal hormones)?

LeVay does not view the hypothalamus as a sexual orientation center; rather, he sees it as an important part of the neural pathway engaged in sexual behavior. He acknowledges that sexual behavior patterns may influence the brain's anatomy. In fish, birds, rats, and humans, brain structures vary with experience—including sexual experience, reports sex researcher Marc Breedlove (1997). But LeVay believes it more likely that brain anatomy influences sexual orientation. His hunch seems confirmed by the discovery of a similar hypothalamic difference between the male sheep that do and don't display same-sex attraction (Larkin et al., 2002; Roselli et al., 2002, 2004). Moreover, report University of London psychologists Qazi Rahman and Glenn Wilson (2003), "the neuroanatomical correlates of male homosexuality differentiate very early postnatally, if not prenatally."

Responses to hormone-derived sexual scents also point to a brain difference (Savic et al., 2005). When straight women were given a whiff of a scent derived from men's sweat, their hypothalamus activated in an area governing sexual arousal. Gay men's brains responded similarly to the men's scent. But straight men's brains showed the arousal response only to a female hormone derivative. Other studies of brain responses to sex-related sweat odors and to pictures of male and female faces have found similar gay-straight differences, including differing responses between lesbians and straight women (Kranz & Ishai, 2006; Martins et al., 2005).

"Gay men simply don't have the brain cells to be attracted to women."

Simon LeVay, *The Sexual Brain,* 1993

Genetic Influences Evidence indicates a genetic influence on sexual orientation. "First, homosexuality does appear to run in families," noted Brian Mustanski and Michael Bailey (2003). "Second, twin studies have established that genes play a substantial role in explaining individual differences in sexual orientation." Identical twins are somewhat more likely than fraternal twins to share a homosexual orientation (Alanko et al., 2010; Långström et al., 2008, 2010). (Because sexual orientations differ in many identical twin pairs, especially female twins, we know that other factors besides genes are also at work.)

By genetic manipulations, experimenters have created female fruit flies that during courtship act like males (pursuing other females) and males that act like females (Demir & Dickson, 2005). "We have shown that a single gene in the fruit fly is sufficient to determine all aspects of the flies' sexual orientation and behavior," explained

Barry Dickson (2005). With humans, it's likely that multiple genes, possibly in interaction with other influences, shape sexual orientation. A genome-wide study of 409 pairs of gay brothers identified sexual orientation links with areas of two chromosomes, one maternally transmitted (Sanders et al., 2014). And molecules attached to genes may affect their expression. Some scientists speculate that, by affecting sensitivity to testosterone, such epigenetic influences might also cause the masculinization of females in the womb, or the feminization of males (Rice et al., 2012).

Researchers have speculated about possible reasons why "gay genes" might exist in the human gene pool, given that same-sex couples cannot naturally reproduce. One possible answer is kin selection. It is important to note the evolutionary psychology reminder that many of our genes also reside in our biological relatives. Perhaps, then, gay people's genes live on through their supporting the survival and reproductive success of their nieces, nephews, and other relatives (who also carry many of the same genes). Gay men make generous uncles, suggests one study of Samoans (Vasey & VanderLaan, 2010).

A *fertile females theory* offers further support for the idea that maternal genetics may be at work (Bocklandt et al., 2006). Recent Italian studies confirm what others have found—that homosexual men tend to have more homosexual relatives on their mother's side than on their father's (Camperio-Ciani et al., 2004, 2009, 2012; VanderLaan et al., 2011, 2012). And the relatives on the mother's side also produce more offspring than do the maternal relatives of heterosexual men. Perhaps the genes that dispose women to be strongly attracted (or attractive) to men, and therefore to have more children, also dispose some men to be attracted to men (LeVay, 2011). Thus, the decreased reproduction by gay men appears offset by the increased reproduction by their maternal extended family.

Prenatal Influences Elevated rates of homosexual orientation in identical *and* fraternal twins suggest the influence not only of shared genes but also a shared prenatal environment. In animals and some human cases, prenatal hormone conditions have altered a fetus' sexual orientation. German researcher Gunter Dorner (1976, 1988) pioneered research on the influence of prenatal hormones by manipulating a fetal rat's exposure to male hormones, thereby "inverting" its sexual orientation. In other studies, when pregnant sheep were injected with testosterone during a critical period of fetal development, their female offspring later showed homosexual behavior (Money, 1987).

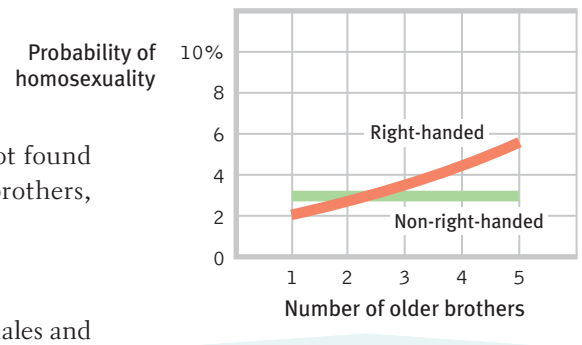
A critical period for the human brain's neural-hormonal control system may exist between the middle of the second and fifth months after conception (Ellis & Ames, 1987; Gladue, 1990; Meyer-Bahlburg, 1995). Exposure to the hormone levels typically experienced by female fetuses during this time appears to predispose the person (whether female or male) to be attracted to males in later life. "Prenatal sex hormones control the sexual differentiation of brain centers involved in sexual behaviors," notes Simon LeVay (2011, p. 216). Thus, female fetuses most exposed to testosterone, and male fetuses least exposed to testosterone, appear most likely later to exhibit gender-atypical traits and to experience same-sex desires.

"Modern scientific research indicates that sexual orientation is . . . partly determined by genetics, but more specifically by hormonal activity in the womb."

Glenn Wilson and Qazi Rahman, *Born Gay: The Psychobiology of Sex Orientation,* 2005

The mother's immune system may also play a role in the development of sexual orientation. Men who have older brothers are somewhat more likely to be gay, report Ray Blanchard (2004, 2008a,b, 2014) and Anthony Bogaert (2003)—about one-third more likely for each additional older brother. If the odds of homosexuality are roughly 2 percent among first sons, they would rise to nearly 3 percent among second sons, 4 percent for third sons, and so on for each additional older brother (see **FIGURE 35.2**). The reason for this curious phenomenon—the *older brother* or *fraternal birth-order effect*—is unclear. Blanchard suspects a defensive maternal immune response to foreign substances produced by male fetuses. With each pregnancy with a male fetus, the maternal antibodies may become stronger and may

prevent the fetus' brain from developing in a male-typical pattern. Consistent with this biological explanation, the fraternal birth-order effect occurs only in men with older brothers born to the same mother (whether raised together or not). Sexual orientation is unaffected by adoptive brothers (Bogaert, 2006b). The birth-order effect on sexual orientation is not found among women with older sisters, women who were womb-mates of twin brothers, and men who are not right-handed (Rose et al., 2002).



▼ FIGURE 35.2
The fraternal birth-order effect
Researcher Ray Blanchard (2008a) offers these approximate curves depicting a man's likelihood of homosexuality as a function of his number of older brothers. This correlation has been found in several studies, but only among right-handed men (as about 9 in 10 men are).

Gay-Straight Trait Differences

On several traits, gays and lesbians appear to fall midway between straight females and males (**TABLE 35.1**; see also LeVay, 2011; Rahman & Koerting, 2008). For example, lesbians' cochlea and hearing systems develop in a way that is intermediate between those of heterosexual females and heterosexual males, which seems attributable to prenatal hormonal influence (McFadden, 2002). Gay men tend to be shorter and lighter, even at birth, than straight men, while women in same-sex marriages were mostly heavier than average at birth (Bogaert, 2010; Frisch & Zdravkovic, 2010). Fingerprint ridge counts may also differ: Although most people have more fingerprint ridges on their right hand than on their left, some studies find a greater right-left difference in heterosexual males than in females and gay males (Hall & Kimura, 1994; Mustanski et al., 2002; Sanders et al., 2002). Given that fingerprint ridges are complete by the sixteenth fetal week, this difference may be due to prenatal hormones.

▼ TABLE 35.1
Biological Correlates of Sexual Orientation

Gay-straight trait differences

Sexual orientation is part of a package of traits. Studies—some in need of replication—indicate that homosexuals and heterosexuals differ in the following biological and behavioral traits.

- spatial abilities
- fingerprint ridge counts
- auditory system development
- handedness
- occupational preferences
- relative finger lengths
- gender nonconformity
- age of onset of puberty in males
- birth size and weight
- sleep length
- physical aggression
- walking style

On average (the evidence is strongest for males), results for gays and lesbians fall between those of straight men and straight women. Three biological influences—brain, genetic, and prenatal—may contribute to these differences.

Brain differences

- One hypothalamic cell cluster is smaller in women and gay men than in straight men.
- Gay men's hypothalamus reacts as do straight women's to the smell of sex-related hormones.

Genetic influences

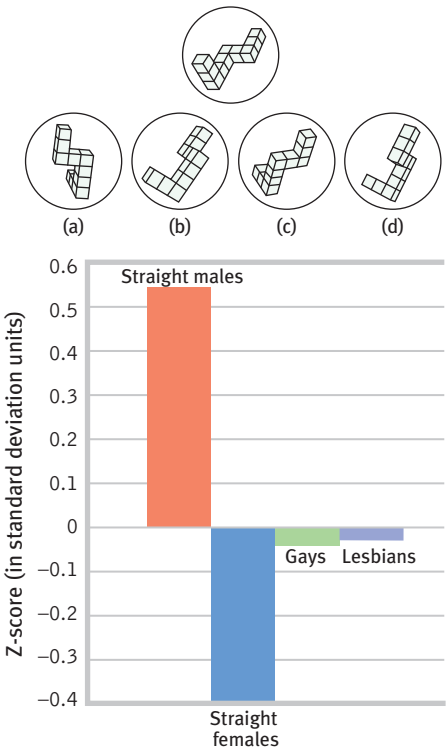
- Shared sexual orientation is higher among identical twins than among fraternal twins.
- Sexual attraction in fruit flies can be genetically manipulated.
- Male homosexuality often appears to be transmitted from the mother's side of the family.

Prenatal influences

- Altered prenatal hormone exposure may lead to homosexuality in humans and other animals.
- Men with several older biological brothers are more likely to be gay, possibly due to a maternal immune-system reaction.

Video material is provided by BBC Worldwide Learning and CBS News Archives, and produced by Princeton Academic Resources.

LaunchPad For an 8-minute overview of the biology of sexual orientation, see LaunchPad's ***Video: Homosexuality and the Nature-Nurture Debate.***



▼ FIGURE 35.3

Spatial abilities and sexual orientation Which of the four figures can be rotated to match the target figure at the top? Straight males tend to find this an easier task than do straight females, with gays and lesbians intermediate. (From Rahman et al., 2003, with 60 people tested in each group.)

Answer: Figures a and d.

"There is no sound scientific evidence that sexual orientation can be changed."

UK Royal College of Psychiatrists, 2009

Another you-never-would-have-guessed-it gay-straight difference appears in studies showing that gay men's spatial abilities resemble those typical of straight women (Cohen, 2002; Gladue, 1994; McCormick & Witelson, 1991; Sanders & Wright, 1997). On mental rotation tasks such as the one illustrated in **FIGURE 35.3**, straight men tend to outscore straight women. (So do women who were womb-mates of a male co-twin [Vuoksimaa et al., 2010].) Studies by Qazi Rahman and colleagues (2004, 2008) find that, as on a number of other measures, the scores of gays and lesbians fall between those of heterosexual males and females. But straight women and gays both outperform straight men at remembering objects' spatial locations in tasks like those found in memory games (Hassan & Rahman, 2007).

* * *

The consistency of the brain, genetic, and prenatal findings has swung the pendulum toward a biological explanation of sexual orientation (Rahman & Wilson, 2003; Rahman & Koerting, 2008). Still, some people wonder: Should the cause of sexual orientation matter? Perhaps it shouldn't, but people's assumptions matter. To justify his signing a 2014 bill that made some homosexual acts punishable by life in prison, the president of Uganda, Yoweri Museveni, declared that homosexuality is not inborn but rather is a matter of "choice" (Balter, 2014; Landau et al., 2014).

However, the new biological research is a double-edged sword (Diamond, 1993; Roan, 2010). If sexual orientation, like skin color and sex, is genetically influenced, that offers a further rationale for civil rights protection. At the same time, this research raises the troubling possibility that genetic markers of sexual orientation could someday be identified through fetal testing, that a fetus could be aborted simply for being predisposed to an unwanted orientation, or that hormonal treatment in the womb might engineer a desired orientation.

RETRIEVAL PRACTICE

- Which THREE of the following five factors have researchers found to have an effect on sexual orientation?
  a. A domineering mother
  b. Size of certain cell clusters in the hypothalamus
  c. Prenatal hormone exposure
  d. A distant or ineffectual father
  e. For men, having multiple older biological brothers

ANSWERS: b., c., e.

Sex and Human Values

35-7 Is scientific research on sexual motivation value free?

Recognizing that values are both personal and cultural, most sex researchers and educators strive to keep their writings value free. But the very words we use to describe behavior can reflect our personal values. Whether we label certain sexual behaviors as "perversions" or as an "alternative sexual lifestyle" depends on our attitude toward the behaviors. Labels describe, but they also evaluate.

Scientific research on sexual motivation does not aim to define the personal meaning of sex in our own lives. You could know every available fact about sex—that the initial spasms of male and female orgasm come at 0.8-second intervals, that the female nipples expand 10 millimeters at the peak of sexual arousal, that systolic blood pressure rises some 60 points and the respiration rate to 40 breaths per minute—but fail to understand the human significance of sexual intimacy.


Yuri Arcurs/Shutterstock

A sharing of love For most adults, a sexual relationship fulfills not only a biological motive but also a social need for intimacy.

Surely one significance of such intimacy is its expression of our profoundly social nature. One recent study asked 2035 married people when they started having sex (while controlling for education, religious engagement, and relationship length). Those whose relationship first developed to a deep commitment, such as marriage, not only reported greater relationship satisfaction and stability but also better sex (Busby et al., 2010; Galinsky & Sonenstein, 2013). For both men and women, but especially for women, orgasm occurs more often (and with less morning-after regret) when sex happens in a committed relationship rather than a sexual hook-up (Garcia et al., 2012, 2013). Partners who share regular meals are more likely than one-night dinner guests to have educated one another about what seasoning touches suit their food tastes; so likewise with the touches of loyal partners who share a bed.

The benefits of commitment—of "vow power"—apply regardless of sexual orientation. Gay and straight couples experience almost identical stability in their relationships, *if* they have married or entered into a civil union—and almost identical instability, if they have not (Rosenfeld, 2014). Thus, as the opportunity for straight and gay people to marry becomes more equal, we can expect the stability of their relationships to become more similar.

Sex is a socially significant act. Men and women can achieve orgasm alone, yet most people find greater satisfaction—and experience a much greater surge in the *prolactin* hormone associated with sexual satisfaction and satiety—after intercourse and orgasm with their loved one (Brody & Tillmann, 2006). Thanks to their overlapping brain reward areas, sexual desire and love feed each other (Cacioppo et al., 2012). Sex at its human best is life uniting and love renewing.

MODULE 35 REVIEW Sexual Motivation

LEARNING OBJECTIVES

RETRIEVAL PRACTICE Take a moment to answer each of these Learning Objective Questions (repeated here from within this module). Then turn to Appendix C, Complete Module Reviews, to check your answers. Research suggests that trying to answer these questions on your own will improve your long-term retention (McDaniel et al., 2009).

35-1 How do hormones influence human sexual motivation?

35-2 What is the human sexual response cycle, and how do sexual dysfunctions and paraphilias differ?

35-3 How can sexually transmitted infections be prevented?

35-4 How do external and imagined stimuli contribute to sexual arousal?

35-5 What factors influence teenagers' sexual behaviors and use of contraceptives?

35-6 What has research taught us about sexual orientation?

35-7 Is scientific research on sexual motivation value free?

TERMS AND CONCEPTS TO REMEMBER

RETRIEVAL PRACTICE Test yourself on these terms by trying to write down the definition before flipping back to the page number referenced to check your answer.

asexual, p. 433
testosterone, p. 433
estrogens, p. 433
sexual response cycle, p. 435
refractory period, p. 435
sexual dysfunction, p. 435
erectile disorder, p. 435
female orgasmic disorder, p. 435
paraphilias, p. 436
AIDS (acquired immune deficiency syndrome), p. 436
sexual orientation, p. 440

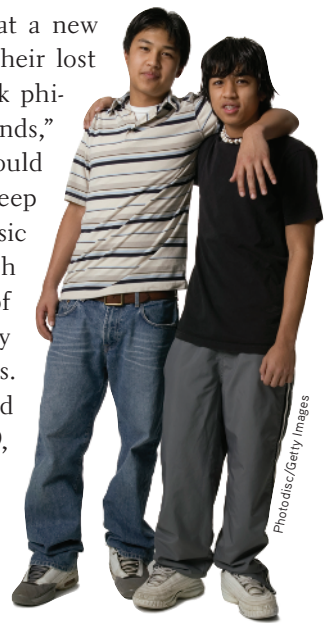
Use LearningCurve to create your personalized study plan, which will direct you to the resources that will help you most in LaunchPad.

MODULE 36 Affiliation and Achievement

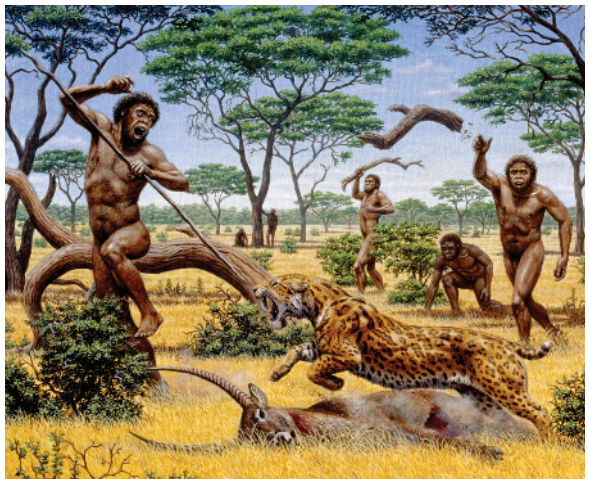
The Need to Belong

36-1 What evidence points to our human affiliation need—our need to belong?

affiliation need the need to build relationships and to feel part of a group.


Photodisc/Getty Images

Separated from friends or family—alone in prison or at a new school or in a foreign land—most people feel keenly their lost connections with important others. We are what Greek philosopher Aristotle called *the social animal*. "Without friends," wrote Aristotle in his *Nichomachean Ethics*, "no one would choose to live, though he had all other goods." This deep *need to belong*—our **affiliation need**—seems to be a basic human motivation (Baumeister & Leary, 1995). Although people vary in their wish for privacy and solitude, most of us seek to affiliate with others, even to become strongly attached to certain others in enduring, close relationships. Human beings, contended personality theorist Alfred Adler, have an "urge to community" (Ferguson, 1989, 2001, 2010). Our psychological needs drive our adaptive behaviors and, when satisfied, enhance our psychological well-being (Sheldon, 2011).


Mauricio Anton/Science Source

"We must love one another or die."

W. H. Auden, "September 1, 1939"

The Benefits of Belonging

Social bonds boosted our early ancestors' chances of survival. Adults who formed attachments were more likely to reproduce and to co-nurture their offspring to maturity. Attachment bonds motivated caregivers to keep children close, calming them and protecting them from threats (Esposito et al., 2013). Indeed, to be "wretched" literally means, in its Middle English origin *(wrecche)*, to be without kin nearby.

Cooperation also enhanced survival. In solo combat, our ancestors were not the toughest predators. But as hunters, they learned that six hands were better than two. As food gatherers, they gained protection from two-footed and four-footed enemies by traveling in groups. Those who felt a need to belong survived and reproduced most successfully, and their genes now predominate. We are innately social creatures. Our need to belong drives us to befriend people who cooperate and avoid those who exploit (Feinberg et al., 2014). People in every society on Earth belong to groups and prefer and favor "us" over "them."

Do you have close friends—people with whom you freely disclose your ups and downs? Having someone who rejoices with us over good news helps us feel even better about the good news, as well as about the friendship (Reis et al., 2010). Close friends can literally make us feel warm, as if we are holding a soothing cup of warm tea (Inagaki & Eisenberger, 2013). The need to belong runs deeper, it seems, than any need to be rich. One study found that *very* happy university students were distinguished not by their money but by their "rich and satisfying close relationships" (Diener & Seligman, 2002).

The need to belong colors our thoughts and emotions. We spend a great deal of time thinking about actual and hoped-for relationships. When relationships form, we often feel joy. Falling in mutual love, people have been known to feel their cheeks ache from their irrepressible grins. Asked, "What is necessary for your happiness?" or "What is it that makes your life meaningful?" most people have mentioned—before anything else—close, satisfying relationships with family, friends, or romantic partners (Berscheid, 1985). Happiness hits close to home.

Consider: What was your most satisfying moment in the past week? Researchers asked that question of American and South Korean collegians, then asked them to rate how much that moment had satisfied various needs (Sheldon et al., 2001). In both countries, the peak moment had contributed most to satisfaction of self-esteem and relatedness-belonging needs. When our need for relatedness is satisfied in balance with two other basic psychological needs—*autonomy* (a sense of personal control) and *competence*—we experience a deep sense of well-being, and our self-esteem rides high (Deci & Ryan, 2002, 2009; Milyavskaya et al., 2009). Indeed, *self-esteem* is a gauge of how valued and accepted we feel (Leary, 2012).

Is it surprising, then, that so much of our social behavior aims to increase our feelings of belonging? To gain acceptance, we generally conform to group standards. We wait in lines, obey laws, and help group members. We monitor our behavior, hoping to make a good impression. We spend billions on clothes, cosmetics, and diet and fitness aids—all motivated by our search for love and acceptance.

By drawing a sharp circle around "us," the need to belong feeds both deep attachments and menacing threats. Out of our need to define a "we" come loving families, faithful friendships, and team spirit, but also teen gangs, ethnic rivalries, and fanatic nationalism.

For good or for bad, we work hard to build and maintain our relationships. Familiarity breeds liking, not contempt. Thrown together in groups at school, at work, in a tornado shelter, we behave like magnets, moving closer, forming bonds. Parting, we feel distress. We promise to call, to write, to return for reunions.

This happens in part because feelings of love activate brain reward and safety systems. In one experiment involving exposure to heat, deeply-in-love university students felt markedly less pain when looking at their beloved's picture (rather than viewing someone else's photo or being distracted by a word task) (Younger et al., 2010). Pictures of our loved ones also activate a brain region associated with safety—the prefrontal cortex—that dampens feelings of physical pain (Eisenberger et al., 2011). Love is a natural painkiller.

Even when bad relationships break, people suffer. In one 16-nation survey, and in repeated U.S. surveys, separated and divorced people have been half as likely as married people to say they were "very happy" (Inglehart, 1990; NORC, 2010). Divorce also predicts earlier mortality. Studies that have followed 6.5 million people in 11 countries reveal that, compared with married people, separated and divorced people are at greater risk for early death (Sbarra et al., 2011).

Children who move through a series of foster homes or through repeated family relocations know the fear of being alone. After repeated disruption of budding attachments, they may have difficulty forming deep attachments (Oishi & Schimmack, 2010). The evidence is clearest at the extremes—the children who grow up in institutions without a sense of belonging to anyone, or who are locked away at home and severely neglected. Too many become withdrawn, frightened, speechless.

No matter how secure our early years were, we all experience anxiety, loneliness, jealousy, or guilt when something threatens or dissolves our social ties. Much as life's best moments occur when close relationships begin—making a new friend, falling in love, having a baby—life's worst moments happen when close relationships end (Jaremka et al., 2011). Bereaved, we may feel life is empty, pointless. Even the first weeks of living on a college campus can be distressing. But our need to belong pushes us to form a new web of social connections (Oishi et al., 2013).

The need to connect Six days a week, women from the Philippines work as "domestic helpers" in 154,000 Hong Kong households. On Sundays, they throng to the central business district to picnic, dance, sing, talk, and laugh. "Humanity could stage no greater display of happiness," reported one observer (*Economist,* 2001).

Vincent Yu/AP Photo

For immigrants and refugees moving alone to new places, the stress and loneliness can be depressing. After years of placing individual families in isolated communities, U.S. immigration policies began to encourage *chain migration* (Pipher, 2002). The second refugee Sudanese family settling in a town generally has an easier adjustment than the first.

Social isolation can put us at risk for mental decline and ill health (Cacioppo & Hawkley, 2009). But if feelings of acceptance and connection increase, so will self-esteem, positive feelings, and physical health (Blackhart et al., 2009; Holt-Lunstad et al., 2010; Smart Richman & Leary, 2009). A socially connected life is often a happy and healthy life.

Enduring the pain of ostracism
Caucasian cadets at the United States Military Academy at West Point ostracized Henry Flipper for years, hoping he would drop out. He somehow resisted their cruelty and in 1877 became the first African-American West Point graduate.

The Pain of Being Shut Out

Can you recall feeling excluded or ignored or shunned? Perhaps you received the silent treatment. Perhaps people avoided you or averted their eyes in your presence or even mocked you behind your back. If you are like others, even being in a group speaking a different language may have left you feeling excluded, a linguistic outsider (Dotan-Elias et al., 2009). In one mock-interview study, women felt more excluded if interviewers used gender-exclusive language *(he, his, him)* rather than inclusive *(his* or *her)* or neutral *(their)* language (Stout & Dasgupta, 2011).

All these experiences are instances of **ostracism**—of social exclusion (Williams, 2007, 2009). Worldwide, humans use many forms of ostracism—exile, imprisonment, solitary confinement—to punish, and therefore control, social behavior. For children, even a brief time-out in isolation can be punishing. Asked to describe personal episodes that made them feel especially *bad* about themselves, people will—about four times in five—describe a relationship difficulty (Pillemer et al., 2007). Feelings of loneliness can also spread through a social network—like a disease—as people complain of loneliness (Cacioppo et al., 2009).

Being shunned—given the cold shoulder or the silent treatment, with others' eyes avoiding yours—threatens one's need to belong (Wirth et al., 2010). "It's the meanest thing you can do to someone, especially if you know they can't fight back. I never should have been born," said Lea, a lifelong victim of the silent treatment by her mother and grandmother. Like Lea, people often respond to ostracism with initial efforts to restore their acceptance, depressed moods, and then withdrawal. William Blake has spent more than 25 years incarcerated in solitary confinement. "I cannot fathom how dying any death could be harder and more terrible than living through all that I have been forced to endure," he said (Blake, 2012). To him, social exclusion is a sentence worse than death.

To experience ostracism is to experience real pain, as social psychologists Kipling Williams and his colleagues were surprised to discover in their studies of exclusion on social media (Gonsalkorale & Williams, 2006). (Perhaps you can recall the feeling of being unfriended or having few followers on a social networking site, being ignored in a chat room, or having a text message or e-mail go unanswered.) Such ostracism, they discovered, takes a toll: It elicits increased activity in brain areas, such as the *anterior cingulate cortex*, that also activate in response to physical pain (Eisenberger, 2012; Kross et al., 2011). When viewing pictures of romantic partners who caused our hearts to break, our brains and bodies begin to ache (Wager et al., 2013). That helps explain another surprising finding: The pain-reliever acetaminophen (as in Tylenol and Anacin) lessens *social* as well as physical pain (DeWall et al., 2010). Across cultures, people use the same words (for example, *hurt, crushed*) for social pain and physical pain (MacDonald & Leary, 2005). Psychologically, we seem to experience social pain with the same emotional unpleasantness that marks physical pain.

ostracism deliberate social exclusion of individuals or groups.

CBS Photo Archive/Getty Images

Social acceptance and rejection Successful participants on the reality TV show *Survivor* form alliances and gain acceptance among their peers. The rest receive the ultimate social punishment as they are "voted off the island."

Pain, whatever its source, focuses our attention and motivates corrective action. Rejected and unable to remedy the situation, people may relieve stress by seeking new friends, eating comforting but calorie-laden foods (such as ice cream), or strengthening their religious faith (Aydin et al., 2010; Maner et al., 2007; Sproesser et al., 2014). Or they may turn nasty. In a series of experiments, researchers told some students (who had taken a personality test) that they were "the type likely to end up alone later in life," or that people they had met didn't want them in a group that was forming (Baumeister et al., 2002; Gaertner et al., 2008; Twenge et al., 2001, 2002, 2007). They told other students that they would have "rewarding relationships throughout life," or that "everyone chose you as someone they'd like to work with." Those who were excluded became much more likely to engage in self-defeating behaviors and to underperform on aptitude tests. The rejection also interfered with their empathy for others and made them more likely to act in disparaging or aggressive ways against those who had excluded them (blasting them with noise, for example). "If intelligent, well-adjusted, successful . . . students can turn aggressive in response to a small laboratory experience of social exclusion," noted the research team, "it is disturbing to imagine the aggressive tendencies that might arise from . . . chronic exclusion from desired groups in actual social life." Indeed, as Williams (2007) has observed, ostracism "weaves through case after case of school violence."

Note: The researchers later *debriefed* and reassured the participants.

RETRIEVAL PRACTICE

- How have students reacted in studies where they were made to feel rejected and unwanted? What helps explain these results?

ANSWER: These students' basic *need to belong* seems to have been disrupted. They engaged in more self-defeating behaviors, underperformed on aptitude tests, and displayed less empathy and more aggression.

Connecting and Social Networking

36-2 How does social networking influence us?

As social creatures, we live for connection. Researcher George Vaillant (2013) was asked what he had learned from studying 238 Harvard University men from the 1930s to the end of their lives. He replied, "Happiness is love." A South African Zulu saying captures the idea: *Umuntu ngumuntu ngabantu*—"a person is a person through other persons."

"If no one turned around when we entered, answered when we spoke, or minded that we did, but if every person we met 'cut us dead,' and acted as if we were non-existing things, a kind of rage and impotent despair would ere long well up in us."

William James, *Principles of Psychology,* 1890/1950, pp. 293–294

Mobile Networks and Social Media Look around and see humans connecting: talking, tweeting, texting, posting, chatting, social gaming, e-mailing. The changes in how we connect have been fast and vast.

"There's no question in my mind about what stands at the heart of the communication revolution—the human desire to connect."

Skype President Josh Silverman, 2009


Image Source/SuperStock

- At the end of 2013, the world had 7.1 billion people and 6.8 billion mobile cell-phone subscriptions (ITU, 2013). But phone talking now accounts for less than half of U.S. mobile network traffic (Wortham, 2010). In Canada and elsewhere, e-mailing is being displaced by texting, social media sites, and other messaging technology (IPSOS, 2010a). Speedy texting is not really writing, said one observer (McWhorter, 2012), but rather a new form of conversation—"fingered speech."
- Three in four U.S. teens text. Half (mostly females) send 60 or more texts daily (Lenhart, 2012). For many, it's as though friends, for better or worse, are always present.
- How many of us are using social networking sites, such as Facebook or Twitter? Among 2010's entering American collegians, 94 percent were (Pryor et al., 2011). With so many of your friends on a social network, its lure becomes hard to resist. Such is our need to belong. Check in or miss out.

The Net Result: Social Effects of Social Networking By connecting like-minded people, the Internet serves as a social amplifier. In times of social crisis or personal stress, it provides information and supportive connections. It also functions as an online dating matchmaker. (I [ND] can attest to this. I met my wife online.) As electronic communication has become an integral part of life, researchers have explored how it has affected our relationships.

HAVE SOCIAL NETWORKING SITES MADE US MORE, OR LESS, SOCIALLY ISOLATED? Online communication in chat rooms and during social games used to be mostly between strangers. In that period, the adolescents and adults who spent more time online thus spent less time with friends; as a result, their offline relationships suffered (Kraut et al., 1998; Mesch, 2001; Nie, 2001). Even in more recent times, lonely people have tended to spend greater-than-average time online, while social butterflies have gravitated toward face-to-face interactions (Bonetti et al., 2010; Pea et al., 2012; Stepanikova et al., 2010). Social networkers have been less likely to know their real-world neighbors and "64 percent less likely than non-Internet users to rely on neighbors for help in caring for themselves or a family member" (Pew, 2009).

But the Internet has also diversified our social networks. (I [DM] am now connected to other hearing-technology advocates across the world.) And despite the decrease in neighborliness, social networking is mostly strengthening our connections with the variety of people we already know (DiSalvo, 2010; Ugander et al., 2012; Valkenburg & Peter, 2009). If your social networking helps you connect with friends, stay in touch with extended family, or find support when facing challenges, then you are not alone (Rainie et al., 2011). Social networks connect us. But they can also, as you've surely noticed, become gigantic time- and attention-sucking distractions that interfere with sleep, exercise, and face-to-face relationships. If you are like most other students, two days without social networking access would be followed by a glut of online time, much as a two-day food fast would be followed by a period of feasting (Sheldon et al., 2011). The net result is an imbalance between face-to-face and online social connection.

DOES ELECTRONIC COMMUNICATION STIMULATE HEALTHY SELF-DISCLOSURE? *Self-disclosure* is sharing ourselves—our joys, worries, and weaknesses—with others. Confiding can be a healthy way of coping with day-to-day challenges. When communicating electronically rather than face to face, we often are

less focused on others' reactions. We are less self-conscious and thus less inhibited. Sometimes this is taken to an extreme, as when teens send photos of themselves they later regret, or bullies hound a victim, or hate groups post messages promoting bigotry or crimes. More often, however, the increased self-disclosure serves to deepen friendships (Valkenburg & Peter, 2009).

Although electronic networking pays dividends, nature has designed us for face-to-face communication, which appears to be a better predictor of life satisfaction (Killingsworth & Gilbert, 2010; Lee et al., 2011). Texting, tweeting, and e-mailing are rewarding, but eye-to-eye conversation is even more so.

DO SOCIAL NETWORKING PROFILES AND POSTS REFLECT PEOPLE'S ACTUAL PERSONALITIES? We've all heard stories of online predators hiding behind false personalities, values, and motives. Generally, however, social networks reveal a person's real personality. In one study, participants completed a personality test twice. In one test, they described their "actual personality"; in the other, they described their "ideal self." Other volunteers then used the participants' Facebook profiles to create an independent set of personality ratings. The Facebook-profile ratings were much closer to the participants' actual personalities than to their ideal personalities (Back et al., 2010). In another study, people who seemed most likable on their Facebook page also seemed most likable in face-to-face meetings (Weisbuch et al., 2009). Twitter posts similarly reveal people's actual friendliness (Qiu et al., 2012). Your online profiles and tweets may indeed reflect the real you!

DOES SOCIAL NETWORKING PROMOTE NARCISSISM? **Narcissism** is self-esteem gone wild. Narcissistic people are self-important, self-focused, and self-promoting. Some personality tests assess narcissism with items such as "I like to be the center of attention." People with high narcissism test scores are especially active on social networking sites. They collect more superficial "friends." They offer more staged, glamorous photos. They retaliate more when people post negative comments. And, not surprisingly, they *seem* more narcissistic to strangers (Buffardi & Campbell, 2008; Carpenter, 2012).

For narcissists, social networking sites are more than a gathering place; they are a feeding trough. In one study, college students were randomly assigned either to edit and explain their online profiles for 15 minutes, or to use that time to study and explain a Google Maps routing (Freeman & Twenge, 2010). After completing their tasks, all were tested. Who then scored higher on a narcissism measure? Those who had spent the time focused on themselves.

"The women on these dating sites don't seem to believe I'm a prince."

Maintaining Balance and Focus

In both Taiwan and the United States, excessive online socializing and gaming have been associated with lower grades (Chen & Fu, 2008; Kaiser Family Foundation, 2010; Walsh et al., 2013). In one U.S. survey, 47 percent of the heaviest users of the Internet and other media were receiving mostly C grades or lower, as were just 23 percent of the lightest users (Kaiser Family Foundation, 2010).

In today's world, each of us is challenged to maintain a healthy balance between our real-world and online time. Experts offer some practical suggestions for balancing online connecting and real-world responsibilities.

- *Monitor your time.* Keep a log of how you use your time. Then ask yourself, "Does my time use reflect my priorities? Am I spending more or less time online than I intended? Is my time online interfering with school or work performance? Have family or friends commented on this?"
- *Monitor your feelings.* Ask yourself, "Am I emotionally distracted by my online interests? When I disconnect and move to another activity, how do I feel?"

narcissism excessive self-love and self-absorption.

"It keeps me from looking at my phone every two seconds."

- *"Hide" your more distracting online friends.* And in your own postings, practice the golden rule. Before you post, ask yourself, "Is this something I'd care about reading if someone else posted it?"
- *Try turning off your mobile devices or leaving them elsewhere.* Selective attention—the flashlight of your mind—can be in only one place at a time. When we try to do two things at once, we don't do either one of them very well (Willingham, 2010). If you want to study or work productively, resist the temptation to check for updates. Disable sound alerts and pop-ups, which can hijack your attention just when you've managed to get focused. (I [DM] am proofing and editing this module in a coffee shop, where I escape the distractions of the office.)
- *Try a social networking fast* (give it up for an hour, a day, or a week) *or a time-controlled social media diet* (check in only after homework is done, or only during a lunch break). Take notes on what you're losing and gaining on your new "diet."
- *Refocus by taking a nature walk.* People learn better after a peaceful walk in the woods, which—unlike a walk on a busy street—refreshes our capacity for focused attention (Berman et al., 2008). Connecting with nature boosts our spirits and sharpens our minds (Zelenski & Nisbet, 2014).

As psychologist Steven Pinker (2010) said, "The solution is not to bemoan technology but to develop strategies of self-control, as we do with every other temptation in life."

RETRIEVAL PRACTICE

- Social networking tends to _____ (strengthen/weaken) your relationships with people you already know, _____ (increase/decrease) your self-disclosure, and _____ (reveal/hide) your true personality.

ANSWERS: strengthen; increase; reveal

Achievement Motivation

36-3 What is achievement motivation?

The biological perspective on motivation—the idea that physiological needs drive us to satisfy those needs—provides only a partial explanation of what energizes and directs our behavior. Some motives, such as hunger and the need to belong, have social as well as biological components. Moreover, there are motives that seem to have little obvious survival value. Billionaires may be motivated to make ever more money, movie stars to become ever more famous, politicians to achieve ever more power, daredevils to seek ever greater thrills. Such motives seem not to diminish when they are fed. The more we achieve, the more we may need to achieve.

Think of someone you know who strives to succeed by excelling at any task where evaluation is possible. Now think of someone who is less driven. Psychologist Henry Murray (1938) defined the first person's **achievement motivation** as a desire for significant accomplishment, for mastering skills or ideas, for control, and for attaining a high standard.

Thanks to their persistence and eagerness for challenge, people with high achievement motivation do achieve more. One study followed the lives of 1528 California children whose intelligence test scores were in the top 1 percent. Forty years later, when researchers compared those who were most and least successful professionally, they found a motivational difference. Those most successful were more ambitious, energetic, and persistent. As children, they had more active hobbies. As adults, they participated in more groups and sports (Goleman, 1980). Gifted children are able learners. Accomplished adults are tenacious doers. Most of us are energetic doers when starting and

"Genius is 1% inspiration and 99% perspiration."

Thomas Edison (1847–1931)

when finishing a project. It's easiest—have you noticed?—to get stuck in the middle. That's when high achievers keep going (Bonezzi et al., 2011).

In other studies of both secondary school and university students, self-discipline has surpassed intelligence test scores to better predict school performance, attendance, and graduation honors. When combined with a positive enthusiasm, sustained, gritty effort predicts success for teachers, too—with their students making good academic progress (Duckworth et al., 2009). "Discipline outdoes talent," concluded researchers Angela Duckworth and Martin Seligman (2005, 2006).

From Calum's Road by Roger Hutchinson, reproduced courtesy of Birlinn Ltd.

Discipline refines talent. By their early twenties, top violinists have accumulated thousands of lifetime practice hours—in fact, double the practice time of other violin students aiming to be teachers (Ericsson 2001, 2006, 2007). A study of outstanding scholars, athletes, and artists found that all were highly motivated and self-disciplined, willing to dedicate hours every day to the pursuit of their goals (Bloom, 1985). As child prodigies illustrate (think young Mozart composing at age 8), native talent matters, too (Hambrick & Meinz, 2011; Ruthsatz & Urbach, 2012). In sports, music, and chess, for example, people's practice time differences account for a third or less of their performance differences (Hambrick et al., 2014a,b; Macnamara et al., 2014). Superstar achievers are, it seems, distinguished both by their extraordinary daily discipline and by their extraordinary natural talent.

Duckworth and Seligman have a name for this passionate dedication to an ambitious, long-term goal: **grit.** "If you want to look good in front of thousands," the saying goes, "you have to outwork thousands in front of nobody."

Although intelligence is distributed like a bell curve, achievements are not. That tells us that achievement involves much more than raw ability. That is why organizational psychologists seek ways to engage and motivate ordinary people doing ordinary jobs (see Appendix A: Psychology at Work). And that is why training students in "hardiness"—resilience under stress—leads to better grades (Maddi et al., 2009).

RETRIEVAL PRACTICE

- What have researchers found an even better predictor of school performance than intelligence test scores?

ANSWER: self-discipline

Calum's road: What grit can accomplish Having spent his life on the Scottish island of Raasay, farming a small patch of land, tending its lighthouse, and fishing, Malcolm ("Calum") MacLeod (1911–1988) felt anguished. His local government repeatedly refused to build a road that would enable vehicles to reach his north end of the island. With the once-flourishing population there having dwindled to two—MacLeod and his wife—he responded with heroic determination. One spring morning in 1964, MacLeod, then in his fifties, gathered an ax, a chopper, a shovel, and a wheelbarrow. By hand, he began to transform the existing footpath into a 1.75-mile road (Miers, 2009).

"With a road," a former neighbor explained, "he hoped new generations of people would return to the north end of Raasay," restoring its culture (Hutchinson, 2006). Day after day he worked through rough hillsides, along hazardous cliff faces, and over peat bogs. Finally, 10 years later, he completed his supreme achievement. The road, which the government has since surfaced, remains a visible example of what vision plus determined grit can accomplish. It bids us each to ponder: What "roads"—what achievements—might we, with sustained effort, build in the years before us?

achievement motivation a desire for significant accomplishment; for mastery of skills or ideas; for control; and for attaining a high standard.

grit in psychology, passion and perseverance in the pursuit of long-term goals.

MODULE 36 REVIEW Affiliation and Achievement

LEARNING OBJECTIVES

RETRIEVAL PRACTICE Take a moment to answer each of these Learning Objective Questions (repeated here from within this module). Then turn to Appendix C, Complete Module Reviews, to check your answers. Research suggests that trying to answer these questions on your own will improve your long-term retention (McDaniel et al., 2009).

36-1 What evidence points to our human affiliation need—our need to belong?

36-2 How does social networking influence us?

36-3 What is achievement motivation?

TERMS AND CONCEPTS TO REMEMBER

RETRIEVAL PRACTICE Test yourself on these terms by trying to write down the definition before flipping back to check your answers.

affiliation need, p. 448

ostracism, p. 450

narcissism, p. 453

achievement motivation, p. 454

grit, p. 455

Use LearningCurve to create your personalized study plan, which will direct you to the resources that will help you most in LaunchPad.

TEST YOURSELF WHAT DRIVES US: HUNGER, SEX, FRIENDSHIP, AND ACHIEVEMENT

Test yourself repeatedly throughout your studies. This will not only help you figure out what you know and don't know; the testing itself will help you learn and remember the information more effectively thanks to the *testing effect.*

MODULE 33 Basic Motivational Concepts

1. Today's evolutionary psychology shares an idea that was an underlying assumption of instinct theory. That idea is that
   - **a.** physiological needs arouse psychological states.
   - **b.** genes predispose species-typical behavior.
   - **c.** physiological needs increase arousal.
   - **d.** external needs energize and direct behavior.
2. An example of a physiological need is _____ . An example of a psychological drive is _____ .
   - **a.** hunger; a "push" to find food
   - **b.** a "push" to find food; hunger
   - **c.** curiosity; a "push" to reduce arousal
   - **d.** a "push" to reduce arousal; curiosity
3. Jan walks into a friend's kitchen, smells bread baking, and begins to feel very hungry. The smell of baking bread is a(n) _____ (incentive/drive).
4. _____ theory attempts to explain behaviors that do NOT reduce physiological needs.
5. With a challenging task, such as taking a difficult exam, performance is likely to peak when arousal is
   - **a.** very high.
   - **b.** moderate.
   - **c.** very low.
   - **d.** absent.
6. According to Maslow's hierarchy of needs, our most basic needs are physiological, including the need for food and water; just above these are _____ needs.
   - **a.** safety
   - **b.** self-esteem
   - **c.** belongingness
   - **d.** self-transcendence

MODULE 34 Hunger

7. Journalist Dorothy Dix (1861-1951) once remarked, "Nobody wants to kiss when they are hungry." How does Maslow's hierarchy of needs support her statement?
8. According to the concept of set point, our body maintains itself at a particular weight level. This "weight thermostat" is an example of _____ .
9. Which of the following is a genetically predisposed response to food?
   - **a.** An aversion to eating cats and dogs
   - **b.** An interest in novel foods
   - **c.** A preference for sweet and salty foods
   - **d.** An aversion to carbohydrates
10. The blood sugar _____ provides the body with energy. When it is _____ (low/high), we feel hungry.
11. The rate at which your body expends energy while at rest is referred to as the _____ _____ rate.
12. Obese people find it very difficult to lose weight permanently. This is due to several factors, including the fact that
    - **a.** dieting triggers neophobia.
    - **b.** the set point of obese people is lower than average.
    - **c.** with dieting, metabolism increases.
    - **d.** there is a genetic influence on body weight.

13. Sanjay recently adopted the typical college diet high in fat and sugar. He knows he may gain weight, but he figures it's no big deal because he can lose the extra pounds in the future. How would you evaluate Sanjay's plan?

MODULE 35 Sexual Motivation

14. A striking effect of hormonal changes on human sexual behavior is the
    - **a.** end of sexual desire in men over 60.
    - **b.** sharp rise in sexual interest at puberty.
    - **c.** decrease in women's sexual desire at the time of ovulation.
    - **d.** increase in testosterone levels in castrated males.
15. In describing the sexual response cycle, Masters and Johnson noted that
    - **a.** a plateau phase follows orgasm.
    - **b.** men experience a refractory period during which they cannot experience orgasm.
    - **c.** the feeling that accompanies orgasm is stronger in men than in women.
    - **d.** testosterone is released equally in women and men.
16. What is the difference between sexual dysfunctions and paraphilias?
17. The use of condoms during sex _____ (does/doesn't) reduce the risk of getting HIV and _____ (does/doesn't) fully protect against skin-to-skin STIs.
18. An example of an external stimulus that might influence sexual behavior is
    - **a.** blood level of testosterone.
    - **b.** the onset of puberty.
    - **c.** a sexually explicit film.
    - **d.** an erotic fantasy or dream.
19. Which factors have researchers thus far found to be *unrelated* to the development of our sexual orientation?

MODULE 36 Affiliation and Achievement

20. Which of the following is NOT part of the evidence presented to support the view that humans are strongly motivated by a need to belong?
    - **a.** Students who rated themselves as "very happy" also tended to have satisfying close relationships.
    - **b.** Social exclusion—such as exile or solitary confinement—is considered a severe form of punishment.
    - **c.** As adults, adopted children tend to resemble their biological parents and to yearn for an affiliation with them.
    - **d.** Children who are extremely neglected become withdrawn, frightened, and speechless.
21. What are some ways to manage our social networking time successfully?

Find answers to these questions in Appendix D, in the back of the book.