



## Key Question Chapter Outline

### What Do Our Emotions Do For Us?

The Evolution of Emotions  
Cultural Universals in Emotional Expression  
Counting the Emotions

### Where Do Our Emotions Come From?

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Resolving Some Persistent Issues

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### How Are Achievement, Hunger, and Sex Alike? Different?

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## CORE CONCEPTS



Emotions have evolved to help us respond to important situations and to convey our intentions to others.



The discovery of two distinct brain pathways for emotional arousal has clarified the connections among the many biological structures involved in emotion and has offered solutions to many long-standing issues in the psychology of emotion.



Although emotional responses are not always consciously regulated, we can learn to control them.



Motivation takes many forms, but all involve inferred mental processes that select and direct our behavior.



Achievement, hunger, and sex exemplify other human motives because they differ not only in the behavior they produce but also in the mix of biological, mental, behavioral, and social/cultural influences on them.



The human stress response to perceived threat activates thoughts, feelings, behaviors, and physiological arousal that normally promote adaptation and survival.



## Psychology in Your Life

### Emotional Differences Between Men and Women Depend on Culture

Men and women differ in their emotional experiences, both within and across cultures.

### Arousal, Performance, and the Inverted U

Up to a point, arousal can increase performance, but either too little or too much arousal will prevent one from achieving peak performance.

### Controlling Anger

Instead of “venting” anger, which may only intensify those feelings, keep your feelings to yourself until you can be more rational about the nature of your complaint and how to resolve it.

### Rewards Can (Sometimes) Squelch Motivation

Extrinsic rewards can sometimes remove the intrinsic motivation.

### The Origins of Sexual Orientation

Research in this area remains controversial because, among other things, the data collected thus far are correlational, rather than experimental, so cause and effect cannot be established.

### Developing Resilience

Six specific processes have been developed to identify characteristics of resiliency.

**USING PSYCHOLOGY TO LEARN PSYCHOLOGY:**  
**Motivating Yourself**

# Emotion and Motivation

**E**LLIOT PRESENTED A PUZZLE. His life was unraveling, yet he maintained an attitude of composure. Once a model employee, he had let the quality of his work slip to the point that he finally lost his job. If anything, said his supervisors, Elliot had developed a habit of working almost too well. He often latched onto a small task, such as sorting a client's paperwork, and spent the whole afternoon on various classification schemes—never quite getting to the real job he had been assigned (Damasio, 1994).

His personal life also fell apart. A divorce was followed by a short marriage and another divorce. Several attempts at starting his own business involved glaringly flawed decisions that finally ate up all his savings.

Yet, surprisingly, in most respects Elliot seemed normal. He had a pleasant personality and an engaging sense of humor. He was obviously smart—well aware of important events, names, and dates. He understood the political and economic affairs of the day. In fact, examinations revealed nothing wrong with his movements, memory, perceptual abilities, language skills, intellect, or ability to learn.

Complaints of headaches led the family doctor to suspect that the changes in Elliot might be the result of a brain lesion. Tests proved the suspicion correct. Brain scans showed a mass the size of a small orange that was pressing on the frontal lobes just above Elliot's eyes.



The tumor was removed, but not before it had done extensive damage. The impact was limited to the frontal lobes—in a pattern that was remarkably similar to that seen in the famous case of Phineas Gage nearly 150 years earlier (see Chapter 3). Like Gage, Elliot had undergone a profound change as the result of frontal lobe damage. But the effects in Elliot were more subtle than in Gage. As a psychologist who examined him said, “We might summarize Elliot’s predicament as *to know but not to feel*” (Damasio, 1994, p. 45). His reasoning abilities were intact, but damage to the circuitry of his frontal lobes disrupted his ability to attach values to the objects, events, and people in his life. In short, Elliot had been emotionally crippled.

One of the most pernicious misunderstandings about the human mind is the idea that emotion is the opposite of reason. But the case of Elliot, taken from Antonio Damasio’s 1994 book *Descartes’ Error*, makes it clear that emotion is a vital ingredient in making effective personal decisions. With a disruption in his ability to connect concepts and emotions, Elliot could not value one course of action over another.

Emotions can, of course, spin out of control, producing the extreme and unwise behavior we see in jealous lovers, severely depressed individuals, and drivers crazed by “road rage.” Yet, as Elliot’s case shows, pure reason unmodulated by emotion can also have devastating effects.

So, what is this thing called *emotion*? In brief, **emotion** is a four-part process consisting of *physiological arousal*, *cognitive interpretation*, *subjective feelings*, and *behavioral expression*. We will illustrate with that most thoroughly studied of all emotions: fear.

Suppose you are frightened by an aggressive, snarling dog. The physiological component of the fear response sets off an alarm that is broadcast simultaneously through the autonomic nervous system and the endocrine system. The result is a visceral fear response, that includes draining of the blood from the stomach (which we describe as a “knot” in the belly) and constriction of the blood vessels in the face (which makes a fearful person pale).

The second component of emotion, a cognitive interpretation of events and feelings, involves both a conscious and an unconscious recognition of the dangerous situation and the consequent feelings of fear. In fact, the more you think about it, the more fearful you may become. Such thoughts, then, can drive both your subjective feelings and physical arousal to new heights.

The “feeling” component of emotions comes from two sources. One involves the brain sensing the body’s state of arousal (Damasio, 1994, 2003). The other comes from memories of the body’s state in similar situations in the past. So, when you encounter the snarling dog, your brain may retrieve a memory of how you felt during previous encounters with hostile dogs.

Finally, emotions can also produce behavior. In response to the aggressive dog, this could manifest itself in the so-called “fight-or-flight” response, as well as in emotion-laden facial expressions and vocalizations, such as crying, grimacing, or shouting. Angry responses might also be accompanied by voluntary gestures, such as waving a fist or pointing out one’s state of mind with the middle finger. In such ways, emotions can act as motives, in the sense that they organize and direct our behavior.

How, then is motivation linked to emotion? Note that both words share a common root, “*mot-*,” from the Latin *motus*, meaning “move.” The psychology of motivation and emotion has retained this meaning by viewing emotion and motivation as complementary processes. The concept of *emotion* emphasizes arousal, both physical and mental, while *motivation* emphasizes how this arousal becomes action.

■ **Emotion** A four-part process that involves physiological arousal, subjective feelings, cognitive interpretation, and behavioral expression—all of which *interact*, rather than occurring in a linear sequence. Emotions help organisms deal with important events.

## WHAT DO OUR EMOTIONS DO FOR US?



The death of a parent, an insult, winning an award, losing a lover to a rival: All induce strong feelings—sorrow, anger, joy, jealousy. But what do these states have in common? That is, why do we put them all in the same category called “emotion”? The common thread is this: All emotions involve a state of mental and physical arousal focused on some event of importance to the individual.

And what functions do these emotional responses serve? Surely emotions must do more than just adding variety or “color” to our mental lives. The brief answer to the question is given by our Core Concept:

Emotions have evolved to help us respond to important situations and to convey our intentions to others.



In this section, we will first consider the adaptive functions of emotions from an evolutionary perspective. Next, we will add a social/cultural perspective to see how the language of emotional expression tells others of our emotional state. Finally, at the end of this section, we will consider the issue of gender differences in emotion and how they are shaped by culture.

### The Evolution of Emotions

Whether they occur in humans, hyenas, cats, or kangaroos, emotions serve as arousal states that help organisms cope with important recurring situations (Dolan, 2002; LeDoux, 1996). Accordingly, emotions have survival value and so have been shaped by natural selection (Gross, 1998). Fear, for example, undoubtedly helped individuals in your family tree react to situations that could have made them a meal instead of an ancestor. Similarly, the emotion we call “love” may commit us to a family, which helps to continue our genetic line. Likewise, sexual jealousy can be seen as an emotion that evolved to deal with the biologically important problem of mate infidelity, which threatens the individual’s chances of producing offspring (Buss & Schmitt, 1993). Humor, too, seems to have evolved to serve, in part, a social purpose, as we can surmise from the “in-jokes” and rampant laughter among people in tightly knit social groups (Panksepp, 2000).

It is an important biological fact that individuals vary tremendously in emotional responsiveness (Davidson, 2000b). Some of these individual differences arise from random genetic variations that inevitably occur as organisms reproduce (Gabbay, 1992). We see this, for example, in the differing tendencies people have for depression. Evolution, then, takes advantage of these random genetic variations.

We should emphasize, however, that emotions are not entirely programmed by genetics. They also involve learning. Particularly important in setting our emotional temperament are experiences that occur early in life, as well as experiences that have evoked particularly strong emotional responses (Barlow, 2000; LeDoux, 1996). Thus, learned emotional responses, along with a biological disposition for emotionality, can be important components of many psychological disorders, including depression, panic attacks, and phobic reactions—to name just a few.



● Sexual jealousy probably has an evolutionary basis because mate infidelity threatens the individual’s chances of producing offspring.





● Facial expressions convey universal messages. Although their culture is very different, it is probably not hard for you to tell how this child from New Guinea is feeling.

## Cultural Universals in Emotional Expression

You can usually tell when your friends are happy or angry by the looks on their faces or by their actions. This is useful because reading their emotional expressions helps you to know how to respond to them: As our Core Concept suggests, emotional expressions aid social interaction. But does raising the eyebrows and rounding the mouth say the same thing in Minneapolis as it does in Madagascar? Much research on emotional expression has centered on such questions.

According to Paul Ekman, the leading researcher in this area, people speak and understand substantially the same “facial language” the world around (Ekman, 1984, 1992, 2003; Ekman & Rosenberg, 1997). Studies by Ekman’s group have demonstrated that humans share a set of universal emotional expressions that testify to the common biological heritage of the human species. Smiles, for example, signal happiness and frowns indicate sadness on the faces of people in such far-flung places as Argentina, Japan, Spain, Hungary, Poland, Sumatra, the United States, Vietnam, the jungles of New Guinea, and the Eskimo villages north of the Arctic Circle (Biehl et al., 1997; Ekman et al., 1987; Izard, 1994).

Ekman and his colleagues claim that people everywhere can recognize at least seven basic emotions: sadness, fear, anger, disgust, contempt, happiness, and surprise (Ekman, 1993; Ekman & Friesen, 1971, 1986; Ekman et al., 1969, 1987; Keating, 1994). There are, however, huge differences across cultures in both the context and the intensity of emotional displays—the so-called **display rules**. In many Asian cultures, for example, children are taught to control emotional responses—especially negative ones—while many American children are encouraged to express their feelings more openly (Matsumoto, 1994, 1996).

Regardless of culture, however, emotions usually show themselves, to some degree, in people’s behavior. From their first days of life, babies produce facial expressions that communicate their feelings (Ganchrow et al., 1983). And the ability to read facial expressions develops early, too. Very young children pay close attention to facial expressions, and by age 5 they nearly equal adults in their skill at reading emotions in people’s faces (Nelson, 1987). You can check your own skill at interpreting facial expressions by taking the quiz in the “Do It Yourself!” box.

This evidence all points to a biological underpinning for our abilities to express and interpret a basic set of human emotions. Moreover, as Charles Darwin pointed out over a century ago, some emotional expressions seem to appear across species boundaries. Darwin especially noted the similarity of our own facial expressions of fear and rage to those of chimpanzees and wolves (Darwin, 1998/1862; Ekman, 1984).

But are *all* emotional expressions universal? No. Cross-cultural psychologists tell us that certain emotional responses carry different meanings in different cultures (Ekman, 1992, 1994; Ellsworth, 1994). These, therefore, must be learned rather than innate. For example, what emotion do you suppose might be conveyed by sticking out the tongue? For Americans this might indicate disgust, while in China it can signify surprise. Likewise, a grin on an American face may indicate joy, while on a Japanese face it may just as easily mean embarrassment. Clearly, culture influences emotional expression.

## Counting the Emotions

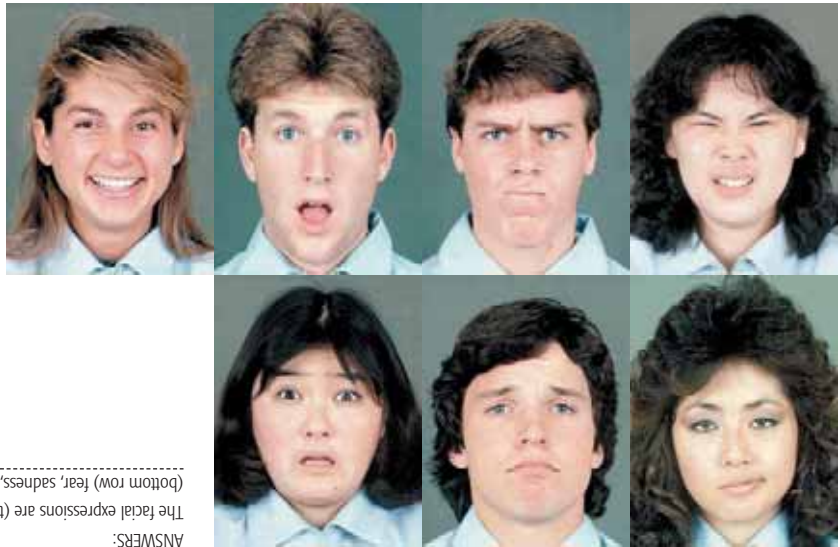
How many emotions are there? A long look in the dictionary turns up more than 500 emotional terms (Averill, 1980). Most experts, however, see a more limited number of basic emotions. Often mentioned is Ekman’s list of seven—anger, disgust, fear, happiness, sadness, contempt, and surprise—based on the

■ **Display rules** The permissible ways of displaying emotions in a particular society.

## DO IT YOURSELF!

### Identifying Facial Expressions of Emotion

Take the facial emotion identification test to see how well you can identify each of the seven emotions that Ekman claims are culturally universal. Do not read the answers until you have matched each of the following pictures with one of these emotions: disgust, happiness, anger, sadness, surprise, fear, and contempt. Apparently, people everywhere in the world interpret these expressions in the same way. This tells us that certain facial expressions of emotion are probably rooted in our human genetic heritage.

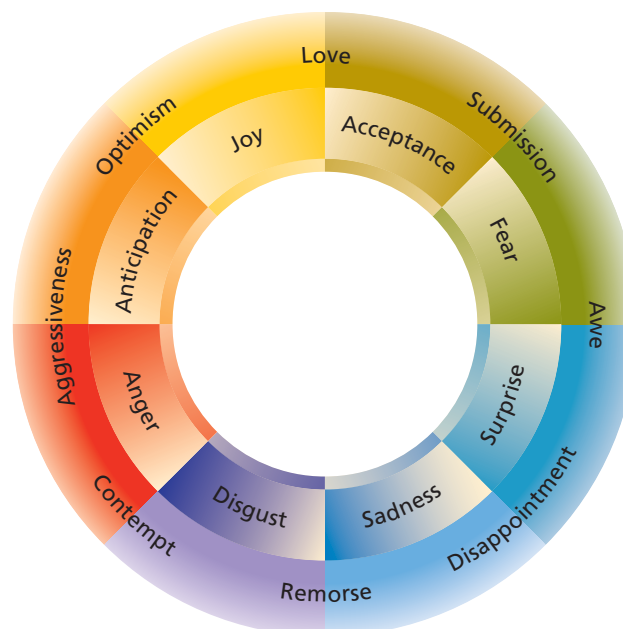


- What emotion is being expressed in each face?

ANSWERS:  
The facial expressions are (top row from left) happiness, surprise, anger, disgust;  
(bottom row) fear, sadness, contempt.

universally recognized facial expressions. Robert Plutchik (1980, 1984) has argued for eight basic emotions that emerged from a mathematical analysis of people's ratings of a large number of emotional terms. You will see in Figure 8.1 that, even though Plutchik and Ekman approached the problem in very different ways, Plutchik's list is remarkably similar to Ekman's.

But what about emotions that appear on none of these basic lists? What of envy, regret, pride, or mirth? From the perspectives of Ekman, Plutchik, and others who argue for a simplified list of basic emotions, a larger palette of human emotions involves complex blends of the more basic emotions.



**FIGURE 8.1** The Emotion Wheel

Robert Plutchik's emotion wheel arranges eight primary emotions on the inner ring of a circle of opposite emotions. Pairs of adjacent emotions can combine to form more complex emotions noted on the outer ring of the figure. For example, love is portrayed as a combination of joy and acceptance. Still other emotions, such as envy or regret (not shown) emerge from still other combinations of more basic emotions portrayed on the wheel. (Source: Figure, "The Emotion Wheel," from "A Language for the Emotions," by R. Plutchik, *Psychology Today*, February 1980. Copyright © 1980 by Sussex Publishers, Inc. Reprinted by permission of Sussex Publishers, Inc.)

## DO IT YOURSELF!

## Are You a Sensation Seeker?

Different people seem to need different levels of emotional arousal. Marvin Zuckerman argues that “sensation seekers” have an unusually high need for stimulation that produces arousal. In addition to the need for thrills, sensation seekers may be impulsive, prefer new experiences, and be easily bored (Kohn et al., 1979; Malatesta et al., 1981; Zuckerman, 1974).

From your score on the Sensation Seeking Scale below you can get a rough idea of your own level of sensation seeking. You may also want to give this scale to some of your friends. Do you suppose that most people choose friends who have sensation-seeking tendencies similar to their own? Wide differences in sensation-seeking tendencies may account for strain on close relationships, when one person is reluctant to take the risks that the other actively seeks.

### THE SENSATION-SEEKING SCALE

Choose A or B for each item, depending on which response better describes your preferences. The scoring key appears at the end.

1. A I would like a job that requires a lot of traveling.  
B I would prefer a job in one location.
2. A I am invigorated by a brisk, cold day.  
B I can't wait to get indoors on a cold day.
3. A I get bored seeing the same old faces.  
B I like the comfortable familiarity of everyday friends.
4. A I would prefer living in an ideal society in which everyone is safe, secure, and happy.  
B I would have preferred living in the unsettled days of our history.
5. A I sometimes like to do things that are a little frightening.  
B A sensible person avoids activities that are dangerous.
6. A I would not like to be hypnotized.  
B I would like to have the experience of being hypnotized.
7. A The most important goal of life is to live it to the fullest and experience as much as possible.  
B The most important goal of life is to find peace and happiness.
8. A I would like to try parachute jumping.  
B I would never want to try jumping out of a plane, with or without a parachute.
9. A I enter cold water gradually, giving myself time to get used to it.  
B I like to dive or jump right into the ocean or a cold pool.
10. A When I go on a vacation, I prefer the comfort of a good room and bed.  
B When I go on a vacation, I prefer the change of camping out.
11. A I prefer people who are emotionally expressive even if they are a bit unstable.  
B I prefer people who are calm and even-tempered.
12. A A good painting should shock or jolt the senses.  
B A good painting should give one a feeling of peace and security.
13. A People who ride motorcycles must have some kind of unconscious need to hurt themselves.  
B I would like to drive or ride a motorcycle.

### KEY

Each of the following answers earns one point: 1A, 2A, 3A, 4B, 5A, 6B, 7A, 8A, 9B, 10B, 11A, 12A, 13B. Compare your point total with the following norms for sensation-seeking:

0–3	Very low
4–5	Low
6–9	Average
10–11	High
12–13	Very high

Source: From “The Search for High Sensation” by M. Zuckerman, *Psychology Today*, February 1978. Copyright © 1978 by Sussex Publishers, Inc. Reprinted by permission of Sussex Publishers, Inc.



## PSYCHOLOGY IN YOUR LIFE: EMOTIONAL DIFFERENCES BETWEEN MEN AND WOMEN DEPEND ON CULTURE

Some emotional differences between males and females undoubtedly have a biological basis. This would explain, for example, why certain emotional disturbances, such as panic disorder and depression, occur more commonly in women. Biological differences may also explain why men show more anger and display more physiological signs of emotional arousal during interpersonal conflicts than do women (Fischer et al., 2004; Gottman, 1994; Gottman & Krokoff, 1989; Gottman & Levenson, 1986; Polefrone & Manuck, 1987; Rusting & Nolen-Hoeksema, 1998). Men also commit most of the world's violent acts.

Other gender differences, however, may depend as much on culture as on biology. For instance, in the United States, males and females often learn different lessons about emotional control. Gender stereotypes dictate that men and boys receive reinforcement for emotional displays of dominance,

anger, and aggressive behavior (Fischer, 1993). On the other hand, they may be punished for emotional displays that show weakness: crying, depression, and sadness (Gottman, 1994). Meanwhile, the pattern of reinforcement and punishment may be reversed for females. Women and girls receive encouragement for emotions that show vulnerability. But they may be punished for displaying emotions that suggest dominance.

Not only does culture affect the emotional displays of men and women differently, but different cultures teach the sexes different *display rules*—the permissible ways of showing emotions (Ekman, 1984). In actuality, researchers have found neither sex to be more emotionally expressive overall. Instead, they have discovered that cultures differ in emotional expression much more than do the sexes.

In Israel and Italy, for example, men more often than women hide their feelings of sadness. The opposite holds true in Britain, Spain, Switzerland, and Germany, where women are more likely than men to hide their emotions. In many Asian cultures both sexes learn to restrain all their emotional expressions (Wallbott et al., 1986).

A note of caution: It is always tricky to distinguish biological from cultural influences. We know that men and women often give different emotional interpretations to the same situation—a crying child, for example—but only when the situation involves both a man and a woman (Lakoff, 1990; Stapley & Haviland, 1989).

Overall, we can say that the sexes often differ in their emotional experiences, both within and across cultures. We cannot conclude, however, that one sex has more emotional intensity than the other (Baumeister et al., 1990; Fischer et al., 1993; Oatley & Duncan, 1994; Shaver & Hazan, 1987; Shields, 1991).

## CHECK YOUR UNDERSTANDING

- RECALL:** From the evolutionary perspective, we can understand emotions as helping organisms identify
  - others of their own gender.
  - sources of danger.
  - beauty and wonder in the world around them.
  - locations in which to find food and mates.
  - important and recurring situations.
- RECALL:** Which one of the following is *not* one of the culturally universal emotions identified by Ekman's research?
  - anger
  - surprise
  - contempt
  - regret
  - fear
- ANALYSIS:** Plutchik would say that *regret* is
  - one of a thousand distinct emotions of which people are capable.
  - one of the most basic human emotions.
  - a combination of more basic emotions.
  - not really an emotion, because it does not appear on the emotion wheel.
  - the basis for other emotions.
- RECALL:** In which respect do men and women differ in their emotional expressions?
  - Women are, overall, more emotionally expressive than men.
  - Certain emotional disorders, such as depression, occur more often in women.
  - In Asian countries, men are more open about their feelings than are women.
  - Men are more rational than women.
  - Women are more rational than men.
- UNDERSTANDING THE CORE CONCEPT:** According to this section of the chapter, what is the adaptive value of communicating our emotional states?
  - It helps us to understand our own needs better.
  - It allows us to deceive others about our emotional states and get what we want.
  - It allows us to anticipate each other's responses and so to live more easily in groups.
  - Communicating our emotional state helps us get rid of strong negative emotions, such as fear and anger.
  - It helps us achieve self-awareness.

ANSWERS: 1. e 2. d 3. c 4. b 5. c





## WHERE DO OUR EMOTIONS COME FROM?

Suppose that you are touring a “haunted house” at Halloween, when a filmy figure startles you with ghostly “Boo!” Your emotional response is immediate. It may involve an outward reaction, such as jumping, gasping, or screaming. At the same time, you respond internally, with changes in body chemistry, the function of internal organs, along with arousal in certain parts of the brain and autonomic nervous system. Moreover, these gut-level responses, such as an accelerated heart beat, can persist long after the you realize that you were really in no danger—after you realize that you were fooled by someone dressed in a sheet.

This suggests that emotion operates both on a visceral level and on a conscious level. And, in fact, that idea connects to one of the great recent discoveries in psychology: the existence of two pathways in the brain that process emotion-provoking information. This, then, is the focus of our Core Concept for this section:



The discovery of two distinct brain pathways for emotional arousal has clarified the connections among the many biological structures involved in emotion and has offered solutions to many of the long-standing issues in the psychology of emotion.

In the following pages we will see how the young neuroscience of emotion has begun to identify the machinery that produces our emotions. The details are not yet entirely clear, but we do have a broad-brush picture of the emotion pathways in the brain and their connections throughout the body. In this section we will look first at the basic neuroscience of emotion. Then we will see how the discoveries in this area have resolved some long-standing disputes in the field. At the end of this section, we will turn to a practical application, to see how emotional arousal can affect our performance—say, on a final examination or in an important athletic contest.

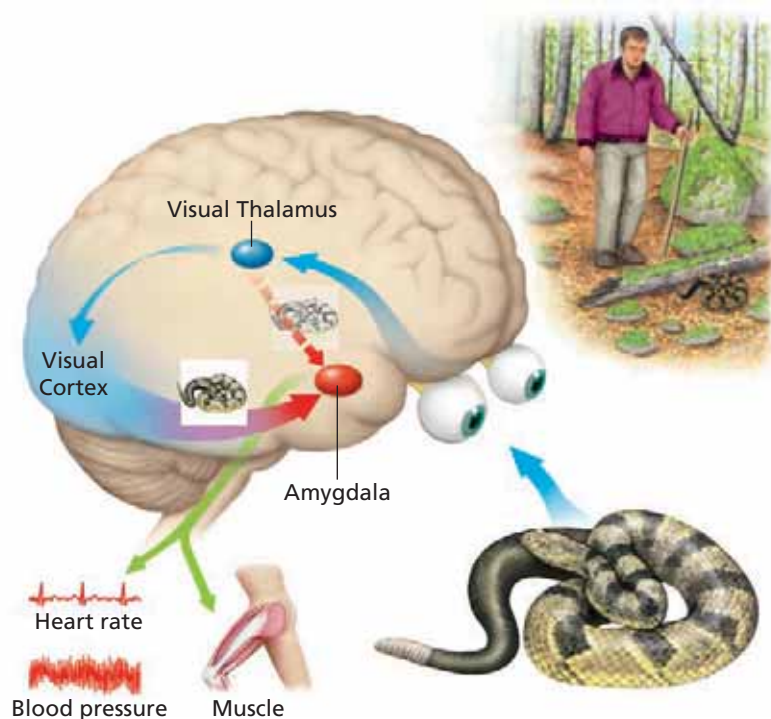
### The Neuroscience of Emotion

People who suffer from phobias, such as a fear of snakes, usually know that their responses are irrational. What causes a person to hold two such conflicting mind sets? The answer lies in two distinct emotion processing systems in the brain (LeDoux, 1996, 2000). One—a fast response system—operates mainly at an unconscious level, where it quickly screens incoming stimuli and helps us respond quickly to cues of potentially important events, even before they reach consciousness. This system, linked to the implicit memory system, acts as an early-warning defense that produces, for example, a near-instantaneous fright response to a loud noise in the middle of the night (Bechara et al., 1995; Helmuth, 2003b; Johnson, 2003). It relies primarily on deep-brain circuitry that operates automatically, without requiring deliberate conscious control. (See Figure 8.2.)

Remarkably, these unconscious emotion circuits seem to have a built-in, innate sensitivity to certain cues—which explains why fears of spiders and snakes are more common than fears of, say, electricity (which actually causes more deaths than spiders and snakes). In addition, this quick-response system can easily learn emotional responses through classical conditioning. But it can also be slow to forget. Thus, a person may quickly learn to fear dogs after being bitten, yet the emotional memory of the incident may be quite difficult to extinguish.

#### CONNECTION: CHAPTER 7

*Implicit memories* involve material of which we are unaware—but that can affect behavior.



● **FIGURE 8.2** Two Emotion-Processing Pathways

Two emotion systems are at work when the hiker sees a snake. One is fast and unconscious; the other operates more slowly and consciously. The fast system routes incoming visual information through the visual thalamus to the amygdala (dashed pathway), which quickly initiates fear and avoidance responses—all occurring unconsciously. The slower pathway involves the visual cortex, which makes a more complete appraisal of the stimulus and also sends an emotional message to the amygdala and other lower brain structures. The result of this is a conscious perception of the situation and a conscious feeling of fear.

The other emotional system—the one that involves conscious processing—is linked to explicit memory (LeDoux, 1996). Its circuitry can create, for example, the fear that grows in your mind when you anticipate giving a speech or the excitement you experience as you consciously process the thrilling sensations of your first whitewater rafting trip. This system generates emotions more slowly than the unconscious pathways, but it delivers more complete information to consciousness. It attaches emotional reactions to concepts and experiences that you find especially interesting, attractive, or repulsive. Relying heavily on the cerebral cortex, its view of events can differ significantly from that of the unconscious processing system. Thus, the phobic person can feel fear, despite “knowing” that there is no sensible basis for the feeling.

As you can see, then, the brain has no “emotion center” (Davidson, 2000a). Rather, it has many emotion-related circuits that serve the two distinct emotion systems. And, to complicate matters, these two systems also interact. So, the feelings that we associate with an emotion such as fear, for example, can well up into consciousness from the unconscious system (LeDoux, 1996). Alternatively, the conscious emotional system can signal the unconscious circuits, which might produce, for example, the knot you feel in your stomach just before giving a speech. The interplay of these two systems apparently gives rise to the feelings that we call “intuition” (Myers, 2002).

Let us take a more detailed look at these biological mechanisms at work behind our emotions.

**The Role of the Limbic System** Both emotion pathways rely on circuits in the brain’s limbic system. Situated in the layer above the brain stem, the limbic structures undoubtedly evolved as control systems for behaviors used in attack, defense, and retreat: the “fight-or-flight” response (Caldwell, 1995; LeDoux, 1994, 1996). Evidence for this comes from lesioning (cutting) or electrically stimulating parts of the limbic system, which can produce dramatic changes in emotional responding. Tame animals with altered limbic systems

may become killers, while prey and predators with limbic lesions may become peaceful companions (Delgado, 1969). Particularly well documented is the importance of the amygdala in the emotion of fear (LeDoux, 1996; Whalen, 1998). (See Figure 8.2.) Like a guard dog, the amygdala is continuously alert for threats, although recent research hints at a role for the amygdala in positive emotions, too (Hamann et al., 2002; Helmuth, 2003a). As you can see in the figure, the amygdala appears to occupy an important position in the processing of our emotions because it receives messages from the quick-and-unconscious emotion-processing pathway, as well as the longer-and-slower conscious pathway.

**The Role of the Reticular Formation** Many emotional reactions such as anger and fear may begin with an early warning sounded by the brain's built-in alarm system: the reticular formation. This structure, strategically located in the brain stem, works with the thalamus and the amygdala to monitor incoming information. If it detects a potential threat, the reticular formation sets off a cascade of automatic responses that not only arouses the brain but makes your heart accelerate, your respiration increase, your mouth get dry, and your muscles become tense. All these responses evolved long ago in our ancestral past to mobilize the body quickly for the fight-or-flight emergency reaction.

**The Role of the Cerebral Cortex** The cerebral cortex—the outermost layer of brain tissue and our “thinking cap”—plays the starring role in the conscious emotion pathway, where it interprets events and associates them with memories and feelings. Just as distinct patches of cortex produce different sensations, positive and negative emotions are associated with different cortical regions. In general, the right hemisphere specializes in negative emotions, such as anger and depression, while the left processes more positive, joyful emotions (Davidson, 1992a, b; 2000a, b; Heller et al., 1998; Kosslyn et al., 2002).

The notion that the two cerebral hemispheres specialize in different classes of emotion has been dubbed **lateralization of emotion**. The evidence is found in EEG recordings of normal people's emotional reactions, as well as in studies relating brain damage in the right or left hemisphere to specific disturbances in emotional expression (Adolphs et al., 2001; Ahern & Schwartz, 1985; Borod et al., 1988).

**The Role of the Autonomic Nervous System** What makes your heart race when you are startled? The messages that you “take to heart” (and to your other internal organs) when you become emotionally aroused are routed through the autonomic nervous system (Levenson, 1992). The parasympathetic division usually dominates in pleasant emotions. But when you are startled or when you experience some unpleasant emotion, the sympathetic division becomes more active (see Table 8.1).

Suppose an emergency—or merely the memory of an emergency—occurs (a speeding car is coming directly at you!). As you will recall from Chapter 3, the brain alerts the body by means of messages carried along pathways of the sympathetic system. Some messages direct the adrenal glands to release stress hormones. Others make the heart race and blood pressure rise. At the same time, the sympathetic system directs certain blood vessels to constrict, diverting energy to the voluntary muscles and away from the stomach and intestines. (This causes the feeling of a “knot” in your stomach.) Then, when the emergency has passed, the parasympathetic division takes over, carrying instructions that counteract the emergency orders of a few moments earlier. You may, however, remain aroused for some time after experiencing a strong emotional activation because hormones continue to circulate in the bloodstream. If the emotion-provoking situation is prolonged (as when you work every day for a

#### ■ Lateralization of emotion

Different influences of the two brain hemispheres on various emotions. The left hemisphere apparently influences positive emotions (for example, happiness), and the right hemisphere influences negative emotions (anger, for example).

TABLE 8.1

Responses Associated with Emotion

Component of emotion	Type of response	Example
Physiological arousal	Neural, hormonal, visceral, and muscular changes	Increased heart rate, blushing, becoming pale, sweating, rapid breathing
Subjective feelings	The private experience of one's internal affective state	Feelings of rage, sadness, happiness
Cognitive interpretation	Attaching meaning to the emotional experience by drawing on memory and perceptual processes	Blaming someone, perceiving a threat
Social/behavioral reactions	Expressing emotion through gestures, facial expressions, or other actions	Smiling, crying, screaming for help

boss whom you detest), the emergency response can sap your energy and cause both physical and mental deterioration.

**The Role of Hormones** Your body produces dozens of hormones, but among the most important for your emotions are serotonin, epinephrine (adrenalin), and norepinephrine. Serotonin is associated with feelings of depression. Epinephrine is the hormone produced in fear. Norepinephrine is more abundant in anger. Steroid hormones (sometimes abused by bodybuilders and other athletes) can also exert a powerful influence on emotions. In addition to their effects on muscles, steroids act on nerve cells, causing them to change their excitability. This is a normal part of the body's response to emergency situations. But when additional doses of steroid drugs are ingested over extended periods, these potent chemicals can produce dangerous side effects, including tendencies to rage or depression (Daly et al., 2003; Majewska et al., 1986; Miller et al., 2002). The mood changes associated with stress, pregnancy, and the menstrual cycle may also be related to the effects that steroid hormones have on brain cells.

#### CONNECTION: CHAPTER 13

Drugs that inhibit the reuptake of serotonin are often used to treat depression.

## Psychological Theories of Emotion: Resolving Some Persistent Issues

The tools of neuroscience have provided evidence that has helped psychologists resolve some long-disputed issues in the field of emotion. How do biology, cognition, and behavior interact to produce an emotion? Is one the cause of the others? Are emotion and cognition separate? Let's look briefly at these controversies and at how insights drawn from neuroscience have begun to resolve them.

**Do Our Physical Responses Cause Our Emotions?** In the early days of psychology, just over a century ago, William James taught that our physical responses underlie our emotions. "We feel sorry *because* we cry, angry *because* we strike, afraid *because* we tremble," James said (1890/1950, p. 1006). This view, simultaneously proposed by the Danish psychologist Carl Lange, became known as the **James–Lange theory**.

Other scientists, notably Walter Cannon and Philip Bard, objected that physical changes in our behavior or our internal organs occur too slowly to account for split-second emotional reactions, such as those we feel in the face of danger. They also objected that our physical responses are not varied enough to account for the whole palette of human emotion. In their view,

■ **James–Lange theory** The proposal that an emotion-provoking stimulus produces a physical response that, in turn, produces an emotion.





● Here on the Capilano Bridge, psychologists Bob Johnson (one of your authors) and Dr. Susan Horton of Mesa Community College reenact the Dutton study described in the text.

referred to as the **Cannon–Bard theory**, the emotional feeling and the internal physical response occurred simultaneously.

Which side was right? Both had part of the truth. On the one hand, modern neuroscience has confirmed that our physical state can influence our emotions—much as the James–Lange theory argued (LeDoux, 1996). You may have noted edgy feelings after drinking too much coffee or grumpiness when hungry. Similarly, psychoactive drugs, such as alcohol or nicotine, can influence the physical condition of our brains and, hence, alter our moods. These emotional responses arise from circuits deep in the brain responding unconsciously to our physical condition.

An important new twist on the James–Lange theory comes from the idea that the brain maintains memories of physical states that are associated with events. So, when you see a snake on the path in front of you, your brain can quickly conjure up a body-memory of the physical response it had previously in a similar situation (Damasio, 1994). This idea, then, effectively counters Walter Cannon’s objection that physical changes in the body occur too slowly to cause our feelings.

On the other hand, our physical responses are not the sole cause of our emotions. Emotions can also be aroused by external cues detected by our unconscious emotional system, as we have seen. Thus, an unexpected loud noise or the sight of blood can trigger a reflexive emotional response that simultaneously makes you jump and produces a visceral response. Many psychologists now believe that depression and phobic reactions can result from conditioned responses of this unconscious emotional system.

**What’s the Role of Cognition in Emotion?** You can make yourself emotional just by thinking, as any student with “test anxiety” will testify. The more you think about the dire consequences of failing a test, the more the anxiety builds. “Method” actors, like the late Marlon Brando, have long exploited this fact to make themselves feel real emotions on stage. They do so by recalling an incident from their own experience that produced the emotion they want to portray, such as grief, joy, or anger.

Stanley Schachter’s (1971) **two-factor theory**, also known as Schachter–Singer theory, adds an interesting complication to the role of cognition in emotion. This theory suggests that the emotions we feel depend on our appraisal of both (a) our internal *physical state* and (b) the external *situation* in which we find ourselves. Strange effects occur when these two factors conflict—as they did in the following classic study of emotion, which enterprising students may want to adapt in order to spice up their romantic lives.

An attractive female researcher interviewed male subjects who had just crossed one of two footbridges. One was a safe, sturdy structure; the other a wobbly suspension bridge across a deep canyon—the latter selected to elicit physical arousal. The researcher, pretending to be interested in the effects of scenery on creativity, asked the men to write brief stories about a picture of a woman. She also invited them to call her if they wanted more information about the research. As predicted, those men who had just crossed the wobbly bridge (and were, presumably, more physically aroused by the experience) wrote stories containing more sexual imagery than those who used the safer structure. And four times as many of them called the female researcher “to get more information”! Apparently, the men who had crossed the shaky bridge misinterpreted their increased arousal as emotional attraction to the female researcher (Dutton & Aron, 1974).

Before you rush out to find the love of your life on a wobbly bridge, we must caution you, numerous attempts to test the two-factor theory have produced conflicting results (Leventhal & Tomarken, 1986; Sinclair et al., 1994). So,

■ **Cannon–Bard theory** The counter-proposal that an emotional feeling and an internal physiological response occur at the same time: One is not the cause of the other. Both were believed to be the result of cognitive appraisal of the situation.

■ **Two-factor theory** The proposal claiming that emotion results from the cognitive appraisal of both physical arousal (Factor 1) and an emotion-provoking stimulus (Factor 2).

under what conditions are we most likely to misinterpret our emotions? Normally, external events confirm what our biology tells us, without much need for elaborate interpretation—as when you feel disgust at an unpleasant odor or joy when seeing an old friend. But what happens when we experience physical arousal from not-so-obvious sources, such as exercise, heat, or drugs? When we know (or think we know) that one of these is the source of our feelings, we will most likely make no emotional interpretation. Misattribution is not inevitable, but it is much more likely in a complex environment where many stimuli are competing for our attention, as in the bridge study, above. It is also likely in an environment where we have faulty information about our physical arousal, as when the unsuspected caffeine in a soft drink makes us edgy. Obviously, however, we need more research on the misattribution of emotions. (See Figure 8.3.)

Another approach to emotion is called the **cognitive appraisal theory** of emotion. According to this theory, advocated by both Frijda (1986) and Lazarus (1991c), after the event has occurred we make a conscious decision about how we should feel. The “appraisal” aspect of this comes into play when we decide whether the event was in our favor and what we believe the cause to be. An example of this is reading the narrative comments your teacher made on an essay you wrote. Your assessment of those comments tells you whether they are positive. In *primary* appraisal we look at how the event affects us, and in *secondary* appraisal we look at how we deal with the event.

Next we will examine the **opponent-process theory** of emotion. In this theory, emotions work in pairs. When we trigger one emotion, its opposite is suppressed. This theory has been expanded to describe drug use, in that the high associated with the use of a drug is later replaced by a low, or withdrawal symptom. In later stages of drug use, following habituation, individuals take a drug not for the high associated with it when they started using drugs, but rather to avoid the lows.



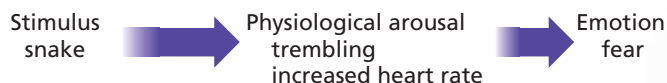
● The two-factor theory would predict that a decaffeinated-coffee drinker who accidentally drank coffee with caffeine could mistake the resulting physical arousal for emotion.

#### ■ Cognitive appraisal theory

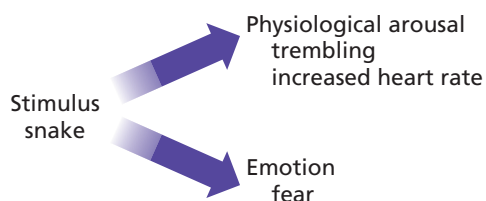
Theory of emotion which theorizes that individuals decide on an appropriate emotion following the event.

■ **Opponent-process theory** Theory of emotion which theorizes that emotions have pairs. When one is triggered, the other is suppressed (for example, when we feel happy, sad is the suppressed emotion).

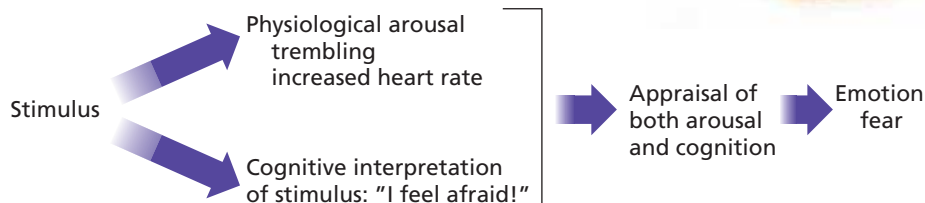
#### James–Lange Theory



#### Cannon–Bard Theory



#### Schachter's Two-Factor Theory



● **FIGURE 8.3** Theories of Emotion Compared



● Depression is more common in women, but men are more prone to violence. This sketch is by Vincent Van Gogh, no stranger to depression himself.

**Can We Separate Cognition and Emotion?** Some theorists have argued that emotion and cognition are separate, independent brain processes (Izard, 1989, 1993; Zajonc, 1980, 1984). In panic disorder, for example, panic attacks can occur suddenly and without warning—in the absence of a threatening situation and without emotion-provoking thoughts.

An opposing view has been set forth by those who specialize in cognitive psychotherapy. This perspective asserts that cognition and emotion have an intimate connection. Richard Lazarus (1984, 1991a), for example, argues that we can conquer negative emotional responses by changing the way we think about events. In this view, cognition and emotion are components of a single mental system.

Again, insights from neuroscience can again help us resolve this conflict. And again, both sides have part of the truth (LeDoux, 1996). Whether emotion and cognition are separate or intertwined depends on which of the two main emotion circuits in the brain is involved. The emotion-and-cognition-are-separate view has recognized the distinction between the conscious and the unconscious emotion systems. In contrast, the emotion-and-cognition-are-connected view has focused on the conscious emotion pathways.

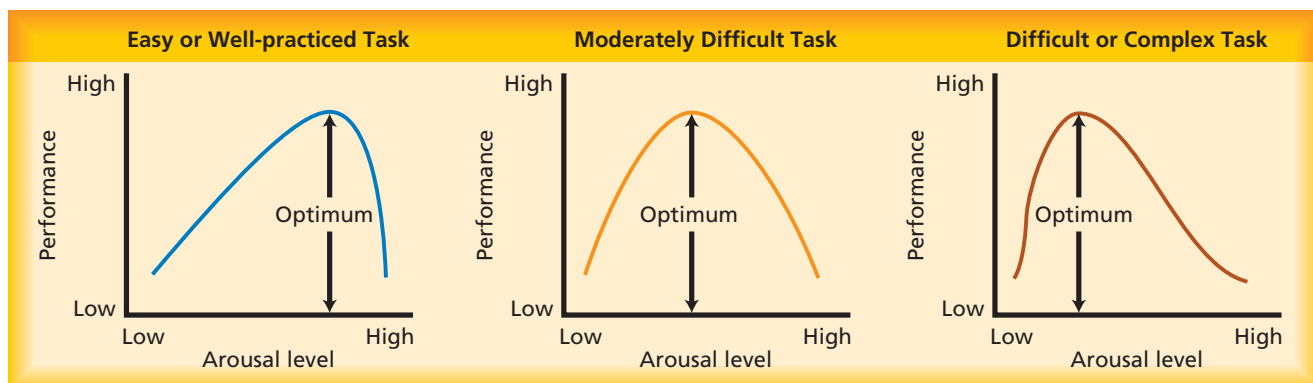


## PSYCHOLOGY IN YOUR LIFE: AROUSAL, PERFORMANCE, AND THE INVERTED U

Athletes always want to be “up” for a game—but how far up should they be? Cheering sports fans might think that increased arousal will always improve performance—but that is not necessarily true. Too much arousal can make an athlete “choke” and her or his performance falter. The same is true for you when you face an examination. Up to a point, increasing levels of arousal can motivate you to study and facilitate your recall during the test, but higher levels can produce test anxiety and a drop in your grade.

This complex relationship between arousal and behavior has been studied both in laboratory animals and in humans. For hungry and thirsty rats used in experiments on learning, the curve of performance first rises and then later declines with the intensity of arousal. The same pattern holds for humans in a variety of circumstances, including athletes under pressure. Psychologists call this the **inverted U function** (so named because the graph

■ **Inverted U function** Describes the relationship between arousal and performance. Both low and high levels of arousal produce lower performance than does a moderate level of arousal.



### The Inverted U

Performance varies with arousal level and task difficulty. For easy or well-practiced tasks, a higher level of arousal increases performance effectiveness. However, for difficult or complex tasks, a lower level of arousal is optimal. A moderate level of arousal is generally best for tasks of moderate difficulty. These inverted U-shaped functions show that performance is worst at both low and high extremes.



resembles an upside-down letter U, as you can see in the figure). It suggests that either too little or too much arousal can impair performance. Think about it: How much pressure would you want your brain surgeon to feel? Which brings us to a second important point.

The optimum amount of arousal varies with the task. As you can see in the figure, it takes more arousal to achieve peak performance on simple or well-practiced tasks than it does on complex tasks that require much thinking and planning. Thus, cheers may boost performance at basketball games but not in brain surgery.

The amount of stimulation needed to produce optimal arousal also varies with the individual. In fact, some people seem to thrive on the thrill of dangerous sports, such as rock climbing and skydiving—activities that would produce immobilizing levels of arousal in most of us (Zuckerman et al., 1978, 1980, 1993). Marvin Zuckerman (1995, 2004), who has studied people he calls **sensation seekers**, believes that such individuals have a biological need for high levels of stimulation. Research suggests that the underlying biology involves the brain's dopamine pathways (Bevins, 2001). You can test your own sensation-seeking tendencies with Zuckerman's scale, found in the "Do It Yourself!" box on page 302.

■ **Sensation seekers** In Zuckerman's theory, individuals who have a biological need for higher levels of stimulation than do other people.

## CHECK YOUR UNDERSTANDING

- RECALL:** During emotional arousal, the \_\_\_\_\_ nervous system sends messages to the internal organs.
  - somatic
  - sensory
  - autonomic
  - cerebellar
  - afferent
- APPLICATION:** We would be most likely to misattribute the source of our arousal when
  - taking a drug, such as a diet pill, that has the unexpected side effect of physical arousal.
  - taking a drug, such as caffeine, that we know produces arousal.
  - winning a race.
  - feeling depressed after the death of a loved one.
  - losing a race.
- RECALL:** In the field of emotion, theorists have long debated whether
  - feelings are associated with emotional responses.
  - we are aware of our emotions.
  - cognition and emotion are independent of each other.
  - men are sensitive to women's emotions.
  - emotions are valid.
- UNDERSTANDING THE CORE CONCEPT:** Emotions result from an interaction of biological arousal, subjective feelings, cognitive interpretation, and behavioral expression. Which two of these are emphasized in the two-factor theory of emotion?
  - subjective feelings and behavioral expression
  - cognitive interpretation and behavioral expression
  - biological arousal and cognitive interpretation
  - biological arousal and subjective feelings
  - subjective feelings and cognitive interpretation

ANSWERS: 1. c 2. a 3. c 4. c

## HOW MUCH CONTROL DO WE HAVE OVER OUR EMOTIONS?



Your supervisor says something critical of your work—unfairly, you think. Suddenly anger and defensiveness well up inside you. You can't express these emotions to the boss, but your face betrays your feelings. Is such a response as automatic and uncontrollable as the knee-jerk reflex? Richard Lazarus (1991a, b) has shown that training can help people not only to modify and control their private feelings but also to control the expression of them.



In many situations, aside from work, it can be desirable to mask or modify what you are feeling. If you dislike a professor, you might be wise not to show your true emotions. And, if you have strong romantic feelings toward someone—more than he or she realizes—it might be safest to reveal the depth of your feelings gradually, lest you frighten the person away with too much too soon. Similarly, in business negotiations, you will do better if you can prevent yourself from signaling too much emotional arousal. Even in leisure activities like playing poker or planning your next move in chess, you will be most successful if you keep your real feelings, beliefs, and intentions a secret. All of these examples testify that emotional control has an important role in our ability to interact with other people.

In this section, then, we look at the issues involved in emotional control. We begin with the concept of “emotional intelligence,” the ability to modulate your own emotions and to understand and react appropriately to those of others. Then we will look at the other side of emotional control: the detection of deception—which is really a problem in detecting emotional responses that someone is trying to hide. Then, in the final part of this section, we will examine the control of anger. Here is the Core Concept that ties these topics together:



Although emotional responses are not always consciously regulated, we can learn to control them.

The practical, takeaway message from this section is that, while emotions do sometimes slip out of control, we are not simply at their mercy. Emotional understanding and control are skills that can be learned.

## Developing Emotional Intelligence

It takes a certain sort of “smarts” to understand and control one’s emotions. Psychologists Peter Salovey and John Mayer have called this **emotional intelligence** (Mayer & Salovey, 1997; Salovey & Mayer, 1990). Their goal is to raise emotional intelligence to the same level in our awareness as the much-better-known academic forms of intelligence assessed by traditional IQ tests—which you will recall from the previous chapter.

**The Predictive Power of Emotional Intelligence** Those with high emotional intelligence are not only tuned in to their own emotions and those of others but they can also manage their negative feelings and curtail inappropriate expression of their impulses. The power of this ability can be seen in the results of the “marshmallow test,” says Daniel Goleman (1995):

Just imagine you’re four years old, and someone makes the following proposal: If you’ll wait until after he runs an errand, you can have two marshmallows for a treat. If you can’t wait until then, you can have only one—but you can have it right now.

How did the children in this experiment respond to the temptation of the marshmallow that sat before them, within reach, while the researcher was away? Goleman continues:

Some four-year-olds were able to wait what must surely have seemed an endless fifteen to twenty minutes for the experimenter to return. To sustain themselves in their struggle they covered their eyes so they wouldn’t have to stare at temptation, or rested their heads in their arms, talked to themselves, sang, played games with their hands and feet, even tried to go to sleep. These plucky preschoolers got the two-marshmallow

■ **Emotional intelligence** The ability to understand and control emotional responses.

reward. But others, more impulsive, grabbed the one marshmallow, almost always within seconds of the experimenter's leaving the room on his "errand." (pp. 80–81)

But the amazing predictive power of the marshmallow test was revealed when these same children were tracked down in adolescence. As a group, those who had curbed their impulse to grab the single marshmallow were better off on all counts. They were more self-reliant, more effective in interpersonal relationships, better students, better able to handle frustration and stress. By contrast, the children who had given in to temptation had lives marked by troubled relationships, shyness, stubbornness, and indecisiveness. They also were much more likely to hold low opinions of themselves, to mistrust others, and to be easily provoked by frustrations. In the academic sphere, they were more likely to be uninterested in school. Goleman notes that the marshmallow test also correlated clearly with SAT scores: Those who, as 4-year-olds, were able to delay gratification scored, on the average, 210 points higher than did their counterparts who had grabbed the single marshmallow years earlier.

Emotional intelligence, however, is not a perfect predictor of success, cautions John Mayer (1999). Nor should we think of it as a replacement for traditional IQ scores. Rather, says Mayer, emotional intelligence is merely another variable that can help us refine our understanding and our predictions of behavior.

## Detecting Deception

You might think you can spot deception when someone fails to "look you in the eye" or fidgets nervously. If so, you could be setting yourself up to be duped. Most of us are poor lie detectors—or truth detectors, for that matter. One reason is that social interactions often occur in familiar situations, where we pay little attention to nonverbal cues. Nevertheless, experts who study deception find that a person who deliberately tries to hoodwink us may "leak" uncontrolled nonverbal signals of deception. Knowing how to read these cues could help you decide whether a salesperson or politician is lying to you or whether a physician might be concealing something about your medical condition.

**Deception Cues** The real key to effective deception detection lies in perceiving patterns of a person's behavior over time. Without the chance for repeated observations, you are much less able to judge a person's honesty (Marsh, 1988). Still, you may find yourself in a situation where even a little help in deception detection might be better than none at all—such as when buying a used car or listening to a political speech. Here are some helpful guidelines that psychology can offer (from DePaulo et al., 2003; Kleinke, 1975; Marsh, 1988; Zuckerman et al., 1981):

- Some lies involve false information, as when a used-car salesperson tells you that a junker is in good working order. In such cases, the effort to hide the truth costs the liar some cognitive effort. This results in heightened attention (evident in dilation of the pupils), longer pauses in speech (to choose words carefully), and more constrained movement and gesturing (in an attempt to avoid "giving away" the truth).
- On the other hand, when a lie involves hiding one's true feelings—as a good poker player does when holding a straight flush—the liar may become physically and behaviorally more aroused. This becomes evident in postural shifts, speech errors, nervous gestures (such as preening by touching or stroking the hair or face), and shrugging (as if to dismiss the lie).

- The face is easier to control than the body, so a deceiver may work on keeping a “poker face” but forget to restrain bodily clues. A smart deception detective might therefore concentrate on a speaker’s body movements: Are they rhythmic? Are they calculated? Do the hands move freely or nervously? (Gamblers and those who study gambling may refer to such an unconscious habit as a “tell.”) The eyes, also, can sometimes give deceivers away—especially when they’re using the common social deception of trying to look happy or amused, when they are not. While our attention may more naturally focus on a smile as an indicator of happiness or amusement, that can be manipulated much more easily than the muscles around the eyes. Only in genuine grins do the eye muscles crinkle up the skin around the eyes. You can test your ability to tell a real from a fake smile in the “Do It Yourself!” box on the facing page.
- The ability to “look you straight in the eye” is, in fact, a reasonably good indicator of truth-telling—but only when dealing with people who usually tell the truth. When they do lie, their amateurish efforts to deceive often show up in averted gaze, reduced blinking (indicating concentration of attention elsewhere), and less smiling. A practiced liar, however, can look straight at you while telling complete fiction.

**Do “Lie Detectors” Really Work?** The **polygraph**, often called a “lie detector,” relies on the assumption that people will exhibit physical signs of arousal when lying. The device really acts as an emotional arousal detector, rather than a direct indicator of truth or lies. Most polygraph machines make a record of the suspect’s heart rate, breathing rate, perspiration, and blood pressure. Occasionally, voice-print analysis is also employed.

Critics have pointed out several problems with the polygraphic procedure (Aftergood, 2000; Holden, 2001b; Saxe, 1991, 1994). For example, subjects know when they are suspects, so some will give heightened responses to the critical questions, whether they are guilty or innocent. Some people, however, can give deceptive responses because they have learned to control or distort their emotional responses. To do so they may employ simple physical movements, drugs, or biofeedback training—a procedure in which people are given moment-to-moment information on certain biological responses, such as perspiration or heart rate (Saxe et al., 1985). Either way, a polygraph examiner risks incorrectly identifying innocent people as guilty and failing to spot the liars.

**A Few Fibs from the Polygrapher** To minimize these problems, polygraphers typically employ several tricks of their trade. They may start the interview by persuading the subject that the machine is highly accurate. A common ploy is to ask a series of loaded questions designed to provoke obvious emotional reactions. For example, “Did you ever, in your life, take anything that did not belong to you?” In another favorite technique, the examiner uses a deceptive stimulation procedure, or “stim test,” in which the subject draws a card from a “stacked” deck. Then the examiner pretends to identify the card from the subject’s polygraph responses (Kleinmuntz & Szucko, 1984).

When the actual interrogation begins, it will consist of an artistic mix of *critical questions*, *irrelevant questions*, and *control questions*. The irrelevant questions (“Are you sitting down right now?”) are designed to elicit truthful answers accompanied by a physical response consistent with truth-telling. The control questions (“Did you ever lie to your parents?”) are designed to elicit an anxious, emotionally aroused response pattern. Then the examiner can compare the subject’s responses to these two types of questions with responses to the critical questions (“Did you steal the jewels?”). It is assumed that a guilty sub-

■ **Polygraph** A device that records or graphs many (“poly”) measures of physical arousal, such as heart rate, breathing, perspiration, and blood pressure. A polygraph is often called a “lie detector,” even though it is really an arousal detector.

## DO IT YOURSELF!

### The Eyes Have It

Can you tell if people are sincere when they smile at you? Smiles aren't made just with the mouth, but with the whole face, especially the eyes. A real smile is different from a fake one, primarily around the eyes. Specifically, when we feel genuine joy or mirth, the *orbicularis oculi* muscles wrinkle up the skin around the eyes.

With this in mind, take a look at these two pictures of smiling faces and see if you can tell which ones is the real smile and which one is forced. See the text for the tell-tale signs of a faked smile.



ject will give a stronger response to the critical questions than to the irrelevant and control questions.

**Serious Concerns About Accuracy** Sensible as this seems, several issues call the polygraph procedure into question. Consider, for example, the problem of accuracy. Even if the examination were 95% accurate, the 5% error rate could lead to the misidentification of many innocent people as being guilty. Imagine that your company arranges for all 500 of your employees to take a “lie detector” test to find out who has been stealing office supplies. Imagine also that only about 4% (20 out of 500 people) are really stealing, which is not an unreasonable estimate. If the lie detector test is 95% accurate, it will correctly spot 19 of these 20 thieves. But the company will still have a big problem. The test will also give 5% *false positives*, falsely fingering 5% of the innocent people. Of the 480 innocent employees, the polygraph will inaccurately implicate 24 as liars. That is, *you could end up with more people falsely accused of lying than people correctly accused of lying*. This was borne out in field study of suspected criminals, who were later either convicted or declared innocent. The polygraph results were no better than a random coin flip (Brett et al., 1986).

An equally serious concern with polygraphy is that there are no generally accepted standards either for administering a polygraph examination or for interpreting its results. Different examiners could conceivably come to different conclusions in the same case.

For these reasons, the U.S. Congress has outlawed most uses of polygraph tests in industry and in the government. About half of the states do not admit lie detector evidence in court (Patrick & Iacono, 1991). And the National Academies of Science (2003) has recently released a report saying that the polygraph is too crude to be useful for screening people to identify possible terrorists or other national security risks.

**Alternative Approaches to Deception Detection** The reining in of polygraph testing has spurred the development of alternative means of detecting dishonesty (Sackett, 1994). Much of this work has been devoted to paper-and-pencil



● The polygraph, often called a “lie detector,” relies on the assumption that people display physical signs of arousal when lying.



instruments that are often called “integrity tests.” How well do these instruments work? Not very well, according to reports by the American Psychological Association and by the U.S. government’s Office of Technology Assessment. In general, like the polygraph, these instruments seem to be more accurate than mere interviews, but they also suffer from a high false-positive rate (Camara & Schneider, 1994).

More recently, researchers have turned to brain-scanning techniques to see if they can catch liars (Ross, 2003). A certain brain wave pattern known as P300 has been linked with a variety of attention-getting cues, such as hearing one’s name, but studies show it can also be evoked by fibbing. In addition, fMRI images show that lying activates all the brain areas involved in telling the truth, plus several more (Langleben et al., 2002). This suggests that lying is not something completely separate from the truth but an operation the liar must perform on the truth, says psychiatrist Daniel Langleben.

The potential advantage of such techniques is that they bypass the anxiety-response pathway used by polygraphy. By registering neural activity, they get much closer to the person’s actual thoughts. But how well do these new techniques work? Not well enough for the police and the courts—yet.



## PSYCHOLOGY IN YOUR LIFE: CONTROLLING ANGER

Anger has a bad reputation because of its association with aggression and violence. But, says anger expert Howard Kassinove, aggression accompanies anger only about 10% of the time (DeAngelis, 2003). And, say psychologists, anger can—if properly controlled—have a positive effect by communicating feelings, helping people stand up for their rights, and clarifying problems in a relationship. Says Carol Tavris (1989), “Imagine what the women’s suffrage movement would have been like if women had said, ‘Guys, it’s really so unfair, we’re nice people and we’re human beings too. Won’t you listen to us and give us the vote?’”

Most people feel angry a few times a week and manage to keep their anger in bounds, so the results are usually positive (Kassinove et al., 1997). On the other hand, a few people go much too far, say anger researcher Raymond Tafrate and his colleagues (2002). Anger episodes that occur frequently—to the point of being a personality trait—are pathological and need treatment. Likewise, violence that causes harm to someone is never normal or acceptable. That said, however, there is no clinically recognized category for abnormal levels of anger, which can be a problem for clinicians who are trying to bill insurance companies for anger management therapy.

So, what happens in therapy for anger? According to Colorado State University’s Jerry Deffenbacher, the best treatment strategies involve some combination of relaxation training, cognitive therapy, and skill development (J. D. Holloway, 2003a). During therapy, patients practice relaxation techniques until they can quickly put themselves in a relaxed mood during an anger-producing situation (a common one involves being cut off by another car on the road).

The cognitive therapy component involves learning alternative ways of interpreting situations that would otherwise cause anger. The motorist who is cut off by another driver might learn to think, “There’s an accident waiting to happen, and I don’t want to be part of it.”

The third part of the therapy—skill development—involves practical applications. For the angry driver, this might mean practicing safe driving techniques, as an alternative to aggressive driving. In this phase, the therapist might shift the treatment setting out of the office and onto the road.

“Anger has long been a problem for me,” writes anger management trainer Melvyn Fein. “Over the years it has cost me a great deal of pain and denied me much happiness” (1993, p. ix). Failing at various efforts to control and constructively express his anger, Fein himself became a clinician and developed an approach to anger disorders. Fein’s program, Integrated Anger Management (I.A.M.), adds three more components to Deffenbacher’s list:

1. Learning to express anger safely, so that it will not spin out of control
2. Identifying the underlying source of one’s anger, such as frustration with injustice or the inability to achieve a valued goal
3. Letting go of unrealistic goals that feed the anger, such as the naive belief that expressing anger will motivate others to “do the right thing”

All the experts agree that the public subscribes to some dangerous myths about anger. On television shows, for example, you can see people attacking and humiliating others, as if the public venting of feelings and the act of revenge will eliminate their anger. In fact, retaliation for a real or imagined wrong is likely to bring only the most fleeting feeling of satisfaction.

It’s far more likely that venting one’s anger will increase the tendency to become enraged at ever smaller provocations. Solid psychological research indicates that when you are angry with someone, “getting it off your chest” by aggressively confronting or hurting that individual will not neutralize your bad feelings. Instead it will almost certainly intensify them. Thus, retaliation is likely not to end a feud but rather to feul it—a reality obvious throughout human history, filled with wars about pride, power, status, and honor. A saner and safer strategy is to keep your feelings to yourself, at least until the passion of your anger has subsided and you can be more rational about the nature of your real complaint and what might be done to solve the problem (Tavris, 1989, 1995). Often, all it takes to defuse a tense and angry situation is to communicate the facts and your feelings to the person toward whom you feel anger.

## CHECK YOUR UNDERSTANDING

1. **RECALL:** People with emotional intelligence
  - a. feel no emotions.
  - b. are extremely emotionally responsive.
  - c. know how to control their emotional responses.
  - d. can always deceive a polygrapher.
  - e. sense others’ feelings.
2. **RECALL:** When lying by giving false information, you are likely to
  - a. become more animated in your gesturing.
  - b. become more constrained in your gesturing.
  - c. control your body more easily than you control your face.
  - d. look someone “straight in the eye.”
  - e. shift your eyes to the left.
3. **RECALL:** “Lie detectors” detect
 

<ol style="list-style-type: none"> <li>a. feelings.</li> <li>b. emotion.</li> <li>c. motivation.</li> </ol>	<ol style="list-style-type: none"> <li>d. untruthfulness.</li> <li>e. physical arousal.</li> </ol>
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4. **APPLICATION:** Psychological research suggests that it might be best to handle your feelings of anger toward a friend by
  - a. hitting a punching bag.
  - b. venting your anger by yelling at your friend.
  - c. calmly telling your friend that you feel angry.
  - d. doing nothing except “stewing” in your angry feelings.
  - e. engaging in other, unrelated activities.
5. **UNDERSTANDING THE CORE CONCEPT:** Research suggests that the ability to control one’s emotional responses is
  - a. a personality trait that cannot be changed.
  - b. largely a matter of hormones.
  - c. closely connected to IQ.
  - d. a skill that can be learned.
  - e. a genetic predisposition.

ANSWERS: 1. c 2. b 3. e 4. c 5. d



## MOTIVATION: WHAT MAKES US ACT AS WE DO?

Why do some people climb mountains, while others rob banks or join the Peace Corps? What drives anorectic individuals to starve themselves—sometimes to their deaths? Why do some of us feel a need to achieve, while others seek security? Such questions lie in the domain of the psychology of motivation, which deals with the internal processes that cause us to move toward a goal or away from a situation we judge to be unpleasant. As you will remember, motivation is the complement of emotion. While emotion arouses us physically and mentally, motivation channels that arousal into goal-directed action.

**Motivation** is the general term for all the processes involved in starting, directing, and maintaining physical and psychological activities. Motivational processes determine which of many possible responses you will select at any moment—although the selection is not always a deliberate, conscious one. Will it be laughing or crying? Fight or flight? Studying or playing? The motivational menu always offers multiple choices. The Core Concept for this section puts it this way:



Motivation takes many forms, but all involve inferred mental processes that select and direct our behavior.

We begin our study of motivation with a look at the ways in which we use the concept of motivation.

### How Psychologists Use the Concept of Motivation

Professors may think that students who do poorly on exams are “not well motivated.” Sports commentators speculate that winning teams were “hungrier” or “more motivated” than their opponents. Detectives seek to establish a motive in building a case against a criminal suspect. In everyday language, we use the term *motivation* to refer to a variety of responses that seem to arise from a person’s internal mental state rather than from the external situation.

Psychologists, too, often need to make inferences about internal processes that select and direct behavior. Such inferences are formalized in the concept of motivation, which psychologists find especially useful in the following circumstances:

- *Motivation connects observable behavior to internal states:* When we see someone eating, we may infer that a hunger drive is at work. We must be careful about drawing such inferences too quickly, though, because eating might be caused by something else (e.g., social pressure, the availability of a favorite food, or a desire to gain weight). So a motive, such as hunger, can be identified with confidence only when other influences have been ruled out.
- *Motivation accounts for variability in behavior:* Psychologists use motivational explanations when the variations in people’s performances are not obviously due to differences in physical or mental abilities or to differing environmental demands. For example, the intensity of your motivation may explain why you play tennis well one day but poorly another. It also may explain why some people do better than others of comparable skill in competitive situations, such as in a basketball game. Thus, differences in motivation explain differences in the same individual or between individuals.
- *Motivation explains perseverance despite adversity:* Motivation helps us understand why organisms continue to perform reliably even under difficult or variable conditions. Motivation gets you to work on time, even when

#### CONNECTION: CHAPTER 14

On the other hand, the common mistake of attributing behavior to internal characteristics, rather than the situation, is known as the *fundamental attribution error*.

■ **Motivation** All the processes involved in starting, directing, and maintaining physical and psychological activities.

you had a sleepless night or had to drive through a blizzard. When highly motivated, you persist, even if you realize the chances of success are slim—as does a determined quarterback whose team is down by 20 points in the final quarter.

- *Motives relate biology to behavior:* We are biological organisms with complex internal mechanisms that automatically regulate bodily functions to promote survival. States of deprivation (such as needing fluids) automatically trigger these mechanisms, which then influence bodily functioning (such as feeling thirsty), creating motivational states.

In each of these cases, an internal motivational process channels the organism's energies into a particular pattern of behavior.

## Types of Motivation

Psychologists often distinguish between motives and drives. They prefer the term **drive** for motivation that is assumed to have a strong biological component and, therefore, plays an important role in survival or reproduction. Hunger and thirst are examples of biological drives. In contrast, many psychologists reserve the term **motive** for urges that are mainly learned, such as the need for achievement or the desire to play video games. Obviously, however, many motivated behaviors—such as eating, drinking, and sexual behavior—can have roots in both biology and learning.

Psychologists also distinguish between *intrinsic* and *extrinsic* motivation. **Intrinsic motivation** comes from within the individual who engages in an activity for its own sake, in the absence of external reward. Leisure activities, such as cycling, kayaking, or playing the guitar, are usually intrinsically motivated. Intrinsic motivation arises from inner qualities, such as personality traits or special interests. On the other hand, **extrinsic motivation** comes from outside the person. It involves behavior aimed at some external consequence, such as money, grades, or praise, rather than at satisfying an internal need.

In addition, motives and drives can arise from either **conscious motivation** or **unconscious motivation**. That is, motivated individuals may or may not be aware of the drives or motives underlying their behavior—much as emotional arousal can occur on a conscious or unconscious level. Freud took this idea a step further, suggesting that the unconscious mind harbors complex motives arising from traumatic experiences and sexual conflicts. Modern-day psychologists, however, stand divided on Freud's teachings (see, for example, Bruner, 1992; Erdelyi, 1992; Greenwald, 1992; Jacoby et al., 1992; Kihlstrom et al., 1992; Loftus & Klinger, 1992).

## Theories of Motivation

We have no comprehensive theory that accounts for the whole gamut of human motives and drives. Sex, for example, seems to obey very different motivational rules from those regulating hunger or thirst or regulation of body temperature, even though all are rooted in biology: You can die from lack of food or warmth, but not from lack of sex. Much of the difficulty in explaining diverse types of motivation arises because of our dual nature: We are simultaneously creatures driven by our biology (as when you are ravenous because you haven't eaten all day) and by learning (as when you associate the lunch bell with food). In the following pages, we will look at several theories of motivation, beginning with *instinct theory*, the grandparent of all modern motivational theories.



● The fact that some people do better in competition than others can be explained in part by different degrees of motivation. These men are participating in the international Games for the Disabled.

- **Drive** Biologically instigated motivation.
- **Motive** An internal mechanism that selects and directs behavior. The term *motive* is often used in the narrower sense of a motivational process that is learned, rather than biologically based (as are drives).
- **Intrinsic motivation** The desire to engage in an activity for its own sake, rather than for some external consequence, such as a reward.
- **Extrinsic motivation** The desire to engage in an activity to achieve an external consequence, such as a reward.
- **Conscious motivation** Having the desire to engage in an activity and being aware of the desire.
- **Unconscious motivation** Having a desire to engage in an activity but being consciously unaware of the desire. Freud's psychoanalytic theory emphasized unconscious motivation.



**Instinct Theory** According to **instinct theory**, organisms are born with a set of biologically based behaviors, called instincts, that generally promote their survival. Instinct accounts reasonably well for regular cycles of animal activity, as seen in salmon that travel thousands of miles back to the stream where they were spawned. Although such instinctive behavior does not depend heavily on learning, experience can often modify the behavior. We see this when bees communicate the location of food to each other, when army ants embark on synchronized hunting expeditions, and when birds use landmarks in their annual migrations.

In recent years, the term *instinct* has migrated from the scientific vocabulary to the speech of everyday life. So we speak casually of “maternal instincts,” of an athlete who “instinctively catches the ball,” and of a “killer instinct” in a competitive entrepreneur. In fact, we use the term in so many ways that its meaning has become vague and imprecise—a mere label, rather than an explanation for behavior. As a result, the term *instinct* has dropped out of favor among psychologists (Deckers, 2001). Ethologists, who study animal behavior in natural habitats, now prefer the term **fixed-action patterns**, more narrowly defined as unlearned behavior patterns that occur throughout a species and are triggered by identifiable stimuli. Examples of fixed-action patterns include such diverse behaviors as bird migration and dominance displays in baboons.

Do instincts—perhaps in their new guise as fixed-action patterns—explain any part of human behavior? They do seem to account for some responses, such as nursing, that we see in newborns. But we stand on shakier ground when using the term to explain more complex human behaviors. So, while we might speculate that the motivation of a hard-driving executive could involve some basic biological instinct, this explanation is weak, at best. Similarly, it is simplistic to think about sex as an unlearned instinct—as we shall see in a few pages.

**Drive Theory** The concept of *drive* originated as an alternative to instinct. It was defined as the hypothetical state of energy or tension that moves an organism to meet a biological need (Woodworth, 1918). Thus, an animal that needs water is driven to drink. Likewise, a need for food drives organisms to eat. Thus, in *drive theory*, it’s a biological **need** that produces a drive—which, in turn, is seen as an urge or motivated state of tension directed at meeting that need. The drive, then, motivates the animal to act to reduce the drive level, a process called *drive reduction*. You have felt this buildup and release of tension if you have been extremely cold and then felt driven to find shelter.

According to drive theory, the desirable state that organisms seek is a balanced condition called **homeostasis** (Hull, 1943, 1952). Organisms that have a biological imbalance (caused, say, by lack of fluids) are driven to seek a homeostatic balance (by drinking). Similarly, we can understand hunger as an imbalance in the body’s energy supply. This imbalance drives an animal that has been deprived of food to eat in order to restore a condition of equilibrium.

Unfortunately for drive theory, the story of motivation has proved not to be that simple. For instance, drive theory cannot explain why, in the absence of any apparent deprivation or drives, organisms act merely to increase stimulation. Thus both humans and animals engage in play—behavior that is satisfying in itself, rather than a means of reducing a drive. And in the laboratory, rats will cross an electrified grid to reach nothing on the other side except a novel environment. Even animals deprived of food and water, when placed in unfamiliar surroundings with plenty of opportunities to eat or drink, may choose to explore instead. Only after they have satisfied their curiosity do they begin to satisfy their hunger and thirst (Berlyne, 1960; Fowler, 1965; Zimbardo & Montgomery, 1957). And, as for human motivation, it is hard to imagine a basic need or a biological drive that could propel people out of airplanes or force them to climb the face of Yosemite’s El Capitán. Apparently, for both

■ **Instinct theory** The now-outmoded view that certain behaviors are completely determined by innate factors. The instinct theory was flawed because it overlooked the effects of learning and because it employed instincts merely as labels, rather than as explanations for behavior.

■ **Fixed-action patterns** Genetically based behaviors, seen across a species, that can be set off by a specific stimulus. The concept of fixed-action patterns has replaced the older notion of instinct.

■ **Need** In drive theory, a need is a biological imbalance (such as dehydration) that threatens survival if the need is left unmet. Biological needs are believed to produce drives.

■ **Homeostasis** The body’s tendency to maintain a biologically balanced condition, especially with regard to nutrients, water, and temperature.

people and animals, exploring and taking an interest in the world are rewarding experiences in themselves. For these reasons, psychologists have concluded that drive theory does not hold all the answers to motivation. Still, they have been reluctant to abandon the concept of drive, which, as we noted earlier, has come to mean a biologically based motive that plays an important role in survival or reproduction.

**Cognitive Theory and Locus of Control** We have seen that many of our motives depend more on learning and thinking than on biological drives or instincts. Watching TV, reading a book, listening to music, climbing a mountain—all owe their motivational push to cognitive processes that we have studied earlier in this book. One of the most influential cognitive theories emphasizes the importance of expectations in motivating behavior.

In his cognitive *social-learning theory* (1954), Julian Rotter (pronounced *ROH-ter*) asserted that the likelihood of our selecting a certain behavior (such as studying instead of partying) is determined by two factors: (1) the expectation of attaining a goal (getting a good grade) and (2) the personal value of the goal. But what determines these expectations? Rotter says that they depend largely on our **locus of control**, our belief about our ability to control the events in our lives. If, for example, you believe that studying hard will lead to good grades, you have an *internal locus of control*, and you will behave differently from those who have an *external locus of control* and believe that grades depend on luck or on the teacher's biases. Rotter's theory would also predict that people who exercise, save money, or use seat belts have an internal locus of control. On the other hand, the theory also predicts that those who buy lottery tickets or smoke cigarettes have an external locus of control. Such predictions have been supported by thousands of studies that you can find simply by typing "locus of control" into the PsychInfo database.

**Freud's Psychodynamic Theory** By contrast with all the other views we have considered, Sigmund Freud taught that motivation comes mainly from the murky depths of the unconscious mind, which he called the *id*. There, he said, lurked two basic desires: *eros*, the desire for sex, and *thanatos*, the aggressive, destructive impulse. Virtually everything we do is based on one or the other of these urges—or the maneuvers that the other parts of the mind use to keep these desires in check. Because these urges are always building, we continually need to find acceptable outlets for our sexual and aggressive needs. Thus, a creative artist is merely finding an acceptable output for the sex drive, while prizefighters and soldiers use their professions as a psychologically safe outlet for their destructive tendencies.

Eros and thanatos are often portrayed as instincts. But it would oversimplify Freud's theory to think of it as just another instinct theory. He wasn't trying to explain the everyday, biologically based behaviors that we find in eating, drinking, mating, nursing, and sleeping. Rather, he was trying to explain the symptoms we find in mental disorders such as phobias or depression.

We will discuss Freud's theory in much more detail when we get to the chapter on personality. Aside from introducing you here to Freud's views on motivation and noting that there is not a great deal of evidence supporting his views, we would like to make one other point. Among the principal theories of motivation discussed in this chapter, Freud's is the only one that takes a developmental approach to motivation. That is, Freud theorized about the ways our motives change from childhood to adulthood. As we mature, our sexual and aggressive desires become less conscious. Meanwhile we develop more and more subtle and sophisticated ways of letting off these two kinds of motivational "steam"—ways that are usually both socially acceptable and acceptable to our conscious minds. For example, according to the Freudian

■ **Locus of control** An individual's sense of where his or her life influences originate—internally or externally.

TABLE 8.2		Theories of Motivation Compared					
Theories		Biological needs	Cognitive needs	Unconscious desires	Developmental changes	Social needs	Self-actualization
Instinct theory							
<i>Main idea:</i> Specific biological mechanisms govern our behaviors.		X					
Drive theory							
<i>Main idea:</i> Needs produce specific drives that motivate behavior until the drive is reduced.		X					
Cognitive theories							
<i>Main idea:</i> Many of our motives are the result of perception and learning, rather than biological processes.			X				
Maslow's theory							
<i>Main idea:</i> Motivation is based on needs, which occur in a priority (hierarchical) order, so more basic needs are met first.		X				X	X
Freud's theory							
<i>Main idea:</i> Motivation stems from <i>eros</i> and <i>thanatos</i> , but as we mature we gain more control over these urges.				X	X		

perspective, a person with a weight problem may be overeating to satisfy an unconscious self-destructive urge. (See Table 8.2.)

**Maslow's Humanistic Theory** What happens when you must choose between meeting a biological need and fulfilling a desire based on learning? How do you choose whether to eat, sleep, visit friends, or study? Abraham Maslow (1970) said that you act on your most pressing needs, which occur in a natural *hierarchy*, or order of importance. Unlike the other theories of motivation we have considered, Maslow's humanistic theory attempts to span a wide range of human motivation from biological drives to social motives to creativity. Specifically, Maslow's theory proposes a **hierarchy of needs**: a listing of needs arranged in order of priority (Figure 8.4). The "higher" needs have little influence on our behavior, said Maslow, until the more basic need are fulfilled.

- *Biological needs*, such as hunger and thirst, fall at the base of the hierarchy and must be satisfied before higher needs make themselves felt. When biological needs are pressing, other concerns are put on hold.
- *Safety needs* motivate us to avoid danger, when biological needs are reasonably well satisfied. Note that a hungry animal (with unmet biological needs) may risk its physical safety for food, until it gets its belly full; then the safety needs take over.
- *Attachment and affiliation needs* energize us when we are no longer concerned about danger. These needs make us want to belong, to affiliate with others, to love, and to be loved.

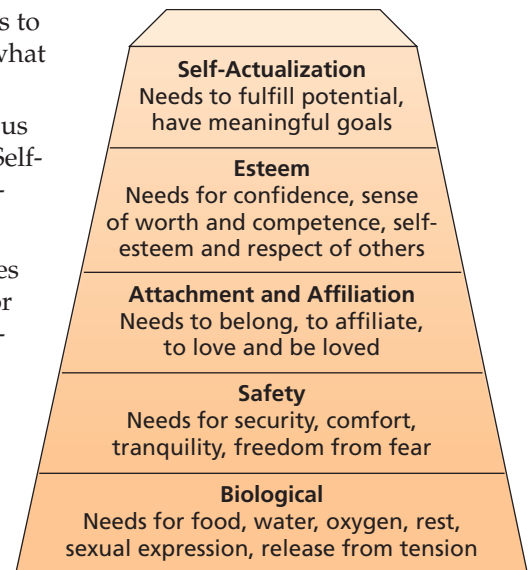
■ **Hierarchy of needs** In Maslow's theory, the notion that needs occur in priority order, with the biological needs as the most basic.

- *Esteem needs* follow next in the hierarchy. These include the needs to like oneself, to see oneself as competent and effective, and to do what is necessary to earn the respect of oneself and others.
- *Self-actualization* lies at the top of the needs hierarchy, motivating us to seek the fullest development of our creative human potential. Self-actualizing persons are self-aware, self-accepting, socially responsive, spontaneous, and open to novelty and challenge.

How does Maslow's theory square with observation? It does explain why we may neglect our friends or our career goals in favor of meeting pressing biological needs signaled by pain, thirst, sleepiness, or sexual desire. Yet—in contradiction to Maslow's theory—people frequently neglect their basic biological needs in favor of social ones, as we saw in rescue workers during the terrorist attack on New York. To Maslow's credit, however, he called our attention to the important role of social motivation in our lives. A great body of work now demonstrates this need we have for relationships with others (Baumeister & Leary, 1995; Brehm, 1992; Hatfield & Rapson, 1993; Kelley et al., 1983; Weber & Harvey, 1994a, b).

Exceptions to Maslow's theory have also been pointed out by cross-cultural psychologists, who see his ideas as applicable only to self-oriented (individualistic) cultures, rather than to group-oriented (collectivistic) cultures. Other critics point out that some important human behaviors do not fit Maslow's hierarchy. It fails to explain, for example, why you might miss a meal when you are absorbed in an interesting book. It fails to explain why sensation seekers, as we saw earlier, would pursue risky interests (such as whitewater kayaking) that override their safety needs. And it fails to explain the behavior of people who deliberately take their own lives. The critics will admit, however, that Maslow's theory was, at least, a step toward a comprehensive theory of motivation.

Overall, Maslow's influence has been greater in the spheres of psychotherapy and education than in motivational research. Business, too, has been especially receptive to Maslow's ideas. Many dollars have been made by consultants using this theory as the basis for seminars on motivating employees. The main idea they have promoted is that humans have an innate need to grow and actualize their highest potentials. Such an upbeat approach was also welcomed by psychologists who had wearied of the negative motivational emphasis on hunger, thirst, anxiety, and fear.



● **FIGURE 8.4** Maslow's Hierarchy of Needs

According to Maslow, needs at the lower level of the hierarchy dominate an individual's motivation as long as they are unsatisfied. Once these are adequately satisfied, the higher needs occupy an individual's attention.



## PSYCHOLOGY IN YOUR LIFE: REWARDS CAN (SOMETIMES) SQUELCH MOTIVATION

It's likely that, at some time or another, you have had to take a test in a subject that didn't interest you. If you were a conscientious student, you learned the material anyway in order to get a good grade or, perhaps, to avoid disappointing your parents. Psychologists say that such behavior is extrinsically motivated because it aims at getting an external reward (or avoiding aversive consequences). Teachers often use grades as extrinsic motivators, hoping to get students more involved in their studies. Extrinsic motivation also explains why people take vitamins, marry for money, pay their taxes, and use deodorant.

But what do you suppose would happen if people were given extrinsic rewards (praise, money, or other incentives) for intrinsically motivated behavior—doing things that they already find enjoyable? Would the reward make the activity even more—or less—enjoyable?





● Overjustification occurs when extrinsic rewards for doing something enjoyable take the intrinsic fun out of the activity. It is likely that this person would not enjoy video games as much if he were paid for playing.

■ **Overjustification** The process by which extrinsic (external) rewards can sometimes displace internal motivation, as when a child receives money for playing video games.

**Overjustification** To find out, psychologists studied two groups of school children who enjoyed drawing pictures (Lepper et al., 1973). One group agreed to draw pictures for a reward certificate, while a control group made drawings without the expectation of reward. Both groups made drawings enthusiastically. Some days later, however, when given the opportunity to draw pictures again, the rewarded children were significantly less enthusiastic about drawing than those who had not been rewarded. In contrast, the group who had received no rewards were actually more interested in drawing than they had been before!

The experimenters concluded that external reinforcement had squelched the internal motivation in the group that had been rewarded. They called this **overjustification**. As a result of overjustification, they reasoned, the children's motivation had changed from intrinsic to extrinsic. Consequently, the children were less interested in making pictures in the absence of reward.

**A Justification for Rewards** But do rewards always have this effect? Many studies of this issue have been done since the drawing study, and it is now clear that rewards do not always interfere with intrinsic motivation (Covington, 2000; Eisenberger & Cameron, 1996). This is consistent with the fact that many professionals both love their work and get paid for it.

Specifically, the newer research shows that overjustification occurs only when the reward is given without regard for quality of performance. In fact, this is just what happened to the children who were all given certificates for their drawings. The same effect can occur in a business when employees are given year-end bonuses regardless of their work. Happily, we now have proof that rewards can be used effectively to motivate people—if the rewards are given not as a bribe but for a job well done.

What's the practical application of these discoveries? If your child doesn't like to practice the piano, wash the dishes, or do homework, no amount of reward is going to change his or her attitude. On the other hand, if the child enjoys piano practice, feel free to give praise, or a special treat, when the job is well done. Such rewards can make a motivated person even more motivated. Likewise, if you have disinterested employees, don't bother trying to motivate them with pay raises (unless, of course, the reason they're unmotivated is that you are paying them poorly). But impromptu praise, an unexpected certificate, or some other small reward when it is deserved may make good employees even better. The danger of rewards seems to occur when the rewards are extrinsic and they are given without regard to the level of performance.

So, how do you think professors should reward their students?

## C H E C K   Y O U R   U N D E R S T A N D I N G

1. **RECALL:** Psychologists use the concept of motivation in several important ways. Which of the following is *not* among them?
  - a. to connect observable behavior to internal states
  - b. to account for variability in behavior
  - c. to explain perseverance despite adversity
  - d. to explain reflexive responses
  - e. to relate behavior and internal feelings
2. **RECALL:** One reason the term instinct has dropped out of favor with psychologists is that
  - a. human behavior has no genetic basis.
  - b. all behavior is learned.
  - c. the term became a label for behavior, rather than an explanation for behavior.
  - d. instinct applies to animal behavior, but not to human behavior.
  - e. instincts are the root of all behavior.

3. **ANALYSIS:** What makes Maslow's theory of motivation different from most other theories?
- a. It deals with biological motives.
  - b. It deals with a wide range of motives.
  - c. It helps us understand both animal behavior and human behavior.
  - d. It deals with both emotion and motivation.
  - e. It preceded all other theories.

4. **UNDERSTANDING THE CORE CONCEPT:** Motivation takes many forms, but all involve inferred mental processes that select and direct our behavior. Thus, the psychology of motivation attempts to explain why a certain \_\_\_\_\_ is selected.
- a. emotion
  - b. action
  - c. sensation
  - d. reward
  - e. perception

ANSWERS: 1. d 2. c 3. b 4. b

## HOW ARE ACHIEVEMENT, HUNGER, AND SEX ALIKE? DIFFERENT?



Now that we have reviewed some essential motivational concepts and theories, we will shift our focus to three diverse and important motives: achievement, hunger, and sex. We will see how each of these motives differs from the others, not just in the behavior it produces, but in deeper ways as well. The Core Concept expresses the point:

Achievement, hunger, and sex exemplify other human motives because they differ not only in the behavior they produce but in the mix of biological, mental, behavioral, and social/cultural influences on them.



Each of the motives to be discussed in this section differs in its blend of nature and nurture. They also differ in their sensitivity to internal and environmental cues, in the reinforcers that satisfy them, and in the social/cultural influences to which they respond. So far, no one—not even Maslow—has been clever enough to devise a theory that encompasses the whole range of motivations, takes all these factors into account, and still fits the facts.

Recent developments in evolutionary psychology, however, show promise in explaining diverse drives heavily rooted in biology, such as hunger and the sex drive (Buss, 1999, 2001). Evolutionary theory suggests that each motivational mechanism evolved in response to different environmental pressures. And as we will see, the evolutionary perspective has offered some particularly strong and controversial proposals to explain gender differences.

But even with these tools, we still have no complete and comprehensive theory of motivation. For the moment, then, psychologists must be content with an array of specific theories, each of which explains a different motive. The contrasts between hunger, sex, and achievement will make this point clear.

### Achievement Motivation

Before you read the caption for Figure 8.5, imagine what might be happening in the picture. The story you tell yourself about the boy and his violin may reveal some of your dominant motives, especially your *need for achievement*. It's a psychological motive that accounts for a wide range of behaviors in our culture. Achievement, of course, can be motivated by a desire for recognition, fame, praise, money, or other extrinsic incentives. But, for most of us, there is an intrinsic satisfaction that comes with meeting a challenge and attaining a goal of personal significance. Whatever its source, the need for achievement is an important source of human motivation.



● **FIGURE 8.5** Alternative Interpretations of a TAT Picture  
 Story Showing High *n Ach*: The boy has just finished his violin lesson. He's happy at his progress and is beginning to believe that all his sacrifices have been worthwhile. To become a concert violinist, he will have to give up much of his social life and practice for many hours each day. Although he knows he could make more money by going into his father's business, he is more interested in being a great violinist and giving people joy with his music. He renews his personal commitment to do all it takes to make it.  
 Story Showing Low *n Ach*: The boy is holding his brother's violin and wishes he could play it. But he knows it isn't worth the time, energy, and money for lessons. He feels sorry for his brother, who has given up all the fun things in life to practice, practice, practice. It would be great to wake up one day and be a top-notch musician, but it doesn't happen that way. The reality is boring practice, no fun, and the likelihood that he'll become just another guy playing a musical instrument in a small-town band.

■ **Need for achievement (*n Ach*)**

In Murray and McClelland's theory, a mental state that produces a psychological motive to excel or to reach some goal.

■ **Individualism** The view, common in the Euro-American world, that places a high value on individual achievement and distinction.

■ **Collectivism** The view, common in Asia, Africa, Latin America, and the Middle East, that values group loyalty and pride over individual distinction.

**Measuring the Need for Achievement** Psychologists Henry Murray and David McClelland pioneered the measurement of achievement motivation with an instrument called the *Thematic Apperception Test (TAT)*. On this test, people are asked to tell stories in response to a series of ambiguous pictures, like the one of the boy with the violin. Each story, Murray and McClelland theorized, represents a *projection* of the respondent's psychological needs. That is, they assumed that the stories would reflect the themes that were psychologically important for the storyteller. From responses to several of these TAT pictures, Murray and McClelland worked out measures of the **need for achievement (*n Ach*)**, which they saw as the desire to attain a difficult, but desired, goal.

Now read the caption for Figure 8.5, which shows an example of how a high *n Ach* individual and a low *n Ach* individual might interpret a TAT picture. We these examples in mind, you can judge where your own story fits on a scale from low to high *n Ach*.

What characteristics distinguish people with a high need for achievement? People high in *n Ach* show more persistence on difficult tasks than do people with low achievement needs (Cooper, 1983; French & Thomas, 1958; McClelland, 1987b). In school, those with high *n Ach* tend to get better grades (Raynor, 1970); they also tend to have higher IQ scores (Harris, 2004). In their career paths, they take more competitive jobs (McClelland, 1965), assume more leadership roles, and earn more rapid promotions (Andrews, 1967). As entrepreneurs, those with high *n Ach* become more successful (McClelland, 1987a, 1993).

**A Cross-Cultural Perspective on Achievement** From a global viewpoint, American psychology's emphasis on achievement motivation may reflect a Western bias. Cross-cultural psychologist Harry Triandis points out that cultures differ in the value they place on achievement motivation. This difference, in turn, involves a fundamental psychological distinction among cultures: their emphasis on *individualism* or *collectivism* (1990). Western cultures, including the United States, Canada, Britain, and Western Europe, emphasize **individualism**. People growing up in these cultures learn to place a high premium on individual

achievement (along with the companion concepts of freedom and equality). By contrast, says Triandis, the cultures of Latin America, Asia, Africa, and the Middle East often emphasize **collectivism**, the values of group loyalty and subordination of self to the group. This means that the collectivistic cultures often discourage individual achievement. Even in the collectivist cultures of Japan, Hong Kong, and South Korea, where very high values are placed on doing well in school and business, the expectation is not of achieving individual honors but of bringing honor to the family.

Without a cross-cultural perspective, it would be easy for Americans to jump to the erroneous conclusion that motivation for individual achievement is a "natural" part of the human makeup. But Triandis's insight suggests that this is not true. Rather, collectivist cultures seem to value group achievement over individual achievement. More generally, cross-cultural research tells us that a complete understanding of motives—particularly those that involve learning—must always take cultural influences into account. (See Table 8.3.)

TABLE 8.3

A Comparison of Three Motives

Motive	Distinguishing features
Achievement	Primarily a psychological motive; no major biological influences known Operates primarily at a conscious level Affected by the culture's emphasis on individualism or collectivism
Hunger	A biological drive, but also influenced by learning A deficiency motive; aroused by deprivation May involve unconscious processes
Sex	A biological drive, but also influenced by learning Not primarily a deficiency motive May involve unconscious processes

## Hunger Motivation

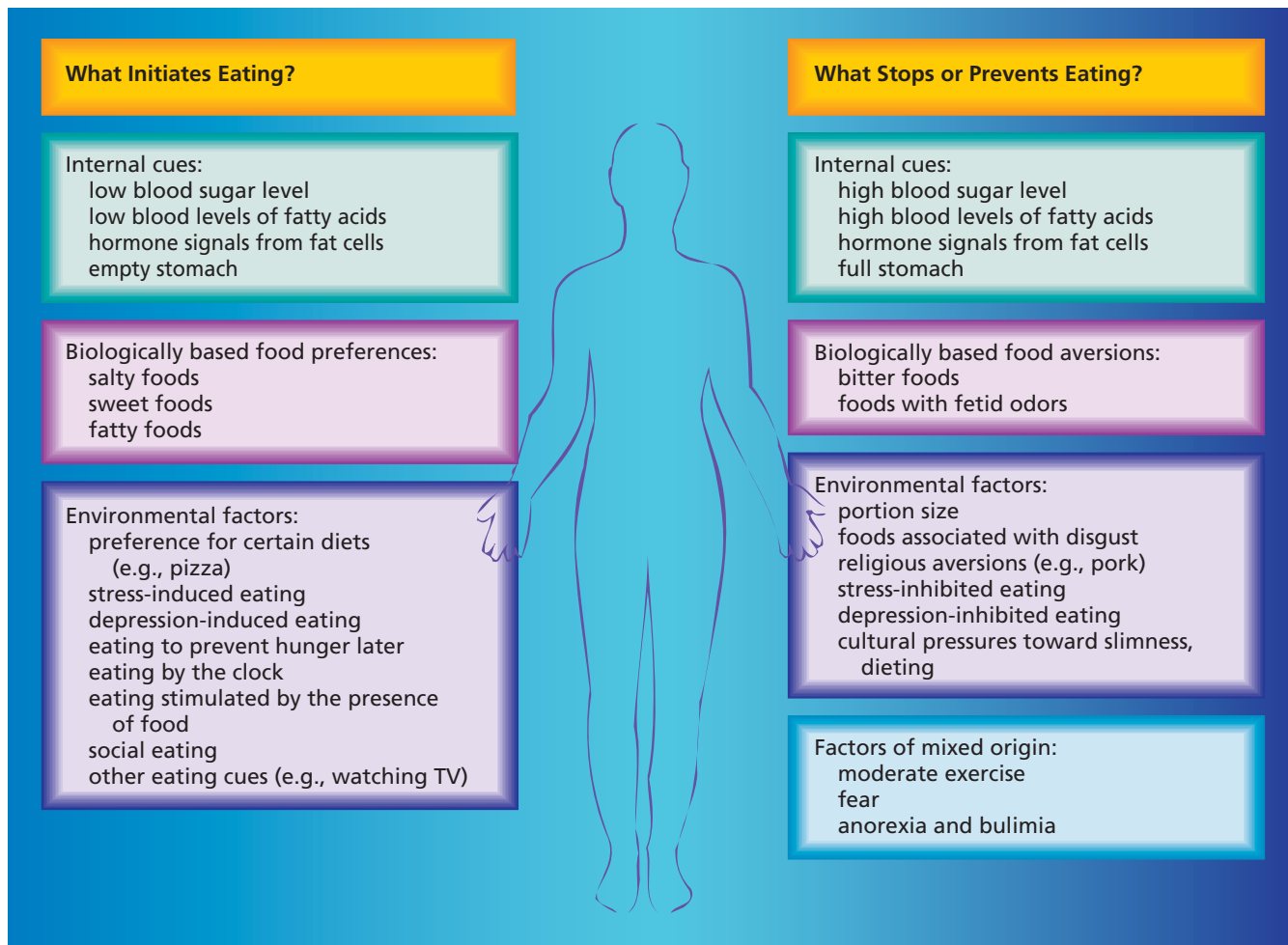
You will survive if you don't achieve, but you will die if you don't eat. Unlike achievement motivation, hunger serves as part of our biological maintenance and survival mechanisms (Rozin, 1996). And if eating were a behavior that had to be entirely learned, many people might starve to death before they mastered its complexities. Instead, when food is available and we are hungry, eating seems to come naturally. But biology isn't the whole story: Hunger motivation and eating behavior have turned out to be far more complex than had originally been thought. So psychologists now incorporate the complexities of hunger and eating into a view we will call the *multiple-systems approach*.

**The Multiple-Systems Approach to Hunger** Your brain combines hunger-related information of many kinds: your body's energy requirements and nutritional state, your food preferences, food cues in your environment, and cultural demands. For example, your readiness to eat a slice of pizza depends on factors such as how long it has been since you last ate, whether you like pizza, what time of day it is (breakfast?), whether your friends are encouraging you to have a slice, and whether pizza is an acceptable food in your culture. Assembling all these data, the brain sends signals to neural, hormonal, organ, and muscle systems to start or stop food-seeking and eating. Here are the main biological factors involved (see also Figure 8.6):

- Receptors in the brain monitor sugar and fat levels in the blood, sending signals to the *lateral hypothalamus*. If the sugar level in your blood is low, for example, this brain structure sends out signals that produce the feeling of hunger (Nisbett, 1972).
- An internal biological "scale" continually weighs the body's fat stores and informs the central nervous system of the result. Whenever deposits stored in specialized fat cells fall below a certain level, or **set point**, signals trigger eating behavior—a homeostatic process (Keesey & Powley, 1975). Research suggests that one cause of obesity may involve certain chemicals (e.g., the hormone *ghrelin*) that signal hunger and others (e.g., *leptin* and *peptide YY3-36*) that signal when the set point has been reached. Animals lacking leptin, for example, continue to eat even when not hungry (Gura, 2000; Woods et al., 1998).
- Pressure detectors in the stomach signal fullness or a feeling of emptiness. These messages are sent to the brain, where they combine with information about blood nutrients and the status of the body's fat cells.

■ **Set point** Refers to the tendency of the body to maintain a certain level of body fat and body weight.





● **FIGURE 8.6** Multiple-Systems Model of Hunger and Eating

- Other mechanisms give us preferences for sweet and high-fat foods. These preferences have a biological basis that evolved to steer our ancestors toward the calorie-dense foods that enabled them to survive when food supplies were unpredictable. This tendency has been exploited in modern times by the manufacturers of sweet and fatty snack foods.
- Physical activity also contributes to hunger and satiation. Extreme exercise provokes hunger, but studies show that moderate exercise actually suppresses appetite (Hill & Peters, 1998).

These hunger mechanisms usually work together to keep fat stores and body weight within a narrow range specified by the biological set point. The set point doesn't always keep weight in a desirable range, however. According to the Centers for Disease Control, half of the U.S. population is overweight, and nearly a quarter is clinically obese (Taubes, 1998; Wickelgren, 1998c).

In addition to the biological mechanisms we have been discussing, our emotional state can encourage or discourage eating. For example, both humans and animals refrain from eating when they are fearful. Stress and depression can affect appetite, too, although the effects are variable: Some people respond by eating more, some by eating less.

We also associate certain situations with eating, so we feel hungry regardless of our biological needs. This explains why you may feel hungry when

you notice that the clock says it is lunch time. It also explains why you may feel a desire to snack when you watch TV or want a third helping at Thanksgiving dinner.

Likewise, culture can influence hunger and eating. This can be seen in societies, such as the United States, where social norms promote thinness or in Oceania, where larger bodies are often considered more attractive (Newman, 2004). Images of ultrathin fashion models can especially influence women and girls to believe they are “supposed” to look as if they do not eat much—a distorted ideal that has been linked to self-destructive eating disorders (Haller, 1992).

**Eating Disorders** When a person weighs less than 85% of the desirable weight and still worries about being fat, the likely diagnosis is *anorexia nervosa*. This condition may also be accompanied by *bulimia nervosa*, characterized by periods of binge eating followed by purging measures, which may include vomiting, fasting, or using laxatives. In the United States, these disorders are estimated to occur about 10 times as often in females as in males, with the greatest risk being in adolescent girls and young women.

Much attention has focused on the social pressures on girls and women to look thin. Recent work on anorexia and bulimia, however, has questioned the assumption that social pressures play the dominant role—focusing instead on possible genetic factors (Grice et al., 2002; Kaye et al., 2004; Keel & Klump, 2003). This makes sense from an evolutionary standpoint, says clinical psychologist Shan Guisinger (2003). She points out the hyperactivity often seen in anorexic individuals—as opposed to the lethargy common in most starving persons—suggesting that hyperactivity under conditions of starvation may have been an advantage that motivated the ancestors of modern-day anorectic individuals to leave famine-impooverished environments.

Other scientists, too, have questioned the assumption that anorexia is a “culture-bound” syndrome occurring primarily in the United States and other Western nations—where obesity seems to be a result of overeating. A careful examination of the available data suggests, however, that the disorder is not limited to Western countries. Rather, it occurs in cultures around the world, where the disorder has previously gone unrecognized. Moreover, it is now seen as an extremely serious disorder, posting the highest mortality rate of any recognized mental disorder (Agras et al., 2004).

**Weight Control** Among Americans, the problem of obesity has grown at an alarming rate since the early 1980s, with the result that 30% of American adults are now classified as obese (Abelson & Kennedy, 2004; Marx, 2003; Newman, 2004; Taubes, 1998; Wickelgren, 1998c). The real problem, of course, is not obesity but the associated health risks for such problems as heart disease, stroke, and diabetes. Worse yet, people in most industrialized nations are following the American lead. Unfortunately, the fundamental causes of this obesity epidemic are not altogether clear. No one in the field of obesity research believes that the condition results from the lack of “will power” (Friedman, 2003). Most experts believe, however, that the causes include lack of exercise, poor diet (including an increasing amount of “junk food”), and genetic factors (Comuzzie & Allison, 1998; Gura, 1998; Hill & Peters, 1998; Levine et al., 1999; Ravussin & Danforth, 1999).

From an evolutionary standpoint, humans are Stone Age creatures adapted to deal with periods of feast and famine. So, we tend to eat more than we need when food is abundant, as a hedge against future periods of starvation. Unfortunately, this Stone Age strategy is not well suited to life in a modern world—where most people in developed countries have no need to expend energy running down game or digging roots. Nor are we well suited to a world of french fries, milkshakes, candy bars, and nachos, which appeal to our

■ **Volumetric thirst** A drop in extracellular fluid levels.

■ **Osmotic thirst** A drop in intracellular fluid levels.

deeply ingrained tastes for salty, fatty, and sweet foods—which just happen to be calorie-rich (Pinel et al., 2000). In many respects, the typical school or office bears far less resemblance to the environment in which humans evolved than to a feedlot, where animals are fattened with abundant food and little opportunity for exercise.

The problem is not lack of concern. Americans, especially, seem obsessed by weight and weight loss, as a glance at the magazine headlines on the newsstand will show. At any given time, one-third of adult Americans say that they are on some sort of weight-control diet (Callaway, 1987; Gibbs, 1996; Jeffery, 1987).

In spite of all we know about hunger and weight control, no one has yet discovered a weight-loss scheme that really works. Notwithstanding nationally advertised claims, no diet, surgical procedure, drug, or other weight-loss gimmick has ever produced long-term weight loss for a majority of the people who have tried it. It is encouraging to know, however, that some potentially effective weight-control chemicals are being tested as you read this, although it may be several years before any come to market (Campfield et al., 1998; Gura, 2003). In the meantime, the experts suggest that the best pathway to long-term weight control involves maintaining a well-balanced diet and a program of moderate exercise (Institute of Medicine, 2002).

**Thirst and Pain** Much as hunger can direct behavior that moves us *toward* certain stimuli that will satisfy that hunger, thirst directs activity that moves us *toward* substances that will satisfy that thirst. On a biological level, the thirst drive takes two forms: *volumetric thirst* and *osmotic thirst*. **Volumetric thirst** is caused by a drop in blood plasma levels, as a result of decreased extracellular fluid (fluid outside the cells in your body, as in the blood). **Osmotic thirst** results from water moving through the cell walls of your body and escaping in the form of sweat, urine, feces, mucus, or the moisture in your breath. Your body detects a drop in intracellular fluid and extracellular fluid as the sensation of thirst—a highly motivating condition increases. When we *rehydrate* by drinking water, a sports drink, or some other thirst-quenching fluid, we are replenishing both intracellular and extracellular fluids.

Pain, by contrast with thirst and hunger, usually produces a drive to *avoid* or *remove*, rather than seek, a stimulus. Consider a pin prick, for example. (Pain is like thirst, however, in that the drive produced by pain has survival value.) Although we avoid most painful stimulation when we can, there are some people who actively seek painful stimuli such as those who consume hot peppers or salsa.

## Sexual Motivation

You may have noticed that sex is a most unusual drive. Unlike hunger or thirst, arousal of the sex drive is usually pleasurable. Even so, sexually aroused individuals typically seek to reduce the tension by sexual activity. And again unlike hunger and thirst, sex is not a homeostatic drive because it does not return the body to an equilibrium condition. Sexual motivation, however, can serve many other goals, including pleasure, reproduction, and social bonding.

In one respect, sexual motivation does have a kinship with hunger and thirst: It has its roots in survival. But even in this respect, sex is unique among biological drives because lack of sex poses no threat to the individual's survival. We can't live for long without food or water, but some people live their lives without sexual activity (although others would say that that's not really living!). Sexual motivation involves the survival of the species, not the individual.

All the biological drives—sex included—exert such powerful influences on behavior that they have led to numerous social constraints and taboos, such as



● Our cultural lessons and life experiences influence the meaning of sex in our lives.

prohibitions on eating certain meats or drinking alcohol. In the realm of sexuality, we find extensive culture-specific rules and sanctions involving a wide variety of sexual practices. In fact, all societies regulate sexual activity, but the restrictions vary widely. For example, homosexuality has been historically suppressed in American culture, but it is widely accepted in Polynesian cultures. Even the discussion of sex can become mired in taboo, misinformation, and embarrassment. Scientists who study human sexuality have felt intense social and political pressures, which show no signs of abating in the present. The result is that the scientific understanding of sexuality, which we examine below, has been hard won.

**The Scientific Study of Sexuality** The first major scientific study of human sexuality was initiated by Alfred Kinsey and his colleagues (1948, 1953) in the mid-20th century, with interviews of some 17,000 Americans concerning their sexual behavior. To a generally shocked public, these researchers revealed that certain behaviors (oral sex, for example) previously considered rare, and even abnormal, were actually quite widespread—or at least reported to be. While Kinsey's data are now over 50 years old, his interviews continue to be considered an important source of information about human sexual behavior, especially since no one else has interviewed such a large and varied sample.

In the 1990s, another large survey of American sexuality was described in *The Social Organization of Sexuality: Sexual Practices in the United States* (Laumann et al., 1994) and in a smaller, more readable companion volume called *Sex in America* (Michael et al., 1994). (See Table 8.4.) This project, known as the National Health and Social Life Survey (NHSLS), involved interviews of 3432 adults, ages 18 to 59. While there were some built-in sources of bias (for example, only English-speaking persons were interviewed), the NHSLS managed to get a remarkable response rate: 79% of those recruited for the survey agreed to participate.

But it was sex researchers William Masters and Virginia Johnson (1966, 1970, 1979) who really broke with tradition and taboo by bringing sex into their laboratory. There they studied sex by directly observing and recording the

**TABLE 8.4**

**Sexual Preferences and Behaviors of Adult Americans**

Frequency of intercourse	Not at all	A few times per year		A few times per month	Two or more times per week	
Percentage of men	14	16		37	34	
Percentage of women	10	18		36	37	
Number of sexual partners since age 18	0	1	2–4	5–10	10–20	21+
Percentage of men	3	20	21	23	16	17
Percentage of women	3	31	31	20	6	3
Infidelity while married						
Men	15.1%					
Women	2.7%					
Sexual orientation	Males		Females			
Heterosexual	96.9		98.6			
Homosexual	2.0		0.9			
Bisexual	0.8		0.5			

Source: Adapted from Michael et al., 1994. Table based on survey of 3432 scientifically selected adult respondents.



■ **Sexual response cycle** The four-stage sequence of arousal, plateau, orgasm, and resolution occurring in both men and women.

physiological patterns of people engaging in sexual activity of various types, including masturbation and intercourse. By doing so, they discovered not what people *said* about sex (which carries obvious problems of response bias) but how people actually *reacted physically* during sex. In the wake of Masters and Johnson's daring departure from tradition, the study of human sexual behavior has become much more accepted as a legitimate field of scientific inquiry.

Based on their observations, Masters and Johnson described four phases of human sexual responding, which they collectively called the **sexual response cycle** (see Figure 8.7). These are the distinguishing events of each phase:

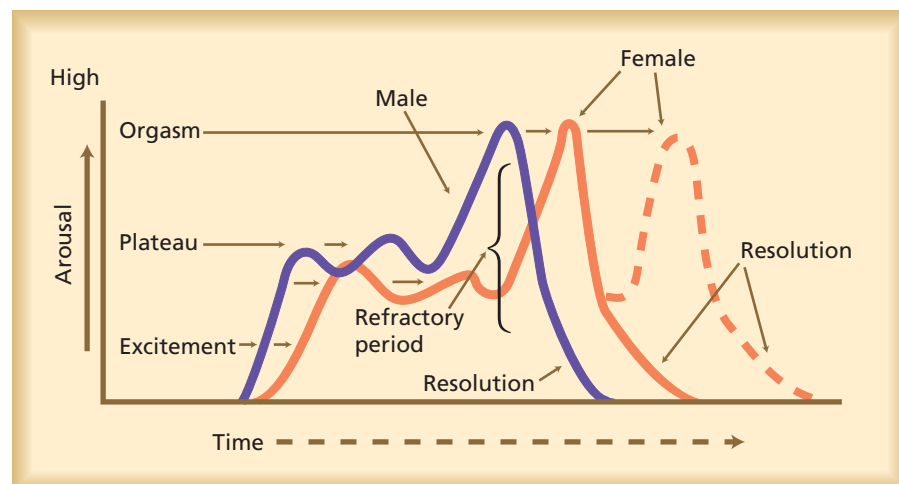
- In the *excitement phase*, blood vessel changes in the pelvic region cause the clitoris to swell and the penis to become erect. Blood and other fluids also become congested in the testicles and vagina.
- During the *plateau phase*, a maximal level of arousal is reached. Rapid increases occur in heartbeat, respiration, blood pressure, glandular secretions, and muscle tension.
- When they reach the *orgasm phase*, males and females experience a very intense and pleasurable sense of release from the cumulative sexual tension. Orgasm, characterized by rhythmic genital contractions, culminates in ejaculation of semen in men and can involve clitoral and vaginal sensations in women.
- During the *resolution phase*, the body gradually returns to its preexcitement state, as fluids dissipate from the sex organs. At the same time, blood pressure and heart rate, which had increased dramatically, drop to their customary levels. Note how similar men's and women's physical responses are at each phase of the cycle.

Note also that Masters and Johnson focused on physiological arousal and responses. They did not emphasize the psychological aspects of sexuality—for example, emotional responses, sexual desire, or the motivation to seek out a partner or make oneself available for sexual experience. Still, from their biological observations of subjects' sexual behavior, Masters and Johnson drew several significant conclusions:

- Men and women have remarkably similar patterns of biological response, regardless of the source of sexual arousal—whether it be intercourse or masturbation. This is clearly seen in the four phases of the sexual response cycle.
- Although the phases of the sexual response cycle are similar in the two sexes, women tend to respond more slowly but often remain aroused longer.

● **FIGURE 8.7** Phases of Human Sexual Response

The phases of sexual response in males and females have similar patterns. The primary differences are in the time it takes for males and females to reach each phase and in the greater likelihood that females will achieve multiple orgasms. (Source: From HUMAN SEXUALITIES by S. H. Gagnon. Copyright © 1977 by HarperCollins Publishers, Inc. Reprinted by permission of the publisher.)



- Many women can have multiple orgasms in a short time period; men rarely do.
- Size of the genitals or other physical sex characteristics (such as vagina, breasts, penis) is generally unrelated to any aspect of sexual performance (except, perhaps, attitude about one's sexual capability).

In addition, Masters and Johnson used their discoveries about sexual behavior to develop effective behavioral therapies for a variety of sexual disorders, including male erectile disorder (inability to achieve or maintain an erection), premature ejaculation, and female orgasmic disorder.

While Masters and Johnson focused on the physiological side of sex, other researchers have studied the cognitive and social components. Much of this work has emphasized how our sexual lives are influenced by learning. We see this, for example, in responses to cues that provoke sexual arousal.

**Sexual Cues** Human sexual motivation does not come primarily from the genitals. In fact, the brain is the major human sex organ. What turns you on is what your brain finds sexually arousing, and how you respond is determined both by your inherited sexual tendencies and by what your brain has learned. The sequence of sexual activities that may lead to orgasm can begin with a single unconditioned stimulus—usually touch—but may also include a variety of conditioned stimuli, such as sights, sounds, and smells. In the form of genital caresses, touch is a universal component of sexual foreplay (Ford & Beach, 1951). Virtually any stimulus that becomes associated with genital touch and orgasm can become a conditioned stimulus that motivates sexual activity—whether the stimulus is present physically or only in memory or fantasy.

Visual stimuli can be arousing to both men and women (Murnen & Stockton, 1997). Exactly what a person finds sexually stimulating, however, is often determined by stimuli (such as erotic pictures) and sexual fantasies experienced during masturbation (Storms, 1980, 1981). Inanimate objects, textures, sounds, visual images, odors—any tangible or imagined stimulus—can become the focus of arousal through this conditioned association. For reasons that are poorly understood, some people learn to become aroused only by specific stimuli, such as pain or the sight of undergarments (Rachman, 1966).

**Sexual Scripts** Generalized sexual arousal can be channeled into specific behaviors (such as kissing or masturbation) that depend on how the individual has learned to think about sexual matters. **Sexual scripts** are socially learned programs of sexual interpretation and responsiveness. How do you know how you are “supposed” to feel when aroused? What do you do when you feel that way? Your culture provides you with many clues from which you develop the sexual scripts for your own behavior. Images from movies and television suggest the importance of kissing and touching, and how to engage in these activities—or at least how beautiful actors and actresses (with many hours of “method” rehearsal) manage to engage in these displays. Advertisements, music videos, and conversations with friends also contribute to many young people's sexual scripts. Unfortunately, while these scripts suggest images and goals, they can provide unreliable and unrealistic information. We assemble aspects of these scripts through social interaction over a lifetime. The attitudes and values embodied in one's sexual scripts define one's general approach to sexuality.

When people have different scripts for an interaction, problems can develop. For example, touch can differ in meaning for men and women. Whether they are mates or coworkers, one person's comment or “friendly touch” may be perceived by the other as a “sexual advance.” In fact, research supports the idea that men and women frequently perceive sexually related behaviors differently (U.S. Merit Systems Protection Board, 1995).

#### CONNECTION: CHAPTER 13

The behavior therapies focus on what people *do*, rather than on what they think or feel. Such treatments are effective for a variety of problems, including phobias and other anxiety disorders.

#### CONNECTION: CHAPTER 7

In general, *scripts* are the expectations we have for events in various situations, such as classrooms, restaurants, traffic jams, and picnics. Scripts often involve social situations—including sexual relationships.

■ **Sexual scripts** Socially learned ways of responding in sexual situations.

**An Evolutionary Perspective on Sexuality** While the theory of sexual scripts says that sexual behavior patterns can be learned, the evolutionary perspective looks for the origins of sexual motivation in our genes. Some observers (Archer, 1996; Buss, 1999, 2001; Buss & Schmitt, 1993) argue that genetic pressures have resulted in different mating strategies, and therefore different gender roles, for males and females. (These views are a matter of emphasis: All theorists recognize that both learning and genetics affect our sexual behaviors.)

Biologically speaking, the goal of both sexes is to leave as many offspring as possible. Yet, the potential physical costs of mating differ for males and females (Bjorklund & Shackelford, 1999). As a result, the sexes have evolved different—and sometimes conflicting—mating strategies, say the evolutionary psychologists. Because females can produce only a few children over a lifetime and because they make a huge biological investment in pregnancy and a substantial commitment of time and energy in child rearing, the best sexual strategy for females involves caution in mate selection. For males, however, the costs and benefits are much different because they cannot become pregnant. For males, the theory says, the biggest payoff results from copulating as often as possible with mates who are in prime breeding condition. As a result, men tend to seek young and physically well-developed partners, while females may seek somewhat older mates who can offer resources, status, and protection for offspring. Not incidentally, these agendas often produce conflict, promiscuity, and sexual jealousy.

Although the evolutionary perspective may seem cold and harsh in its view of sexual motivation, it does account for many gender differences in mating behaviors, such as the larger number of sexual partners typically reported by men than women. (See Table 8.4.) Even so, biology does not prohibit the learning of alternative sex roles and scripts, nor does it explain the social and cultural pressures that cast men and women in different roles (Eagly & Wood, 1999). Moreover, it does not explain why most people remain with their mates over extended periods of time (Hazan & Diamond, 2000). A complete understanding of sexual motivation must include both its evolutionary roots and, especially in humans, the many variations that occur through learning.

## Motives in Conflict

As we have seen, there are many different motives and many ways in which people's behavior can be influenced. Most of the motives we have covered in this chapter have involved biological processes, however, there are cognitive factors that influence behavior as well. A good way to look at the role of cognition with respect to motives is to look at how we resolve conflicts. There are four primary ways to look at conflict (Miller, 1959): approach–approach conflict, approach–avoidance conflict, avoidance–avoidance conflict, and multiple approach–avoidance conflict.

In **approach–approach conflict**, one must choose between two equally attractive options, such as going to the movies with friends or attending another friend's party. This differs from **approach–avoidance conflict**, in which there are both appealing and negative aspects to the decision you have to make, for example, telling the truth about a friend cheating on a test. (The positive is that in doing so, you would ensure that everyone was graded on their merits; the negative is that you might be afraid that you would lose a friend.) In **avoidance–avoidance conflict**, one has to choose between two equally unattractive options. For example, do you take out the trash or clean up the kitchen? Neither is something you want to do, but you have to do one of them. The last type of conflict is **multiple approach–avoidance conflict**. Here, one has

### ■ Approach–approach conflict

A conflict in which one must choose between two equally attractive options.

### ■ Approach–avoidance conflict

A conflict in which there are both appealing and negative aspects to the decision to be made.

### ■ Avoidance–avoidance conflict

A conflict in which one has to choose between two equally unattractive options.

### ■ Multiple approach–avoidance conflict

A conflict in which one must choose between options that have both many attractive and many negative aspects.

TABLE 8.5

Motives in Conflict

Motive	Choice
Approach–approach	Two equally attractive options
Approach–avoidance	Equally attracted to and repelled by the same option
Avoidance–avoidance	Two equally unattractive options
Multiple approach–avoidance	Many positive and negative aspects affecting choice among options

to choose between both attractive and negative aspects of the available alternatives. A good example of this is choosing a college. Each one has plusses and minuses, so deciding which one to attend can be very difficult.



## PSYCHOLOGY IN YOUR LIFE: THE ORIGINS OF SEXUAL ORIENTATION

Heterosexuality and homosexuality represent two forms of **sexual orientation**, which refers to the direction or object of one's sexual interests. Ever since Alfred Kinsey's first reports, we have known that human sexual orientation is a complex issue. To complicate matters, cross-cultural studies reveal considerable variability in the ways that sexual orientation occurs. In parts of New Guinea, for example, the culture dictates that homosexual behavior is universal among young males, who then switch to a heterosexual orientation when they marry (Money, 1987). Among Americans, estimates put the figure between about 1 and 10%—depending on whether homosexuality is defined as one's primary orientation (see Table 8.4 on p. 331) or, more broadly, as any same-sex erotic behavior during one's lifetime.

What does the available evidence tell us about the origins of sexual orientation? We know several factors that are *not* involved. Speaking biologically, we know that sexual orientation is *not* caused by variations in levels of testosterone in adults, although the issue of testosterone or estrogen influences in the fetus is still an open question (McAnulty & Burnette, 2004). From a social perspective, we also know that certain parenting styles or family configurations do *not* cause children to turn toward heterosexuality or homosexuality (see Bailey et al., 1995; Bell et al., 1981; Golombok & Tasker, 1996; Isay, 1990). Similarly, researchers have come up empty-handed in their attempts to link human sexual orientation to early sexual experiences.

A controversial theory proposed by Daryl Bem, however, asserts that we become attracted to the sex that we, as young children, consider most unlike us. Bem has amassed considerable evidence in support of this “exotic becomes erotic” theory (Bem, 1996, 2001). (For an opposing viewpoint, however, see Peplau et al., 1998, who dispute Bem's interpretation of the evidence and argue that his theory does not take women's experiences into account.)

On a more positive note, attempts to identify biological origins of sexual feelings in the genes and the brain have shown some promise. For example, Richard Pillard and Michael Bailey (1991) studied sexual orientation of male identical twins. They discovered that when one twin is homosexual, the chances of the other being homosexual is about 50%—as compared with an incidence of roughly 5 or 6% in the general population. This study also found that the rate drops to 22% for fraternal twins and 11% for adoptive brothers



● The origins of sexual orientation are unclear, although some evidence points to biological factors. What is clear is that research on sexual orientation often generates controversy.

■ **Sexual orientation** One's erotic attraction toward members of the same sex (a homosexual orientation), the opposite sex (a heterosexual orientation), or both sexes (a bisexual orientation).



of homosexuals. Encouraged by these results, the researchers later studied female twin pairs—with essentially the same results (Bower, 1992).

Looking through a different biological window on sexual orientation, neurobiologist Simon LeVay (1991; LeVay & Hamer, 1995) found that a part of the hypothalamus in the brains of homosexual men was smaller than the same structure in heterosexual men. Critics of LeVay's research warn of confounding factors, arising from the fact that most of his homosexual subjects were AIDS victims and that the disease may have affected the structure under study.

Research in this area remains controversial because of the strong feelings, political issues, and prejudices involved (Herek, 2000). Further, it has attracted scientific criticism because it is correlational—rather than experimental—so the data cannot establish cause and effect with certainty. Moreover, some observers object that gay men and lesbians should not feel pressured to justify their behavior by seeking a biological basis for it (Byne, 1995).

Where does this leave us in our understanding of sexual orientation? Attitudes toward minority forms of sexual orientation, such as homosexuality, differ sharply among cultures around the world, with Americans among the most divided on issues such as gay marriage. Most experts—but not all—would say that the research strongly supports some biological influence on sexual orientation. Just how biology might influence our behavior in the bedroom, however, remains a mystery.

## CHECK YOUR UNDERSTANDING

- RECALL:** Which of the following is often considered a biological drive?
  - hunger
  - safety
  - n Ach*
  - fear
  - all of the above
- RECALL:** How did Murray and McClelland measure *n Ach*?
  - with a polygraph
  - with the Thematic Apperception Test
  - by measuring achievement-related hormones in the blood
  - by using grade-point averages (GPAs)
  - by using AP tests
- RECALL:** Which motive seems to regulate behavior in order to maintain a certain physical condition in the body, known as a *set point*?
  - achievement
  - hunger
  - sex
  - homeostasis
  - all of the above
- ANALYSIS:** Which of the following motives would most likely be influenced by living in an individualistic culture versus a collectivist culture?
  - hunger
  - thirst
  - sex
  - homeostasis
  - n Ach*
- UNDERSTANDING THE CORE CONCEPT:** In which of the following would biological factors be *least* important in accounting for the motivational differences between individuals?
  - hunger
  - thirst
  - n Ach*
  - sex
  - homeostasis

ANSWERS: 1 a 2 b 3 b 4 e 5 c



## HOW AND WHY DO WE EXPERIENCE STRESS?

What images come to mind when you hear the word *stress*? Most people think of the pressures in their lives: difficult jobs, unhappy relationships, financial woes, health problems, and final exams. You may have some visceral associations with stress, too: a churning stomach, perspiration, headache, or high

blood pressure. And, as we have noted, stress is also linked with physical illness. In fact, stress is associated with many aspects of modern society, and it is also associated with our internal reactions. This is what makes stress a slippery concept.

We use the word *stress* loosely in everyday conversation, referring to a *situation* that confronts us (Lazarus et al., 1985). For example, if your employer or professor has been giving you a difficult time, you may say that you are “under stress,” as though you were being squashed by a heavy object. In this conversational sense, stress means an external threat or pressure, an unpleasant event.

However, psychologists use the term in a more specific way: For them, stress is not a situation but a *response*. They see **stress** as referring to the physical and mental changes that occur in response to a challenging or threatening situation (Krantz et al., 1985). It is useful to make a distinction between, on the one hand, stressful stimuli or situations, which we call **stressors**, and, on the other hand, the arousal we call stress or the *stress response*. Thus a stressor is the large, angry man climbing out of the car you just bashed into; stress is your response to that large, angry man: your racing heart, shaky hands, and sudden perspiration. Your demanding boss is the stressor; your upset stomach is part of your stress response.

This section of the chapter begins with a review of the stressors that have drawn the most attention from psychologists. These include everything from petty hassles to relationship problems to terrorist attacks. The Core Concept for this section emphasizes the essentially adaptive nature of the stress response to stressors that vary dramatically in nature and intensity:

The human stress response to perceived threat activates thoughts, feelings, behaviors, and physiological arousal that normally promote adaptation and survival.



Whether stress comes from the 9/11 disaster, a long illness, or a traffic jam, how we respond depends on an interaction of the same basic elements that you see in Figure 8.8: the stressor, our personal characteristics, the resources we have available. Many of the individual differences seen in responses stem from how we consciously and unconsciously evaluate the stressor and assess our resources for coping with it. Together these two sets of perceptions—identifying the threat and determining how one will cope—make up the process of *cognitive appraisal*.

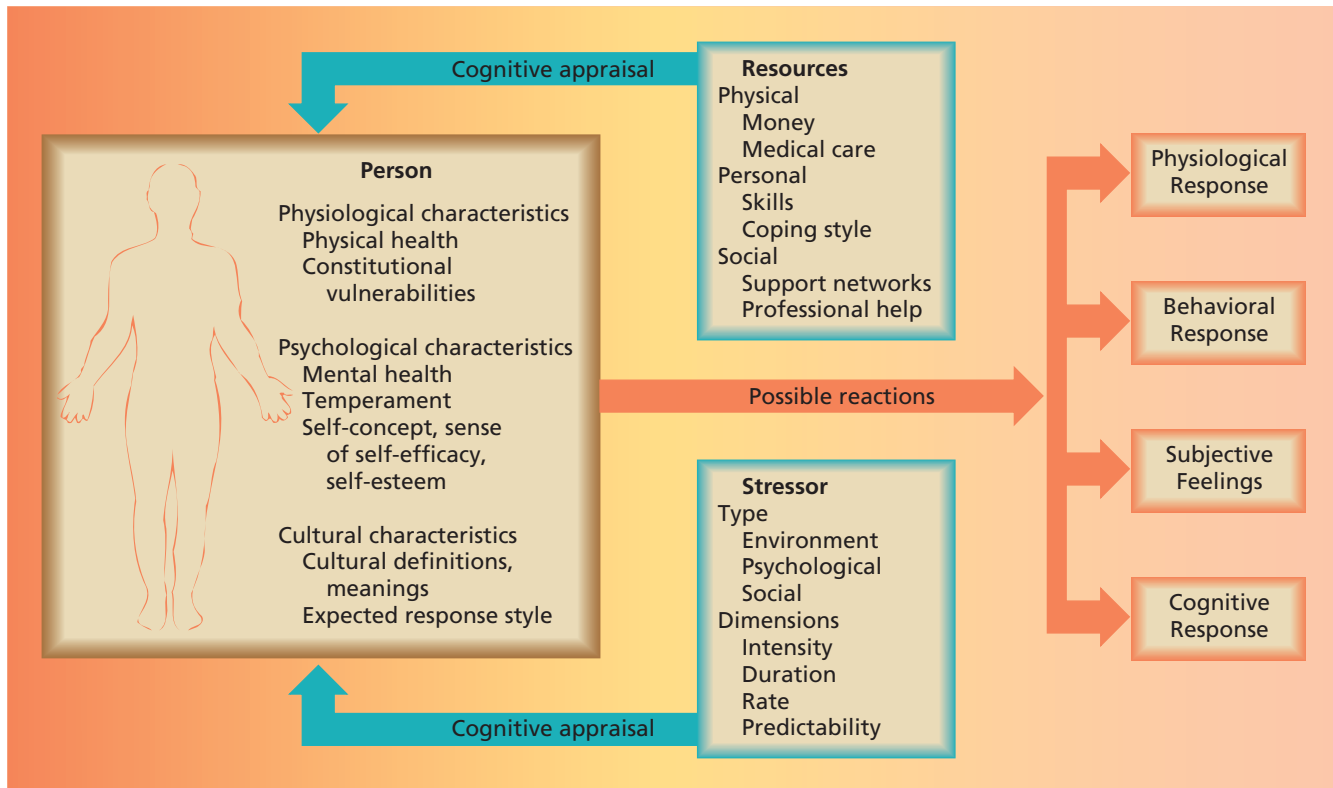
The stress response has the same components as the emotional response. This means that it has four major components, shown in Figure 8.8. In addition to cognitive appraisal, the stress response includes a physiological response (such as a “knot” in the stomach), subjective feelings (such as fear), and behavior (such as aggression). But stress is not just another emotion. In its most worrisome form, it is an emotional response that people can experience for long periods—which makes the physiological arousal potentially so dangerous. You cannot remain in a state of arousal for months or years without some dire consequences. As we will see, however, cognitive appraisal can be turned to our advantage, as one of the most effective tools for coping with stress.

## Stressors, Ancient and Modern

Early humans survived mortal dangers by responding quickly and decisively to potentially lethal attacks by predators or hostile tribes, and some of the ways we respond to stressors in modern times are the result of our ancestors’ evolutionary legacy. Modern life, of course, adds some new dangers: demanding jobs, financial worries, and computer crashes. Most recently we have faced the

■ **Stress** A physical and mental response to a challenging or threatening situation.

■ **Stressor** A stressful stimulus, a condition demanding adaptation.



● **FIGURE 8.8** A Model of Stress

Cognitive appraisal of the stress situation interacts with the stressor and the physical, social, and personal resources available for dealing with the stressor. Individuals respond to threats on various levels—physical, behavioral, emotional, and cognitive. Some responses are adaptive, and others are maladaptive or even lethal.

stressors of international terrorism. Yet while we are exposed to new stressors, our stress response reflects the body’s millennia-old ability to become quickly aroused to meet emergencies. So, when the power company threatens to cut off your power or your boss criticizes your work, an ancient response pattern occurs, as your muscles tighten, your hormones surge, and you feel an urge to flee or fight. Unfortunately, these old remedies don’t always work as well with the new problems.

Some of the serious stressors confronting our ancestors, such as catastrophe or combat, do continue to face us today. Thus we begin our review with a look at primitive threats to survival and the responses that evolved to meet them. Next we contrast sudden, traumatic stressors with more gradual chronic stressors. Finally, we consider stress of adapting to normal life-changing events.

**Primitive Stressors** Human beings have adapted to an enormous variety of living environments and environmental conditions worldwide, confronting climate extremes, scarce resources, and hostile neighbors. Those who responded most quickly and effectively to danger survived and passed those responsive genes to their offspring; slower or less clever individuals were less likely to survive in the course of human evolution. In all the variety of challenges humans faced, three mortal threats continually demanded quick action: the danger of *starvation*, *exposure* to the elements, and mortal *attack*. Wherever we have lived, whatever we have done, we always must find a way to feed ourselves, to obtain shelter and protection, and to defend ourselves. While these

goals are unmet, there is no time to waste; we must be quick to appraise the problem and solve it. The quicker we are to feel fear or anger and take appropriate action, the better our chances of success and survival.

**Responding to Threat** Thus we are the descendants of ancestors who were best suited to *fight or flee* when faced with threats to survival. This evolutionary script is retained in our body's automatic responses to frightening or enraging conditions. If someone insults you, your face feels hot and your fists seem to clench by themselves, readying you for a physical contest. Facing a very different sort of "threat": Suppose you are unprepared for class discussion, but the instructor calls on *you*. Your heart races, your knees get wobbly, and you feel the urge to run away. These examples illustrate the two poles of the fight-or-flight response, a sequence of internal processes triggered when a threat is perceived, preparing the organism for either struggle or escape.

An individual's fight-or-flight pattern depends on an innate "program" built into the brain. However, responses to different stressors are also affected by how an individual has *learned* to deal with threat. The built-in impulse to either fight or flee from a stressor can cause you to overreact to a mild problem, one that cannot be solved with either action. You may feel intimidated by an unwanted phone call, but running away won't make the caller stop pursuing you. Or an obnoxious television talk show might upset you, but yelling or throwing the remote control at the set won't change the host's politics. Thus you find what works and what doesn't work and refine your responses to various stressors accordingly.

Since prehistoric times, humans have been individually challenged by loss and catastrophe. As people collected into communities, societal issues and group conflict has also led us to "worry ourselves sick" by anticipating what might go wrong, from minor irritants to major traumas (Sapolsky, 1994). Both traumatic events and chronic stressors continue to challenge us today.

## Traumatic Stressors

Catastrophic events such as natural disaster and major terrorist attacks both qualify as types of **traumatic stressors**, situations that threaten your own or others' physical safety, arousing feelings of fear, horror, or helplessness. On a more personal level, the loss of a loved one constitutes a trauma, despite the fact that death and separation are likely to affect everyone at some time. We examine traumatic stress by considering first natural and human-made catastrophes, then the power of personal loss, and finally the complexity of post-traumatic stress.

**Catastrophe** Stress and loss in the extreme accompany *catastrophic events*—sudden, violent calamities, including both natural disasters, such as the 2004 tsunami in Southeast Asia, and human-made tragedies such as terrorist attacks and warfare. Anyone caught up in such a catastrophic event can lose loved ones or possessions; less obvious is the fact that one's *response* to a catastrophe can have devastating effects on physical and mental health. For example, firefighters and emergency workers find themselves reliving the events in nightmares and in daytime flashbacks.

Studies of catastrophe survivors have taught psychologists how individuals who have undergone such traumas and losses respond to these ordeals (Asarnow et al., 1999; Baum, 1990; Sprang, 1999). Such research is difficult: Ethics prevent psychologists from creating disastrous events in order to study their effects on volunteer subjects. The only way to study these events is to be on the scene after the catastrophe, getting the story from the survivors while it is fresh in their minds.

■ **Traumatic stressor** A situation that threatens one's physical safety, arousing feelings of fear, horror, or helplessness.



● Catastrophic events, like the September 11, 2001, terrorist attack on the World Trade Center, are particularly stressful because they are life threatening, out of our control, and difficult to explain.



Natural disasters are violent, destroying life and property in the affected area. But human-made catastrophes such as massive crime and terrorism have an added dimension of threat, because they are produced intentionally by other people. *Terrorism* has been defined as a type of disaster caused by “human malevolence” with a goal of disrupting society by creating fear and danger (Hall et al., 2002).

Psychological responses to extreme natural and human-caused disasters have been theorized to occur in stages, as victims experience shock, feel intense emotion, and struggle to reorganize their lives (Beigel & Berren, 1985; Horowitz, 1997). Cohen and Ahearn (1980) identified five stages that we pass through:

1. Immediately after the event, victims experience *psychic numbness*, including shock and confusion, and for moments to days cannot comprehend what has happened.
2. During a phase of *automatic action*, victims have little awareness of their own experiences and later show poor recall for what occurred. This phase is worsened by a lack of preparedness, delaying rescue and costing lives.
3. In a third stage of *communal effort*, people pool resources and collaborate, proud of their accomplishments but also weary and aware that they are using up precious energy reserves. Without better planning, many survivors lose hope and initiative for rebuilding their lives.
4. In the fourth phase, survivors may experience a *letdown* as, depleted of energy, they comprehend and feel the tragedy’s impact. Public interest and media attention fade, and survivors feel abandoned although the state of emergency continues.
5. An extended final period of *recovery* follows as survivors adapt to the changes created by the disaster. The fabric of the community will change as the natural and business environments are altered. On the national scale after 9/11, survivors demanded to know how the attacks could have happened in the first place—reflecting a basic need to know “why?” and to find meaning in loss.

Stage theories of stress response are useful because they help us to anticipate what survivors will go through and what kinds of assistance they need. To learn from and make sense of catastrophic loss, we formulate *accounts*, narratives that explain what happened and why. These stories help us to explain ourselves to each other; sharing them may even reflect a more general human need to tell our stories and be understood by those close to us (Harvey, 1996; Harvey et al., 1990). When an event is surprising or unpleasant, we are especially likely to formulate explanations (Holtzworth-Munroe & Jacobson, 1985). By confiding our stories to others, we begin to work through the pain of loss (Harvey, 2000; Weber & Harvey, 1994b).

People who undergo any sort of trauma generally become more susceptible to physical illness. The power of stories holds even here, however: Survivors who discuss their experiences in detail with others suffer fewer health problems (Niederhoffer & Pennebaker, 2002; Pennebaker, 1990; Pennebaker & Harber, 1991; Pennebaker et al., 1988, 1989).

Newsworthy events such as natural disasters merit news coverage, broadcasting the sounds and images of others' pain. Viewers are not immune to such programs, however, and may experience a sort of "second-hand" traumatization.

**Posttraumatic Stress** Individuals who have undergone severe ordeals—rape, combat, beatings, torture—may experience a belated pattern of stress symptoms that can appear months, or even years, after their trauma. In **posttraumatic stress disorder (PTSD)**, the individual reexperiences mental and physical responses that accompanied the trauma. Nearly one adult in 12 in the United States has suffered from PTSD at some time in his or her life—a higher rate than many experts had assumed, with symptoms lasting more than 10 years for over one-third of cases. Traumas described by PTSD victims most frequently include having witnessed another person's being killed or badly injured, having lived through a natural disaster, and having survived a life-threatening accident. Men cite more experiences of physical attack, military combat, threat with a weapon, or being held captive or hostage; women cite more experiences of rape, sexual molestation, physical abuse, and neglect during childhood (Bower, 1995a).

A little-acknowledged threat to combat soldiers is killing the enemy. Soldiers who had killed in combat were found to suffer higher rates of PTSD than other troops, a special syndrome dubbed *perpetration-induced traumatic stress* (PITS) (MacNair, 1999, 2002). Training and commanding troops to kill, argues one scholar, is a major factor in eventual breakdown. Such trauma can be reduced if individual soldiers are taught mentally to confront the act of killing—an unlikely policy as long as the military itself cannot confront it (Grossman, 1996). Although military authorities "have produced reams of studies on every other aspect of combat trauma—grief, survivor's guilt, fear, and so on—the after-effects of taking an enemy's life are almost never studied" (Baum, 2004, p. 46).

Victims of posttraumatic stress disorder typically become distracted, disorganized, and experience memory difficulties (Arnsten, 1998). They suffer a psychic numbing to everyday events (a reaction also called *diminished hedonic capacity*). They may also feel alienated from other people. The emotional pain of this reaction can result in various symptoms, such as problems with sleeping, guilt about surviving, difficulty concentrating, and an exaggerated "startle response" (wide-eyed, gasping, surprised behavior displayed when one perceives a sudden threat). Rape survivors, for example, may experience a barrage of psychological aftereffects, including feelings of betrayal by people close to them, anger about having been victimized, and fear of being alone (Baron & Straus, 1985; Cann et al., 1981).

#### CONNECTION: CHAPTER 12

Posttraumatic stress disorder is categorized as an *anxiety disorder*, along with panic, phobic, and obsessive-compulsive disorders.

■ **Posttraumatic stress disorder (PTSD)** Delayed stress reaction in which an individual involuntarily reexperiences emotional, cognitive, and behavioral aspects of past trauma.

Posttraumatic stress disorder can also have lasting biological consequences (Arnsten, 1998; Caldwell, 1995; Crowell, 2002; Mukerjee, 1995; Sapolsky, 1998). The brain may undergo physical changes when the stress is extreme in intensity or duration. Stress can cause the brain's hormone-regulating system to develop hair-trigger responsiveness, making the victim of posttraumatic stress overreact to mild stressors or even harmless but surprising stimulation. Based on these clues, researchers are searching for a treatment that might counteract these malfunctioning brain pathways.



● Confiding in others is helpful in working through feelings generated by trauma and loss.

A recent study of the mental health of troops returning from the Middle East showed the overall rate of mental health concerns, including PTSD as well as depression and anxiety, was close to 15%, whereas about twice as many veterans of Vietnam reported nightmares and other PTSD symptoms. Authors of the study found a significant risk of mental health problems, exacerbated because various barriers prevent troops from obtaining care and treatment, “particularly the perception of stigma among those most in need of such care” (Hoge et al., 2004, p. 13). The soldiers with the worst symptoms resist seeking treatment *even after returning home*, for fear it will cause them embarrassment or harassment. Such harsh judgment constitutes a “worst-care scenario” that demands immediate attention (Friedman, 2004, p. 76).

We have seen that stress has many sources, and it can have serious health consequences. Now we will learn how it works on us both biologically and psychologically.

## The Physical Stress Response

There is no scientific evidence that mental power alone can alter external physical events, such as the roll of the dice or dealing of cards. The mind can control matter outside our bodies only by controlling our behavior. Mental influence on internal events, however, is another story: Evidence for this internal mind-over-matter effect abounds in psychology and medicine. How this works during stress—to our advantage and disadvantage—is the subject of this section of the chapter, where we look at the physical components of stress.

Firefighters usually report that they love their work, and for some the job is a family tradition. But these individuals' camaraderie and commitment cannot lessen the threat, the risk of injury and death—the stress they experience—when they must answer the alarm, race into harm's way, grieve, and adapt. Even for an experienced firefighter, how does the body respond to the perception of that stressor?

The physical response to nearly any stressor follows the same sequence:

1. An initial arousal
2. A protective behavioral reaction, often taking the form of the fight-or-flight response
3. Internal responses of the autonomic nervous system (ANS) and endocrine system
4. A decrease in the effectiveness of the immune system

As we examine each physical response, note that these are the same processes we reviewed in the experience of emotion in the last chapter. As we have stated, the stress response is a form of emotional response.

**Arousal** When a stressful situation begins suddenly—as when a professional firefighter first hears the alarm—the stress response is likely to begin with abrupt

and intense physiological arousal, including accelerated heart rate, quickened breathing, increased blood pressure, and profuse perspiration. This response involves the same unconscious brain circuits involved in emotional arousal (recall Figure 8.2). This scenario illustrates a case of **acute stress**, a temporary pattern of stressor-activated arousal with a distinct onset and limited duration.

Sometimes, however, arousal may merely fester, or it may grow slowly, as when jealousy first tugs at you, then distracts you, and finally disrupts your life with fear or outrage. This sort of long-term arousal is an example of **chronic stress**. It involves a continuous state of stressful arousal persisting over time, a state in which the demands may be greater than one's resources for dealing with them.

Arousal does us no good if it creates panic and confusion that keep us from responding to a threat. Fortunately, the human brain evolved to coordinate several simultaneous reactions involving the nervous system, the endocrine system, and the muscles. As a result, we are biologically equipped to make efficient and effective responses to changing environmental demands. So, when one perceives an external threat, these bodily mechanisms are set in motion. Many are automatic or reflexive because instant action and extra strength may be required if the organism is to survive. As introduced earlier, this basic pattern of internal activity constitutes the *fight-or-flight response*.

**Fight or Flight** Imagine you are attending a meeting with your coworkers. Suddenly the department head criticizes you and claims that you have failed to attend to tasks that were really someone else's responsibility. As everyone's eyes quickly turn your way, you feel your face getting hot, your jaw tightening, and your fists clenching. You would not dream of shouting or hitting anyone—but you feel like it.

Now imagine another stressful scenario: You walk into class a few moments late, only to find everyone putting their books and notes away, apparently clearing their desks for a test you did not realize was scheduled for today. Your heart seems to stop, your mouth is dry, and your knees feel weak. Momentarily you consider hurrying back out the door. Why does this feel like a threat? Your life is not really in danger, and running away won't solve your problem. So why do you feel a physical urge to escape?

These two scenarios illustrate the two poles of the **fight-or-flight response**, a sequence of internal processes that prepares the aroused organism for struggle or escape. It occurs when a situation is *interpreted* as threatening. When a fight-or-flight reaction does occur, its pattern depends on how the organism has learned to deal with threat, as well as on an innate fight-or-flight “program” built into the brain. Thus you have an *internal* urge to flee from an unexpected test, but you have *learned* from experience that, sooner or later, you'll have to face the music and make up the missed work—so fleeing does no good and could even worsen your problem.

While the fight-or-flight response can be acquired or influenced by learning, it is essentially an innate reaction operating largely outside consciousness. This autonomic response was first recognized early in the 20th century by physiologist Walter Cannon, whose research revealed that a threat stimulates a sequence of activities in the organism's nerves and glands (Cannon, 1914; 1936). We now know that the amygdala and the hypothalamus control this response by initiating a cascade of events in the autonomic nervous system (ANS), endocrine system, and immune system (Jansen et al., 1995; LeDoux, 1996).

As you recall, the autonomic nervous system (ANS) regulates the activities of our internal organs. When an individual perceives a situation as threatening, the hypothalamus sends an emergency message to the ANS, which sets in motion several bodily reactions to stress. See Figure 8.9 for an account of how



● In cases of acute stress, such as this woman faces as a fire races through her house, the stressful situation arises suddenly, and the stress response begins with abrupt and intense physiological arousal.

#### CONNECTION: CHAPTER 3

The *autonomic nervous system* operates outside of consciousness and sends messages to the internal organs.

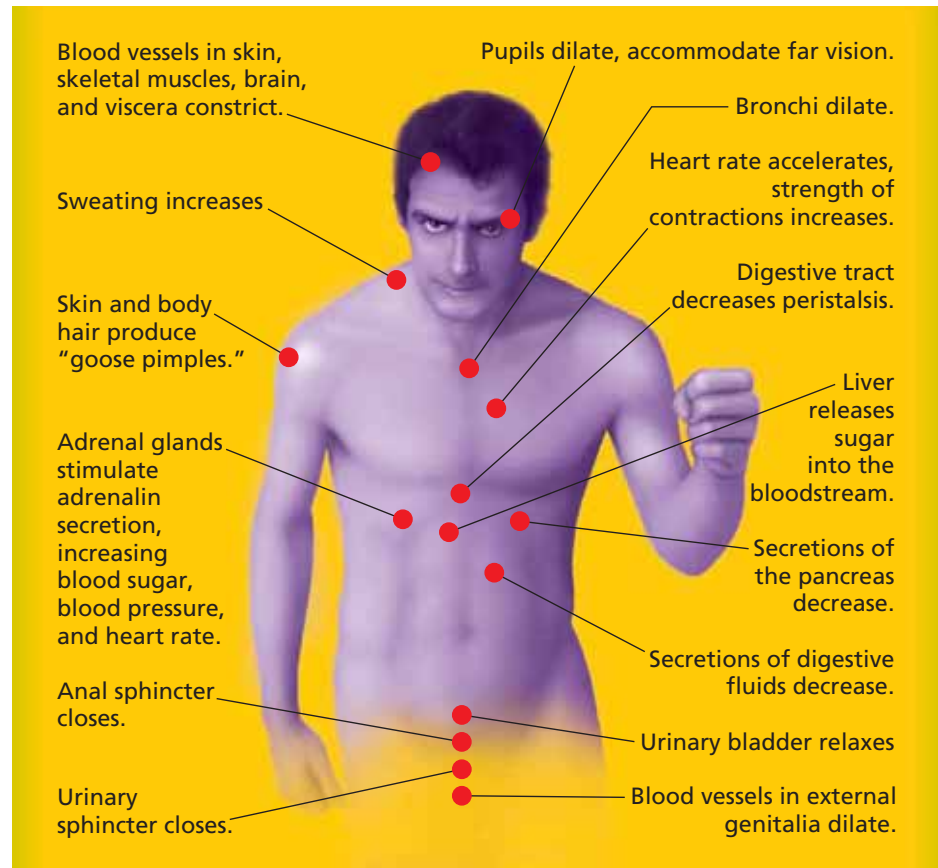
■ **Acute stress** A temporary pattern of stressor-activated arousal with a distinct onset and limited duration.

■ **Chronic stress** Continuous stressful arousal persisting over time.

■ **Fight-or-flight response** Sequence of internal processes preparing an organism for struggle or escape.



● **FIGURE 8.9** Bodily Reactions to Stress



the body is prepared for an emergency response by the ANS and endocrine system (system of internal glands). The response can be helpful when you need to escape a mudslide, confront a hostile rival, or protect your children from a tsunami, and it served our ancestors well. But it has a cost. Staying physiologically “on guard” against a threat eventually wears down the body’s natural defenses. In this way, suffering from frequent stress—or frequently interpreting experiences as stressful—can create a serious health risk: An essentially healthy stress response can become distress.

In sudden emergencies, these automatic responses can be helpful, producing effective action without requiring the time and effort of complex thinking and planning. But, as we have seen, modern living has produced a different class of stressors—*psychosocial stressors*—that act over far longer periods and threaten not our immediate survival but our status, lifestyle, health, or self-respect. In the face of chronic psychological stressors, our emergency response may offer little help—or may even backfire. The automatic response that evolved for quick action and to ensure survival can, when prolonged, exhaust bodily resources and actually *impede* survival. Stress researcher Robert Sapolsky notes that our powerful stress-response system works effectively for short-term emergencies, “but we turn it on for months on end, worrying about mortgages, relationships, and promotions” (1998, p. 7).

While fight-or-flight behaviors—efforts to counterattack or flee—are visible in our behavior, the accompanying autonomic and endocrine responses occur invisibly inside us. Like the fight-or-flight response, these internal responses are adaptive for dealing with acute, life-threatening stressors. But if a stressor is chronic and long-term, or is not a definable external threat, then our inter-

nal stress response can become prolonged, producing physical weakness and illness—even death.

## The General Adaptation Syndrome

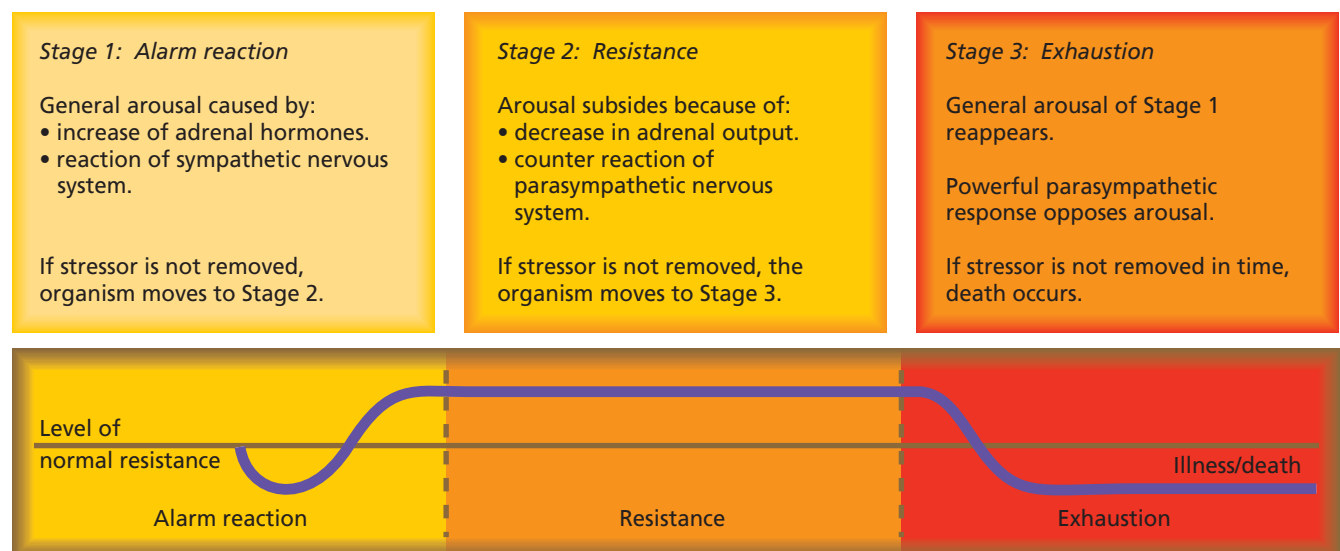
How do victims of stress and persistent negative emotions become candidates for disease? Our understanding of how stress causes illness began in the early 20th century with the work of Canadian endocrinologist Hans Selye (pronounced *SELL-yeh*). In brief, he discovered that different stressors trigger essentially the same systemic reaction, or general physical response, which mobilizes the body's resources to deal with the threat. Moreover, he found, all stressors provoke some attempt at adaptation, or adjustment of the body to the stressor. Because the bodily response was a general rather than a specific adaptation effort, Selye dubbed it the **general adaptation syndrome (GAS)**. (See Figure 8.10.) Normally, these responses are helpful, but under chronically stressful conditions, they can lead to heart disease, asthma, headache, gastric ulcers, arthritis, and a variety of other disorders (Carlson, 2004; Friedman & Booth-Kewley, 1988; Salovey et al., 2000).

Selye's model of the GAS describes a three-stage response to any threat, consisting of an *alarm reaction*, a *stage of resistance*, and a *stage of exhaustion* (Hughes et al., 1984; Johnson, 1991; Selye, 1956, 1991).

**The Alarm Reaction.** In the first stage of stress, the body's warning system activates and begins to mobilize its resources against the stressor. In this **alarm reaction**, the hypothalamus sets off an emergency response in the hormone system, especially in the adrenal glands, through the pathway shown in Figure 8.11. The result is a flood of steroid hormones into the bloodstream—chemicals that support strength and endurance (the reason why some athletes risk dangerous side effects by abusing steroids).

At the same time, the hypothalamus sends emergency messages through the sympathetic division of the autonomic nervous system to internal organs and glands, arousing the body for action. This mechanism probably underlies

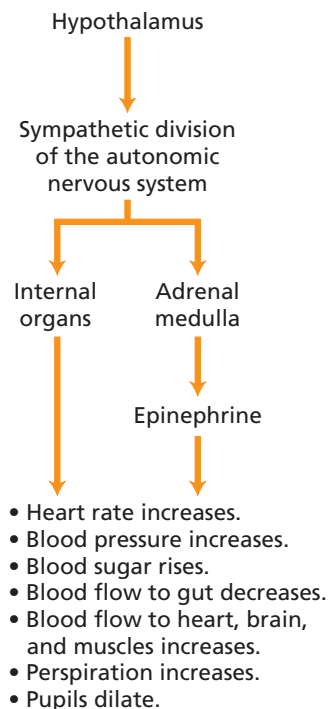
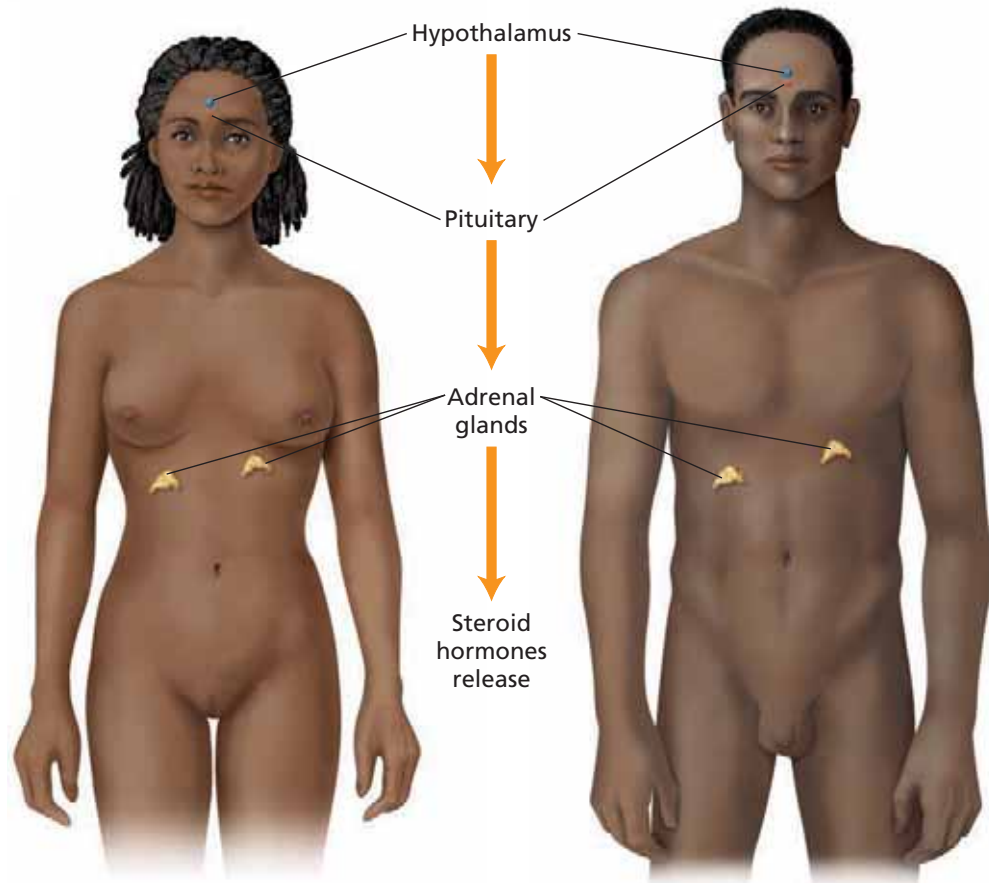
■ **General adaptation syndrome (GAS)** Pattern of general physical responses that take essentially the same form in responding to any serious chronic stressor.  
■ **Alarm reaction** First stage of the GAS, during which the body mobilizes its resources to cope with a stressor.



● **FIGURE 8.10** The General Adaptation Syndrome

In Stage 1, the body produces an emergency arousal response to a stressor. Then, in Stage 2, the body adapts to the continuing presence of the stressor. In Stage 3, if the stressor is not reduced, an arousal response begins again even though the body's defenses are depleted—with dangerous results.

● **FIGURE 8.11** The Alarm Reaction Pathway



● **FIGURE 8.12** Diagram of Sympathetic Pathways for Responses to Stress

stories of people in emergencies exhibiting amazing strength, speed, or prowess in feats they could not duplicate later. This autonomic response follows the pathways listed in Figure 8.12.

As our Core Concept notes, if the stressor persists over a long period, this initially adaptive alarm reaction can become distress, as it depletes much of the body's energy and defensive resources. It can also cause high blood pressure, deterioration of the immune system, fatty deposits in the blood vessels, bleeding ulcers, and a variety of other symptoms. These reactions also make the stressed person a prime candidate for infections or other diseases. In addition, studies suggest that prolonged or repeated stress may produce long-term changes in the brain that provoke depression (Sapolsky, 1998; Schulkin, 1994). Stress hormones can also damage the brain and interfere with its ability to regenerate neurons, especially in the hippocampus (Gould et al., 1998; Sapolsky, 1998).

**The Stage of Resistance.** If the stressor persists but is not so strong that it overwhelms the organism during the first stage, the individual begins to rebound during stage 2, the **stage of resistance**. Outwardly, the body appears to be gaining the advantage—resisting the stressor, as the symptoms of the alarm reaction fade. The organism's defenses have been engaged, and fight or flight might reduce or eliminate the threat. Internal changes begin to restore homeostasis. Previously swollen, the adrenal glands now return to normal size and diminish steroid output, although hormone response continues at a lower level, as an internal struggle against the stressor continues.

Surprisingly, the resistance that the body displays in this stage applies only to the *original* stressor, the challenge that first raised the alarm. In his research,

Selye found that if an experimental animal had adapted to one stressor (e.g., electric shock), but a second stressor was introduced (e.g., extreme cold), the animal soon died. The animal's resources were apparently so depleted that it could not mobilize a defense against the new stressor. In general, if a second stressor is introduced in the second stage of the GAS, the organism may not be able to adapt. A tragic human example is found in a soldier who collapses and dies in response to the new stress of a prison camp after surviving months of stressful combat.

Alarm and resistance activities use bodily energy. They reduce the levels of resources available for dealing with additional stressors. The body now requires time and rest to build up its energy reserves again. Imagine yourself as the star of an action movie, pursued by an evil archenemy. You race your old car a long distance to escape your pursuer. But the engine oil was low to begin with, and now it's worse. Just when it seems you have a good lead and can safely pull over to add some oil, another evildoer's vehicle appears in your rear view mirror! You must go on—but how long can you run like this before you burn out your engine?

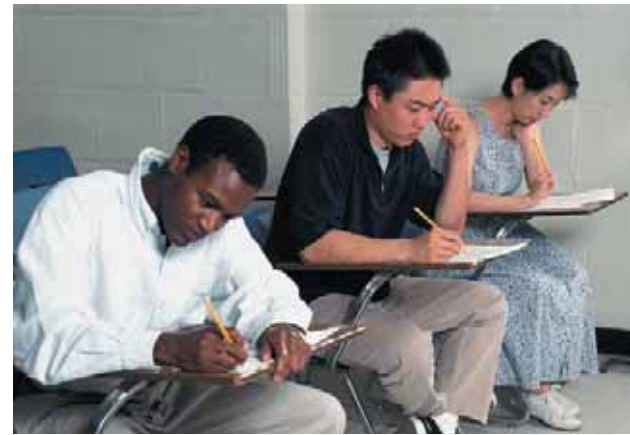
Now imagine your body responding to a stressful scenario: You've just completed a grueling test; you went without sleep, studying day and night, surviving on junk food and caffeine. Now it's over. You can relax and rest at last. But the phone rings: It's the welcome voice of the love of your life, with an unwelcome note of some negative emotion. Before you can announce the good news that you survived the test, the voice says, "I don't know how to say this, but—look, we have to talk . . ." This is probably not *good* news but may signal serious trouble, even a breakup—definitely a stressor. Already exhausted by your test-taking experience, how will you handle this important conversation? You feel stricken, frightened, and even angry: Why this threat? Why now?

**The Stage of Exhaustion.** Running on empty, overreacting to a stressor that is "too much," these examples illustrate the experience of physiological *exhaustion*. In Selye's GAS model, if the stage of resistance fails to relieve stress, then the symptoms of the alarm reaction inevitably reappear. This time, however, a powerful autonomic response accompanies them. In this third stage, the **stage of exhaustion**, the autonomic nervous system overcompensates in its attempt to moderate resurging hormone activity. Soon the organism may approach the point of no return: Exhaustion and eventual death overtake it if the stressor is not removed quickly. You can also see why prolonged use of steroids—which are really stress hormones—is dangerous (except under certain medical conditions): They effectively put the body into a state of exhaustion, producing perilous deterioration.

Can you die from the stress of a broken heart? Well, you can certainly get *sick* from a broken heart! And, should it occur in the final stage of the GAS, a broken heart might indeed be fatal.

So we see that Selye's GAS model offers a useful explanation of how stress can lead not only to the initial fight-or-flight reaction but also to chronic and debilitating conditions. In particular, it has enlightened medical and psychological researchers about the connections between stressful experiences and physical ailments. Before we look more closely at the details of the chronic stress response, let's first consider two intriguing alternatives to fight-or-flight: withdrawal and nurturance.

**Withdrawal** Fight-or-flight is not always possible: An individual can become *entrapped* when efforts to fight or run away are blocked at every turn (Gilbert



● After responding to one stressor, such as finishing a difficult test, you may find your bodily resources somewhat depleted, leaving you less able to deal with another, unexpected stressor.

■ **Stage of resistance** Second stage of the GAS, during which the body adapts to and uses resources to cope with a stressor.

■ **Stage of exhaustion** Third stage of the GAS, during which the body depletes its resources in responding to an ongoing stressor.



& Gilbert, 2003). Or a stressor maybe just too much for an individual to cope with, and no action is taken at all: The individual might “freeze like a deer in the headlights.” Of course, nonhuman animals have not yet evolved to cope with human inventions like automobiles speeding through the countryside. But human beings may also “freeze” in the face of threat. This pattern of adaptation is the *passive fear response*, in which the individual responds to threat by becoming emotionally withdrawn and disengaged (Eisler & Levine, 2002).

For prey species such as rabbits and deer, it makes good biological sense to freeze momentarily, so no sound or movement betrays its location to a predator. For humans, however, withdrawing from others cannot hide us from emotional stressors, yet it can be protective by discouraging unwanted contact. This response can be learned, but biology may also predispose some individuals to passivity—including reduced activity and movement, a lower rate of metabolism, and slowing of the heart rate. Either way, regular reliance on passivity produces a *general inhibition syndrome (GIS)* of withdrawal rather than active response to stress. The GIS is more likely when an organism perceives itself to be helpless and defenseless in the presence of danger (Hamilton, 1989). The “freeze” pattern may also be a symptom of anxiety, major depression, and other mental disorders.

**Tend and Befriend** We have seen that fight and flight are alternative reactions to stress and that passivity or withdrawal represents another possibility. But there is yet another—which has only recently been recognized.

Psychologist Shelley Taylor noticed that the fight-or-flight model was developed by male theorists doing research with male subjects—male rats, mice, and humans. But, she suggests, fear and aggression may characterize the responses of males more than those of females (Taylor, 2003; Taylor et al., 2000). Taylor has proposed an alternative **tend-and-befriend** model of stress response that may better explain the behavior of females in response to threats to themselves and their offspring. This theory argues that because females are the primary caretakers of offspring, priority must be given to protecting the survival of the young. Aggression (“fight”) can cause injury to oneself or one’s children; escape (“flight”) leaves children defenseless. Neither response promotes adaptation and survival from the female caretaker’s point of view (Volpe, 2004).

The tend-and-befriend model proposes that females are biologically predisposed—through brain and hormonal activity—to respond to threat by nurturing and protecting their offspring and seeking social support (Eisler & Levine, 2002; Ennis et al., 2001; Taylor et al., 2000). This pattern, also called the *bonding response*, is common to all female mammals—part of the caregiving pattern that is necessary for infant attachment to develop.

One study in support of the tend-and-befriend model examined men’s and women’s hormonal changes and self-reports prior to an important examination. While reported anxiety levels did not differ, men had significantly higher levels of cortisol excretion than women—an important steroid in the fight-or-flight response (Ennis et al., 2001). In times of crisis, a more adaptive response for a woman may be to tend the children and befriend others who can provide strength in numbers to insure adaptation and survival of her offspring. There is also evidence that support providers benefit, too, as seen in a lower mortality rate for older adults who give help and emotional support to friends, relatives, and neighbors (Brown et al., 2003).

The picture emerging from these complementary responses to stressful situations—fight-or-flight, passivity, and tend-and-befriend—is of a more complex stress response that works both to defend and to nurture, promoting the survival not only of the individual but also of offspring, family, and community. Thus, we can see that the hormonal systems and brain processes have

#### CONNECTION: CHAPTER 9

Infants apparently have an inborn need for attachment.

■ **Tend-and-befriend model** Stress response model proposing that females are biologically predisposed to respond to threat by nurturing and protecting offspring and seeking social support.

evolved to enable both self-protection and reaching out to others in times of danger (Pitman, 2003). Tending-and-befriending powerfully complements the fight-or-flight pattern, together accounting for the survival of not only individuals but relationships and communities.

## Stress and the Immune System

Originally, Selye's research examined only the effects of various *physical* stressors on animals' bodily responses. Since that time, further research has revealed how *mental* processes, such as perception and worry, also affect one's health and resources. We now know that any threat or stressor has similar effects—and one of the most interesting is the effect of stress on the **immune system**, the body's elaborate set of physical defenses against disease. Research has shown, for example, that the stress of loss that occurs when relationships end in death or divorce can produce both depression and *immunosuppression* (impairment in the function of the immune system), leaving people more vulnerable to disease (Cohen & Syme, 1985; Kiecolt-Glaser & Glaser, 1987, 2001).

Obviously, the immune system can be important to both our physical and our mental health, so the connection between stress and the immune system deserves a closer look. This connection involves the discovery of links between thought processes and brain function. Together these connections define a field known as **psychoneuroimmunology** (Ader & Cohen, 1993; Maier et al., 1994; Solvason et al., 1988).

The human immune response, which evolved to respond to short-term stressors, may react to chronic stressors by breaking down and turning on itself (Segerstrom & Miller, 2004). Thus, a person who faces, for example, the long-term stress of caring for a parent with Alzheimer's disease runs the risk of dangerous immunosuppression—which increases vulnerability to physical disease. Ironically, immune function can also be accompanied by less serious problems that we *interpret* as stressors. When next you feel upset over seemingly uncontrollable events or possible future problems, such as grades, career choices, or relationships, consider the signals you are sending to your brain and immune system. You may literally be worrying yourself sick. (Which, of course, can be just one more thing to worry about, if you are a chronic worrier!)

How do mental processes affect the immune system? The central nervous system and immune systems maintain a communication “loop” in response to stress, injury, or infection—a cold virus, for example (Maier & Watkins, 1999). In response to a stressor, the brain sends messages to the autonomic nervous system and endocrine system, which have links to organs that produce the immune response. (Components of the immune system include the blood, bone marrow, the liver, and the thymus gland.) The brain then receives feedback from the immune system via neural and endocrine pathways (Maier & Watkins, 2000). Among the chemical messengers shuttling between the brain and the immune system are proteins known as **cytokines**. After these hormonelike chemicals alert the brain to distress in the body, the brain releases its own cytokines to reduce energy output, causing symptoms like fever and listlessness—responses that usually help fight disease but can sometimes get out of control (DeAngelis, 2002a). In addition to tiredness, cytokines may produce feelings of depression, involving a spiral of negative emotion and thought. Such a response can prolong stress and illness (National Public Radio, 2004a).

One of the main factors that determine whether an immune reaction will harm rather than support health is the nature of the stressor (Pert, 1997). Many physical stressors, such as strenuous exercise or an attack by an aggressive animal, begin and end abruptly. These *acute* stressors trigger *natural immunity*

■ **Immune system** Bodily organs and responses that protect the body from foreign substances and threats.

■ **Psychoneuroimmunology** Multidisciplinary field that studies the influence of mental states on the immune system.

■ **Cytokines** Hormonelike chemicals facilitating communication between brain and immune system.



● A basketball coach displays some Type A behaviors.

responses, which help reduce the risk of injury. In contrast, *chronic* psychological stressors—a difficult marriage, a bad supervisor, an unfair professor—emerge gradually, last a long time, and are not readily solved with fight or flight or with an immune response. There is no physical enemy to battle, no safe haven to seek—no quick fix. Bodily responses become maladaptive, the body becomes more vulnerable to infection and injury, and eventually immune disorders can develop. This immunosuppression, a diminished effectiveness of the immune response, entails serious health risks.

In fact, many chronic stressors are conditions that challenge our emotional well-being or social status. We have seen that such conditions can cause physical disease just as surely as can viruses, bacteria, and physical trauma. Not surprisingly, then, it has been psychology rather than medicine that has had the most to say about the ways people cope with stress, both successfully and unsuccessfully.

**Type A and Type B Patterns** Cardiologists Meyer Friedman and Ray Rosenman (1974) hired an upholsterer to repair the furnishings in their waiting room. When the upholsterer pointed out that for most of the chairs, it was the front edges of the seats that showed unusually high wear, the two doctors realized that their patients' heart problems might be related to a certain style of coping with stress. It was as if these heart patients were always "on the edge of their seats." When the patients were interviewed about their habits, their behaviors revealed a striking pattern of impatience, competitiveness, aggressiveness, and hostility—all stress-related responses. Many also admitted they were notorious workaholics. Friedman and Rosenman later found this collection of attitudes and behaviors predictive of heart disease, dubbing it the **Type A** pattern. In fact, the Type A individual had twice as much risk of heart disease as the **Type B**, an individual who takes a relaxed approach to life (Matthews, 1982).

While the speed, perfectionism, and time-urgency of Type A's are valued in our competitive society and may promote success in professional and social life, there is a price to pay. Type A businessmen are stricken with coronary heart disease more than twice as often as men in the general population (Friedman & Rosenman, 1974; Jenkins, 1976); Type A's are at greater risk for all forms of cardiovascular disease, including heart attack and stroke (Dembroski et al., 1978; Dembroski & Costa, 1987; Haynes & Feinleib, 1980). Besides cardiovascular risks, other illnesses have been linked with Type A habits: allergies, head colds, headaches, stomach disorders, and mononucleosis (Suls & Marco, 1990; Suls & Sanders, 1988). In the long run, the "successful" Type A style can actually be dysfunctional, unhealthy, and self-defeating.

A tendency toward anger and hostility is suspected to be the riskiest component of the Type A pattern (Clay, 2001; Whiteman & Fowkes, 1997). It is reasonable to feel irritated when a slow-moving vehicle blocks you in traffic, but feeling enraged is irrational and dangerous. Likewise, the Type A's perfectionism has been linked to anxiety (about reaching impossible goals) and depression (from failing to reach them) (Joiner & Schmidt, 1995). How does the Type A behavior pattern get translated into a heart attack or other physical disease? The details are not yet clear, but Friedman and Ulmer (1984) found that as deadlines approached for one group of working subjects, blood tests showed increased cholesterol and clotting factors—similar to the alarm reaction of Selye's general adaptation syndrome.

The majority of us have personality patterns that do not fit either of these extremes. However, understanding the link between Type A behavior and heart disease can help in developing more effective disease prevention. One study showed heart attack survivors given stress-management training had

■ **Type A** Behavior pattern characterized intense, angry, competitive, or perfectionistic responses to challenging situations.

■ **Type B** Behavior pattern characterized by relaxed, unstressed approach to life.

half as many heart attacks in the next three years as a control group who had received no such training (Friedman & Ulmer, 1984). The researchers concluded, “No drug, food, or exercise program ever devised, not even a coronary bypass surgical program, could match the protection against recurrent heart attacks” afforded by learning to manage stress (p. 141).

While such reports have caused a stir among health professions and the press, the last line has not yet been written about the link between personality and disease (Lesperance & Frasurre-Smith, 1996). At this moment, it appears that those who are most at risk may be the ones who are depressed, those who display lots of anger, and (paradoxically) those who *suppress* their negative emotions (Clay, 2001; Friedman et al., 1994; Whiteman & Fowkes, 1997; Wright, 1988).

**Learned Helplessness** Earlier we examined an alternative to the fight-or-flight response to stress, which often produces a retreat to passivity or fear. Anyone might freeze at some point in life, but what if such inhibition became a chronic pattern? To illustrate, imagine a child who has grown up in a dysfunctional or abusive family—a child who received no emotional or intellectual support. All his life he has been told how “dumb” he is, and when he gets to school, he stumbles on his initial attempts with words and numbers. The teacher gives him poor grades; the other kids make fun of him. After only a few more such attempts he gives up permanently. This passive resignation following recurring failure or punishment is termed **learned helplessness**.

Evidence of learned helplessness originally came from animal studies performed by Martin Seligman and his colleagues. This work showed that dogs receiving inescapable electric shocks soon gave up their attempts to avoid the punishment and passively resigned themselves to their fate (Seligman, 1975, 1991; Seligman & Maier, 1967). Later, when given the opportunity to escape, the dogs typically did nothing but whimper and take the shock. In contrast, a control group of dogs that had not been subjected to previous punishment were quick to escape. Seligman concluded that the experimental group of animals had already learned that nothing they did mattered or altered the consequences, so they “gave up and lay down” (Seligman, 1991, p. 23) and passively accepted their fate (Seligman & Maier, 1967).

An experiment by Donald Hiroto (1974) employed human subjects in a variation of Seligman’s dog research. Students were placed in a very noisy room, but some quickly found a way to turn off the noise; for others the noise controls did not work. When the subjects were placed in a new room and afflicted with a different irritating noise, those who had successfully turned off the noise in the previous room quickly found the simple solution in the second room. In contrast, those who had failed to shut off the noise earlier just sat in the new room, making no effort to stop the latest stressor. They had already learned to be helpless. Seligman and other scholars see symptoms of the same learned helplessness syndrome in human populations, such as abused and discouraged children, battered wives, prisoners of war, depressed patients—and some college students in introductory psychology (Finamore, 2000; Overmier, 2002; Seligman, 1975, 1998; Yee et al., 2003).

In nursing homes and hospitals, too, patients may learn to feel and act helpless (Baltes, 1995; Buie, 1988). Some nursing homes caring for large numbers of residents may not encourage patients to make decisions or take control of their lives. Such independence takes too much staff time—and time is seen as money. So residents are awakened, fed, bathed, toileted, cached in front of television sets, and cycled back to bed, on a routine that offers little variety or choice. But such treatment robs patients of individual responsibility and makes them seem incapable of even the simplest tasks.



● In hospitals and nursing homes, patients may learn to feel helpless, because they cannot make decisions or exert control over their own lives.

■ **Learned helplessness** Pattern of failure to respond to noxious stimuli after an organism learns its responses are ineffective.



But what do you suppose would happen if nursing-home patients were given more control over their lives? Researchers Judith Rodin and Ellen Langer arranged for one group of elderly patients to make more choices about day-to-day events, such as meals and activities. For a control group the staff took full charge of their care, as usual. After 18 months, the “more responsible” residents were more active and alert and reported a more positive outlook than the controls. That outcome was predicted—but there was an even more intriguing result. During the follow-up period, 25% of the control group died, while death claimed only 15% of the group given increased responsibility (Rodin, 1986). Other research has extended the conclusion that a sense of personal control and mastery can alleviate learned helplessness and improve the quality of life in a broad range of institutional settings, including hospitals, prisons, and schools (Faulkner, 2001; Schill & Marcus, 1998; Sommer, 2000; Zarit & Pearlin, 2003).



## PSYCHOLOGY IN YOUR LIFE: DEVELOPING RESILIENCE

Perhaps you have already survived adversity in your life and recognize in yourself some of the qualities that enabled you to bounce back from adversity. If not, you probably feel grateful not to have faced such pain or difficulty. But if you were to face major obstacles in life, how could you begin now to develop greater resilience?

Robert Brooks and Sam Goldstein (2004) list number of processes as part of experiencing the *resilient mindset*, including:

- Feeling in control of your life
- Communicating and interacting effectively with others
- Establishing realistic goals and expectations
- Learning from both successes and failures
- Feeling empathy and compassion for others
- Feeling special (but not self-centered)

While a mindset sounds “set” or inflexible, Brooks and Goldstein note that “*mindsets can be changed*” (2003, p. 3). To that end, they offer a workbook to help you review the specific attitudes, habits, and experiences that contribute to your present level of resilience, with suggestions for making the changes you need to make. Here are several questions to ask yourself (adapted from Brooks & Goldstein, 2004). Review your answers and identify one or two changes you might begin to undertake right away. Make achieving greater resilience one of those goals about which to be realistic right from the start!

1. Identify a self-defeating behavior you would like to change. What can you change about the way you think that will help you make this change?
2. List several sources of meaning and energy in your life. How do these help you to overcome setbacks?
3. What are some differences between how you would like others to see you, and how you see yourself? How can you close the gap in order to be as you would like others to see you?
4. Do you make mistakes that prevent you from communicating well with others? What could you do to make these mistakes less frequently?
5. Describe your ideal self. Which ideal traits are least like your present self? In what ways are you already closest to your ideal self?

Remember that the goal of this and other self-review exercises is to change behavior in order to become healthier and more resilient—not to change things about yourself that you believe in and value. By learning about other resilient people—reading about them or listening to people you probably already know—you will identify the most realistic goals for this effort and the best ways to meet those goals.

## EMOTION AND MOTIVATION: THE STATE OF THE ART

Recent advances in neuroscience have produced deep insights into our emotions. Long neglected by behaviorists and purely cognitive psychologists, emotions can now be seen as vital components of our thought processes—even those we once thought of as purely rational. Yet, many details of emotion remain unclear, particularly the details of the brain's emotional circuitry. Another major area that cries out for new research involves ways of treating emotional disorders, such as depression and various anxiety-related disorders, which represent major health problems all over the world. And, while we're at it, we also need effective ways of helping people develop the "emotional intelligence" needed to control anger and other impulsive behavior.

As for motivation, the basic neural processes have received relatively little attention—compared to the explosion in research in emotion in the past decade. The state of the art is a somewhat detailed understanding of individual motives, but only a fragmentary "big picture" of how diverse motives, such as hunger, sexuality, and achievement, go together. Thus, motivation is a field of psychology that is ripe for a revolution.

### USING PSYCHOLOGY TO LEARN PSYCHOLOGY

#### Motivating Yourself

The world's greatest achievements in music, art, science, business, and countless other pursuits often stem from the intrinsic motivation of people pursuing ideas in which they are deeply interested. You achieve this state of mind when focusing intently on some problem or activity that makes you lose track of time and become oblivious to events around you. Psychologist Mihaly Csikszentmihalyi calls this **flow** (1990, 1998).

Although some people turn to drugs or alcohol to experience an artificial feeling of flow, meaningful work produces more satisfying and more sustained flow experiences. In fact, one type of flow experience identified by Csikszentmihalyi (1990) is very similar to the goal of *n Ach* as identified by McClelland (1987b), namely the pleasure of mastering a challenging task.

■ **Flow** In Csikszentmihalyi's theory, an intense focus on an activity, accompanied by increased creativity and near-ecstatic feelings. Flow involves intrinsic motivation.

What is the link with studying and learning? If you find yourself lacking in motivation to learn the material for some class, the extrinsic promise of grades may not be enough to prod you to study. You may, however, be able to trick yourself into developing intrinsic motivation and flow by posing this question: What do people who are specialists in this field find interesting? Among other things, the experts are fascinated by an unsolved mystery, a theoretical dispute, or the possibility of an exciting practical application. A psychologist, for example, might wonder: "What motivates violent behavior?" Or, "How can we increase people's motivation to achieve?" Once you find such an issue, try to find out what solutions have been proposed. In this way, you will share the mind set of those who are leaders in the field. And—who knows?—perhaps you will become fascinated with the field, too.



### ● WHAT DO OUR EMOTIONS DO FOR US?

Emotion and motivation are complementary processes that arouse the organism and direct its behavior. Emotions are normally adaptive, but if too intense or prolonged, they may be destructive. From an evolutionary standpoint, the function of motives and emotions is to help organisms make responses that promote their survival and reproduction. Socially, emotional expressions serve to communicate feelings and intentions.

At least seven basic facial expressions of emotion are universally understood across cultures. There is no consensus on the number of emotions humans can experience; most experts believe that there are a small number of basic emotions, which can mix to produce more complex emotions.

Some emotional differences between males and females probably have a biological basis. This is seen in differential rates of certain emotional disorders. On the other hand, cultural differences demonstrate that some gender differences in emotion are learned. Specifically, different cultures teach men and women different display rules about controlling emotional expression. In general, neither sex can be said to be more emotional than the other.

● **Emotions have evolved to help us respond to important situations and to convey our intentions to others.**

### ● WHERE DO OUR EMOTIONS COME FROM?

Neuroscience has revealed two distinct emotion systems in the brain. One operates mainly at an unconscious level and relies on deep limbic structures, especially the amygdala; the other involves conscious processing in the cortex. Emotions also involve visceral changes in response to messages transmitted by the autonomic nervous system and the hormone system. Understanding how the two emotion systems work has begun to resolve some controversies involving the roles of physical responses and cognition in emotion—particularly the interplay among physical responses, cognitions, and feelings of emotion.

The inverted U theory describes the complex relationship between arousal and performance: Increasing arousal produces improved performance, but only up to a certain level of optimum arousal, which depends on the complexity of the task. Sensation seekers seem to have an especially high need for arousal.

● **The discovery of two distinct brain pathways for emotional arousal has clarified the connections among the many biological structures involved in emotion and has offered solutions to many long-standing issues in the psychology of emotion.**

### ● HOW MUCH CONTROL DO WE HAVE OVER OUR EMOTIONS?

Emotional intelligence, the ability to keep one's emotions from getting out of control, is vital for maintaining good social relationships. It is distinct from the characteristics measured by traditional IQ tests. Emotional control can be achieved by learning, which has been demonstrated in anger management programs.

People can also control their emotions to deceive, and no sure method of detecting such deception exists, even though

the use of "lie detectors" is widespread. The polygraph industry is built on the dubious premise that people who are lying will show certain signs of emotional arousal, although no verified and accepted standards exist for such examinations.

While aggression can be the result of anger, people usually hold aggression in check. In fact, the expression of anger without aggression often has positive results, as in the women's suffrage movement. Some people, however, have trouble managing anger and aggression and can benefit from cognitive therapy. The commonsense view that it is always good to vent anger and aggression is a dangerous myth.

● **Although emotional responses are not always consciously regulated, we can learn to control them.**

### ● MOTIVATION: WHAT MAKES US ACT AS WE DO?

The concept of motivation refers to inferred internal processes that guide behavior. The concept of motivation helps explain behavior that cannot be explained by the circumstances alone. Psychologists often distinguish psychological motives from biological drives, intrinsic motivation from extrinsic motivation, and conscious motivation from unconscious motivation.

Theorists have explained motivation in terms of instincts, drives, and cognitive states, such as perceived locus of control. Freud taught that our primary motives are unconscious and based on sexual and aggressive instincts. Maslow attempted to tie together a wide range of human motivation—from biological drives to psychological motives—into a hierarchy of needs. Many exceptions to his theory have been pointed out, however.

Extrinsic rewards are widely used as motivators. Research has shown, however, that extrinsic rewards can dampen intrinsic motivation, especially when rewards are given without regard for the quality of performance.

● **Motivation takes many forms, but all involve inferred mental processes that select and direct our behavior.**

### ● HOW ARE ACHIEVEMENT, HUNGER, AND SEX ALIKE? DIFFERENT?

Some motives rely heavily on learning, while others depend more heavily on biological factors. Moreover, motives differ in their sensitivity to environmental cues, reinforcers, and social/cultural influences. No comprehensive theory of motivation takes all these factors into account, although an evolutionary perspective suggests that each distinct motive evolved independently, in response to environmental pressures.

Achievement is a psychological motive that accounts for an important segment of human behavior, both in school and on the job. Societies vary in the intensity of their need for achievement, depending on their tendencies toward individualism or collectivism. In contrast, hunger and eating are motivated at many levels—by biological processes, external cues, social influences, and learning. Many Americans seek to control their appetite and body weight, although no weight-loss scheme is effective for most people over the long run. Unlike hunger and

weight control, the sex drive is not homeostatic, even though sexual motivation is heavily influenced by biology. Sexual behavior in humans also depends on learning—of various sexual scripts. Most evidence suggests, however, that sexual orientation also has its origins in biology.

● **Achievement, hunger, and sex exemplify other human motives because they differ not only in the behavior they produce but also in the mix of biological, mental, behavioral, and social/cultural influences on them.**

## ● HOW AND WHY DO WE EXPERIENCE STRESS?

At the root of most stress is change and the need to adapt to environmental, physical, psychological, and social demands. Primitive stressors included mortal threats such as the struggle to survive, catastrophe, and loss. Modern stressors include posttraumatic stress and daily hassles.

Stress begins with arousal triggered by interpreting an event or condition as a stressor. The autonomic nervous system produces bodily responses to adapt to such experiences. Both

acute threats and chronic conditions can trigger a fight-or-flight response, expressing aggression or fear. Hans Selye identified three stages in the general adaptation syndrome: alarm, resistance, and exhaustion. Other theories propose a passive withdrawal or entrapment response, and a tend-and-befriend pattern more characteristic of women. Stress can either excite or suppress the body's immune response.

Individuals' psychological reactions to stress vary according to what those stressors mean. Those with Type A personality traits risk adverse stress reactions, while Type B's are more relaxed. As a result of experiencing failure, learned helplessness produces passive resignation in the face of threat. Personal qualities can also reduce stress. People who have learned a pattern of cognitive hardiness are more resistant to stress. From an early age, some individuals demonstrate resilience, a capacity to "bounce back" from and overcome adversity. A more resilient mindset can be developed by increasing your sense of control, effectiveness, confidence, and realism.

● **The human stress response to perceived threat activates thoughts, feelings, behaviors, and physiological arousal that normally promote adaptation and survival.**

## REVIEW TEST

*For each of the following items, choose the single best answer. The answer key appears at the end.*

1. While emotion emphasizes \_\_\_\_\_, motivation emphasizes \_\_\_\_\_.
  - a. behavior/cognition
  - b. arousal/action
  - c. neural activity/hormones
  - d. needs/drives
  - e. drives/needs
2. Which of the following is the region of the brain most involved in emotions, attack, self-defense, and flight?
  - a. the occipital cortex
  - b. the limbic system
  - c. the endocrine system
  - d. the cerebellum
  - e. the parietal lobe
3. Which theory of emotion first called attention to the idea that our physical responses can influence our emotions?
  - a. the instinct theory
  - b. Maslow's theory
  - c. Ekman's theory
  - d. the Schachter–Singer theory
  - e. the James–Lange theory
4. Unlike achievement motivation, hunger and sex have a strong \_\_\_\_\_ basis.
  - a. cognitive
  - b. environmental
  - c. biological
  - d. perceptual
  - e. genetic
5. People who are high in the need for achievement have been found to be more likely to
  - a. demand immediate gratification for their desires.
  - b. persist in monotonous tasks.
  - c. have excellent interpersonal skills.
  - d. get better grades in school.
  - e. have a high IQ.
6. According to psychologists, which of the following experiences would be considered an example of *stress*?
  - a. an earthquake that destroys your home and possessions
  - b. an angry neighbor who demands that you turn down your stereo
  - c. a pop quiz your instructor announces just as you take your seat
  - d. the death of a beloved grandparent
  - e. your arousal and behaviors when you are threatened by a stranger
7. Like the experience of emotion, the physical response to stress almost always begins with
  - a. a protective behavior.
  - b. a state of arousal.
  - c. a reduction in immune effectiveness.
  - d. fear.
  - e. humor.
8. In the \_\_\_\_ stage of Selye's GAS, the organism's defenses are fully engaged and the organism shows signs of recovery from the initial stress.
  - a. alarm
  - b. withdrawal
  - c. resistance
  - d. exhaustion
  - e. recovery



9. Which of the following stressors is the type that would most likely cause the immune system to malfunction and even cause harm?
- accidentally slipping and falling on an icy surface
  - caring for a dying family member for a prolonged period
  - being rejected by someone you are romantically interested in
  - receiving a bad grade on a test in an important college course
  - waking up in a bad mood

10. Amanda possesses many Type A personality traits; this means Amanda has a higher probability of suffering from \_\_\_\_ than non-Type A individuals.
- heart disease
  - colds and flu
  - accidents
  - cancer
  - schizophrenia

ANSWERS: 1. b 2. b 3. e 4. c 5. d 6. e 7. b 8. c 9. b 10. a

## KEY TERMS

**Emotion** (p. 298)

**Display rules** (p. 300)

**Lateralization of emotion** (p. 306)

**James–Lange theory** (p. 307)

**Cannon–Bard theory** (p. 308)

**Two-factor theory** (p. 308)

**Cognitive appraisal theory** (p. 309)

**Opponent-process theory** (p. 309)

**Inverted U function** (p. 310)

**Sensation seekers** (p. 311)

**Emotional intelligence** (p. 312)

**Polygraph** (p. 314)

**Motivation** (p. 318)

**Drive** (p. 319)

**Motive** (p. 319)

**Intrinsic motivation** (p. 319)

**Extrinsic motivation** (p. 319)

**Conscious motivation** (p. 319)

**Unconscious motivation** (p. 319)

**Instinct theory** (p. 320)

**Fixed-action patterns** (p. 320)

**Need** (p. 320)

**Homeostasis** (p. 320)

**Locus of control** (p. 321)

**Hierarchy of needs** (p. 322)

**Overjustification** (p. 324)

**Need for achievement**  
(*n Ach*) (p. 326)

**Individualism** (p. 326)

**Collectivism** (p. 326)

**Set point** (p. 327)

**Volumetric thirst** (p. 330)

**Osmotic thirst** (p. 330)

**Sexual response cycle** (p. 332)

**Sexual scripts** (p. 333)

**Approach–approach conflict**  
(p. 334)

**Approach–avoidance conflict**  
(p. 334)

**Avoidance–avoidance conflict**  
(p. 334)

**Multiple approach–avoidance conflict** (p. 334)

**Sexual orientation** (p. 335)

**Stress** (p. 337)

**Stressor** (p. 337)

**Traumatic stressor** (p. 339)

**Posttraumatic stress disorder (PTSD)** (p. 341)

**Acute stress** (p. 343)

**Chronic stress** (p. 343)

**Fight-or-flight response** (p. 343)

**General adaptation syndrome (GAS)** (p. 345)

**Alarm reaction** (p. 345)

**Stage of resistance** (p. 347)

**Stage of exhaustion** (p. 347)

**Tend-and-befriend model** (p. 348)

**Immune system** (p. 349)

**Psychoneuroimmunology**  
(p. 349)

**Cytokines** (p. 349)

**Type A** (p. 350)

**Type B** (p. 350)

**Learned helplessness** (p. 351)

**Flow** (p. 353)

## AP\* REVIEW: VOCABULARY

Match each of the following vocabulary terms to its definition.

- |                            |                      |
|----------------------------|----------------------|
| 1. James–Lange theory      | 6. Motive            |
| 2. Cannon–Bard theory      | 7. Osmotic thirst    |
| 3. Schachter–Singer theory | 8. Volumetric thirst |
| 4. Emotional intelligence  | 9. Stress            |
| 5. Drive                   | 10. Stressor         |
- \_\_\_\_\_ a. Emotion-producing stimulus produces a physical response which produces an emotion.
- \_\_\_\_\_ b. An internal mechanism that selects and directs behavior.
- \_\_\_\_\_ c. Emotional feeling and internal responses take place at the same time.

- \_\_\_\_\_ d. A drop in intracellular fluid levels.
- \_\_\_\_\_ e. A condition demanding adaptation.
- \_\_\_\_\_ f. A drop in extracellular fluid levels.
- \_\_\_\_\_ g. The ability to understand and control emotional responses.
- \_\_\_\_\_ h. Emotion results from the cognitive appraisal of both physical arousal and an emotion-provoking stimulus.
- \_\_\_\_\_ i. Biologically instigated motivation.
- \_\_\_\_\_ j. A physical and mental response to a challenging or threatening situation.

## AP\* REVIEW: ESSAY

Use your knowledge of the chapter concepts to answer the following essay question.

Compare and contrast the following theories of motivation. Be sure that your analysis includes the definition of each theory and a valid, theoretically based criticism. Be specific.

- a. James–Lange theory
- b. Drive reduction
- c. Cognitive appraisal

## OUR RECOMMENDED BOOKS AND VIDEOS

### BOOKS

Barer-Stein, T. (1999). *You eat what you are: People, culture, and food traditions*. Toronto: Culture Concepts. Barer-Stein explores how our culture determines not only what we eat but what we want to eat, how we hunger, and the role of food in our individual lives.

Evans, D. (2001). *Emotion: The science of sentiment*. Oxford, UK: Oxford University Press. A philosopher explores the role of feelings in life and in our lives, including discussions of complex states such as love and happiness and whether nonemotional intellect is superior—or disabled.

Groopman, J. (2003). *The anatomy of hope: How people prevail in the face of illness*. New York: Random House. Surveying cancer patients and lab researchers, the author, a medical doctor, uses stories and personalities to explore the origins of hope and its impact on healing, doctors' impact on their patients' optimism, and why some severely or terminally ill persons are able to hang on to hope—while others let go and give up.

Jamison, K. R. (1999). *On moods*. New York: Random House. The doctor-author who revolutionized writing about manic–depressive illness (bipolar disorder) in her book *An Unquiet Mind* now explores the range and power of lasting emotions and moods in general.

McEwen, B. S., & Lasley, E. N. (2004). *The end of stress as we know it*. Washington, DC: The Dana Press. Not another pop-psych book for consumers of quick techniques, this book offers updated research and applied neuroscience for understanding how the brain and immune system interact, with the ironic result that stress *protects* you from temporary stressors but can *harm* you in responding to chronic stressors.

Pyszczynsky, T., Solomon, S., & Greenberg, J. (2003). *In the wake of 9/11: The psychology of terror*. Washington, DC: American Psychological Association. Relying on terror management theory, the authors show how the threat of death triggers the thoughts and emotions produced by terrorist attack.

Ridley, M. (1995). *The Red Queen: Sex and the evolution of human nature*. New York: Penguin. In Lewis Carroll's *Through the Looking Glass*, the Red Queen had to keep running just to stay in place.

Likewise, author Matt Ridley argues, with wit and insight, sex is the human species's best strategy for changing and adapting to ever-changing world conditions.

Taylor, S. E. (2003). *The tending instinct: Women, men, and the biology of relationships*. New York: Owl Books. Psychologist Shelley Taylor, disagreeing with theories that all survival depends on a self-preservation instinct, argues that human survival thrives on social motivations, including cooperation, caregiving, and altruism—especially for women.

### Videos

*The Fight Club*. (1999, color, 139 min.) Directed by David Fincher; starring Edward Norton, Brad Pitt, Meat Loaf. An unusual new acquaintance introduces a disillusioned young man to a new way of life—through fighting. Does manhood (or personhood) depend on a willingness to harm and be harmed? The unusual story, with a surprising psychological twist, made for a surprisingly popular film. (Rating R)

*The Fisher King*. (1991, color, 137 min.). Directed by Terry Gilliam; starring Robin Williams, Jeff Bridges, Amanda Plummer, Mercedes Ruehl, Michael Jeter. When a talk-radio announcer's flip remark to an unstable caller has tragic consequences, he seeks to make amends by helping one of the victims. The film includes powerful imagery of fantastic visions, paranoid delusions, and posttraumatic stress—with poignant and comic moments, too. (Rating R)

*Patch Adams*. (1998, color, 103 min.). Directed by Tom Shadyac; starring Robin Williams, Monica Potter, Daniel London, Bob Gunton, Peter Coyote. The film is based on the true story of Hunter "Patch" Adams, M.D., who became a physician despite his irreverence regarding the power and money of modern medicine and his desire to make medical care reassuring and even fun for patients. (Rating PG-13)

*Shine*. (1999, color, 105 min.). Directed by Scott Hicks; starring Geoffrey Rush, Sonia Todd, Armin Mueller-Stahl. Based on the true story of concert pianist David Helfgott, this film shows his recuperation from a crushing breakdown by reviewing the stress and abuse of his early life and choosing to prevail and work toward an acclaimed comeback. (Rating PG-13)