

most likely to have a caregiver who was insensitive and inattentive to their needs (Ainsworth, Blehar, Waters, & Wall, 1978).

In cases of **resistant attachment**, *children tend to show clingy behavior, but then they reject the attachment figure's attempts to interact with them* (Ainsworth & Bell, 1970). These children do not explore the toys in the room, as they are too fearful. During separation in the Strange Situation, they became extremely disturbed and angry with the parent. When the parent returns, the children are difficult to comfort. Resistant attachment is the result of the caregivers' inconsistent level of response to their child.

Finally, children with **disorganized attachment** *behaved oddly* in the Strange Situation. They freeze, run around the room in an erratic manner, or try to run away when the caregiver returns (Main & Solomon, 1990). This type of attachment is seen most often in kids who have been abused. Research has shown that abuse disrupts a child's ability to regulate their emotions.

While Ainsworth's research has found support in subsequent studies, it has also met criticism. Some researchers have pointed out that a child's temperament may have a strong influence on attachment (Gervai, 2009; Harris, 2009), and others have noted that attachment varies from culture to culture, a factor not accounted for in Ainsworth's research (Rothbaum, Weisz, Pott, Miyake, & Morelli, 2000; van Ijzendoorn & Sagi-Schwartz, 2008).

Watch this video to view a clip of the Strange Situation. Try to identify which type of attachment baby Lisa exhibits: [The Strange Situation – Mary Ainsworth](#).



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Self-Concept

Just as attachment is the main psychosocial milestone of infancy, the primary psychosocial milestone of childhood is the development of a positive sense of self. How does self-awareness develop? Infants don't have a self-concept, which is an understanding of who they are. If you place a baby in front of a mirror, she will reach out to touch her image, thinking it is another baby. However, by about 18 months a toddler will recognize that the person in the mirror is herself. How do we know this? In a well-known experiment, a researcher placed a red dot of paint on children's noses before putting them in front of a mirror (Amsterdam, 1972). Commonly

known as the mirror test, this behavior is demonstrated by humans and a few other species and is considered evidence of self-recognition (Archer, 1992). At 18 months old they would touch their own noses when they saw the paint, surprised to see a spot on their faces. By 24–36 months old children can name and/or point to themselves in pictures, clearly indicating self-recognition.

Children from 2–4 years old display a great increase in social behavior once they have established a self-concept. They enjoy playing with other children, but they have difficulty sharing their possessions. Also, through play children explore and come to understand their gender roles and can label themselves as a girl or boy (Chick, Heilman-Houser, & Hunter, 2002). By 4 years old, children can cooperate with other children, share when asked, and separate from parents with little anxiety. Children at this age also exhibit **autonomy**, *initiate tasks, and carry out plans*. Success in these areas *contributes to a positive sense of self*. Once children reach 6 years old, they can identify themselves in terms of group memberships: “I’m a first grader!” School-age children compare themselves to their peers and discover that they are competent in some areas and less so in others (recall Erikson’s task of industry versus inferiority). At this age, children recognize their own personality traits as well as some other traits they would like to have. For example, 10-year-old Layla says, “I’m kind of shy. I wish I could be more talkative like my friend Alexa.”

Development of a positive self-concept is important to healthy development. Children with a positive self-concept tend to be more confident, do better in school, act more independently, and are more willing to try new activities (Maccoby, 1980; Ferrer & Fugate, 2003). Formation of a positive self-concept begins in Erikson’s toddlerhood stage, when children establish autonomy and become confident in their abilities. Development of self-concept continues in elementary school, when children compare themselves to others. When the comparison is favorable, children feel a sense of competence and are motivated to work harder and accomplish more. Self-concept is re-evaluated in Erikson’s adolescence stage, as teens form an identity. They internalize the messages they have received regarding their strengths and weaknesses, keeping some messages and rejecting others. Adolescents who have achieved identity formation are capable of contributing positively to society (Erikson, 1968).

What can parents do to nurture a healthy self-concept? Diana Baumrind (1971, 1991) thinks parenting style may be a factor. The way we parent is an important factor in a child’s socioemotional growth. Baumrind developed and refined a theory describing **four parenting styles**: *authoritative, authoritarian, permissive, and uninvolved*. With the **authoritative style**, *the parent gives reasonable demands and consistent limits, expresses warmth and affection, and listens to the child’s point of view*. Parents set rules and explain the reasons behind them. They are also flexible and willing to make exceptions to the rules in certain cases—for example, temporarily relaxing bedtime rules to allow for a nighttime swim during a family vacation. Of the four parenting styles, the authoritative style is the one that is most encouraged in modern American society. American children raised by authoritative parents tend to have high self-esteem and social skills. However, effective parenting styles vary as a function of culture and, as Small (1999) points out, the authoritative style is not necessarily preferred or appropriate in all cultures.

In **authoritarian style**, *the parent places high value on conformity and obedience. The parents are often strict,*

tightly monitor their children, and express little warmth. In contrast to the authoritative style, authoritarian parents probably would not relax bedtime rules during a vacation because they consider the rules to be set, and they expect obedience. This style can create anxious, withdrawn, and unhappy kids. However, it is important to point out that authoritarian parenting is as beneficial as the authoritative style in some ethnic groups (Russell, Crockett, & Chao, 2010). For instance, first-generation Chinese American children raised by authoritarian parents did just as well in school as their peers who were raised by authoritative parents (Russell et al., 2010).

For parents who employ the **permissive style of parenting**, *the kids run the show and anything goes. Permissive parents make few demands and rarely use punishment.* They tend to be very nurturing and loving and may play the role of friend rather than parent. In terms of our example of vacation bedtimes, permissive parents might not have bedtime rules at all—instead they allow the child to choose his bedtime whether on vacation or not. Not surprisingly, children raised by permissive parents tend to lack self-discipline, and the permissive parenting style is negatively associated with grades (Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987). The permissive style may also contribute to other risky behaviors such as alcohol abuse (Bahr & Hoffman, 2010), risky sexual behavior especially among female children (Donenberg, Wilson, Emerson, & Bryant, 2002), and increased display of disruptive behaviors by male children (Parent et al., 2011). However, there are some positive outcomes associated with children raised by permissive parents. They tend to have higher self-esteem, better social skills, and report lower levels of depression (Darling, 1999).

With the **uninvolved style of parenting**, *the parents are indifferent, uninvolved, and sometimes referred to as neglectful. They don't respond to the child's needs and make relatively few demands.* This could be because of severe depression or substance abuse, or other factors such as the parents' extreme focus on work. These parents may provide for the child's basic needs, but little else. The children raised in this parenting style are usually emotionally withdrawn, fearful, anxious, perform poorly in school, and are at an increased risk of substance abuse (Darling, 1999).

As you can see, parenting styles influence childhood adjustment, but could a child's temperament likewise influence parenting? **Temperament** refers to innate traits that influence how one thinks, behaves, and reacts with their environment. Children with easy temperaments demonstrate positive emotions, adapt well to change, and are capable of regulating their emotions. Conversely, children with difficult temperaments demonstrate negative emotions and have difficulty adapting to change and regulating their emotions. Difficult children are much more likely to challenge parents, teachers, and other caregivers (Thomas, 1984). Therefore, it's possible that easy children (i.e., social, adaptable, and easy to soothe) tend to elicit warm and responsive parenting, while demanding, irritable, withdrawn children evoke irritation in their parents or cause their parents to withdraw (Sanson & Rothbart, 1995).

The Importance of Play and Recess

According to the American Academy of Pediatrics (2007), unstructured play is an integral part of a child's development. It builds creativity, problem-solving skills, and social relationships. Play also allows children to develop a theory-of-mind as they imaginatively take on the perspective of others.

Outdoor play allows children the opportunity to directly experience and sense the world around them. While doing so, they may collect objects that they come across and develop lifelong interests and hobbies. They also benefit from increased exercise, and engaging in outdoor play can actually increase how much they enjoy physical activity. This helps support the development of a healthy heart and brain. Unfortunately, research suggests that today's children are engaging in less and less outdoor play (Clements, 2004). Perhaps, it is no surprise to learn that lowered levels of physical activity in conjunction with easy access to calorie-dense foods with little nutritional value are contributing to alarming levels of childhood obesity (Karnik & Kanekar, 2012).

Despite the adverse consequences associated with reduced play, some children are over-scheduled and have little free time to engage in unstructured play. In addition, some schools have taken away recess time for children in a push for students to do better on standardized tests, and many schools commonly use loss of recess as a form of punishment. Do you agree with these practices? Why or why not?

Test Your Understanding



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Adolescence

Adolescence is a socially constructed concept. In pre-industrial society, children were considered adults when they reached physical maturity, but today we have an extended time between childhood and adulthood called adolescence. **Adolescence** is *the period of development that begins at puberty and ends at emerging adulthood*, which is discussed later. In the United States, adolescence is seen as a time to develop independence from

parents while remaining connected to them. The typical age range of adolescence is from 12 to 18 years, and this stage of development also has some predictable physical, cognitive, and psychosocial milestones.



Peers are a primary influence on our development in adolescence. (credit: Sheila Tostes)

Physical Development

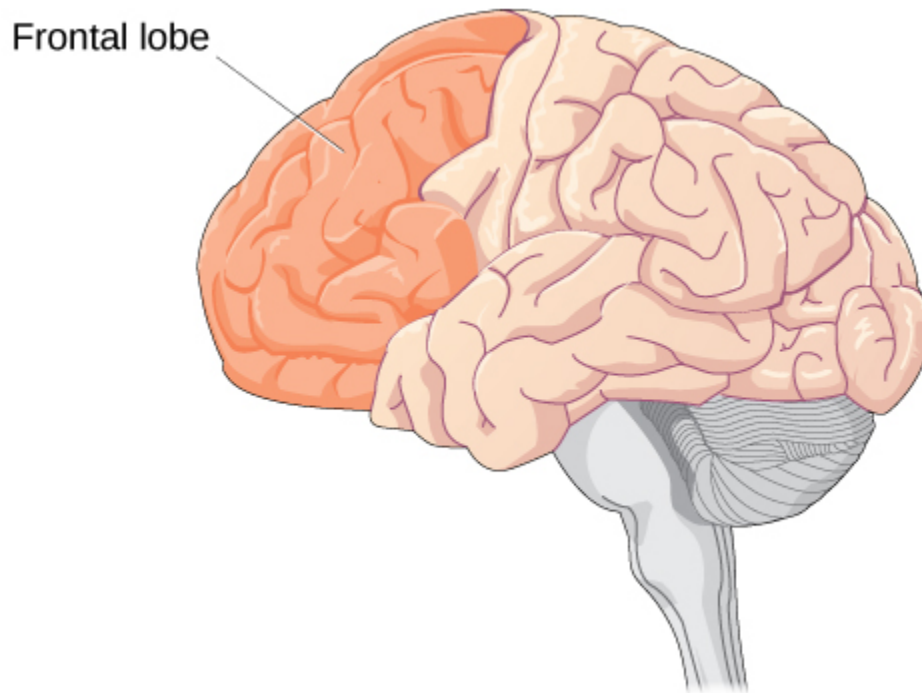
As noted above, adolescence begins with puberty. While the sequence of physical changes in puberty is predictable, the onset and pace of puberty vary widely. Several physical changes occur during puberty, such as **adrenarche and gonadarche**, *the maturing of the adrenal glands and sex glands, respectively*. Also during this time, primary and secondary sexual characteristics develop and mature. **Primary sexual characteristics** are *organs specifically needed for reproduction, like the uterus and ovaries in females and testes in males*. **Secondary sexual characteristics** are *physical signs of sexual maturation that do not directly involve sex organs, such as development of breasts and hips in girls, and development of facial hair and a deepened voice in boys*. Girls experience **menarche**, *the beginning of menstrual periods, usually around 12–13 years old*, and boys experience **spermarche**, *the first ejaculation, around 13–14 years old*.

During puberty, both sexes experience a rapid increase in height (i.e., growth spurt). For girls this begins between 8 and 13 years old, with adult height reached between 10 and 16 years old. Boys begin their growth spurt slightly later, usually between 10 and 16 years old, and reach their adult height between 13 and 17 years old. Both nature (i.e., genes) and nurture (e.g., nutrition, medications, and medical conditions) can influence height.

Because rates of physical development vary so widely among teenagers, puberty can be a source of pride or embarrassment. Early maturing boys tend to be stronger, taller, and more athletic than their later maturing peers. They are usually more popular, confident, and independent, but they are also at a greater risk for substance abuse and early sexual activity (Flannery, Rowe, & Gulley, 1993; Kaltiala-Heino, Rimpela, Rissanen, & Rantanen, 2001). Early maturing girls may be teased or overtly admired, which can cause them to feel self-conscious about their developing bodies. These girls are at a higher risk for depression, substance abuse,

and eating disorders (Ge, Conger, & Elder, 2001; Graber, Lewinsohn, Seeley, & Brooks-Gunn, 1997; Striegel-Moore & Cachelin, 1999). Late-blooming boys and girls (i.e., they develop more slowly than their peers) may feel self-conscious about their lack of physical development. Negative feelings are particularly a problem for late-maturing boys, who are at a higher risk for depression and conflict with parents (Graber et al., 1997) and are more likely to be bullied (Pollack & Shuster, 2000).

The adolescent brain also remains under development. Up until puberty, brain cells continue to bloom in the frontal region. Adolescents engage in increased risk-taking behaviors and emotional outbursts possibly because the frontal lobes of their brains are still developing. Recall that this area is responsible for judgment, impulse control, and planning, and it is still maturing into early adulthood (Casey, Tottenham, Liston, & Durston, 2005).



Brain growth continues into the early 20s. The development of the frontal lobe, in particular, is important during this stage.

According to neuroscientist Jay Giedd in the Frontline video “Inside the Teenage Brain” (2013), “It’s sort of unfair to expect [teens] to have adult levels of organizational skills or decision-making before their brains are finished being built.” Watch this segment on “The Wiring of the Adolescent Brain” to find out more about the developing brain during adolescence: [The Teenage Brain](#).

Cognitive Development

More complex thinking abilities emerge during adolescence. Some researchers suggest this is due to increases in processing speed and efficiency rather than as the result of an increase in mental capacity—in other words, due to improvements in existing skills rather than the development of new ones (Bjorkland, 1987; Case, 1985). During adolescence, teenagers move beyond concrete thinking and become capable of abstract thought. Recall that Piaget refers to this stage as formal operational thought. Teen thinking is also characterized by the ability to consider multiple points of view, imagine hypothetical situations, debate ideas and opinions (e.g., politics, religion, and justice), and form new ideas. In addition, it's not uncommon for adolescents to question authority or challenge established societal norms.

Cognitive empathy, also known as *theory-of-mind* (which we discussed earlier with regard to egocentrism), *relates to the ability to take the perspective of others and feel concern for others* (Shamay-Tsoory, Tomer, & Aharon-Peretz, 2005). Cognitive empathy begins to increase in adolescence and is an important component of social problem-solving and conflict avoidance. According to one longitudinal study, levels of cognitive empathy begin rising in girls around 13 years old and around 15 years old in boys (Van der Graaff et al., 2013). Teens who reported having supportive fathers with whom they could discuss their worries were found to be better able to take the perspective of others (Miklikowska, Duriez, & Soenens, 2011).



Teenage thinking is characterized by the ability to reason logically and solve hypothetical problems such as how to design, plan, and build a structure. (credit: U.S. Army RDECOM)

Psychosocial Development

Adolescents continue to refine their sense of self as they relate to others. Erikson referred to the task of the adolescent as one of identity versus role confusion. Thus, in Erikson's view, an adolescent's main questions are "Who am I?" and "Who do I want to be?" Some adolescents adopt the values and roles that their parents expect

from them. Other teens develop identities that are in opposition to their parents but align with a peer group. This is common as peer relationships become a central focus in adolescents' lives.

As adolescents work to form their identities, they pull away from their parents, and the peer group becomes very important (Shanahan, McHale, Osgood, & Crouter, 2007). Despite spending less time with their parents, most teens report positive feelings toward them (Moore, Guzman, Hair, Lippman, & Garrett, 2004). Warm and healthy parent-child relationships have been associated with positive child outcomes, such as better grades and fewer school behavior problems, in the United States as well as in other countries (Hair et al., 2005).

It appears that most teens don't experience adolescent storm and stress to the degree once famously suggested by **G. Stanley Hall**, *a pioneer in the study of adolescent development*. Only a small number of teens have major conflicts with their parents (Steinberg & Morris, 2001), and most disagreements are minor. For example, in a study of over 1,800 parents of adolescents from various cultural and ethnic groups, Barber (1994) found that conflicts occurred over day-to-day issues such as homework, money, curfews, clothing, chores, and friends. These types of arguments tend to decrease as teens develop (Galambos & Almeida, 1992).

Test Your Understanding



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Emerging Adulthood

The next stage of development is **emerging adulthood**. This is a *relatively newly defined period of lifespan development spanning from 18 years old to the mid-20s, characterized as an in-between time where identity exploration is focused on work and love*.

When does a person become an adult? There are many ways to answer this question. In the United States, you are legally considered an adult at 18 years old. But other definitions of adulthood vary widely; in sociology, for example, a person may be considered an adult when she becomes self-supporting, chooses a career, gets married, or starts a family. The ages at which we achieve these milestones vary from person to person as well as

from culture to culture. For example, in the African country of Malawi, 15-year-old Njemile was married at 14 years old and had her first child at 15 years old. In her culture she is considered an adult. Children in Malawi take on adult responsibilities such as marriage and work (e.g., carrying water, tending babies, and working fields) as early as 10 years old. In stark contrast, independence in Western cultures is taking longer and longer, effectively delaying the onset of adult life.

Why is it taking twentysomethings so long to grow up? It seems that emerging adulthood is a product of both Western culture and our current times (Arnett, 2000). People in developed countries are living longer, allowing the freedom to take an extra decade to start a career and family. Changes in the workforce also play a role. For example, 50 years ago, a young adult with a high school diploma could immediately enter the workforce and climb the corporate ladder. That is no longer the case. Bachelor's and even graduate degrees are required more and more often—even for entry-level jobs (Arnett, 2000). In addition, many students are taking longer (5 or 6 years) to complete a college degree as a result of working and going to school at the same time. After graduation, many young adults return to the family home because they have difficulty finding a job. Changing cultural expectations may be the most important reason for the delay in entering adult roles. Young people are spending more time exploring their options, so they are delaying marriage and work as they change majors and jobs multiple times, putting them on a much later timetable than their parents (Arnett, 2000).

Adulthood

Adulthood *begins around 20 years old and has three distinct stages: early, middle, and late.* Each stage brings its own set of rewards and challenges.

Physical Development

By the time we reach early adulthood (20 to early 40s), our physical maturation is complete, although our height and weight may increase slightly. In young adulthood, our physical abilities are at their peak, including muscle strength, reaction time, sensory abilities, and cardiac functioning. Most professional athletes are at the top of their game during this stage. Many women have children in the young adulthood years, so they may see additional weight gain and breast changes.

Middle adulthood *extends from the 40s to the 60s.* Physical decline is gradual. The skin loses some elasticity, and wrinkles are among the first signs of aging. Visual acuity decreases during this time. Women experience a gradual decline in fertility as they approach the onset of **menopause**, *the end of the menstrual cycle, around 50 years old.* Both men and women tend to gain weight: in the abdominal area for men and in the hips and thighs for women. Hair begins to thin and turn gray.



Physical declines of middle and late adulthood can be minimized with proper exercise, nutrition, and an active lifestyle. (credit: modification of work by Peter Stevens)

Late adulthood is considered to extend from the 60s on. This is the last stage of physical change. The skin continues to lose elasticity, reaction time slows further, and muscle strength diminishes. Smell, taste, hearing, and vision, so sharp in our 20s, decline significantly. The brain may also no longer function at optimal levels, leading to problems like memory loss, dementia, and Alzheimer's disease in later years.

Aging doesn't mean a person can't explore new pursuits, learn new skills, and continue to grow. Watch this inspiring story about Neal Unger, who is a newbie to the world of skateboarding at 60 years old: [NEAL UNGER – 60 YEAR OLD SKATEBOARDER](https://louis.pressbooks.pub/intropsychology/?p=599#oembed-5).



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Cognitive Development

Because we spend so many years in adulthood (more than any other stage), cognitive changes are numerous. In

fact, research suggests that adult cognitive development is a complex, ever-changing process that may be even more active than cognitive development in infancy and early childhood (Fischer, Yan, & Stewart, 2003).

There is good news for the middle age brain. View this brief video to find out what it is: [Middle Age Brains – NJN News Healthwatch Report](#).



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Unlike our physical abilities, which peak in our mid-20s and then begin a slow decline, our cognitive abilities remain steady throughout early and middle adulthood. Our **crystallized intelligence** (*information, skills, and strategies we have gathered through a lifetime of experience*) tends to hold steady as we age—it may even improve. For example, adults show relatively stable to increasing scores on intelligence tests until their mid-30s to mid-50s (Bayley & Oden, 1955). However, in late adulthood we begin to experience a decline in another area of our cognitive abilities—**fluid intelligence** (*information processing abilities, reasoning, and memory*). These processes become slower. How can we delay the onset of cognitive decline? Mental and physical activity seem to play a part. Research has found adults who engage in mentally and physically stimulating activities experience less cognitive decline and have a reduced incidence of mild cognitive impairment and dementia (Hertzog, Kramer, Wilson, & Lindenberger, 2009; Larson et al., 2006; Podewils et al., 2005).



Cognitive activities such as playing mahjong, chess, or other games can keep you mentally fit. The same is true for solo pastimes like reading and completing crossword puzzles. (credit: Philippe Put)

Psychosocial Development

There are many theories about the social and emotional aspects of aging. Some aspects of healthy aging include activities, social connectedness, and the role of a person's culture. According to many theorists, including George Vaillant (2002), who studied and analyzed over 50 years of data, we need to have and continue to find meaning throughout our lives. For those in early and middle adulthood, meaning is found through work (Sterns & Huyck, 2001) and family life (Markus, Ryff, Curan, & Palmersheim, 2004). These areas relate to the tasks that Erikson referred to as generativity and intimacy. As mentioned previously, adults tend to define themselves by what they do—their careers. Earnings peak during this time, yet job satisfaction is more closely tied to work that involves contact with other people, is interesting, provides opportunities for advancement, and allows some independence (Mohr & Zoghi, 2006) than it is to salary (Iyengar, Wells, & Schwartz, 2006). How might being unemployed or being in a dead-end job challenge adult well-being?

Positive relationships with significant others in our adult years have been found to contribute to a state of well-being (Ryff & Singer, 2009). Most adults in the United States identify themselves through their relationships with family—particularly with spouses, children, and parents (Markus et al., 2004). While raising children can be stressful, especially when they are young, research suggests that parents reap the rewards down the road, as adult children tend to have a positive effect on parental well-being (Umberson, Pudrovska, & Reczek, 2010). Having a stable marriage has also been found to contribute to well-being throughout adulthood (Vaillant, 2002).

Another aspect of positive aging is believed to be social connectedness and social support. As we get older, socioemotional selectivity theory suggests that our social support and friendships dwindle in number but remain as close, if not closer, than in our earlier years (Carstensen, 1992).



Social support is important as we age. (credit: Gabriel Rocha)

To learn more, view this video on aging in America:
[The Many Faces of Aging In America.](#)



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Summary

At conception, the egg and sperm cell are united to form a zygote, which will begin to divide rapidly. This marks the beginning of the first stage of prenatal development (germinal stage), which lasts about 2 weeks. Then the zygote implants itself into the lining of the woman's uterus, marking the beginning of the second stage of prenatal development (embryonic stage), which lasts about 6 weeks. The embryo begins to develop body and organ structures, and the neural tube forms, which will later become the brain and spinal cord. The third phase of prenatal development (fetal stage) begins at 9 weeks and lasts until birth. The body, brain, and organs grow rapidly during this stage. During all stages of pregnancy it is important that the mother receive prenatal care to reduce health risks to herself and to her developing baby.

Newborn infants weigh about 7.5 pounds. Doctors assess a newborn's reflexes, such as the sucking, rooting, and Moro reflexes. Our physical, cognitive, and psychosocial skills grow and change as we move through developmental stages from infancy through late adulthood. Attachment in infancy is a critical component of healthy development. Parenting styles have been found to have an effect on childhood outcomes of well-being. The transition from adolescence to adulthood can be challenging due to the timing of puberty, and due to the extended amount of time spent in emerging adulthood. Although physical decline begins in middle adulthood, cognitive decline does not begin until later. Activities that keep the body and mind active can help maintain good physical and cognitive health as we age. Social supports through family and friends remain important as we age.

Review Questions



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Critical Thinking Questions

What are some known teratogens, and what kind of damage can they do to the developing fetus?

Alcohol is a teratogen. Excessive drinking can cause intellectual disabilities in children. The child can also have a small head and abnormal facial features, which are characteristic of fetal alcohol syndrome (FAS). Another teratogen is nicotine. Smoking while pregnant can lead to low-birth weight, premature birth, stillbirth, and SIDS.

What is prenatal care and why is it important?

Prenatal care is medical care during pregnancy that monitors the health of both the mother and fetus. It's important to receive prenatal care because it can reduce complications to the mother and fetus during pregnancy.

Describe what happens in the embryonic stage of development. Describe what happens in the fetal stage of development.

In the embryonic stage, basic structures of the embryo start to develop into areas that will become the head, chest, and abdomen. The heart begins to beat and organs form and begin to function. The neural tube forms along the back of the embryo, developing into the spinal cord and brain. In the fetal stage, the brain and body continue to develop. Fingers and toes develop along with hearing, and internal organs form.

What makes a personal quality part of someone's personality?

The particular quality or trait must be part of an enduring behavior pattern, so that it is a consistent or predictable quality.

Describe some of the newborn reflexes. How might they promote survival?

The sucking reflex is the automatic, unlearned sucking motions that infants do with their mouths. It may help promote survival because this action helps the baby take in nourishment.

The rooting reflex is the newborn's response to anything that touches her cheek. When you stroke a baby's cheek, she will naturally turn her head that way and begin to suck. This may aid survival because it helps the newborn locate a source of food.

Compare and contrast the four parenting styles and describe the kinds of childhood outcomes we can expect with each.

With the authoritative style, children are given reasonable demands and consistent limits, warmth and affection are expressed, the parent listens to the child's point of view, and the child initiates positive standards. Children raised by authoritative parents tend to have high self-esteem and social skills. Another parenting style is authoritarian: The parent places a high value on conformity and obedience. The parents are often strict, tightly monitor their children, and express little warmth. This style can create anxious, withdrawn, and unhappy kids. The third parenting style is permissive: Parents make few demands, rarely use punishment, and give their children free rein. Children raised by permissive parents tend to lack self-discipline, which

contributes to poor grades and alcohol abuse. However, they have higher self-esteem, better social skills, and lower levels of depression. The fourth style is the uninvolved parent: They are indifferent, uninvolved, and sometimes called neglectful. The children raised in this parenting style are usually emotionally withdrawn, fearful, anxious, perform poorly in school, and are at an increased risk of substance abuse.

What is emerging adulthood and what are some factors that have contributed to this new stage of development?

Emerging adulthood is a relatively new period of lifespan development from 18 years old to the mid-20s, characterized as a transitional time in which identity exploration focuses on work and love. According to Arnett, changing cultural expectations facilitate the delay to full adulthood. People are spending more time exploring their options, so they are delaying marriage and work as they change majors and jobs multiple times, putting them on a much later timetable than their parents.

Personal Application Questions

1. Which parenting style describes how you were raised? Provide an example or two to support your answer.
2. Would you describe your experience of puberty as one of pride or embarrassment? Why?
3. Your best friend is a smoker who just found out she is pregnant. What would you tell her about smoking and pregnancy?
4. Imagine you are a nurse working at a clinic that provides prenatal care for pregnant women. Your patient, Anna, has heard that it's a good idea to play music for her unborn baby, and she wants to know when her baby's hearing will develop. What will you tell her?

30.

DEATH AND DYING

Learning Objectives

By the end of this section, you will be able to:

- Discuss hospice care
- Describe the five stages of grief

Every story has an ending. Death marks the end of your life story. Our culture and individual backgrounds influence how we view death. In some cultures, death is accepted as a natural part of life and is embraced. In contrast, until about 50 years ago in the United States, a doctor might not inform someone that they were dying, and the majority of deaths occurred in hospitals. In 1967 that reality began to change with Cicely Saunders, who created the first modern hospice in England. The aim of **hospice** *is to help provide a death with dignity and pain management in a humane and comfortable environment, which is usually outside of a hospital setting*. In 1974, Florence Wald founded the first hospice in the United States. Today, hospice provides care for 1.65 million Americans and their families. Because of hospice care, many terminally ill people are able to spend their last days at home.



In some cultures, people's bodies may be buried in a cemetery after death. (credit: Christina Rutz)

Research has indicated that hospice care is beneficial for the patient (Brumley, Enquidanos, & Cherin, 2003; Brumley et al., 2007; Godkin, Krant, & Doster, 1984) and for the patient's family (Rhodes, Mitchell, Miller, Connor, & Teno, 2008; Godkin et al., 1984). Hospice patients report high levels of satisfaction with hospice care because they are able to remain at home and are not completely dependent on strangers for care (Brumley et al., 2007). In addition, hospice patients tend to live longer than non-hospice patients (Connor, Pyenson, Fitch, Spence, & Iwasaki, 2007; Temel et al., 2010). Family members receive emotional support and are regularly informed of their loved one's treatment and condition. The family member's burden of care is also reduced (McMillan et al., 2006). Both the patient and the patient's family members report increased family support, increased social support, and improved coping while receiving hospice services (Godkin et al., 1984).

How do you think you might react if you were diagnosed with a terminal illness like cancer? Elizabeth Kübler-Ross (1969), who worked with the founders of hospice care, described the process of an individual accepting his own death. She proposed **five stages of grief**: *denial, anger, bargaining, depression, and acceptance*. Most individuals experience these stages, but the stages may occur in different orders, depending on the individual. In addition, not all people experience all of the stages. It is also important to note that some psychologists believe that the more a dying person fights death, the more likely he is to remain stuck in the denial phase. This could make it difficult for the dying person to face death with dignity. However, other psychologists believe that not facing death until the very end is an adaptive coping mechanism for some people.

1. Denial: "I feel fine." "This can't be happening; not to me."
2. Anger: "Why me? It's not fair!" "How can this happen to me?" "Who is to blame?"
3. Bargaining: "Just let me live to see my children graduate." "I'd do anything for a few more years." "I'd give my life savings if..."
4. Depression: "I'm so sad, why bother with anything?" "I'm going to die. What's the point?" "I miss my

loved ones—why go on?”

5. Acceptance: “I know my time has come; it’s almost my time.”

Whether due to illness or old age, not everyone facing death or the loss of a loved one experiences the negative emotions outlined in the Kübler-Ross model (Nolen-Hoeksema & Larson, 1999). For example, research suggests that people with religious or spiritual beliefs are better able to cope with death because of their hope in an afterlife and because of social support from religious or spiritual associations (Hood, Spilka, Hunsberger, & Corsuch, 1996; McIntosh, Silver, & Wortman, 1993; Paloutzian, 1996; Samarel, 1991; Wortman & Park, 2008).

A prominent example of a person creating meaning through death is Randy Pausch, who was a well-loved and respected professor at Carnegie Mellon University. Diagnosed with terminal pancreatic cancer in his mid-40s and given only 3–6 months to live, Pausch focused on living in a fulfilling way in the time he had left. Instead of becoming angry and depressed, he presented his now famous last lecture called “Really Achieving Your Childhood Dreams.” In his moving yet humorous talk, he shares his insights on seeing the good in others, overcoming obstacles, and experiencing zero gravity, among many other things. Despite his terminal diagnosis, Pausch lived the final year of his life with joy and hope, showing us that our plans for the future still matter, even if we know that we are dying.

Really Achieving Your Childhood Dreams is Randy Pausch’s last lecture. Listen to his inspiring talk: [Randy Pausch Last Lecture: Achieving Your Childhood Dreams](https://www.youtube.com/watch?v=601#oembed-1).



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Test Your Understanding



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Summary

Death marks the endpoint of our lifespan. There are many ways that we might react when facing death. Kübler-Ross developed a five-stage model of grief as a way to explain this process. Many people facing death choose hospice care, which allows their last days to be spent at home in a comfortable, supportive environment.

Review Questions



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Critical Thinking Questions

Describe the five stages of grief and provide examples of how a person might react in each stage.

The first stage is denial. The person receives news that he is dying, and either does not take it seriously or tries to escape from the reality of the situation. He might say something like, “Cancer could never happen to me. I take good care of myself. This has to be a mistake.” The next stage is anger. He realizes time is short, and he may not have a chance to accomplish what he wanted in life. “It’s not fair. I promised my grandchildren that we would go to Disney World, and now I’ll never have the chance to take them.” The third stage is bargaining. In this stage, he tries to delay the inevitable by bargaining or pleading for extra time, usually with God, family members, or medical care providers. “God, just give me one more year so I can take that trip with my grandchildren. They’re too young to understand what’s happening and why I can’t take them.” The fourth stage is depression. He becomes sad about his impending death. “I can’t believe this is how I’m going to die. I’m in so much pain. What’s going to become of my family when I’m gone?” The final stage is acceptance. This stage is usually reached in the last few days or weeks before death. He recognizes that death is inevitable. “I need to get everything in order and say all of my good-byes to the people I love.”

What is the purpose of hospice care?

Hospice is a program of services that provide medical, social, and spiritual support for dying people and their families.

Personal Application Questions

1. Have you ever had to cope with the loss of a loved one? If so, what concepts described in this section provide context that may help you understand your experience and process of grieving?
2. If you were diagnosed with a terminal illness would you choose hospice care or a traditional death in a hospital? Why?

31.

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PART VII

LEARNING



Loggerhead sea turtle hatchlings are born knowing how to find the ocean and how to swim. Unlike the sea turtle, humans must learn how to swim (and surf). (credit “turtle”: modification of work by Becky Skiba, USFWS; credit “surfer”: modification of work by Mike Baird)

The summer sun shines brightly on a deserted stretch of beach. Suddenly, a tiny grey head emerges from the sand, then another and another. Soon the beach is teeming with loggerhead sea turtle hatchlings. Although only minutes old, the hatchlings know exactly what to do. Their flippers are not very efficient for moving across the hot sand, yet they continue onward, instinctively. Some are quickly snapped up by gulls circling overhead and others become lunch for hungry ghost crabs that dart out of their holes. Despite these dangers, the hatchlings are driven to leave the safety of their nest and find the ocean.

Not far down this same beach, Ben and his son, Julian, paddle out into the ocean on surfboards. A wave approaches. Julian crouches on his board, then jumps up and rides the wave for a few seconds before losing his balance. He emerges from the water in time to watch his father ride the face of the wave.

Unlike baby sea turtles, which know how to find the ocean and swim with no help from their parents, we are not born knowing how to swim (or surf). Yet we humans pride ourselves on our ability to learn. In fact, over thousands of years and across cultures, we have created institutions devoted entirely to learning. But have you ever asked yourself how exactly it is that we learn? What processes are at work as we come to know what we know? This chapter focuses on the primary ways in which learning occurs.

32.

WHAT IS LEARNING?

Learning Objectives

By the end of this section, you will be able to:

- Explain how learned behaviors are different from instincts and reflexes
- Define learning
- Recognize and define three basic forms of learning—classical conditioning, operant conditioning, and observational learning

Birds build nests and migrate as winter approaches. Infants suckle at their mother's breast. Dogs shake water off wet fur. Salmon swim upstream to spawn, and spiders spin intricate webs. What do these seemingly unrelated behaviors have in common? They all are *unlearned* behaviors. Both instincts and reflexes are innate behaviors that organisms are born with. Reflexes are a motor or neural reaction to a specific stimulus in the environment. They tend to be simpler than instincts, involve the activity of specific body parts and systems (e.g., the knee-jerk reflex and the contraction of the pupil in bright light), and involve more primitive centers of the central nervous system (e.g., the spinal cord and the medulla). In contrast, instincts are innate behaviors that are triggered by a broader range of events, such as aging and the change of seasons. They are more complex patterns of behavior, involve movement of the organism as a whole (e.g., sexual activity and migration), and involve higher brain centers.

Both reflexes and instincts help an organism adapt to its environment and do not have to be learned. For example, every healthy human baby has a sucking reflex, present at birth. Babies are born knowing how to suck on a nipple, whether artificial (from a bottle) or human. Nobody teaches the baby to suck, just as no one teaches a sea turtle hatchling to move toward the ocean.

Learning, like reflexes and instincts, allows an organism to adapt to its environment. But unlike instincts and reflexes, learned behaviors involve change and experience; learning is a relatively permanent change in behavior or knowledge that results from experience. In contrast to the innate behaviors discussed above,

learning involves acquiring knowledge and skills through experience. Looking back at our surfing scenario, Julian will have to spend much more time training with his surfboard before he learns how to ride the waves like his father.

Learning to surf, as well as any complex learning process (e.g., learning about the discipline of psychology), involves a complex interaction of conscious and unconscious processes. Learning has traditionally been studied in terms of its simplest components—the associations our minds automatically make between events. Our minds have a natural tendency to connect events that occur closely together or in sequence. Associative learning occurs when an organism makes connections between stimuli or events that occur together in the environment. You will see that associative learning is central to all three basic learning processes discussed in this chapter; classical conditioning tends to involve unconscious processes, operant conditioning tends to involve conscious processes, and observational learning adds social and cognitive layers to all the basic associative processes, both conscious and unconscious. These learning processes will be discussed in detail later in the chapter, but it is helpful to have a brief overview of each as you begin to explore how learning is understood from a psychological perspective.

In classical conditioning, also known as Pavlovian conditioning, organisms learn to associate events—or stimuli—that repeatedly happen together. We experience this process throughout our daily lives. For example, you might see a flash of lightning in the sky during a storm and then hear a loud boom of thunder. The sound of the thunder naturally makes you jump (loud noises have that effect by reflex). Because lightning reliably predicts the impending boom of thunder, you may associate the two and jump when you see lightning. Psychological researchers study this associative process by focusing on what can be seen and measured—behaviors. Researchers ask if one stimulus triggers a reflex, can we train a different stimulus to trigger that same reflex?

In operant conditioning, organisms learn, again, to associate events—a behavior and its consequence (reinforcement or punishment). A pleasant consequence encourages more of that behavior in the future, whereas a punishment deters the behavior. Imagine you are teaching your dog, Hodor, to sit. You tell Hodor to sit, and give him a treat when he does. After repeated experiences, Hodor begins to associate the act of sitting with receiving a treat. He learns that the consequence of sitting is that he gets a doggie biscuit. Conversely, if the dog is punished when exhibiting a behavior, it becomes conditioned to avoid that behavior (e.g., receiving a small shock when crossing the boundary of an invisible electric fence).



In operant conditioning, a response is associated with a consequence. This dog has learned that certain behaviors result in receiving a treat. (credit: Crystal Rolfe)

Observational learning extends the effective range of both classical and operant conditioning. In contrast to classical and operant conditioning, in which learning occurs only through direct experience, observational learning is the process of watching others and then imitating what they do. A lot of learning among humans and other animals comes from observational learning. To get an idea of the extra effective range that observational learning brings, consider Ben and his son Julian from the introduction. How might observation help Julian learn to surf, as opposed to learning by trial and error alone? By watching his father, he can imitate the moves that bring success and avoid the moves that lead to failure. Can you think of something you have learned how to do after watching someone else?

All of the approaches covered in this chapter are part of a particular tradition in psychology, called behaviorism, which we discuss in the next section. However, these approaches do not represent the entire study of learning. Separate traditions of learning have taken shape within different fields of psychology, such as memory and cognition, so you will find that other chapters will round out your understanding of the topic. Over time these traditions tend to converge. For example, in this chapter you will see how cognition has come to play a larger role in behaviorism, whose more extreme adherents once insisted that behaviors are triggered by the environment with no intervening thought.

Test Your Understanding



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Review Questions



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Critical Thinking Questions

Compare and contrast classical and operant conditioning. How are they alike? How do they differ?

Both classical and operant conditioning involve learning by association. In classical conditioning, responses are involuntary and automatic; however, responses are voluntary and learned in operant conditioning. In classical conditioning, the event that drives the behavior (the stimulus)

comes before the behavior; in operant conditioning, the event that drives the behavior (the consequence) comes after the behavior. Also, whereas classical conditioning involves an organism forming an association between an involuntary (reflexive) response and a stimulus, operant conditioning involves an organism forming an association between a voluntary behavior and a consequence.

What is the difference between a reflex and a learned behavior?

A reflex is a behavior that humans are born knowing how to do, such as sucking or blushing; these behaviors happen automatically in response to stimuli in the environment. Learned behaviors are things that humans are not born knowing how to do, such as swimming and surfing. Learned behaviors are not automatic; they occur as a result of practice or repeated experience in a situation.

Personal Application Questions

What is your personal definition of learning? How do your ideas about learning compare with the definition of learning presented in this text?

What kinds of things have you learned through the process of classical conditioning? Operant conditioning? Observational learning? How did you learn them?

Summary

Instincts and reflexes are innate behaviors—they occur naturally and do not involve learning. In contrast, learning is a change in behavior or knowledge that results from experience. There are three main types of learning: classical conditioning, operant conditioning, and observational learning. Both classical and operant conditioning are forms of associative learning where associations are made between events that occur together. Observational learning is just as it sounds: learning by observing others.

33.

CLASSICAL CONDITIONING

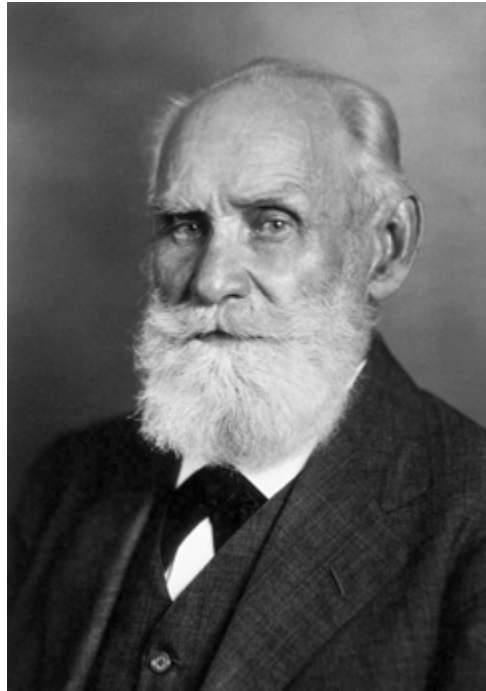
Learning Objectives

By the end of this section, you will be able to:

- Explain how classical conditioning occurs
- Summarize the processes of acquisition, extinction, spontaneous recovery, generalization, and discrimination

Does the name Ivan Pavlov ring a bell? Even if you are new to the study of psychology, chances are that you have heard of Pavlov and his famous dogs.

Pavlov (1849–1936), a Russian scientist, performed extensive research on dogs and is best known for his experiments in classical conditioning. As we discussed briefly in the previous section, classical conditioning is a process by which we learn to associate stimuli and, consequently, to anticipate events.



Ivan Pavlov's research on the digestive system of dogs unexpectedly led to his discovery of the learning process now known as classical conditioning.

Pavlov came to his conclusions about how learning occurs completely by accident. Pavlov was a physiologist, not a psychologist. Physiologists study the life processes of organisms, from the molecular level to the level of cells, organ systems, and entire organisms. Pavlov's area of interest was the digestive system (Hunt, 2007). In his studies with dogs, Pavlov surgically implanted tubes inside dogs' cheeks to collect saliva. He then measured the amount of saliva produced in response to various foods. Over time, Pavlov (1927) observed that the dogs began to salivate not only at the taste of food, but also at the sight of food, at the sight of an empty food bowl, and even at the sound of the laboratory assistants' footsteps. Salivating to food in the mouth is reflexive, so no learning is involved. However, dogs don't naturally salivate at the sight of an empty bowl or the sound of footsteps.

These unusual responses intrigued Pavlov, and he wondered what accounted for what he called the dogs' "psychic secretions" (Pavlov, 1927). To explore this phenomenon in an objective manner, Pavlov designed a series of carefully controlled experiments to see which stimuli would cause the dogs to salivate. He was able to train the dogs to salivate in response to stimuli that clearly had nothing to do with food, such as the sound of a bell, a light, and a touch on the leg. Through his experiments, Pavlov realized that an organism has two types of responses to its environment: (1) unconditioned (unlearned) responses, or reflexes, and (2) conditioned (learned) responses.

In Pavlov's experiments, the dogs salivated each time meat powder was presented to them. The meat powder in this situation was an unconditioned stimulus (UCS): a stimulus that elicits a reflexive response in an

organism. The dogs' salivation was an unconditioned response (UCR): a natural (unlearned) reaction to a given stimulus. Before conditioning, think of the dogs' stimulus and response like this:

Meat powder (UCS) → Salivation (UCR)

In classical conditioning, a neutral stimulus is presented immediately before an unconditioned stimulus. Pavlov would sound a tone (like ringing a bell) and then give the dogs the meat powder. The tone was the neutral stimulus (NS), which is a stimulus that does not naturally elicit a response. Prior to conditioning, the dogs did not salivate when they just heard the tone because the tone had no association for the dogs. Quite simply this pairing means:

Tone (NS) + Meat Powder (UCS) → Salivation (UCR)

When Pavlov paired the tone with the meat powder over and over again, the previously neutral stimulus (the tone) also began to elicit salivation from the dogs. Thus, the neutral stimulus became the conditioned stimulus (CS), which is a stimulus that elicits a response after repeatedly being paired with an unconditioned stimulus. Eventually, the dogs began to salivate to the tone alone, just as they previously had salivated at the sound of the assistants' footsteps. The behavior caused by the conditioned stimulus is called the conditioned response (CR). In the case of Pavlov's dogs, they had learned to associate the tone (CS) with being fed, and they began to salivate (CR) in anticipation of food.

Before Conditioning**During Conditioning****After Conditioning**

Before conditioning, an unconditioned stimulus (food) produces an unconditioned response (salivation), and a neutral stimulus (bell) does not produce a response. During conditioning, the unconditioned stimulus (food) is presented repeatedly just after the presentation of the neutral stimulus (bell). After conditioning, the neutral stimulus alone produces a conditioned response (salivation), thus becoming a conditioned stimulus.

View this video to learn more about Pavlov and his dogs: [Classical Conditioning – Ivan Pavlov](#).



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General Processes in Classical Conditioning

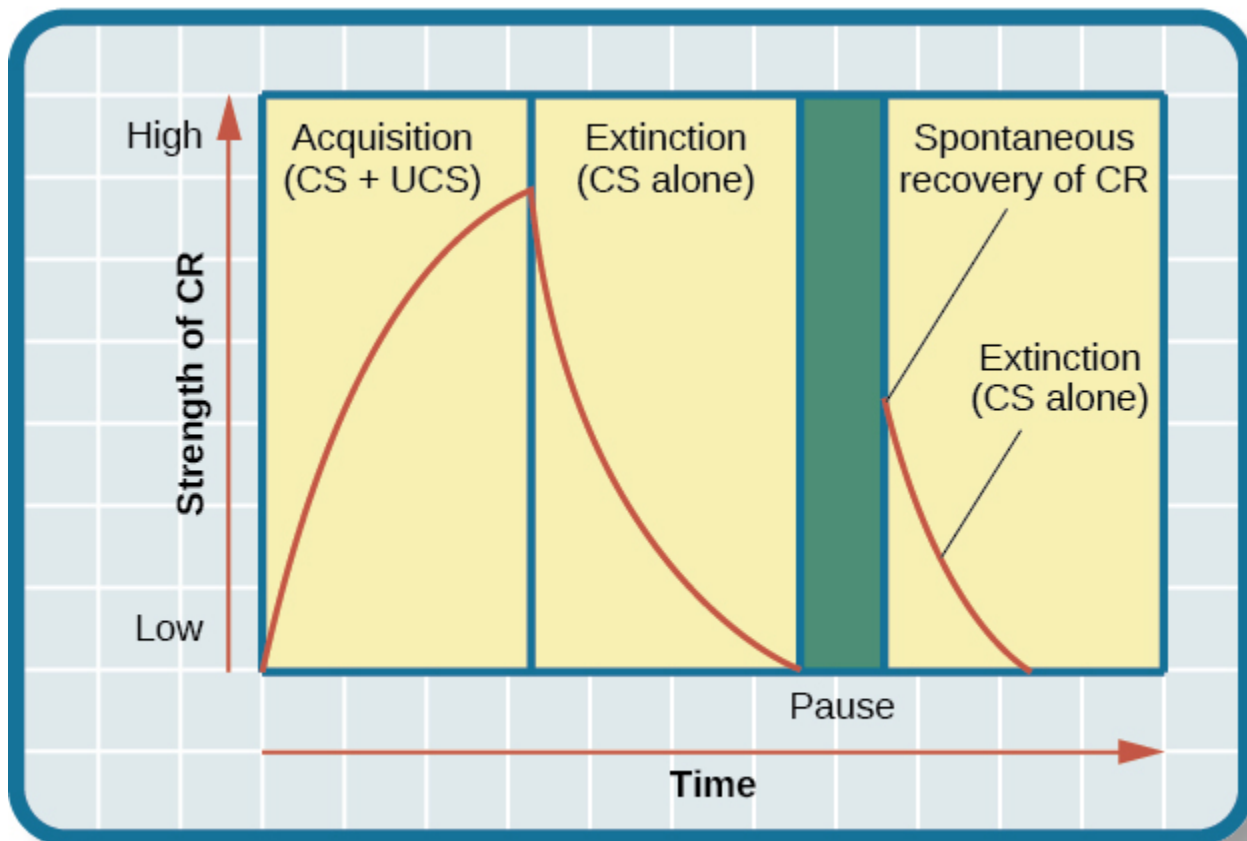
Now that you know how classical conditioning works and have seen several examples, let's take a look at some of the general processes involved. In classical conditioning, the initial period of learning is known as acquisition, when an organism learns to connect a neutral stimulus and an unconditioned stimulus. During acquisition, the neutral stimulus begins to elicit the conditioned response, and eventually the neutral stimulus becomes a conditioned stimulus capable of eliciting the conditioned response by itself. Timing is important for conditioning to occur. Typically, there should only be a brief interval between the presentation of the conditioned stimulus and the unconditioned stimulus. Depending on what is being conditioned, sometimes this interval is as little as five seconds (Chance, 2009). However, with other types of conditioning, the interval can be up to several hours.

Taste aversion is a type of conditioning in which an interval of several hours may pass between the conditioned stimulus (something ingested) and the unconditioned stimulus (nausea or illness). Here's how it works. Between classes, you and a friend grab a quick lunch from a food cart on campus. You share a dish of chicken curry and head off to your next class. A few hours later, you feel nauseous and become ill. Although your friend is fine and you determine that you have intestinal flu (the food is not the culprit), you've developed a taste aversion; the next time you are at a restaurant and someone orders curry, you immediately feel ill. While the chicken dish is not what made you sick, you are experiencing taste aversion: you've been conditioned to be averse to a food after a single, negative experience.

How does this occur—conditioning based on a single instance and involving an extended time lapse between the event and the negative stimulus? Research into taste aversion suggests that this response may be an evolutionary adaptation designed to help organisms quickly learn to avoid harmful foods (Garcia & Rusiniak, 1980; Garcia & Koelling, 1966). Not only may this contribute to species survival via natural selection, but it may also help us develop strategies for challenges such as helping cancer patients through the nausea induced by certain treatments (Holmes, 1993; Jacobsen et al., 1993; Hutton, Baracos, & Wismer, 2007; Skolin et al., 2006).

Once we have established the connection between the unconditioned stimulus and the conditioned stimulus, how do we break that connection and get the dog, cat, or child to stop responding? In Tiger's case, imagine what would happen if you stopped using the electric can opener for her food and began to use it only for human food. Now, Tiger would hear the can opener, but she would not get food. In classical conditioning terms, you would be giving the conditioned stimulus, but not the unconditioned stimulus. Pavlov explored this scenario in his experiments with dogs: sounding the tone without giving the dogs the meat powder. Soon the dogs stopped responding to the tone. Extinction is the decrease in the conditioned response when the unconditioned stimulus is no longer presented with the conditioned stimulus. When presented with the conditioned stimulus alone, the dog, cat, or other organism would show a weaker and weaker response, and finally no response. In classical conditioning terms, there is a gradual weakening and disappearance of the conditioned response.

What happens when learning is not used for a while—when what was learned lies dormant? As we just discussed, Pavlov found that when he repeatedly presented the bell (conditioned stimulus) without the meat powder (unconditioned stimulus), extinction occurred; the dogs stopped salivating to the bell. However, after a couple of hours of resting from this extinction training, the dogs again began to salivate when Pavlov rang the bell. What do you think would happen with Tiger’s behavior if your electric can opener broke, and you did not use it for several months? When you finally got it fixed and started using it to open Tiger’s food again, Tiger would remember the association between the can opener and her food—she would get excited and run to the kitchen when she heard the sound. The behavior of Pavlov’s dogs and Tiger illustrates a concept Pavlov called spontaneous recovery: the return of a previously extinguished conditioned response following a rest period.



This is the curve of acquisition, extinction, and spontaneous recovery. The rising curve shows the conditioned response quickly getting stronger through the repeated pairing of the conditioned stimulus and the unconditioned stimulus (acquisition). Then the curve decreases, which shows how the conditioned response weakens when only the conditioned stimulus is presented (extinction). After a break or pause from conditioning, the conditioned response reappears (spontaneous recovery).

Of course, these processes also apply to humans. For example, let’s say that every day when you walk to campus, an ice cream truck passes your route. Day after day, you hear the truck’s music (neutral stimulus), so you finally stop and purchase a chocolate ice cream bar. You take a bite (unconditioned stimulus) and then your

mouth waters (unconditioned response). This initial period of learning is known as acquisition, when you begin to connect the neutral stimulus (the sound of the truck) and the unconditioned stimulus (the taste of the chocolate ice cream in your mouth). During acquisition, the conditioned response gets stronger and stronger through repeated pairings of the conditioned stimulus and unconditioned stimulus. Several days (and ice cream bars) later, you notice that your mouth begins to water (conditioned response) as soon as you hear the truck's musical jingle—even before you bite into the ice cream bar. Then one day you head down the street. You hear the truck's music (conditioned stimulus), and your mouth waters (conditioned response). However, when you get to the truck, you discover that they are all out of ice cream. You leave disappointed. The next few days you pass by the truck and hear the music, but don't stop to get an ice cream bar because you're running late for class. You begin to salivate less and less when you hear the music, until by the end of the week, your mouth no longer waters when you hear the tune. This illustrates extinction. The conditioned response weakens when only the conditioned stimulus (the sound of the truck) is presented, without being followed by the unconditioned stimulus (chocolate ice cream in the mouth). Then the weekend comes. You don't have to go to class, so you don't pass the truck. Monday morning arrives and you take your usual route to campus. You round the corner and hear the truck again. What do you think happens? Your mouth begins to water again. Why? After a break from conditioning, the conditioned response reappears, which indicates spontaneous recovery.

Acquisition and extinction involve the strengthening and weakening, respectively, of a learned association. Two other learning processes—stimulus discrimination and stimulus generalization—are involved in distinguishing which stimuli will trigger the learned association. Animals (including humans) need to distinguish between stimuli—for example, between sounds that predict a threatening event and sounds that do not—so that they can respond appropriately (such as running away if the sound is threatening). When an organism learns to respond differently to various stimuli that are similar, it is called stimulus discrimination. In classical conditioning terms, the organism demonstrates the conditioned response only to the conditioned stimulus. Pavlov's dogs discriminated between the basic tone that sounded before they were fed and other tones (e.g., the doorbell), because the other sounds did not predict the arrival of food. Similarly, Tiger, the cat, discriminated between the sound of the can opener and the sound of the electric mixer. When the electric mixer is going, Tiger is not about to be fed, so she does not come running to the kitchen looking for food.

On the other hand, when an organism demonstrates the conditioned response to stimuli that are similar to the condition stimulus, it is called stimulus generalization, the opposite of stimulus discrimination. The more similar a stimulus is to the condition stimulus, the more likely the organism is to give the conditioned response. For instance, if the electric mixer sounds very similar to the electric can opener, Tiger may come running after hearing its sound. But if you do not feed her following the electric mixer sound, and you continue to feed her consistently after the electric can opener sound, she will quickly learn to discriminate between the two sounds (provided they are sufficiently dissimilar that she can tell them apart).

Sometimes, classical conditioning can lead to habituation. Habituation occurs when we learn not to respond to a stimulus that is presented repeatedly without change. As the stimulus occurs over and over, we

learn not to focus our attention on it. For example, imagine that your neighbor or roommate constantly has the television blaring. This background noise is distracting and makes it difficult for you to focus when you're studying. However, over time, you become accustomed to the stimulus of the television noise, and eventually you hardly notice it any longer.

Test Your Understanding



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Review Questions



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Critical Thinking Questions

If the sound of your toaster popping up toast causes your mouth to water, what are the UCS, CS, and CR?

The food being toasted is the UCS; the sound of the toaster popping up is the CS; salivating to the sound of the toaster is the CR.

Explain how the processes of stimulus generalization and stimulus discrimination are considered opposites.

In stimulus generalization, an organism responds to new stimuli that are similar to the original conditioned stimulus. For example, a dog barks when the doorbell rings. He then barks when the oven timer dings because it sounds very similar to the doorbell. On the other hand, stimulus discrimination occurs when an organism learns a response to a specific stimulus, but does not respond the same way to new stimuli that are similar. In this case, the dog would bark when he hears the doorbell, but he would not bark when he hears the oven timer ding because they sound different; the dog is able to distinguish between the two sounds.

How does a neutral stimulus become a conditioned stimulus?

This occurs through the process of acquisition. A human or an animal learns to connect a neutral stimulus and an unconditioned stimulus. During the acquisition phase, the neutral stimulus begins to elicit the conditioned response. The neutral stimulus is becoming the conditioned stimulus. At the end of the acquisition phase, learning has occurred and the neutral stimulus becomes a conditioned stimulus capable of eliciting the conditioned response by itself.

Personal Application Question

Can you think of an example in your life of how classical conditioning has produced a positive emotional response, such as happiness or excitement? How about a negative emotional response, such as fear, anxiety, or anger?

Summary

Pavlov's pioneering work with dogs contributed greatly to what we know about learning. His experiments explored the type of associative learning we now call classical conditioning. In classical conditioning, organisms learn to associate events that repeatedly happen together, and researchers study how a reflexive response to a stimulus can be mapped to a different stimulus—by training an association between the two stimuli. Pavlov's experiments show how stimulus-response bonds are formed. Watson, the founder of behaviorism, was greatly influenced by Pavlov's work. He tested humans by conditioning fear in an infant known as Little Albert. His findings suggest that classical conditioning can explain how some fears develop.

34.

OPERANT CONDITIONING

Learning Objectives

By the end of this section, you will be able to:

- Define operant conditioning
- Explain the difference between reinforcement and punishment
- Distinguish between reinforcement schedules

The previous section of this chapter focused on the type of associative learning known as classical conditioning. Remember that in classical conditioning, something in the environment triggers a reflex automatically, and researchers train the organism to react to a different stimulus. Now we turn to the second type of associative learning, operant conditioning. In operant conditioning, organisms learn to associate a behavior with its consequence. A pleasant consequence makes that behavior more likely to be repeated in the future. For example, Spirit, a dolphin at the National Aquarium in Baltimore, does a flip in the air when her trainer blows a whistle. The consequence is that she gets a fish.

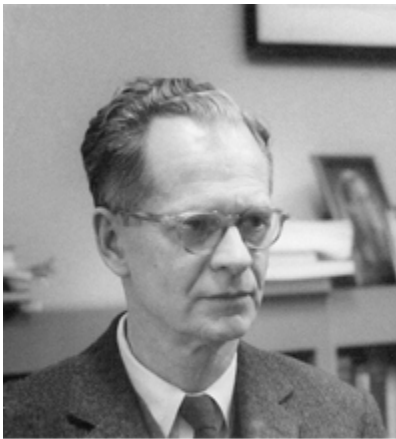
Classical and Operant Conditioning Compared

	Classical Conditioning	Operant Conditioning
Conditioning approach	An unconditioned stimulus (such as food) is paired with a neutral stimulus (such as a bell). The neutral stimulus eventually becomes the conditioned stimulus, which brings about the conditioned response (salivation).	The target behavior is followed by reinforcement or punishment to either strengthen or weaken it, so that the learner is more likely to exhibit the desired behavior in the future.
Stimulus timing	The stimulus occurs immediately before the response.	The stimulus (either reinforcement or punishment) occurs soon after the response.

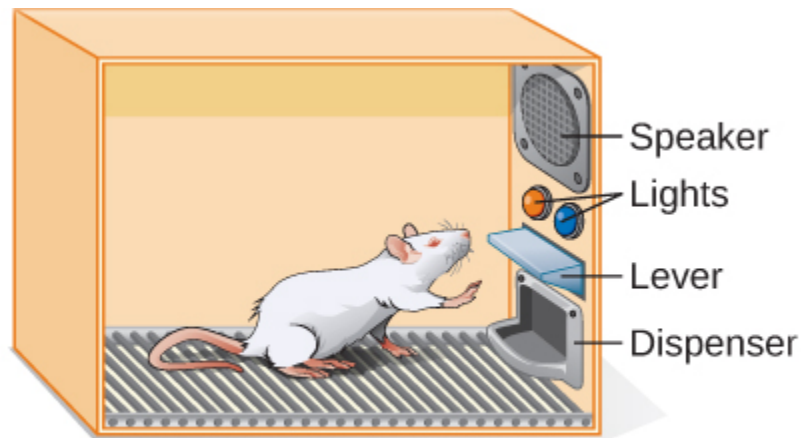
Psychologist B. F. Skinner saw that classical conditioning is limited to existing behaviors that are reflexively

elicited, and it doesn't account for new behaviors such as riding a bike. He proposed a theory about how such behaviors come about. Skinner believed that behavior is motivated by the consequences we receive for the behavior: the reinforcements and punishments. His idea that learning is the result of consequences is based on the law of effect, which was first proposed by psychologist Edward Thorndike. According to the law of effect, behaviors that are followed by consequences that are satisfying to the organism are more likely to be repeated, and behaviors that are followed by unpleasant consequences are less likely to be repeated (Thorndike, 1911). Essentially, if an organism does something that brings about a desired result, the organism is more likely to do it again. If an organism does something that does not bring about a desired result, the organism is less likely to do it again. An example of the law of effect is in employment. One of the reasons (and often the main reason) we show up for work is because we get paid to do so. If we stop getting paid, we will likely stop showing up—even if we love our job.

Working with Thorndike's law of effect as his foundation, Skinner began conducting scientific experiments on animals (mainly rats and pigeons) to determine how organisms learn through operant conditioning (Skinner, 1938). He placed these animals inside an operant conditioning chamber, which has come to be known as a "Skinner box." A Skinner box contains a lever (for rats) or disk (for pigeons) that the animal can press or peck for a food reward via the dispenser. Speakers and lights can be associated with certain behaviors. A recorder counts the number of responses made by the animal.



(a)



(b)

(a) B. F. Skinner developed operant conditioning for systematic study of how behaviors are strengthened or weakened according to their consequences. (b) In a Skinner box, a rat presses a lever in an operant conditioning chamber to receive a food reward. (credit a: modification of work by "Silly rabbit"/Wikimedia Commons)

In discussing operant conditioning, we use several everyday words—positive, negative, reinforcement, and punishment—in a specialized manner. In operant conditioning, positive and negative do not mean good and bad. Instead, *positive* means you are adding something, and *negative* means you are taking something away. *Reinforcement* means you are increasing a behavior, and *punishment* means you are decreasing a behavior.

Reinforcement can be positive or negative, and punishment can also be positive or negative. All reinforcers (positive or negative) *increase* the likelihood of a behavioral response. All punishers (positive or negative) *decrease* the likelihood of a behavioral response. Now let’s combine these four terms: positive reinforcement, negative reinforcement, positive punishment, and negative punishment.

Positive and Negative Reinforcement and Punishment		
	Reinforcement	Punishment
Positive	Something is <i>added</i> to <i>increase</i> the likelihood of a behavior.	Something is <i>added</i> to <i>decrease</i> the likelihood of a behavior.
Negative	Something is <i>removed</i> to <i>increase</i> the likelihood of a behavior.	Something is <i>removed</i> to <i>decrease</i> the likelihood of a behavior.

Reinforcement

The most effective way to teach a person or animal a new behavior is with positive reinforcement. In positive reinforcement, a desirable stimulus is added to increase a behavior.

For example, you tell your five-year-old son, Jerome, that if he cleans his room, he will get a toy. Jerome quickly cleans his room because he wants a new art set. Let’s pause for a moment. Some people might say, “Why should I reward my child for doing what is expected?” But in fact we are constantly and consistently rewarded in our lives. Our paychecks are rewards, as are high grades and acceptance into our preferred school. Being praised for doing a good job and for passing a driver’s test is also a reward. Positive reinforcement as a learning tool is extremely effective. It has been found that one of the most effective ways to increase achievement in school districts with below-average reading scores was to pay the children to read. Specifically, second-grade students in Dallas were paid two dollars each time they read a book and passed a short quiz about the book. The result was a significant increase in reading comprehension (Fryer, 2010). What do you think about this program? If Skinner were alive today, he would probably think this was a great idea. He was a strong proponent of using operant conditioning principles to influence students’ behavior at school. In fact, in addition to the Skinner box, he also invented what he called a teaching machine that was designed to reward small steps in learning (Skinner, 1961)—an early forerunner of computer-assisted learning. His teaching machine tested students’ knowledge as they worked through various school subjects. If students answered questions correctly, they received immediate positive reinforcement and could continue; if they answered incorrectly, they did not receive any reinforcement. The idea was that students would spend additional time studying the material to increase their chance of being reinforced the next time (Skinner, 1961).

In negative reinforcement, an undesirable stimulus is removed to increase a behavior. For example, car manufacturers use the principles of negative reinforcement in their seatbelt systems, which go “beep, beep, beep” until you fasten your seatbelt. The annoying sound stops when you exhibit the desired behavior, increasing the likelihood that you will buckle up in the future. Negative reinforcement is also used frequently

in horse training. Riders apply pressure—by pulling the reins or squeezing their legs—and then remove the pressure when the horse performs the desired behavior, such as turning or speeding up. The pressure is the negative stimulus that the horse wants to remove.

Punishment

Many people confuse negative reinforcement with punishment in operant conditioning, but they are two very different mechanisms. Remember that reinforcement, even when it is negative, always increases a behavior. In contrast, punishment always decreases a behavior. In positive punishment, you add an undesirable stimulus to decrease a behavior. An example of positive punishment is scolding a student to get the student to stop texting in class. In this case, a stimulus (the reprimand) is added in order to decrease the behavior (texting in class). In negative punishment, you remove an aversive stimulus to decrease behavior. For example, when a child misbehaves, a parent can take away a favorite toy. In this case, a stimulus (the toy) is removed in order to decrease the behavior.

Punishment, especially when it is immediate, is one way to decrease undesirable behavior. For example, imagine your four-year-old son, Brandon, hit his younger brother. You have Brandon write one hundred times “I will not hit my brother” (positive punishment). Chances are he won’t repeat this behavior. While strategies like this are common today, in the past children were often subject to physical punishment, such as spanking. It’s important to be aware of some of the drawbacks of using physical punishment on children. First, punishment may teach fear. Brandon may become fearful of the street, but he also may become fearful of the person who delivered the punishment—you, his parent. Similarly, children who are punished by teachers may come to fear the teacher and try to avoid school (Gershoff et al., 2010). Consequently, most schools in the United States have banned corporal punishment. Second, punishment may cause children to become more aggressive and prone to antisocial behavior and delinquency (Gershoff, 2002). They see their parents resort to spanking when they become angry and frustrated, so, in turn, they may act out this same behavior when they become angry and frustrated. For example, because you spank Brenda when you are angry with her for her misbehavior, she might start hitting her friends when they won’t share their toys.

While positive punishment can be effective in some cases, Skinner suggested that the use of punishment should be weighed against the possible negative effects. Today’s psychologists and parenting experts favor reinforcement over punishment—they recommend that you catch your child doing something good and reward her for it.

Shaping

In his operant conditioning experiments, Skinner often used an approach called shaping. Instead of rewarding only the target behavior, in shaping, we reward successive approximations of a target behavior. Why is shaping

needed? Remember that in order for reinforcement to work, the organism must first display the behavior. Shaping is needed because it is extremely unlikely that an organism will display anything but the simplest of behaviors spontaneously. In shaping, behaviors are broken down into many small, achievable steps. The specific steps used in the process are the following:

Reinforce any response that resembles the desired behavior.

Then reinforce the response that more closely resembles the desired behavior. You will no longer reinforce the previously reinforced response.

Next, begin to reinforce the response that even more closely resembles the desired behavior.

Continue to reinforce closer and closer approximations of the desired behavior.

Finally, only reinforce the desired behavior.

Shaping is often used in teaching a complex behavior or chain of behaviors. Skinner used shaping to teach pigeons not only such relatively simple behaviors as pecking a disk in a Skinner box, but also many unusual and entertaining behaviors, such as turning in circles, walking in figure eights, and even playing ping pong; the technique is commonly used by animal trainers today. An important part of shaping is stimulus discrimination. Recall Pavlov's dogs—he trained them to respond to the tone of a bell, and not to similar tones or sounds. This discrimination is also important in operant conditioning and in shaping behavior.

Here is a brief video of Skinner's pigeons playing ping pong: [BF Skinner Foundation – Pigeon Ping Pong Clip](#).



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It's easy to see how shaping is effective in teaching behaviors to animals, but how does shaping work with humans? Let's consider parents whose goal is to have their child learn to clean his room. They use shaping to help him master steps toward the goal. Instead of performing the entire task, they set up these steps and reinforce each step. First, he cleans up one toy. Second, he cleans up five toys. Third, he chooses whether to pick up ten toys or put his books and clothes away. Fourth, he cleans up everything except two toys. Finally, he cleans his entire room.

Test Your Understanding



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Primary and Secondary Reinforcers

Rewards such as stickers, praise, money, toys, and more can be used to reinforce learning. Let's go back to Skinner's rats again. How did the rats learn to press the lever in the Skinner box? They were rewarded with food each time they pressed the lever. For animals, food would be an obvious reinforcer.

What would be a good reinforcer for humans? For your daughter Sydney, it was the promise of a toy if she cleaned her room. How about Joaquin, the soccer player? If you gave Joaquin a piece of candy every time he made a goal, you would be using a primary reinforcer. Primary reinforcers are reinforcers that have innate reinforcing qualities. These kinds of reinforcers are not learned. Water, food, sleep, shelter, sex, and touch, among others, are primary reinforcers. Pleasure is also a primary reinforcer. Organisms do not lose their drive for these things. For most people, jumping in a cool lake on a very hot day would be reinforcing and the cool lake would be innately reinforcing—the water would cool the person off (a physical need), as well as provide pleasure.

A secondary reinforcer has no inherent value and only has reinforcing qualities when linked with a primary reinforcer. Praise, linked to affection, is one example of a secondary reinforcer, as when you called out "Great shot!" every time Joaquin made a goal. Another example, money, is only worth something when you can use it to buy other things—either things that satisfy basic needs (food, water, shelter—all primary reinforcers) or other secondary reinforcers. If you were on a remote island in the middle of the Pacific Ocean and you had stacks of money, the money would not be useful if you could not spend it. What about the stickers on the behavior chart? They also are secondary reinforcers.

Sometimes, instead of stickers on a sticker chart, a token is used. Tokens, which are also secondary reinforcers, can then be traded in for rewards and prizes. Entire behavior management systems, known as token economies, are built around the use of these kinds of token reinforcers. Token economies have been found to be very effective at modifying behavior in a variety of settings such as schools, prisons, and mental hospitals.

For example, a study by Cangi and Daly (2013) found that the use of a token economy increased appropriate social behaviors and reduced inappropriate behaviors in a group of autistic schoolchildren. Autistic children tend to exhibit disruptive behaviors such as pinching and hitting. When the children in the study exhibited appropriate behavior (not hitting or pinching), they received a “quiet hands” token. When they hit or pinched, they lost a token. The children could then exchange specified amounts of tokens for minutes of playtime.

Behavior Modification in Children

Parents and teachers often use behavior modification to change a child’s behavior. Behavior modification uses the principles of operant conditioning to accomplish behavior change so that undesirable behaviors are switched for more socially acceptable ones. Some teachers and parents create a sticker chart, in which several behaviors are listed. Sticker charts are a form of token economies, as described in the text. Each time children perform the behavior, they get a sticker, and after a certain number of stickers, they get a prize, or reinforcer. The goal is to increase acceptable behaviors and decrease misbehavior. Remember, it is best to reinforce desired behaviors, rather than to use punishment. In the classroom, the teacher can reinforce a wide range of behaviors, from students raising their hands, to walking quietly in the hall, to turning in their homework. At home, parents might create a behavior chart that rewards children for things such as putting away toys, brushing their teeth, and helping with dinner. In order for behavior modification to be effective, the reinforcement needs to be connected with the behavior; the reinforcement must matter to the child and be done consistently.



Sticker charts are a form of positive reinforcement and a tool for behavior modification. Once this little girl earns a certain number of stickers for demonstrating a desired behavior, she will be rewarded with a trip to the ice cream parlor. (credit: Abigail Batchelder)

Time-out is another popular technique used in behavior modification with children. It operates on the principle of negative punishment. When a child demonstrates an undesirable behavior, she is removed from the desirable activity at hand. For example, say that Sophia and her brother Mario are playing with building blocks. Sophia throws some blocks at her brother, so you give her a warning that she will go to time-out if she does it again. A few minutes later, she throws more blocks at Mario. You remove Sophia from the room for a few minutes. When she comes back, she doesn't throw blocks.

There are several important points that you should know if you plan to implement time-out as a behavior modification technique. First, make sure the child is being removed from a desirable activity and placed in a less desirable location. If the activity is something undesirable for the child, this technique will backfire because it is more enjoyable for the child to be removed from the activity. Second, the length of the time-out is important. The general rule of thumb is one minute for each year of the child's age. Sophia is five; therefore, she sits in a time-out for five minutes. Setting a timer helps children know how long they have to sit in time-out. Finally, as a caregiver, keep several guidelines in mind over the course of a time-out: remain calm when directing your child to time-out; ignore your child during time-out (because caregiver attention may reinforce misbehavior); and give the child a hug or a kind word when time-out is over.



(a)



(b)

Time-out is a popular form of negative punishment used by caregivers. When a child misbehaves, he or she is removed from a desirable activity in an effort to decrease the unwanted behavior. For example, (a) a child might be playing on the playground with friends and push another child; (b) the child who misbehaved would then be removed from the activity for a short period of time. (credit a: modification of work by Simone Ramella; credit b: modification of work by "JefferyTurner"/Flickr)

Reinforcement Schedules

Remember, the best way to teach a person or animal a behavior is to use positive reinforcement. For example, Skinner used positive reinforcement to teach rats to press a lever in a Skinner box. At first, the rat might randomly hit the lever while exploring the box, and out would come a pellet of food. After eating the pellet, what do you think the hungry rat did next? It hit the lever again, and received another pellet of food. Each time

the rat hit the lever, a pellet of food came out. When an organism receives a reinforcer each time it displays a behavior, it is called continuous reinforcement. This reinforcement schedule is the quickest way to teach someone a behavior, and it is especially effective in training a new behavior. Let's look back at the dog that was learning to sit earlier in the chapter. Now, each time he sits, you give him a treat. Timing is important here: you will be most successful if you present the reinforcer immediately after he sits, so that he can make an association between the target behavior (sitting) and the consequence (getting a treat).

Watch this video clip where veterinarian Dr. Sophia Yin shapes a dog's behavior using the steps outlined above: [Free Shaping with an Australian CattleDog | drsophiayin.com](https://www.youtube.com/watch?v=696#oembed-2).



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Once a behavior is trained, researchers and trainers often turn to another type of reinforcement schedule—partial reinforcement. In partial reinforcement, also referred to as intermittent reinforcement, the person or animal does not get reinforced every time they perform the desired behavior. There are several different types of partial reinforcement schedules. These schedules are described as either fixed or variable, and as either interval or ratio. *Fixed* refers to the number of responses between reinforcements, or the amount of time between reinforcements, which is set and unchanging. *Variable* refers to the number of responses or amount of time between reinforcements, which varies or changes. *Interval* means the schedule is based on the time between reinforcements, and *ratio* means the schedule is based on the number of responses between reinforcements.

Reinforcement Schedules

Reinforcement Schedule	Description	Result	Example
Fixed interval	Reinforcement is delivered at predictable time intervals (e.g., after 5, 10, 15, and 20 minutes).	Moderate response rate with significant pauses after reinforcement	Hospital patient uses patient-controlled, doctor-timed pain relief
Variable interval	Reinforcement is delivered at unpredictable time intervals (e.g., after 5, 7, 10, and 20 minutes).	Moderate yet steady response rate	Checking Facebook
Fixed ratio	Reinforcement is delivered after a predictable number of responses (e.g., after 2, 4, 6, and 8 responses).	High response rate with pauses after reinforcement	Piecework—factory worker getting paid for every x number of items manufactured
Variable ratio	Reinforcement is delivered after an unpredictable number of responses (e.g., after 1, 4, 5, and 9 responses).	High and steady response rate	Gambling

Now let's combine these four terms. A fixed interval reinforcement schedule is when behavior is rewarded after a set amount of time. For example, June undergoes major surgery in a hospital. During recovery, she is expected to experience pain and will require prescription medications for pain relief. June is given an IV drip with a patient-controlled painkiller. Her doctor sets a limit: one dose per hour. June pushes a button when pain becomes difficult, and she receives a dose of medication. Since the reward (pain relief) only occurs on a fixed interval, there is no point in exhibiting the behavior when it will not be rewarded.

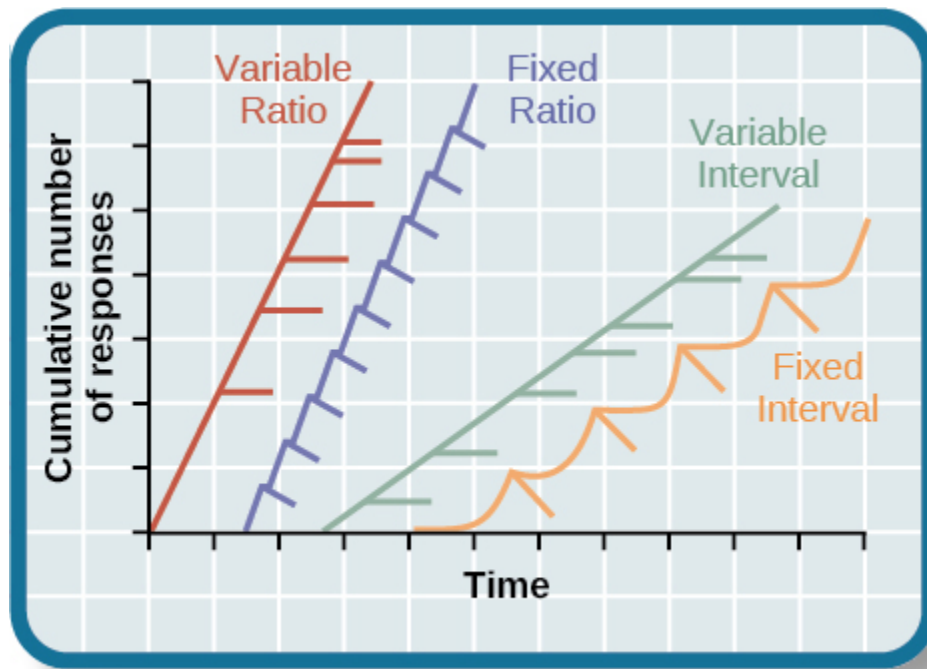
With a variable interval reinforcement schedule, the person or animal gets the reinforcement based on varying amounts of time, which are unpredictable. Say that Manuel is the manager at a fast-food restaurant. Every once in a while someone from the quality control division comes to Manuel's restaurant. If the restaurant is clean and the service is fast, everyone on that shift earns a \$20 bonus. Manuel never knows when the quality control person will show up, so he always tries to keep the restaurant clean and ensures that his employees provide prompt and courteous service. His productivity regarding prompt service and keeping a clean restaurant is steady because he wants his crew to earn the bonus.

With a fixed ratio reinforcement schedule, there are a set number of responses that must occur before the behavior is rewarded. Carla sells glasses at an eyeglass store, and she earns a commission every time she sells a pair of glasses. She always tries to sell people more pairs of glasses, including prescription sunglasses or a backup pair, so she can increase her commission. She does not care if the person really needs the prescription sunglasses, Carla just wants her bonus. The quality of what Carla sells does not matter because her commission is not based on quality; it's only based on the number of pairs sold. This distinction in the quality of performance can help determine which reinforcement method is most appropriate for a particular situation. Fixed ratios are better suited to optimize the quantity of output, whereas a fixed interval, in which the reward is not quantity-based, can lead to a higher quality of output.

In a variable ratio reinforcement schedule, the number of responses needed for a reward varies. This is

the most powerful partial reinforcement schedule. An example of the variable ratio reinforcement schedule is gambling. Imagine that Sarah—generally a smart, thrifty woman—visits Las Vegas for the first time. She is not a gambler, but out of curiosity she puts a quarter into the slot machine, and then another, and another. Nothing happens. Two dollars in quarters later, her curiosity is fading, and she is just about to quit. But then, the machine lights up, bells go off, and Sarah gets 50 quarters back. That’s more like it! Sarah gets back to inserting quarters with renewed interest, and a few minutes later she has used up all her gains and is \$10 in the hole. Now might be a sensible time to quit. And yet, she keeps putting money into the slot machine because she never knows when the next reinforcement is coming. She keeps thinking that with the next quarter she could win \$50, or \$100, or even more. Because the reinforcement schedule in most types of gambling has a variable ratio schedule, people keep trying and hoping that the next time they will win big. This is one of the reasons that gambling is so addictive—and so resistant to extinction.

In operant conditioning, the extinction of a reinforced behavior occurs at some point after reinforcement stops, and the speed at which this happens depends on the reinforcement schedule. In a variable ratio schedule, the point of extinction comes very slowly, as described above. But in the other reinforcement schedules, extinction may come quickly. For example, if June presses the button for the pain relief medication before the allotted time her doctor has approved, no medication is administered. She is on a fixed interval reinforcement schedule (dosed hourly), so extinction occurs quickly when reinforcement doesn’t come at the expected time. Among the reinforcement schedules, variable ratio is the most productive and the most resistant to extinction. Fixed interval is the least productive and the easiest to extinguish.



The four reinforcement schedules yield different response patterns. The variable ratio schedule is unpredictable and yields high and steady response rates, with little if any pause after reinforcement (e.g., gambler). A fixed ratio schedule is predictable and produces a high response rate, with a short pause after reinforcement (e.g., eyeglass saleswoman). The variable interval schedule is unpredictable and produces a moderate, steady response rate (e.g., restaurant manager). The fixed interval schedule yields a scallop-shaped response pattern, reflecting a significant pause after reinforcement (e.g., surgery patient).

Test Your Understanding



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Review Questions



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Critical Thinking Questions

What is a Skinner box and what is its purpose?

A Skinner box is an operant conditioning chamber used to train animals such as rats and pigeons to perform certain behaviors, like pressing a lever. When the animals perform the desired behavior, they receive a reward: food or water.

What is the difference between negative reinforcement and punishment?

In negative reinforcement you are taking away an undesirable stimulus in order to increase the frequency of a certain behavior (e.g., buckling your seat belt stops the annoying beeping sound in your car and increases the likelihood that you will wear your seatbelt). Punishment is designed to reduce a behavior (e.g., you scold your child for running into the street in order to decrease the unsafe behavior.)

What is shaping and how would you use shaping to teach a dog to roll over?

Shaping is an operant conditioning method in which you reward closer and closer approximations of the desired behavior. If you want to teach your dog to roll over, you might reward him first when he sits, then when he lies down, and then when he lies down and rolls onto his back. Finally, you would reward him only when he completes the entire sequence: lying down, rolling onto his back, and then continuing to roll over to his other side.

Personal Application Questions

Explain the difference between negative reinforcement and punishment and provide several examples of each based on your own experiences.

Think of a behavior that you have that you would like to change. How could you use behavior modification, specifically positive reinforcement, to change your behavior? What is your positive reinforcer?

Summary

Operant conditioning is based on the work of B. F. Skinner. Operant conditioning is a form of learning in which the motivation for a behavior happens *after* the behavior is demonstrated. An animal or a human receives a consequence after performing a specific behavior. The consequence is either a reinforcer or a punisher. All reinforcement (positive or negative) *increases* the likelihood of a behavioral response. All punishment (positive or negative) *decreases* the likelihood of a behavioral response. Several types of reinforcement schedules are used to reward behavior depending on either a set or variable period of time.

35.

OBSERVATIONAL LEARNING (MODELING)

Learning Objectives

By the end of this section, you will be able to:

- Define observational learning
- Discuss the steps in the modeling process
- Explain the prosocial and antisocial effects of observational learning

Previous sections of this chapter focused on classical and operant conditioning, which are forms of associative learning. In observational learning, we learn by watching others and then imitating, or modeling, what they do or say. The individuals performing the imitated behavior are called models. Research suggests that this imitative learning involves a specific type of neuron, called a mirror neuron (Hickock, 2010; Rizzolatti, Fadiga, Fogassi, & Gallese, 2002; Rizzolatti, Fogassi, & Gallese, 2006).

Humans and other animals are capable of observational learning. As you will see, the phrase “monkey see, monkey do” really is accurate. The same could be said about other animals. For example, in a study of social learning in chimpanzees, researchers gave juice boxes with straws to two groups of captive chimpanzees. The first group dipped the straw into the juice box, and then sucked on the small amount of juice at the end of the straw. The second group sucked through the straw directly, getting much more juice. When the first group, the “dippers,” observed the second group, “the suckers,” what do you think happened? All of the “dippers” in the first group switched to sucking through the straws directly. By simply observing the other chimps and modeling their behavior, they learned that this was a more efficient method of getting juice (Yamamoto, Humle, and Tanaka, 2013).



This spider monkey learned to drink water from a plastic bottle by seeing the behavior modeled by a human. (credit: U.S. Air Force, Senior Airman Kasey Close)

Imitation is much more obvious in humans, but is imitation really the sincerest form of flattery? Consider Claire's experience with observational learning. Claire's nine-year-old son, Jay, was getting into trouble at school and was defiant at home. Claire feared that Jay would end up like her brothers, two of whom were in prison. One day, after yet another bad day at school and another negative note from the teacher, Claire, at her wit's end, beat her son with a belt to get him to behave. Later that night, as she put her children to bed, Claire witnessed her four-year-old daughter, Anna, take a belt to her teddy bear and whip it. Claire was horrified, realizing that Anna was imitating her mother. It was then that Claire knew she wanted to discipline her children in a different manner.

Like Tolman, whose experiments with rats suggested a cognitive component to learning, psychologist Albert Bandura's ideas about learning were different from those of strict behaviorists. Bandura and other researchers proposed a brand of behaviorism called social learning theory, which took cognitive processes into account. According to Bandura, pure behaviorism could not explain why learning can take place in the absence of external reinforcement. He felt that internal mental states must also have a role in learning and that observational learning involves much more than imitation. In imitation, a person simply copies what the model does. Observational learning is much more complex. According to Lefrançois (2012) there are several ways that observational learning can occur:

- You learn a new response. After watching your coworker get chewed out by your boss for coming in late, you start leaving home 10 minutes earlier so that you won't be late.
- You choose whether or not to imitate the model depending on what you saw happen to the model. Remember Julian and his father? When learning to surf, Julian might watch how his father pops up successfully on his surfboard and then attempt to do the same thing. On the other hand, Julian might

learn not to touch a hot stove after watching his father get burned on a stove.

- You learn a general rule that you can apply to other situations.

Bandura identified three kinds of models: live, verbal, and symbolic. A live model demonstrates a behavior in person, as when Ben stood up on his surfboard so that Julian could see how he did it. A verbal instructional model does not perform the behavior, but instead explains or describes the behavior, as when a soccer coach tells his young players to kick the ball with the side of the foot, not with the toe. A symbolic model can be fictional characters or real people who demonstrate behaviors in books, movies, television shows, video games, or Internet sources.



(a)



(b)

(a) Yoga students learn by observation as their yoga instructor demonstrates the correct stance and movement for her students (live model). (b) Models don't have to be present for learning to occur: through symbolic modeling, this child can learn a behavior by watching someone demonstrate it on television. (credit a: modification of work by Tony Cecala; credit b: modification of work by Andrew Hyde)

Latent learning and modeling are used all the time in the world of marketing and advertising.

[This commercial](#) played for months across the New York, New Jersey, and Connecticut areas.

Derek Jeter, an award-winning baseball player for the New York Yankees, is advertising a Ford:

[Full Derek Jeter Ford commercial](#). The commercial aired in a part of the country where Jeter is an incredibly well-known athlete. He is wealthy and considered very loyal and good-looking. What

message are the advertisers sending by having him featured in the ad? How effective do you think it is?



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Test Your Understanding



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Steps in the Modeling Process

Of course, we don't learn a behavior simply by observing a model. Bandura described specific steps in the process of modeling that must be followed if learning is to be successful: attention, retention, reproduction, and motivation. First, you must be focused on what the model is doing—you have to pay attention. Next, you must be able to retain, or remember, what you observed; this is retention. Then, you must be able to perform the behavior that you observed and committed to memory; this is reproduction. Finally, you must have motivation. You need to want to copy the behavior, and whether or not you are motivated depends on what happened to the model. If you saw that the model was reinforced for her behavior, you will be more motivated to copy her. This is known as vicarious reinforcement. On the other hand, if you observed the model being punished, you would be less motivated to copy her. This is called vicarious punishment. For example,

imagine that four-year-old Allison watched her older sister Kaitlyn playing in their mother's makeup, and then saw Kaitlyn get a time-out when their mother came in. After their mother left the room, Allison was tempted to play in the make-up, but she did not want to get a time-out from her mother. What do you think she did? Once you actually demonstrate the new behavior, the reinforcement you receive plays a part in whether or not you will repeat the behavior.

Bandura researched modeling behavior, particularly children's modeling of adults' aggressive and violent behaviors (Bandura, Ross, & Ross, 1961). He conducted an experiment with a five-foot inflatable doll that he called a Bobo doll. In the experiment, children's aggressive behavior was influenced by whether the teacher was punished for her behavior. In one scenario, a teacher acted aggressively with the doll, hitting, throwing, and even punching the doll, while a child watched. There were two types of responses by the children to the teacher's behavior. When the teacher was punished for her bad behavior, the children decreased their tendency to act as she had. When the teacher was praised or ignored (and not punished for her behavior), the children imitated what she did, and even what she said. They punched, kicked, and yelled at the doll.

Watch this video clip to see a portion of the famous Bobo doll experiment, including an interview with Albert Bandura: [Albert Bandura Bobo Doll experiment.mp4](#).



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What are the implications of this study? Bandura concluded that we watch and learn, and that this learning can have both prosocial and antisocial effects. Prosocial (positive) models can be used to encourage socially acceptable behavior. Parents in particular should take note of this finding. If you want your children to read, then read to them. Let them see you reading. Keep books in your home. Talk about your favorite books. If you want your children to be healthy, then let them see you eat right and exercise, and spend time engaging in physical fitness activities together. The same holds true for qualities like kindness, courtesy, and honesty. The main idea is that children observe and learn from their parents, even their parents' morals, so be consistent and toss out the old adage "Do as I say, not as I do," because children tend to copy what you do instead of what you say. Besides parents, many public figures, such as Martin Luther King, Jr. and Mahatma Gandhi, are viewed as prosocial models who are able to inspire global social change. Can you think of someone who has been a prosocial model in your life?

The antisocial effects of observational learning are also worth mentioning. As you saw from the example of

Claire at the beginning of this section, her daughter viewed Claire's aggressive behavior and copied it. Research suggests that this may help to explain why abused children often grow up to be abusers themselves (Murrell, Christoff, & Henning, 2007). In fact, about 30% of abused children become abusive parents (U.S. Department of Health & Human Services, 2013). We tend to do what we know. Abused children, who grow up witnessing their parents deal with anger and frustration through violent and aggressive acts, often learn to behave in that manner themselves. Sadly, it's a vicious cycle that's difficult to break.

Some studies suggest that violent television shows, movies, and video games may also have antisocial effects, although further research needs to be done to understand the correlational and causal aspects of media violence and behavior. Some studies have found a link between viewing violence and aggression seen in children (Anderson & Gentile, 2008; Kirsch, 2010; Miller, Grabell, Thomas, Bermann, & Graham-Bermann, 2012). These findings may not be surprising, given that a child graduating from high school has been exposed to around 200,000 violent acts, including murder, robbery, torture, bombings, beatings, and rape through various forms of media (Huston et al., 1992). Not only might viewing media violence affect aggressive behavior by teaching people to act that way in real-life situations, but it has also been suggested that repeated exposure to violent acts also desensitizes people to it. Psychologists are working to understand this dynamic.



Can video games make us violent? Psychological researchers study this topic. (credit: "woodleywonderworks"/Flickr)

View this [video](#) to hear Brad Bushman, a psychologist who has published extensively on human aggression and violence, discuss his research: [Can Violent Video Games Play a Role in Violent Behavior?](#)

Review Questions



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://louis.pressbooks.pub/intropsychology/?p=698#h5p-183>

Critical Thinking Questions

What is the effect of prosocial modeling and antisocial modeling?

Prosocial modeling can prompt others to engage in helpful and healthy behaviors, while antisocial modeling can prompt others to engage in violent, aggressive, and unhealthy behaviors.

Cara is 17 years old. Cara's mother and father both drink alcohol every night. They tell Cara that drinking is bad and she shouldn't do it. Cara goes to a party where beer is being served. What do you think Cara will do? Why?

Cara is more likely to drink at the party because she has observed her parents drinking regularly. Children tend to follow what a parent does rather than what they say.

Personal Application Question

What is something you have learned how to do after watching someone else?

Summary

According to Bandura, learning can occur by watching others and then modeling what they do or say. This is known as observational learning. There are specific steps in the process of modeling that must be followed if learning is to be successful. These steps include attention, retention, reproduction, and motivation. Through modeling, Bandura has shown that children learn many things both good and bad simply by watching their parents, siblings, and others.

36.

USING THE PRINCIPLES OF LEARNING TO UNDERSTAND EVERYDAY BEHAVIOR

Learning Objectives

- Review the ways that learning theories can be applied to understanding and modifying everyday behavior.
- Describe the situations under which reinforcement may make people *less* likely to enjoy engaging in a behavior.
- Explain how principles of reinforcement are used to understand social dilemmas such as the prisoner's dilemma and why people are likely to make competitive choices in them.

The principles of learning are some of the most general and most powerful in all of psychology. It would be fair to say that these principles account for more behavior using fewer principles than any other set of psychological theories. The principles of learning are applied in numerous ways in everyday settings. For example, operant conditioning has been used to motivate employees, to improve athletic performance, to increase the functioning of those suffering from developmental disabilities, and to help parents successfully toilet train their children (Simek & O'Brien, 1981; Pedalino & Gamboa, 1974; Azrin & Foxx, 1974; McGlynn, 1990). In this section we will consider how learning theories are used in advertising, in education, and in understanding competitive relationships between individuals and groups.

USING CLASSICAL CONDITIONING IN

ADVERTISING

Classical conditioning has long been, and continues to be, an effective tool in marketing and advertising (Hawkins, Best, & Coney, 1998). The general idea is to create an advertisement that has positive features such that the ad creates enjoyment in the person exposed to it. The enjoyable ad serves as the unconditioned stimulus (US), and the enjoyment is the unconditioned response (UR). Because the product being advertised is mentioned in the ad, it becomes associated with the US, and then becomes the conditioned stimulus (CS). In the end, if everything has gone well, seeing the product online or in the store will then create a positive response in the buyer, leading him or her to be more likely to purchase the product.

A similar strategy is used by corporations that sponsor teams or events. For instance, if people enjoy watching a college basketball team play basketball, and if that team is sponsored by a product, such as Pepsi, then people may end up experiencing positive feelings when they view a can of Pepsi. Of course, the sponsor wants to sponsor only good teams and good athletes because these create more pleasurable responses.

Advertisers use a variety of techniques to create positive advertisements, including enjoyable music, cute babies, attractive models, and funny spokespeople. In one study, Gorn (1982) showed research participants pictures of different writing pens of different colors, but paired one of the pens with pleasant music and the other with unpleasant music. When given a choice as a free gift, more people chose the pen color associated with the pleasant music. And Schemer, Matthes, Wirth, and Textor (2008) found that people were more interested in products that had been embedded in music videos of artists that they liked and less likely to be interested when the products were in videos featuring artists that they did not like.

Another type of ad that is based on principles of classical conditioning is one that associates fear with the use of a product or behavior, such as those that show pictures of deadly automobile accidents to encourage seatbelt use or images of lung cancer surgery to discourage smoking. These ads have also been found to be effective (Das, de Wit, & Stroebe, 2003; Perloff, 2003; Witte & Allen, 2000), due in large part to conditioning. When we see a cigarette and the fear of dying has been associated with it, we are hopefully less likely to light up.

Taken together then, there is ample evidence of the utility of classical conditioning, using both positive as well as negative stimuli, in advertising. This does not, however, mean that we are always influenced by these ads. The likelihood of conditioning being successful is greater for products that we do not know much about, where the differences between products are relatively minor, and when we do not think too carefully about the choices (Schemer et al., 2008).

PSYCHOLOGY IN EVERYDAY LIFE: OPERANT CONDITIONING IN THE CLASSROOM

John B. Watson and B. F. Skinner believed that all learning was the result of reinforcement, and thus that reinforcement could be used to educate children. For instance, Watson wrote in his book on behaviorism,

Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors. I am going beyond my facts and I admit it, but so have the advocates of the contrary and they have been doing it for many thousands of years (Watson, 1930, p. 82).

Skinner promoted the use of *programmed instruction*, an educational tool that consists of self-teaching with the aid of a specialized textbook or teaching machine that presents material in a logical sequence (Skinner, 1965). Programmed instruction allows students to progress through a unit of study at their own rate, checking their own answers and advancing only after answering correctly. Programmed instruction is used today in many classes, for instance to teach computer programming (Emurian, 2009).

Although reinforcement can be effective in education, and teachers make use of it by awarding gold stars, good grades, and praise, there are also substantial limitations to using rewards to improve learning. To be most effective, rewards must be contingent on appropriate behavior. In some cases teachers may distribute rewards indiscriminately, for instance by giving praise or good grades to children whose work does not warrant it, in the hope that they will “feel good about themselves” and that this self-esteem will lead to better performance. Studies indicate, however, that high self-esteem alone does not improve academic performance (Baumeister, Campbell, Krueger, & Vohs, 2003). When rewards are not earned, they become meaningless and no longer provide motivation for improvement.

Another potential limitation of rewards is that they may teach children that the activity should be performed for the reward, rather than for one's own interest in the task. If rewards are offered too often, the task itself becomes less appealing. Mark Lepper and his colleagues (Lepper, Greene, & Nisbett, 1973) studied this possibility by leading some children to think that they engaged in an activity for a reward, rather than because they simply enjoyed it. First, they placed some fun felt-tipped markers in the classroom of the children they were studying. The children loved the markers and played with them right away. Then, the markers were taken out of the classroom, and the children were given a chance to play with the markers individually at an experimental session with the researcher. At the research session, the children were randomly assigned to one of three experimental groups. One group of children (the *expected reward* condition) was told that if they

played with the markers they would receive a good drawing award. A second group (the *unexpected reward* condition) also played with the markers, and also got the award—but they were not told ahead of time that they would be receiving the award; it came as a surprise after the session. The third group (the *no reward* group) played with the markers too, but got no award.

Then, the researchers placed the markers back in the classroom and observed how much the children in each of the three groups played with them. As you can see in the figure “Undermining Intrinsic Interest,” the children who had been led to expect a reward for playing with the markers during the experimental session played with the markers less at the second session than they had at the first session. The idea is that, when the children had to choose whether or not to play with the markers when the markers reappeared in the classroom, they based their decision on their own prior behavior. The children in the no reward groups and the children in the unexpected reward groups realized that they played with the markers because they liked them. Children in the expected award condition, however, remembered that they were promised a reward for the activity the last time they played with the markers. These children, then, were more likely to draw the inference that they play with the markers only for the external reward, and because they did not expect to get an award for playing with the markers in the classroom, they determined that they didn’t like them. Expecting to receive the award at the session had undermined their initial interest in the markers.

Undermining Intrinsic Interest



Mark Lepper and his colleagues (1973) found that giving rewards for playing with markers, which the children naturally enjoyed, could reduce their interest in the activity.

Adapted from Lepper, M. R., Greene, D., & Nisbett, R. E. (1973). Undermining children's intrinsic interest with extrinsic reward: A test of the "overjustification" hypothesis. *Journal of Personality & Social Psychology*, 28(1), 129–137.

This research suggests that, although giving rewards may in many cases lead us to perform an

activity more frequently or with more effort, reward may not always increase our liking for the activity. In some cases reward may actually make us like an activity less than we did before we were rewarded for it. This outcome is particularly likely when the reward is perceived as an obvious attempt on the part of others to get us to do something. When children are given money by their parents to get good grades in school, they may improve their school performance to gain the reward. But at the same time their liking for school may decrease. On the other hand, rewards that are seen as more internal to the activity, such as rewards that praise us, remind us of our achievements in the domain, and make us feel good about ourselves as a result of our accomplishments are more likely to be effective in increasing not only the performance of, but also the liking of, the activity (Hulleman, Durik, Schweigert, & Harackiewicz, 2008; Ryan & Deci, 2002).

Other research findings also support the general principle that punishment is generally less effective than reinforcement in changing behavior. In a recent meta-analysis, Gershoff (2002) found that although children who were spanked by their parents were more likely to immediately comply with the parents' demands, they were also more aggressive, showed less ability to control aggression, and had poorer mental health in the long term than children who were not spanked. The problem seems to be that children who are punished for bad behavior are likely to change their behavior only to avoid the punishment, rather than by internalizing the norms of being good for its own sake. Punishment also tends to generate anger, defiance, and a desire for revenge. Moreover, punishment models the use of aggression and ruptures the important relationship between the teacher and the learner (Kohn, 1993).

REINFORCEMENT IN SOCIAL DILEMMAS

The basic principles of reinforcement, reward, and punishment have been used to help understand a variety of human behaviors (Rotter, 1945; Bandura, 1977; Miller & Dollard, 1941). The general idea is that, as predicted by principles of operant learning and the law of effect, people act in ways that maximize their *outcomes*, where outcomes are defined as the presence of reinforcers and the absence of punishers.

Consider, for example, a situation known as the *commons dilemma*, as proposed by the ecologist Garrett Hardin (1968). Hardin noted that in many European towns there was at one time a centrally located pasture, known as the commons, which was shared by the inhabitants of the village to graze their livestock. But the commons was not always used wisely. The problem was that each individual who owned livestock wanted

to be able to use the commons to graze his or her own animals. However, when each group member took advantage of the commons by grazing many animals, the commons became overgrazed, the pasture died, and the commons was destroyed.

Although Hardin focused on the particular example of the commons, the basic dilemma of individual desires versus the benefit of the group as a whole can also be found in many contemporary public goods issues, including the use of limited natural resources, air pollution, and public land. In large cities most people may prefer the convenience of driving their own car to work each day rather than taking public transportation. Yet this behavior uses up public goods (the space on limited roadways, crude oil reserves, and clean air). People are lured into the dilemma by short-term rewards, seemingly without considering the potential long-term costs of the behavior, such as air pollution and the necessity of building even more highways.

A social dilemma such as the commons dilemma is *a situation in which the behavior that creates the most positive outcomes for the individual may in the long term lead to negative consequences for the group as a whole*. The dilemmas are arranged in a way that it is easy to be selfish, because the personally beneficial choice (such as using water during a water shortage or driving to work alone in one's own car) produces reinforcements for the individual. Furthermore, social dilemmas tend to work on a type of "time delay." The problem is that, because the long-term negative outcome (the extinction of fish species or dramatic changes in the earth's climate) is far away in the future and the individual benefits are occurring right now, it is difficult for an individual to see how many costs there really are. The paradox, of course, is that if everyone makes the personally selfish choice in an attempt to maximize his or her own outcomes, the long-term result is poorer outcomes for every individual in the group. Each individual prefers to make use of the public goods for himself or herself, whereas the best outcome for the group as a whole is to use the resources more slowly and wisely.

One method of understanding how individuals and groups behave in social dilemmas is to create such situations in the laboratory and observe how people react to them. The best known of these laboratory simulations is called the prisoner's dilemma game (Poundstone, 1992). This game *represents a social dilemma in which the goals of the individual compete with the goals of another individual (or sometimes with a group of other individuals)*. Like all social dilemmas, the prisoner's dilemma assumes that individuals will generally try to maximize their own outcomes in their interactions with others.

In the prisoner's dilemma game, the participants are shown a *payoff matrix* in which numbers are used to express the potential outcomes for each of the players in the game, given the decisions each player makes. The payoffs are chosen beforehand by the experimenter to create a situation that models some real-world outcome. Furthermore, in the prisoner's dilemma game, the payoffs are normally arranged as they would be in a typical social dilemma, such that each individual is better off acting in his or her immediate self-interest, and yet if all individuals act according to their self-interests, then everyone will be worse off.

In its original form, the prisoner's dilemma game involves a situation in which two prisoners (we'll call them Frank and Malik) have been accused of committing a crime. The police believe that the two worked together on the crime, but they have only been able to gather enough evidence to convict each of them of a more minor offense. In an attempt to gain more evidence, and thus to be able to convict the prisoners of the larger crime,

each of the prisoners is interrogated individually, with the hope that he will confess to having been involved in the more major crime, in return for a promise of a reduced sentence if he confesses first. Each prisoner can make either the *cooperative choice* (which is to not confess) or the *competitive choice* (which is to confess).

The incentives for either confessing or not confessing are expressed in a payoff matrix such as the one shown in the figure “The Prisoner’s Dilemma.” The top of the matrix represents the two choices that Malik might make (to either confess that he did the crime or not confess), and the side of the matrix represents the two choices that Frank might make (also to either confess or not confess). The payoffs that each prisoner receives, given the choices of each of the two prisoners, are shown in each of the four squares.

The Prisoner’s Dilemma

		Malik	
		Don’t confess	Confess
Frank	Don’t confess	3 3	0 30
	Confess	30 0	10 10
		Sentence in years	

In the prisoner’s dilemma game, two suspected criminals are interrogated separately. The matrix indicates the outcomes for each prisoner, measured as the number of years each is sentenced to prison, as a result of each combination of cooperative (don’t confess) and competitive (confess) decisions. Outcomes for Malik are in black and outcomes for Frank are in gray.

If both prisoners make the cooperative choice by not confessing (the situation represented in the upper left square of the matrix), there will be a trial, the limited available information will be used to convict each

prisoner, and they each will be sentenced to a relatively short prison term of 3 years. However, if either of the prisoners confesses, turning “state’s evidence” against the other prisoner, then there will be enough information to convict the other prisoner of the larger crime, and that prisoner will receive a sentence of 30 years, whereas the prisoner who confesses will get off free. These outcomes are represented in the lower left and upper right squares of the matrix. Finally, it is possible that both players confess at the same time. In this case there is no need for a trial, and in return the prosecutors offer a somewhat reduced sentence (of 10 years) to each of the prisoners.

The prisoner’s dilemma has two interesting characteristics that make it a useful model of a social dilemma. For one, the prisoner’s dilemma is arranged such that a positive outcome for one player does not necessarily mean a negative outcome for the other player. If you consider again the matrix in the figure “The Prisoner’s Dilemma,” you can see that if one player makes the cooperative choice (to not confess) and the other takes the competitive choice (to confess), then the prisoner who cooperates loses, whereas the other prisoner wins. However, if both prisoners make the cooperative choice, each remaining quiet, then neither gains more than the other, and both prisoners receive a relatively light sentence. In this sense both players can win at the same time.

Second, the prisoner’s dilemma matrix is arranged such that each individual player is motivated to make the competitive choice, because this choice leads to a higher payoff regardless of what the other player does. Imagine for a moment that you are Malik, and you are trying to decide whether to cooperate (don’t confess) or to compete (confess). And imagine that you are not really sure what Frank is going to do. Remember the goal of the individual is to maximize outcomes. The values in the matrix make it clear that if you think that Frank is going to confess, you should confess yourself (to get 10 rather than 30 years in prison). And, it is also clear that if you think Frank is not going to confess, you should still confess (to get 0 rather than 3 years in prison). So the matrix is arranged such that the “best” alternative for each player, at least in the sense of pure reward and self-interest, is to make the competitive choice, even though in the end both players would prefer the combination in which both players cooperate to the one in which they both compete.

Although initially specified in terms of the two prisoners, similar payoff matrices can be used to predict behavior in many different types of dilemmas involving two or more parties and including choices of helping and not helping, working and loafing, and paying and not paying debts. For instance, we can use the prisoner’s dilemma to help us understand roommates living together in a house who might not want to contribute to the housework. Each of them would be better off if they relied on the other to clean the house. Yet if neither of them makes an effort to clean the house (the cooperative choice), the house becomes a mess and they will both be worse off.

Summary

Classical conditioning was first studied by physiologist Ivan Pavlov. In classical conditioning a person or animal learns to associate a neutral stimulus (the conditioned stimulus, or CS) with a stimulus (the unconditioned

stimulus, or US) that naturally produces a behavior (the unconditioned response, or UR). As a result of this association, the previously neutral stimulus comes to elicit the same or similar response (the conditioned response, or CR).

Classically conditioned responses show extinction if the CS is repeatedly presented without the US. The CR may reappear later in a process known as spontaneous recovery.

Organisms may show stimulus generalization, in which stimuli similar to the CS may produce similar behaviors, or stimulus discrimination, in which the organism learns to differentiate between the CS and other similar stimuli.

Second-order conditioning occurs when a second CS is conditioned to a previously established CS.

Psychologist Edward Thorndike developed the law of effect: the idea that responses that are reinforced are “stamped in” by experience and thus occur more frequently, whereas responses that are punishing are “stamped out” and subsequently occur less frequently.

B.F. Skinner (1904–1990) expanded on Thorndike’s ideas to develop a set of principles to explain operant conditioning.

Positive reinforcement strengthens a response by presenting something pleasant after the response, and negative reinforcement strengthens a response by reducing or removing something unpleasant. Positive punishment weakens a response by presenting something unpleasant after the response, whereas negative punishment weakens a response by reducing or removing something pleasant.

Shaping is the process of guiding an organism’s behavior to the desired outcome through the use of reinforcers.

Reinforcement may be either partial or continuous. Partial-reinforcement schedules are determined by whether the reward is presented on the basis of the time that elapses between rewards (interval) or on the basis of the number of responses that the organism engages in (ratio), and by whether the reinforcement occurs on a regular (fixed) or unpredictable (variable) schedule.

Not all learning can be explained through the principles of classical and operant conditioning. Insight is the sudden understanding of the components of a problem that makes the solution apparent, and latent learning refers to learning that is not reinforced and not demonstrated until there is motivation to do so.

Learning by observing the behavior of others and the consequences of those behaviors is known as observational learning. Aggression, altruism, and many other behaviors are learned through observation.

Learning theories can and have been applied to change behaviors in many areas of everyday life. Some advertising uses classical conditioning to associate a pleasant response with a product.

Rewards are frequently and effectively used in education but must be carefully designed to be contingent on performance and to avoid undermining interest in the activity.

Social dilemmas, such as the prisoner’s dilemma, can be understood in terms of a desire to maximize one’s outcomes in a competitive relationship.

37.

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PART VIII

THINKING AND INTELLIGENCE



Thinking is an important part of our human experience and one that has captivated people for centuries. Today, it is one area of psychological study. The 19th-century *Girl with a Book* by José Ferraz de Almeida Júnior, the 20th-century sculpture *The Thinker* by Auguste Rodin, and Shi Ke's 10th-century painting *Huike Thinking* all reflect the fascination with the process of human thought. (credit "middle": modification of work by Jason Rogers; credit "right": modification of work by Tang Zu-Ming)

Why is it so difficult to break habits—like reaching for your ringing phone even when you shouldn't, such as when you're driving? How does a person who has never seen or touched snow in real life develop an understanding of the concept of snow? How do young children acquire the ability to learn a language with no formal instruction? Psychologists who study thinking explore questions like these.

Cognitive psychologists also study intelligence. What is intelligence, and how does it vary from person to person? Are “street smarts” a kind of intelligence, and if so, how do they relate to other types of intelligence? What does an IQ test really measure? These questions and more will be explored in this chapter as you study thinking and intelligence.

In other chapters, we discussed the cognitive processes of perception, learning, and memory. In this chapter, we will focus on high-level cognitive processes. As a part of this discussion, we will consider thinking and briefly explore the development and use of language. We will also discuss problem-solving and creativity before ending with a discussion of how intelligence is measured and how our biology and environments interact to affect intelligence. After finishing this chapter, you will have a greater appreciation of the higher-level cognitive processes that contribute to our distinctiveness as a species.

38.

DEFINING AND MEASURING INTELLIGENCE

Learning Objectives

By the end of this section, you will be able to:

- Define the term intelligence
- Explain how intelligence tests are developed
- Describe the history of the use of IQ tests
- Describe the purposes and benefits of intelligence testing

The word “intelligence” continues to escape a true definition, which is agreed upon by all. Two researchers reviewed the literature in an attempt to generate one definition that could receive the approval of the largest number of academicians and scientists. The summation of the work led to a discovery of over seventy separate definitions, which they conceptualized into one defining statement: “*Intelligence measures an agent’s ability to achieve goals in a wide range of environments*” (Legg & Hutter, 2007).

While you’re likely familiar with the term “IQ” and associate it with the idea of intelligence, what does IQ really mean? IQ stands for “intelligence quotient” and describes a score earned on a test designed to measure intelligence. There are many ways psychologists describe intelligence (or more aptly, intelligences). Similarly, IQ tests—the tools designed to measure intelligence—have been the subject of debate throughout their development and use.

When might an IQ test be used? What do we learn from the results, and how might people use this information? IQ tests are expensive to administer and must be given by a licensed psychologist. Intelligence testing has been considered both a bane and a boon for education and social policy. In this section, we will explore what intelligence tests measure, how they are scored, and how they were developed.

Looking at it one way, everyone knows what it [intelligence] means, looking at it another way, no one does.

Robert J. Sternberg, 2000

Measuring Intelligence

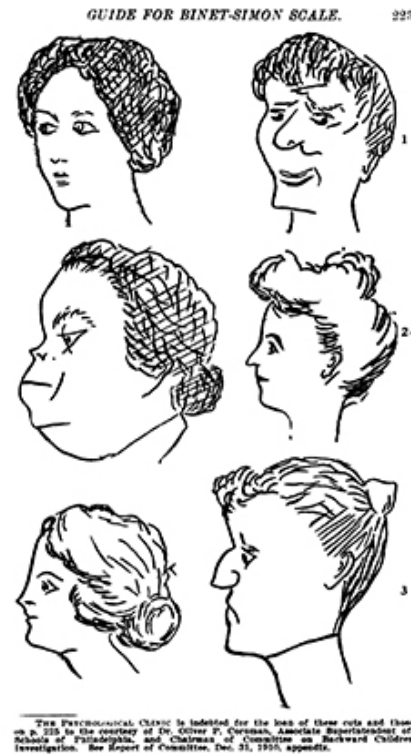
It seems that the human understanding of intelligence is somewhat limited when we focus on traditional or academic-type intelligence. How then, can intelligence be measured? And when we measure intelligence, how do we ensure that we capture what we're really trying to measure (in other words, that IQ tests function as valid measures of intelligence)? In the following paragraphs, we will explore how intelligence tests were developed and the history of their use.

The IQ test has been synonymous with intelligence for over a century. In the late 1800s, Sir Francis Galton developed the first broad test of intelligence (Flanagan & Kaufman, 2004). Although he was not a psychologist, his contributions to the concepts of intelligence testing are still felt today (Gordon, 1995). Reliable intelligence testing (reliability refers to a test's ability to produce consistent results) began in earnest during the early 1900s with a researcher named Alfred Binet. Binet was asked by the French government to develop an intelligence test to use on children to determine which ones might have difficulty in school; it included many verbally based tasks. American researchers soon realized the value of such testing. Louis Terman, a Stanford professor, modified Binet's work by standardizing the administration of the test and tested thousands of different-aged children to establish an average score for each age. As a result, the test was normed and standardized, which means that the test was administered consistently to a large enough representative sample of the population that the range of scores resulted in a bell curve (bell curves will be discussed later).

Standardization means that the manner of administration, scoring, and interpretation of results is consistent. Norming involves giving a test to a large population so data can be collected comparing groups, such as age groups. The resulting data provide norms, or referential scores, by which to interpret future scores. Norms are not expectations of what a given group *should* know but a demonstration of what that group *does* know. Norming and standardizing the test ensures that new scores are reliable. This new version of the test was called the Stanford-Binet Intelligence Scale (Terman, 1916). Remarkably, an updated version of this test is still widely used today.



(a)



(b)

French psychologist Alfred Binet helped to develop intelligence testing. (b) This page is from a 1908 version of the Binet-Simon Intelligence Scale. Children being tested were asked which face, of each pair, was prettier.

In 1939, David Wechsler, a psychologist who spent part of his career working with World War I veterans, developed a new IQ test in the United States. Wechsler combined several subtests from other intelligence tests used between 1880 and World War I. These subtests tapped into a variety of verbal and nonverbal skills because Wechsler believed that intelligence encompassed “the global capacity of a person to act purposefully, to think rationally, and to deal effectively with his environment” (Wechsler, 1958, p. 7). He named the test the Wechsler-Bellevue Intelligence Scale (Wechsler, 1981). This combination of subtests became one of the most extensively used intelligence tests in the history of psychology. Although its name was later changed to the Wechsler Adult Intelligence Scale (WAIS) and it has been revised several times, the aims of the test remain virtually unchanged since its inception (Boake, 2002). Today, there are three intelligence tests credited to Wechsler, the Wechsler Adult Intelligence Scale-fourth edition (WAIS-IV), the Wechsler Intelligence Scale for Children (WISC-V), and the Wechsler Preschool and Primary Scale of Intelligence—IV (WPPSI-IV) (Wechsler, 2012). These tests are used widely in schools and communities throughout the United States, and they are periodically normed and standardized as a means of recalibration. Interestingly, the periodic recalibrations have led to an interesting

observation known as the Flynn effect. Named after James Flynn, who was among the first to describe this trend, the Flynn effect refers to the observation that each generation has a significantly higher IQ than the last. Flynn himself argues, however, that increased IQ scores do not necessarily mean that younger generations are more intelligent per se (Flynn, Shaughnessy, & Fulgham, 2012). As a part of the recalibration process, the WISC-V was given to thousands of children across the country, and children taking the test today are compared with their same-age peers.

The WISC-V is composed of 14 subtests, which comprise five indices, which then render an IQ score. The five indices are Verbal Comprehension, Visual Spatial, Fluid Reasoning, Working Memory, and Processing Speed. When the test is complete, individuals receive a score for each of the five indices and a Full-Scale IQ score. The method of scoring reflects the understanding that intelligence is comprised of multiple abilities in several cognitive realms and focuses on the mental processes that the child used to arrive at his or her answers to each test item.

Ultimately, we are still left with the question of how valid intelligence tests are. Certainly, the most modern versions of these tests tap into more than verbal competencies, yet the specific skills that should be assessed in IQ testing, the degree to which any test can truly measure an individual's intelligence, and the use of the results of IQ tests are still issues of debate (Gresham & Witt, 1997; Flynn, Shaughnessy, & Fulgham, 2012; Richardson, 2002; Schlenger, 2003).

Intellectually Disabled Criminals and Capital Punishment

The case of *Atkins v. Virginia* was a landmark case in the United States Supreme Court. On August 16, 1996, two men, Daryl Atkins and William Jones, robbed, kidnapped, and then shot and killed Eric Nesbitt, a local airman from the U.S. Air Force. A clinical psychologist evaluated Atkins and testified at the trial that Atkins had an IQ of 59. Atkins' IQ score was over two standard deviations (SD) below the mean, which is 100. Each standard deviation in intelligence measurement is 15 points. The psychologist concluded that Atkins was mildly intellectually disabled.

The jury found Atkins guilty, and he was sentenced to death. Atkins and his attorneys appealed to the Supreme Court. In June 2002, the Supreme Court reversed a previous decision and ruled that executions of intellectually disabled criminals are "cruel and unusual punishments" prohibited by the Eighth Amendment. The court wrote in its decision:

Clinical definitions of mental retardation require not only subaverage intellectual functioning, but also significant limitations in adaptive skills. Mentally retarded persons frequently know the difference between right and wrong and are competent to stand trial. Because of their impairments, however, by definition they have diminished

capacities to understand and process information, to communicate, to abstract from mistakes and learn from experience, to engage in logical reasoning, to control impulses, and to understand others' reactions. Their deficiencies do not warrant an exemption from criminal sanctions, but diminish their personal culpability (*Atkins v. Virginia*, 2002, par. 5).

The court also decided that there was a state legislature consensus against the execution of the intellectually disabled and that this consensus should stand for all of the states. The Supreme Court ruling left it up to the states to determine their own definitions of mental retardation and intellectual disability. The definitions vary among states as to who can be executed. In the *Atkins* case, a jury decided that because he had many contacts with his lawyers and thus was provided with intellectual stimulation, his IQ had reportedly increased, and he was now smart enough to be executed. He was given an execution date and then received a stay of execution after it was revealed that lawyers for the co-defendant, William Jones, coached Jones to “produce a testimony against Mr. Atkins that did match the evidence” (Liptak, 2008). After the revelation of this misconduct, Atkins was re-sentenced to life imprisonment.

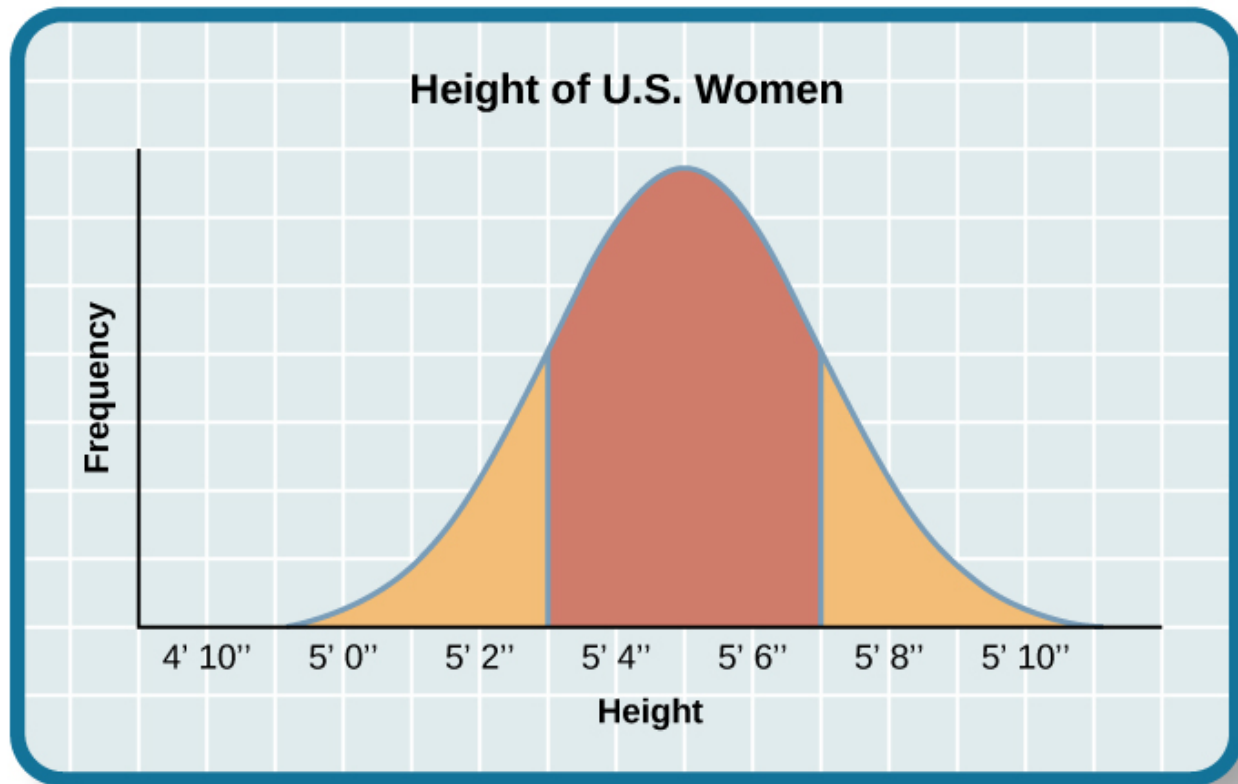
Atkins v. Virginia (2002) highlights several issues regarding society's beliefs around intelligence. In the *Atkins* case, the Supreme Court decided that intellectual disability *does* affect decision making and therefore should affect the nature of the punishment such criminals receive. Where, however, should the lines of intellectual disability be drawn? In May 2014, the Supreme Court ruled in a related case (*Hall v. Florida*) that IQ scores cannot be used as a final determination of a prisoner's eligibility for the death penalty (Roberts, 2014).

The Bell Curve

The results of intelligence tests follow the bell curve, a graph in the general shape of a bell. When the bell curve is used in psychological testing, the graph demonstrates a normal distribution of a trait, in this case, intelligence, in the human population. Many human traits naturally follow the bell curve. For example, if you lined up all your female schoolmates according to height, it is likely that a large cluster of them would be the average height for an American woman: 5'4"–5'6". This cluster would fall in the center of the bell curve, representing the average height for American women. There would be fewer women who stand closer to 4'11". The same would be true for women of above-average height: those who stand closer to 5'11". The trick to finding a bell curve in nature is to use a large sample size. Without a large sample size, it is less likely that the bell curve will represent the wider population.

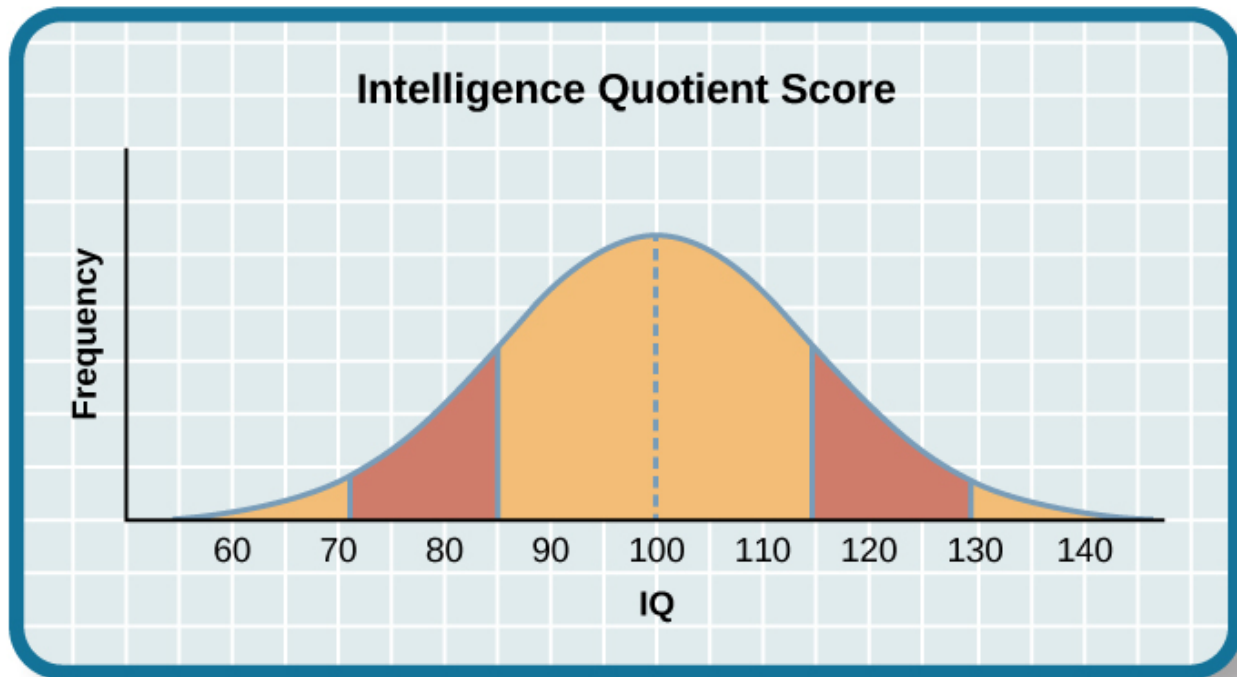
A representative sample is a subset of the population that accurately represents the general population. If, for example, you measured the height of the women in your classroom only, you might not actually have a

representative sample. Perhaps the women's basketball team wanted to take this course together, and they are all in your class. Because basketball players tend to be taller than average, the women in your class may not be a good representative sample of the population of American women. But if your sample included all the women at your school, it is likely that their heights would form a natural bell curve.



Are you of below-average, average, or above-average height?

The same principles apply to intelligence test scores. Individuals earn a score called an intelligence quotient (IQ). Over the years, different types of IQ tests have evolved, but the way scores are interpreted remains the same. The average IQ score on an IQ test is 100. Standard deviations describe how data are dispersed in a population and give context to large data sets. The bell curve uses the standard deviation to show how all scores are dispersed from the average score. In modern IQ testing, one standard deviation is 15 points. So a score of 85 would be described as “one standard deviation below the mean.” How would you describe a score of 115 and a score of 70? Any IQ score that falls within one standard deviation above and below the mean (between 85 and 115) is considered average, and 68% of the population has IQ scores in this range. An IQ score of 130 or above is considered a superior level.



The majority of people have an IQ score between 85 and 115.

Only 2.2% of the population has an IQ score below 70 (American Psychological Association [APA], 2013). A score of 70 or below indicates significant cognitive delays, major deficits in adaptive functioning, and difficulty meeting “community standards of personal independence and social responsibility” when compared to same-aged peers (APA, 2013, p. 37). An individual in this IQ range would be considered to have an intellectual disability and exhibit deficits in intellectual functioning and adaptive behavior (American Association on Intellectual and Developmental Disabilities, 2013). Formerly known as mental retardation, the accepted term now is intellectual disability, and it has four subtypes: mild, moderate, severe, and profound. Early to mid-twentieth-century medical terminology delineating the severity of intellectual disability included the terms idiotic, moronic, and imbecilic.

The Diagnostic and Statistical Manual of Psychological Disorders lists criteria for each subgroup (APA, 2013).

Characteristics of Cognitive Disorders

Intellectual Disability Subtype	Percentage of Intellectually Disabled Population	Description
Mild	85%	3rd- to 6th-grade skill level in reading, writing, and math; may be employed and live independently
Moderate	10%	Basic reading and writing skills; functional self-care skills; requires some oversight
Severe	5%	Functional self-care skills; requires oversight of daily environment and activities
Profound	<1%	May be able to communicate verbally or nonverbally; requires intensive oversight

On the other end of the intelligence spectrum are those individuals whose IQs fall into the highest ranges. Consistent with the bell curve, about 2% of the population falls into this category. People are considered gifted if they have an IQ score of 130 or higher, or superior intelligence in a particular area. Long ago, popular belief suggested that people of high intelligence were maladjusted. This idea was disproven through a groundbreaking study of gifted children. In 1921, Lewis Terman began a longitudinal study of over 1,500 children with IQs over 135 (Terman, 1925). His findings showed that these children became well-educated, successful adults who were, in fact, well-adjusted (Terman & Oden, 1947). Additionally, Terman's study showed that the subjects were above average in physical build and attractiveness, dispelling an earlier popular notion that highly intelligent people were "weaklings." Some people with very high IQs elect to join Mensa, an organization dedicated to identifying, researching, and fostering intelligence. Members must have an IQ score in the top 2% of the population, and they may be required to pass other exams in their application to join the group.

What's in a Name? Mental Retardation

In the past, individuals with IQ scores below 70 and significant adaptive and social functioning delays were diagnosed with mental retardation. When this diagnosis was first named, the title held no social stigma. In time, however, the degrading word "retard" sprang from this diagnostic term. "Retard" was frequently used as a taunt, especially among young people, until the words "mentally retarded" and "retard" became an insult. As such, the DSM-5 now labels this diagnosis as "intellectual disability." Many states once had a Department of Mental Retardation to serve those diagnosed with such cognitive delays, but most have changed their name to the Department of Developmental Disabilities or something similar in language. The Social Security Administration still uses the term "mental retardation" but is considering eliminating it from its programming (Goad, 2013).

Do you think changing the title of this department has any impact on how people regard those with

developmental disabilities? Does a different name give people more dignity, and if so, how? Does it change the expectations for those with developmental or cognitive disabilities? Why or why not?

Why Measure Intelligence?

The value of IQ testing is most evident in educational or clinical settings. Children who seem to be experiencing learning difficulties or severe behavioral problems can be tested to ascertain whether the child's difficulties can be partly attributed to an IQ score that is significantly different from the mean for the child's age group. Without IQ testing—or another measure of intelligence—children and adults needing extra support might not be identified effectively. In addition, IQ testing is used in courts to determine whether a defendant has special or extenuating circumstances that preclude the accused from participating in some way in a trial. People also use IQ testing results to seek disability benefits from the Social Security Administration. While IQ tests have sometimes been used as arguments in support of insidious purposes, such as the eugenics movement (Severson, 2011), the following case study demonstrates the usefulness and benefits of IQ testing.

Candace, a 14-year-old girl experiencing problems at school, was referred for a court-ordered psychological evaluation. She was in regular education classes in ninth grade and was failing every subject. Candace had never been a stellar student but had always been passed to the next grade. Frequently, she would curse at any of her teachers who called on her in class. She also got into fights with other students and occasionally shoplifted. When she arrived for the evaluation, Candace immediately said that she hated everything about school, including the teachers, the rest of the staff, the building, and the homework. Her parents stated that they felt their daughter was picked on because she was of a different race than the teachers and most of the other students. When asked why she cursed at her teachers, Candace replied, “They only call on me when I don’t know the answer. I don’t want to say, ‘I don’t know all of the time and look like an idiot in front of my friends. The teachers embarrass me.’” She was given a battery of tests, including an IQ test. Her score on the IQ test was 68. What does Candace’s score say about her ability to excel or even succeed in regular education classes without assistance?

Summary

In this section, we learned about the definition of intelligence, the history of intelligence testing, and some of the challenges regarding intelligence testing. Intelligence tests began in earnest with Binet; Wechsler later developed intelligence tests that are still in use today: the WAIS-IV and WISC-V. The Bell curve shows the range of scores that encompass average intelligence as well as standard deviations.

Review Questions



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Critical Thinking Questions

Why do you think different theorists have defined intelligence in different ways? Since cognitive processes are complex, ascertaining them in a measurable way is challenging. Researchers have taken different approaches to defining intelligence in an attempt to comprehensively describe and measure it.

Compare and contrast the benefits of the Stanford-Binet IQ test and Wechsler's IQ tests. The Wechsler-Bellevue IQ test combined a series of subtests that tested verbal and nonverbal skills into a single IQ test in order to get a reliable, descriptive score of intelligence. While the Stanford-Binet test was normed and standardized, it focused more on verbal skills than variations in other cognitive processes.

Personal Application Question

In thinking about the case of Candace described earlier, do you think that Candace benefited or suffered as a result of consistently being passed on to the next grade?

39.

LANGUAGE

Learning Objectives

By the end of this section, you will be able to:

- Define language and demonstrate familiarity with the components of language
- Understand how the use of language develops
- Explain the relationship between language and thinking

Language is a communication system that involves using words and systematic rules to organize those words to transmit information from one individual to another. While language is a form of communication, not all communication is language. Many species communicate with one another through their postures, movements, odors, or vocalizations. This communication is crucial for species that need to interact and develop social relationships with their conspecifics, members of the same species. However, many people have asserted that it is language that makes humans unique among all of the animal species (Corballis & Suddendorf, 2007; Tomasello & Rakoczy, 2003). This section will focus on what distinguishes language as a special form of communication, how the use of language develops, and how language affects the way we think.

Components of Language

Language, be it spoken, signed, or written, has specific components: a lexicon and grammar. Lexicon refers to the words of a given language. Thus, the lexicon is a language's vocabulary. Grammar refers to the set of rules that are used to convey meaning through the use of the lexicon (Fernández & Cairns, 2011). For instance, English grammar dictates that most verbs receive an “-ed” at the end to indicate past tense.

Words are formed by combining the various phonemes that make up the language. A phoneme (e.g., the sounds “ah” vs. “eh”) is a basic sound unit of a given language, and different languages have different sets of

phonemes. Phonemes are combined to form morphemes, which are the smallest units of language that convey some type of meaning (e.g., “I” is both a phoneme and a morpheme). We use semantics and syntax to construct language. Semantics and syntax are part of a language’s grammar. Semantics refers to the process by which we derive meaning from morphemes and words. Syntax refers to the way words are organized into sentences (Chomsky, 1965; Fernández & Cairns, 2011).

We apply the rules of grammar to organize the lexicon in novel and creative ways, which allow us to communicate information about both concrete and abstract concepts. We can talk about our immediate and observable surroundings as well as the surface of unseen planets. We can share our innermost thoughts, and our plans for the future, and debate the value of a college education. We can provide detailed instructions for cooking a meal, fixing a car, or building a fire. The flexibility that language provides to relay vastly different types of information is a property that makes language so distinct as a mode of communication among humans.

Language Development

Given the remarkable complexity of a language, one might expect that mastering a language would be an especially arduous task; indeed, for those of us trying to learn a second language as adults, this might seem to be true. However, young children master language very quickly and with relative ease. B. F. Skinner (1957) proposed that language is learned through reinforcement. Noam Chomsky (1965) criticized this behaviorist approach, asserting instead that the mechanisms underlying language acquisition are biologically determined. Chomsky argued that humans have an innate language acquisition device (LAD), genetic imprinting within children. The use of language develops in the absence of formal instruction and appears to follow a very similar pattern in children from vastly different cultures and backgrounds. It would seem, therefore, that we are born with a biological predisposition to acquire a language (Chomsky, 1965; Fernández & Cairns, 2011). Moreover, it appears that there is a critical period for language acquisition, such that this proficiency at acquiring language is maximal early in life; generally, as people age, the ease with which they acquire and master new languages diminishes (Johnson & Newport, 1989; Lenneberg, 1967; Singleton, 1995).

Children begin to learn about language from a very early age. In fact, it appears that this is occurring even before we are born. Newborns show a preference for their mother’s voice and appear to be able to discriminate between the language spoken by their mother and other languages. Babies are also attuned to the languages being used around them and show preferences for videos of faces that are moving in synchrony with the audio of spoken language versus videos that do not synchronize with the audio (Blossom & Morgan, 2006; Pickens, 1994; Spelke & Cortelou, 1981).

Stages of Language and Communication Development

Stage	Age	Developmental Language and Communication
1	0–3 months	Reflexive communication
2	3–8 months	Reflexive communication; interest in others
3	8–13 months	Intentional communication; sociability
4	12–18 months	First words
5	18–24 months	Simple sentences of two words
6	2–3 years	Sentences of three or more words
7	3–5 years	Complex sentences; has conversations

THE CASE OF GENIE

In the fall of 1970, a social worker in the Los Angeles area found a 13-year-old girl who was being raised in extremely neglectful and abusive conditions. The girl, who came to be known as Genie, had lived most of her life tied to a potty chair or confined to a crib in a small room that was kept closed with the curtains drawn. For a little over a decade, Genie had virtually no social interaction and no access to the outside world. As a result of these conditions, Genie was unable to stand up, chew solid food, or speak (Fromkin, Krashen, Curtiss, Rigler, & Rigler, 1974; Rymer, 1993). The police took Genie into protective custody.

Genie's abilities improved dramatically following her removal from her abusive environment, and early on, it appeared she was acquiring language—much later than would be predicted by critical period hypotheses that had been posited at the time (Fromkin et al., 1974). Genie managed to amass an impressive vocabulary in a relatively short amount of time. However, she never developed a mastery of the grammatical aspects of language (Curtiss, 1981). Perhaps being deprived of the opportunity to learn a language during a critical period impeded Genie's ability to fully acquire and use language.

You may recall that each language has its own set of phonemes that are used to generate morphemes, words, and so on. Babies can discriminate among the sounds that make up a language (for example, they can tell the difference between the “s” in vision and the “ss” in fission). Early on, children can differentiate between the sounds of all human languages, even those that do not occur in the languages that are used in their environments. However, by the time they are about 1 year old, they can only discriminate among those

phonemes that are used in the language or languages in their environments (Jensen, 2011; Werker & Lalonde, 1988; Werker & Tees, 1984).

View this video to learn more about how babies lose the ability to discriminate among all possible human phonemes as they age: [Infant Speech Discrimination](#).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://louis.pressbooks.pub/intropsychology/?p=391#oembed-1>

After the first few months of life, babies enter what is known as the babbling stage, during which time they tend to produce single syllables that are repeated over and over. As time passes, more variations appear in the syllables that they produce. During this time, it is unlikely that the babies are trying to communicate; they are just as likely to babble when they are alone as when they are with their caregivers (Fernández & Cairns, 2011). Interestingly, babies who are raised in environments in which sign language is used will also begin to show babbling in the gestures of their hands during this stage (Petitto, Holowka, Sergio, Levy, & Ostry, 2004).

Generally, a child's first word is uttered sometime between the ages of 1 year to 18 months, and for the next few months, the child will remain in the "one word" stage of language development. During this time, children know a number of words, but they only produce one-word utterances. The child's early vocabulary is limited to familiar objects or events, often nouns. Although children in this stage only make one-word utterances, these words often carry a larger meaning, known as the holophrastic stage (Fernández & Cairns, 2011). So, for example, a child saying "cookie" could be identifying a cookie or asking for a cookie.

As a child's lexicon grows, she begins to utter simple sentences and acquire new vocabulary at a very rapid pace. In addition, children begin to demonstrate a clear understanding of the specific rules that apply to their language(s). Even the mistakes that children sometimes make provide evidence of just how much they understand those rules. This is sometimes seen in the form of overgeneralization. In this context, overgeneralization refers to an extension of a language rule to an exception to the rule. For example, in English, it is usually the case that an "s" is added to the end of a word to indicate plurality. For example, we speak of one dog versus two dogs. Young children will overgeneralize this rule to cases that are exceptions to the "add an s to the end of the word" rule and say things like "those two geese" or "three mouses." Clearly, the rules of the language are understood, even if the exceptions to the rules are still being learned (Moskowitz, 1978).

Language and Thought

When we speak one language, we agree that words are representations of ideas, people, places, and events. The given language that children learn is connected to their culture and surroundings. But can words themselves shape the way we think about things? Psychologists have long investigated the question of whether language shapes thoughts and actions, or whether our thoughts and beliefs shape our language. Two researchers, Edward Sapir and Benjamin Lee Whorf began this investigation in the 1940s. They wanted to understand how the language habits of a community encourage members of that community to interpret language in a particular manner (Sapir, 1941/1964). Sapir and Whorf proposed that language determines thought, suggesting, for example, that a person whose community language did not have past-tense verbs would be challenged to think about the past (Whorf, 1956). Researchers have since identified this view as too absolute, pointing out a lack of empiricism behind what Sapir and Whorf proposed (Abler, 2013; Boroditsky, 2011; van Troyer, 1994). Today, psychologists continue to study and debate the relationship between language and thought.

The Meaning of Language

Think about what you know of other languages; perhaps you even speak multiple languages. Imagine for a moment that your closest friend fluently speaks more than one language. Do you think that friend thinks differently, depending on which language is being spoken? You may know a few words that are not translatable from their original language into English. For example, the Portuguese word *saudade* originated during the 15th century, when Portuguese sailors left home to explore the seas and travel to Africa or Asia. Those left behind described the emptiness and fondness they felt as *saudade*. The word came to express many meanings, including loss, nostalgia, yearning, warm memories, and hope. There is no single word in English that includes all of those emotions in a single description. Do words such as *saudade* indicate that different languages produce different patterns of thought in people? What do you think?



(a)



(b)

These two works of art depict *saudade*. (a) *Saudade de Nápoles*, which is translated into “missing Naples,” was painted by Bertha Worms in 1895. (b) Almeida Júnior painted *Saudade* in 1899.

Language may indeed influence the way that we think, an idea known as linguistic determinism (Fontana et al., 2018). One recent demonstration of this phenomenon involved differences in the way that English and Mandarin Chinese speakers talk and think about time. English speakers tend to talk about time using terms that describe changes along a horizontal dimension, for example, saying something like “I’m running behind schedule” or “Don’t get ahead of yourself.” While Mandarin Chinese speakers also describe time in horizontal terms, it is not uncommon to also use terms associated with a vertical arrangement. For example, the past might be described as being “up” and the future as being “down.” It turns out that these differences in language translate into differences in performance on cognitive tests designed to measure how quickly an individual can recognize temporal relationships. Specifically, when given a series of tasks with vertical priming, Mandarin Chinese speakers were faster at recognizing temporal relationships between months. Indeed, Boroditsky (2001) sees these results as suggesting that “habits in language encourage habits in thought” (p. 12).

One group of researchers wanted to investigate how language influences thought compared to how English speakers and the Dani people of Papua New Guinea think and speak about color. The Dani have two words

for color: one word for *light* and one word for *dark*. In contrast, the English language has eleven color words. Researchers hypothesized that the number of color terms could limit the ways that the Dani people conceptualized color. However, Dani was able to distinguish colors with the same ability as English speakers, despite having fewer words at their disposal (Berlin & Kay, 1969). A recent review of research aimed at determining how language might affect something like color perception suggests that language can influence perceptual phenomena, especially in the left hemisphere of the brain. You may recall from earlier chapters that the left hemisphere is associated with language for most people. However, the right (less linguistic hemisphere) of the brain is less affected by linguistic influences on perception (Regier & Kay, 2009)

Test Your Understanding



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<https://louis.pressbooks.pub/intropsychology/?p=391#h5p-126>

Summary

Language is a communication system that has both a lexicon and a system of grammar. Language acquisition occurs naturally and effortlessly during the early stages of life, and this acquisition occurs in a predictable sequence for individuals around the world. Language has a strong influence on thought, and the concept of how language may influence cognition remains an area of study and debate in psychology.

Review Questions



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Critical Thinking Questions

How do words not only represent our thoughts but also represent our values?
People tend to talk about the things that are important to them or the things they think about the most. What we talk about, therefore, is a reflection of our values.

How could grammatical errors actually be indicative of language acquisition in children?
People tend to talk about the things that are important to them or the things they think about the most. What we talk about, therefore, is a reflection of our values.

Personal Application Question

Can you think of examples of how language affects cognition?

40.

COGNITION AND EMOTION

Learning Objectives

By the end of this section, you will be able to:

- Describe cognition
- Distinguish concepts and prototypes
- Explain the difference between natural and artificial concepts

Imagine all of your thoughts as if they were physical entities, swirling rapidly inside your mind. How is it possible that the brain is able to move from one thought to the next in an organized, orderly fashion? The brain is endlessly perceiving, processing, planning, organizing, and remembering—it is always active. Yet, you don't notice most of your brain's activity as you move throughout your daily routine. This is only one facet of the complex processes involved in cognition. Simply put, **cognition** is *thinking, and it encompasses the processes associated with perception, knowledge, problem-solving, judgment, language, and memory*. Scientists who study cognition are searching for ways to understand how we integrate, organize, and utilize our conscious cognitive experiences without being aware of all of the unconscious work that our brains are doing (Kahneman, 2011).

Cognition

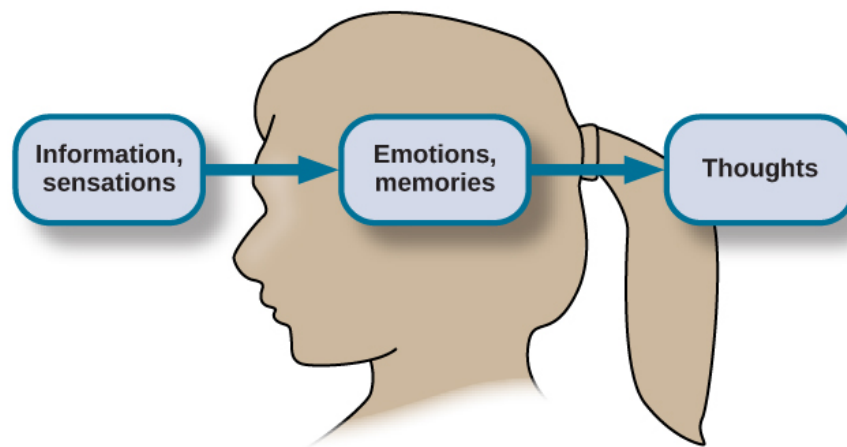
Upon waking each morning, you begin thinking—contemplating the tasks that you must complete that day. In what order should you run your errands? Should you go to the bank, the cleaners, or the grocery store first? Can you get these things done before you head to class or will they need to wait until school is done? These thoughts are one example of cognition at work. Exceptionally complex, cognition is an essential feature of human consciousness, yet not all aspects of cognition are consciously experienced.

Cognitive psychology is the field of psychology dedicated to examining how people think. It attempts to

explain how and why we think the way we do by studying the interactions among human thinking, emotion, creativity, language, and problem-solving, in addition to other cognitive processes. Cognitive psychologists strive to determine and measure different types of intelligence, why some people are better at problem-solving than others, and how emotional intelligence affects success in the workplace, among countless other topics. They also sometimes focus on how we organize thoughts and information gathered from our environments into meaningful categories of thought, which will be discussed later.

Concepts and Prototypes

The human nervous system is capable of handling endless streams of information. The senses serve as the interface between the mind and the external environment, receiving stimuli and translating them into nerve impulses that are transmitted to the brain. The brain then processes this information and uses the relevant pieces to create thoughts, which can then be expressed through language or stored in memory for future use. To make this process more complex, the brain does not gather information from external environments only. When thoughts are formed, the brain also pulls information from emotions and memories. Emotion and memory are powerful influences on both our thoughts and behaviors.



Sensations and information are received by our brains, filtered through emotions and memories, and processed to become thoughts.

In order to organize this staggering amount of information, the brain has developed a file cabinet of sorts in the mind. The different files stored in the file cabinet are called concepts. Concepts are categories or groupings of linguistic information, images, ideas, or memories, such as life experiences. Concepts are, in many ways, big ideas that are generated by observing details and categorizing and combining these details into cognitive structures. You use concepts to see the relationships among the different elements of your experiences and to keep the information in your mind organized and accessible.

Concepts are informed by our semantic memory, a process for giving meaning to experiences and stimuli,

and are present in every aspect of our lives; however, one of the easiest places to notice concepts is inside a classroom, where they are discussed explicitly. When you study United States history, for example, you learn about more than just individual events that have happened in America's past. You absorb a large quantity of information by listening to and participating in discussions, examining maps, and reading first-hand accounts of people's lives. Your brain analyzes these details and develops an overall understanding of American history. In the process, your brain gathers details that inform and refine your understanding of related concepts like democracy, power, and freedom.

Concepts can be complex and abstract, like justice, or more concrete, like types of birds. In psychology, for example, Piaget's stages of development are abstract concepts. Some concepts, like tolerance, are agreed upon by many people because they have been used in various ways over many years. Other concepts, like the characteristics of your ideal friend or your family's birthday traditions, are personal and individualized. In this way, concepts touch every aspect of our lives, from our many daily routines to the guiding principles behind the way governments function.

Another technique used by your brain to organize information is the identification of prototypes for the concepts you have developed. A prototype is the best example or representation of a concept. For example, for the category of civil disobedience, your prototype could be Rosa Parks. Her peaceful resistance to segregation on a city bus in Montgomery, Alabama, is a recognizable example of civil disobedience. Or your prototype could be Mohandas Gandhi, sometimes called Mahatma Gandhi ("Mahatma" is an honorific title).



In 1930, Mohandas Gandhi led a group in peaceful protest against a British tax on salt in India.

Mohandas Gandhi served as a nonviolent force for independence for India while simultaneously demanding

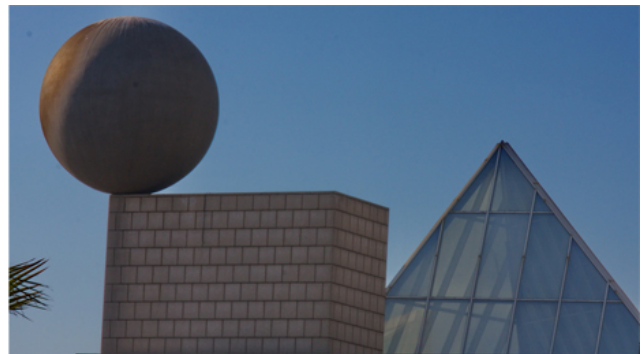
that Buddhist, Hindu, Muslim, and Christian leaders—both Indian and British—collaborate peacefully. Although he was not always successful in preventing violence around him, his life provides a steadfast example of the civil disobedience prototype (Constitutional Rights Foundation, 2013). Just as concepts can be abstract or concrete, we can make a distinction between concepts that are functions of our direct experience with the world and those that are more artificial in nature.

Natural and Artificial Concepts

In psychology, concepts can be divided into two categories, natural and artificial. Natural concepts are created “naturally” through your experiences and can be developed from either direct or indirect experiences. For example, if you live in Essex Junction, Vermont, you have probably had a lot of direct experience with snow. You’ve watched it fall from the sky, you’ve seen lightly falling snow that barely covers the windshield of your car, and you’ve shoveled out 18 inches of fluffy white snow as you’ve thought, “This is perfect for skiing.” You’ve thrown snowballs at your best friend and gone sledding down the steepest hill in town. In short, you know snow. You know what it looks like, smells like, tastes like, and feels like. If, however, you’ve lived your whole life on the island of Saint Vincent in the Caribbean, you may never have actually seen snow, much less tasted, smelled, or touched it. You know snow from the indirect experience of seeing pictures of falling snow—or from watching films that feature snow as part of the setting. Either way, snow is a natural concept because you can construct an understanding of it through direct observations or experiences of snow.



(a)



(b)

(a) Our concept of snow is an example of a natural concept—one that we understand through direct observation and experience. (b) In contrast, artificial concepts are ones that we know by a specific set of characteristics that they always exhibit, such as what defines different basic shapes. (credit a: modification of work by Maarten Takens; credit b: modification of work by “Shayan [USA]”/Flickr)

An artificial concept, on the other hand, is a concept that is defined by a specific set of characteristics. Various properties of geometric shapes, like squares and triangles, serve as useful examples of artificial concepts. A triangle always has three angles and three sides. A square always has four equal sides and four right angles. Mathematical formulas, like the equation for the area ($\text{length} \times \text{width}$), are artificial concepts defined by

specific sets of characteristics that are always the same. Artificial concepts can enhance the understanding of a topic by building on one another. For example, before learning the concept of “area of a square” (and the formula to find it), you must understand what a square is. Once the concept of “area of a square” is understood, an understanding of area for other geometric shapes can be built upon the original understanding of the area. The use of artificial concepts to define an idea is crucial to communicating with others and engaging in complex thought. According to Goldstone and Kersten (2003), concepts act as building blocks and can be connected in countless combinations to create complex thoughts.

Schemata

A **schema** is a *mental construct consisting of a cluster or collection of related concepts* (Bartlett, 1932). There are many different types of schemata, and they all have one thing in common: schemata are a method of organizing information that allows the brain to work more efficiently. When a schema is activated, the brain makes immediate assumptions about the person or object being observed.

There are several types of schemata. A role schema makes assumptions about how individuals in certain roles will behave (Callero, 1994). For example, imagine you meet someone who introduces themselves as a firefighter. When this happens, your brain automatically activates the “firefighter schema” and begins making assumptions that this person is brave, selfless, and community-oriented. Despite not knowing this person, already you have unknowingly made judgments about the individual. Schemata also help you fill in gaps in the information you receive from the world around you. While schemata allow for more efficient information processing, there can be problems with schemata, regardless of whether they are accurate: Perhaps this particular firefighter is not brave, but simply works as a firefighter to pay the bills while studying to become a children’s librarian.

An event schema, also known as a cognitive script, is a set of behaviors that can feel like a routine. Think about what you do when you walk into an elevator. First, the doors open and you wait to let exiting passengers leave the elevator car. Then, you step into the elevator and turn around to face the doors, looking for the correct button to push. You never face the back of the elevator, do you? And when you’re riding in a crowded elevator and you can’t face the front, it feels uncomfortable, doesn’t it? Interestingly, event schemata can vary widely among different cultures and countries. For example, while it is quite common for people to greet one another with a handshake in the United States, in Tibet, you greet someone by sticking your tongue out at them, and in Belize, you bump fists (Cairns Regional Council, n.d.)



What event schema do you perform when riding in an elevator? (credit: "Gideon"/Flickr)

Because event schemata are automatic, they can be difficult to change. Imagine that you are driving home from work or school. This event schema involves getting in the car, shutting the door, and buckling your seatbelt before putting the key in the ignition. You might perform this script two or three times each day. As you drive home, you hear your phone's ring tone. Typically, the event schema that occurs when you hear your phone ringing involves locating the phone and answering it or responding to your latest text message. So without thinking, you reach for your phone, which could be in your pocket, in your bag, or in the passenger seat of the car. This powerful event schema is informed by your pattern of behavior and the pleasurable stimulation that a phone call or text message gives your brain. Because it is a schema, it is extremely challenging for us to stop reaching for the phone, even though we know that we endanger our own lives and the lives of others while we do it (Neyfakh, 2013).



Texting while driving is dangerous, but it is a difficult event schema for some people to resist.

Remember the elevator? It feels almost impossible to walk in and *not* face the door. Our powerful event schema dictates our behavior in the elevator, and it is no different with our phones. Current research suggests that it is the habit, or event schema, of checking our phones in many different situations that makes refraining from checking them while driving especially difficult (Bayer & Campbell, 2012). Because texting while driving has become a dangerous epidemic in recent years, psychologists are looking at ways to help people interrupt the “phone schema” while driving. Event schemata like these are the reason why many habits are difficult to break once they have been acquired. As we continue to examine thinking, keep in mind how powerful the forces of concepts and schemata are to our understanding of the world.

Test Your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://louis.pressbooks.pub/intropsychology/?p=389#h5p-123>

Summary

In this section, you were introduced to cognitive psychology, which is the study of cognition, or the brain’s ability to think, perceive, plan, analyze, and remember. Concepts and their corresponding prototypes help us quickly organize our thinking by creating categories into which we can sort new information. We also develop schemata, which are clusters of related concepts. Some schemata involve routines of thought and behavior, and these help us function properly in various situations without having to “think twice” about them. Schemata show up in social situations and routines of daily behavior.

Review Questions



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<https://louis.pressbooks.pub/intropsychology/?p=389#h5p-124>

Critical Thinking Questions

Describe an event schema that you would notice at a sporting event.

Answers will vary. When attending a basketball game, it is typical to support your team by wearing the team colors and sitting behind their bench.

Explain why event schemata have so much power over human behavior.

Event schemata are rooted in the social fabric of our communities. We expect people to behave in certain ways in certain types of situations, and we hold ourselves to the same social standards. It is uncomfortable to go against an event schema—it feels almost like we are breaking the rules.

Personal Application Question

Describe a natural concept that you know fully but that would be difficult for someone else to understand, and explain why it would be difficult.

41.

THE SOURCE OF INTELLIGENCE

Learning Objectives

By the end of this section, you will be able to:

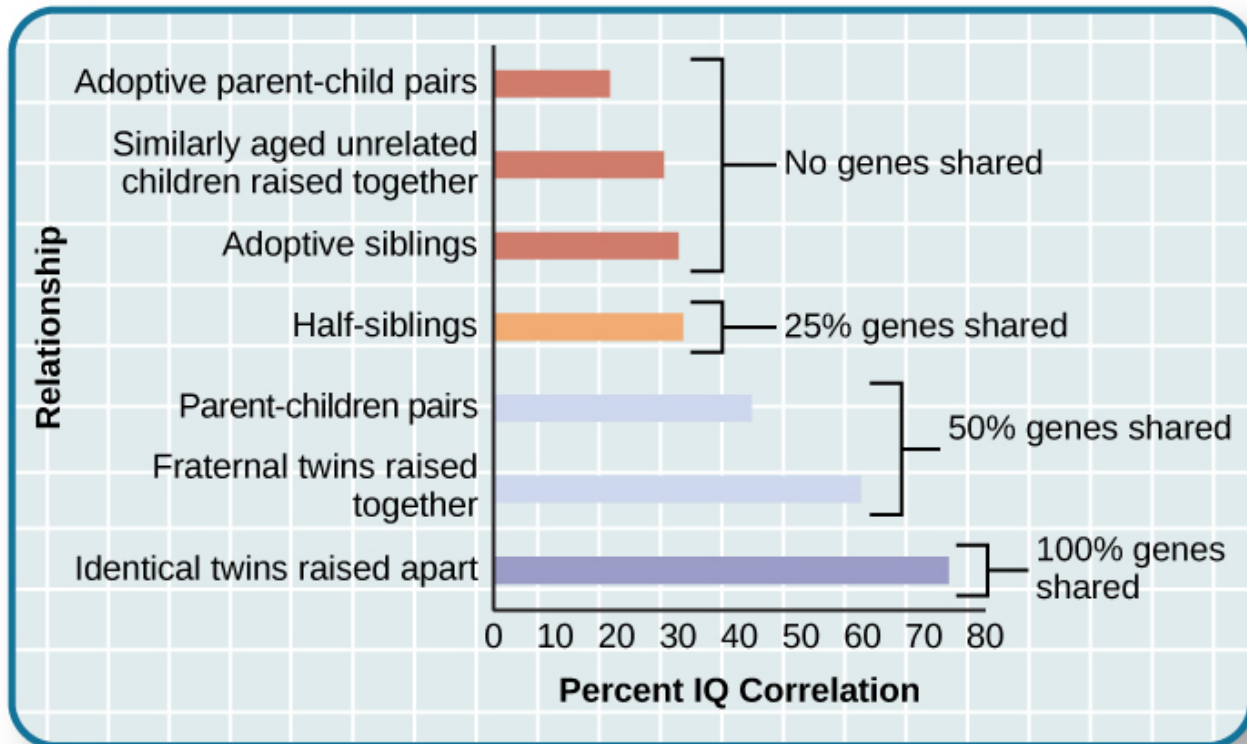
- Describe how genetics and environment affect intelligence
- Explain the relationship between IQ scores and socioeconomic status
- Describe the difference between a learning disability and a developmental disorder

A young girl, born to teenage parents, lives with her grandmother in rural Mississippi. They are poor—in serious poverty—but they do their best to get by with what they have. She learns to read when she is just 3 years old. As she grows older, she longs to live with her mother, who now resides in Wisconsin. She moves there at the age of 6. At 9 years of age, she is raped. During the next several years, several different male relatives repeatedly molest her. Her life unravels. She turns to drugs and sex to fill the deep, lonely void inside her. Her mother then sends her to Nashville to live with her father, who imposes strict behavioral expectations upon her, and over time, her wild life settles once again. She begins to experience success in school, and at 19 years old, becomes the youngest and first African American female news anchor (“Dates and Events,” n.d.). The woman—Oprah Winfrey—goes on to become a media giant known for both her intelligence and her empathy.

High Intelligence: Nature or Nurture?

Where does high intelligence come from? Some researchers believe that intelligence is a trait inherited from a person’s parents. Scientists who research this topic typically use twin studies to determine the heritability of intelligence. The Minnesota Study of Twins Reared Apart is one of the most well-known twin studies. In this investigation, researchers found that identical twins raised together and identical twins raised apart exhibit a higher correlation between their IQ scores than siblings or fraternal twins raised together (Bouchard, Lykken,

McGue, Segal, & Tellegen, 1990). The findings from this study reveal a genetic component to intelligence. At the same time, other psychologists believe that intelligence is shaped by a child's developmental environment. If parents were to provide their children with intellectual stimulation before they are born, it is likely that they would absorb the benefits of that stimulation, and it would be reflected in intelligence levels.



The correlations of IQs of unrelated versus related persons reared apart or together suggest a genetic component to intelligence.

The reality is that aspects of each idea are probably correct. In fact, one study suggests that although genetics seem to be in control of the level of intelligence, the environmental influences provide both stability and change to trigger the manifestation of cognitive abilities (Bartels, Rietveld, Van Baal, & Boomsma, 2002). Certainly, there are behaviors that support the development of intelligence, but the genetic component of high intelligence should not be ignored. As with all heritable traits, however, it is not always possible to isolate how and when high intelligence is passed on to the next generation.

Range of Reaction is the theory that each person responds to the environment in a unique way based on his or her genetic makeup (Hunt, 1981). According to this idea, your genetic potential is a fixed quantity, but whether you reach your full intellectual potential is dependent upon the environmental stimulation you experience, especially in childhood. Think about this scenario: A couple adopts a child who has average genetic intellectual potential. They raise her in an extremely stimulating environment. What will happen to the couple's new daughter? It is likely that the stimulating environment will improve her intellectual

outcomes over the course of her life. But what happens if this experiment is reversed? If a child with an extremely strong genetic background is placed in an environment that does not stimulate him: What happens? Interestingly, according to a longitudinal study of highly gifted individuals, it was found that “the two extremes of optimal and pathological experience are both represented disproportionately in the backgrounds of creative individuals”; however, those who experienced supportive family environments were more likely to report being happy (Csikszentmihalyi & Csikszentmihalyi, 1993, p. 187).

Another challenge to determining the origins of high intelligence is the confounding nature of our human social structures. It is troubling to note that some ethnic groups perform better on IQ tests than others—and it is likely that the results do not have much to do with the quality of each ethnic group’s intellect. The same is true for socioeconomic status. Children who live in poverty experience more pervasive, daily stress than children who do not worry about the basic needs of safety, shelter, and food. These worries can negatively affect how the brain functions and develops, causing a dip in IQ scores. Mark Kishiyama and his colleagues determined that children living in poverty demonstrated reduced prefrontal brain functioning comparable to children with damage to the lateral prefrontal cortex (Kishiyama, Boyce, Jimenez, Perry, & Knight, 2009).

The debate around the foundations and influences on intelligence exploded in 1969 when an educational psychologist named Arthur Jensen published the article “How Much Can We Boost I.Q. and Achievement” in the *Harvard Educational Review*. Jensen had administered IQ tests to diverse groups of students, and his results led him to the conclusion that IQ is determined by genetics. He also posited that intelligence was made up of two types of abilities: Level I and Level II. In his theory, Level I is responsible for rote memorization, whereas Level II is responsible for conceptual and analytical abilities. According to his findings, Level I remained consistent among the human race. Level II, however, exhibited differences among ethnic groups (Modgil & Routledge, 1987). Jensen’s most controversial conclusion was that Level II intelligence is prevalent among Asians, then Caucasians, then African Americans. Robert Williams was among those who called out racial bias in Jensen’s results (Williams, 1970).

Obviously, Jensen’s interpretation of his own data caused an intense response in a nation that continued to grapple with the effects of racism (Fox, 2012). However, Jensen’s ideas were not solitary or unique; rather, they represented one of many examples of psychologists asserting racial differences in IQ and cognitive ability. In fact, Rushton and Jensen (2005) reviewed three decades’ worth of research on the relationship between race and cognitive ability. Jensen’s belief in the inherited nature of intelligence and the validity of the IQ test to be the truest measure of intelligence is at the core of his conclusions. If, however, you believe that intelligence is more than Levels I and II, or that IQ tests do not control for socioeconomic and cultural differences among people, then perhaps you can dismiss Jensen’s conclusions as a single window that looks out on the complicated and varied landscape of human intelligence.

In a related story, parents of African American students filed a case against the State of California in 1979, because they believed that the testing method used to identify students with learning disabilities was culturally unfair as the tests were normed and standardized using white children (*Larry P. v. Riles*). The testing method used by the state disproportionately identified African American children as intellectually disabled.

This resulted in many students being incorrectly classified as “mentally retarded.” According to a summary of the case, *Larry P. v. Riles*:

In violation of Title VI of the Civil Rights Act of 1964, the Rehabilitation Act of 1973, and the Education for All Handicapped Children Act of 1975, defendants have utilized standardized intelligence tests that are racially and culturally biased, have a discriminatory impact against black children, and have not been validated for the purpose of essentially permanent placements of black children into educationally dead-end, isolated, and stigmatizing classes for the so-called educable mentally retarded. Further, these federal laws have been violated by defendants’ general use of placement mechanisms that, taken together, have not been validated and result in a large over-representation of black children in the special E.M.R. classes. (*Larry P. v. Riles*, par. 6)

Once again, the limitations of intelligence testing were revealed.

What are Learning Disabilities?

Learning disabilities are *cognitive disorders that affect different areas of cognition, particularly language or reading*. It should be pointed out that learning disabilities are not the same thing as intellectual disabilities. Learning disabilities are considered specific neurological impairments rather than global intellectual or developmental disabilities. A person with a language disability has difficulty understanding or using spoken language, whereas someone with a reading disability, such as dyslexia, has difficulty processing what he or she is reading.

Often, learning disabilities are not recognized until a child reaches school age. One confounding aspect of learning disabilities is that they often affect children with average to above-average intelligence. At the same time, learning disabilities tend to exhibit comorbidity with other disorders, like attention-deficit hyperactivity disorder (ADHD). Anywhere between 30–70% of individuals with diagnosed cases of ADHD also have some sort of learning disability (Riccio, Gonzales, & Hynd, 1994). Let’s take a look at two examples of common learning disabilities: dysgraphia and dyslexia.

Dysgraphia

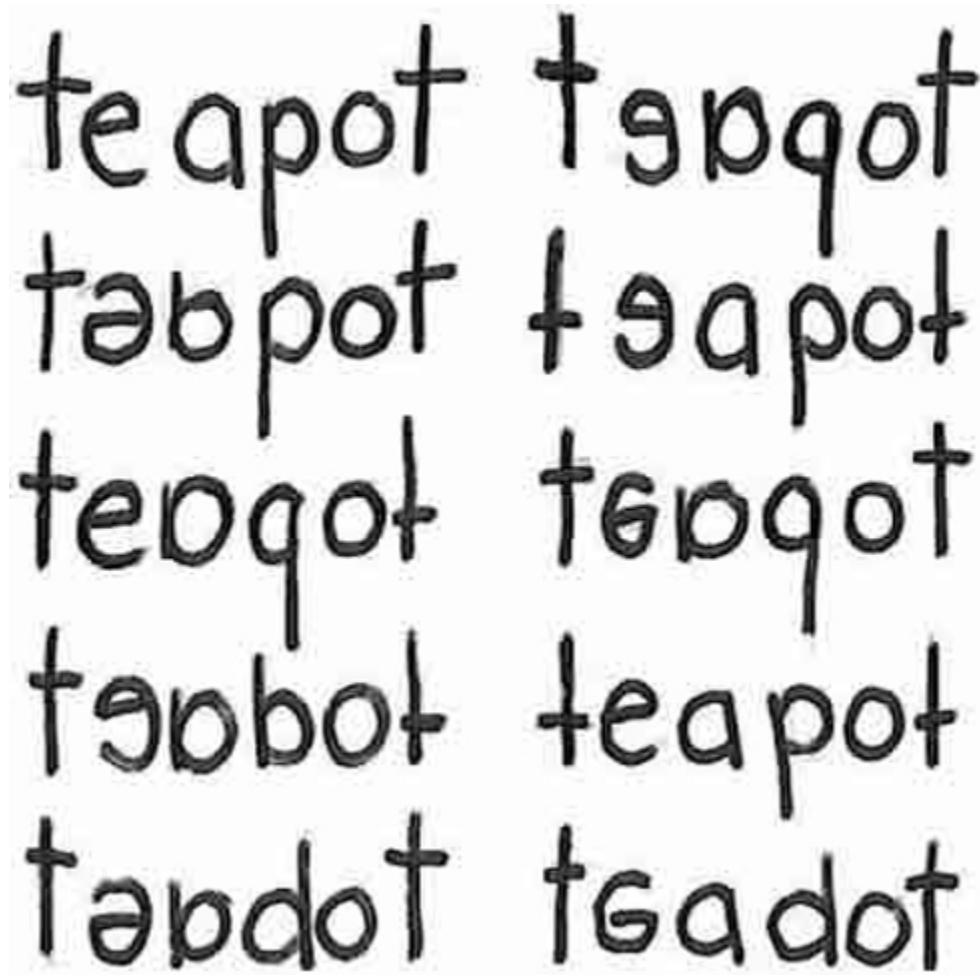
Children with dysgraphia have a learning disability that results in a struggle to write legibly. The physical task of writing with a pen and paper is extremely challenging for the person. These children often have extreme difficulty putting their thoughts down on paper (Smits-Engelsman & Van Galen, 1997). This difficulty is inconsistent with a person’s IQ. That is, based on the child’s IQ and/or abilities in other areas, a child with dysgraphia should be able to write, but can’t. Children with dysgraphia may also have problems with spatial abilities.

Students with dysgraphia need academic accommodations to help them succeed in school. These accommodations can provide students with alternative assessment opportunities to demonstrate what they

know (Barton, 2003). For example, a student with dysgraphia might be permitted to take an oral exam rather than a traditional paper-and-pencil test. Treatment is usually provided by an occupational therapist, although there is some question as to how effective such treatment is (Zwicker, 2005).

Dyslexia

Dyslexia is the most common learning disability in children. An individual with dyslexia exhibits an inability to correctly process letters. The neurological mechanism for sound processing does not work properly in someone with dyslexia. As a result, dyslexic children may not understand sound-letter correspondence. A child with dyslexia may mix up letters within words and sentences—letter reversals are a hallmark of this learning disability—or skip whole words while reading. A child experiencing dyslexia may have difficulty spelling words correctly while writing. Because of the disordered way that the brain processes letters and sounds, learning to read is a frustrating experience. Some individuals experiencing dyslexia cope by memorizing the shapes of most words, but they never actually learn to read (Berninger, 2008).



These written words show variations of the word “teapot” as written by individuals with dyslexia.

Summary

Genetics and environment affect intelligence and the challenges of certain learning disabilities. The intelligence levels of all individuals seem to benefit from rich stimulation in their early environments. Highly intelligent individuals, however, may have a built-in resiliency that allows them to overcome difficult obstacles in their upbringing. Learning disabilities can cause major challenges for children who are learning to read and write. Unlike developmental disabilities, learning disabilities are strictly neurological in nature and are not related to intelligence levels. Students with dyslexia, for example, may have extreme difficulty learning to read, but their intelligence levels are typically average or above average.

Review Questions



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Critical Thinking Questions

What evidence exists for a genetic component to an individual's IQ?

Twin studies are one strong indication that IQ has a genetic component. Another indication is anecdotal evidence in the form of stories about highly intelligent individuals who come from difficult backgrounds yet still become highly successful adults.

Describe the relationship between learning disabilities and intellectual disabilities to intelligence.

Learning disabilities are specific neurological problems within the brain and are separate from intelligence. Intellectual disabilities are pervasive and related to intelligence.

Personal Application Question

Do you believe your level of intelligence was improved because of the stimuli in your childhood environment? Why or why not?

42.

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PART IX

MEMORY



Photographs can trigger our memories and bring past experiences back to life. (credit: modification of work by Cory Zanker)

We may be top-notch learners, but if we don't have a way to store what we've learned, what good is the knowledge we've gained?

Take a few minutes to imagine what your day might be like if you could not remember anything you had learned. You would have to figure out how to get dressed. What clothing should you wear, and how do buttons and zippers work? You would need someone to teach you how to brush your teeth and tie your shoes. Who would you ask for help with these tasks, since you wouldn't recognize the faces of these people in your house? Wait . . . is this even your house? Uh oh, your stomach begins to rumble and you feel hungry. You'd like something to eat, but you don't know where the food is kept or even how to prepare it. Oh dear, this is getting confusing. Maybe it would be best to just go back to bed. A bed . . . what is a bed?

We have an amazing capacity for memory, but how, exactly, do we process and store information? Are there different kinds of memory, and if so, what characterizes the different types? How, exactly, do we retrieve our memories? And why do we forget? This chapter will explore these questions as we learn about memory.

43.

HOW MEMORY FUNCTIONS

Learning Objectives

By the end of this section, you will be able to:

- Discuss the three basic functions of memory
- Describe the three stages of memory storage
- Describe and distinguish between procedural and declarative memory and semantic and episodic memory

Memory is an information processing system; therefore, we often compare it to a computer. **Memory** *is the set of processes used to encode, store, and retrieve information over different periods of time.*



Encoding involves the input of information into the memory system. Storage is the retention of the encoded information. Retrieval, or getting the information out of memory and back into awareness, is the third function.

Encoding

We get information into our brains through a process called **encoding**, *which is the input of information into the memory system.* Once we receive sensory information from the environment, our brains label or code it.

We organize the information with other similar information and connect new concepts to existing concepts. Encoding information occurs through automatic processing and effortful processing.

If someone asks you what you ate for lunch today, more than likely you could recall this information quite easily. This is known as **automatic processing**, *or the encoding of details like time, space, frequency, and the meaning of words*. Automatic processing is usually done without any conscious awareness. Recalling the last time you studied for a test is another example of automatic processing. But what about the actual test material you studied? It probably *required a lot of work and attention on your part in order to encode that information*. This is known as **effortful processing**.



When you first learn new skills such as driving a car, you have to put forth effort and attention to encode information about how to start a car, how to brake, how to handle a turn, and so on. Once you know how to drive, you can encode additional information about this skill automatically. (credit: Robert Couse-Baker)

What are the most effective ways to ensure that important memories are well encoded? Even a simple sentence is easier to recall when it is meaningful (Anderson, 1984). Read the following sentences (Bransford & McCarrell, 1974), then look away and count backward from 30 by threes to zero, and then try to write down the sentences (no peeking back at this page!).

1. The notes were sour because the seams split.
2. The voyage wasn't delayed because the bottle shattered.
3. The haystack was important because the cloth ripped.

How well did you do? By themselves, the statements that you wrote down were most likely confusing and difficult for you to recall. Now, try writing them again, using the following prompts: bagpipe, ship christening,

and parachutist. Next, count backward from 40 by fours, then check yourself to see how well you recalled the sentences this time. You can see that the sentences are now much more memorable because each of the sentences was placed in context. Material is far better encoded when you make it meaningful.

There are three types of encoding. *The encoding of words and their meanings is known as **semantic encoding***. It was first demonstrated by William Bousfield (1935) in an experiment in which he asked people to memorize words. The 60 words were actually divided into 4 categories of meaning, although the participants did not know this because the words were randomly presented. When they were asked to remember the words, they tended to recall them in categories, showing that they paid attention to the meanings of the words as they learned them.

Visual encoding *is the encoding of images*, and **acoustic encoding** *is the encoding of sounds, words in particular*. To see how visual encoding works, read over this list of words: *car, level, dog, truth, book, value*. If you were asked later to recall the words from this list, which ones do you think you'd most likely remember? You would probably have an easier time recalling the words *car, dog, and book*, and a more difficult time recalling the words *level, truth, and value*. Why is this? Because you can recall images (mental pictures) more easily than words alone. When you read the words *car, dog, and book*, you created images of these things in your mind. These are concrete, high-imagery words. On the other hand, abstract words like *level, truth, and value* are low-imagery words. High-imagery words are encoded both visually and semantically (Paivio, 1986), thus building a stronger memory.

Now let's turn our attention to acoustic encoding. You are driving in your car and a song comes on the radio that you haven't heard in at least 10 years, but you sing along, recalling every word. In the United States, children often learn the alphabet through song, and they learn the number of days in each month through rhyme: "Thirty days hath September, / April, June, and November; / All the rest have thirty-one, / Save February, with twenty-eight days clear, / And twenty-nine each leap year." These lessons are easy to remember because of acoustic encoding. We encode the sounds the words make. This is one of the reasons why much of what we teach young children is done through song, rhyme, and rhythm.

Which of the three types of encoding do you think would give you the best memory of verbal information? Some years ago, psychologists Fergus Craik and Endel Tulving (1975) conducted a series of experiments to find out. Participants were given words along with questions about them. The questions required the participants to process the words at one of the three levels. The visual processing questions included such things as asking the participants about the font of the letters. The acoustic processing questions asked the participants about the sound or rhyming of the words, and the semantic processing questions asked the participants about the meaning of the words. After participants were presented with the words and questions, they were given an unexpected recall or recognition task.

Words that had been encoded semantically were better remembered than those encoded visually or acoustically. Semantic encoding involves a deeper level of processing than the shallower visual or acoustic encoding. Craik and Tulving concluded that we process verbal information best through semantic encoding, especially if we apply what is called the self-reference effect. The **self-reference effect** *is the tendency for an*

individual to have better memory for information that relates to oneself in comparison to material that has less personal relevance (Rogers, Kuiper & Kirker, 1977). Could semantic encoding be beneficial to you as you attempt to memorize the concepts in this chapter?

Test Your Understanding



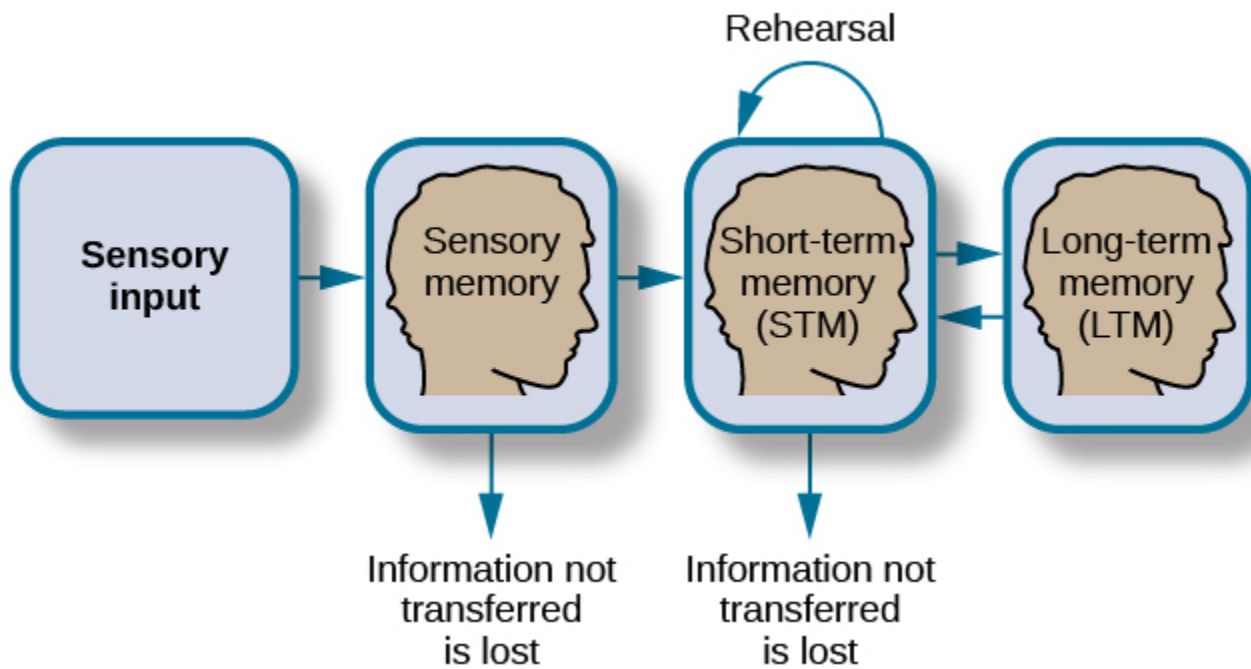
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Storage

Once the information has been encoded, we have to somehow have to retain it. Our brains take the encoded information and place it in storage. **Storage** *is the creation of a permanent record of information.*

In order for a memory to go into storage (i.e., long-term memory), it has to pass through three distinct stages: Sensory Memory, Short-Term Memory, and finally Long-Term Memory. These stages were first proposed by Richard Atkinson and Richard Shiffrin (1968). Their model of human memory, called **Atkinson-Shiffrin (A-S)**, *is based on the belief that we process memories in the same way that a computer processes information.*



According to the Atkinson-Shiffrin model of memory, information passes through three distinct stages in order for it to be stored in long-term memory.

But A-S is just one model of memory. Others, such as Baddeley and Hitch (1974), have proposed a model where short-term memory itself has different forms. In this model, storing memories in short-term memory is like opening different files on a computer and adding information. The type of short-term memory (or computer file) depends on the type of information received. There are memories in visual-spatial form, as well as memories of spoken or written material, and they are stored in three short-term systems: a visuospatial sketchpad, an episodic buffer, and a phonological loop. According to Baddeley and Hitch, a central executive part of memory supervises or controls the flow of information to and from the three short-term systems.

Sensory Memory

In the Atkinson-Shiffrin model, stimuli from the environment are processed first in **sensory memory**: *storage of brief sensory events, such as sights, sounds, and tastes*. It is very brief storage—up to a couple of seconds. We are constantly bombarded with sensory information. We cannot absorb all of it, or even most of it. And most of it has no impact on our lives. For example, what was your professor wearing during the last class period? As long as the professor was dressed appropriately, it did not really matter what she was wearing. Sensory information about sights, sounds, smells, and even textures, which we do not view as valuable information, we discard. If we view something as valuable, the information will move into our short-term memory system.

One study of sensory memory researched the significance of valuable information on short-term memory storage. J. R. Stroop discovered a memory phenomenon in the 1930s: you will name a color more easily if it

appears printed in that color, which is called the Stroop effect. In other words, the word “red” will be named more quickly, regardless of the color the word appears in, than any word that is colored red. Do not read the words, but say the color the word is printed in. For example, upon seeing the word “yellow” in green print, you should say “green,” not “yellow.” This experiment is fun, but it’s not as easy as it seems.



The Stroop effect describes why it is difficult for us to name a color when the word and the color of the word are different.

Short-Term Memory

Short-term memory (STM) *is a temporary storage system that processes incoming sensory memory; sometimes it is called working memory.* Short-term memory takes information from sensory memory and sometimes connects that memory to something already in long-term memory. Short-term memory storage lasts about 20 seconds. George Miller (1956), in his research on the capacity of memory, found that most people can retain about 7 items in STM. Some remember 5, some 9, so he called the capacity of STM 7 plus or minus 2.

Think of short-term memory as the information you have displayed on your computer screen—a document, a spreadsheet, or a web page. Then, information in short-term memory goes to long-term memory (you save it to your hard drive), or it is discarded (you delete a document or close a web browser). *This step of rehearsal, the conscious repetition of information to be remembered, to move STM into long-term memory is called* **memory consolidation**.

You may find yourself asking, “How much information can our memory handle at once?” To explore the capacity and duration of your short-term memory, have a partner read the strings of random numbers out loud

to you, beginning each string by saying, “Ready?” and ending each by saying, “Recall,” at which point you should try to write down the string of numbers from memory.

9754 68259 913825 5316842 86951372 719384273
6419 67148 648327 5963827 51739826 163875942

Work through this series of numbers using the recall exercise explained above to determine the longest string of digits that you can store.

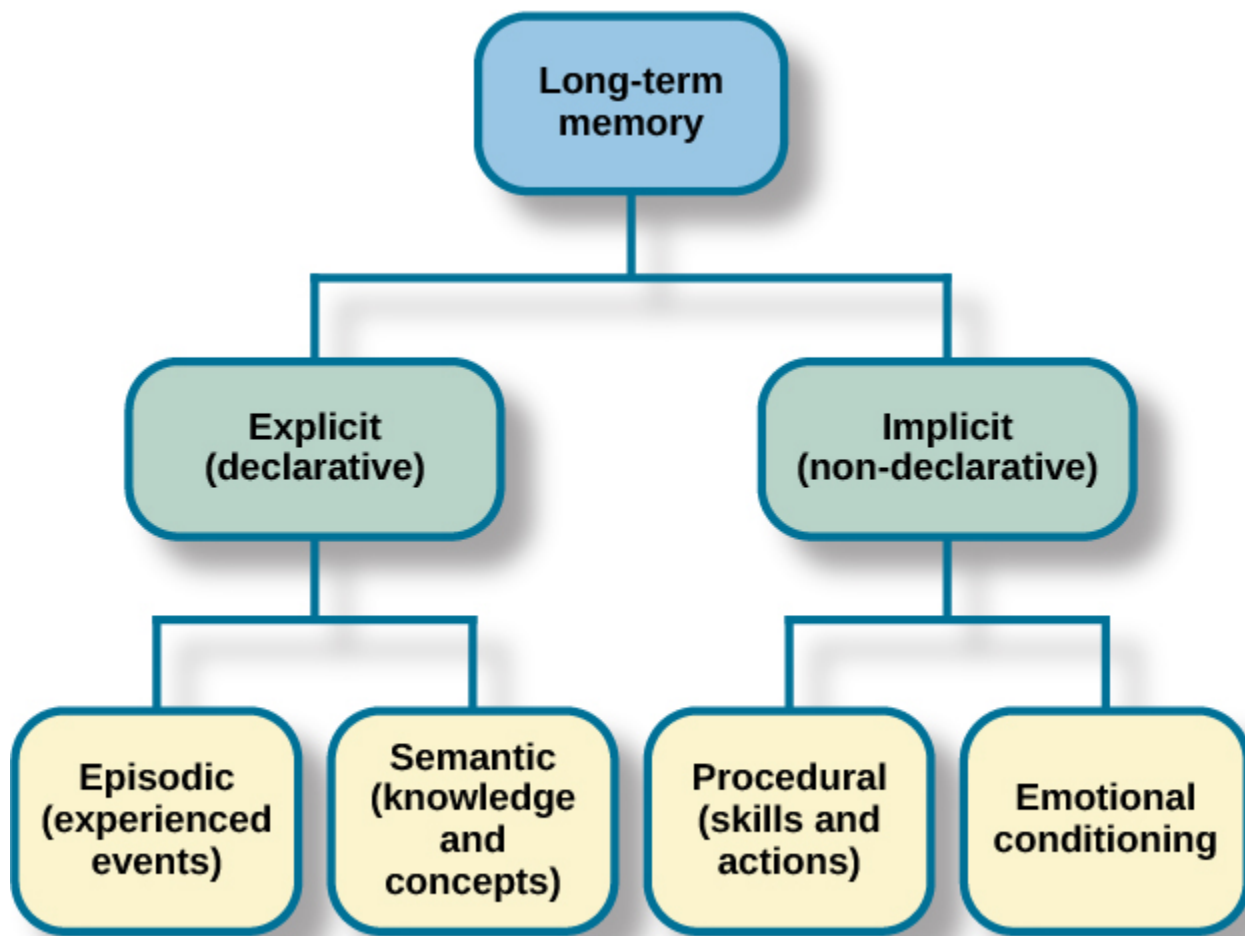
Note the longest string at which you got the series correct. For most people, this will be close to 7, Miller’s famous 7 plus or minus 2. Recall is somewhat better for random numbers than for random letters (Jacobs, 1887), and also often slightly better for information we hear (acoustic encoding) rather than see (visual encoding) (Anderson, 1969).

Long-term Memory

Long-term memory (LTM) *is the continuous storage of information.* Unlike short-term memory, the storage capacity of LTM has no limits. It encompasses all the things you can remember that happened more than just a few minutes ago to all of the things that you can remember that happened days, weeks, and years ago. In keeping with the computer analogy, the information in your LTM would be like the information you have saved on the hard drive. It isn’t there on your desktop (your short-term memory), but you can pull up this information when you want it, at least most of the time. Not all long-term memories are strong memories. Some memories can only be recalled through prompts. For example, you might easily recall a fact— “What is the capital of the United States?”—or a procedure—“How do you ride a bike?”—but you might struggle to recall the name of the restaurant you had dinner at when you were on vacation in France last summer. A prompt, such as that the restaurant was named after its owner, who spoke to you about your shared interest in soccer, may help you recall the name of the restaurant.

Long-term memory is divided into two types: explicit and implicit. Understanding the different types is important because a person’s age or particular types of brain trauma or disorders can leave certain types of LTM intact while having disastrous consequences for other types. **Explicit memories** *are those we consciously try to remember and recall.* For example, if you are studying for your chemistry exam, the material you are learning will be part of your explicit memory. (Note: Sometimes, but not always, the terms explicit memory and declarative memory are used interchangeably.)

Implicit memories *are memories that are not part of our consciousness.* They are memories formed from behaviors. Implicit memory is also called non-declarative memory.



There are two components of long-term memory: explicit and implicit. Explicit memory includes episodic and semantic memory. Implicit memory includes procedural memory and things learned through conditioning.

Procedural memory is a type of implicit memory: it stores information about how to do things. It is the memory for skilled actions, such as how to brush your teeth, how to drive a car, and how to swim the crawl (freestyle) stroke. If you are learning how to swim freestyle, you practice the stroke: how to move your arms, how to turn your head to alternate breathing from side to side, and how to kick your legs. You would practice this many times until you become good at it. Once you learn how to swim freestyle and your body knows how to move through the water, you will never forget how to swim freestyle, even if you do not swim for a couple of decades. Similarly, if you present an accomplished guitarist with a guitar, even if he has not played in a long time, he will still be able to play quite well.

Declarative memory has to do with the storage of facts and events we personally experienced. Explicit (declarative) memory has two parts: semantic memory and episodic memory. Semantic means having to do with language and knowledge about language. An example would be the question “What does *argumentative*

mean?” Stored in our semantic memory *is knowledge about words, concepts, and language-based knowledge and facts*. For example, answers to the following questions are stored in your semantic memory:

- Who was the first president of the United States?
- What is democracy?
- What is the longest river in the world?

Episodic memory *is information about events we have personally experienced*. The concept of episodic memory was first proposed about 40 years ago (Tulving, 1972). Since then, Tulving and others have looked at scientific evidence and reformulated the theory. Currently, scientists believe that episodic memory is memory about happenings in particular places at particular times, the what, where, and when of an event (Tulving, 2002). It involves the recollection of visual imagery as well as the feeling of familiarity (Hassabis & Maguire, 2007).

Can You Remember Everything You Ever Did or Said?

Episodic memories are also called autobiographical memories. Let’s quickly test your autobiographical memory. What were you wearing exactly five years ago today? What did you eat for lunch on April 10, 2009? You probably find it difficult, if not impossible, to answer these questions. Can you remember every event you have experienced over the course of your life—meals, conversations, clothing choices, weather conditions, and so on? Most likely none of us could even come close to answering these questions; however, American actress Marilu Henner, best known for the television show *Taxi*, can remember. She has an amazing and highly superior autobiographical memory.



Marilu Henner’s super autobiographical memory is known as hyperthymesia. (credit: Mark Richardson)

Very few people can recall events in this way; right now, only 12 known individuals have this ability, and only

a few have been studied (Parker, Cahill & McGaugh 2006). And although hyperthymesia normally appears in adolescence, two children in the United States appear to have memories from well before their tenth birthdays.

Watch the video clip on superior autobiographical memory from the television news show *60 Minutes*: [Endless Memory, Part 1](#).



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Test Your Understanding



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The Structure of LTM: Categories, Prototypes, and Schemas

Memories that are stored in LTM are not isolated but rather are linked together into **categories**—*networks of associated memories that have features in common with each other*. Forming categories, and using categories to guide behavior, is a fundamental part of human nature. Associated concepts within a category are connected through *spreading activation*, which occurs when activating one element of a category activates other associated elements. For instance, because tools are associated in a category, reminding people of the word

“screwdriver” will help them remember the word “wrench.” If they have just remembered the word “wrench,” they are more likely to remember the word “screwdriver” next than they are to remember the word “dahlia,” because the words are organized in memory by category and because “dahlia” is activated by spreading activation from “wrench” (Srull & Wyer, 1989).

Some categories have *defining features* that must be true of all members of the category. For instance, all members of the category “triangles” have three sides, and all members of the category “birds” lay eggs. But most categories are not so well-defined; the members of the category share some common features, but it is impossible to define which are or are not members of the category. For instance, there is no clear definition of the category “tool.” Some examples of the category, such as a hammer and a wrench, are clearly and easily identified as category members, whereas other members are not so obvious. Is an ironing board a tool? What about a car?

Members of categories (even those with defining features) can be compared to the category **prototype**, which is *the member of the category that is most average or typical of the category*. Some category members are more prototypical of, or similar to, the category than others. For instance, some category members (robins and sparrows) are highly prototypical of the category “birds,” whereas other category members (penguins and ostriches) are less prototypical. We retrieve information that is prototypical of a category faster than we retrieve information that is less prototypical (Rosch, 1975).



Category members vary in terms of their prototypicality. Some cats are “better” members of the category than others.

Mental categories are sometimes referred to as **schemas**—*patterns of knowledge in long-term memory that help us organize information*. We have schemas about objects (that a triangle has three sides and may take on different angles), about people (that Sam is friendly, likes to golf, and always wears sandals), about events (the particular steps involved in ordering a meal at a restaurant), and about social groups (we call these group schemas *stereotypes*).



Our schemas about people, couples, and events help us organize and remember information

Schemas are important in part because they help us remember new information by providing an organizational structure for it. Read the following paragraph (Bransford & Johnson, 1972) and then try to write down everything you can remember.

“The procedure is actually quite simple. First you arrange things into different groups. Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to a lack of facilities, that is the next step; otherwise you are pretty well set. It is important not to overdo things. That is, it is better to do too few things at once than too many. In the short run, this may not seem important, but complications can easily arise. A mistake can be expensive as well. At first the whole procedure will seem complicated. Soon, however, it will become just another facet of life. It is difficult to foresee any end to the necessity for this task in the immediate future, but then one never can tell. After the procedure is completed, one arranges the materials into different groups again. Then they can be put into their appropriate places. Eventually they will be used once more and the whole cycle will then have to be repeated. However, that is part of life.”

It turns out that people’s memory for this information is quite poor, unless they have been told ahead of time that the information describes “doing the laundry,” in which case their memory for the material is much better.

This demonstration of the role of schemas in memory shows how our existing knowledge can help us organize new information, and how this organization can improve encoding, storage, and retrieval.

Retrieval

So you have worked hard to encode (via effortful processing) and store some important information for your upcoming final exam. How do you get that information back out of storage when you need it? The act of getting information out of memory storage and back into conscious awareness is known as retrieval. This would be similar to finding and opening a paper you had previously saved on your computer's hard drive. Now it's back on your desktop, and you can work with it again. Our ability to retrieve information from long-term memory is vital to our everyday functioning. You must be able to retrieve information from memory in order to do everything, from knowing how to brush your hair and teeth, to driving to work, to knowing how to perform your job once you get there.

There are three ways you can retrieve information from your long-term memory storage system: recall, recognition, and relearning. **Recall** is what we most often think about when we talk about memory retrieval: it means you can access information without cues. For example, you would use recall for an essay test. Recognition happens when you identify information that you have previously learned after encountering it again. It involves a process of comparison. When you take a multiple-choice test, you are relying on recognition to help you choose the correct answer. Here is another example. Let's say you graduated from high school 10 years ago, and you have returned to your hometown for your 10-year reunion. You may not be able to recall all of your classmates, but you may recognize many of them based on their yearbook photos.

The third form of retrieval is **relearning**, and it's just what it sounds like. *It involves learning information that you previously learned.* Whitney took Spanish in high school, but after high school she did not have the opportunity to speak Spanish. Whitney is now 31, and her company has offered her an opportunity to work in their Mexico City office. In order to prepare herself, she enrolls in a Spanish course at the local community center. She's surprised at how quickly she's able to pick up the language after not speaking it for 13 years; this is an example of relearning.

Review Questions



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Critical Thinking Questions

Compare and contrast implicit and explicit memory.

Both are types of long-term memory. Explicit memories are memories we consciously try to remember and recall. Explicit memory is also called declarative memory and is subdivided into episodic memory (life events) and semantic memory (words, ideas, and concepts). Implicit memories are memories that are not part of our consciousness; they are memories formed from behaviors. Implicit memory is also called non-declarative memory and includes procedural memory as well as things learned through classical conditioning.

According to the Atkinson-Shiffrin model, name and describe the three stages of memory.

According to the Atkinson-Shiffrin model, memory is processed in three stages. The first is sensory memory; this is very brief: 1–2 seconds. Anything not attended to is ignored. The stimuli we pay attention to then move into our short-term memory. Short-term memory can hold approximately 7 bits of information for around 20 seconds. Information here is either forgotten, or it is encoded into long-term memory through the process of rehearsal. Long-term memory is the permanent storage of information—its capacity is basically unlimited.

Compare and contrast the two ways in which we encode information.

Information is encoded through automatic or effortful processing. Automatic processing refers to all information that enters long-term memory without conscious effort. This includes things such as time, space, and frequency—for example, your ability to remember what you ate for breakfast today or the fact that you remember that you ran into your best friend in the

supermarket twice this week. Effortful processing refers to encoding information through conscious attention and effort. Material that you study for a test requires effortful processing.

Personal Application Questions

Describe something you have learned that is now in your procedural memory. Discuss how you learned this information.

Describe something you learned in high school that is now in your semantic memory.

Summary

Memory is a system or process that stores what we learn for future use.

Our memory has three basic functions: encoding, storing, and retrieving information. Encoding is the act of getting information into our memory system through automatic or effortful processing. Storage is the retention of information, and **retrieval** *is the act of getting information out of storage and into conscious awareness through recall, recognition, and relearning*. The idea that information is processed through three memory systems is called the Atkinson-Shiffrin (A-S) model of memory. First, environmental stimuli enter our sensory memory for a period of less than a second to a few seconds. Those stimuli that we notice and pay attention to then move into short-term memory (also called working memory). According to the A-S model, if we rehearse this information, then it moves into long-term memory for permanent storage. Other models like that of Baddeley and Hitch suggest there is more of a feedback loop between short-term memory and long-term memory. Long-term memory has a practically limitless storage capacity and is divided into implicit and explicit memory. Finally, retrieval is the act of getting memories out of storage and back into conscious awareness. This is done through recall, recognition, and relearning.

44.

PARTS OF THE BRAIN INVOLVED WITH MEMORY

Learning Objectives

By the end of this section, you will be able to:

- Explain the brain functions involved in memory
- Recognize the roles of the hippocampus, amygdala, and cerebellum

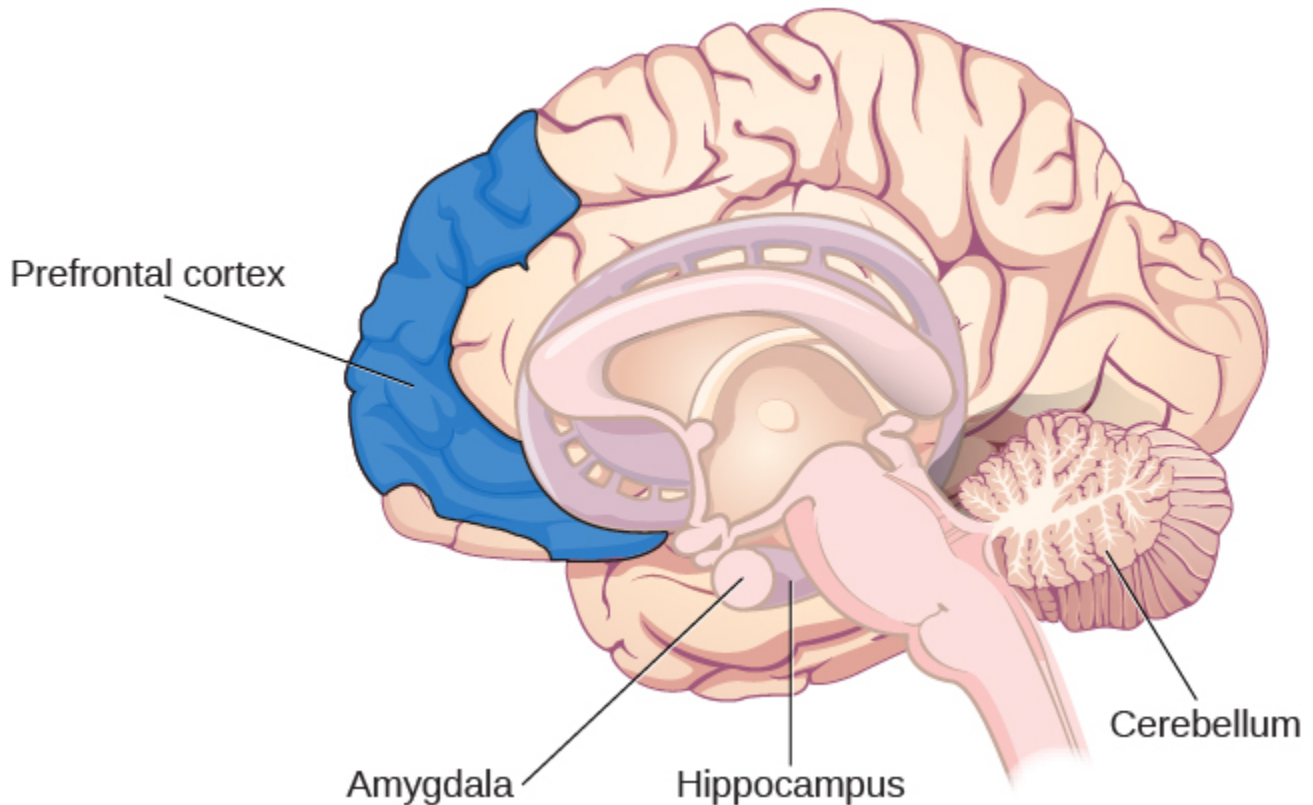
Are memories stored in just one part of the brain, or are they stored in many different parts of the brain? Karl Lashley began exploring this problem, about 100 years ago, by making lesions in the brains of animals such as rats and monkeys. He was searching for evidence of the **engram**: *the group of neurons that serve as the “physical representation of memory”* (Josselyn, 2010). First, Lashley (1950) trained rats to find their way through a maze. Then, he used the tools available at the time—in this case a soldering iron—to create lesions in the rats’ brains, specifically in the cerebral cortex. He did this because he was trying to erase the engram, or the original memory trace that the rats had of the maze.

Lashley did not find evidence of the engram, and the rats were still able to find their way through the maze, regardless of the size or location of the lesion. Based on his creation of lesions and the animals’ reaction, he formulated the **equipotentiality hypothesis**: *if part of one area of the brain involved in memory is damaged, another part of the same area can take over that memory function* (Lashley, 1950). Although Lashley’s early work did not confirm the existence of the engram, modern psychologists are making progress locating it. Eric Kandel, for example, spent decades working on the synapse, the basic structure of the brain, and its role in controlling the flow of information through neural circuits needed to store memories (Mayford, Siegelbaum, & Kandel, 2012).

Many scientists believe that the entire brain is involved with memory. However, since Lashley’s research, other scientists have been able to look more closely at the brain and memory. They have argued that memory

is located in specific parts of the brain, and specific neurons can be recognized for their involvement in forming memories. The main parts of the brain involved with memory are the amygdala, the hippocampus, the cerebellum, and the prefrontal cortex.

The amygdala is involved in fear and fear memories. The hippocampus is associated with declarative and episodic memory as well as recognition memory. The cerebellum plays a role in processing procedural memories, such as how to play the piano. The prefrontal cortex appears to be involved in remembering semantic tasks.



The main parts of the brain involved with memory are the amygdala, the hippocampus, the cerebellum, and the prefrontal cortex.

The Amygdala

First, let's look at the role of the amygdala in memory formation. The main job of the amygdala is to regulate emotions, such as fear and aggression. The amygdala plays a part in how memories are stored because storage is influenced by stress hormones. For example, one researcher experimented with rats and the fear response (Josselyn, 2010). Using Pavlovian conditioning, a neutral tone was paired with a foot shock to the rats. This produced a fear memory in the rats. After being conditioned, each time they heard the tone, they would freeze (a defense response in rats), indicating a memory of the impending shock. Then the researchers induced cell

death in neurons in the lateral amygdala, which is the specific area of the brain responsible for fear memories. They found the fear memory faded (became extinct). Because of its role in processing emotional information, the amygdala is also involved in memory consolidation: the process of transferring new learning into long-term memory. The amygdala seems to facilitate encoding memories at a deeper level when the event is emotionally arousing.

In this TED Talk called “A Mouse. A Laser Beam. A Manipulated Memory,” Steve Ramirez and Xu Liu from MIT talk about using laser beams to manipulate fear memory in rats. Find out why their work caused a media frenzy once it was published in *Science*: [A Mouse. A Laser Beam. A Manipulated Memory](#).



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The Hippocampus

Another group of researchers also experimented with rats to learn how the hippocampus functions in memory processing. They created lesions in the hippocampi of the rats, and found that the rats demonstrated memory impairment on various tasks, such as object recognition and maze running. They concluded that the hippocampus is involved in memory, specifically normal recognition memory as well as spatial memory (when the memory tasks are like recall tests) (Clark, Zola, & Squire, 2000). Another job of the hippocampus is to project information to cortical regions that give memories meaning and connect them with other connected

memories. It also plays a part in memory consolidation: the process of transferring new learning into long-term memory.

Injury to this area leaves us unable to process new declarative memories. One famous patient, known for years only as H. M., had both his left and right temporal lobes (hippocampi) removed in an attempt to help control the seizures he had been suffering from for years (Corkin, Amaral, González, Johnson, & Hyman, 1997). As a result, his declarative memory was significantly affected, and he could not form new semantic knowledge. He lost the ability to form new memories, yet he could still remember information and events that had occurred prior to the surgery.

For a closer look at how memory works, view this video on quirks of memory: [How does your memory work? | Head Squeeze](#).



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The Cerebellum and Prefrontal Cortex

Although the hippocampus seems to be more of a processing area for explicit memories, you could still lose it and be able to create implicit memories (procedural memory, motor learning, and classical conditioning) thanks to your cerebellum. For example, one classical conditioning experiment is to accustom subjects to blink when they are given a puff of air. When researchers damaged the cerebellums of rabbits, they discovered that the rabbits were not able to learn the conditioned eye-blink response (Steinmetz, 1999; Green & Woodruff-Pak, 2000).

Other researchers have used brain scans, including positron emission tomography (PET) scans, to learn how people process and retain information. From these studies, it seems the prefrontal cortex is involved. In one study, participants had to complete two different tasks: either looking for the letter *a* in words (considered a perceptual task) or categorizing a noun as either living or non-living (considered a semantic task) (Kapur et al., 1994). Participants were then asked which words they had previously seen. Recall was much better for the semantic task than for the perceptual task. According to PET scans, there was much more activation in the left inferior prefrontal cortex in the semantic task. In another study, encoding was associated with left frontal activity, while retrieval of information was associated with the right frontal region (Craik et al., 1999).

Neurotransmitters

There also appear to be specific neurotransmitters involved with the process of memory, such as epinephrine, dopamine, serotonin, glutamate, and acetylcholine (Myhrer, 2003). There continues to be discussion and debate among researchers as to which neurotransmitter plays which specific role (Blockland, 1996). Although we don't yet know which role each neurotransmitter plays in memory, we do know that communication among neurons via neurotransmitters is critical for developing new memories. Repeated activity by neurons leads to increased neurotransmitters in the synapses and more efficient and more synaptic connections. This is how memory consolidation occurs.

*It is also believed that strong emotions trigger the formation of strong memories, and weaker emotional experiences form weaker memories; this is called **arousal theory** (Christianson, 1992).* For example, strong emotional experiences can trigger the release of neurotransmitters, as well as hormones, which strengthen memory; therefore, our memory of an emotional event is usually better than our memory of a non-emotional event. When humans and animals are stressed, the brain secretes more of the neurotransmitter glutamate, which helps them remember the stressful event (McGaugh, 2003). This is clearly evidenced by what is known as the flashbulb memory phenomenon.

A **flashbulb memory** *is an exceptionally clear recollection of an important event.* Where were you when you first heard about the 9/11 terrorist attacks? Most likely you can remember where you were and what you were doing. In fact, a Pew Research Center (2011) survey found that for those Americans who were age 8 or older at the time of the event, 97% can recall the moment they learned of this event, even a decade after it happened.



Most people can remember where they were when they first heard about the 9/11 terrorist attacks. This is an example of a flashbulb memory: a record of an atypical and unusual event that has very strong emotional associations. (credit: Michael Foran)

Inaccurate and False Memories

Even flashbulb memories can have decreased accuracy with the passage of time, even with very important events. For example, on at least three occasions, when asked how he heard about the terrorist attacks of 9/11, President George W. Bush responded inaccurately. In January 2002, less than 4 months after the attacks, the then-sitting President Bush was asked how he heard about the attacks. He responded:

I was sitting there, and my Chief of Staff—well, first of all, when we walked into the classroom, I had seen this plane fly into the first building. There was a TV set on. And you know, I thought it was pilot error and I was amazed that anybody could make such a terrible mistake. (Greenberg, 2004, p. 2)

Contrary to what President Bush recalled, no one saw the first plane hit, except people on the ground near the twin towers. The first plane was not videotaped because it was a normal Tuesday morning in New York City, until the first plane hit.

Some people attributed Bush's wrong recall of the event to conspiracy theories. However, there is a much more benign explanation: human memory, even flashbulb memories, can be frail. In fact, memory can be so frail that we can convince a person an event happened to them, even when it did not. In studies, research participants will recall hearing a word, even though they never heard the word. For example, participants were

given a list of 15 sleep-related words, but the word “sleep” was not on the list. Participants recalled hearing the word “sleep” even though they did not actually hear it (Roediger & McDermott, 2000). The researchers who discovered this named the theory after themselves and a fellow researcher, calling it the Deese-Roediger-McDermott paradigm.

Test Your Understanding



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Review Questions



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Critical Thinking Questions

What might happen to your memory system if you sustained damage to your hippocampus? Because your hippocampus seems to be more of a processing area for your explicit memories, injury to this area could leave you unable to process new declarative (explicit) memories; however, even with this loss, you would be able to create implicit memories (procedural memory, motor learning and classical conditioning).

Personal Application Questions

Describe a flashback memory of a significant event in your life.

Summary

Beginning with Karl Lashley, researchers and psychologists have been searching for the engram, which is the physical trace of memory. Lashley did not find the engram, but he did suggest that memories are distributed throughout the entire brain rather than stored in one specific area. Now we know that three brain areas do play significant roles in the processing and storage of different types of memories: cerebellum, hippocampus, and amygdala. The cerebellum's job is to process procedural memories; the hippocampus is where new memories are encoded; the amygdala helps determine what memories to store, and it plays a part in determining where the memories are stored based on whether we have a strong or weak emotional response to the event. Strong emotional experiences can trigger the release of neurotransmitters, as well as hormones, which strengthen memory, so that memory for an emotional event is usually stronger than memory for a non-emotional event. This is shown by what is known as the flashback memory phenomenon: our ability to remember significant life events. However, our memory for life events (autobiographical memory) is not always accurate.

45.

PROBLEMS WITH MEMORY

Learning Objectives

By the end of this section, you will be able to:

- Compare and contrast the two types of amnesia
- Discuss the unreliability of eyewitness testimony
- Discuss encoding failure
- Discuss the various memory errors
- Compare and contrast the two types of interference

You may pride yourself on your amazing ability to remember the birthdates and ages of all of your friends and family members, or you may be able to recall vivid details of your fifth birthday party at Chuck E. Cheese's. However, all of us have at times felt frustrated, and even embarrassed, when our memories have failed us. There are several reasons why this happens.

Amnesia

Amnesia is the loss of long-term memory that occurs as the result of disease, physical trauma, or psychological trauma. Psychologist Tulving (2002) and his colleagues at the University of Toronto studied K. C. for years. K. C. suffered a traumatic head injury in a motorcycle accident and then had severe amnesia. Tulving writes,

the outstanding fact about K.C.'s mental make-up is his utter inability to remember any events, circumstances, or situations from his own life. His episodic amnesia covers his whole life, from birth to the present. The only exception is the experiences that, at any time, he has had in the last minute or two. (Tulving, 2002, p. 14)

Anterograde Amnesia

There are two common types of amnesia: anterograde amnesia and retrograde amnesia. Anterograde amnesia is commonly caused by brain trauma, such as a blow to the head. With **anterograde amnesia**, *you cannot remember new information, although you can remember information and events that happened prior to your injury*. The hippocampus is usually affected (McLeod, 2011). This suggests that damage to the brain has resulted in the inability to transfer information from short-term to long-term memory; that is, the inability to consolidate memories.

Many people with this form of amnesia are unable to form new episodic or semantic memories, but are still able to form new procedural memories (Bayley & Squire, 2002). This was true of H. M., who was discussed earlier. The brain damage caused by his surgery resulted in anterograde amnesia. H. M. would read the same magazine over and over, having no memory of ever reading it—it was always new to him. He also could not remember people he had met after his surgery. If you were introduced to H. M. and then you left the room for a few minutes, he would not know you upon your return and would introduce himself to you again. However, when presented with the same puzzle several days in a row, although he did not remember having seen the puzzle before, his speed at solving it became faster each day (because of relearning) (Corkin, 1965, 1968). This diagram illustrates the timeline of retrograde and anterograde amnesia. *Memory problems that extend back in time before the injury and prevent retrieval of information previously stored in long-term memory are known as **retrograde amnesia***. Conversely, memory problems that extend forward in time from the point of injury and prevent the formation of new memories are called anterograde amnesia.



Timeline of retrograde and anterograde amnesia

Retrograde Amnesia

Retrograde amnesia is a loss of memory for events that occurred prior to the trauma. People with retrograde amnesia cannot remember some or even all of their past. They have difficulty remembering episodic memories. What if you woke up in the hospital one day and there were people surrounding your bed claiming to be your spouse, your children, and your parents? The trouble is you don't recognize any of them. You were in a car accident, suffered a head injury, and now have retrograde amnesia. You don't remember anything about your

life prior to waking up in the hospital. This may sound like the stuff of Hollywood movies, and Hollywood has been fascinated with the amnesia plot for nearly a century, going all the way back to the film *Garden of Lies* from 1915 to more recent movies such as the Jason Bourne spy thrillers. However, for real-life sufferers of retrograde amnesia, like former NFL football player Scott Bolzan, the story is not a Hollywood movie. Bolzan fell, hit his head, and deleted 46 years of his life in an instant. He is now living with one of the most extreme cases of retrograde amnesia on record.

View the video story profiling Scott Bolzan's amnesia and his attempts to get his life back: [Scott Bolzan – My Life Was Deleted](#).



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Memory Construction and Reconstruction

*The formulation of new memories is sometimes called **construction**, and the process of bringing up old memories is called **reconstruction**.* Yet as we retrieve our memories, we also tend to alter and modify them. A memory pulled from long-term storage into short-term memory is flexible. New events can be added and we can change what we think we remember about past events, resulting in inaccuracies and distortions. People may not intend to distort facts, but it can happen in the process of retrieving old memories and combining them with new memories (Roediger and DeSoto, in press).

Suggestibility

When someone witnesses a crime, that person's memory of the details of the crime is very important in catching the suspect. Because memory is so fragile, witnesses can be easily (and often accidentally) misled due to the problem of suggestibility. **Suggestibility** *describes the effects of misinformation from external sources that leads to the creation of false memories.* In the fall of 2002, a sniper in the DC area shot people at a gas station, leaving Home Depot, and walking down the street. These attacks went on in a variety of places for over three weeks and resulted in the deaths of ten people. During this time, as you can imagine, people were terrified to

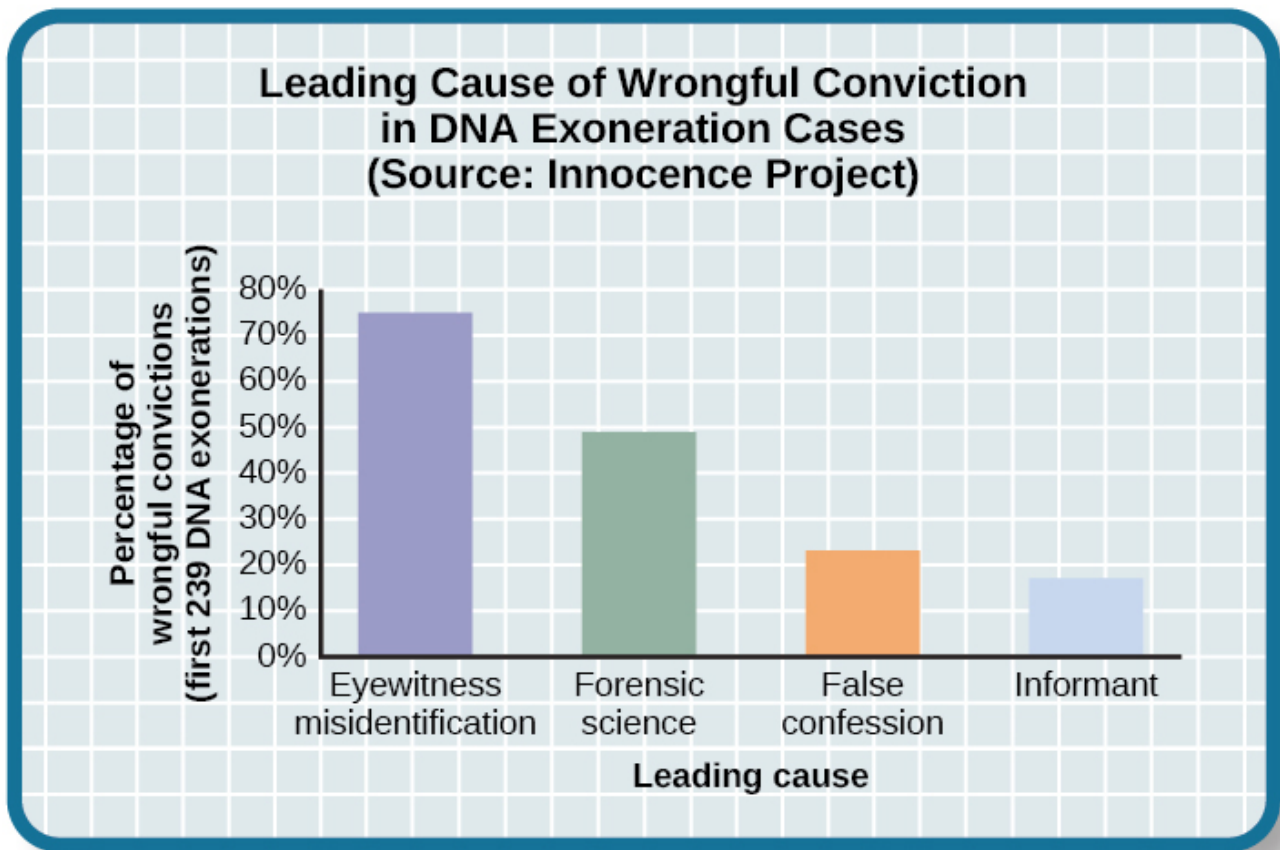
leave their homes, go shopping, or even walk through their neighborhoods. Police officers and the FBI worked frantically to solve the crimes, and a tip hotline was set up. Law enforcement received over 140,000 tips, which resulted in approximately 35,000 possible suspects (Newseum, n.d.).

Most of the tips were dead ends, until a white van was spotted at the site of one of the shootings. The police chief went on national television with a picture of the white van. After the news conference, several other eyewitnesses called to say that they too had seen a white van fleeing from the scene of the shooting. At the time, there were more than 70,000 white vans in the area. Police officers, as well as the general public, focused almost exclusively on white vans because they believed the eyewitnesses. Other tips were ignored. When the suspects were finally caught, they were driving a blue sedan.

As illustrated by this example, we are vulnerable to the power of suggestion, simply based on something we see on the news. Or we can claim to remember something that in fact is only a suggestion someone made. It is the suggestion that is the cause of the false memory.

Eyewitness Misidentification

Even though memory and the process of reconstruction can be fragile, police officers, prosecutors, and the courts often rely on eyewitness identification and testimony in the prosecution of criminals. However, faulty eyewitness identification and testimony can lead to wrongful convictions.



In studying cases where DNA evidence has exonerated people from crimes, the Innocence Project discovered that eyewitness misidentification is the leading cause of wrongful convictions (Benjamin N. Cardozo School of Law, Yeshiva University, 2009).

How does this happen? In 1984, Jennifer Thompson, then a 22-year-old college student in North Carolina, was brutally raped at knifepoint. As she was being raped, she tried to memorize every detail of her rapist's face and physical characteristics, vowing that if she survived, she would help get him convicted. After the police were contacted, a composite sketch was made of the suspect, and Jennifer was shown six photos. She chose two, one of which was of Ronald Cotton. After looking at the photos for 4–5 minutes, she said, "Yeah. This is the one," and then she added, "I think this is the guy." When questioned about this by the detective who asked, "You're sure? Positive?" She said that it was him. Then she asked the detective if she did OK, and he reinforced her choice by telling her she did great. These kinds of unintended cues and suggestions by police officers can lead witnesses to identify the wrong suspect. The district attorney was concerned about her lack of certainty the first time, so she viewed a lineup of seven men. She said she was trying to decide between numbers 4 and 5, finally deciding that Cotton, number 5, "Looks most like him." He was 22 years old.

By the time the trial began, Jennifer Thompson had absolutely no doubt that she was raped by Ronald Cotton. She testified at the court hearing, and her testimony was compelling enough that it helped convict him. How did she go from "I think it's the guy" and it "Looks most like him" to such certainty? Gary Wells

and Deah Quinlivan (2009) assert its suggestive police identification procedures, such as stacking lineups to make the defendant stand out, telling the witness which person to identify, and confirming witnesses' choices by telling them "Good choice," or "You picked the guy."

After Cotton was convicted of the rape, he was sent to prison for life plus 50 years. After 4 years in prison, he was able to get a new trial. Jennifer Thompson once again testified against him. This time Ronald Cotton was given two life sentences. After serving 11 years in prison, DNA evidence finally demonstrated that Ronald Cotton did not commit the rape, was innocent, and had served over a decade in prison for a crime he did not commit.

Ronald Cotton's story, unfortunately, is not unique. There are also people who were convicted and placed on death row who were later exonerated. The Innocence Project is a non-profit group that works to exonerate falsely convicted people, including those convicted by eyewitness testimony. To learn more, you can visit <http://www.innocenceproject.org>.

Preserving Eyewitness Memory: The Elizabeth Smart Case

Contrast the Cotton case with what happened in the Elizabeth Smart case. When Elizabeth was 14 years old and fast asleep in her bed at home, she was abducted at knifepoint. Her 9-year-old sister, Mary Katherine, was sleeping in the same bed and watched, terrified, as her beloved older sister was abducted. Mary Katherine was the sole eyewitness to this crime and was very fearful. In the coming weeks, the Salt Lake City police and the FBI proceeded with caution with Mary Katherine. They did not want to implant any false memories or mislead her in any way. They did not show her police line-ups or push her to do a composite sketch of the abductor. They knew if they corrupted her memory, Elizabeth might never be found. For several months, there was little or no progress on the case. Then, about 4 months after the kidnapping, Mary Katherine first recalled that she had heard the abductor's voice prior to that night (he had worked one time as a handyman at the family's home) and then she was able to name the person whose voice it was. The family contacted the press and others recognized him—after a total of 9 months, the suspect was caught and Elizabeth Smart was returned to her family.

The Misinformation Effect

Cognitive psychologist Elizabeth Loftus has conducted extensive research on memory. She has studied false memories as well as recovered memories of childhood sexual abuse. Loftus also developed the **misinformation effect paradigm**, *which holds that after exposure to incorrect information, a person may misremember the original event.*

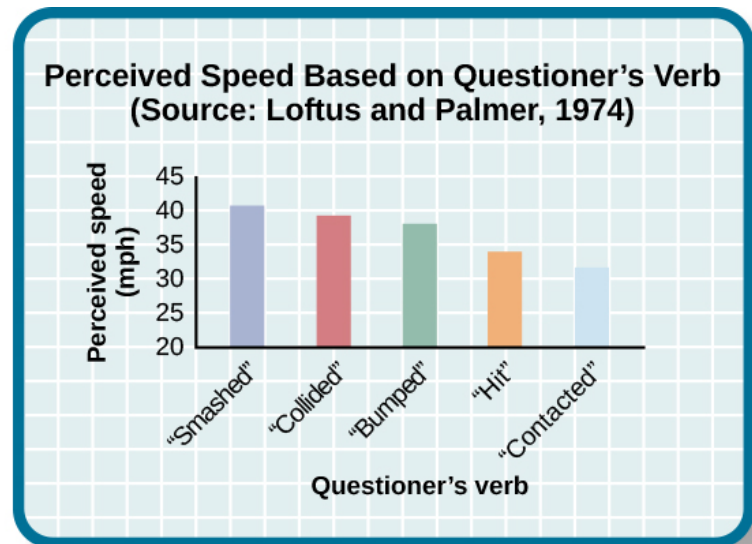
According to Loftus, an eyewitness's memory of an event is very flexible due to the misinformation effect.

To test this theory, Loftus and John Palmer (1974) asked 45 U.S. college students to estimate the speed of cars using different forms of questions. The participants were shown films of car accidents and were asked to play the role of the eyewitness and describe what happened. They were asked, “About how fast were the cars going when they (smashed, collided, bumped, hit, contacted) each other?” The participants estimated the speed of the cars based on the verb used.

Participants who heard the word “smashed” estimated that the cars were traveling at a much higher speed than participants who heard the word “contacted.” The implied information about speed, based on the verb they heard, had an effect on the participants’ memory of the accident. In a follow-up one week later, participants were asked if they saw any broken glass (none was shown in the accident pictures). Participants who had been in the “smashed” group were more than twice as likely to indicate that they did remember seeing glass. Loftus and Palmer demonstrated that a leading question encouraged them to not only remember the cars were going faster, but to also falsely remember that they saw broken glass.



(a)



(b)

When people are asked leading questions about an event, their memory of the event may be altered.
(credit a: modification of work by Rob Young)

Controversies over Repressed and Recovered Memories

Other researchers have described how whole events, not just words, can be falsely recalled, even when they did not happen. The idea that memories of traumatic events could be repressed has been a theme in the field of psychology, beginning with Sigmund Freud, and the controversy surrounding the idea continues today.

*Recall of false autobiographical memories is called **false memory syndrome**.* This syndrome has received a lot of publicity, particularly as it relates to memories of events that do not have independent witnesses—often the only witnesses to the abuse are the perpetrator and the victim (e.g., sexual abuse).

On one side of the debate are those who have recovered memories of childhood abuse years after it occurred.

These researchers argue that some children's experiences have been so traumatizing and distressing that they must lock those memories away in order to lead some semblance of a normal life. They believe that repressed memories can be locked away for decades and later recalled intact through hypnosis and guided imagery techniques (Devilly, 2007).

Research suggests that having no memory of childhood sexual abuse is quite common in adults. For instance, one large-scale study conducted by John Briere and Jon Conte (1993) revealed that 59% of 450 men and women who were receiving treatment for sexual abuse that had occurred before age 18 had forgotten their experiences. Ross Cheit (2007) suggested that repressing these memories created psychological distress in adulthood. The Recovered Memory Project was created so that victims of childhood sexual abuse can recall these memories and allow the healing process to begin (Cheit, 2007; Devilly, 2007).

On the other side, Loftus has challenged the idea that individuals can repress memories of traumatic events from childhood, including sexual abuse, and then recover those memories years later through therapeutic techniques such as hypnosis, guided visualization, and age regression.

Loftus is not saying that childhood sexual abuse doesn't happen, but she does question whether or not those memories are accurate, and she is skeptical of the questioning process used to access these memories, given that even the slightest suggestion from the therapist can lead to misinformation effects. For example, researchers Stephen Ceci and Maggie Brucks (1993, 1995) asked three-year-old children to use an anatomically correct doll to show where their pediatricians had touched them during an exam. Fifty-five percent of the children pointed to the genital/anal area on the dolls, even when they had not received any form of genital exam.

Ever since Loftus published her first studies on the suggestibility of eyewitness testimony in the 1970s, social scientists, police officers, therapists, and legal practitioners have been aware of the flaws in interview practices. Consequently, steps have been taken to decrease the suggestibility of witnesses. One way is to modify how witnesses are questioned. When interviewers use neutral and less leading language, children more accurately recall what happened and who was involved (Goodman, 2006; Pipe, 1996; Pipe, Lamb, Orbach, & Esplin, 2004). Another change is in how police lineups are conducted. It's recommended that a blind photo lineup be used. This way the person administering the lineup doesn't know which photo belongs to the suspect, minimizing the possibility of giving leading cues. Additionally, judges in some states now inform jurors about the possibility of misidentification. Judges can also suppress eyewitness testimony if they deem it unreliable.

Forgetting

"I've a grand memory for forgetting," quipped Robert Louis Stevenson. **Forgetting** *refers to the loss of information from long-term memory*. We all forget things, like a loved one's birthday, someone's name, or where we put our car keys. As you've come to see, memory is fragile, and forgetting can be frustrating and even embarrassing. But why do we forget? To answer this question, we will look at several perspectives on forgetting.

Encoding Failure

Sometimes memory loss happens before the actual memory process begins, which is encoding failure. We can't remember something if we never stored it in our memory in the first place. This would be like trying to find a book on your e-reader that you never actually purchased and downloaded. Often, in order to remember something, we must pay attention to the details and actively work to process the information (effortful encoding). Lots of times we don't do this. For instance, think of how many times in your life you've seen a penny. Can you accurately recall what the front of a U.S. penny looks like? When researchers Raymond Nickerson and Marilyn Adams (1979) asked this question, they found that most Americans don't know which one it is. The reason is most likely encoding failure. Most of us never encode the details of the penny. We only encode enough information to be able to distinguish it from other coins. If we don't encode the information, then it's not in our long-term memory, so we will not be able to remember it.



(a)



(b)



(c)



(d)

Can you tell which coin, (a), (b), (c), or (d), is the accurate depiction of a US nickel? The correct answer is (c).

Memory Errors

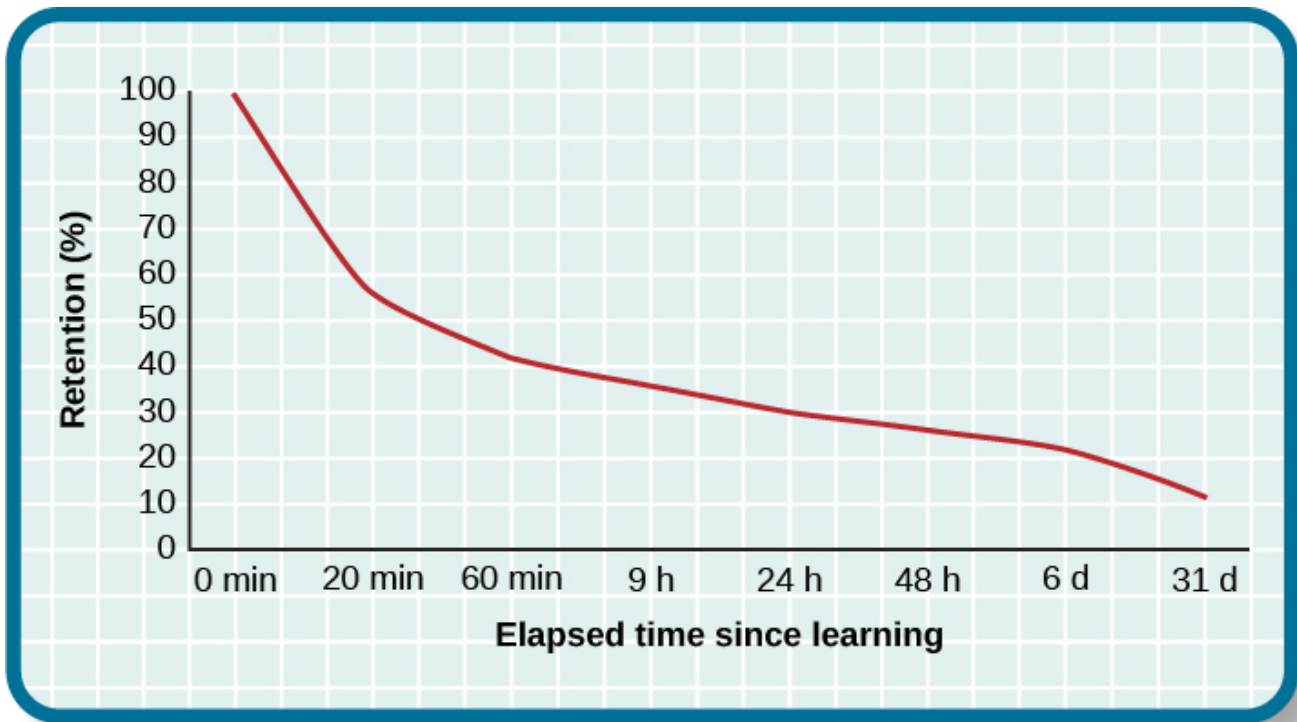
Psychologist Daniel Schacter (2001), a well-known memory researcher, offers seven ways our memories fail us. He calls them the seven sins of memory and categorizes them into three groups: forgetting, distortion, and intrusion.

Schacter's Seven Sins of Memory

Sin	Type	Description	Example
Transience	Forgetting	Accessibility of memory decreases over time	Forget events that occurred long ago
Absentmindedness	Forgetting	Forgetting caused by lapses in attention	Forget where your phone is
Blocking	Forgetting	Accessibility of information is temporarily blocked	Tip of the tongue
Misattribution	Distortion	Source of memory is confused	Recalling a dream memory as a waking memory
Suggestibility	Distortion	False memories	Result from leading questions
Bias	Distortion	Memories distorted by current belief system	Align memories to current beliefs
Persistence	Intrusion	Inability to forget undesirable memories	Traumatic events

Let's look at the first sin of the forgetting errors: **transience**, which means that memories can fade over time. Here's an example of how this happens. Nathan's English teacher has assigned his students to read the novel *To Kill a Mockingbird*. Nathan comes home from school and tells his mom he has to read this book for class. "Oh, I loved that book!" she says. Nathan asks her what the book is about, and after some hesitation, she says, "Well . . . I know I read the book in high school, and I remember that one of the main characters is named Scout, and her father is an attorney, but I honestly don't remember anything else." Nathan wonders if his mother actually read the book, and his mother is surprised she can't recall the plot. What is going on here is storage decay: unused information tends to fade with the passage of time.

In 1885, German psychologist Hermann Ebbinghaus analyzed the process of memorization. First, he memorized lists of nonsense syllables. Then he measured how much he learned (retained) when he attempted to relearn each list. He tested himself over different periods of time from 20 minutes later to 30 days later. The result is his famous forgetting curve. Due to storage decay, an average person will lose 50% of the memorized information after 20 minutes and 70% of the information after 24 hours (Ebbinghaus, 1885/1964). Your memory for new information decays quickly and then eventually levels out.



The Ebbinghaus forgetting curve shows how quickly memory for new information decays.

Are you constantly losing your cell phone? Have you ever driven back home to make sure you turned off the stove? Have you ever walked into a room for something, but forgotten what it was? You probably answered yes to at least one, if not all, of these examples—but don’t worry, you are not alone. We are all prone to committing the memory error known as **absentmindedness**. These *lapses in memory are caused by breaks in attention or our focus being somewhere else*.

Cynthia, a psychologist, recalls a time when she recently committed the memory error of absentmindedness.

When I was completing court-ordered psychological evaluations, each time I went to the court, I was issued a temporary identification card with a magnetic strip which would open otherwise locked doors. As you can imagine, in a courtroom, this identification is valuable and important and no one wanted it to be lost or be picked up by a criminal. At the end of the day, I would hand in my temporary identification. One day, when I was almost done with an evaluation, my daughter’s day care called and said she was sick and needed to be picked up. It was flu season, I didn’t know how sick she was, and I was concerned. I finished up the evaluation in the next ten minutes, packed up my tools, and rushed to drive to my daughter’s day care. After I picked up my daughter, I could not remember if I had handed back my identification or if I had left it sitting out on a table. I immediately called the court to check. It turned out that I had handed back my identification. Why could I not remember that? (personal communication, September 5, 2013)

When have you experienced absentmindedness?

“I just went and saw this movie called *Oblivion*, and it had that famous actor in it. Oh, what’s his name? He’s been in all of those movies, like *The Shawshank Redemption* and *The Dark Knight* trilogy. I think he’s

even won an Oscar. Oh gosh, I can picture his face in my mind, and hear his distinctive voice, but I just can't think of his name! This is going to bug me until I can remember it!" This particular error can be so frustrating because you have the information right on the tip of your tongue. Have you ever experienced this? If so, you've committed the error known as blocking: you can't access stored information.



Blocking is also known as *tip-of-the-tongue (TOT) phenomenon*. The memory is right there, but you can't seem to recall it, just like not being able to remember the name of that very famous actor, Morgan Freeman. (credit: modification of work by D. Miller)

Now let's take a look at the three errors of distortion: misattribution, suggestibility, and bias. **Misattribution** happens when you confuse the source of your information. Let's say Alejandro was dating Lucia and they saw the first Hobbit movie together. Then they broke up and Alejandro saw the second Hobbit movie with someone else. Later that year, Alejandro and Lucia get back together. One day, they are discussing how the Hobbit books

and movies are different and Alejandro says to Lucia, “I loved watching the second movie with you and seeing you jump out of your seat during that super scary part.” When Lucia responded with a puzzled and then angry look, Alejandro realized he’d committed the error of misattribution.

What if someone is a victim of rape shortly after watching a television program? Is it possible that the victim could actually blame the rape on the person she saw on television because of misattribution? This is exactly what happened to Donald Thomson.

Australian eyewitness expert Donald Thomson appeared on a live TV discussion about the unreliability of eyewitness memory. He was later arrested, placed in a lineup and identified by a victim as the man who had raped her. The police charged Thomson although the rape had occurred at the time he was on TV. They dismissed his alibi that he was in plain view of a TV audience and in the company of the other discussants, including an assistant commissioner of police. . . . Eventually, the investigators discovered that the rapist had attacked the woman as she was watching TV—the very program on which Thomson had appeared. Authorities eventually cleared Thomson. The woman had confused the rapist’s face with the face that she had seen on TV. (Baddeley, 2004, p. 133)

The second distortion error is suggestibility. Suggestibility is similar to misattribution, since it also involves false memories, but it’s different. With misattribution you create the false memory entirely on your own, which is what the victim did in the Donald Thomson case above. With suggestibility, it comes from someone else, such as a therapist or police interviewer asking leading questions of a witness during an interview.

Memories can also be affected by **bias**, which is the final distortion error. Schacter (2001) says that *your feelings and view of the world can actually distort your memory of past events*. There are several types of bias.

Stereotypical bias involves racial and gender biases. For example, when Asian American and European American research participants were presented with a list of names, they more frequently incorrectly remembered typical African American names such as Jamal and Tyrone to be associated with the occupation basketball player, and they more frequently incorrectly remembered typical White names such as Greg and Howard to be associated with the occupation of politician (Payne, Jacoby, & Lambert, 2004).

Egocentric bias involves enhancing our memories of the past (Payne et al., 2004). Did you really score the winning goal in that big soccer match, or did you just assist?

Hindsight bias happens when we think an outcome was inevitable after the fact. This is the “I knew it all along” phenomenon. The reconstructive nature of memory contributes to hindsight bias (Carli, 1999). We remember untrue events that seem to confirm that we knew the outcome all along.

Have you ever had a song play over and over in your head? How about a memory of a traumatic event, something you really do not want to think about? *When you keep remembering something, to the point where you can’t “get it out of your head” and it interferes with your ability to concentrate on other things, it is called persistence*. It’s Schacter’s seventh and last memory error. It’s actually a failure of our memory system because we involuntarily recall unwanted memories, particularly unpleasant ones. For instance, you witness a

horrific car accident on the way to work one morning, and you can't concentrate on work because you keep remembering the scene.

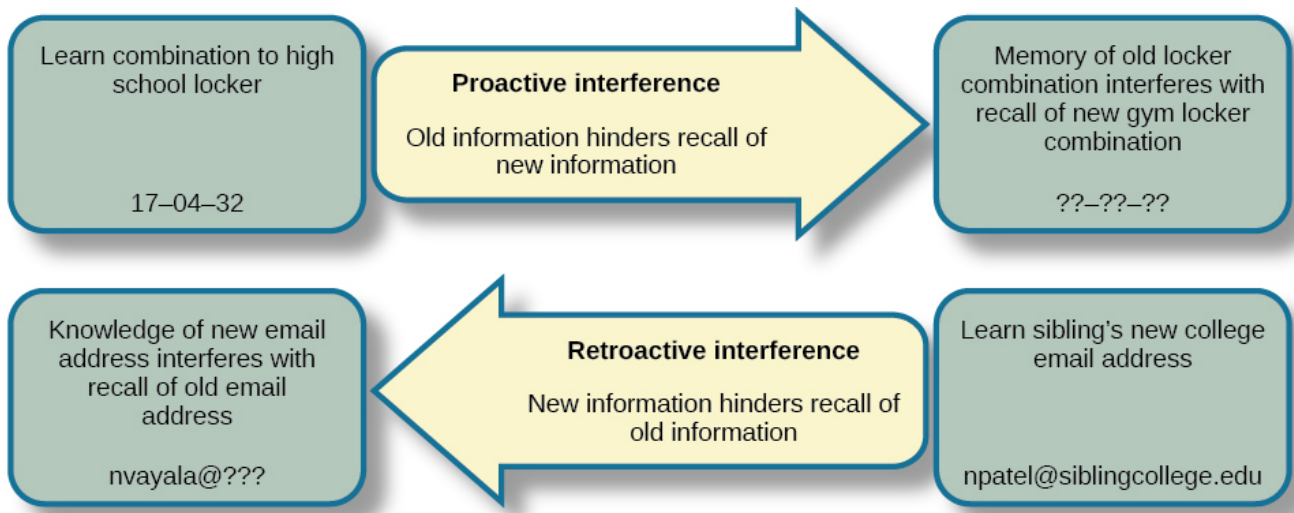


Many veterans of military conflicts involuntarily recall unwanted, unpleasant memories. (credit: Department of Defense photo by U.S. Air Force Tech. Sgt. Michael R. Holzworth)

Interference

Sometimes information is stored in our memory, but for some reason it is inaccessible. This is known as interference, and there are two types: proactive interference and retroactive interference. Have you ever gotten a new phone number or moved to a new address, but right after, you tell people the old (and wrong) phone number or address? When the new year starts, do you find you accidentally write the previous year? These are examples of **proactive interference**: *when old information hinders the recall of newly learned information*. **Retroactive interference** *happens when information learned more recently hinders the recall of older information*. For example, this week you are studying Freud's Psychoanalytic Theory. Next week you study the humanistic perspective of Maslow and Rogers. Thereafter, you have trouble remembering Freud's Psychosexual Stages of Development because you can only remember Maslow's Hierarchy of Needs.

Sometimes forgetting is caused by a failure to retrieve information. This can be due to interference, either retroactive or proactive.



Sometimes forgetting is caused by a failure to retrieve information. This can be due to interference, either retroactive or proactive.

Test Your Understanding



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Review Questions



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Critical Thinking Questions

Compare and contrast the two types of interference.

There are two types of interference: retroactive and proactive. Both are types of forgetting caused by a failure to retrieve information. With retroactive interference, new information hinders the ability to recall older information. With proactive interference, it's the opposite: old information hinders the recall of newly learned information.

Compare and contrast the two types of amnesia.

There are two types of amnesia: retrograde and anterograde. Both involve the loss of long-term memory that occurs as the result of disease, physical trauma, or psychological trauma. With anterograde amnesia, you cannot remember new information; however, you can remember information and events that happened prior to your injury. Retrograde amnesia is the exact opposite: you experience loss of memory for events that occurred before the trauma.

Personal Application Questions

1. Which of the seven memory errors presented by Schacter have you committed? Provide an example of each one.

2. Jurors place a lot of weight on eyewitness testimony. Imagine you are an attorney representing a defendant who is accused of robbing a convenience store. Several eyewitnesses have been called to testify against your client. What would you tell the jurors about the reliability of eyewitness testimony?

Summary

All of us at times have felt dismayed, frustrated, and even embarrassed when our memories have failed us. Our memory is flexible and prone to many errors, which is why eyewitness testimony has been found to be largely unreliable. There are several reasons why forgetting occurs. In cases of brain trauma or disease, forgetting may be due to amnesia. Another reason we forget is due to encoding failure. We can't remember something if we never stored it in our memory in the first place. Schacter presents seven memory errors that also contribute to forgetting. Sometimes, information is actually stored in our memory, but we cannot access it due to interference. Proactive interference happens when old information hinders the recall of newly learned information. Retroactive interference happens when information learned more recently hinders the recall of older information.

46.

WAYS TO ENHANCE MEMORY

Learning Objectives

By the end of this section, you will be able to:

- Recognize and apply memory-enhancing strategies
- Recognize and apply effective study techniques

Most of us suffer from memory failures of one kind or another, and most of us would like to improve our memories so that we don't forget where we put the car keys or, more importantly, the material we need to know for an exam. In this section, we'll look at some ways to help you remember better, and at some strategies for more effective studying.

Memory-Enhancing Strategies

What are some everyday ways we can improve our memory, including recall? *To help make sure information goes from short-term memory to long-term memory, you can use **memory-enhancing strategies**.* One strategy is rehearsal, or the conscious repetition of information to be remembered (Craig & Watkins, 1973). Think about how you learned your multiplication tables as a child. You may recall that $6 \times 6 = 36$, $6 \times 7 = 42$, and $6 \times 8 = 48$. Memorizing these facts is rehearsal.

Another strategy is **chunking**: *you organize information into manageable bits or chunks* (Bodie, Powers, & Fitch-Hauser, 2006). Chunking is useful when trying to remember information like dates and phone numbers. Instead of trying to remember 5205550467, you remember the number as 520-555-0467. So, if you met an interesting person at a party and you wanted to remember his phone number, you would naturally chunk it, and you could repeat the number over and over, which is the rehearsal strategy.

Try this fun activity that employs a memory-enhancing strategy: [Letter Memorization Test](#)

You could also enhance memory by using elaborative rehearsal. **Elaborative rehearsal** is a technique in which you think about the meaning of the new information and its relation to knowledge already stored in your memory (Tigner, 1999). For example, in this case, you could remember that 520 is an area code for Arizona and the person you met is from Arizona. This would help you better remember the 520 prefix. If the information is retained, it goes into long-term memory.

Mnemonic devices are memory aids that help us organize information for encoding. They are especially useful when we want to recall larger bits of information such as steps, stages, phases, and parts of a system (Bellezza, 1981). Brian needs to learn the order of the planets in the solar system, but he's having a hard time remembering the correct order. His friend Kelly suggests a mnemonic device that can help him remember. Kelly tells Brian to simply remember the name Mr. VEM J. SUN, and he can easily recall the correct order of the planets: **M**ercury, **V**enus, **E**arth, **M**ars, **J**upiter, **S**aturn, **U**ranus, and **N**eptune. You might use a mnemonic device to help you remember someone's name, a mathematical formula, or the seven levels of Bloom's taxonomy.



This is a knuckle mnemonic to help you remember the number of days in each month. Months with 31 days are represented by the protruding knuckles and shorter months fall in the spots between knuckles. (credit: modification of work by Cory Zanker)

If you have ever watched the television show *Modern Family*, you might have seen Phil Dunphy explain how he remembers names:

The other day I met this guy named Carl. Now, I might forget that name, but he was wearing a Grateful Dead t-shirt. What's a band like the Grateful Dead? Phish. Where do fish live? The ocean. What else lives in the ocean? Coral. Hello, Co-arl. (Wrubel & Spiller, 2010)

It seems the more vivid or unusual the mnemonic, the easier it is to remember. The key to using any mnemonic successfully is to find a strategy that works for you.

Watch this fascinating TED Talks lecture titled "Feats of Memory Anyone Can Do." The lecture is given by Joshua Foer, a science writer who "accidentally" won the U. S. Memory Championships. He explains a mnemonic device called the memory palace: [Feats of Memory Anyone Can Do](#).

Some other strategies that are used to improve memory include expressive writing and saying words aloud. Expressive writing helps boost your short-term memory, particularly if you write about a traumatic experience in your life. Masao Yogo and Shuji Fujihara (2008) had participants write for 20-minute intervals several times per month. The participants were instructed to write about a traumatic experience, their best possible future selves, or a trivial topic. The researchers found that this simple writing task increased short-term memory capacity after five weeks, but only for the participants who wrote about traumatic experiences. Psychologists can't explain why this writing task works, but it does.

What if you want to remember items you need to pick up at the store? Simply say them out loud to yourself. A series of studies (MacLeod, Gopie, Hourihan, Neary, & Ozubko, 2010) found that saying a word out loud improves your memory of the word because it increases the word's distinctiveness. Feel silly saying random grocery items aloud? This technique works equally well if you just mouth the words. Using these techniques increased participants' memory of the words by more than 10%. These techniques can also be used to help you study.

How to Study Effectively

Based on the information presented in this chapter, here are some strategies and suggestions to help you hone your study techniques. The key with any of these strategies is to figure out what works best for you.



Memory techniques can be useful when studying for class. (credit: Barry Pousman)

- **Use elaborative rehearsal:** In a famous article, Craik and Lockhart (1972) discussed their belief that information we process more deeply goes into long-term memory. Their theory is called **levels of processing**. *If we want to remember a piece of information, we should think about it more deeply and link it to other information and memories to make it more meaningful.* For example, if we are trying to remember that the hippocampus is involved with memory processing, we might envision a hippopotamus with excellent memory and then we could better remember the hippocampus.
- **Apply the self-reference effect:** As you go through the process of elaborative rehearsal, it would be even more beneficial to make the material you are trying to memorize personally meaningful to you. In other words, make use of the self-reference effect. Write notes in your own words. Write definitions from the text, and then rewrite them in your own words. Relate the material to something you have already learned for another class, or think how you can apply the concepts to your own life. When you do this, you are building a web of retrieval cues that will help you access the material when you want to remember it.
- **Don't forget the forgetting curve:** As you know, the information you learn drops off rapidly with time. Even if you think you know the material, study it again right before test time to increase the likelihood the information will remain in your memory. Overlearning can help prevent storage decay.
- **Rehearse, rehearse, rehearse:** Review the material over time, in spaced and organized study sessions. Organize and study your notes, and take practice quizzes/exams. Link the new information to other information you already know well.
- **Be aware of interference:** To reduce the likelihood of interference, study during a quiet time without interruptions or distractions (like television or music).
- **Keep moving:** Of course you already know that exercise is good for your body, but did you also know it's also good for your mind? Research suggests that regular aerobic exercise (anything that gets your heart rate elevated) is beneficial for memory (van Praag, 2008). Aerobic exercise promotes neurogenesis: the growth of new brain cells in the hippocampus, an area of the brain known to play a role in memory and learning.
- **Get enough sleep:** While you are sleeping, your brain is still at work. During sleep the brain organizes and consolidates information to be stored in long-term memory (Abel & Bäuml, 2013).
- **Make use of mnemonic devices:** As you learned earlier in this chapter, mnemonic devices often help us to remember and recall information. There are different types of mnemonic devices, such as the acronym. An acronym is a word formed by the first letter of each of the words you want to remember. For example, even if you live near one, you might have difficulty recalling the names of all five Great Lakes. What if I told you to think of the word Homes? HOMES is an acronym that represents Huron, Ontario, Michigan, Erie, and Superior: the five Great Lakes. Another type of mnemonic device is an acrostic: you make a phrase of all the first letters of the words. For example, if you are taking a math test and you are having difficulty remembering *the order of operations*, recalling the following sentence will help you: "Please Excuse My Dear Aunt Sally," because the order of mathematical operations is

Parentheses, Exponents, Multiplication, Division, Addition, Subtraction. There also are jingles, which are rhyming tunes that contain key words related to the concept, such as *i before e, except after c*.

Review Questions



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Critical Thinking Questions

What is the self-reference effect, and how can it help you study more effectively?

The self-reference effect is the tendency of an individual to have better memory for information that relates to oneself than information that is not personally relevant. You can use the self-reference effect to relate the material to something you have already learned for another class, or think how you can apply the concepts to your life. When you do this, you are building a web of retrieval cues that will help you access the material when you want to remember it.

You and your roommate spent all of last night studying for your psychology test. You think you know the material; however, you suggest that you study again the next morning an hour prior to the test. Your roommate asks you to explain why you think this is a good idea. What do you tell her?

You remind her about Ebbinghaus's forgetting curve: the information you learn drops off rapidly with time. Even if you think you know the material, you should study it again right before test time to increase the likelihood the information will remain in your memory. Overlearning can help prevent storage decay.

Personal Application Questions

Create a mnemonic device to help you remember a term or concept from this chapter.

What is an effective study technique that you have used? How is it similar to/different from the strategies suggested in this chapter.

Summary

There are many ways to combat the inevitable failures of our memory system. Some common strategies that can be used in everyday situations include mnemonic devices, rehearsal, self-referencing, and adequate sleep. These same strategies also can help you to study more effectively.

47.

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PART X

EMOTION AND MOTIVATION



Emotions can change in an instant, especially in response to an unexpected event. Surprise, fear, anger, and sadness are some immediate emotions that people experienced in the aftermath of the April 15, 2013, Boston Marathon bombing. What are emotions? What causes them? What motivated some bystanders to immediately help others, while other people ran for safety? (credit: modification of work by Aaron “tango” Tang)

What makes us behave as we do? What drives us to eat? What drives us toward sex? Is there a biological basis to explain the feelings we experience? How universal are emotions?

In this chapter, we will explore issues relating to both motivation and emotion. We will begin with a discussion of several theories that have been proposed to explain motivation and why we engage in a given behavior. You will learn about the physiological needs that drive some human behaviors, as well as the importance of our social experiences in influencing our actions.

Next, we will consider both eating and having sex as examples of motivated behaviors. What are the physiological mechanisms of hunger and satiety? What understanding do scientists have of why obesity occurs, and what treatments exist for obesity and eating disorders? How has research into human sex and sexuality evolved over the past century? How do psychologists understand and study the human experience of sexual orientation and gender identity? These questions—and more—will be explored.

This chapter will close with a discussion of emotion. You will learn about several theories that have been proposed to explain how emotion occurs, the biological underpinnings of emotion, and the universality of emotions.

48.

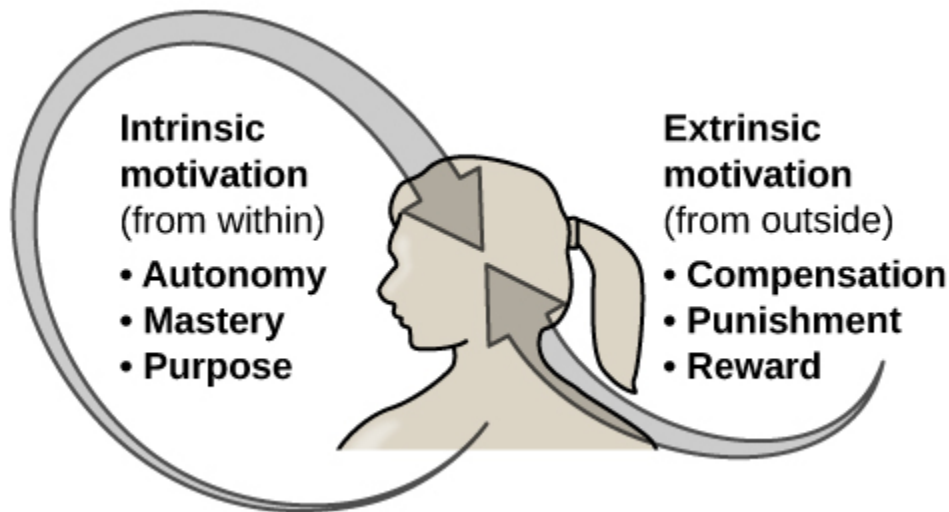
MOTIVATION

Learning Objectives

By the end of this section, you will be able to:

- Define intrinsic and extrinsic motivation
- Understand that instincts, drive reduction, self-efficacy, and social motives have all been proposed as theories of motivation
- Explain the basic concepts associated with Maslow's hierarchy of needs

Why do we do the things we do? What motivations underlie our behaviors? **Motivation** *describes the wants or needs that direct behavior toward a goal*. In addition to biological motives, motivations can be intrinsic (arising from internal factors) or extrinsic (arising from external factors). Intrinsically motivated behaviors are performed because of the sense of personal satisfaction that they bring, while extrinsically motivated behaviors are performed in order to receive something from others.



Intrinsic motivation comes from within the individual, while **extrinsic motivation** comes from outside the individual.

Think about why you are currently in college. Are you here because you enjoy learning and want to pursue an education to make yourself a more well-rounded individual? If so, then you are intrinsically motivated. However, if you are here because you want to get a college degree to make yourself more marketable for a high-paying career or to satisfy the demands of your parents, then your motivation is more extrinsic in nature.

In reality, our motivations are often a mix of both intrinsic and extrinsic factors, but the nature of the mix of these factors might change over time (often in ways that seem counter-intuitive). There is an old adage: “Choose a job that you love, and you will never have to work a day in your life,” meaning that if you enjoy your occupation, work doesn’t seem like . . . well, work. Some research suggests that this isn’t necessarily the case (Daniel & Esser, 1980; Deci, 1972; Deci, Koestner, & Ryan, 1999). According to this research, receiving some sort of extrinsic reinforcement (i.e., getting paid) for engaging in behaviors that we enjoy leads to those behaviors being thought of as work, no longer providing that same enjoyment. As a result, we might spend less time engaging in these reclassified behaviors in the absence of any extrinsic reinforcement. For example, Odessa loves baking, so in her free time, she bakes for fun. Oftentimes, after stocking shelves at her grocery store job, she often whips up pastries in the evenings because she enjoys baking. When a coworker in the store’s bakery department leaves his job, Odessa applies for his position and gets transferred to the bakery department. Although she enjoys what she does in her new job, after a few months, she no longer has much desire to concoct tasty treats in her free time. Baking has become work in a way that changes her motivation to do it. What Odessa has experienced is called the overjustification effect—intrinsic motivation is diminished when extrinsic motivation is given. This can lead to extinguishing the intrinsic motivation and creating a dependence on extrinsic rewards for continued performance (Deci et al., 1999).



Research suggests that when something we love to do, like icing cakes, becomes our job, our intrinsic and extrinsic motivations to do it may change.
(credit: Agustín Ruiz)

Other studies suggest that intrinsic motivation may not be so vulnerable to the effects of extrinsic reinforcements, and in fact, reinforcements such as verbal praise might actually increase intrinsic motivation (Arnold, 1976; Cameron & Pierce, 1994). In that case, Odessa's motivation to bake in her free time might remain high if, for example, customers regularly compliment her baking or cake decorating skills.

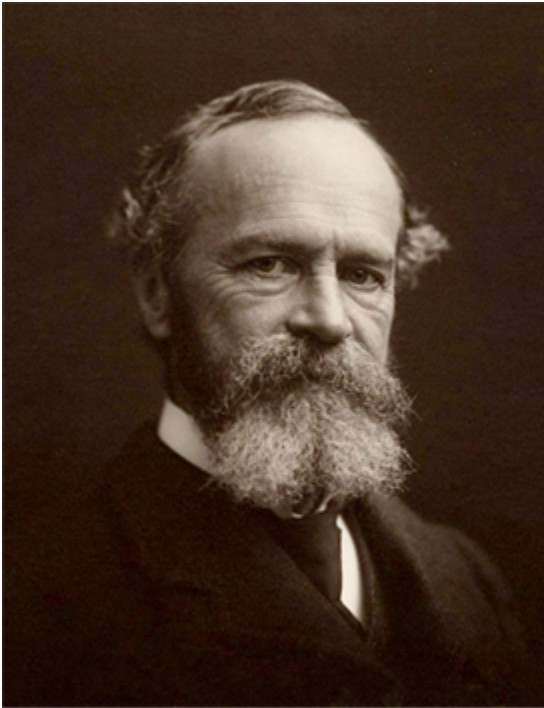
These apparent discrepancies in the researchers' findings may be understood by considering several factors. For one, physical reinforcement (such as money) and verbal reinforcement (such as praise) may affect an individual in very different ways. In fact, tangible rewards (i.e., money) tend to have more negative effects on intrinsic motivation than do intangible rewards (i.e., praise). Furthermore, the expectation of the extrinsic motivator by an individual is crucial: If the person expects to receive an extrinsic reward, then intrinsic motivation for the task tends to be reduced. If, however, there is no such expectation, and the extrinsic motivation is presented as a surprise, then intrinsic motivation for the task tends to persist (Deci et al., 1999).

In educational settings, students are more likely to experience intrinsic motivation to learn when they feel a sense of belonging and respect in the classroom. This internalization can be enhanced if the evaluative aspects of the classroom are de-emphasized and if students feel that they exercise some control over the learning environment. Furthermore, providing students with activities that are challenging, yet doable, along with a rationale for engaging in various learning activities can enhance intrinsic motivation for those tasks (Niemiec & Ryan, 2009). Consider Hakim, a first-year law student with two courses this semester: Family Law and Criminal Law. The Family Law professor has a rather intimidating classroom: He likes to put students on the spot with tough questions, which often leaves students feeling belittled or embarrassed. Grades are based exclusively on quizzes and exams, and the instructor posts results of each test on the classroom door. In contrast, the Criminal Law professor facilitates classroom discussions and respectful debates in small groups. The majority of the course grade is not exam-based, but centers on a student-designed research project on a crime issue of the student's choice. Research suggests that Hakim will be less intrinsically motivated in

his Family Law course, where students are intimidated in the classroom setting and there is an emphasis on teacher-driven evaluations. Hakim is likely to experience a higher level of intrinsic motivation in his Criminal Law course, where the class setting encourages inclusive collaboration and a respect for ideas, and where students have more influence over their learning activities.

Theories about Motivation

William James (1842–1910) was an important contributor to early research into motivation, and he is often referred to as the father of psychology in the United States. James theorized that behavior was driven by a number of instincts, which aid survival. From a biological perspective, an **instinct** *is a species-specific pattern of behavior that is not learned*. There was, however, considerable controversy among James and his contemporaries over the exact definition of instinct. James proposed several dozen special human instincts, but many of his contemporaries had their own lists that differed. A mother's protection of her baby, the urge to lick sugar, and hunting prey were among the human behaviors proposed as true instincts during James's era. This view—that human behavior is driven by instincts—received a fair amount of criticism because of the undeniable role of learning in shaping all sorts of human behavior. In fact, as early as the 1900s, some instinctive behaviors were experimentally demonstrated to result from associative learning (recall when you learned about Watson's conditioning of fear response in “Little Albert”) (Faris, 1921).



(a)



(b)

(a) William James proposed the instinct theory of motivation, asserting that behavior is driven by instincts. (b) In humans, instincts may include behaviors such as an infant's rooting for a nipple and sucking. (credit b: modification of work by "Mothering Touch"/Flickr)

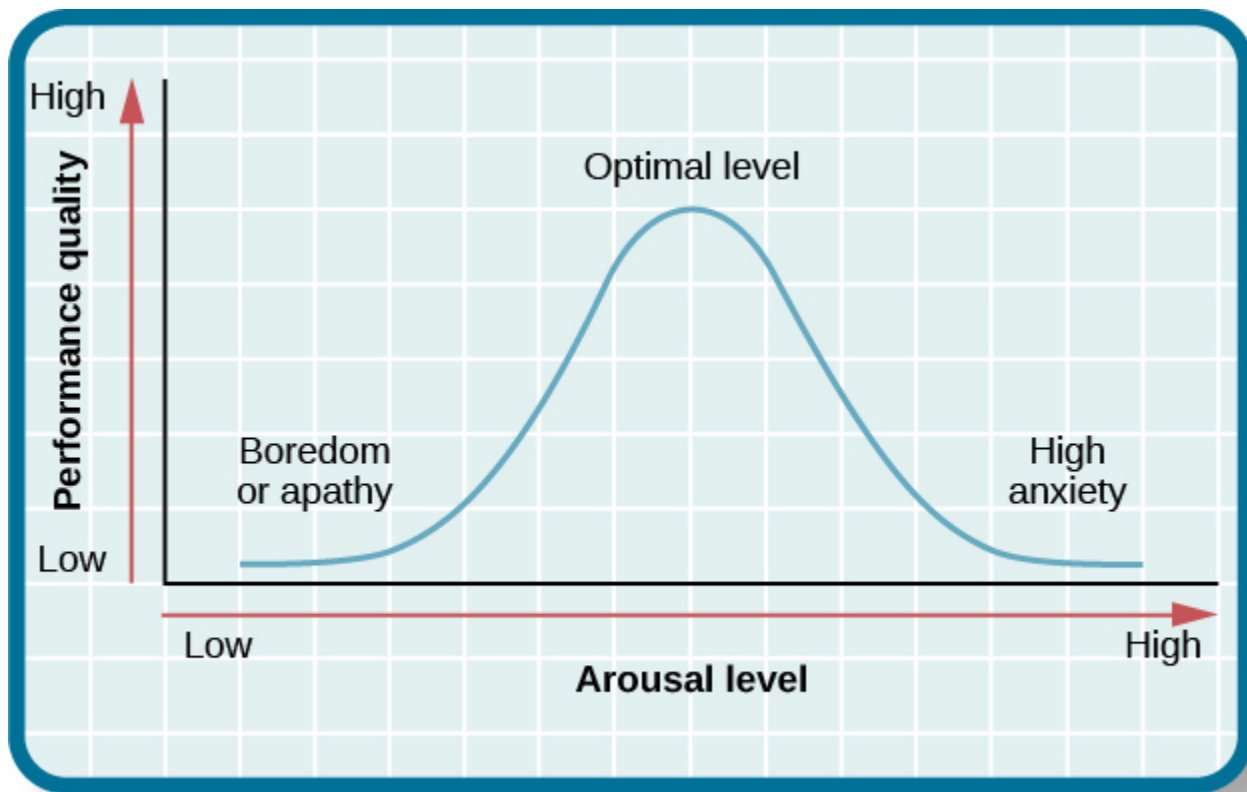
Another early theory of motivation proposed that the maintenance of homeostasis is particularly important in directing behavior. You may recall from your earlier reading that homeostasis is the tendency to maintain a balance, or optimal level, within a biological system. In a body system, a control center (which is often part of the brain) receives input from receptors (which are often complexes of neurons). The control center directs effectors (which may be other neurons) to correct any imbalance detected by the control center.

According to the **drive theory of motivation**, *deviations from homeostasis create physiological needs*. These needs result in psychological drive states that direct behavior to meet the need and, ultimately, bring the system back to homeostasis. For example, if it's been a while since you ate, your blood sugar levels will drop below normal. This low blood sugar will induce a physiological need and a corresponding drive state (i.e., hunger) that will direct you to seek out and consume food. Eating will eliminate the hunger, and, ultimately, your blood sugar levels will return to normal. Interestingly, drive theory also emphasizes the role that habits play in the type of behavioral response in which we engage. A **habit** is a *pattern of behavior in which we regularly engage*. Once we have engaged in a behavior that successfully reduces a drive, we are more likely to engage in that behavior whenever faced with that drive in the future (Graham & Weiner, 1996).



Hunger and subsequent eating are the result of complex physiological processes that maintain homeostasis. (credit “left”: modification of work by “Gracie and Viv”/Flickr; credit “center”: modification of work by Steven Depolo; credit “right”: modification of work by Monica Renata)

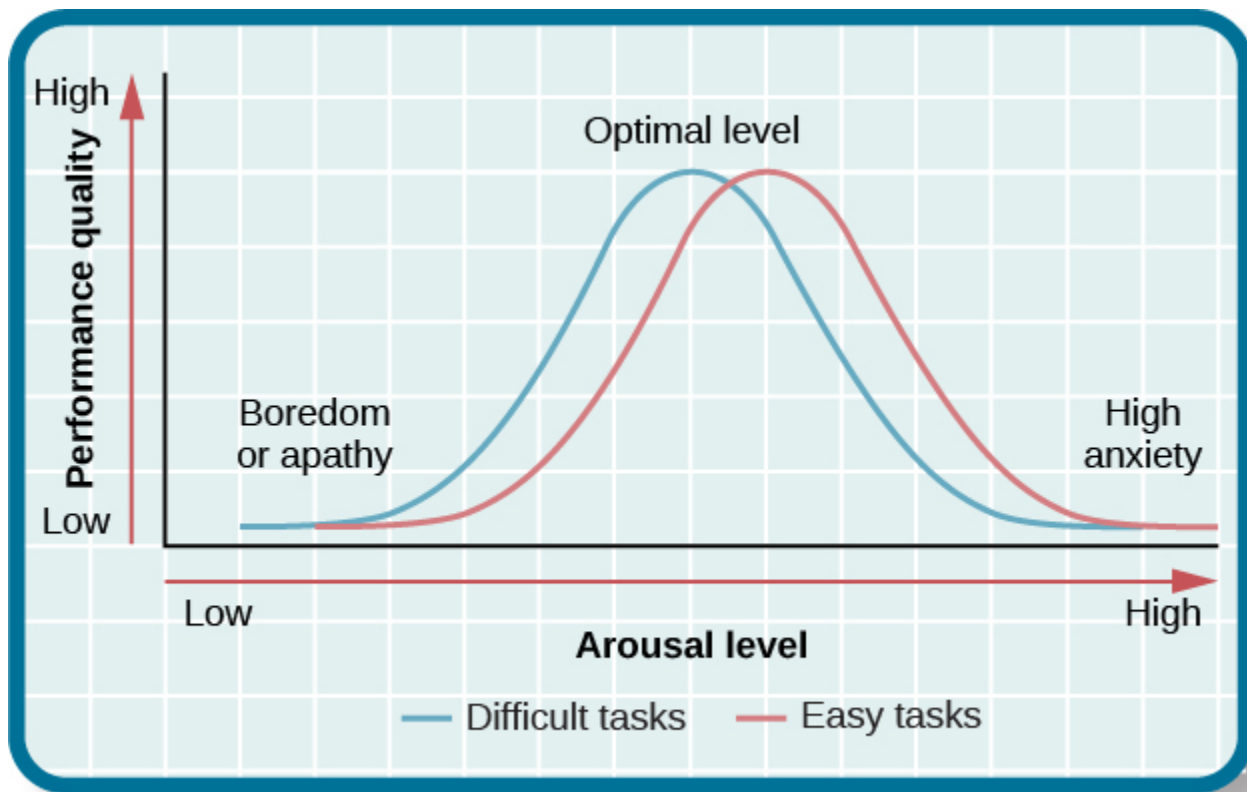
Extensions of drive theory take into account levels of arousal as potential motivators. As you recall from your study of learning, these theories assert that there is an optimal level of arousal that we all try to maintain. If we are underaroused, we become bored and will seek out some sort of stimulation. On the other hand, if we are overaroused, we will engage in behaviors to reduce our arousal (Berlyne, 1960). Most students have experienced this need to maintain optimal levels of arousal over the course of their academic career. Think about how much stress students experience toward the end of spring semester. They feel overwhelmed with seemingly endless exams, papers, and major assignments that must be completed on time. They probably yearn for the rest and relaxation that awaits them over the extended summer break. However, once they finish the semester, it doesn’t take too long before they begin to feel bored. Generally, by the time the next semester is beginning in the fall, many students are quite happy to return to school. This is an example of how arousal theory works.



The concept of optimal arousal in relation to performance on a task is depicted here. Performance is maximized at the optimal level of arousal, and it tapers off during under- and overarousal.

So what is the optimal level of arousal? What level leads to the best performance? Research shows that moderate arousal is generally best; when arousal is very high or very low, performance tends to suffer (Yerkes & Dodson, 1908). Think of your arousal level regarding taking an exam for this class. If your level is very low, such as boredom and apathy, your performance will likely suffer. Similarly, a very high level, such as extreme anxiety, can be paralyzing and hinder performance. Consider the example of a softball team facing a tournament. They are favored to win their first game by a large margin, so they go into the game with a lower level of arousal and get beat by a less skilled team.

But optimal arousal level is more complex than a simple answer that the middle level is always best. Researchers Robert Yerkes (pronounced “Yerk-EES”) and John Dodson discovered that the optimal arousal level depends on the complexity and difficulty of the task to be performed. This relationship is known as **Yerkes-Dodson law**, which holds that a simple task is performed best when arousal levels are relatively high and complex tasks are best performed when arousal levels are lower.



Task performance is best when arousal levels are in a middle range, with difficult tasks best performed under lower levels of arousal and simple tasks best performed under higher levels of arousal.

Test Your Understanding



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Self-efficacy and Social Motives

Self-efficacy is an individual's belief in her own capability to complete a task, which may include a previous

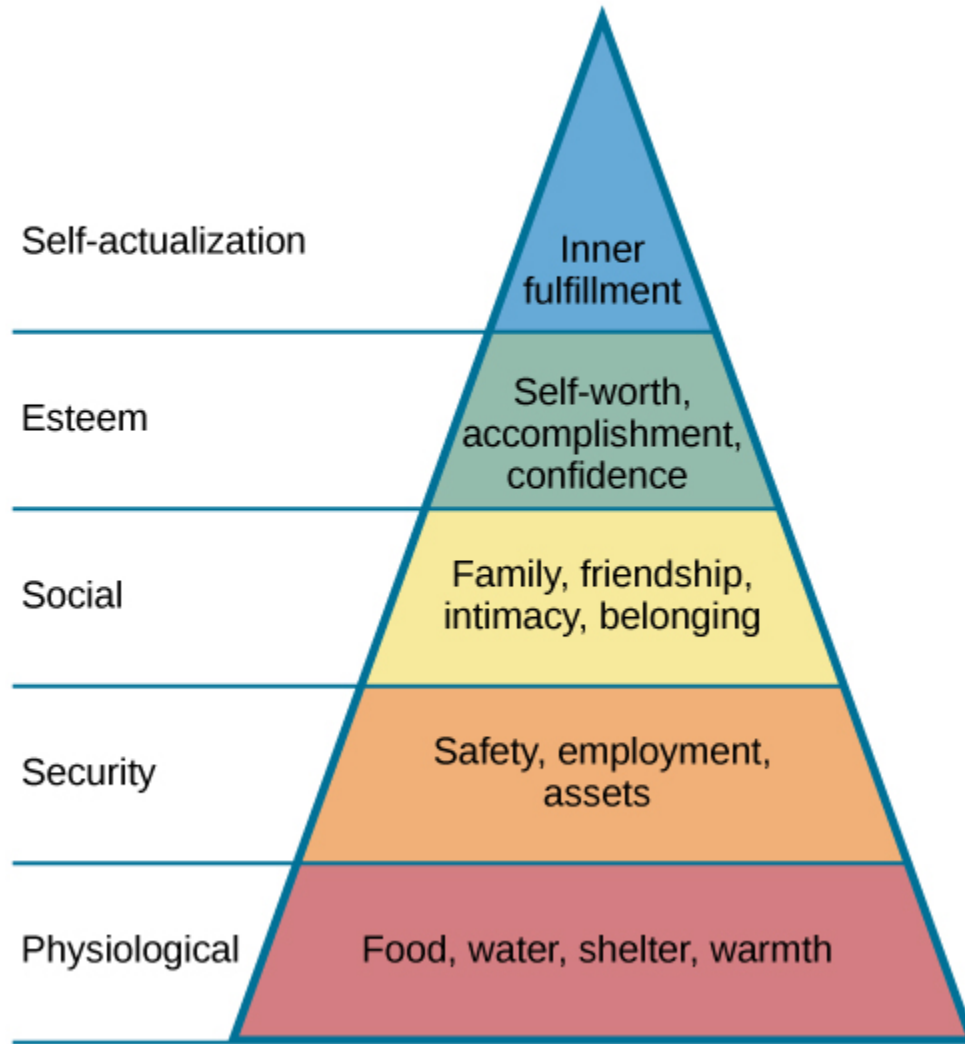
successful completion of the exact task or a similar task. Albert Bandura (1994) theorized that an individual's sense of self-efficacy plays a pivotal role in motivating behavior. Bandura argues that motivation derives from expectations that we have about the consequences of our behaviors, and ultimately, it is the appreciation of our capacity to engage in a given behavior that will determine what we do and the future goals that we set for ourselves. For example, if you have a sincere belief in your ability to achieve at the highest level, you are more likely to take on challenging tasks and to not let setbacks dissuade you from seeing the task through to the end.

A number of theorists have focused their research on understanding social motives (McAdams & Constantian, 1983; McClelland & Liberman, 1949; Murray et al., 1938). Among the motives they describe are needs for achievement, affiliation, and intimacy. It is the need for achievement that drives accomplishment and performance. The need for affiliation encourages positive interactions with others, and the need for intimacy causes us to seek deep, meaningful relationships. Henry Murray et al. (1938) categorized these needs into domains. For example, the need for achievement and recognition falls under the domain of ambition. Dominance and aggression were recognized as needs under the domain of human power, and play was a recognized need in the domain of interpersonal affection.

Maslow's Hierarchy of Needs

While the theories of motivation described earlier relate to basic biological drives, individual characteristics, or social contexts, Abraham Maslow (1943) proposed a **hierarchy of needs** *that spans the spectrum of motives ranging from the biological to the individual to the social.* These needs are often depicted as a pyramid.

Maslow's Hierarchy of Needs



Maslow's hierarchy of needs is illustrated here. In some versions of the pyramid, cognitive and aesthetic needs are also included between esteem and self-actualization. Others include another tier at the top of the pyramid for self-transcendence.

At the base of the pyramid are all of the physiological needs that are necessary for survival. These are followed by basic needs for security and safety, the need to be loved and to have a sense of belonging, and the need to have self-worth and confidence. The top tier of the pyramid is self-actualization, which is a need that essentially equates to achieving one's full potential, and it can only be realized when needs lower on the pyramid have been met. To Maslow and humanistic theorists, self-actualization reflects the humanistic emphasis on positive aspects of human nature. Maslow suggested that this is an ongoing, life-long process and that only a small percentage of people actually achieve a self-actualized state (Francis & Kritsonis, 2006; Maslow, 1943).

According to Maslow (1943), one must satisfy lower-level needs before addressing those needs that occur higher in the pyramid. So, for example, if someone is struggling to find enough food to meet his nutritional

requirements, it is quite unlikely that he would spend an inordinate amount of time thinking about whether others viewed him as a good person or not. Instead, all of his energies would be geared toward finding something to eat. However, it should be pointed out that Maslow's theory has been criticized for its subjective nature and its inability to account for phenomena that occur in the real world (Leonard, 1982). Other research has more recently addressed that late in life, Maslow proposed a self-transcendence level above self-actualization—to represent striving for meaning and purpose beyond the concerns of oneself (Koltko-Rivera, 2006). For example, people sometimes make self-sacrifices in order to make a political statement or in an attempt to improve the conditions of others. Mohandas K. Gandhi, a world-renowned advocate for independence through nonviolent protest, on several occasions went on hunger strikes to protest a particular situation. People may starve themselves or otherwise put themselves in danger, displaying higher-level motives beyond their own needs.

Check out this interactive exercise that illustrates some of the important concepts in Maslow's hierarchy of needs: [Maslow's Hierarchy of Needs Exercise](#).

Review Questions



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<https://louis.pressbooks.pub/intropsychology/?p=719#h5p-186>

Critical Thinking Questions

How might someone espousing an arousal theory of motivation explain visiting an amusement park?

The idea of optimal levels of arousal is similar to a drive theory of motivation. Presumably, we all seek to maintain some intermediate level of arousal. If we are underaroused, we are bored. If we are overaroused, we experience stress. The rides at an amusement park would provide higher arousal (however, we would hope that these rides don't actually pose significant threats to personal safety that would lead to a state of panic) to push us toward our own optimal level of arousal. Individuals at the park would choose different rides based on their specific arousal thresholds; for example, one person might find a simple water ride optimally arousing and an extreme roller coaster overarousing, while others would find the extreme roller coaster optimally arousing.

Schools often use concrete rewards to increase adaptive behaviors. How might this be a disadvantage for students intrinsically motivated to learn? What are educational implications of the potential for concrete rewards to diminish intrinsic motivation for a given task?

We would expect to see a shift from learning for the sake of learning to learning to earn some reward. This would undermine the foundation upon which traditional institutions of higher education are built. For a student motivated by extrinsic rewards, dependence on those may pose issues later in life (post-school) when there are not typically extrinsic rewards for learning.

Personal Application Question

Can you think of recent examples of how Maslow's hierarchy of needs might have affected your behavior in some way?

Summary

Motivation to engage in a given behavior can come from internal and/or external factors. Multiple theories have been put forward regarding motivation. More biologically oriented theories deal with the ways that instincts and the need to maintain bodily homeostasis motivate behavior. Bandura postulated that our sense

of self-efficacy motivates behaviors, and there are a number of theories that focus on a variety of social motives. Abraham Maslow's hierarchy of needs is a model that shows the relationship among multiple motives that range from lower-level physiological needs to a very high level of self-actualization.

49.

HUNGER AND EATING

Learning Objectives

By the end of this section, you will be able to:

- Describe how hunger and eating are regulated
- Differentiate between levels of overweight and obesity and the associated health consequences
- Explain the health consequences resulting from anorexia and bulimia nervosa

Eating is essential for survival, and it is no surprise that a drive like hunger exists to ensure that we seek out sustenance. While this chapter will focus primarily on the physiological mechanisms that regulate hunger and eating, powerful social, cultural, and economic influences also play important roles. This section will explain the regulation of hunger, eating, and body weight, and we will discuss the adverse consequences of disordered eating.

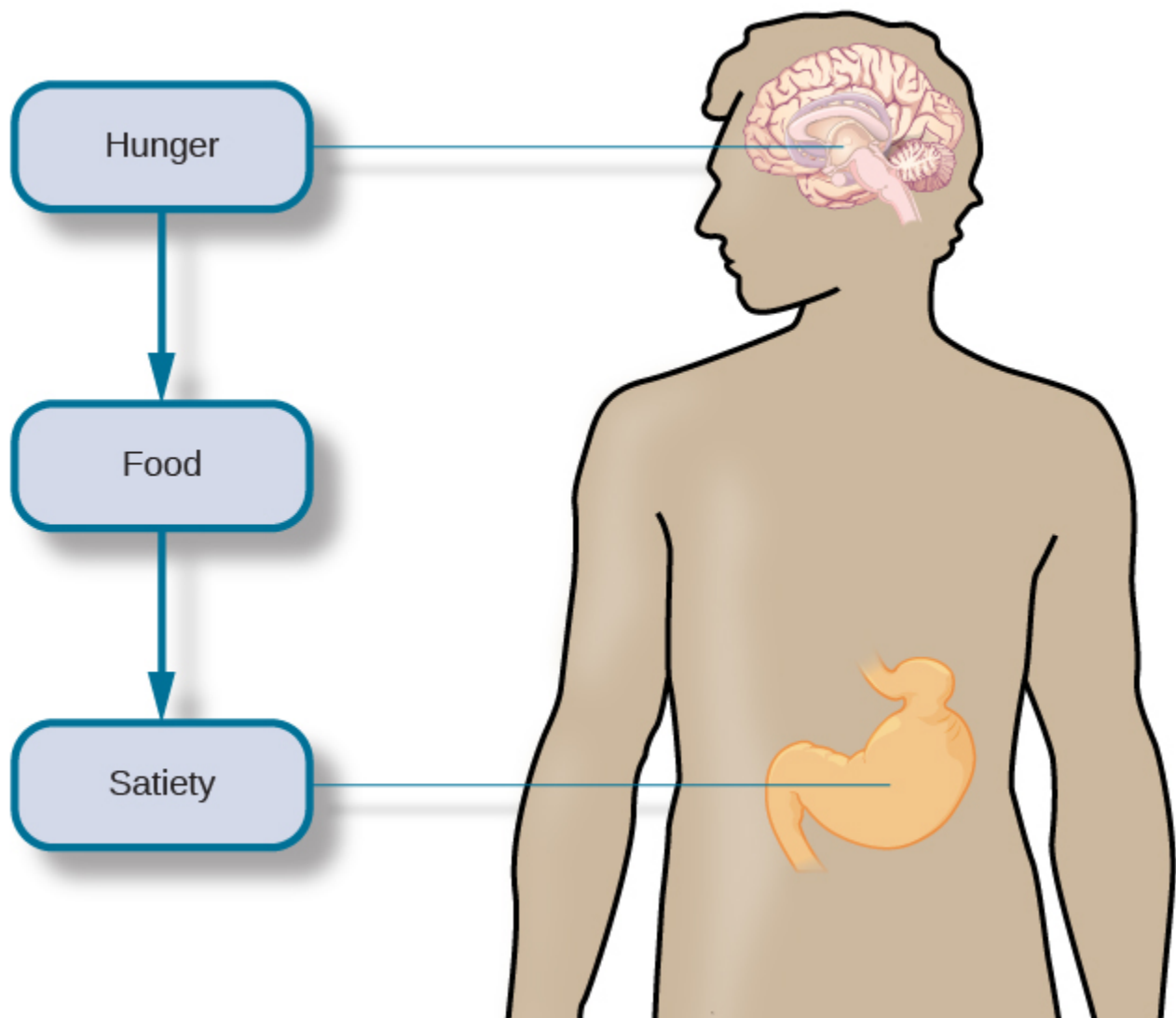
Physiological Mechanisms

There are a number of physiological mechanisms that serve as the basis for hunger. When our stomachs are empty, they contract, causing both hunger pangs and the secretion of chemical messages that travel to the brain to serve as a signal to initiate feeding behavior. When our blood glucose levels drop, the pancreas and liver generate a number of chemical signals that induce hunger (Konturek et al., 2003; Novin, Robinson, Culbreth, & Tordoff, 1985) and thus initiate feeding behavior.

For most people, once they have eaten, they feel satiation, or fullness and satisfaction, and their eating behavior stops. Like the initiation of eating, satiation is also regulated by several physiological mechanisms. As blood glucose levels increase, the pancreas and liver send signals to shut off hunger and eating (Drazen &

Woods, 2003; Druce, Small, & Bloom, 2004; Greary, 1990). The food's passage through the gastrointestinal tract also provides important satiety signals to the brain (Woods, 2004), and fat cells release **leptin**, a *satiety hormone*.

The various hunger and satiety signals that are involved in the regulation of eating are integrated in the brain. Research suggests that several areas of the hypothalamus and hindbrain are especially important sites where this integration occurs (Ahima & Antwi, 2008; Woods & D'Alessio, 2008). Ultimately, activity in the brain determines whether or not we engage in feeding behavior.



Hunger and eating are regulated by a complex interplay of hunger and satiety signals that are integrated in the brain.

Metabolism and Body Weight

Our body weight is affected by a number of factors, including gene-environment interactions, and the number

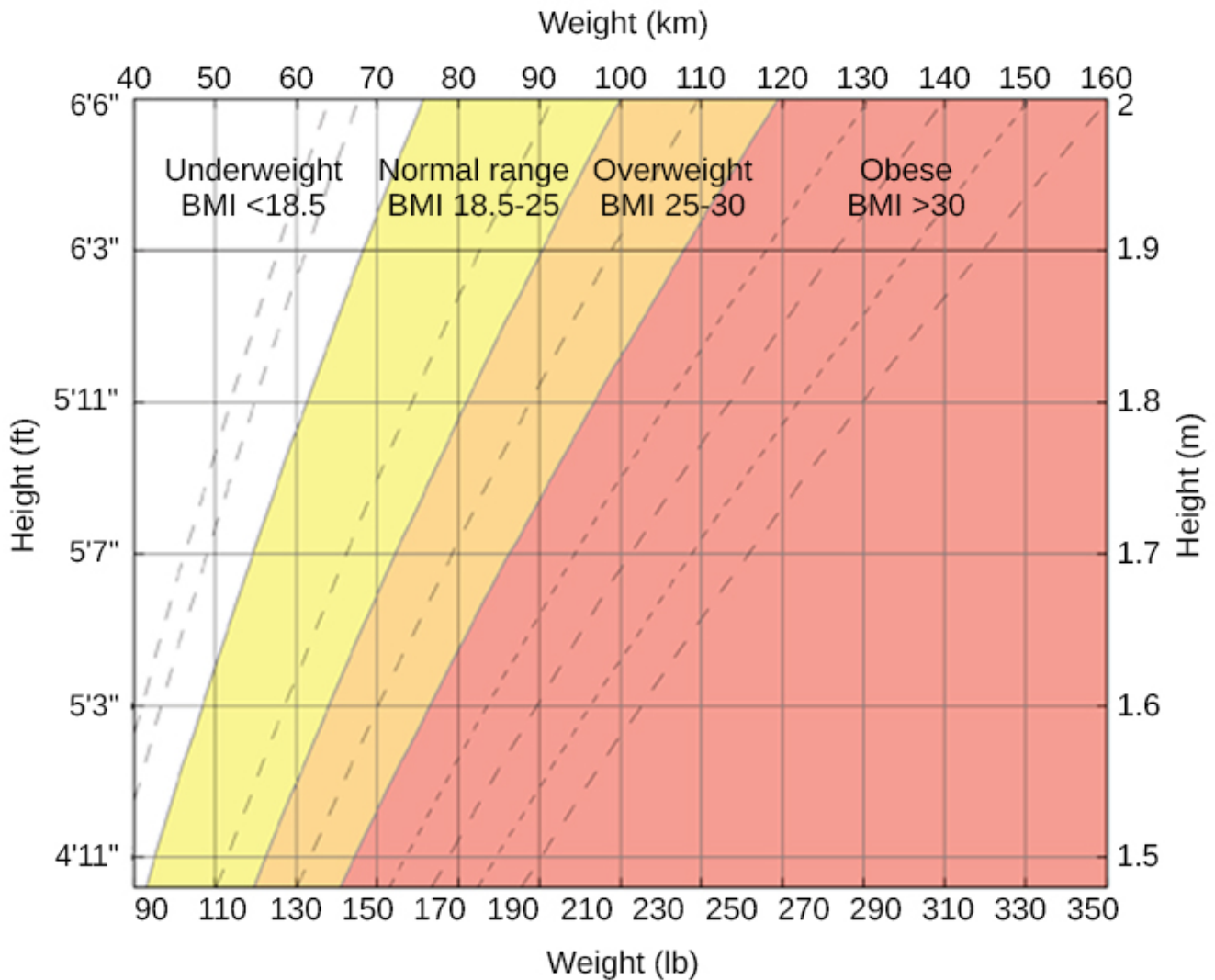
of calories we consume versus the number of calories we burn in daily activity. If our caloric intake exceeds our caloric use, our bodies store excess energy in the form of fat. If we consume fewer calories than we burn off, then stored fat will be converted to energy. Our energy expenditure is obviously affected by our levels of activity, but our body's metabolic rate also comes into play. A person's **metabolic rate** *is the amount of energy that is expended in a given period of time*, and there is tremendous individual variability in our metabolic rates. People with high rates of metabolism are able to burn off calories more easily than those with lower rates of metabolism.

We all experience fluctuations in our weight from time to time, but generally, most people's weights fluctuate within a narrow margin, in the absence of extreme changes in diet and/or physical activity. This observation led some to propose a set-point theory of body weight regulation. The set-point theory asserts that each individual has an ideal body weight, or set point, which is resistant to change. This set-point is genetically predetermined, and efforts to move our weight significantly from the set-point are resisted by compensatory changes in energy intake and/or expenditure (Speakman et al., 2011).

Some of the predictions generated from this particular theory have not received empirical support. For example, there are no changes in metabolic rate between individuals who had recently lost significant amounts of weight and a control group (Weinsier et al., 2000). In addition, the set-point theory fails to account for the influence of social and environmental factors in the regulation of body weight (Martin-Gronert & Ozanne, 2013; Speakman et al., 2011). Despite these limitations, set-point theory is still often used as a simple, intuitive explanation of how body weight is regulated.

Obesity

When someone weighs more than what is generally accepted as healthy for a given height, they are considered overweight or **obese**. According to the Centers for Disease Control and Prevention (CDC), *an adult with a body mass index (BMI) between 25 and 29.9 is considered overweight*. An adult with a BMI of 30 or higher is considered obese (Centers for Disease Control and Prevention [CDC], 2012). People who are so overweight that they are at risk for death are classified as morbidly obese. **Morbid obesity** *is defined as having a BMI over 40*. Note that although BMI has been used as a healthy weight indicator by the World Health Organization (WHO), the CDC, and other groups, its value as an assessment tool has been questioned. The BMI is most useful for studying populations, which is the work of these organizations. It is less useful in assessing an individual, since height and weight measurements fail to account for important factors like fitness level. An athlete, for example, may have a high BMI because the tool doesn't distinguish between the body's percentage of fat and muscle in a person's weight.



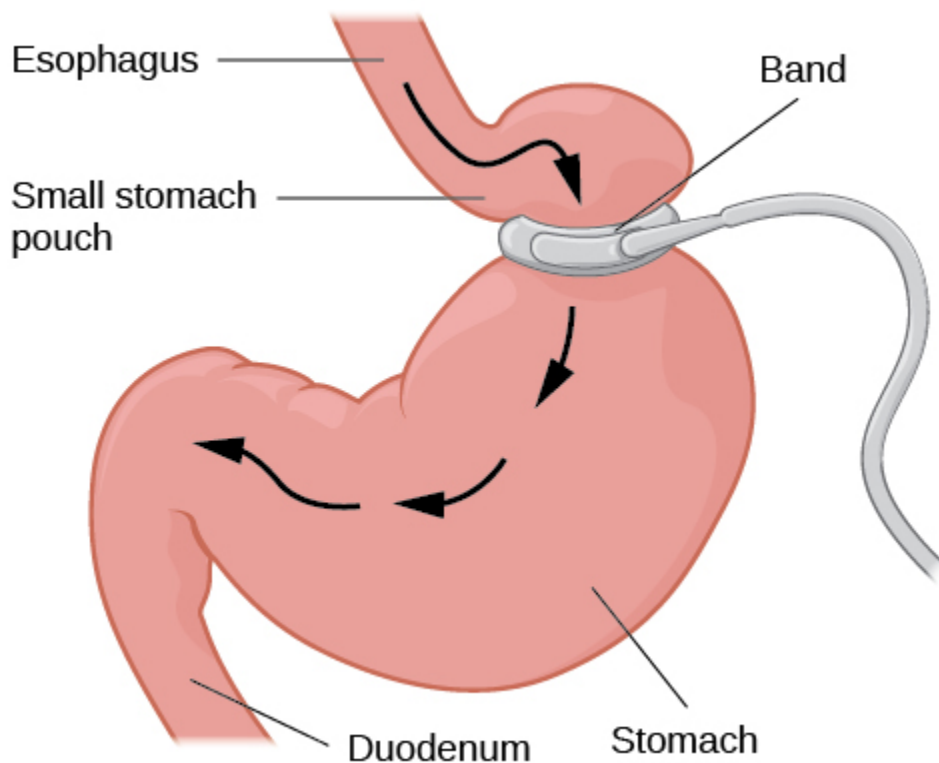
This is a graph of BMI categories based on the World Health Organization data. The dashed lines represent subdivisions within a major categorization.

Being extremely overweight or obese is a risk factor for several negative health consequences. These include, but are not limited to, an increased risk for cardiovascular disease, stroke, Type 2 diabetes, liver disease, sleep apnea, colon cancer, breast cancer, infertility, and arthritis. Given that it is estimated that in the United States around one-third of the adult population is obese and that nearly two-thirds of adults and one in six children qualify as overweight (CDC, 2012), there is substantial interest in trying to understand how to combat this important public health concern.

What causes someone to be overweight or obese? You have already read that both genes and environment are important factors for determining body weight, and if more calories are consumed than expended, excess energy is stored as fat. However, socioeconomic status and the physical environment must also be considered as contributing factors (CDC, 2012). For example, an individual who lives in an impoverished neighborhood that is overrun with a crime may never feel comfortable walking or biking to work or to the local market.

This might limit the amount of physical activity in which he engages and result in increased body weight. Similarly, some people may not be able to afford healthy food options from their market, or these options may be unavailable (especially in urban areas or poorer neighborhoods); therefore, some people rely primarily on available, inexpensive, high fat, and high-calorie fast food as their primary source of nutrition.

Generally, overweight and obese individuals are encouraged to try to reduce their weight through a combination of both diet and exercise. While some people are very successful with these approaches, many struggle to lose excess weight. In cases in which a person has had no success with repeated attempts to reduce weight or is at risk for death because of obesity, bariatric surgery may be recommended. **Bariatric surgery** is a type of surgery specifically aimed at weight reduction, and it involves modifying the gastrointestinal system to reduce the amount of food that can be eaten and/or limiting how much of the digested food can be absorbed (Mayo Clinic, 2013). A recent meta-analysis suggests that bariatric surgery is more effective than non-surgical treatment for obesity in the two-years immediately following the procedure, but to date, no long-term studies yet exist (Gloy et al., 2013).



Gastric banding surgery creates a small pouch of stomach, reducing the size of the stomach that can be used for digestion.

Prader-Willi Syndrome

Prader-Willi Syndrome (PWS) is a genetic disorder that results in persistent feelings of intense hunger and

reduced rates of metabolism. Typically, affected children have to be supervised around the clock to ensure that they do not engage in excessive eating. Currently, PWS is the leading genetic cause of morbid obesity in children, and it is associated with a number of cognitive deficits and emotional problems.



Eugenia Martínez Vallejo, depicted in this 1680 painting, may have had Prader-Willi syndrome. At just eight years old, she weighed approximately 120 pounds, and she was nicknamed “La Monstrua” (the monster).

While genetic testing can be used to make a diagnosis, there are a number of behavioral diagnostic criteria associated with PWS. From birth to 2 years of age, lack of muscle tone and poor sucking behavior may serve as early signs of PWS. Developmental delays are seen between the ages of 6 and 12, and excessive eating and cognitive deficits associated with PWS usually onset a little later.

While the exact mechanisms of PWS are not fully understood, there is evidence that affected individuals have hypothalamic abnormalities. This is not surprising, given the hypothalamus’s role in regulating hunger and eating. However, as you will learn in the next section of this chapter, the hypothalamus is also involved

in the regulation of sexual behavior. Consequently, many individuals suffering from PWS fail to reach sexual maturity during adolescence.

There is no current treatment or cure for PWS. However, if weight can be controlled in these individuals, then their life expectancies are significantly increased (historically, sufferers of PWS often died in adolescence or early adulthood). Advances in the use of various psychoactive medications and growth hormones continue to enhance the quality of life for individuals with PWS (Cassidy & Driscoll, 2009; Prader-Willi Syndrome Association, 2012).

Eating Disorders

While nearly two out of three US adults struggle with issues related to being overweight, a smaller, but significant, portion of the population has eating disorders that typically result in being normal weight or underweight. Often, these individuals are fearful of gaining weight. Individuals who suffer from bulimia nervosa and anorexia nervosa face many adverse health consequences (Mayo Clinic, 2012a, 2012b).

People suffering from **bulimia nervosa** *engage in binge eating behavior that is followed by an attempt to compensate for a large amount of food consumed*. Purging the food by inducing vomiting or through the use of laxatives are two common compensatory behaviors. Some affected individuals engage in excessive amounts of exercise to compensate for their binges. Bulimia is associated with many adverse health consequences that can include kidney failure, heart failure, and tooth decay. In addition, these individuals often suffer from anxiety and depression, and they are at an increased risk for substance abuse (Mayo Clinic, 2012b). The lifetime prevalence rate for bulimia nervosa is estimated at around 1% for women and less than 0.5% for men (Smink, van Hoeken, & Hoek, 2012).

As of the 2013 release of the *Diagnostic and Statistical Manual, fifth edition*, **Binge eating disorder** is a disorder recognized by the American Psychiatric Association (APA). Unlike with bulimia, *eating binges are not followed by inappropriate behavior, such as purging, but they are followed by distress, including feelings of guilt and embarrassment*. The resulting psychological distress distinguishes binge eating disorder from overeating (American Psychiatric Association [APA], 2013).

Anorexia nervosa *is an eating disorder characterized by the maintenance of a body weight well below average through starvation and/or excessive exercise*. Individuals suffering from anorexia nervosa often have a **distorted body image**, *referenced in literature as a type of body dysmorphia, meaning that they view themselves as overweight even though they are not*. Like bulimia nervosa, anorexia nervosa is associated with a number of significant negative health outcomes: bone loss, heart failure, kidney failure, amenorrhea (cessation of the menstrual period), reduced function of the gonads, and in extreme cases, death. Furthermore, there is an increased risk for a number of psychological problems, which include anxiety disorders, mood disorders, and substance abuse (Mayo Clinic, 2012a). Estimates of the prevalence of anorexia nervosa vary from study

to study but generally range from just under one percent to just over four percent in women. Generally, prevalence rates are considerably lower for men (Smink et al., 2012).

While both anorexia and bulimia nervosa occur in men and women of many different cultures, Caucasian females from Western societies tend to be the most at-risk population. Recent research indicates that females between the ages of 15 and 19 are most at risk, and it has long been suspected that these eating disorders are culturally-bound phenomena that are related to messages of a thin ideal often portrayed in popular media and the fashion world (Smink et al., 2012). While social factors play an important role in the development of eating disorders, there is also evidence that genetic factors may predispose people to these disorders (Collier & Treasure, 2004).



Young women in our society are inundated with images of extremely thin models (sometimes accurately depicted and sometimes digitally altered to make them look even thinner). These images may contribute to eating disorders. (credit: Peter Duhon)

Test Your Understanding



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Review Questions



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Critical Thinking Questions

The index that is often used to classify people as being underweight, normal weight, overweight, obese, or morbidly obese is called BMI. Given that BMI is calculated solely on weight and height, how could it be misleading?

Using BMI as a sole metric can actually be misleading because people who have large amounts of lean muscle mass can actually be characterized as being overweight or obese based on their

height and weight. Weight versus height is a somewhat crude measurement as it doesn't distinguish the amount of body weight that comes from lean versus fatty tissue.

As indicated in this section, Caucasian women from industrialized, Western cultures tend to be at the highest risk for eating disorders like anorexia and bulimia nervosa. Why might this be? These disorders are closely associated with sociocultural emphasis on a thin-ideal that is often portrayed in media. Given that non-Caucasians are under-represented in popular media in the West and that the thin-ideal is more heavily emphasized for women, this particular group is most vulnerable.

Personal Application Question

Think about popular television programs on the air right now. What do the women in these programs look like? What do the men look like? What kinds of messages do you think the media is sending about men and women in our society?

Summary

Hunger and satiety are highly regulated processes that result in a person maintaining a fairly stable weight that is resistant to change. When more calories are consumed than expended, a person will store excess energy as fat. Being significantly overweight adds substantially to a person's health risks and problems, including cardiovascular disease, type 2 diabetes, certain cancers, and other medical issues. Sociocultural factors that emphasize thinness as a beauty ideal and a genetic predisposition contribute to the development of eating disorders in many young females, though eating disorders span ages and genders.

50.

SEXUAL BEHAVIOR

Learning Objectives

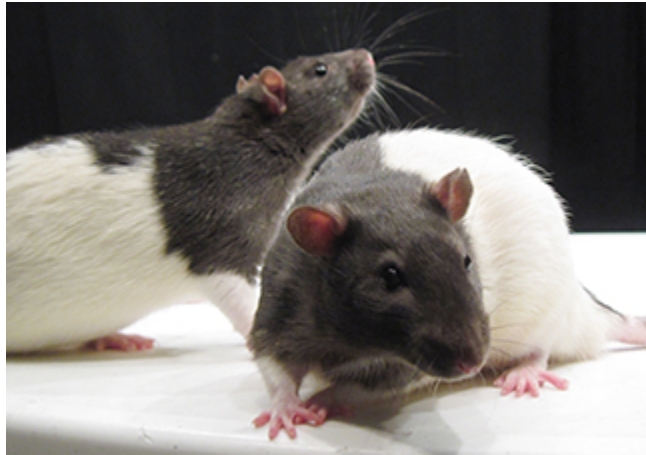
By the end of this section, you will be able to:

- Understand basic biological mechanisms regulating sexual behavior and motivation
- Define sexual orientation and gender identity

Like food, sex is an important part of our lives. From an evolutionary perspective, the reason is obvious—perpetuation of the species. Sexual behavior in humans, however, involves much more than reproduction. This section provides an overview of research that has been conducted on human sexual behavior and motivation. This section will close with a discussion of issues related to gender and sexual orientation.

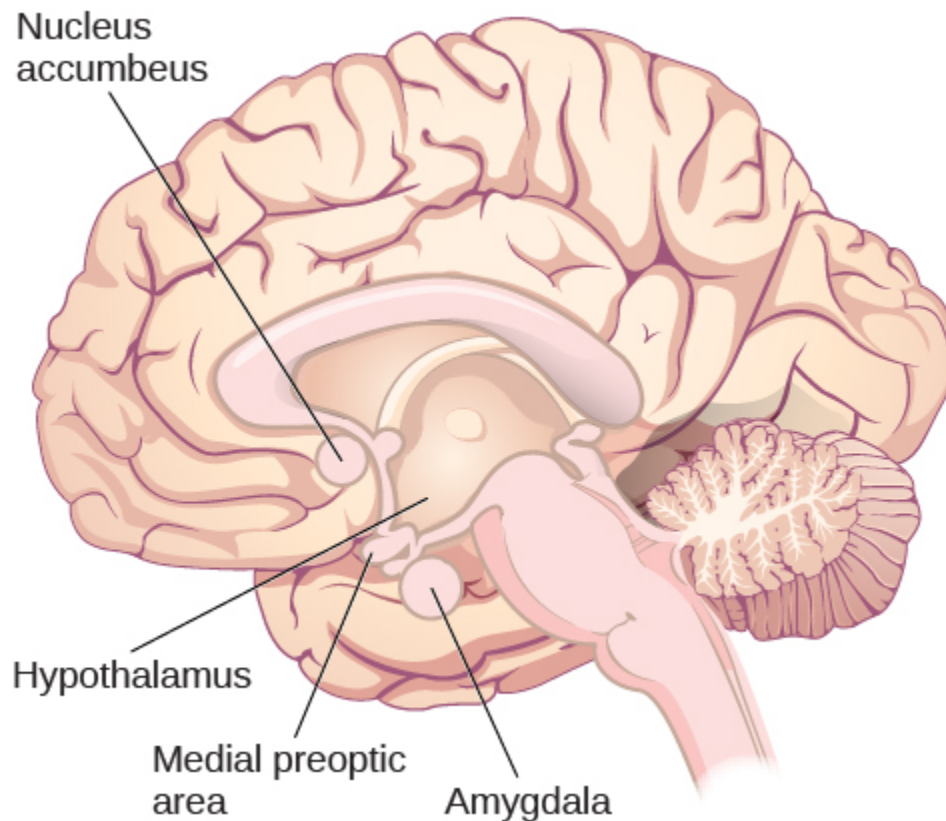
Physiological Mechanisms of Sexual Behavior and Motivation

Much of what we know about the physiological mechanisms that underlie sexual behavior and motivation comes from animal research. As you've learned, the hypothalamus plays an important role in motivated behaviors, and sex is no exception. In fact, lesions to an area of the hypothalamus called the medial preoptic area completely disrupt a male rat's ability to engage in sexual behavior. Surprisingly, medial preoptic lesions do not change how hard a male rat is willing to work to gain access to a sexually receptive female. This suggests that the ability to engage in sexual behavior and the motivation to do so may be mediated by neural systems distinct from one another.



A male rat that cannot engage in sexual behavior still seeks receptive females, suggesting that the ability to engage in sexual behavior and the motivation to do so are mediated by different systems in the brain. (credit: Jason Snyder)

Animal research suggests that limbic system structures such as the amygdala and nucleus accumbens are especially important for sexual motivation. Damage to these areas results in a decreased motivation to engage in sexual behavior, while leaving the ability to do so intact (Everett, 1990). Similar dissociations of sexual motivation and sexual ability have also been observed in the female rat (Becker, Rudick, & Jenkins, 2001; Jenkins & Becker, 2001).



The medial preoptic area, an area of the hypothalamus, is involved in the ability to engage in sexual behavior, but it does not affect sexual motivation. In contrast, the amygdala and nucleus accumbens are involved in motivation for sexual behavior, but they do not affect the ability to engage in it.

Although human sexual behavior is much more complex than that seen in rats, some parallels between animals and humans can be drawn from this research. The worldwide popularity of drugs used to treat erectile dysfunction (Conrad, 2005) speaks to the fact that sexual motivation and the ability to engage in sexual behavior can also be dissociated in humans. Moreover, disorders that involve abnormal hypothalamic function are often associated with hypogonadism (reduced function of the gonads) and reduced sexual function (e.g., Prader-Willi syndrome). Given the hypothalamus's role in endocrine function, it is not surprising that hormones secreted by the endocrine system also play important roles in sexual motivation and behavior. For example, many animals show no sign of sexual motivation in the absence of the appropriate combination of sex hormones from their gonads. While this is not the case for humans, there is considerable evidence that sexual motivation for both men and women varies as a function of circulating testosterone levels (Bhasin, Enzlin, Coviello, & Basson, 2007; Carter, 1992; Sherwin, 1988).

Test Your Understanding



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Sexual Orientation

A person's **sexual orientation** is *their emotional and erotic attraction toward another individual*. While the majority of people identify as heterosexual, there is a sizable population of people within the United States who identify as either homosexual or bisexual. Research suggests that somewhere between 3% and 10% of the population identifies as homosexual (Kinsey, Pomeroy, & Martin, 1948; LeVay, 1996; Pillard & Bailey, 1995).



Between 3% and 10% of the adult population identifies as homosexual. (credit: Till Krech)

Issues of sexual orientation have long fascinated scientists interested in determining what causes one individual to be heterosexual while another is homosexual. For many years, people believed that these differences arose because of different socialization and familial experiences. However, research has consistently demonstrated that the family backgrounds and experiences are very similar among heterosexuals and homosexuals (Bell, Weinberg, & Hammersmith, 1981; Ross & Arrindell, 1988).

Genetic and biological mechanisms have also been proposed, and the balance of research evidence suggests that sexual orientation has an underlying biological component. For instance, over the past 25 years, research has demonstrated gene-level contributions to sexual orientation (Bailey & Pillard, 1991; Hamer, Hu, Magnuson, Hu, & Pattatucci, 1993; Rodriguez-Larralde & Paradisi, 2009), with some researchers estimating that genes account for at least half of the variability seen in human sexual orientation (Pillard & Bailey, 1998). Other studies report differences in brain structure and function between heterosexuals and homosexuals (Allen & Gorski, 1992; Byne et al., 2001; Hu et al., 2008; LeVay, 1991; Ponseti et al., 2006; Rahman & Wilson, 2003a; Swaab & Hofman, 1990), and even differences in basic body structure and function have been observed

(Hall & Kimura, 1994; Lippa, 2003; Loehlin & McFadden, 2003; McFadden & Champlin, 2000; McFadden & Pasanen, 1998; Rahman & Wilson, 2003b). In aggregate, the data suggest that to a significant extent, sexual orientations are something with which we are born.

Misunderstandings about Sexual Orientation

Regardless of how sexual orientation is determined, research has made clear that sexual orientation is not a choice, but rather it is a relatively stable characteristic of a person that cannot be changed. Claims of successful gay conversion therapy have received wide criticism from the research community due to significant concerns with research design, recruitment of experimental participants, and interpretation of data. As such, there is no credible scientific evidence to suggest that individuals can change their sexual orientation (Jenkins, 2010).

Dr. Robert Spitzer, the author of one of the most widely-cited examples of successful conversion therapy, apologized to both the scientific community and the gay community for his mistakes, and he publicly recanted his own paper in a public letter addressed to the editor of *Archives of Sexual Behavior* in the spring of 2012 (Carey, 2012). In this letter, Spitzer wrote,

I was considering writing something that would acknowledge that I now judge the major critiques of the study as largely correct. . . . I believe I owe the gay community an apology for my study making unproven claims of the efficacy of reparative therapy. I also apologize to any gay person who wasted time or energy undergoing some form of reparative therapy because they believed that I had proven that reparative therapy works with some “highly motivated” individuals. (Becker, 2012, pars. 2, 5)

Citing research that suggests not only that gay conversion therapy is ineffective, but also potentially harmful, legislative efforts to make such therapy illegal have either been enacted (e.g., it is now illegal in California) or are underway across the United States, and many professional organizations have issued statements against this practice (Human Rights Campaign, n.d.)

Read this draft of Dr. Spitzer’s letter: EXCLUSIVE: [Dr. Robert Spitzer Apologizes to Gay Community for Infamous “Ex-Gay” Study](#).

Gender Identity

Many people conflate sexual orientation with gender identity because of stereotypical attitudes that exist about homosexuality. In reality, these are two related, but different, issues. Gender identity refers to one’s sense of being male or female. Generally, our gender identities correspond to our chromosomal and phenotypic sex,

but this is not always the case. When individuals do not feel comfortable identifying with the gender associated with their biological sex, then they experience gender dysphoria. **Gender dysphoria** is a diagnostic category in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* that describes individuals who do not identify as the gender that most people would assume they are. This dysphoria must persist for at least six months and result in significant distress or dysfunction to meet DSM-5 diagnostic criteria. In order for children to be assigned this diagnostic category, they must verbalize their desire to become the other gender.

Many people who are classified as gender dysphoric seek to live their lives in ways that are consistent with their own gender identity. This involves dressing in opposite-sex clothing and assuming an opposite-sex identity. These individuals may also undertake **transgender hormone therapy** in an attempt to make their bodies look more like the opposite sex, and in some cases, they elect to have surgeries to alter the appearance of their external genitalia to resemble that of their gender identity. While these may sound like drastic changes, gender dysphoric individuals take these steps because their bodies seem to them to be a mistake of nature, and they seek to correct this mistake.



(a)



(b)

Chaz Bono, a transgender male, is a well-known person who transitioned from female to male. (a) In the 1970s, the world knew Chaz as Chastity Bono, the daughter of the famous entertaining duo Sonny and Cher; here young Chastity is pictured with Sonny. (b) Later in life, Chaz transitioned to align his physical body with his gender identity. (credit b: modification of work by “dvsross”/Flickr)

Check Your Understanding



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Cultural Factors in Sexual Orientation and Gender Identity

Issues related to sexual orientation and gender identity are very much influenced by sociocultural factors. Even the ways in which we define sexual orientation and gender vary from one culture to the next. While in the United States exclusive heterosexuality is viewed as the norm, there are societies that have different attitudes regarding homosexual behavior. In fact, in some instances, periods of exclusively homosexual behavior are socially prescribed as a part of normal development and maturation. For example, in parts of New Guinea, young boys are expected to engage in sexual behavior with other boys for a given period of time because it is believed that doing so is necessary for these boys to become men (Baldwin & Baldwin, 1989).

There is a two-gendered culture in the United States. We tend to classify an individual as either male or female. However, in some cultures there are additional gender variants resulting in more than two gender categories. For example, in Thailand, you can be male, female, or kathoey. A kathoey is an individual who would be described as intersexed or transgendered in the United States (Tangmunkongvorakul, Banwell, Carmichael, Utomo, & Sleigh, 2010).

THE CASE OF DAVID REIMER

In August of 1965, Janet and Ronald Reimer of Winnipeg, Canada, welcomed the birth of their twin sons,

Bruce and Brian. Within a few months, the twins were experiencing urinary problems; doctors recommended the problems could be alleviated by having the boys circumcised. A malfunction of the medical equipment used to perform the circumcision resulted in Bruce's penis being irreparably damaged. Distraught, Janet and Ronald looked to expert advice on what to do with their baby boy. By happenstance, the couple became aware of Dr. John Money at Johns Hopkins University and his theory of psychosexual neutrality (Colapinto, 2000).

Dr. Money had spent a considerable amount of time researching transgendered individuals and individuals born with ambiguous genitalia. As a result of this work, he developed a theory of psychosexual neutrality. His theory asserted that we are essentially neutral at birth with regard to our gender identity and that we don't assume a concrete gender identity until we begin to master language. Furthermore, Dr. Money believed that the way in which we are socialized in early life is ultimately much more important than our biology in determining our gender identity (Money, 1962).

Dr. Money encouraged Janet and Ronald to bring the twins to Johns Hopkins University, and he convinced them that they should raise Bruce as a girl. Left with few other options at the time, Janet and Ronald agreed to have Bruce's testicles removed and to raise him as a girl. When they returned home to Canada, they brought with them Brian and his "sister," Brenda, along with specific instructions to never reveal to Brenda that she had been born a boy (Colapinto, 2000).

Early on, Dr. Money shared with the scientific community the great success of this natural experiment that seemed to fully support his theory of psychosexual neutrality (Money, 1975). Indeed, in early interviews with the children it appeared that Brenda was a typical little girl who liked to play with "girly" toys and do "girly" things.

However, Dr. Money was less than forthcoming with information that seemed to argue against the success of the case. In reality, Brenda's parents were constantly concerned that their little girl wasn't really behaving as most girls did, and by the time Brenda was nearing adolescence, it was painfully obvious to the family that she was really having a hard time identifying as a female. In addition, Brenda was becoming increasingly reluctant to continue her visits with Dr. Money to the point that she threatened suicide if her parents made her go back to see him again.

At that point, Janet and Ronald disclosed the true nature of Brenda's early childhood to their daughter. While initially shocked, Brenda reported that things made sense to her now, and ultimately, by the time she was an adolescent, Brenda had decided to identify as a male. Thus, she became David Reimer.

David was quite comfortable in his masculine role. He made new friends and began to think about his future. Although his castration had left him infertile, he still wanted to be a father. In 1990, David married a single mother and loved his new role as a husband and father. In 1997, David was made aware that Dr. Money was continuing to publicize his case as a success supporting his theory of psychosexual neutrality. This prompted David and his brother to go public with their experiences in an attempt to discredit the doctor's publications. While this revelation created a firestorm in the scientific community for Dr. Money, it also triggered a series of unfortunate events that ultimately led to David committing suicide in 2004 (O'Connell, 2004).

This sad story speaks to the complexities involved in gender identity. While the Reimer case had earlier been paraded as a hallmark of how socialization trumped biology in terms of gender identity, the truth of the story made the scientific and medical communities more cautious in dealing with cases that involve intersex children and how to deal with their unique circumstances. In fact, stories like this one have prompted measures to prevent unnecessary harm and suffering to children who might have issues with gender identity. For example, in 2013, a law took effect in Germany allowing parents of intersex children to classify their children as indeterminate so that children can self-assign the appropriate gender once they have fully developed their own gender identities (Paramaguru, 2013).

Watch this news story about the experiences of David Reimer and his family: [Circumcision Damage Leads to More Tragedy](#).



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Review Questions



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Critical Thinking Questions

While much research has been conducted on how an individual develops a given sexual orientation, many people question the validity of this research, citing that the participants used may not be representative. Why do you think this might be a legitimate concern? Given the stigma associated with being non-heterosexual, participants who openly identify as homosexual or bisexual in research projects may not be entirely representative of the non-heterosexual population as a whole.

There is no reliable scientific evidence that gay conversion therapy actually works. What kinds of evidence would you need to see in order to be convinced by someone arguing that she had successfully converted her sexual orientation?

Answers will vary, but it should be indicated that something more than self-reports of successful conversion would be necessary to support such a claim. Longitudinal, objective demonstrations of a real switch in both erotic attraction and the actual behavior in which the individual engaged would need to be presented in addition to assurances that this type of therapy was safe.

Personal Application Question

Issues related to sexual orientation have been at the forefront of the current political landscape. What do you think about current debates on legalizing same-sex marriage?

Summary

The hypothalamus and structures of the limbic system are important in sexual behavior and motivation. There is evidence to suggest that our motivation to engage in sexual behavior and our ability to do so are related, but separate, processes. While often confused, sexual orientation and gender identity are related, but distinct, concepts.

51.

EMOTION

Learning Objectives

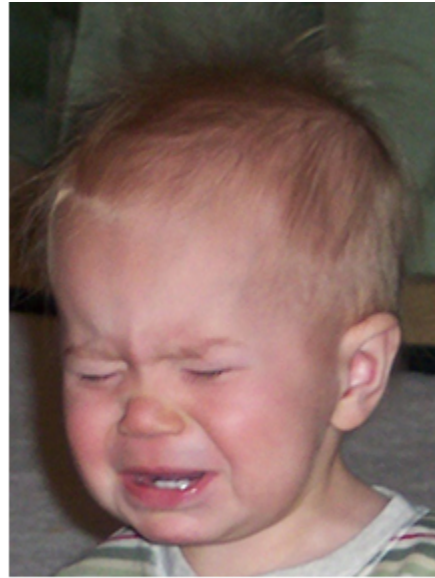
By the end of this section, you will be able to:

- Explain the major theories of emotion
- Describe the role that limbic structures play in emotional processing
- Understand the ubiquitous nature of producing and recognizing emotional expression

As we move through our daily lives, we experience a variety of emotions. An **emotion** *is a subjective state of being that we often describe as our feelings*. The words “emotion” and “mood” are sometimes used interchangeably, but psychologists use these words to refer to two different things. Typically, the word “emotion” indicates a subjective, affective state that is relatively intense and that occurs in response to something we experience. Emotions are often thought to be consciously experienced and intentional. Mood, on the other hand, refers to a prolonged, less intense, affective state that does not occur in response to something we experience. Mood states may not be consciously recognized and do not carry the intentionality that is associated with emotion (Beedie, Terry, Lane, & Devonport, 2011). Here we will focus on emotion, and you will learn more about mood in the chapter that covers psychological disorders.



(a)



(b)

Toddlers can cycle through emotions quickly, being (a) extremely happy one moment and (b) extremely sad the next. (credit a: modification of work by Kerry Ceszyk; credit b: modification of work by Kerry Ceszyk)

We can be at the heights of joy or in the depths of despair. We might feel angry when we are betrayed, fear when we are threatened, and surprised when something unexpected happens. This section will outline some of the most well-known theories explaining our emotional experience and provide insight into the biological bases of emotion. This section closes with a discussion of the ubiquitous nature of facial expressions of emotion and our abilities to recognize those expressions in others.

Theories of Emotion

*Our emotional states are combinations of physiological arousal, psychological appraisal, and subjective experiences. Together, these are known as the **components of emotion**.* These appraisals are informed by our experiences, backgrounds, and cultures. Therefore, different people may have different emotional experiences even when faced with similar circumstances. Over time, several different theories of emotion have been proposed to explain how the various components of emotion interact with one another.

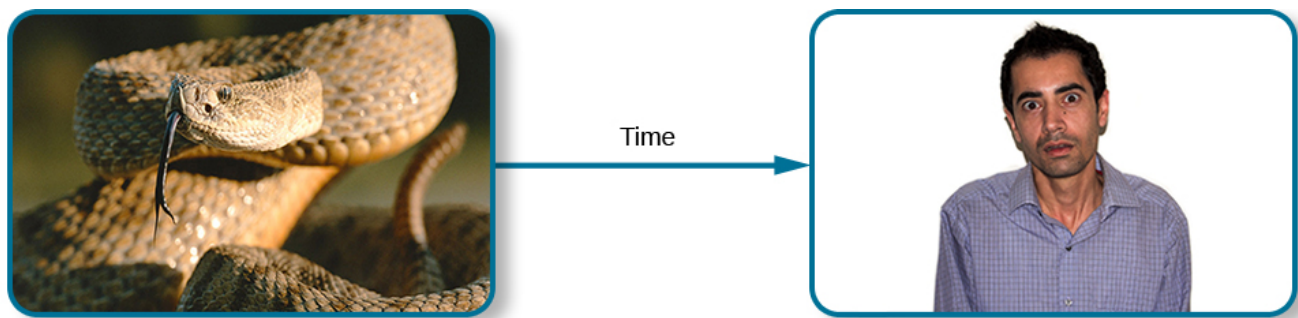
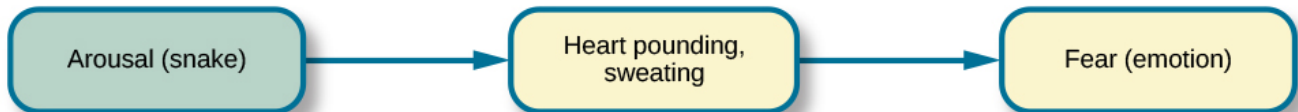
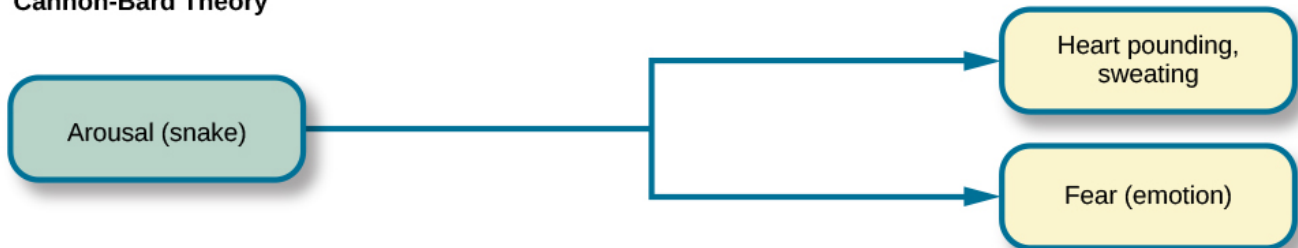
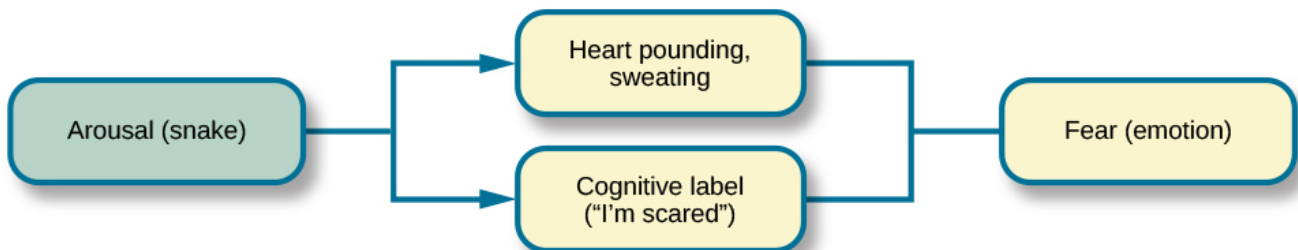
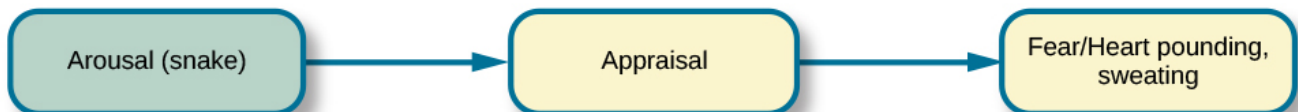
The **James-Lange theory of emotion** *asserts that emotions arise from physiological arousal*. Recall what you have learned about the sympathetic nervous system and our fight or flight response when threatened. If you were to encounter some threat in your environment, like a venomous snake in your backyard, your sympathetic nervous system would initiate significant physiological arousal, which would make your heart race and increase your respiration rate. According to the James-Lange theory of emotion, you would only

experience a feeling of fear after this physiological arousal had taken place. Furthermore, different arousal patterns would be associated with different feelings.

Other theorists, however, doubted that the physiological arousal that occurs with different types of emotions is distinct enough to result in the wide variety of emotions that we experience. Thus, the Cannon-Bard theory of emotion was developed. According to this view, physiological arousal and emotional experience occur simultaneously, yet independently (Lang, 1994). So, when you see the venomous snake, you feel fear at exactly the same time that your body mounts its fight or flight response. This emotional reaction would be separate and independent of the physiological arousal, even though they co-occur.

The James-Lange and Cannon-Bard theories have each garnered some empirical support in various research paradigms. For instance, Chwalisz, Diener, and Gallagher (1988) conducted a study of the emotional experiences of people who had spinal cord injuries. They reported that individuals who were incapable of receiving autonomic feedback because of their injuries still experienced emotion; however, there was a tendency for people with less awareness of autonomic arousal to experience less intense emotions. More recently, research investigating the **facial feedback hypothesis** *suggested that suppression of facial expression of emotion lowered the intensity of some emotions experienced by participants* (Davis, Senghas, & Ochsner, 2009). In both of these examples, neither theory is fully supported because physiological arousal does not seem to be necessary for the emotional experience, but this arousal does appear to be involved in enhancing the intensity of the emotional experience.

The **Schachter-Singer two-factor theory of emotion** is another variation on theories of emotions that takes into account both physiological arousal and the emotional experience. According to this theory, *emotions are composed of two factors: physiological and cognitive*. In other words, physiological arousal is interpreted in context to produce the emotional experience. In revisiting our example involving the venomous snake in your backyard, the two-factor theory maintains that the snake elicits sympathetic nervous system activation that is labeled as fear given the context, and our experience is that of fear.

**James-Lange Theory****Cannon-Bard Theory****Schachter-Singer Two-Factor Theory****Lazarus' Cognitive-mediational Theory**

This figure illustrates the major assertions of the James-Lange, Cannon-Bard, and Schachter-Singer two-factor theories of emotion. (credit "snake": modification of work by "tableatny"/Flickr; credit "face": modification of work by Cory Zanker)

It is important to point out that Schachter and Singer believed that physiological arousal is very similar across the different types of emotions that we experience, and therefore, the cognitive appraisal of the situation is

critical to the actual emotion experienced. In fact, it might be possible to misattribute arousal to an emotional experience if the circumstances were right (Schachter & Singer, 1962).

To test their idea, Schachter and Singer performed a clever experiment. Male participants were randomly assigned to one of several groups. Some of the participants received injections of epinephrine that caused bodily changes that mimicked the fight-or-flight response of the sympathetic nervous system; however, only some of these men were told to expect these reactions as side effects of the injection. The other men that received injections of epinephrine were told either that the injection would have no side effects or that it would result in a side effect unrelated to a sympathetic response, such as itching feet or headache. After receiving these injections, participants waited in a room with someone else they thought was another subject in the research project. In reality, the other person was a confederate of the researchers. The confederate engaged in scripted displays of euphoric or angry behavior (Schachter & Singer, 1962).

When those subjects who were told that they should expect to feel symptoms of physiological arousal were asked about any emotional changes that they had experienced related to either euphoria or anger (depending on how their confederate behaved), they reported none. However, the men who weren't expecting physiological arousal as a function of the injection were more likely to report that they experienced euphoria or anger as a function of their assigned confederate's behavior. While everyone that received an injection of epinephrine experienced the same physiological arousal, only those who were not expecting the arousal used context to interpret the arousal as a change in emotional state (Schachter & Singer, 1962).

Strong emotional responses are associated with strong physiological arousal. This has led some to suggest that the signs of physiological arousal, which include increased heart rate, respiration rate, and sweating, might serve as a tool to determine whether someone is telling the truth or not. The assumption is that most of us would show signs of physiological arousal if we were being dishonest with someone. A **polygraph**, or *lie detector test*, measures the physiological arousal of an individual responding to a series of questions. Someone trained in reading these tests would look for answers to questions that are associated with increased levels of arousal as potential signs that the respondent may have been dishonest on those answers. While polygraphs are still commonly used, their validity and accuracy are highly questionable because there is no evidence that lying is associated with any particular pattern of physiological arousal (Saxe & Ben-Shakhar, 1999).

The relationship between our experiencing of emotions and our cognitive processing of them, and the order in which these occur, remains a topic of research and debate. Lazarus (1991) developed the **cognitive-mediational theory** that asserts our emotions are determined by our appraisal of the stimulus. This appraisal mediates between the stimulus and the emotional response, and it is immediate and often unconscious. In contrast to the Schachter-Singer model, the appraisal precedes a cognitive label. You will learn more about Lazarus's appraisal concept when you study stress, health, and lifestyle.

Two other prominent views arise from the work of Robert Zajonc and Joseph LeDoux. Zajonc asserted that some emotions occur separately from or prior to our cognitive interpretation of them, such as feeling fear in response to an unexpected loud sound (Zajonc, 1998). He also believed in what we might casually refer to as a gut feeling—that we can experience an instantaneous and unexplainable like or dislike for someone

or something (Zajonc, 1980). LeDoux also views some emotions as requiring no cognition: some emotions completely bypass contextual interpretation. His research into the neuroscience of emotion has demonstrated the amygdala's primary role in fear (Cunha, Monfils, & LeDoux, 2010; LeDoux 1996, 2002). A fear stimulus is processed by the brain through one of two paths: from the thalamus (where it is perceived) directly to the amygdala or from the thalamus through the cortex and then to the amygdala. The first path is quick, while the second enables more processing about details of the stimulus. In the following section, we will look more closely at the neuroscience of emotional response.

Test Your Understanding



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Supplemental Video

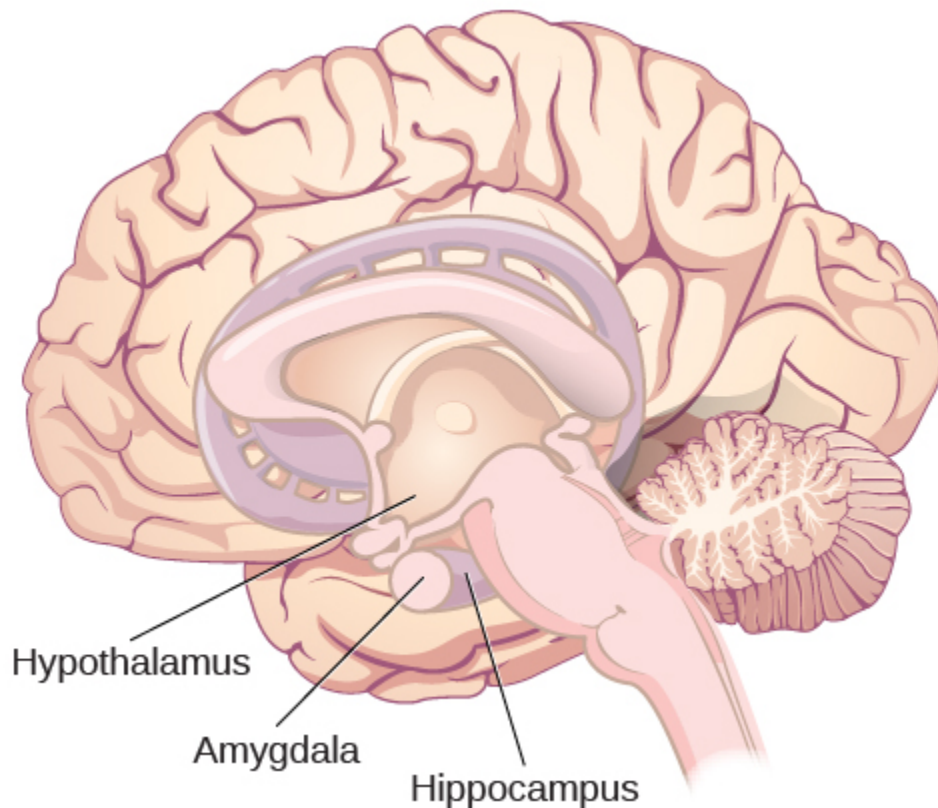


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The Biology of Emotions

Earlier, you learned about the limbic system, which is the area of the brain involved in emotion and memory. The limbic system includes the hypothalamus, thalamus, amygdala, and the hippocampus. The hypothalamus plays a role in the activation of the sympathetic nervous system that is a part of any given emotional reaction. The thalamus serves as a sensory relay center whose neurons project to both the amygdala and the higher cortical regions for further processing. The amygdala plays a role in processing emotional information and sending that information on to cortical structures (Fossati, 2012). The hippocampus integrates emotional experience with cognition (Femenía, Gómez-Galán, Lindskog, & Magara, 2012).

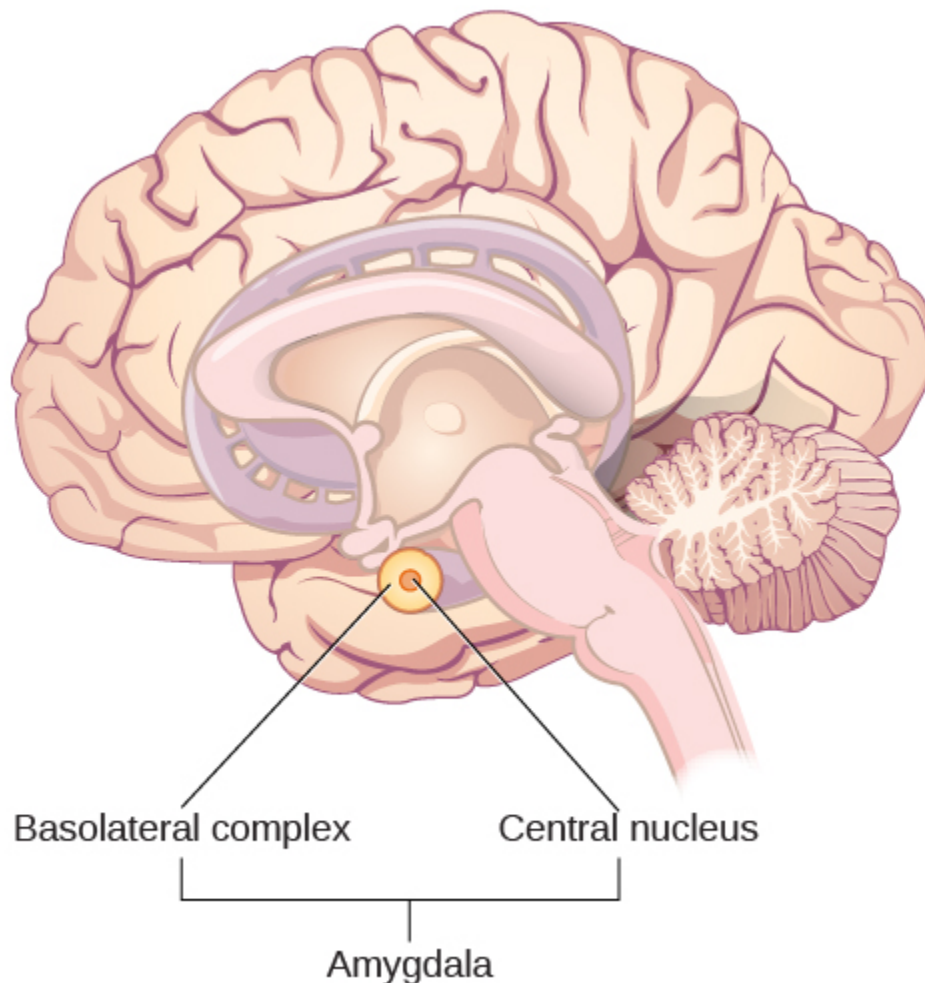


The limbic system, which includes the hypothalamus, thalamus, amygdala, and the hippocampus, is involved in mediating emotional response and memory.

Work through this Open Colleges interactive 3D brain simulator for a refresher on the brain's parts and their functions. To begin, click the "Start Exploring" button. To access the limbic system, click the plus sign in the right-hand menu (set of three tabs): [Open Colleges Interactive Brain](#).

Amygdala

The amygdala has received a great deal of attention from researchers interested in understanding the biological basis for emotions, especially fear and anxiety (Blackford & Pine, 2012; Goosens & Maren, 2002; Maren, Phan, & Liberzon, 2013). The amygdala is composed of various subnuclei, including the basolateral complex and the central nucleus. The **basolateral complex** *has dense connections with a variety of sensory areas of the brain. It is critical for classical conditioning and for attaching emotional value to learning processes and memory.* The **central nucleus** *plays a role in attention, and it has connections with the hypothalamus and various brainstem areas to regulate the autonomic nervous and endocrine systems' activity* (Pessoa, 2010).



The anatomy of the basolateral complex and central nucleus of the amygdala are illustrated in this diagram.

Animal research has demonstrated that there is increased activation of the amygdala in rat pups that have odor cues paired with electrical shock when their mother is absent. This leads to an aversion to the odor cue that suggests the rats learned to fear the odor cue. Interestingly, when the mother was present, the rats actually

showed a preference for the odor cue despite its association with an electrical shock. This preference was associated with no increases in amygdala activation. This suggests a differential effect on the amygdala by the *context* (the presence or absence of the mother) determined whether the pups learned to fear the odor or to be attracted to it (Moriceau & Sullivan, 2006).

Raineki, Cortés, Belnoue, and Sullivan (2012) demonstrated that, in rats, negative early life experiences could alter the function of the amygdala and result in adolescent patterns of behavior that mimic human mood disorders. In this study, rat pups received either abusive or normal treatment during postnatal days 8–12. There were two forms of abusive treatment. The first form of abusive treatment had an insufficient bedding condition. The mother rat had insufficient bedding material in her cage to build a proper nest that resulted in her spending more time away from her pups trying to construct a nest and less time nursing her pups. The second form of abusive treatment had an associative learning task that involved pairing odors and an electrical stimulus in the absence of the mother, as described above. The control group was in a cage with sufficient bedding and was left undisturbed with their mothers during the same time period. The rat pups that experienced abuse were much more likely to exhibit depressive-like symptoms during adolescence when compared to controls. These depressive-like behaviors were associated with increased activation of the amygdala.

Human research also suggests a relationship between the amygdala and psychological disorders of mood or anxiety. Changes in amygdala structure and function have been demonstrated in adolescents who are either at-risk or have been diagnosed with various mood and/or anxiety disorders (Miguel-Hidalgo, 2013; Qin et al., 2013). It has also been suggested that functional differences in the amygdala could serve as a biomarker to differentiate individuals suffering from bipolar disorder from those suffering from major depressive disorder (Fournier, Keener, Almeida, Kronhaus, & Phillips, 2013).

Hippocampus

As mentioned earlier, the hippocampus is also involved in emotional processing. Like the amygdala, research has demonstrated that hippocampal structure and function are linked to a variety of mood and anxiety disorders. Individuals suffering from posttraumatic stress disorder (PTSD) show marked reductions in the volume of several parts of the hippocampus, which may result from decreased levels of neurogenesis and dendritic branching (the generation of new neurons and the generation of new dendrites in existing neurons, respectively) (Wang et al., 2010). While it is impossible to make a causal claim with correlational research like this, studies have demonstrated behavioral improvements and hippocampal volume increases following either pharmacological or cognitive-behavioral therapy in individuals suffering from PTSD (Bremner & Vermetten, 2004; Levy-Gigi, Szabó, Kelemen, & Kéri, 2013).

Watch this video about research that demonstrates how the volume of the hippocampus can vary as a function of traumatic experiences: [BYU study finds brain shrinkage after traumatic events](#).

Test Your Understanding



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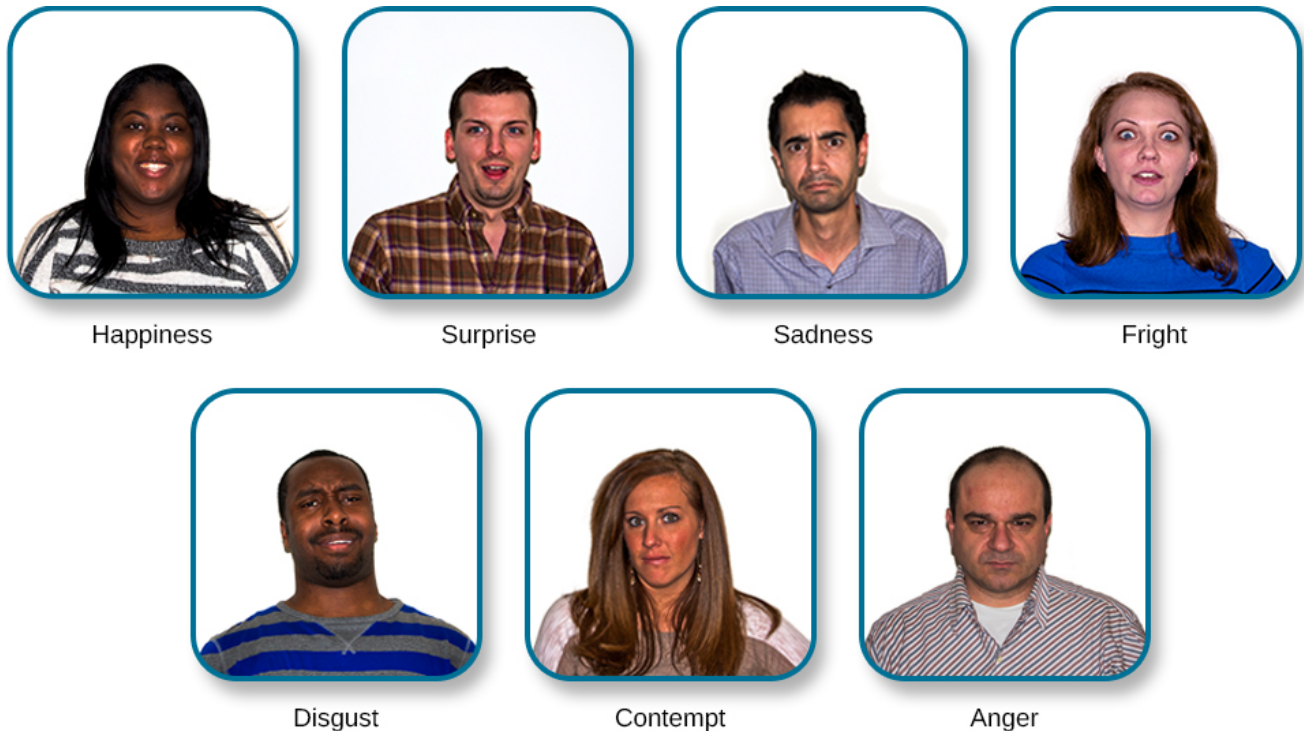
Facial Expression and Recognition of Emotions

Culture can impact the way in which people display emotion. A **cultural display rule** is one of a collection of culturally specific standards that govern the types and frequencies of displays of emotions that are acceptable (Malatesta & Haviland, 1982). Therefore, people from varying cultural backgrounds can have very different cultural display rules of emotion. For example, research has shown that individuals from the United States express negative emotions like fear, anger, and disgust both alone and in the presence of others, while Japanese individuals only do so while alone (Matsumoto, 1990). Furthermore, individuals from cultures that tend to emphasize social cohesion are more likely to engage in suppression of emotional reaction so they can evaluate which response is most appropriate in a given context (Matsumoto, Yoo, & Nakagawa, 2008).

Other distinct cultural characteristics might be involved in emotionality. For instance, there may be gender differences involved in emotional processing. While research into gender differences in emotional display is equivocal, there is some evidence that men and women may differ in regulation of emotions (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008).

Despite different emotional display rules, our ability to recognize and produce facial expressions of emotion appears to be universal. In fact, even congenitally blind individuals produce the same facial expression of

emotions, despite their never having the opportunity to observe these facial displays of emotion in other people. This would seem to suggest that the pattern of activity in facial muscles involved in generating emotional expressions is universal, and indeed, this idea was suggested in the late 19th century in Charles Darwin's book *The Expression of Emotions in Man and Animals* (1872). In fact, there is substantial evidence for seven universal emotions that are each associated with distinct facial expressions. These include happiness, surprise, sadness, fright, disgust, contempt, and anger (Ekman & Keltner, 1997).



The seven universal facial expressions of emotion are shown. (credit: modification of work by Cory Zanker)

Does smiling make you happy? Or does being happy make you smile? The facial feedback hypothesis asserts that facial expressions are capable of influencing our emotions, meaning that smiling can make you feel happier (Buck, 1980; Soussignan, 2001; Strack, Martin, & Stepper, 1988). Recent research explored how Botox, which paralyzes facial muscles and limits facial expression, might affect emotion. Havas, Glenberg, Gutowski, Lucarelli, and Davidson (2010) discovered that depressed individuals reported less depression after paralysis of their frowning muscles with Botox injections.

Of course, emotion is not only displayed through facial expressions. We also use the tone of our voices, various behaviors, and body language to communicate information about our emotional states. **Body language** is the expression of emotion in terms of body position or movement. Research suggests that we are quite sensitive to the emotional information communicated through body language, even if we're not consciously aware of it (de Gelder, 2006; Tamietto et al., 2009).

Watch this short [History Channel video](#) about body language to see how it plays out in the tense situation of a political debate: [Decoding debate body language](#).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://louis.pressbooks.pub/intropsychology/?p=725#oembed-1>

To apply these same concepts to the more everyday situations most of us face, check out these tips from an interview on the show [Today](#) with body language expert Janine Driver.

AUTISM SPECTRUM DISORDER AND EXPRESSION OF EMOTIONS

Autism spectrum disorder (ASD) is a *set of neurodevelopmental disorders characterized by repetitive behaviors and communication and social problems*. Children who have autism spectrum disorders have difficulty recognizing the emotional states of others, and research has shown that this may stem from an inability to distinguish various nonverbal expressions of emotion (i.e., facial expressions) from one another (Hobson, 1986). In addition, there is evidence to suggest that autistic individuals also have difficulty expressing emotion through tone of voice and by producing facial expressions (Macdonald et al., 1989). Difficulties with emotional recognition and expression may contribute to the impaired social interaction and communication that characterize autism; therefore, various therapeutic approaches have been explored to address these difficulties. Various educational curricula, cognitive-behavioral therapies, and pharmacological therapies have shown some promise in helping autistic individuals process emotionally relevant information (Bauminger, 2002; Golan & Baron-Cohen, 2006; Guastella et al., 2010).

Review Questions



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Critical Thinking Questions

Imagine you find a venomous snake crawling up your leg just after taking a drug that prevented sympathetic nervous system activation. What would the James-Lange theory predict about your experience?

The James-Lange theory would predict that I would not feel fear because I haven't had the physiological arousal necessary to induce that emotional state.

Why can we not make causal claims regarding the relationship between the volume of the hippocampus and PTSD?

The research that exists is correlational in nature. It could be the case that reduced hippocampal volume predisposes people to develop PTSD or the decreased volume could result from PTSD. Causal claims can only be made when performing an experiment.

Personal Application Question

Think about times in your life when you have been absolutely elated (e.g., perhaps your school's basketball team just won a closely contested game for the national championship) and very fearful (e.g., you are about to give a speech in your public speaking class to a roomful of 100 strangers). How would you describe how your

arousal manifested itself physically? Were there marked differences in physiological arousal associated with each emotional state?

Summary

Emotions are subjective experiences that consist of physiological arousal and cognitive appraisal. Various theories have been put forward to explain our emotional experiences. The James-Lange theory asserts that emotions arise as a function of physiological arousal. The **Cannon-Bard theory** *maintains that emotional experience occurs simultaneous to and independent of physiological arousal.* The **Schachter-Singer two-factor theory** *suggests that physiological arousal receives cognitive labels as a function of the relevant context and that these two factors together result in an emotional experience.*

The limbic system is the brain's emotional circuit, which includes the amygdala and the hippocampus. Both of these structures are implicated in playing a role in normal emotional processing as well as in psychological mood and anxiety disorders. Increased amygdala activity is associated with learning to fear, and it is seen in individuals who are at risk for or suffering from mood disorders. The volume of the hippocampus has been shown to be reduced in individuals suffering from posttraumatic stress disorder.

The ability to produce and recognize facial expressions of emotions seems to be universal regardless of cultural background. However, there are cultural display rules which influence how often and under what circumstances various emotions can be expressed. Tone of voice and body language also serve as a means by which we communicate information about our emotional states.

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PART XI

PERSONALITY



What makes two individuals have different personalities? (credit: modification of work by Nicolas Alejandro)

Three months before William Jefferson Blythe III was born, his father died in a car accident. He was raised by his mother, Virginia Dell, and grandparents, in Hope, Arkansas. When he turned 4, his mother married Roger Clinton, Jr., an alcoholic who was physically abusive to William's mother. Six years later, Virginia gave birth to another son, Roger. William, who later took the last name Clinton from his stepfather, became the 42nd president of the United States. While Bill Clinton was making his political ascendance, his half-brother, Roger Clinton, was arrested numerous times for drug charges, including possession, conspiracy to distribute cocaine, and driving under the influence, serving time in jail. Two brothers, raised by the same people, took radically different paths in their lives. Why did they make the choices they did? What internal forces shaped their decisions? Personality psychology can help us answer these questions and more.

53.

WHAT IS PERSONALITY?

Learning Objectives

By the end of this section, you will be able to:

- Define personality
- Describe early theories about personality development

Personality refers to the long-standing traits and patterns that propel individuals to consistently think, feel, and behave in specific ways. Our personality is what makes us unique individuals. Each person has an idiosyncratic pattern of enduring, long-term characteristics and a manner in which he or she interacts with other individuals and the world around them. Our personalities are thought to be long term, stable, and not easily changed. The word *personality* comes from the Latin word *persona*. In the ancient world, a persona was a mask worn by an actor. While we tend to think of a mask as being worn to conceal one's identity, the theatrical mask was originally used to either represent or project a specific personality trait of a character.

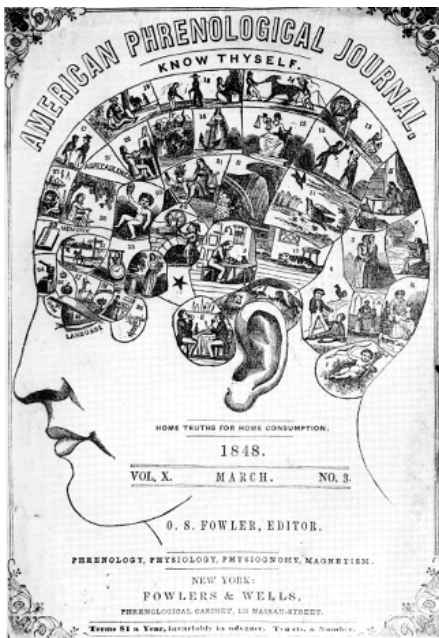


Happy, sad, impatient, shy, fearful, curious, helpful. What characteristics describe your personality?

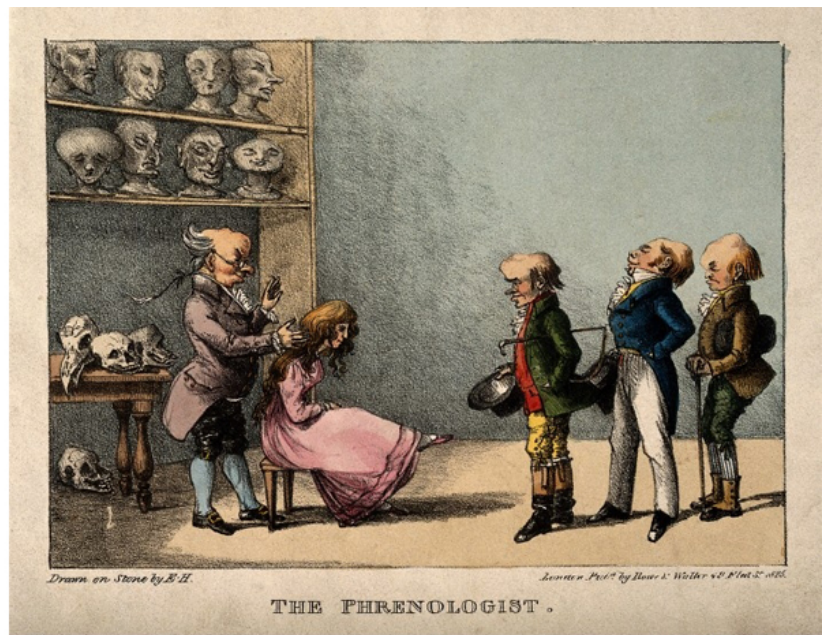
Historical Perspectives

The concept of personality has been studied for at least 2,000 years, beginning with Hippocrates in 370 BCE (Fazeli, 2012). Hippocrates theorized that personality traits and human behaviors are based on four separate temperaments associated with four fluids (“humors”) of the body: choleric temperament (yellow bile from the liver), melancholic temperament (black bile from the kidneys), sanguine temperament (red blood from the heart), and phlegmatic temperament (white phlegm from the lungs) (Clark & Watson, 2008; Eysenck & Eysenck, 1985; Lecci & Magnavita, 2013; Noga, 2007). Centuries later, the influential Greek physician and philosopher Galen built on Hippocrates’s theory, suggesting that both diseases and personality differences could be explained by imbalances in the humors and that each person exhibits one of the four temperaments. For example, the choleric person is passionate, ambitious, and bold; the melancholic person is reserved, anxious, and unhappy; the sanguine person is joyful, eager, and optimistic; and the phlegmatic person is calm, reliable, and thoughtful (Clark & Watson, 2008; Stelmack & Stalikas, 1991). Galen’s theory was prevalent for over 1,000 years and continued to be popular through the Middle Ages.

In 1780, Franz Gall, a German physician, proposed that the distances between bumps on the skull reveal a person’s personality traits, character, and mental abilities. According to Gall, measuring these distances revealed the sizes of the brain areas underneath, providing information that could be used to determine whether a person was friendly, prideful, murderous, kind, good with languages, and so on. Initially, phrenology was very popular; however, it was soon discredited for lack of empirical support and has long been relegated to the status of pseudoscience (Fancher, 1979).



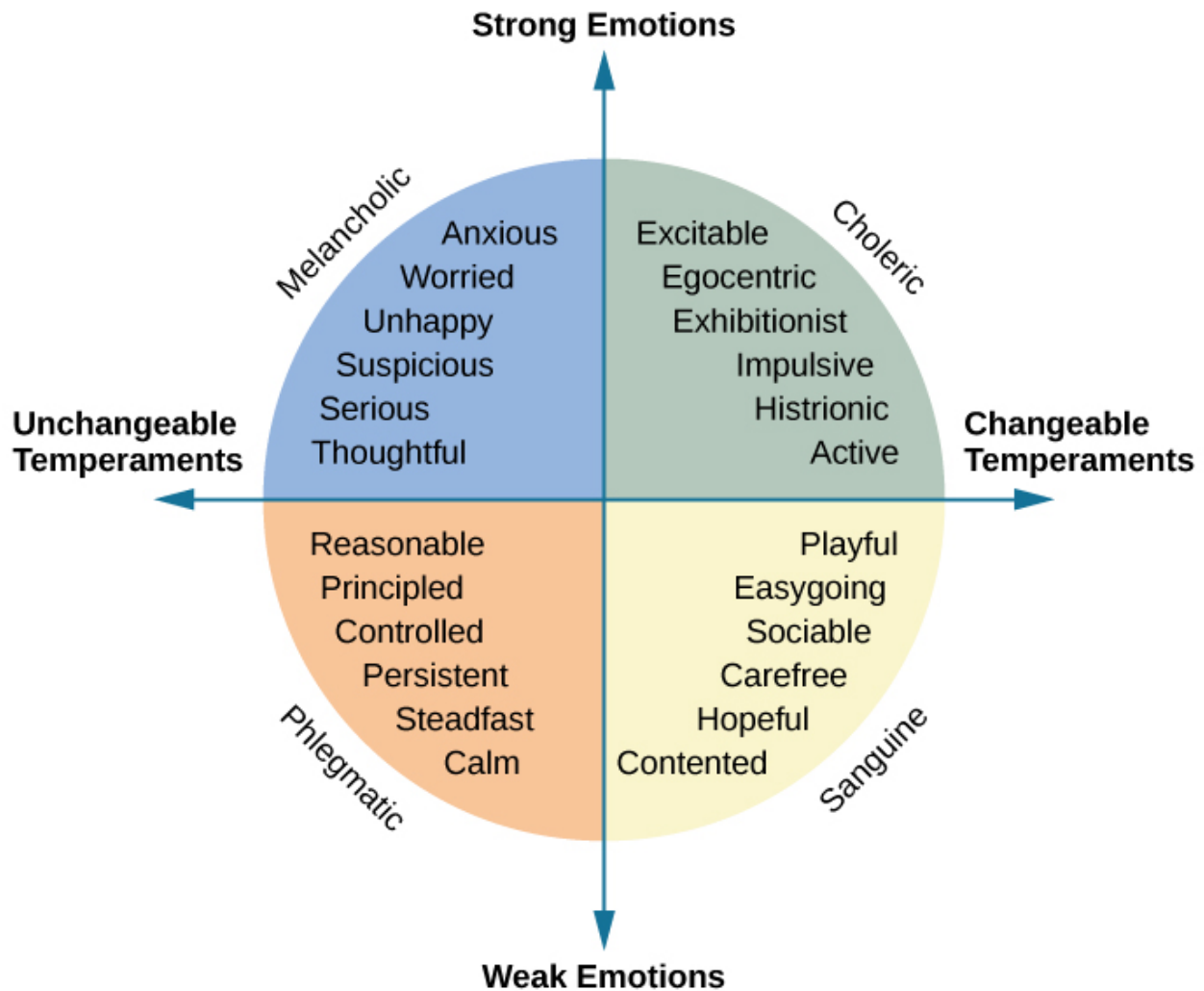
(a)



(b)

The pseudoscience of measuring the areas of a person's skull is known as phrenology. (a) Gall developed a chart that depicted which areas of the skull corresponded to particular personality traits or characteristics (Hothersall, 1995). (b) An 1825 lithograph depicts Gall examining the skull of a young woman. (credit b: modification of work by Wellcome Library, London)

In the centuries after Galen, other researchers contributed to the development of his four primary temperament types, most prominently Immanuel Kant (in the 18th century) and psychologist Wilhelm Wundt (in the 19th century) (Eysenck, 2009; Stelmack & Stalikas, 1991; Wundt, 1874/1886). Kant agreed with Galen that everyone could be sorted into one of the four temperaments and that there was no overlap between the four categories (Eysenck, 2009). He developed a list of traits that could be used to describe the personality of a person from each of the four temperaments. However, Wundt suggested that a better description of personality could be achieved using two major axes: emotional/nonemotional and changeable/unchangeable. The first axis separated strong from weak emotions (the melancholic and choleric temperaments from the phlegmatic and sanguine). The second axis divided the changeable temperaments (choleric and sanguine) from the unchangeable ones (melancholic and phlegmatic) (Eysenck, 2009).



Developed from Galen's theory of the four temperaments, Kant proposed trait words to describe each temperament. Wundt later suggested the arrangement of the traits on two major axes.

Sigmund Freud's psychodynamic perspective of personality was the first comprehensive theory of personality, explaining a wide variety of both normal and abnormal behaviors. According to Freud, unconscious drives influenced by sex and aggression, along with childhood sexuality, are the forces that influence our personality. Freud attracted many followers who modified his ideas to create new theories about personality. These theorists, referred to as neo-Freudians, generally agreed with Freud that childhood experiences matter, but they reduced the emphasis on sex and focused more on the social environment and effects of culture on personality. The perspective of personality proposed by Freud and his followers was the dominant theory of personality for the first half of the 20th century.

Other major theories then emerged, including the learning, humanistic, biological, evolutionary, trait, and cultural perspectives. In this chapter, we will explore these various perspectives on personality in depth.

View this video for a brief overview of some of the psychological perspectives on personality:

[Video Lecture: Explain the Major Perspectives on Personality.](#)



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://louis.pressbooks.pub/intropsychology/?p=212#oembed-1>

Test Your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

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Summary

Personality has been studied for over 2,000 years, beginning with Hippocrates. More recent theories of personality have been proposed, including Freud's psychodynamic perspective, which holds that personality is formed through early childhood experiences. Other perspectives then emerged in reaction to the psychodynamic perspective, including the learning, humanistic, biological, trait, and cultural perspectives.

Review Questions



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Critical Thinking Questions

What makes a personal quality part of someone's personality?
The particular quality or trait must be part of an enduring behavior pattern, so that it is a consistent or predictable quality.

Personal Application Questions

1. How would you describe your own personality? Do you think that friends and family would describe you in much the same way? Why or why not?
2. How would you describe your personality in an online dating profile?
3. What are some of your positive and negative personality qualities? How do you think these qualities will affect your choice of career?

Glossary



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54.

ORIGINS OF PERSONALITY

Learning Objectives

By the end of this section, you will be able to:

- Describe the strengths and limitations of the psychodynamic approach to explaining personality.
- Summarize the accomplishments of the neo-Freudians.
- Identify the major contributions of the humanistic approach to understanding personality.
- Describe the behaviorist, cognitive, and social cognitive perspectives on personality.

Although measures such as the Big Five and the Minnesota Multiphasic Personality Inventory (MMPI) are able to effectively assess personality, they do not say much about where personality comes from. In this section we will consider two major theories of the origin of personality: *psychodynamic* and *humanistic* approaches.

PSYCHODYNAMIC THEORIES OF PERSONALITY: THE ROLE OF THE UNCONSCIOUS

One of the most important psychological approaches to understanding personality is based on the theorizing of the Austrian physician and psychologist Sigmund Freud (1856–1939), who founded what today is known

as the psychodynamic approach to understanding personality. Many people know about Freud because his work has had a huge impact on our everyday thinking about psychology, and the psychodynamic approach is one of the most important approaches to psychological therapy (Roudinesco, 2003; Taylor, 2009). Freud is probably the best known of all psychologists, in part because of his impressive observation and analyses of personality (there are 24 volumes of his writings). As is true of all theories, many of Freud's ingenious ideas have turned out to be at least partially incorrect, and yet other aspects of his theories are still influencing psychology.

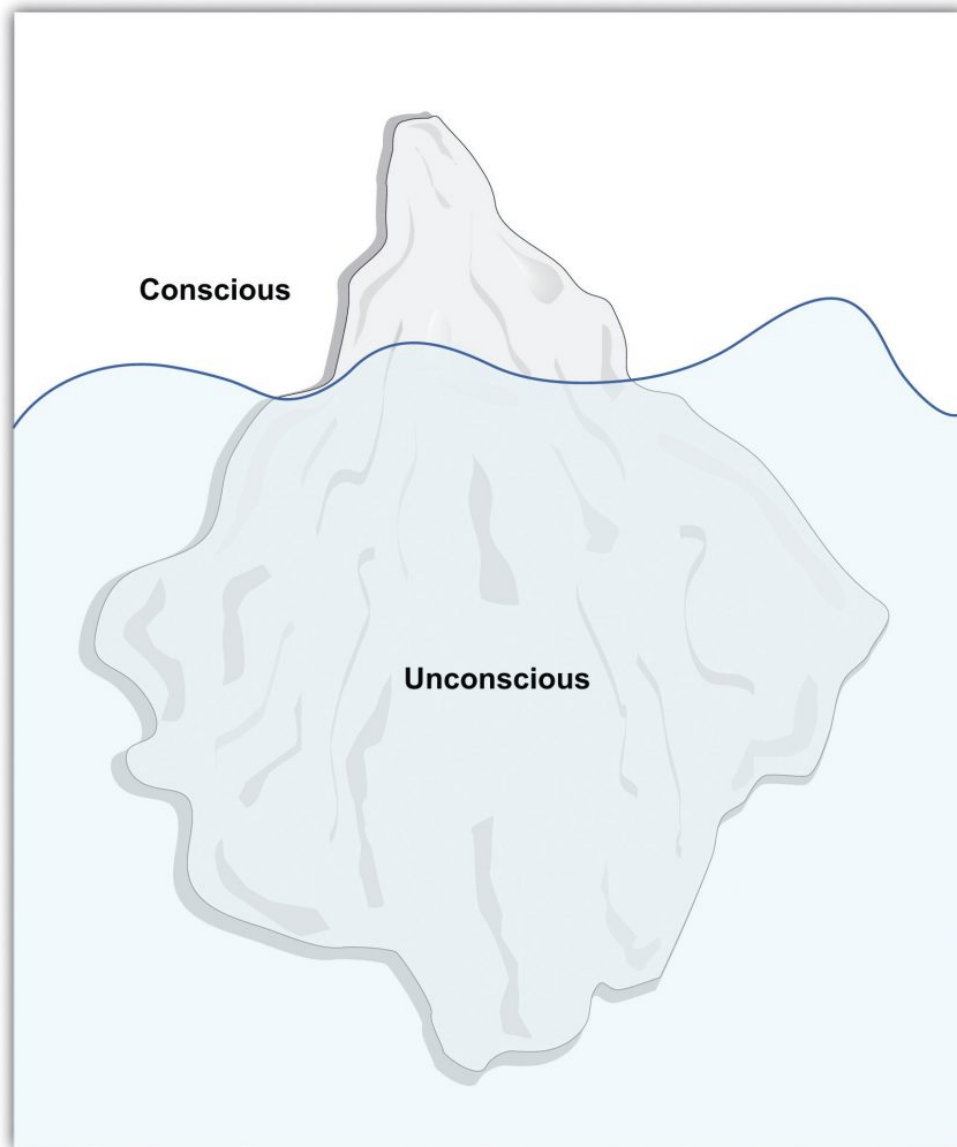
Freud was influenced by the work of the French neurologist Jean-Martin Charcot (1825–1893), who had been interviewing patients (almost all women) who were experiencing what was at the time known as *hysteria*. Although it is no longer used to describe a psychological disorder, hysteria at the time referred to a set of personality and physical symptoms that included chronic pain, fainting, seizures, and paralysis.

Charcot could find no biological reason for the symptoms. For instance, some women experienced a loss of feeling in their hands and yet not in their arms, and this seemed impossible given that the nerves in the arms are the same that are in the hands. Charcot was experimenting with the use of hypnosis, and he and Freud found that under hypnosis many of the hysterical patients reported having experienced a traumatic sexual experience, such as sexual abuse, as children (Dolnick, 1998).

Freud and Charcot also found that during hypnosis the remembering of the trauma was often accompanied by an outpouring of emotion, known as *catharsis*, and that following the catharsis the patient's symptoms were frequently reduced in severity. These observations led Freud and Charcot to conclude that these disorders were caused by psychological rather than physiological factors.

Freud used the observations that he and Charcot had made to develop his theory regarding the sources of personality and behavior, and his insights are central to the fundamental themes of psychology. In terms of free will, Freud did not believe that we were able to control our own behaviors. Rather, he believed that all behaviors are predetermined by motivations that lie outside our awareness, in the unconscious. These forces show themselves in our dreams, in neurotic symptoms such as obsessions, while we are under hypnosis, and in Freudian “slips of the tongue” in which people reveal their unconscious desires in language. Freud argued that we rarely understand why we do what we do, although we can make up explanations for our behaviors after the fact. For Freud the mind was like an iceberg, with the many motivations of the unconscious being much larger, but also out of sight, in comparison to the consciousness of which we are aware.

Mind as Iceberg



In Sigmund Freud's conceptualization of personality, the most important motivations are unconscious, just as the major part of an iceberg is underwater.

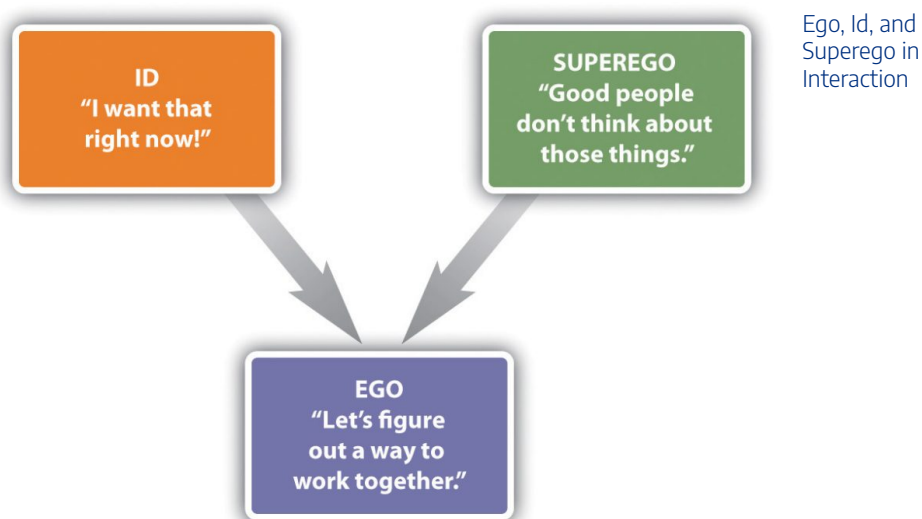
Id, Ego, and Superego

Freud proposed that the mind is divided into three components: *id*, *ego*, and *superego*, and that the interactions and conflicts among the components create personality (Freud, 1923/1943). According to Freudian theory, the **id** is *the component of personality that forms the basis of our most primitive impulses*. The id is entirely unconscious, and it drives our most important motivations, including the sexual drive (*libido*) and the aggressive or destructive drive (*Thanatos*). According to Freud, the id is driven by the *pleasure principle*—the

desire for immediate gratification of our sexual and aggressive urges. The id is why we smoke cigarettes, drink alcohol, view pornography, tell mean jokes about people, and engage in other fun or harmful behaviors, often at the cost of doing more productive activities.

In stark contrast to the id, the **superego** represents *our sense of morality and thoughts*. The superego tells us all the things that we shouldn't do, or the duties and obligations of society. The superego strives for perfection, and when we fail to live up to its demands, we feel guilty.

In contrast to the id, which is about the pleasure principle, the function of the *ego* is based on the *reality principle*—the idea that we must delay gratification of our basic motivations until the appropriate time with the appropriate outlet. The **ego** is *the largely conscious controller or decision-maker of personality*. The ego serves as the intermediary between the desires of the id and the constraints of society contained in the superego. We may wish to scream, yell, or hit, and yet our ego normally tells us to wait, reflect, and choose a more appropriate response.



Freud believed that psychological disorders, and particularly the experience of anxiety, occur when there is conflict or imbalance among the motivations of the id, ego, and superego. When the ego finds that the id is pressing too hard for immediate pleasure, it attempts to correct for this problem, often through the use of **defense mechanisms**—*unconscious psychological strategies used to cope with anxiety and to maintain a positive self-image*. Freud believed that the defense mechanisms were essential for effective coping with everyday life, but that any of them could be overused.

The Major Freudian Defense Mechanisms

Defense mechanism	Definition	Possible behavioral example
Displacement	Diverting threatening impulses away from the source of the anxiety and toward a more acceptable source	A student who is angry at her professor for a low grade lashes out at her roommate, who is a safer target of her anger.
Projection	Disguising threatening impulses by attributing them to others	A man with powerful unconscious sexual desires for women claims that women use him as a sex object.
Rationalization	Generating self-justifying explanations for our negative behaviors	A drama student convinces herself that getting the part in the play wasn't that important after all.
Reaction formation	Making unacceptable motivations appear as their exact opposite	Jane is sexually attracted to friend Jake, but she claims in public that she intensely dislikes him.
Regression	Retreating to an earlier, more childlike, and safer stage of development	A college student who is worried about an important test begins to suck on his finger.
Repression (or denial)	Pushing anxiety-arousing thoughts into the unconscious	A person who witnesses his parents having sex is later unable to remember anything about the event.
Sublimation	Channeling unacceptable sexual or aggressive desires into acceptable activities	A person participates in sports to sublimate aggressive drives. A person creates music or art to sublimate sexual drives.

The most controversial, and least scientifically valid, part of Freudian theory is its explanations of personality development. Freud argued that personality is developed through a series of *psychosexual stages*, each focusing on pleasure from a different part of the body. Freud believed that sexuality begins in infancy, and that the appropriate resolution of each stage has implications for later personality development.

Freud's Stages of Psychosexual Development

Stage	Approximate ages	Description
Oral	Birth to 18 months	Pleasure comes from the mouth in the form of sucking, biting, and chewing.
Anal	18 months to 3 years	Pleasure comes from bowel and bladder elimination and the constraints of toilet training.
Phallic	3 years to 6 years	Pleasure comes from the genitals, and the conflict is with sexual desires for the opposite-sex parent.
Latency	6 years to puberty	Sexual feelings are less important.
Genital	Puberty and older	If prior stages have been properly reached, mature sexual orientation develops.

In the first of Freud's proposed stages of psychosexual development, which begins at birth and lasts until about 18 months of age, the focus is on the mouth. During this *oral stage*, the infant obtains sexual pleasure by sucking and drinking. Infants who receive either too little or too much gratification become *fixated* or "locked" in the oral stage, and are likely to regress to these points of fixation under stress, even as adults. According to Freud, a child who receives too little oral gratification (e.g., who was underfed or neglected) will become *orally dependent* as an adult and be likely to manipulate others to fulfill his or her needs rather than becoming independent. On the other hand, the child who was overfed or overly gratified will resist growing up and try to return to the prior state of dependency by acting helpless, demanding satisfaction from others, and acting in a needy way.

The *anal stage*, lasting from about 18 months to 3 years of age, is when children first experience psychological conflict. During this stage children desire to experience pleasure through bowel movements, but they are also being toilet trained to delay this gratification. Freud believed that if this toilet training was either too harsh or too lenient, children would become fixated in the anal stage and become likely to regress to this stage under stress as adults. If the child received too little anal gratification (i.e., if the parents had been very harsh about toilet training), the adult personality will be *anal retentive*—stingy, with a compulsive seeking of order and tidiness. On the other hand, if the parents had been too lenient, the *anal expulsive* personality results, characterized by a lack of self-control and a tendency toward messiness and carelessness.

The *phallic stage*, which lasts from age 3 to age 6, is when the penis (for boys) and clitoris (for girls) become the primary erogenous zone for sexual pleasure. During this stage, Freud believed that children develop a powerful but unconscious attraction for the opposite-sex parent, as well as a desire to eliminate the same-sex parent as a rival. Freud based his theory of sexual development in boys (the "Oedipus complex") on the Greek mythological character Oedipus, who unknowingly killed his father and married his mother, and then put his own eyes out when he learned what he had done. Freud argued that boys will normally eventually abandon their love of the mother, and instead identify with the father, also taking on the father's personality characteristics, but that boys who do not successfully resolve the Oedipus complex will experience psychological problems later in life. Although it was not as important in Freud's theorizing, in girls the phallic stage is often termed the "Electra complex," after the Greek character who avenged her father's murder by killing her mother. Freud believed that girls frequently experienced *penis envy*, the sense of deprivation supposedly experienced by girls because they do not have a penis.

The *latency stage* is a period of relative calm that lasts from about 6 years to 12 years. During this time, Freud believed that sexual impulses were repressed, leading boys and girls to have little or no interest in members of the opposite sex.

The fifth and last stage, the *genital stage*, begins at about 12 years of age and lasts into adulthood. According to Freud, sexual impulses return during this time frame, and if development has proceeded normally to this point, the child is able to move into the development of mature romantic relationships. But if earlier problems have not been appropriately resolved, difficulties with establishing intimate love attachments are likely.

FREUD'S FOLLOWERS: THE NEO-FREUDIANS

Freudian theory was so popular that it led to a number of followers, including many of Freud's own students, who developed, modified, and expanded his theories. Taken together, these approaches are known as **neo-Freudian theories**. *The neo-Freudian theories are theories based on Freudian principles that emphasize the role of the unconscious and early experience in shaping personality but place less evidence on sexuality as the primary motivating force in personality and are more optimistic concerning the prospects for personality growth and change in personality in adults.*

Alfred Adler (1870–1937) was a follower of Freud who developed his own interpretation of Freudian theory. Adler proposed that the primary motivation in human personality was not sex or aggression, but rather the striving for superiority. According to Adler, we desire to be better than others and we accomplish this goal by creating a unique and valuable life. We may attempt to satisfy our need for superiority through our school or professional accomplishments, or by our enjoyment of music, athletics, or other activities that seem important to us.

Adler believed that psychological disorders begin in early childhood. He argued that children who are either overly nurtured or overly neglected by their parents are later likely to develop an *inferiority complex*—a psychological state in which people feel that they are not living up to expectations, leading them to have low self-esteem, with a tendency to try to overcompensate for the negative feelings. People with an inferiority complex often attempt to demonstrate their superiority to others at all costs, even if it means humiliating, dominating, or alienating them. According to Adler, most psychological disorders result from misguided attempts to compensate for the inferiority complex in order to meet the goal of superiority.

Carl Jung (1875–1961) was another student of Freud who developed his own theories about personality. Jung agreed with Freud about the power of the unconscious but felt that Freud overemphasized the importance of sexuality. Jung argued that in addition to the personal unconscious, there was also a **collective unconscious**, or *a collection of shared ancestral memories*. Jung believed that the collective unconscious contains a variety of *archetypes*, or cross-culturally universal symbols, which explain the similarities among people in their emotional reactions to many stimuli. Important archetypes include the mother, the goddess, the hero, and the mandala or circle, which Jung believed symbolized a desire for wholeness or unity. For Jung, the underlying motivation that guides successful personality is *self-realization*, or learning about and developing the self to the fullest possible extent.

Karen Horney (the last syllable of her last name rhymes with “eye”; 1855–1952), was a German physician who applied Freudian theories to create a personality theory that she thought was more balanced between men and women. Horney believed that parts of Freudian theory, and particularly the ideas of the Oedipus complex and penis envy, were biased against women. Horney argued that women's sense of inferiority was not due to their lack of a penis but rather to their dependency on men, an approach that the culture made it difficult for

them to break from. For Horney, the underlying motivation that guides personality development is the desire for *security*, the ability to develop appropriate and supportive relationships with others.

Another important neo-Freudian was Erich Fromm (1900–1980). Fromm’s focus was on the negative impact of technology, arguing that the increases in its use have led people to feel increasingly isolated from others. Fromm believed that the independence that technology brings us also creates the need to “escape from freedom,” that is, to become closer to others.

RESEARCH FOCUS: HOW THE FEAR OF DEATH CAUSES AGGRESSIVE BEHAVIOR

Fromm believed that the primary human motivation was to escape the fear of death, and contemporary research has shown how our concerns about dying can influence our behavior. In this research, people have been made to confront their death by writing about it or otherwise being reminded of it, and effects on their behavior are then observed. In one relevant study, McGregor et al. (1998) demonstrated that people who are provoked may be particularly aggressive after they have been reminded of the possibility of their own death. The participants in the study had been selected, on the basis of prior reporting, to have either politically liberal or politically conservative views. When they arrived at the lab they were asked to write a short paragraph describing their opinion of politics in the United States. In addition, half of the participants (the *mortality salient condition*) were asked to “briefly describe the emotions that the thought of your own death arouses in you” and to “jot down as specifically as you can, what you think will happen to you as you physically die, and once you are physically dead.” Participants in the *exam control condition* also thought about a negative event, but not one associated with a fear of death. They were instructed to “please briefly describe the emotions that the thought of your next important exam arouses in you” and to “jot down as specifically as you can, what you think will happen to you as you physically take your next exam, and once you are physically taking your next exam.”

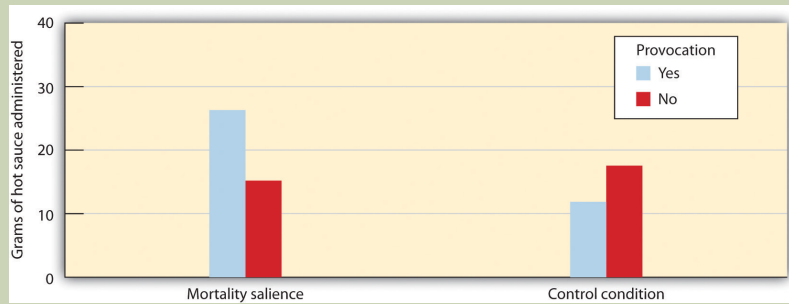
Then the participants read the essay that had supposedly just been written by another person. (The other person did not exist, but the participants didn’t know this until the end of the experiment.) The essay that they read had been prepared by the experimenters to be very negative toward politically liberal views or to be very negative toward politically conservative views. Thus one-half of the participants were provoked by the other person by reading a statement that strongly conflicted with their own political beliefs, whereas the other half read an essay in which the other person’s views supported their own (liberal or conservative) beliefs.

At this point the participants moved on to what they thought was a completely separate study in which they were to be tasting and giving their impression of some foods. Furthermore, they were told that it was necessary for the participants in the research to administer the food samples to

each other. At this point, the participants found out that the food they were going to be sampling was spicy hot sauce and that they were going to be administering the sauce to the very person whose essay they had just read. In addition, the participants read some information about the other person that indicated that he very much disliked eating spicy food. Participants were given a taste of the hot sauce (it was really hot!) and then instructed to place a quantity of it into a cup for the other person to sample. Furthermore, they were told that the other person would have to eat all the sauce.

As you can see in the figure below, *Aggression as a Function of Mortality Salience and Provocation*, McGregor et al. found that the participants who had not been reminded of their own death, even if they had been insulted by the partner, did not retaliate by giving him a lot of hot sauce to eat. On the other hand, the participants who were both provoked by the other person and who had also been reminded of their own death administered significantly more hot sauce than did the participants in the other three conditions. McGregor et al. (1998) argued that thinking about one's own death creates a strong concern with maintaining one's cherished worldviews (in this case, our political beliefs). When we are concerned about dying, we become more motivated to defend these important beliefs from the challenges made by others, in this case by aggressing through the hot sauce.

Aggression as a Function of Mortality Salience and Provocation



Participants who had been provoked by a stranger who disagreed with them on important opinions, and who had also been reminded of their own death, administered significantly more unpleasant hot sauce to the partner than did the participants in the other three conditions. Adapted from McGregor, H. A., Lieberman, J. D., Greenberg, J., Solomon, S., Arndt, J., Simon, L., & Pyszczynski, T. (1998). Terror management and aggression: Evidence that mortality salience motivates aggression against worldview-threatening others. *Journal of Personality and Social Psychology*, 74(3), 590-605.

STRENGTHS AND LIMITATIONS OF FREUDIAN AND NEO-FREUDIAN APPROACHES

Freud has probably exerted a greater impact on the public's understanding of personality than any other thinker, and he has also in large part defined the field of psychology. Although Freudian psychologists no

longer talk about oral, anal, or genital “fixations,” they do continue to believe that our childhood experiences and unconscious motivations shape our personalities and our attachments with others, and they still make use of psychodynamic concepts when they conduct psychological therapy.

Nevertheless, Freud’s theories, as well as those of the neo-Freudians, have in many cases failed to pass the test of empiricism, and as a result they are less influential now than they have been in the past (Crews, 1998). The problems are first, that it has proved to be difficult to rigorously test Freudian theory because the predictions that it makes (particularly those regarding defense mechanisms) are often vague and unfalsifiable, and second, that the aspects of the theory that can be tested often have not received much empirical support.

As examples, although Freud claimed that children exposed to overly harsh toilet training would become fixated in the anal stage and thus be prone to excessive neatness, stinginess, and stubbornness in adulthood, research has found few reliable associations between toilet training practices and adult personality (Fisher & Greenberg, 1996). And since the time of Freud, the need to repress sexual desires would seem to have become much less necessary as societies have tolerated a wider variety of sexual practices. And yet the psychological disorders that Freud thought we caused by this repression have not decreased.

There is also little scientific support for most of the Freudian defense mechanisms. For example, studies have failed to yield evidence for the existence of repression. People who are exposed to traumatic experiences in war have been found to remember their traumas only too well (Kihlstrom, 1997). Although we may attempt to push information that is anxiety-arousing into our unconscious, this often has the ironic effect of making us think about the information even more strongly than if we hadn’t tried to repress it (Newman, Duff, & Baumeister, 1997). It is true that children remember little of their childhood experiences, but this seems to be true of both negative as well as positive experiences, is true for animals as well, and probably is better explained in terms of the brain’s inability to form long-term memories than in terms of repression. On the other hand, Freud’s important idea that expressing or talking through one’s difficulties can be psychologically helpful has been supported in current research (Baddeley & Pennebaker, 2009) and has become a mainstay of psychological therapy.

A particular problem for testing Freudian theories is that almost anything that conflicts with a prediction based in Freudian theory can be explained away in terms of the use of a defense mechanism. A man who expresses a lot of anger toward his father may be seen via Freudian theory to be experiencing the Oedipus complex, which includes conflict with the father. But a man who expresses no anger at all toward the father also may be seen as experiencing the Oedipus complex by repressing the anger. Because Freud hypothesized that either was possible, but did not specify when repression would or would not occur, the theory is difficult to falsify.

In terms of the important role of the unconscious, Freud seems to have been at least in part correct. More and more research demonstrates that a large part of everyday behavior is driven by processes that are outside our conscious awareness (Kihlstrom, 1987). And yet, although our unconscious motivations influence every aspect of our learning and behavior, Freud probably overestimated the extent to which these unconscious motivations are primarily sexual and aggressive.

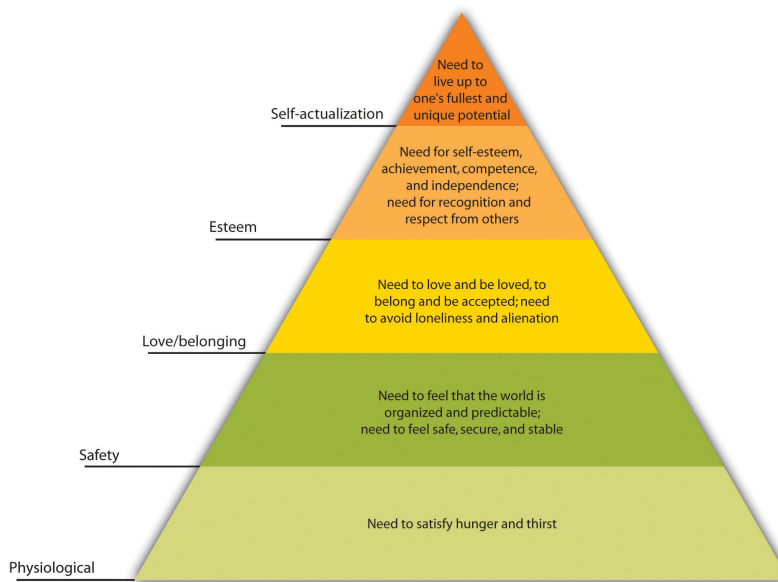
Taken together, it is fair to say that Freudian theory, like most psychological theories, was not entirely correct and that it has had to be modified over time as the results of new studies have become available. But the fundamental ideas about personality that Freud proposed, as well as the use of talk therapy as an essential component of therapy, are nevertheless still a major part of psychology and are used by clinical psychologists every day.

FOCUSING ON THE SELF: HUMANISM AND SELF-ACTUALIZATION

Psychoanalytic models of personality were complemented during the 1950s and 1960s by the theories of **humanistic psychologists**. In contrast to the proponents of psychoanalysis, humanists embraced the notion of free will. Arguing that people are free to choose their own lives and make their own decisions, humanistic psychologists focused on the underlying motivations that they believed drove personality, focusing on the nature of the **self-concept**, *the set of beliefs about who we are*, and **self-esteem**, *our positive feelings about the self*.

One of the most important humanists, Abraham Maslow (1908–1970), conceptualized personality in terms of a pyramid-shaped *hierarchy of motives*. At the base of the pyramid are the lowest-level motivations, including hunger and thirst, and safety and belongingness. Maslow argued that only when people are able to meet the lower-level needs are they able to move on to achieve the higher-level needs of self-esteem, and eventually **self-actualization**, which is *the motivation to develop our innate potential to the fullest possible extent*.

Maslow's Hierarchy of Needs



Abraham Maslow conceptualized personality in terms of a hierarchy of needs. The highest of these motivations is self-actualization.

Maslow studied how successful people, including Albert Einstein, Abraham Lincoln, Martin Luther King, Jr., Helen Keller, and Mahatma Gandhi had been able to lead such successful and productive lives. Maslow (1970) believed that self-actualized people are creative, spontaneous, and loving of themselves and others. They tend to have a few deep friendships rather than many superficial ones and are generally private. He felt that these individuals do not need to conform to the opinions of others because they are very confident and thus free to express unpopular opinions. Self-actualized people are also likely to have *peak experiences*, or transcendent moments of tranquility accompanied by a strong sense of connection with others.

Perhaps the best-known humanistic theorist is Carl Rogers (1902–1987). Rogers was positive about human nature, viewing people as primarily moral and helpful to others, and believed that we can achieve our full potential for emotional fulfillment if the self-concept is characterized by **unconditional positive regard**—*a set of behaviors including being genuine, open to experience, transparent, able to listen to others, and self-disclosing and empathic*. When we treat ourselves or others with unconditional positive regard, we express understanding and support, even while we may acknowledge failings. Unconditional positive regard allows us to admit our fears and failures, to drop our pretenses, and yet at the same time to feel completely accepted for what we are. The principle of unconditional positive regard has become a foundation of psychological therapy; therapists who use it in their practice are more effective than those who do not (Prochaska & Norcross, 2007; Yalom, 1995).

Although there are critiques of the humanistic psychologists (e.g., that Maslow focused on historically productive rather than destructive personalities in his research and thus drew overly optimistic conclusions about the capacity of people to do good), the ideas of humanism are so powerful and optimistic that they have continued to influence both everyday experiences as well as psychology. Today the *positive psychology movement* argues for many of these ideas, and research has documented the extent to which thinking positively and

openly has important positive consequences for our relationships, our life satisfaction, and our psychological and physical health (Seligman & Csikszentmihalyi, 2000).

RESEARCH FOCUS: SELF-DISCREPANCIES, ANXIETY, AND DEPRESSION

Tory Higgins and his colleagues (Higgins, Bond, Klein, & Strauman, 1986; Strauman & Higgins, 1988) have studied how different aspects of the self-concept relate to personality characteristics. These researchers focused on the types of emotional distress that we might experience as a result of how we are currently evaluating our self-concept. Higgins proposes that the emotions we experience are determined both by our perceptions of how well our own behaviors meet up to the standards and goals we have provided ourselves (our *internal standards*) and by our perceptions of how others think about us (our *external standards*). Furthermore, Higgins argues that different types of *self-discrepancies* lead to different types of negative emotions.

In one of Higgins's experiments (Higgins, Bond, Klein, & Strauman, 1986), participants were first asked to describe themselves using a self-report measure. The participants listed 10 thoughts that they thought described the kind of person they actually are; this is the *actual self-concept*. Then, participants also listed 10 thoughts that they thought described the type of person they would "ideally like to be" (the *ideal self-concept*) as well as 10 thoughts describing the way that someone else—for instance, a parent—thinks they "ought to be" (the *ought self-concept*).

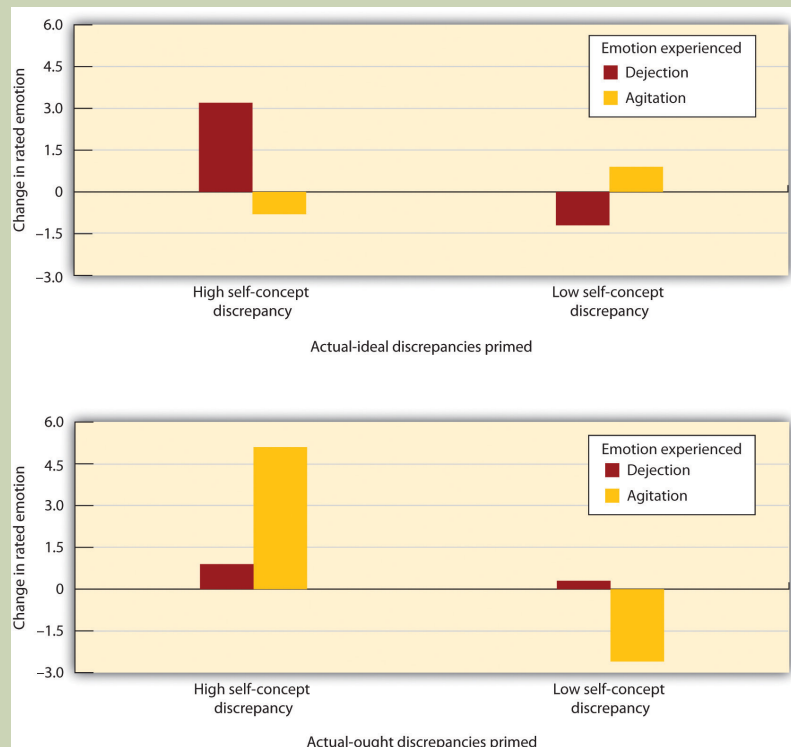
Higgins then divided his participants into two groups. Those with *low self-concept discrepancies* were those who listed similar traits on all three lists. Their ideal, ought, and actual self-concepts were all pretty similar and so they were not considered to be vulnerable to threats to their self-concept. The other half of the participants, those with *high self-concept discrepancies*, were those for whom the traits listed on the ideal and ought lists were very different from those listed on the actual self list. These participants were expected to be vulnerable to threats to the self-concept.

Then, at a later research session, Higgins first asked people to express their current emotions, including those related to sadness and anxiety. After obtaining this baseline measure Higgins activated either ideal or ought discrepancies for the participants. Participants in the *ideal self-discrepancy priming* condition were asked to think about and discuss their own and their parents' hopes and goals for them. Participants in the *ought self-priming condition* listed their own and their parents' beliefs concerning their duty and obligations. Then all participants again indicated their current emotions.

As you can see in the figure, Results from Higgins, Bond, Klein, and Strauman, for low self-concept discrepancy participants, thinking about their ideal or ought selves did not much change their emotions. For high self-concept discrepancy participants, however, priming the ideal self-concept

increased their sadness and dejection, whereas priming the ought self-concept increased their anxiety and agitation. These results are consistent with the idea that discrepancies between the ideal and the actual self lead us to experience sadness, dissatisfaction, and other depression-related emotions, whereas discrepancies between the actual and ought self are more likely to lead to fear, worry, tension, and other anxiety-related emotions.

Results From Higgins, Bond, Klein, and Strauman



Higgins and his colleagues documented the impact of self-concept discrepancies on emotion. For participants with low self-concept discrepancies (right bars), seeing words that related to the self had little influence on emotions. For those with high self-concept discrepancies (left bars), priming the ideal self increased dejection whereas priming the ought self increased agitation. Adapted from Higgins, E. T., Bond, R. N., Klein, R., & Strauman, T. (1986). Self-discrepancies and emotional vulnerability: How magnitude, accessibility, and type of discrepancy influence affect. *Journal of Personality and Social Psychology*, 51(1), 5–15.

One of the critical aspects of Higgins's approach is that, as is our personality, our feelings are also influenced both by our own behavior and by our expectations of how other people view us. This makes it clear that even though you might not care that much about achieving in school, your failure to do well may still produce negative emotions because you realize that your parents do think it is important.

KEY TAKEAWAYS

- One of the most important psychological approaches to understanding personality is based on the psychodynamic approach to personality developed by Sigmund Freud.
- For Freud the mind was like an iceberg, with the many motivations of the unconscious being much larger, but also out of sight, in comparison to the consciousness of which we are aware.
- Freud proposed that the mind is divided into three components: id, ego, and superego, and that the interactions and conflicts among the components create personality.
- Freud proposed that we use defense mechanisms to cope with anxiety and to maintain a positive self-image.
- Freud argued that personality is developed through a series of psychosexual stages, each focusing on pleasure from a different part of the body.
- The neo-Freudian theorists, including Adler, Jung, Horney, and Fromm, emphasized the role of the unconscious and early experience in shaping personality, but placed less evidence on sexuality as the primary motivating force in personality.
- Psychoanalytic and behavioral models of personality were complemented during the 1950s and 1960s by the theories of humanistic psychologists, including Maslow and Rogers.

Exercises and Critical Thinking

1. Based on your understanding of psychodynamic theories, how would you analyze your own personality? Are there aspects of the theory that might help you explain your own strengths and weaknesses?
2. Based on your understanding of humanistic theories, how would you try to change your behavior to better meet the underlying motivations of security, acceptance, and self-realization?
3. Consider your own self-concept discrepancies. Do you have an actual-ideal or actual-

ought discrepancy? Which one is more important for you, and why?

55.

PERSONALITY AND BEHAVIOR

Learning Objectives

By the end of this section, you will be able to:

- Describe the trait approach to understanding personality and the influences of personality on behaviors.
- Discuss how situations play a role in one's personality.

Personality as Traits

One approach to examine the influence of personality on behaviors is the trait approach. Personalities are characterized in terms of **traits**, which are *relatively enduring characteristics that influence our behavior across many situations*. Personality traits such as introversion, friendliness, conscientiousness, honesty, and helpfulness are important because they help explain consistencies in behavior.

The most popular way of measuring traits is by administering personality tests on which people self-report about their own characteristics. Psychologists have investigated hundreds of traits using the self-report approach, and this research has found many personality traits that have important implications for behavior. You can see some examples of the personality dimensions that have been studied by psychologists and their implications for behavior in the table, *Some Personality Traits That Predict Behavior*.

Some Personality Traits That Predict Behavior

Trait	Description	Examples of behaviors exhibited by people who have the trait
Authoritarianism (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950)	A cluster of traits including conventionalism, superstition, toughness, and exaggerated concerns with sexuality	Authoritarians are more likely to be prejudiced, to conform to leaders, and to display rigid behaviors.
Individualism-collectivism (Triandis, 1989)	Individualism is the tendency to focus on oneself and one's personal goals; collectivism is the tendency to focus on one's relations with others.	Individualists prefer to engage in behaviors that make them stand out from others, whereas collectivists prefer to engage in behaviors that emphasize their similarity to others.
Internal versus external locus of control (Rotter, 1966)	In comparison to those with an external locus of control, people with an internal locus of control are more likely to believe that life events are due largely to their own efforts and personal characteristics.	People with higher internal locus of control are happier, less depressed, and healthier in comparison to those with an external locus of control.
Need for achievement (McClelland, 1958)	The desire to make significant accomplishments by mastering skills or meeting high standards	Those high in need for achievement select tasks that are not too difficult to be sure they will succeed in them.
Need for cognition (Cacioppo & Petty, 1982)	The extent to which people engage in and enjoy effortful cognitive activities	People high in the need for cognition pay more attention to arguments in ads.
Regulatory focus (Shah, Higgins, & Friedman, 1998)	Refers to differences in the motivations that energize behavior, varying from a <i>promotion orientation</i> (seeking out new opportunities) to a <i>prevention orientation</i> (avoiding negative outcomes)	People with a promotion orientation are more motivated by goals of gaining money, whereas those with prevention orientation are more concerned about losing money.
Self-consciousness (Fenigstein, Sheier, & Buss, 1975)	The tendency to introspect and examine one's inner self and feelings	People high in self-consciousness spend more time preparing their hair and makeup before they leave the house.
Self-esteem (Rosenberg, 1965)	High self-esteem means having a positive attitude toward oneself and one's capabilities.	High self-esteem is associated with a variety of positive psychological and health outcomes.
Sensation seeking (Zuckerman, 2007)	The motivation to engage in extreme and risky behaviors	Sensation seekers are more likely to engage in risky behaviors such as extreme and risky sports, substance abuse, unsafe sex, and crime.

Sources: Adorno, T. W., Frenkel-Brunswik, E., Levinson, D. J., & Sanford, R. N. (1950). The authoritarian personality. New York, NY: Harper; Triandis, H. (1989). The self and social behavior in differing cultural contexts. *Psychological Review*, 93, 506–520; Rotter, J. (1966). Generalized expectancies of internal versus external locus of control of reinforcement. *Psychological Monographs*, 80; McClelland, D. C. (1958). Methods of measuring human motivation. In John W. Atkinson (Ed.), *Motives in fantasy, action and society*. Princeton,

NJ: D. Van Nostrand; Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology*, 42, 116–131; Shah, J., Higgins, T., & Friedman, R. S. (1998). Performance incentives and means: How regulatory focus influences goal attainment. *Journal of Personality and Social Psychology*, 74(2), 285–293; Fenigstein, A., Scheier, M. F., & Buss, A. H. (1975). Public and private self-consciousness: Assessment and theory. *Journal of Consulting and Clinical Psychology*, 43, 522–527; Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press; Zuckerman, M. (2007). *Sensation seeking and risky behavior*. Washington, DC: American Psychological Association.

As with intelligence tests, the utility of self-report measures of personality depends on their *reliability* and *construct validity*. Some popular measures of personality are not useful because they are unreliable or invalid. Perhaps you have heard of a personality test known as the Myers-Briggs Type Indicator (MBTI). If so, you are not alone, because the MBTI is the most widely administered personality test in the world, given millions of times a year to employees in thousands of companies. The MBTI categorizes people into one of four categories on each of four dimensions: *introversion* versus *extroversion*, *sensing* versus *intuiting*, *thinking* versus *feeling*, and *judging* versus *perceiving*.

Although completing the MBTI can be useful for helping people think about individual differences in personality, and for “breaking the ice” at meetings, the measure itself is not psychologically useful because it is not reliable or valid. People’s classifications change over time and scores on the MBTI do not relate to other measures of personality or to behavior (Hunsley, Lee, & Wood, 2003). Measures such as the MBTI remind us that it is important to scientifically and empirically test the effectiveness of personality tests by assessing their stability over time and their ability to predict behavior.

One of the challenges of the trait approach to personality is that there are so many of them; there are at least 18,000 English words that can be used to describe people (Allport & Odbert, 1936). Thus a major goal of psychologists is to take this vast number of descriptors (many of which are very similar to each other) and to determine the underlying important or “core” traits among them (John, Angleitner, & Ostendorf, 1988).

The trait approach to personality was pioneered by early psychologists, including Gordon Allport (1897–1967), Raymond Cattell (1905–1998), and Hans Eysenck (1916–1997). Each of these psychologists believed in the idea of the trait as the stable unit of personality, and each attempted to provide a list or taxonomy of the most important trait dimensions. Their approach was to provide people with a self-report measure and then to use statistical analyses to look for the underlying “factors” or “clusters” of traits, according to the frequency and the co-occurrence of traits in the respondents.

Allport (1937) began his work by reducing the 18,000 traits to a set of about 4,500 traitlike words that he organized into three levels according to their importance. He called them “cardinal traits” (the most important traits), “central traits” (the basic and most useful traits), and “secondary traits” (the less obvious and less consistent ones). Cattell (1990) used a statistical procedure known as *factor analysis* to analyze the correlations among traits and to identify the most important ones. On the basis of his research he identified what he referred to as “source” (more important) and “surface” (less important) traits, and he developed a measure that assessed 16 dimensions of traits based on personality adjectives taken from everyday language.

Hans Eysenck was particularly interested in the biological and genetic origins of personality and made an

important contribution to understanding the nature of a fundamental personality trait: *extraversion* versus *introversion* (Eysenck, 1998). Eysenck proposed that people who are extroverted (i.e., who enjoy socializing with others) have lower levels of naturally occurring arousal than do introverts (who are less likely to enjoy being with others). Eysenck argued that extroverts have a greater desire to socialize with others to increase their arousal level, which is naturally too low, whereas introverts, who have naturally high arousal, do not desire to engage in social activities because they are overly stimulating.

The fundamental work on trait dimensions conducted by Allport, Cattell, Eysenck, and many others has led to contemporary trait models, the most important and well-validated of which is the **Five-Factor (Big Five) Model of Personality**. According to this model, *there are five fundamental underlying trait dimensions that are stable across time, cross-culturally shared, and explain a substantial proportion of behavior* (Costa & McCrae, 1992; Goldberg, 1982). As you can see in the table, The Five Factors of the Five-Factor Model of Personality, the five dimensions (sometimes known as the “Big Five”) are *agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience*. (You can remember them using the watery acronyms CANOE or OCEAN.)

The Five Factors of the Five-Factor Model of Personality

Dimension	Sample items	Description	Examples of behaviors predicted by the trait
Openness to experience	"I have a vivid imagination"; "I have a rich vocabulary"; "I have excellent ideas."	A general appreciation for art, emotion, adventure, unusual ideas, imagination, curiosity, and variety of experience	Individuals who are highly open to experience tend to have distinctive and unconventional decorations in their home. They are also likely to have books on a wide variety of topics, a diverse music collection, and works of art on display.
Conscientiousness	"I am always prepared"; "I am exacting in my work"; "I follow a schedule."	A tendency to show self-discipline, act dutifully, and aim for achievement	Individuals who are conscientious have a preference for planned rather than spontaneous behavior.
Extraversion	"I am the life of the party"; "I feel comfortable around people"; "I talk to a lot of different people at parties."	The tendency to experience positive emotions and to seek out stimulation and the company of others	Extroverts enjoy being with people. In groups they like to talk, assert themselves, and draw attention to themselves.
Agreeableness	"I am interested in people"; "I feel others' emotions"; "I make people feel at ease."	A tendency to be compassionate and cooperative rather than suspicious and antagonistic toward others; reflects individual differences in general concern for social harmony	Agreeable individuals value getting along with others. They are generally considerate, friendly, generous, helpful, and willing to compromise their interests with those of others.
Neuroticism	"I am not usually relaxed"; "I get upset easily"; "I am easily disturbed"	The tendency to experience negative emotions, such as anger, anxiety, or depression; sometimes called "emotional instability"	Those who score high in neuroticism are more likely to interpret ordinary situations as threatening and minor frustrations as hopelessly difficult. They may have trouble thinking clearly, making decisions, and coping effectively with stress.

A large body of research evidence has supported the five-factor model. The Big Five dimensions seem to be cross-cultural, because the same five factors have been identified in participants in China, Japan, Italy, Hungary, Turkey, and many other countries (Triandis & Suh, 2002). The Big Five dimensions also accurately predict behavior. For instance, a pattern of high conscientiousness, low neuroticism, and high agreeableness predicts successful job performance (Tett, Jackson, & Rothstein, 1991). Scores on the Big Five dimensions also predict the performance of U.S. presidents; ratings of openness to experience are correlated positively with ratings of presidential success, whereas ratings of agreeableness are correlated negatively with success (Rubenzer, Faschingbauer, & Ones, 2000). The Big Five factors are also increasingly being used in helping

researchers understand the dimensions of psychological disorders such as anxiety and depression (Oldham, 2010; Saulsman & Page, 2004).

An advantage of the five-factor approach is that it is parsimonious. Rather than studying hundreds of traits, researchers can focus on only five underlying dimensions. The Big Five may also capture other dimensions that have been of interest to psychologists. For instance, the trait dimension of *need for achievement* relates to the Big Five variable of conscientiousness, and *self-esteem* relates to low neuroticism. On the other hand, the Big Five factors do not seem to capture all the important dimensions of personality. For instance, the Big Five does not capture moral behavior, although this variable is important in many theories of personality. And there is evidence that the Big Five factors are not exactly the same across all cultures (Cheung & Leung, 1998).

SITUATIONAL INFLUENCES ON PERSONALITY

One challenge to the trait approach to personality is that traits may not be as stable as we think they are. When we say that Malik is friendly, we mean that Malik is friendly today and will be friendly tomorrow and even next week. And we mean that Malik is friendlier than average in all situations. But what if Malik were found to behave in a friendly way with his family members but to be unfriendly with his fellow classmates? This would clash with the idea that traits are stable across time and situation.

The psychologist Walter Mischel (1968) reviewed the existing literature on traits and found that there was only a relatively low correlation (about $r = .30$) between the traits that a person expressed in one situation and those that they expressed in other situations. In one relevant study, Hartshorne, May, Maller, & Shuttlesworth (1928) examined the correlations among various behavioral indicators of honesty in children. They also enticed children to behave either honestly or dishonestly in different situations, for instance, by making it easy or difficult for them to steal and cheat. The correlations among children's behavior was low, generally less than $r = .30$, showing that children who steal in one situation are not always the same children who steal in a different situation. And similar low correlations were found in adults on other measures, including dependency, friendliness, and conscientiousness (Bem & Allen, 1974).

Psychologists have proposed two possibilities for these low correlations. One possibility is that the natural tendency for people to see traits in others leads us to believe that people have stable personalities when they really do not. In short, perhaps traits are more in the heads of the people who are doing the judging than they are in the behaviors of the people being observed. The fact that people tend to use human personality traits, such as the Big Five, to judge animals in the same way that they use these traits to judge humans is consistent

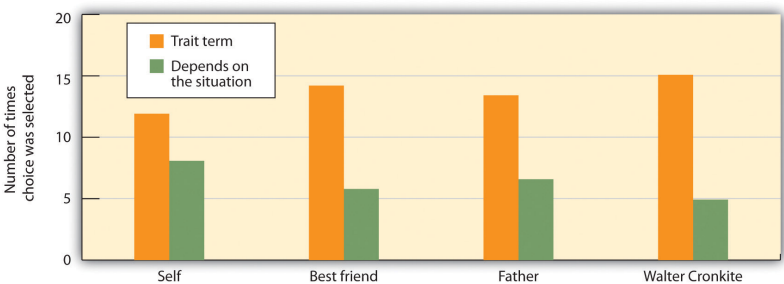
with this idea (Gosling, 2001). And this idea also fits with research showing that people use their knowledge representation (schemas) about people to help them interpret the world around them and that these schemas color their judgments of others’ personalities (Fiske & Taylor, 2007).

Research has also shown that people tend to see more traits in other people than they do in themselves. You might be able to get a feeling for this by taking the following short quiz. First, think about a person you know—your mom, your roommate, or a classmate—and choose which of the three responses on each of the four lines best describes him or her. Then answer the questions again, but this time about yourself.

1.	Energetic	Relaxed	Depends on the situation
2.	Skeptical	Trusting	Depends on the situation
3.	Quiet	Talkative	Depends on the situation
4.	Intense	Calm	Depends on the situation

Richard Nisbett and his colleagues (Nisbett, Caputo, Legant, & Marecek, 1973) had college students complete this same task for themselves, for their best friend, for their father, and for the (at the time well-known) newscaster Walter Cronkite. As you can see in the figure, *We Tend to Overestimate the Traits of Others*, the participants chose one of the two trait terms more often for other people than they did for themselves, and chose “depends on the situation” more frequently for themselves than they did for the other people. These results also suggest that people may perceive more consistent traits in others than they should.

We Tend to Overestimate the Traits of Others



Adapted from Nisbett, R. E., Caputo, C., Legant, P., & Marecek, J. (1973). Behavior as seen by the actor and as seen by the observer. *Journal of Personality and Social Psychology*, 27(2), 154-164.

The human tendency to perceive traits is so strong that it is very easy to convince people that trait descriptions of themselves are accurate. Imagine that you had completed a personality test and the psychologist administering the measure gave you this description of your personality:

You have a great need for other people to like and admire you. You have a tendency to be critical of yourself. You have a great deal of unused capacity, which you have not turned to your advantage. While you have some

personality weaknesses, you are generally able to compensate for them. Disciplined and self-controlled outside, you tend to be worrisome and insecure inside. At times you have serious doubts as to whether you have made the right decision or done the right thing.

I would imagine that you might find that it described you. You probably do criticize yourself at least sometimes, and you probably do sometimes worry about things. The problem is that you would most likely have found some truth in a personality description that was the opposite. Could this description fit you too?

You frequently stand up for your own opinions even if it means that others may judge you negatively. You have a tendency to find the positives in your own behavior. You work to the fullest extent of your capabilities. You have few personality weaknesses, but some may show up under stress. You sometimes confide in others that you are concerned or worried, but inside you maintain discipline and self-control. You generally believe that you have made the right decision and done the right thing.

The **Barnum effect** refers to *the observation that people tend to believe in descriptions of their personality that supposedly are descriptive of them but could in fact describe almost anyone*. The Barnum effect helps us understand why many people believe in astrology, horoscopes, fortune-telling, palm reading, tarot card reading, and even some personality tests. People are likely to accept descriptions of their personality if they think that they have been written for them, even though they cannot distinguish their own tarot card or horoscope readings from those of others at better than chance levels (Hines, 2003). Again, people seem to believe in traits more than they should.



The popularity of tarot card reading, crystal ball reading, horoscopes, palm reading, and other techniques shows the human propensity to believe in traits. Credit: Conny Sandland – Fortune teller in Little India, Klang, Malaysia – CC BY-NC 2.0; that's – Tarot cards on a Thai fortune teller's table – CC BY-NC 2.0.

A second way that psychologists responded to Mischel's findings was by searching even more carefully for the existence of traits. One insight was that the relationship between a trait and a behavior is less than perfect because people can express their traits in different ways (Mischel & Shoda, 2008). People high in extraversion, for instance, may become teachers, salesmen, actors, or even criminals. Although the behaviors are very different, they nevertheless all fit with the meaning of the underlying trait.

Psychologists also found that, because people do behave differently in different situations, personality will only predict behavior when the behaviors are aggregated or averaged across different situations. We might not be able to use the personality trait of openness to experience to determine what Saul will do on Friday night, but we can use it to predict what he will do over the next year in a variety of situations. When many measurements of behavior are combined, there is much clearer evidence for the stability of traits and for the effects of traits on behavior (Roberts & DelVecchio, 2000; Srivastava, John, Gosling, & Potter, 2003).

Taken together, these findings make a very important point about personality, which is that it not only comes from inside us but is also shaped by the situations that we are exposed to. Personality is derived

from our interactions with and observations of others, from our interpretations of those interactions and observations, and from our choices of which social situations we prefer to enter or avoid (Bandura, 1986). In fact, behaviorists such as B. F. Skinner explain personality entirely in terms of the environmental influences that the person has experienced. Because we are profoundly influenced by the situations that we are exposed to, our behavior does change from situation to situation, making personality less stable than we might expect. And yet personality does matter—we can, in many cases, use personality measures to predict behavior across situations.

56.

APPROACHES AND MEASUREMENTS

Learning Objectives

By the end of this section you should be able to:

- Describe what MMPI is and how people use MMPI to measure personalities.
- Describe various projective tests.
- Discuss how personality may differ across cultures.
- Discuss ways to study personalities across cultures.

The MMPI and Projective Tests

One of the most important measures of personality (which is used primarily to assess deviations from a “normal” or “average” personality) is the **Minnesota Multiphasic Personality Inventory (MMPI)**, *a test used around the world to identify personality and psychological disorders* (Tellegen et al., 2003). The MMPI was developed by creating a list of more than 1,000 true-false questions and choosing those that best differentiated patients with different psychological disorders from other people. The current version (the MMPI-2) has more than 500 questions, and the items can be combined into a large number of different subscales. Some of the most important of these are shown in the table, Some of the Major Subscales of the MMPI, but there are also scales that represent family problems, work attitudes, and many other dimensions. The MMPI also has questions that are designed to detect the tendency of the respondents to lie, fake, or simply not answer the questions.

Some of the Major Subscales of the MMPI

Abbreviation	Description	What is measured	No. of items
Hs	Hypochondriasis	Concern with bodily symptoms	32
D	Depression	Depressive symptoms	57
Hy	Hysteria	Awareness of problems and vulnerabilities	60
Pd	Psychopathic deviate	Conflict, struggle, anger, respect for society's rules	50
MF	Masculinity/femininity	Stereotypical masculine or feminine interests/behaviors	56
Pa	Paranoia	Level of trust, suspiciousness, sensitivity	40
Pt	Psychasthenia	Worry, anxiety, tension, doubts, obsessiveness	48
Sc	Schizophrenia	Odd thinking and social alienation	78
Ma	Hypomania	Level of excitability	46
Si	Social introversion	People orientation	69

To interpret the results, the clinician looks at the pattern of responses across the different subscales and makes a diagnosis about the potential psychological problems facing the patient. Although clinicians prefer to interpret the patterns themselves, a variety of research has demonstrated that computers can often interpret the results as well as can clinicians (Garb, 1998; Karon, 2000). Extensive research has found that the MMPI-2 can accurately predict which of many different psychological disorders a person suffers from (Graham, 2006).

One potential problem with a measure like the MMPI is that it asks people to consciously report on their inner experiences. But much of our personality is determined by unconscious processes of which we are only vaguely or not at all aware. **Projective measures** are *measures of personality in which unstructured stimuli, such as inkblots, drawings of social situations, or incomplete sentences, are shown to participants, who are asked to freely list what comes to mind as they think about the stimuli*. Experts then score the responses for clues to personality. The proposed advantage of these tests is that they are more indirect—they allow the respondent to freely express whatever comes to mind, including perhaps the contents of their unconscious experiences.

One commonly used projective test is the *Rorschach Inkblot Test*, developed by the Swiss psychiatrist Hermann Rorschach (1884–1922). The **Rorschach Inkblot Test** is *a projective measure of personality in which the respondent indicates his or her thoughts about a series of 10 symmetrical inkblots*. The Rorschach is administered millions of times every year. The participants are asked to respond to the inkblots, and their responses are systematically scored in terms of what, where, and why they saw what they saw. For example, people who focus on the details of the inkblots may have obsessive-compulsive tendencies, whereas those who talk about sex or aggression may have sexual or aggressive problems.

Rorschach Inkblots



The Rorschach Inkblot Test is a projective test designed to assess psychological disorders.

Another frequently administered projective test is the *Thematic Apperception Test (TAT)*, developed by the psychologist Henry Murray (1893–1988). The **Thematic Apperception Test (TAT)** is a *projective measure of personality in which the respondent is asked to create stories about sketches of ambiguous situations, most of them of people, either alone or with others*. The sketches are shown to individuals, who are asked to tell a story about what is happening in the picture. The TAT assumes that people may be unwilling or unable to admit their true feelings when asked directly but that these feelings will show up in the stories about the pictures. Trained coders read the stories and use them to develop a personality profile of the respondent.

Other popular projective tests include those that ask the respondent to draw pictures, such as the Draw-A-Person test (Machover, 1949), and free association tests in which the respondent quickly responds with the first word that comes to mind when the examiner says a test word. Another approach is the use of “anatomically correct” dolls that feature representations of the male and female genitals. Investigators allow children to play with the dolls and then try to determine on the basis of the play if the children may have been sexually abused.

The advantage of projective tests is that they are less direct, allowing people to avoid using their defense

mechanisms and therefore show their “true” personality. The idea is that when people view ambiguous stimuli they will describe them according to the aspects of personality that are most important to them, and therefore bypass some of the limitations of more conscious responding.

Despite their widespread use, however, the empirical evidence supporting the use of projective tests is mixed (Karon, 2000; Wood, Nezworski, Lilienfeld, & Garb, 2003). The reliability of the measures is low because people often produce very different responses on different occasions. The construct validity of the measures is also suspect because there are very few consistent associations between Rorschach scores or TAT scores and most personality traits. The projective tests often fail to distinguish between people with psychological disorders and those without or to correlate with other measures of personality or with behavior.

In sum, projective tests are more useful as icebreakers to get to know a person better, to make the person feel comfortable, and to get some ideas about topics that may be of importance to that person than for accurately diagnosing personality.

Psychology in Everyday Life: Leaders and Leadership

One trait that has been studied in thousands of studies is **leadership**, *the ability to direct or inspire others to achieve goals*. *Trait theories of leadership* are theories based on the idea that some people are simply “natural leaders” because they possess personality characteristics that make them effective (Zaccaro, 2007). Consider Steve Jobs, the founder of Apple, shown in the figure “Varieties of Leaders.” What characteristics do you think he possessed that allowed him to create such a strong company, even though many similar companies failed?

Varieties of Leaders



Which personality traits do you think characterize these leaders?

Research has found that being intelligent is an important characteristic of leaders, as long as the leader communicates to others in a way that is easily understood by his or her followers (Simonton, 1994, 1995). Other research has found that people with good social skills, such as the ability to accurately perceive the needs and goals of the group members and to communicate with others, also tend to make good leaders (Kenny & Zaccaro, 1983).

Because so many characteristics seem to be related to leader skills, some researchers have attempted to account for leadership not in terms of individual traits, but rather in terms of a package of traits that successful leaders seem to have. Some have considered this in terms of charisma (Sternberg & Lubart, 1995; Sternberg, 2002). **Charismatic leaders** are *leaders who are enthusiastic, committed, and self-confident; who tend to talk about the importance of group goals at a broad level; and who make personal sacrifices for the group*. Charismatic leaders express views that support and validate existing group norms but that also contain a vision of what the group could or should be. Charismatic leaders use their referent power to motivate, uplift, and inspire others. And research has found a positive relationship between a leader's charisma and effective leadership performance (Simonton, 1988).

Another trait-based approach to leadership is based on the idea that leaders take either *transactional* or *transformational* leadership styles with their subordinates (Bass, 1999; Pieterse, Van Knippenberg, Schippers, & Stam, 2010). *Transactional* leaders are the more regular leaders, who work with their subordinates to help them understand what is required of them and to get the job done. *Transformational* leaders, on the other hand, are more like charismatic leaders—they have a vision of where the group is going, and attempt to stimulate and inspire their workers to move beyond their present status and to create a new and better future.

Despite the fact that there appear to be at least some personality traits that relate to leadership ability, the most important approaches to understanding leadership take into consideration both the personality characteristics of the leader as well as the situation in which the leader is operating. In some cases the situation itself is important. For instance, you might remember that President George W. Bush's ratings as a leader increased dramatically after the September 11, 2001, terrorist attacks on the World Trade Center. This is a classic example of how a situation can influence the perceptions of a leader's skill.

In still other cases, different types of leaders may perform differently in different situations. Leaders whose personalities lead them to be more focused on fostering harmonious social relationships among the members of the group, for instance, are particularly effective in situations in which the group is already functioning well and yet it is important to keep the group members engaged in the task and committed to the group outcomes. Leaders who are more task-oriented and directive, on the other hand, are more effective when the group is not functioning well and needs a firm hand to guide it (Ayman, Chemers, & Fiedler, 1995).

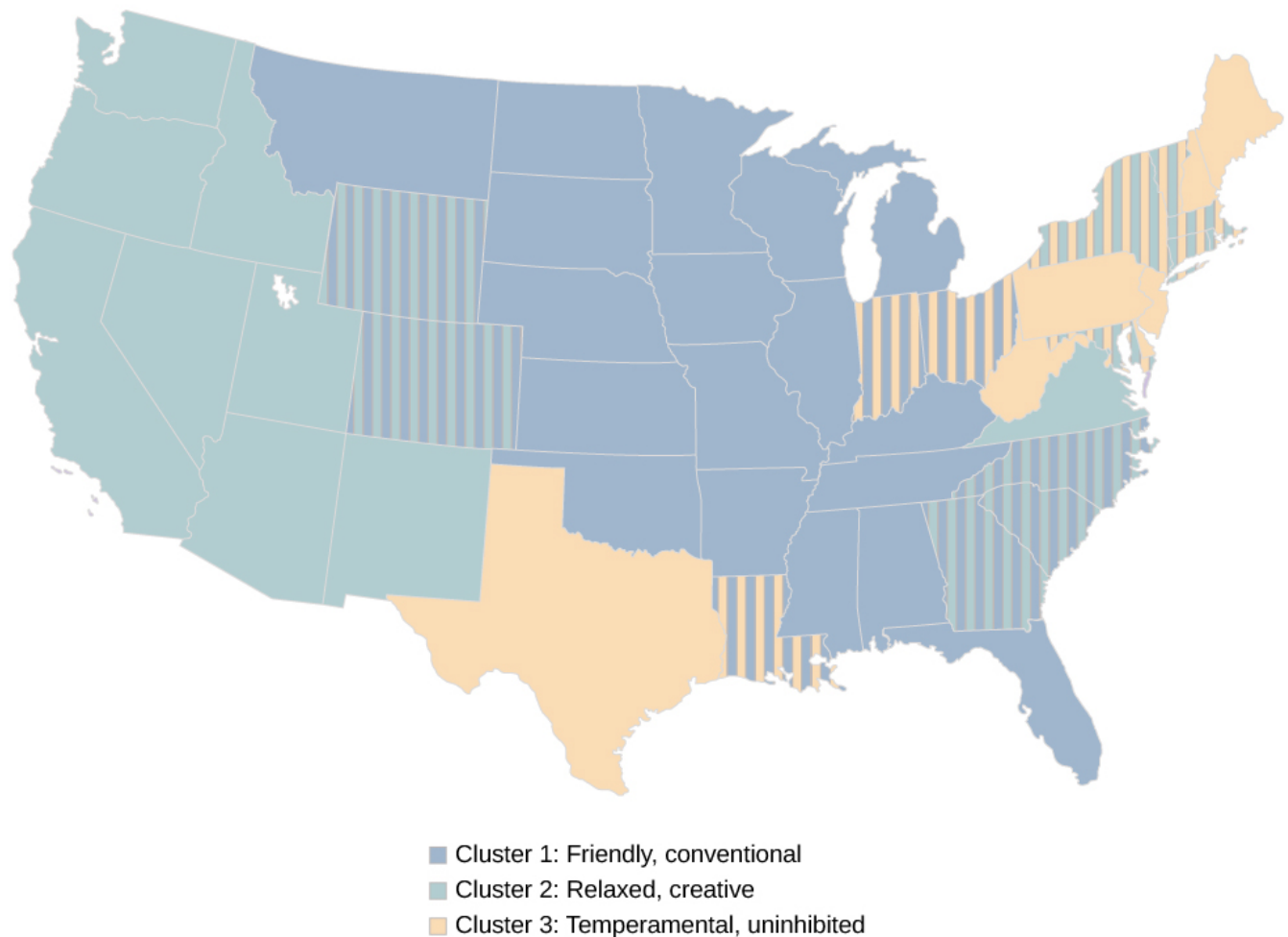
As you have learned in this chapter, personality is shaped by both genetic and environmental factors. The culture in which you live is one of the most important environmental factors that shapes your personality (Triandis & Suh, 2002). The term *culture* refers to all of the beliefs, customs, art, and traditions of a particular society. Culture is transmitted to people through language as well as through the modeling of culturally acceptable and nonacceptable behaviors that are either rewarded or punished (Triandis & Suh, 2002). With these ideas in mind, personality psychologists have become interested in the role of culture in understanding personality. They ask whether personality traits are the same across cultures or if there are variations. It appears that there are both universal and culture-specific aspects that account for variation in people's personalities.

Why might it be important to consider cultural influences on personality? Western ideas about personality may not be applicable to other cultures (Benet-Martinez & Oishi, 2008). In fact, there is evidence that the strength of personality traits varies across cultures. Let's take a look at some of the Big Five factors (conscientiousness, neuroticism, openness, and extroversion) across cultures. As you will learn when you study

social psychology, Asian cultures are more collectivist, and people in these cultures tend to be less extroverted. People in Central and South American cultures tend to score higher on openness to experience, whereas Europeans score higher on neuroticism (Benet-Martinez & Karakitapoglu-Aygun, 2003).

According to this study, there also seem to be regional personality differences within the United States. Researchers analyzed responses from over 1.5 million individuals in the United States and found that there are three distinct regional personality clusters: Cluster 1, which is in the Upper Midwest and Deep South, is dominated by people who fall into the “friendly and conventional” personality; Cluster 2, which includes the West, is dominated by people who are more relaxed, emotionally stable, calm, and creative; and Cluster 3, which includes the Northeast, has more people who are stressed, irritable, and depressed. People who live in Clusters 2 and 3 are also generally more open (Rentfrow et al., 2013).

Personality Clusters in the Continental United States



Researchers found three distinct regional personality clusters in the United States. People tend to be friendly and conventional in the Upper Midwest and Deep South; relaxed, emotionally stable, and creative in the West; and stressed, irritable, and depressed in the Northeast (Rentfrow et al., 2013).

One explanation for the regional differences is selective migration (Rentfrow et al., 2013). Selective migration is the concept that people choose to move to places that are compatible with their personalities and needs. For example, a person high on the agreeable scale would likely want to live near family and friends, and would choose to settle or remain in such an area. In contrast, someone high on openness would prefer to settle in a place that is recognized as diverse and innovative (such as California).

Personality in Individualist and Collectivist Cultures

Individualist cultures and collectivist cultures place emphasis on different basic values. People who live in individualist cultures tend to believe that independence, competition, and personal achievement are important. Individuals in Western nations such as the United States, England, and Australia score high on individualism (Oyserman, Coon, & Kemmelmier, 2002). People who live in collectivist cultures value social harmony, respectfulness, and group needs over individual needs. Individuals who live in countries in Asia, Africa, and South America score high on collectivism (Hofstede, 2001; Triandis, 1995). These values influence personality. For example, Yang (2006) found that people in individualist cultures displayed more personally oriented personality traits, whereas people in collectivist cultures displayed more socially oriented personality traits.

Approaches to Studying Personality in a Cultural Context

There are three approaches that can be used to study personality in a cultural context, the *cultural-comparative approach*; the *indigenous approach*; and the *combined approach*, which incorporates elements of both views. Since ideas about personality have a Western basis, the cultural-comparative approach seeks to test Western ideas about personality in other cultures to determine whether they can be generalized and if they have cultural validity (Cheung van de Vijver, & Leong, 2011). For example, recall from the previous section on the trait perspective that researchers used the cultural-comparative approach to test the universality of McCrae and Costa's Five Factor Model. They found applicability in numerous cultures around the world, with the Big Five traits being stable in many cultures (McCrae & Costa, 1997; McCrae et al., 2005). The indigenous approach came about in reaction to the dominance of Western approaches to the study of personality in non-Western settings (Cheung et al., 2011). Because Western-based personality assessments cannot fully capture the personality constructs of other cultures, the indigenous model has led to the development of personality assessment instruments that are based on constructs relevant to the culture being studied (Cheung et al., 2011). The third approach to cross-cultural studies of personality is the combined approach, which serves as a bridge

between Western and indigenous psychology as a way of understanding both universal and cultural variations in personality (Cheung et al., 2011).

Test Your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://louis.pressbooks.pub/intropsychology/?p=226#h5p-75>

Summary

The culture in which you live is one of the most important environmental factors that shapes your personality. Western ideas about personality may not be applicable to other cultures. In fact, there is evidence that the strength of personality traits varies across cultures. Individualist cultures and collectivist cultures place emphasis on different basic values. People who live in individualist cultures tend to believe that independence, competition, and personal achievement are important. People who live in collectivist cultures value social harmony, respectfulness, and group needs over individual needs. There are three approaches that can be used to study personality in a cultural context: the cultural-comparative approach, the indigenous approach, and the combined approach, which incorporates both elements of both views.

Review Questions



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://louis.pressbooks.pub/intropsychology/?p=226#h5p-76>

Critical Thinking Questions

Why might it be important to consider cultural influences on personality?
Since culture influences one's personality, then Western ideas about personality may not be applicable to people of other cultures. In addition, Western-based measures of personality assessment may not be valid when used to collect data on people from other cultures.

Personal Application Questions

According to the work of Rentfrow and colleagues, personalities are not randomly distributed. Instead they fit into distinct geographic clusters. Based on where you live, do you agree or disagree with the traits associated with yourself and the residents of your area of the country? Why or why not?

57.

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PART XII

SOCIAL PSYCHOLOGY



Trayvon Martin, 17, was shot to death at the hands of George Zimmerman, a volunteer neighborhood watchman, in 2012. Was his death the result of self-defense or racial bias? That question drew hundreds of people to rally on each side of this heated debate. (credit “signs”: modification of work by David Shankbone; credit “walk”: modification of work by “Fibonacci Blue”/Flickr)

Humans are diverse, and sometimes our differences make it challenging for us to get along with one another. A poignant example is that of Trayvon Martin, a 17-year-old African American who was shot by a neighborhood watch volunteer, George Zimmerman, in a predominantly White neighborhood in 2012. Zimmerman grew suspicious of the boy dressed in a hoodie and pursued Martin. A physical altercation ended with Zimmerman fatally shooting Martin. Zimmerman claimed that he acted in self-defense; Martin was unarmed. A Florida jury found Zimmerman not guilty of second degree murder nor of manslaughter.

Several groups protested what they deemed racial profiling and brutality against an unarmed Black male. Zimmerman, who has a Peruvian mother and a German father, was accused of being racist. Some media coverage was criticized for inflaming racial politics in their coverage. In spite of conflicts such as these, people also work together to create positive change. For example, after the 9/11 terrorist attacks, people rallied together and charitable donations skyrocketed (Brown & Minty, 2006). This chapter explores how the presence of other people influences the behavior of individuals, dyads, and groups. Social factors can determine whether human behavior tends toward conflict or harmony.

58.

WHAT IS SOCIAL PSYCHOLOGY?

Learning Objectives

By the end of this section, you will be able to:

- Define social psychology
- Describe situational versus dispositional influences on behavior
- Describe the fundamental attribution error

Social psychology *examines how people affect one another, and it looks at the power of the situation.* Social psychologists assert that an individual's thoughts, feelings, and behaviors are very much influenced by social situations. Essentially, people will change their behavior to align with the social situation at hand. If we are in a new situation or are unsure how to behave, we will take our cues from other individuals.

The field of social psychology studies topics at both the intra- and interpersonal levels. Intrapersonal topics (those that pertain to the individual) include emotions and attitudes, the self, and social cognition (the ways in which we think about ourselves and others). Interpersonal topics (those that pertain to dyads and groups) include helping behavior, aggression, prejudice and discrimination, attraction and close relationships, and group processes and intergroup relationships.



Social psychology deals with all kinds of interactions between people, spanning a wide range of how we connect: from moments of confrontation to moments of working together and helping others, as shown here. (credit: Sgt. Derec Pierson, U.S. Army)

Social psychologists focus on how people construe or interpret situations and how these interpretations influence their thoughts, feelings, and behaviors (Ross & Nisbett, 1991). Thus, social psychology studies individuals in a social context and how situational variables interact to influence behavior. In this chapter, we discuss the intrapersonal processes of self-presentation, cognitive dissonance and attitude change, and the interpersonal processes of conformity and obedience, aggression and altruism, and, finally, love and attraction.

Situational and Dispositional Influences on Behavior

Behavior is a product of both the situation (e.g., cultural influences, social roles, and the presence of bystanders) and of the person (e.g., personality characteristics). Subfields of psychology tend to focus on one influence or behavior over others. Situationism is the view that our behavior and actions are determined by our immediate environment and surroundings. In contrast, dispositionism holds that our behavior is determined by internal factors (Heider, 1958). An internal factor is an attribute of a person and includes personality traits and temperament. Social psychologists have tended to take the situationist perspective, whereas personality psychologists have promoted the dispositionist perspective. Modern approaches to social psychology, however, take both the situation and the individual into account when studying human behavior (Fiske, Gilbert, & Lindzey, 2010). In fact, the field of social-personality psychology has emerged to study the complex interaction

of internal and situational factors that affect human behavior (Mischel, 1977; Richard, Bond, & Stokes-Zoota, 2003).

Fundamental Attribution Error

In the United States, the predominant culture tends to favor a dispositional approach in explaining human behavior. Why do you think this is? We tend to think that people are in control of their own behaviors, and, therefore, any behavior change must be due to something internal, such as their personality, habits, or temperament. According to some social psychologists, people tend to overemphasize internal factors as explanations—or attributions—for the behavior of other people. They tend to assume that the behavior of another person is a *trait* of that person, and to underestimate the power of the situation on the behavior of others. They tend to fail to recognize when the behavior of another is due to situational variables, and thus to the person's *state*. This erroneous assumption is called the fundamental attribution error (Ross, 1977; Riggio & Garcia, 2009). To better understand, imagine this scenario: Greg returns home from work, and upon opening the front door his wife happily greets him and inquires about his day. Instead of greeting his wife, Greg yells at her, "Leave me alone!" Why did Greg yell at his wife? How would someone committing the fundamental attribution error explain Greg's behavior? The most common response is that Greg is a mean, angry, or unfriendly person (his traits). This is an internal or dispositional explanation. However, imagine that Greg was just laid off from his job due to company downsizing. Would your explanation for Greg's behavior change? Your revised explanation might be that Greg was frustrated and disappointed for losing his job; therefore, he was in a bad mood (his state). This is now an external or situational explanation for Greg's behavior.

The fundamental attribution error is so powerful that people often overlook obvious situational influences on behavior. A classic example was demonstrated in a series of experiments known as the quizmaster study (Ross, Amabile, & Steinmetz, 1977). Student participants were randomly assigned to play the role of a questioner (the quizmaster) or a contestant in a quiz game. Questioners developed difficult questions to which they knew the answers, and they presented these questions to the contestants. The contestants answered the questions correctly only 4 out of 10 times. After the task, the questioners and contestants were asked to rate their own general knowledge compared to the average student. Questioners did not rate their general knowledge higher than the contestants, but the contestants rated the questioners' intelligence higher than their own. In a second study, observers of the interaction also rated the questioner as having more general knowledge than the contestant. The obvious influence on performance is the situation. The questioners wrote the questions, so of course they had an advantage. Both the contestants and observers made an internal attribution for the performance. They concluded that the questioners must be more intelligent than the contestants.



In the quizmaster study, people tended to disregard the influence of the situation and wrongly concluded that a questioner's knowledge was greater than their own. (credit: Steve Jurvetson)

As demonstrated in the example above, the fundamental attribution error is considered a powerful influence in how we explain the behaviors of others. However, it should be noted that some researchers have suggested that the fundamental attribution error may not be as powerful as it is often portrayed. In fact, a recent review of more than 173 published studies suggests that several factors (e.g., high levels of idiosyncrasy of the character and how well hypothetical events are explained) play a role in determining just how influential the fundamental attribution error is (Malle, 2006).

Is the Fundamental Attribution Error a Universal Phenomenon?

You may be able to think of examples of the fundamental attribution error in your life. Do people in all cultures commit the fundamental attribution error? Research suggests that they do not. People from an individualistic culture, that is, a culture that focuses on individual achievement and autonomy, have the greatest tendency to commit the fundamental attribution error. Individualistic cultures, which tend to be found in western countries such as the United States, Canada, and the United Kingdom, promote a focus on the individual. Therefore, a person's disposition is thought to be the primary explanation for her behavior. In contrast, people from a collectivistic culture, that is, a culture that focuses on communal relationships with others, such as family, friends, and community, are less likely to commit the fundamental attribution error (Markus & Kitayama, 1991; Triandis, 2001).



(a)



(b)



(c)

People from collectivistic cultures, such as some Asian cultures, are more likely to emphasize relationships with others than to focus primarily on the individual. Activities such as (a) preparing a meal, (b) hanging out, and (c) playing a game engage people in a group. (credit a: modification of work by Arian Zwegers; credit b: modification of work by “conbon33”/Flickr; credit c: modification of work by Anja Disseldorp)

Why do you think this is the case? Collectivistic cultures, which tend to be found in East Asian countries and in Latin American and African countries, focus on the group more than on the individual (Nisbett, Peng, Choi, & Norenzayan, 2001). This focus on others provides a broader perspective that takes into account both situational and cultural influences on behavior; thus, a more nuanced explanation of the causes of others' behavior becomes more likely.

Characteristics of Individualistic and Collectivistic Cultures

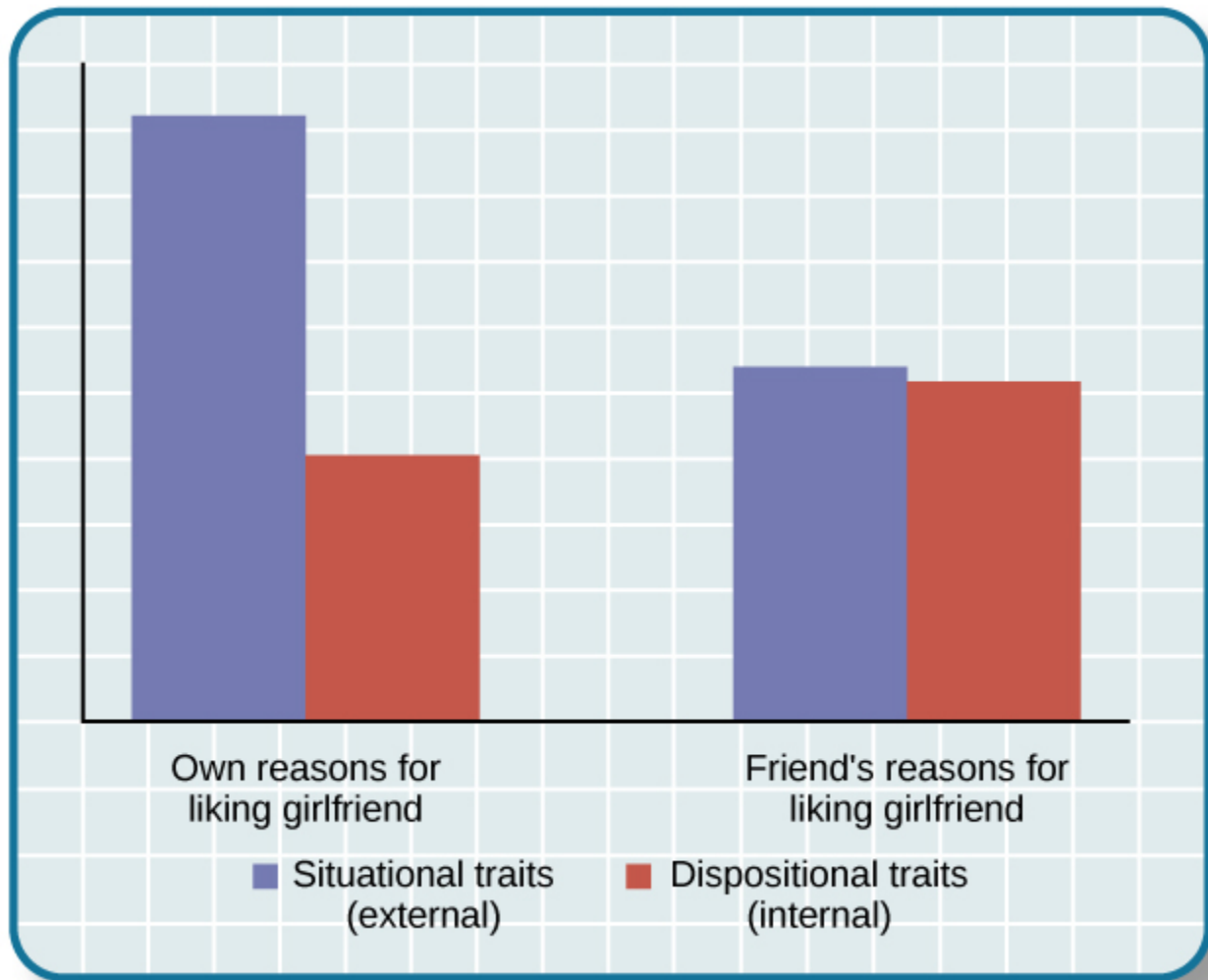
Individualistic Culture	Collectivistic Culture
Achievement oriented	Relationship oriented
Focus on autonomy	Focus on group autonomy
Dispositional perspective	Situational perspective
Independent	Interdependent
Analytic thinking style	Holistic thinking style

Actor-Observer Bias

Returning to our earlier example, Greg knew that he lost his job, but an observer would not know. So a naïve observer would tend to attribute Greg's hostile behavior to Greg's disposition rather than to the true, situational cause. Why do you think we underestimate the influence of the situation on the behaviors of others? One reason is that we often don't have all the information we need to make a situational explanation for another person's behavior. The only information we might have is what is observable. Due to this lack of information we have a tendency to assume the behavior is due to a dispositional, or internal, factor. When it comes to explaining our own behaviors, however, we have much more information available to us. If you

came home from school or work angry and yelled at your dog or a loved one, what would your explanation be? You might say you were very tired or feeling unwell and needed quiet time—a situational explanation. The **actor-observer bias** is *the phenomenon of attributing other people's behavior to internal factors (fundamental attribution error) while attributing our own behavior to situational forces* (Jones & Nisbett, 1971; Nisbett, Caputo, Legant, & Marecek, 1973; Choi & Nisbett, 1998). As actors of behavior, we have more information available to explain our own behavior. However as observers, we have less information available; therefore, we tend to default to a dispositionist perspective.

One study on the actor-observer bias investigated reasons male participants gave for why they liked their girlfriend (Nisbett et al., 1973). When asked why participants liked their own girlfriend, participants focused on internal, dispositional qualities of their girlfriends (for example, her pleasant personality). The participants' explanations rarely included causes internal to themselves, such as dispositional traits (for example, "I need companionship"). In contrast, when speculating why a male friend likes his girlfriend, participants were equally likely to give dispositional and external explanations. This supports the idea that actors tend to provide few internal explanations but many situational explanations for their own behavior. In contrast, observers tend to provide more dispositional explanations for a friend's behavior.



Actor-observer bias is evident when subjects explain their own reasons for liking a girlfriend versus their impressions of others' reasons for liking a girlfriend.

Self-Serving Bias

Following an outcome, **self-serving bias** are those *attributions that enable us to see ourselves in favorable light* (for example, making internal attributions for success and external attributions for failures). When you do well at a task—for example, acing an exam—it is in your best interest to make a dispositional attribution for your behavior (“I’m smart”) instead of a situational one (“The exam was easy”). The tendency of an individual to take credit by making dispositional or internal attributions for positive outcomes but situational or external attributions for negative outcomes is known as the self-serving bias (Miller & Ross, 1975). This bias serves to protect self-esteem. You can imagine that if people always made situational attributions for their behavior, they would never be able to take credit and feel good about their accomplishments.

We can understand self-serving bias by digging more deeply into attribution, a belief about the cause

of a result. One model of attribution proposes three main dimensions: locus of control (internal versus external), stability (stable versus unstable), and controllability (controllable versus uncontrollable). In this context, stability refers to the extent to which the circumstances that result in a given outcome are changeable. The circumstances are considered stable if they are unlikely to change. Controllability refers to the extent to which the circumstances that are associated with a given outcome can be controlled. Obviously, those things that we have the power to control would be labeled controllable (Weiner, 1979).

Consider the example of how we explain our favorite sports team's wins. Research shows that we make internal, stable, and controllable attributions for our team's victory (Grove, Hanrahan, & McInman, 1991). For example, we might tell ourselves that our team is talented (internal), consistently works hard (stable), and uses effective strategies (controllable). In contrast, we are more likely to make external, unstable, and uncontrollable attributions when our favorite team loses. For example, we might tell ourselves that the other team has more experienced players or that the referees were unfair (external), the other team played at home (unstable), and the cold weather affected our team's performance (uncontrollable).



We tend to believe that our team wins because it's better, but loses for reasons it cannot control (Roesch & Amirkham, 1997). (credit: "TheAHL"/Flickr)

Just-World Hypothesis

One consequence of westerners' tendency to provide dispositional explanations for behavior is victim blame (Jost & Major, 2001). When people experience bad fortune, others tend to assume that they somehow are responsible for their own fate. A common ideology, or worldview, in the United States is the just-world hypothesis. The **just-world hypothesis** is *the belief that people get the outcomes they deserve* (Lerner & Miller, 1978). In order to maintain the belief that the world is a fair place, people tend to think that good people

experience positive outcomes, and bad people experience negative outcomes (Jost, Banaji, & Nosek, 2004; Jost & Major, 2001). The ability to think of the world as a fair place, where people get what they deserve, allows us to feel that the world is predictable and that we have some control over our life outcomes (Jost et al., 2004; Jost & Major, 2001). For example, if you want to experience positive outcomes, you just need to work hard to get ahead in life.

Can you think of a negative consequence of the just-world hypothesis? One negative consequence is people's tendency to blame poor individuals for their plight. What common explanations are given for why people live in poverty? Have you heard statements such as, "The poor are lazy and just don't want to work" or "Poor people just want to live off the government"? What types of explanations are these, dispositional or situational? These dispositional explanations are clear examples of the fundamental attribution error. Blaming poor people for their poverty ignores situational factors that impact them, such as high unemployment rates, recession, poor educational opportunities, and the familial cycle of poverty. Other research shows that people who hold just-world beliefs have negative attitudes toward people who are unemployed and people living with AIDS (Sutton & Douglas, 2005). In the United States and other countries, victims of sexual assault may find themselves blamed for their abuse. Victim advocacy groups, such as Domestic Violence Ended (DOVE), attend court in support of victims to ensure that blame is directed at the perpetrators of sexual violence, not the victims.



People who hold just-world beliefs tend to blame the people in poverty for their circumstances, ignoring situational and cultural causes of poverty. (credit: Adrian Miles)