As we journey through life—from womb to tomb—when and how do we develop? Virtually all of us began walking around age 1 and talking by age 2. As children, we engaged in social play in preparation for life’s work. As teenagers, you and your classmates all smile and cry, love and loathe, and occasionally ponder the fact that someday, life will
Developmental psychology examines how people are continually developing—physically, cognitively, and socially—from infancy through old age. Much of its research centers on three major issues:

1. **Nature and nurture:** How do genetic inheritance (our nature) and experience (the nurture we receive) influence our development?
2. **Continuity and stages:** Is development a gradual, continuous process like riding an escalator, or does it proceed through a sequence of separate stages, like climbing rungs on a ladder?
3. **Stability and change:** Do our early personality traits persist through life, or do we become different persons as we age?

**Prenatal Development and the Newborn**

How does life develop before birth?

**Conception**

Nothing is more natural than a species reproducing itself. Yet nothing is more wondrous. With humans, the process starts when a woman’s ovary releases a mature egg—a cell roughly the size of the period at the end of this sentence. The woman was born with all the immature eggs she would ever have, although only 1 in 5000 will ever mature and be released. A man, in contrast, begins producing sperm cells at puberty. For the rest of his life, 24 hours a day, he will be a nonstop sperm factory, although the rate of production—in the beginning more than 1000 sperm during the second it takes to read this phrase—will slow with age.

Like space voyagers approaching a huge planet, the 200 million or more deposited sperm begin their race upstream, approaching a cell 85,000 times their own size. The relatively few reaching the egg release digestive enzymes that eat away its protective coating (**Figure 9.1**). As soon as one sperm begins to penetrate and is welcomed in, the egg’s surface blocks out the others. Before half a day elapses, the egg nucleus and the sperm nucleus fuse. The two have become one. Consider it your most fortunate of moments. Among 200 million sperm, the one needed to make you, in combination with that one particular egg, won the race.

**Figure 9.1 Life is sexually transmitted** (a) Sperm cells surround an ovum. (b) As one sperm penetrates the egg’s jellylike outer coating, a series of chemical events begins that will cause sperm and egg to fuse into a single cell. If all goes well, that cell will subdivide again and again to emerge 9 months later as a 100-trillion-cell human being. Both photos Lennart Nilsson/Albert Bonniers Publishing Company

“Nature is all that a man brings with him into the world; nurture is every influence that affects him after his birth.”

Francis Galton, *English Men of Science*, 1874
Prenatal Development

Fewer than half of all fertilized eggs, called zygotes, survive beyond the first 2 weeks (Grobstein, 1979; Hall, 2004). But for you and me, good fortune prevailed. One cell became 2, then 4—each just like the first—until this cell division produced a zygote of some 100 cells within the first week. Then the cells began to differentiate—to specialize in structure and function. How identical cells do this—as if one decides “I'll become a brain, you become intestines!”—is a puzzle that scientists are just beginning to solve.

About 10 days after conception, the zygote attaches to the mother’s uterine wall, beginning approximately 37 weeks of the closest human relationship. The zygote’s inner cells become the embryo (Figure 9.2a). Over the next 6 weeks, organs begin to form and function. The heart begins to beat.

Figure 9.2 Prenatal development (a) The embryo grows and develops rapidly. At 40 days, the spine is visible and the arms and legs are beginning to grow. (b) By the end of the second month, when the fetal period begins, facial features, hands, and feet have formed. (c) As the fetus enters the fourth month, its 3 ounces could fit in the palm of your hand. Images courtesy of Lennart Nilsson/Albert Bonniers Publishing Company

- Prenatal development

  zygote: conception to 2 weeks

  embryo: 2 weeks through 8 weeks

  fetus: 9 weeks to birth •

By 9 weeks after conception, the embryo looks unmistakably human (Figure 9.2c). It is now a fetus (Latin for “offspring” or “young one”). During the sixth month, organs such as the stomach have developed enough to allow a prematurely born fetus a chance of survival. At this point, the fetus is also responsive to sound (Hepper, 2005). Microphone readings taken inside the uterus have revealed that the fetus is exposed to the sound of its mother’s muffled voice (Ecklund-Flores, 1992). Immediately after birth, when newborns emerge from living 38 or so weeks underwater, they prefer this voice to another woman’s or to their father’s voice (Busnel et al., 1992; DeCasper et al., 1984, 1986, 1994).

“You shall conceive and bear a son. So then drink no wine or strong drink.”

Judges 13:7

At each prenatal stage, genetic and environmental factors affect our development. The placenta, which formed as the zygote’s outer cells attached to the uterine wall, transfers nutrients and oxygen from mother to fetus. A healthy and well-nourished mother helps form a healthy baby-to-be. The placenta also screens out many potentially harmful substances. But some substances slip by, including teratogens, which are harmful agents such as viruses and drugs. If the mother carries the HIV virus, her baby may also. If she is a heroin addict, her baby will be born a heroin addict.
A pregnant woman never smokes alone; she and her fetus both experience reduced blood oxygen and a shot of nicotine. If she is a heavy smoker, her fetus may receive fewer nutrients and be born underweight and at risk for various problems (Pringle et al., 2005).

There is no known safe amount of alcohol during pregnancy. Alcohol enters the woman’s bloodstream—and her fetus’—and depresses activity in both their central nervous systems. A pregnant mother’s alcohol use may prime her offspring to like alcohol. Teens whose mothers drank when pregnant are at risk for heavy drinking and alcohol dependence. In experiments, when pregnant rats drink alcohol, their young offspring later display a liking for alcohol’s odor (Youngentob et al., 2007). Even light drinking can affect the fetal brain (Braun, 1996; Ikonomidou et al., 2000), and persistent heavy drinking will put the fetus at risk for birth defects and intellectual disability. For 1 in about 800 infants, the effects are visible as fetal alcohol syndrome (FAS), marked by a small, misproportioned head and lifelong brain abnormalities (May & Gossage, 2001).

**The Competent Newborn**

What are some newborn abilities, and how do researchers explore infants’ mental abilities?

Having survived prenatal hazards, we as newborns came equipped with automatic responses ideally suited for our survival. We withdrew our limbs to escape pain. If a cloth over our face interfered with our breathing, we turned our head from side to side and swiped at it.

New parents are often in awe of the coordinated sequence of reflexes by which their baby gets food. When something touches their cheek, babies turn toward that touch, open their mouth, and vigorously root for a nipple. Finding one, they automatically close on it and begin sucking—which itself requires a coordinated sequence of reflexive tonguing, swallowing, and breathing. Failing to find satisfaction, the hungry baby may cry—a behavior parents find highly unpleasant and very rewarding to relieve.

The pioneering American psychologist William James presumed that the newborn experiences a “blooming, buzzing confusion.” Until the 1960s, few people disagreed. It was said that, apart from a blur of meaningless light and dark shades, newborns could not see. But then scientists discovered that babies can tell you a lot—if you know how to ask. To ask, you must capitalize on what babies can do—gaze, suck, turn their heads. So, equipped with eye-tracking machines and pacifiers wired to electronic gear, researchers set out to answer parents’ age-old questions: What can my baby see, hear, smell, and think?

One technique developmental researchers use to answer such questions is a simple form of learning called habituation—a decrease in responding with repeated stimulation. A novel stimulus gets attention when first presented. But the more often the stimulus is presented, the weaker the response becomes. This seeming boredom with familiar stimuli gives us a way to ask infants what they see and remember.
Janine Spencer, Paul Quinn, and their colleagues (1997; Quinn, 2002) used a *novelty-preference procedure* to ask 4-month-olds how they recognize cats and dogs. The researchers first showed the infants a series of images of cats or dogs. Which of the two animals in Figure 9.3 do you think the infants would find more novel (measured in looking time) after seeing a series of cats? It was the hybrid animal with the dog’s head (or with a cat’s head, if they had previously viewed a series of dogs). This suggests that infants, like adults, focus first on the face, not the body.

Indeed, we are born preferring sights and sounds that facilitate social responsiveness. As newborns, we turn our heads in the direction of human voices. We gaze longer at a drawing of a facelike image (Figure 9.4) than at a bull’s-eye pattern; yet we gaze more at a bull’s-eye pattern—which has contrasts much like those of the human eye—than at a solid disk (Fantz, 1961). We prefer to look at objects 8 to 12 inches away. Wonder of wonders, that just happens to be the approximate distance between a nursing infant’s eyes and its mother’s (Maurer & Maurer, 1988).

Within days after birth, our brain’s neural networks were stamped with the smell of our mother’s body. Thus, a week-old nursing baby, placed between a gauze pad from its mother’s bra and one from another nursing mother, will usually turn toward the smell of its own mother’s pad (MacFarlane, 1978). At 3 weeks, if given a pacifier that sometimes turns on recordings of its mother’s voice and sometimes that of a female stranger’s, an infant will suck more vigorously when it hears its now-familiar mother’s voice (Mills & Melhuish, 1974). So not only could we as young infants see what we needed to see, and smell and hear well, we were already using our sensory equipment to learn.

**Infancy and Childhood**

“It is a rare privilege to watch the birth, growth, and first feeble struggles of a living human mind.”

Annie Sullivan, in Helen Keller’s *The Story of My Life*, 1903
DURING INFANCY, A BABY GROWS from newborn to toddler, and during childhood from toddler to teenager. We all traveled this path, developing physically, cognitively, and socially. From infancy on, brain and mind—neural hardware and cognitive software—develop together.

**Physical Development**

During infancy and childhood, how do the brain and motor skills develop?

### Brain Development

In humans, the brain is immature at birth. As the child matures, the neural networks grow increasingly more complex.

In your mother’s womb, your developing brain formed nerve cells at the explosive rate of nearly one-quarter million per minute. The developing brain cortex actually overproduces neurons, with the number peaking at 28 weeks and then subsiding to a stable 23 billion or so at birth (Rabinowicz et al., 1996, 1999; de Courten-Myers, 2002). On the day you were born, you had most of the brain cells you would ever have. However, your nervous system was immature: After birth, the branching neural networks that eventually enabled you to walk, talk, and remember had a wild growth spurt (Figure 9.5). From ages 3 to 6, the most rapid growth was in your frontal lobes, which enable rational planning. This helps explain why preschoolers display a rapidly developing ability to control their attention and behavior (Garon et al., 2008).

The association areas—those linked with thinking, memory, and language—are the last cortical areas to develop. As they do, mental abilities surge (Chugani & Phelps, 1986; Thatcher et al., 1987). Fiber pathways supporting language and agility proliferate into puberty, after which a pruning process shuts down excess connections and strengthens others (Paus et al., 1999; Thompson et al., 2000).

As a flower unfolds in accord with its genetic instructions, so do we, in the orderly sequence of biological growth processes called maturation. Maturation decrees many of our commonalities—from standing before walking, to using nouns before adjectives. Severe deprivation or abuse can retard development, and ample experiences talking and reading with parents will help sculpt neural connections. Yet the genetic growth tendencies are inborn. Maturation sets the basic course of development; experience adjusts it.

### Motor Development
The developing brain enables physical coordination. As an infant’s muscles and nervous system mature, more complicated skills emerge. With occasional exceptions, the motor development sequence is universal. Babies roll over before they sit unsupported, and they usually creep on all fours before they walk (Figure 9.6). These behaviors reflect not imitation but a maturing nervous system; blind children, too, crawl before they walk.

**Figure 9.6 Triumphant toddlers** Sit, crawl, walk, run—the sequence of these motor development milestones is the same the world around, though babies reach them at varying ages. Photo Credit From Left to Right: Renee Altier for Worth Publishers, Jim Craigmyle/Corbis, Phototake Inc./Alamy Images, Profimedia.CZ s.r.o./Alamy.

In the eight years following the 1994 launch of a U.S. “Back to Sleep” educational campaign, the number of infants sleeping on their stomachs dropped from 70 to 11 percent—and SIDS (Sudden Infant Death Syndrome) deaths fell by half (Braiker, 2005).

There are, however, individual differences in timing. In the United States, for example, 25 percent of all babies walk by age 11 months, 50 percent within a week after their first birthday, and 90 percent by age 15 months (Frankenburg et al., 1992). The recommended infant back-to-sleep position (putting babies to sleep on their backs to reduce the risk of a smothering crib death) has been associated with somewhat later crawling but not with later walking (Davis et al., 1998; Lipsitt, 2003).

Genes play a major role in motor development. Identical twins typically begin sitting up and walking on nearly the same day (Wilson, 1979). Maturation—including the rapid development of the cerebellum at the back of the brain—creates our readiness to learn walking at about age 1. Experience before that time has a limited effect. This is true for other physical skills, including bowel and bladder control. Before necessary muscular and neural maturation, parents shouldn’t expect pleading or punishment to produce successful toilet training.

**Maturation and Infant Memory**

Can you recall your first day of preschool (or your third birthday party)?

Our earliest memories seldom predate our third birthday. We see this infantile amnesia in the memories of some preschoolers who experienced an emergency fire evacuation caused by a burning popcorn maker. Seven years later, they were able to recall the alarm and what caused it—if they were 4 to 5 years old at the time. Those experiencing the event as 3-year-olds could not remember the cause and usually misrecalled being already outside when the alarm sounded (Pillemer, 1995). Other studies confirm that the average age of earliest conscious memory is 3.5 years (Bauer, 2002). By 4 to 5 years, childhood amnesia is giving way to remembered experiences (Bruce et al., 2000). But even into adolescence, the brain areas underlying memory, such as the hippocampus and frontal lobes, continue to mature (Bauer, 2007).
Figure 9.7 **Infant at work** Babies only 3 months old can learn that kicking moves a mobile, and they can retain that learning for a month. (From Rovee-Collier, 1989, 1997.) Michael Newman/Photo Edit

Although we *consciously* recall little from before age 4, our memory was processing information during those early years. In 1965, while finishing her doctoral work, Carolyn Rovee-Collier observed an infant memory. She was also a new mom, whose colicky 2-month-old, Benjamin, could be calmed by moving a crib mobile. Weary of bonking the mobile, she strung a cloth ribbon connecting the mobile to Benjamin’s foot. Soon, he was kicking his foot to move the mobile. Thinking about her unintended home experiment, Rovee-Collier realized that, contrary to popular opinion at that time, babies are capable of learning. To know for sure that little Benjamin wasn’t just a whiz kid, Rovee-Collier had to repeat the experiment with other infants (Rovee-Collier, 1989, 1999). Sure enough, they, too, soon kicked more when linked to a mobile, both on the day of the experiment and the day after. They had learned the link between moving legs and moving mobile. If, however, she hitched them to a different mobile the next day, the infants showed no learning. Their actions indicated that they remembered the original mobile and recognized the difference. Moreover, when tethered to a familiar mobile a month later, they remembered the association and again began kicking (Figure 9.7).

Evidence of early processing also appeared in a study in which 10-year-olds were shown photos of preschoolers and asked to spot their former classmates. Although they consciously recognized only 1 in 5 of their onetime compatriots, their physiological responses (measured as skin perspiration) were greater to their former classmates whether or not they consciously recognized them (Newcombe et al., 2000). What the conscious mind does not know and cannot express in words, the nervous system somehow remembers.

**Cognitive Development**

From the perspective of Piaget and of today’s researchers, how does a child’s mind develop?

“Who knows the thoughts of a child?”

Poet Nora Perry
Jean Piaget (1896–1980) “If we examine the intellectual development of the individual or of the whole of humanity, we shall find that the human spirit goes through a certain number of stages, each different from the other” (1930). Bill Anderson/Photo Researchers, Inc.

Cognition refers to all the mental activities associated with thinking, knowing, remembering, and communicating. Somewhere on your precarious journey “from egghood to personhood” (Broks, 2007), you became conscious. When was that, and how did your mind unfold from there? Developmental psychologist Jean Piaget (pronounced Pee-ah-ZHAY) spent his life searching for the answers to such questions. His interest began in 1920, when he was in Paris developing questions for children’s intelligence tests. While administering the tests, Piaget became intrigued by children’s wrong answers, which, he noted, were often strikingly similar among children of a given age. Where others saw childish mistakes, Piaget saw intelligence at work.

A half-century spent with children convinced Piaget that a child’s mind is not a miniature model of an adult’s. Thanks partly to his work, we now understand that children reason differently, in “wildly illogical ways about problems whose solutions are self-evident to adults” (Brainerd, 1996).

“Childhood has its own way of seeing, thinking, and feeling, and there is nothing more foolish than the attempt to put ours in its place.”

Philosopher Jean-Jacques Rousseau, 1798

Piaget’s studies led him to believe that a child’s mind develops through a series of stages, in an upward march from the newborn’s simple reflexes to the adult’s abstract reasoning power. Thus, an 8-year-old can comprehend things a toddler cannot, such as the analogy that “getting an idea is like having a light turn on in your head,” or that a miniature slide is too small for sliding, and a miniature car is much too small to get into (Figure 9.8). But our adult minds likewise engage in reasoning uncomprehended by 8-year-olds.
Psychologists Judy DeLoache, David Uttal, and Karl Rosengren (2004) report that 18-to 30-month-old children may fail to take the size of an object into account when trying to perform impossible actions with it. At left, a 21-month-old attempts to slide down a miniature slide. At right, a 24-month-old opens the door to a miniature car and tries to step inside. Both photos: Courtesy Judy DeLoache

Piaget’s core idea is that the driving force behind our intellectual progression is an unceasing struggle to make sense of our experiences: “Children are active thinkers, constantly trying to construct more advanced understandings of the world” (Siegler & Ellis, 1996). To this end, the maturing brain builds schemas, concepts or mental molds into which we pour our experiences (Figure 9.9). By adulthood we have built countless schemas, ranging from cats and dogs to our concept of love.

To explain how we use and adjust our schemas, Piaget proposed two more concepts. First, we assimilate new experiences—we interpret them in terms of our current understandings (schemas). Having a simple schema for cow, for example, a toddler may call all four-legged animals cows. But as we interact with the world, we also adjust, or accommodate, our schemas to incorporate information provided by new experiences. Thus, the child soon learns that the original cow schema is too broad and accommodates by refining the category (Figure 9.10).

Piaget believed that as children construct their understandings while interacting with the world, they experience spurts of change, followed by greater stability as they move from one cognitive plateau to the next. He viewed these plateaus as forming stages. Let’s consider Piaget’s stages now, in the light of current thinking.
Piaget’s Theory and Current Thinking

Piaget proposed that children progress through four stages of cognitive development, each with distinctive characteristics that permit specific kinds of thinking (Table 9.1).

Table 9.1

<table>
<thead>
<tr>
<th><strong>Typical Age Range</strong></th>
<th><strong>Description of Stage</strong></th>
<th><strong>Developmental Phenomena</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to nearly 2 years</td>
<td>Sensorimotor</td>
<td>• Object permanence</td>
</tr>
<tr>
<td></td>
<td>Experiencing the world through senses and actions (looking, hearing, touching, mouthing, and grasping)</td>
<td>• Stranger anxiety</td>
</tr>
<tr>
<td>2 to about 6 or 7 years</td>
<td>Preoperational</td>
<td>• Pretend play</td>
</tr>
<tr>
<td></td>
<td>Representing things with words and images; using intuitive rather than logical reasoning</td>
<td>• Egocentrism</td>
</tr>
<tr>
<td>About 7 to 11 years</td>
<td>Concrete operational</td>
<td>• Conservation</td>
</tr>
<tr>
<td></td>
<td>Thinking logically about concrete events; grasping concrete analogies and performing arithmetical operations</td>
<td>• Mathematical transformations</td>
</tr>
<tr>
<td>About 12 through adulthood</td>
<td>Formal operational</td>
<td>• Abstract logic</td>
</tr>
<tr>
<td></td>
<td>Abstract reasoning</td>
<td>• Potential for mature moral reasoning</td>
</tr>
</tbody>
</table>

**Sensorimotor Stage** In the sensorimotor stage, from birth to nearly age 2, babies take in the world through their senses and actions—through looking, hearing, touching, mouthing, and grasping.

Very young babies seem to live in the present: Out of sight is out of mind. In one test, Piaget showed an infant an appealing toy and then flopped his beret over it. Before the age of 6 months, the infant acted as if it ceased to exist. Young infants lack object permanence—the awareness that objects continue to exist when not perceived (Figure 9.11). By 8 months, infants begin exhibiting memory for things no longer seen. If you hide a toy, the infant will momentarily look for it. Within another month or two, the infant will look for it even after being restrained for several seconds.
Infants younger than 6 months seldom understand that things continue to exist when they are out of sight. But for this infant, out of sight is definitely not out of mind. 

Doug Goodman

Infants can discriminate between possible and impossible objects After habituating to the stimulus on the left, 4-month-olds stared longer if shown the impossible version of the cube—where one of the back vertical bars crosses over a front horizontal bar (Shuwairi et al., 2007). Sarah Shuwairi

But does object permanence in fact blossom at 8 months, much as tulips blossom in spring? Today’s researchers see development as more continuous than Piaget did, and they believe object permanence unfolds gradually. Even young infants will at least momentarily look for a toy where they saw it hidden a second before (Wang et al., 2004). Researchers believe Piaget and his followers underestimated young children’s competence. Consider some simple experiments that demonstrate baby logic:

- Like adults staring in disbelief at a magic trick (the “Whoa!” look), infants look longer at an unexpected and unfamiliar scene of a car seeming to pass through a solid object, a ball stopping in midair, or an object violating object permanence by magically disappearing (Baillargeon, 1995, 2008; Wellman & Gelman, 1992). In another clever experiment, Sarah Shuwairi and her colleagues (2007) exposed 4-month-olds to a picture of a cube (Figure 9.12) with one small area covered. After the infants had habituated to this image, they stared longer when shown an impossible rather than possible version of the cube. Babies, it seems, have a more intuitive grasp of simple laws of physics than Piaget realized.

- Babies also have a head for numbers. Karen Wynn (1992, 2000) showed 5-month-olds one or two objects. Then she hid the objects behind a screen, and visibly removed or added one (Figure 9.13). When she lifted the screen, the infants sometimes did a double take, staring longer when shown a wrong number of objects. But were they just responding to a greater or smaller mass of objects, rather than a change in number (Feigenson et al., 2002)? Later experiments showed that babies’ number sense extends to larger numbers and such things as drumbeats and motions (McCrink & Wynn, 2004; Spelke & Kinzler, 2007; Wynn et al., 2002). If accustomed to a Daffy Duck puppet jumping three times on stage, they show surprise if it jumps only twice. Clearly, infants are smarter than Piaget appreciated. Even as babies, we had a lot on our minds.
Preoperational Stage Piaget believed that until about age 6 or 7, children are in a preoperational stage—too young to perform mental operations. For a 5-year-old, the milk that seems “too much” in a tall, narrow glass may become an acceptable amount if poured into a short, wide glass. Focusing only on the height dimension, this child cannot perform the operation of mentally pouring the milk back, because she lacks the concept of conservation—the principle that quantity remains the same despite changes in shape (Figure 9.14).

Figure 9.14 Piaget’s test of conservation This preoperational child does not yet understand the principle of conservation of substance. When the milk is poured into a tall, narrow glass, it suddenly seems like “more” than when it was in the shorter, wider glass. In another year or so, she will understand that the volume stays the same.

Question: If most 2½-year-olds do not understand how miniature toys can symbolize real objects, should anatomically correct dolls be used when questioning such children about alleged physical or sexual abuse? Judy DeLoache (1995) reports that “very young children do not find it natural or easy to use a doll as a representation of themselves.

Piaget did not view the stage transitions as abrupt. Even so, symbolic thinking appears at an earlier age than he supposed. Judy DeLoache (1987) discovered this when she showed children a model of a room and hid a model toy in it (a miniature stuffed dog behind a miniature couch). The 2½-year-olds easily remembered where to find the miniature toy, but they could not use the model to locate an actual stuffed dog behind a couch in a real room. Three-year-olds—only 6 months older—usually went right to the actual stuffed animal in the real room, showing they could think of the model as a symbol for the room. Piaget probably would have been surprised.

Egocentrism Piaget contended that preschool children are egocentric: They have difficulty perceiving things from another’s point of view. Asked to “show Mommy your picture,” 2-year-old Gabriella holds the picture up facing her own eyes. Three-year-old Gray makes himself “invisible” by putting his hands over his eyes, assuming that if he can’t see his grandparents, they can’t see him. Children’s conversations also reveal their egocentrism, as one young boy demonstrated (Phillips, 1969, p. 61):

“How do you have a brother?”

“Yes.”

“What’s his name?”
“Jim.”

“Does Jim have a brother?”

“It’s too late, Roger—they’ve seen us.”

Roger has not outgrown his early childhood egocentrism. ©The New Yorker Collection, 2007, David Sipress from cartoonbank.com. All rights reserved.

“No.”

Like Gabriella, TV-watching preschoolers who block your view of the TV assume that you see what they see. They simply have not yet developed the ability to take another’s viewpoint. Even teens and adults often overestimate the extent to which others share their opinion and perspectives. We assume that something will be clear to others if it is clear to us, or that text message recipients will “hear” our “just kidding” intent (Epley et al., 2004; Kruger et al., 2005). Children, however, are even more susceptible to this curse of knowledge.

Use your finger to trace a capital E on your forehead. When Adam Galinsky and his colleagues (2006) invited people to do that, they were more egocentric—less likely to draw it from the perspective of someone looking at them—if they were first made to feel powerful. Other studies confirm that feeling powerful reduces people’s sensitivity to how others see, think, and feel.

Theory of Mind When Little Red Riding Hood realizes her “grandmother” is really a wolf, she swiftly revises her ideas about the creature’s intentions and races away. Preschoolers, although still egocentric, develop this ability to infer others’ mental states when they begin forming a theory of mind (a term first coined by psychologists David Premack and Guy Woodruff, to describe chimpanzees’ seeming ability to read intentions).

As children’s ability to take another’s perspective develops, they seek to understand what made a playmate angry, when a sibling will share, and what might make a parent buy a toy. And they begin to tease, empathize, and persuade. Between about 3½ and 4½, children worldwide come to realize that others may hold false beliefs (Callaghan et al., 2005; Sabbagh et al., 2006). Jennifer Jenkins and Janet Astington (1996) showed Toronto children a Band-Aids box and asked them what was inside. Expecting Band-Aids, the children were surprised to discover that the box actually contained pencils. Asked what a child who had never seen the box would think was inside, 3-year-olds typically answered “pencils.” By age 4 to 5, the children’s theory of mind had leapt forward, and they anticipated their friends’ false belief that the box would hold Band-Aids.

In a follow-up experiment, children see a doll named Sally leaving her ball in a red cupboard (Figure 9.15). Another doll, Anne, then moves the ball to a blue cupboard. Researchers then pose a question: When Sally returns, where will she look for the ball? Children with autism (see Close-Up: Autism, below) have difficulty understanding that Sally’s state of mind differs from their own—that Sally, not knowing the ball has been moved, will return to the red cupboard. They also have difficulty reflecting on their own mental states. They are, for example, less likely to use the personal pronouns I and me. Deaf children who have hearing parents and minimal communication opportunities have similar difficulty inferring others’ states of mind (Peterson & Siegal, 1999).
This simple problem illustrates how researchers explore children’s presumptions about others’ mental states. (Inspired by Baron-Cohen et al., 1985.)
Our abilities to perform mental operations, to think symbolically, and to take another’s perspective are not absent in the preoperational stage and then miraculously present in later stages. Rather, these abilities begin to show up early and continue to develop gradually (Wellman et al., 2001). For example, we are able to appreciate others’ perceptions and feelings before we can appreciate others’ beliefs (Saxe & Powell, 2006).

By age 7, children become increasingly capable of thinking in words and of using words to work out solutions to problems. They do this, noted the Russian psychologist Lev Vygotsky (1896–1934), by internalizing their culture’s language and relying on inner speech. Parents who say “No, no!” when pulling a child’s hand away from a cake are giving the child a self-control tool. When later needing to resist temptation, the child may likewise say “No, no!” Second-graders who mutter to themselves while doing math problems grasp third-grade math better the following year (Berk, 1994). Whether out loud or inaudibly, talking to themselves helps children control their behavior and emotions and master new skills.

Concrete Operational Stage By about 6 or 7 years of age, said Piaget, children enter the **concrete operational stage**. Given concrete materials, they begin to grasp conservation. Understanding that change in form does not mean change in quantity, they can mentally pour milk back and forth between glasses of different shapes. They also enjoy jokes that allow them to use this new understanding:

Mr. Jones went into a restaurant and ordered a whole pizza for his dinner. When the waiter asked if he wanted it cut into 6 or 8 pieces, Mr. Jones said, “Oh, you’d better make it 6, I could never eat 8 pieces!” (McGhee, 1976)
Piaget believed that during the concrete operational stage, children fully gain the mental ability to comprehend mathematical transformations and conservation. When my daughter, Laura, was 6, I was astonished at her inability to reverse simple arithmetic. Asked, “What is 8 plus 4?” she required 5 seconds to compute “12,” and another 5 seconds to then compute 12 minus 4. By age 8, she could answer a reversed question instantly.

**Formal Operational Stage** By age 12, our reasoning expands from the purely concrete (involving actual experience) to encompass abstract thinking (involving imagined realities and symbols). As children approach adolescence, said Piaget, many become capable of solving hypothetical propositions and deducing consequences: *If this, then that.* Systematic reasoning, what Piaget called **formal operational** thinking, is now within their grasp.

Although full-blown logic and reasoning await adolescence, the rudiments of formal operational thinking begin earlier than Piaget realized. Consider this simple problem:

**If John is in school, then Mary is in school. John is in school. What can you say about Mary?**

Formal operational thinkers have no trouble answering correctly. But neither do most 7-year-olds (Suppes, 1982).

**Reflecting on Piaget’s Theory**

What remains of Piaget’s ideas about the child’s mind? Plenty—enough to merit his being singled out by *Time* magazine as one of the twentieth century’s 20 most influential scientists and thinkers and rated in a survey of British psychologists as the greatest psychologist of that century (*Psychologist,* 2003). Piaget identified significant cognitive milestones and stimulated worldwide interest in how the mind develops. His emphasis was less on the ages at which children typically reach specific milestones than on their sequence. Studies around the globe, from aboriginal Australia to Algeria to North America, have confirmed that human cognition unfolds basically in the sequence Piaget described (Lourenço & Machado, 1996; Segall et al., 1990).

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“Assessing the impact of Piaget on developmental psychology is like assessing the impact of Shakespeare on English literature.”

Developmental psychologist Harry Beilin (1992)
Diagnoses of autism, a disorder marked by communication deficiencies and repetitive behaviors, have been increasing, according to recent estimates. Once believed to affect 1 in 2500 children, autism or a related disorder will now strike 1 in 150 American children and, in Britain’s London area, 1 in 86 children (Baird et al., 2006; CDC, 2007; Lillienfeld & Arkowitz, 2007). Some people have attributed the modern “autism epidemic” to small amounts of mercury in childhood vaccines, leading nearly 5000 parents of children with autism to file a 2007 lawsuit against the U.S. government. But the mercury-laden ingredient was removed from vaccines in 2001, and autism rates have reportedly not dropped since then (Normand & Dallery, 2007; Schechter & Grether, 2008). Moreover, the increase in autism diagnoses has been offset by a decrease in the number of children considered “cognitively disabled” or “learning disabled,” which suggests a relabeling of children’s disorders (Gernsbacher et al., 2005; Grinker, 2007; Shattuck, 2006).

We do know that the underlying source of autism’s symptoms seems to be poor communication among brain regions that normally work together to let us take another’s viewpoint. This effect appears to result from an unknown number of autism-related genes interacting with the environment in as yet poorly understood ways (Blakeslee, 2005; Wickelgren, 2005).

People with autism are therefore said to have an impaired theory of mind (Rajendran & Mitchell, 2007). They have difficulty inferring others’ thoughts and feelings. They do not appreciate that playmates and parents might view things differently. Mindreading that most find intuitive (Is that face conveying a happy smile, a self-satisfied smirk, or a contemptuous sneer?) is difficult for those with autism. Most children learn that another child’s pouting mouth signals sadness, and that twinkling eyes mean happiness or mischief. A child with autism fails to understand these signals (Frith & Frith, 2001).

To encompass the variations in autism, today’s researchers refer to Autism spectrum disorder. One variation in this spectrum is Asperger syndrome, a “high-functioning” form of autism. Asperger syndrome is marked by normal intelligence, often accompanied by exceptional skill or talent in a specific area, but deficient social and communication skills (and thus an inability to form normal peer relationships).

Psychologist Simon Baron-Cohen (2008) proposes that autism, which afflicts four boys for every girl, represents an “extreme male brain.” Girls are naturally predisposed to be “empathizers,” he contends. They are better at reading facial expressions and gestures—a challenging task for those with autism. And, although the sexes overlap, boys are, he believes, better “systemizers”—understanding things according to rules or laws, as in mathematical and mechanical systems.

“If two ‘systemizers’ have a child, this will increase the risk of the child having autism,” Baron-Cohen theorizes. And because of assortative mating—people’s tendency to seek spouses who share their interests—two systemizers will indeed often mate. “I do not discount environmental factors,” he notes. “I’m just saying, don’t forget about biology.”

Biology’s influence appears in studies of identical twins. If one twin is diagnosed with autism, the chances are 70 percent that the identical co-twin will be as well (Sebat et al., 2007). The younger sibling of a child with autism also is at a heightened risk of 15 percent or so (Sutcliffe, 2008). Random genetic mutations in sperm-producing cells may also play a role. As men age, these mutations become more frequent, which may help explain why an over-40 man has
a much higher risk of fathering a child with autism than does a man under 30 (Reichenberg et al., 2007). Genetic influences appear to do their damage by altering brain synapses (Crawley, 2007; Garber, 2007).

Biology's role in autism also appears in studies comparing the brain's functioning in those with and without autism. People without autism often yawn after seeing others yawn. And as they view and imitate another's smiling or frowning, they feel something of what the other is feeling, thanks to their brain's mirror neurons (Unit 6). Not so among those with autism, who are less imitative and whose brain areas involved in mirroring others' actions are much less active (Dapretto et al., 2006; Perra et al., 2008; Senju et al., 2007). For example, when people with autism watch another person's hand movements, their brain displays less than normal mirroring activity (Oberman & Ramachandran, 2007; ThÉoret et al., 2005).

Such discoveries have launched explorations of treatments that might alleviate some of autism's symptoms by triggering mirror neuron activity (Ramachandran & Oberman, 2006). For example, seeking to "systemize empathy," Baron-Cohen and his Cambridge University colleagues (2007; Golan et al., 2007) collaborated with Britain's National Autistic Society and a film production company. Knowing that television shows with vehicles have been most popular for kids with autism, they created a series of animations that graft emotion-conveying faces onto toy tram, train, and tractor characters in a pretend boy's bedroom (Figure 9.16). After the boy leaves for school, the characters come to life and have experiences that lead them to display various emotions (which I predict you would enjoy viewing at www.thetransporters.com). The children expressed a surprising ability to generalize what they had learned to a new, real context. By the end of the intervention, their previously deficient ability to recognize emotions on real faces now equaled that of children without autism.

However, today's researchers see development as more continuous than did Piaget. By detecting the beginnings of each type of thinking at earlier ages, they have revealed conceptual abilities Piaget missed. Moreover, they see formal logic as a smaller part of cognition than he did. Piaget would not be surprised that today, as part of our own cognitive development, we are adapting his ideas to accommodate new findings.

Piaget's emphasis on how the child's mind grows through interaction with the physical environment is complemented by Vygotsky's emphasis on how the child's mind grows through interaction with the social environment. If Piaget's child was a young scientist, Vygotsky's was a young apprentice. By mentoring children and giving them new words, parents and others provide a temporary scaffold from which children can step to higher levels of thinking (Renninger & Granott, 2005). Language, an important ingredient of social mentoring, provides the building blocks for thinking, noted Vygotsky (who was born the same year as Piaget, but died prematurely of tuberculosis). Effective mentoring occurs when children are developmentally ready to learn a new skill. For Vygotsky, a child's zone of proximal development was the zone between what they could learn with and without help.
Implications for Parents and Teachers  Future parents and teachers remember: Young children are incapable of adult logic. Preschoolers find it easier to follow positive instructions (“Hold the puppy gently”) than negative ones (“Don’t squeeze the puppy”). Preschoolers who stand in the way when others are trying to watch TV simply have not learned to take another’s viewpoint. What seems simple and obvious to us—getting off a teeter-totter will cause a friend on the other end to crash—may be incomprehensible to a 3-year-old. Also remember that children are not passive receptacles waiting to be filled with knowledge. Better to build on what they already know, engaging them in concrete demonstrations and stimulating them to think for themselves. And, finally, accept children’s cognitive immaturity as adaptive. It is nature’s strategy for keeping children close to protective adults and providing time for learning and socialization (Bjorklund & Green, 1992).

Social Development

How do parent-infant attachment bonds form?

From birth, babies in all cultures are social creatures, developing an intense bond with their caregivers. Infants come to prefer familiar faces and voices, then to coo and gurgle when given their mother’s or father’s attention. Soon after object permanence emerges and children become mobile, a curious thing happens. At about 8 months, they develop stranger anxiety. They may greet strangers by crying and reaching for familiar caregivers. “No! Don’t leave me!” their distress seems to say. At about this age, children have schemas for familiar faces; when they cannot assimilate the new face into these remembered schemas, they become distressed (Kagan, 1984). Once again, we see an important principle: The brain, mind, and social-emotional behavior develop together.

Origins of Attachment

Stranger anxiety A newly emerging ability to evaluate people as unfamiliar and possibly threatening helps protect babies 8 months and older. © Christina Kennedy/PhotoEdit

By 12 months, infants typically cling tightly to a parent when they are frightened or expect separation. Reunited after being separated, they shower the parent with smiles and hugs. No social behavior is more striking than this intense and mutual infant-parent bond. This attachment bond is a powerful survival impulse that keeps infants close to their caregivers. Infants become attached to those—typically their parents—who are comfortable and familiar. For many years, developmental psychologists reasoned that infants became attached to those who satisfied their need for nourishment. It made sense. But an accidental finding overturned this explanation.

Body Contact During the 1950s, University of Wisconsin psychologists Harry Harlow and Margaret Harlow bred monkeys for their learning studies. To equalize the infant monkeys’ experiences and to isolate any disease, they separated them from their mothers shortly after birth and raised them in sanitary individual cages, which included a cheesecloth baby blanket (Harlow et al., 1971). Then came a surprise: When their blankets were taken to be laundered, the monkeys became distressed.

The Harlows recognized that this intense attachment to the blanket contradicted the idea that attachment derives from an association with nourishment. But how could they show this more convincingly? To pit the drawing power of a food source against the contact comfort of the blanket, they created two artificial mothers. One was a bare wire cylinder with a wooden head and an attached feeding bottle, the other a cylinder wrapped with terry cloth.
Psychologists Harry Harlow and Margaret Harlow raised monkeys with two artificial mothers—one a bare wire cylinder with a wooden head and an attached feeding bottle, the other a cylinder with no bottle but covered with foam rubber and wrapped with terry cloth. The Harlows’ discovery surprised many psychologists: The infants much preferred contact with the comfortable cloth mother, even while feeding from the nourishing mother. When raised with both, the monkeys overwhelmingly preferred the comfy cloth mother (Figure 9.17). Like human infants clinging to their mothers, the monkeys would cling to their cloth mothers when anxious. When venturing into the environment, they used her as a secure base, as if attached to her by an invisible elastic band that stretched only so far before pulling them back. Researchers soon learned that other qualities—rocking, warmth, and feeding—made the cloth mother even more appealing.

Human infants, too, become attached to parents who are soft and warm and who rock, feed, and pat. Much parent-infant emotional communication occurs via touch (Hertenstein et al., 2006), which can be either soothing (snuggles) or arousing (tickles). Human attachment also consists of one person providing another with a safe haven when distressed and a secure base from which to explore. As we mature, our secure base and safe haven shift—from parents to peers and partners (Cassidy & Shaver, 1999). But at all ages we are social creatures. We gain strength when someone offers, by words and actions, a safe haven: “I will be here. I am interested in you. Come what may, I will actively support you” (Crowell & Waters, 1994).

Lee Kirkpatrick (1999) reports that for some people a perceived relationship with God functions as do other attachments, by providing a secure base for exploration and a safe haven when threatened.

**Familiarity** Contact is one key to attachment. Another is familiarity. In many animals, attachments based on familiarity likewise form during a critical period—an optimal period when certain events must take place to facilitate proper development (Bornstein, 1989). For goslings, ducklings, or chicks, that period falls in the hours shortly after hatching, when the first moving object they see is normally their mother. From then on, the young fowl follow her, and her alone.

Konrad Lorenz (1937) explored this rigid attachment process, called imprinting. He wondered: What would ducklings do if he was the first moving creature they observed? What they did was follow him around: Everywhere that Konrad went, the ducks were sure to go. Further tests revealed that although baby birds imprint best to their own species, they also will imprint to a variety of moving objects—an animal of another species, a box on wheels, a bouncing ball (Colombo, 1982; Johnson, 1992). And, once formed, this attachment is difficult to reverse.
When French pilot Christian Moullec took off in his microlight plane, his imprinted geese, which he had raised since their hatching, followed closely. Alastair Miller

Children—unlike ducklings—do not imprint. However, they do become attached during a less precisely defined sensitive period to what they've known. Mere exposure to people and things fosters fondness (see Unit 14). Children like to reread the same books, rewatch the same movies, reenact family traditions. They prefer to eat familiar foods, live in the same familiar neighborhood, attend school with the same old friends. Familiarity is a safety signal. Familiarity breeds content.

Attachment Differences: Temperament and Parenting

What accounts for children's attachment differences? Placed in a strange situation (usually a laboratory playroom), about 60 percent of infants display secure attachment. In their mother's presence they play comfortably, happily exploring their new environment. When she leaves, they are distressed; when she returns, they seek contact with her. Other infants avoid attachment or show insecure attachment. They are less likely to explore their surroundings; they may even cling to their mother. When she leaves, they either cry loudly and remain upset or seem indifferent to her departure and return (Ainsworth, 1973, 1989; Kagan, 1995; van IJzendoorn & Kroonenberg, 1988).

Mary Ainsworth (1979), who designed the strange situation experiments, studied attachment differences by observing mother-infant pairs at home during their first six months. Later she observed the 1-year-old infants in a strange situation without their mothers. Sensitive, responsive mothers—those who noticed what their babies were doing and responded appropriately—had infants who exhibited secure attachment. Insensitive, unresponsive mothers—mothers who attended to their babies when they felt like doing so but ignored them at other times—had infants who often became insecurely attached. The Harlows' monkey studies, with unresponsive artificial mothers, produced even more striking effects. When put in strange situations without their artificial mothers, the deprived infants were terrified (Figure 9.18).

Follow-up studies have confirmed that sensitive mothers—and fathers—tend to have securely attached infants (De Wolff & van IJzendoorn, 1997). But what explains the correlation? Is attachment style the result of parenting? Or is attachment style the result of genetically influenced temperament—a person’s characteristic emotional reactivity and intensity?

As most parents will tell you after having their second child, babies differ even before gulping their first breath. One quickly apparent aspect of personality is an infant’s temperament—whether reactive, intense, and fidgety, or easygoing, quiet, and placid. From the first weeks of life, difficult babies are more irritable, intense, and
unpredictable. *Easy* babies are cheerful, relaxed, and predictable in feeding and sleeping. *Slow-to-warm-up* infants tend to resist or withdraw from new people and situations (Chess & Thomas, 1987; Thomas & Chess, 1977).

Temperament differences tend to persist. Consider:

- The most emotionally reactive newborns tend also to be the most reactive 9-month-olds (Wilson & Matheny, 1986; Worobey & Blajda, 1989).
- Exceptionally inhibited and fearful 2-year-olds often are still relatively shy as 8-year-olds; about half will become introverted adolescents (Kagan et al., 1992, 1994).
- The most emotionally intense preschoolers tend to be relatively intense young adults (Larsen & Diener, 1987). In one study of more than 900 New Zealanders, emotionally reactive and impulsive 3-year-olds developed into somewhat more impulsive, aggressive, and conflict-prone 21-year-olds (Caspi, 2000).

> "Oh, he's cute, all right, but he's got the temperament of a car alarm." © The New Yorker Collection, 1999, Barbara Smaller from cartoonbank.com. All rights reserved.

Heredity predisposes temperament differences (Rothbart, 2007). As we have seen, identical twins have more similar personalities, including temperament, than do fraternal twins. Physiological tests reveal that anxious, inhibited infants have high and variable heart rates and a reactive nervous system, and that they become more physiologically aroused when facing new or strange situations (Kagan & Snidman, 2004). One form of a gene that regulates the neurotransmitter serotonin predisposes a fearful temperament and, in combination with unsupportive caregiving, an inhibited child (Fox et al., 2007). Such evidence adds to the emerging conclusion that our biologically rooted temperament helps form our enduring personality (McCrae et al., 2000, 2007; Rothbart et al., 2000).

By neglecting such inborn differences, chides Judith Harris (1998), the parenting studies are like “comparing foxhounds reared in kennels with poodles reared in apartments.” So, to separate nature and nurture, Dutch researcher Dymphna van den Boom (1990, 1995) varied parenting while controlling temperament. (Pause and think: If you were the researcher, how might you have done this?)

**Fantastic father** Among the Aka people of Central Africa, fathers form an especially close bond with their infants, even suckling the babies with their own nipples when hunger makes the child impatient for Mother’s return. According to
anthropologist Barry Hewlett (1991), fathers in this culture are holding or within reach of their babies 47 percent of the time. © Barry Hewlett

Van den Boom’s solution was to randomly assign one hundred 6-to 9-month-old temperamentally difficult infants to either an experimental condition, in which mothers received personal training in sensitive responding, or to a control condition in which they did not. At 12 months of age, 68 percent of the experimental-condition infants were rated securely attached, as were only 28 percent of the control-condition infants. Other studies have also found that intervention programs can increase parental sensitivity and, to a lesser extent, infant attachment security (Bakermans-Kranenburg et al., 2003; Van Zeijl et al., 2006).

As these examples indicate, researchers have more often studied mother care than father care. Infants who lack a caring mother are said to suffer “maternal deprivation”; those lacking a father’s care merely experience “father absence.” This reflects a wider attitude in which “fathering a child” has meant impregnating, and “mothering” has meant nurturing. But fathers are more than just mobile sperm banks. Across nearly 100 studies worldwide, a father’s love and acceptance have been comparable to a mother’s love in predicting their offspring’s health and well-being (Rohner & Veneziano, 2001). In one mammoth British study following 7259 children from birth to adulthood, those whose fathers were most involved in parenting (through outings, reading to them, and taking an interest in their education) tended to achieve more in school, even after controlling for many other factors, such as parental education and family wealth (Flouri & Buchanan, 2004).

Whether children live with one parent or two, are cared for at home or in a day-care center, live in North America, Guatemala, or the Kalahari Desert, their anxiety over separation from parents peaks at around 13 months, then gradually declines (Figure 9.19). Does this mean our need for and love of others also fades away? Hardly. Our capacity for love grows, and our pleasure in touching and holding those we love never ceases. The power of early attachment does nonetheless gradually relax, allowing us to move out into a wider range of situations, communicate with strangers more freely, and stay emotionally attached to loved ones despite distance.

Figure 9.19 Infants’ distress over separation from parents In an experiment, groups of infants were left by their mothers in an unfamiliar room. In both groups, the percentage who cried when the mother left peaked at about 13 months. Whether the infant had experienced day care made little difference. (From Kagan, 1976.)

“We need fathers to realize that responsibility does not end at conception. We need them to realize that what makes you a man is not the ability to have a child—it’s the courage to raise one.”

Barack Obama, Father’s Day sermon, 2008

“Out of the conflict between trust and mistrust, the infant develops hope, which is the earliest form of what gradually becomes faith in adults.”
Developmental theorist Erik Erikson (1902–1994), working in collaboration with his wife, Joan Erikson, said that securely attached children approach life with a sense of basic trust—a sense that the world is predictable and reliable. He attributed basic trust not to environment or inborn temperament, but to early parenting. He theorized that infants blessed with sensitive, loving caregivers form a lifelong attitude of trust rather than fear. (Later we’ll consider Erikson’s other stages of development.)

Although debate continues, many researchers now believe that our early attachments form the foundation for our adult relationships and our comfort with affection and intimacy (Birnbaum et al., 2006; Fraley, 2002). Adult styles of romantic love do tend to exhibit secure, trusting attachment; insecure, anxious attachment; or the avoidance of attachment (Feeney & Noller, 1990; Shaver & Mikulincer, 2007; Rhoades & Simpson, 2004). Moreover, these adult attachment styles in turn affect relationships with our children, as avoidant people find parenting more stressful and unsatisfying (Rhoades et al., 2006). Attachment style is also associated with motivation, note Andrew Elliot and Harry Reis (2003). Securely attached people exhibit less fear of failure and a greater drive to achieve.

**Deprivation of Attachment**

**Do parental neglect, family disruption, or day care affect children’s attachments?**

“What is learned in the cradle, lasts to the grave.”

French proverb

If secure attachment nurtures social competence, what happens when circumstances prevent a child from forming attachments? In all of psychology, there is no sadder research literature. Babies reared in institutions without the stimulation and attention of a regular caregiver, or locked away at home under conditions of abuse or extreme neglect, are often withdrawn, frightened, even speechless. Those abandoned in Romanian orphanages during the 1980s looked “frighteningly like [the Harlows’] monkeys” (Carlson, 1995). If institutionalized more than 8 months, they often bore lasting emotional scars (Chisholm, 1998; Malinosky-Rummell & Hansen, 1993; Rutter et al., 1998).

The Harlows’ monkeys bore similar scars if reared in total isolation, without even an artificial mother. As adults, when placed with other monkeys their age, they either cowered in fright or lashed out in aggression. When they reached sexual maturity, most were incapable of mating. If artificially impregnated, females often were neglectful, abusive, even murderous toward their first-born. An experiment with primates confirms the abuse-breeds-abuse phenomenon. Whether reared by biological or adoptive mothers, 9 of 16 females who were abused by their mothers became abusive parents, as did no female reared by a nonabusive mother (Maestripieri, 2005).

In humans, too, the unloved sometimes become the unloving. Most abusive parents—and many condemned murderers—report having been neglected or battered as children (Kempe & Kempe, 1978; Lewis et al., 1988). But does this mean that today’s victim is predictably tomorrow’s victimizer? No. Though most abusers were indeed abused, most abused children do not later become violent criminals or abusive parents. Most children growing up under adversity (as did the surviving children of the Holocaust) are resilient; they become normal adults (Helmreich, 1992; Masten, 2001). But others, especially those who experience no sharp break from their abusive past, don’t bounce back so readily. Some 30 percent of people who have been abused do abuse their children—a rate lower than that found in the primate study, but four times the U.S. national rate of child abuse (Dumont et al., 2007; Kaufman & Zigler, 1987; Widom, 1989a,b).

Extreme early trauma seems to leave footprints on the brain. If repeatedly threatened and attacked while young, normally placid golden hamsters grow up to be cowards when caged with same-sized hamsters, or bullies when caged with weaker ones (Ferris, 1996). Such animals show changes in the brain chemical serotonin, which calms aggressive impulses. A similarly sluggish serotonin response has been found in abused children who become aggressive teens and adults. “Stress can set off a ripple of hormonal changes that permanently wire a child’s brain to cope with a malevolent world,” concludes abuse researcher Martin Teicher (2002).

Such findings help explain why young children terrorized through physical abuse or wartime atrocities (being beaten, witnessing torture, and living in constant fear) may suffer other lasting wounds—often nightmares, depression, and an adolescence troubled by substance abuse, binge eating, or aggression (Kendall-Tackett et al., 1993, 2004; Polusny
& Follette, 1995; Trickett & McBride-Chang, 1995). Child sexual abuse, especially if severe and prolonged, places children at increased risk for health problems, psychological disorders, substance abuse, and criminality (Freyd et al., 2005; Tyler, 2002). Abuse victims are at considerable risk for depression if they carry a gene variation that spurs stress-hormone production (Bradley et al., 2008). As we will see again and again, behavior and emotion arise from a particular environment interacting with particular genes.

**Disruption of Attachment** What happens to an infant when attachment is disrupted? Separated from their families, infants—both monkeys and humans—become upset and, before long, withdrawn and even despairing (Bowlby, 1973; Mineka & Suomi, 1978). Fearing that the stress of separation might cause lasting damage (and when in doubt, acting to protect parents’ rights), courts are usually reluctant to remove children from their homes.

If placed in a more positive and stable environment, most infants recover from the separation distress. In studies of adopted children, Leon Yarrow and his co-workers (1973) found that when children between 6 and 16 months of age were removed from their foster mothers, they initially had difficulties eating, sleeping, and relating to their new mothers. But when these children were studied at age 10, little visible effect remained. Thus, they fared no worse than children placed before the age of 6 months (with little accompanying distress). Likewise, socially deprived but adequately nourished Romanian orphans who were adopted into a loving home during infancy or early childhood usually progressed rapidly, especially in their cognitive development. If removed and adopted after age 2, however, they were at risk for attachment problems. Foster care that prevents attachment by moving a child through a series of foster families can be very disruptive. So can repeated and prolonged removals from a mother.

Adults also suffer when attachment bonds are severed. Whether through death or separation, a break produces a predictable sequence. Agitated preoccupation with the lost partner is followed by deep sadness and, eventually, the beginnings of emotional detachment and a return to normal living (Hazan & Shaver, 1994). Newly separated couples who have long ago ceased feeling affection are sometimes surprised at their desire to be near the former partner. Deep and longstanding attachments seldom break quickly. Detaching is a process, not an event.

An example of high-quality day care Research has shown that young children thrive socially and intellectually in safe, stimulating environments with a ratio of one caregiver for every three or four children. Digital Vision/Getty Images

**Does Day Care Affect Attachment?** In the mid-twentieth century, when Mom-at-home was the social norm, researchers asked, “Is day care bad for children? Does it disrupt children’s attachments to their parents?” For the high-quality day-care programs usually studied, the answer was no. In Mother Care/Other Care, developmental psychologist Sandra Scarr (1986) explained that children are “biologically sturdy individuals...who can thrive in a wide variety of life situations.” Scarr spoke for many developmental psychologists, whose research has uncovered no major impact of maternal employment on children’s development (Erel et al., 2000; Goldberg et al., 2008).

Research then shifted to the effects of differing quality of day care on different types and ages of children. Scarr (1997) explained: Around the world, “high-quality child care consists of warm, supportive interactions with adults in a safe, healthy, and stimulating environment...Poor care is boring and unresponsive to children’s needs.” Newer research not only confirms that day-care quality matters, but also finds that family poverty often consigns children to lower-quality day care, as well as more family instability and turmoil, more authoritarian parenting (imposing strict rules and demanding obedience), more time in front of the television, and less access to books (Love et al., 2003; Evans, 2004).

One ongoing study in 10 American cities has followed 1100 children since the age of 1 month. The researchers found that at ages 4½ to 6, those children who had spent the most time in day care had slightly advanced thinking and
language skills. They also had an increased rate of aggressiveness and defiance (NICHD, 2002, 2003, 2006). To developmental psychologist Eleanor Maccoby (2003), the positive correlation between increased rate of problem behaviors and time spent in child care suggests “some risk for some children spending extended time in some day-care settings as they’re now organized.” But the child’s temperament, the parents’ sensitivity, and the family’s economic and educational level mattered more than time spent in day care.

To be a day-care researcher and “to follow the data” can be controversial, notes researcher Jay Belsky (2003). Both opponents and advocates of day care have strong feelings. “As a result,” says Belsky, “the scientist who is willing to report unpopular results is all too frequently blamed for generating them.” Just as weather forecasters can report rain but love sunshine, so scientists aim to reveal and report the way things are, even when they wish it were otherwise.

Children’s ability to thrive under varied types of responsive caregiving should not surprise us, given cultural variations in attachment patterns. Westernized attachment features one or two caregivers and their offspring. In other cultures, such as the Efe of Zaire, multiple caregivers are the norm (Field, 1996; Whaley et al., 2002). Even before the mother holds her newborn, the baby is passed among several women. In the weeks to come, the infant will be constantly held (and fed) by other women. The result is strong multiple attachments. As an African proverb says, “It takes a village to raise a child.”

There is little disagreement that the many preschool children left alone for part of their parents’ working hours deserve better. So do the children who merely exist for 9 hours a day in minimally equipped, understaffed centers. What all children need is a consistent, warm relationship with people whom they can learn to trust. The importance of such relationships extends beyond the preschool years, as Finnish psychologist Lea Pulkkinen (2006) observed in her career-long study of 285 individuals tracked from age 8 to 42. Her observation that adult monitoring of children was associated with favorable outcomes led her to undertake, with support from Finland’s parliament, a nationwide program of adult-supervised activities for all first and second graders (Pulkkinen, 2004; Rose, 2004).

Self-Concept

8: How do children’s self-concepts develop, and how are children’s traits related to parenting styles?

Self-awareness Mirror images fascinate infants from the age of about 6 months. Only at about 18 months, however, does the child recognize that the image in the mirror is “me.” Kate Nurre/Worth Publishers

Infancy’s major social achievement is attachment. Childhood’s major social achievement is a positive sense of self. By the end of childhood, at about age 12, most children have developed a self-concept—an understanding and assessment of who they are. (Their self-esteem is how they feel about who they are.) Parents often wonder when and how this sense of self develops. “Is my baby girl aware of herself—does she know she is a person distinct from everyone else?”

Of course we cannot ask the baby directly, but we can again capitalize on what she can do—letting her behavior provide clues to the beginnings of her self-awareness. In 1877, biologist Charles Darwin offered one idea: Self-awareness begins when we recognize ourselves in a mirror. By this indicator, self-recognition emerges gradually over about a year, starting in roughly the sixth month as the child reaches toward the mirror to touch her image as if it were another child (Courage & Howe, 2002; Damon & Hart, 1982, 1988, 1992).

But how can we know when the child recognizes that the girl in the mirror is indeed herself, not just an agreeable playmate? In a simple variation of the mirror procedure, researchers sneakily dabbed rouge on children’s noses
before placing them in front of the mirror. At about 15 to 18 months, children will begin to touch their own noses when they see the red spot in the mirror (Butterworth, 1992; Gallup & Suarez, 1986). Apparently, 18-month-olds have a schema of how their face should look, and they wonder, “What is that spot doing on my face?”

Beginning with this simple self-recognition, the child’s self-concept gradually strengthens. By school age, children start to describe themselves in terms of their gender, group memberships, and psychological traits, and they compare themselves with other children (Newman & Ruble, 1988; Stipek, 1992). They come to see themselves as good and skillful in some ways but not others. They form a concept of which traits, ideally, they would like to have. By age 8 or 10, their self-image is quite stable.

As adolescents and adults, will our self-esteem be lower if we have experienced adoption? That’s what Dutch researchers Femmie Juffer and Marinus van IJzendoorn (2007) predicted, given that some adopted children will have suffered early neglect or abuse, will know that their biological parents gave them up, and will often look different from their adoptive parents. To check their presumption, they mined data from 88 studies comparing the self-esteem scores of 10,977 adoptees and 33,862 nonadoptees. To their surprise, they found “no difference in self-esteem.” This was true even for transracial and international adoptees. Many adoptees face challenges, the researchers acknowledge, but “supported by the large investment of adoptive families” they display resilience.

Children’s views of themselves affect their actions. Children who form a positive self-concept are more confident, independent, optimistic, assertive, and sociable (Maccoby, 1980). This then raises important questions: How can parents encourage a positive yet realistic self-concept?

Parenting Styles

Some parents spank, some reason. Some are strict, some are lax. Some show little affection, some liberally hug and kiss. Do such differences in parenting styles affect children?

The most heavily researched aspect of parenting has been how, and to what extent, parents seek to control their children. Investigators have identified three parenting styles:

1. **Authoritarian** parents impose rules and expect obedience: “Don’t interrupt.” “Keep your room clean.”
   “Don’t stay out late or you’ll be grounded.” “Why? Because I said so.”
2. **Permissive** parents submit to their children’s desires. They make few demands and use little punishment.
3. **Authoritative** parents are both demanding and responsive. They exert control by setting rules and enforcing them, but they also explain the reasons for rules. And, especially with older children, they encourage open discussion when making the rules and allow exceptions.

**Self-aware animals** After prolonged exposure to mirrors, several species—chimpanzees, orangutans, gorillas, dolphins, elephants, and magpies—have similarly demonstrated self-recognition of their mirror image (Gallup, 1970: Reiss & Marino, 2001; Prior et al., 2008). In an experiment by Joshua Plotnik and colleagues (2006), an Asian elephant, when facing a mirror, repeatedly used her trunk to touch an “X” painted above her eye (but not a similar mark above the other eye that was visible only under black light). AP Photo/National Academy of Sciences, Courtesy of Joshua Plotnik, Frans de Waal, and Diana Reiss

Too hard, too soft, and just right, these styles have been called. Studies by Stanley Coopersmith (1967), Diana Baumrind (1996), and John Buri and others (1988) reveal that children with the highest self-esteem, self-reliance,
and social competence usually have warm, concerned, authoritative parents. (Those with authoritarian parents tend to have less social skill and self-esteem, and those with permissive parents tend to be more aggressive and immature.) The participants in most studies have been middle-class White families, and some critics suggest that effective parenting may vary by culture. Yet studies with families of other races and in more than 200 cultures worldwide confirm the social and academic correlates of loving and authoritative parenting (Rohner & Veneziano, 2001; Sorkhabi, 2005; Steinberg & Morris, 2001). And the effects are stronger when children are embedded in authoritative communities with connected adults who model a good life (Commission on Children at Risk, 2003).

A word of caution: The association between certain parenting styles (being firm but open) and certain childhood outcomes (social competence) is correlational. Correlation is not causation. Here are two possible alternative explanations for this parenting-competence link. (Can you imagine others?)

- Children’s traits may influence parenting more than vice versa. Parental warmth and control vary somewhat from child to child, even in the same family (Holden & Miller, 1999). So perhaps socially mature, agreeable, easygoing children evoke greater trust and warmth from their parents, and less competent and less cooperative children elicit less. Twin studies support this possibility (Kendler, 1996).
- Some underlying third factor may be at work. Perhaps, for example, competent parents and their competent children share genes that predispose social competence. Twin studies also support this possibility (South et al., 2008).

Parents struggling with conflicting advice and with the stresses of child-rearing should remember that all advice reflects the advice-giver’s values. For those who prize unquestioning obedience from a child, an authoritarian style may have the desired effect. For those who value children’s sociability and self-reliance, authoritative firm-but-open parenting is advisable.

**Culture and Child-Rearing**


Parents in every culture facilitate their children’s discovery of their world, but cultures differ in what they deem important. Asian cultures place more emphasis on school and hard work than do North American cultures. This may help explain why Japanese and Taiwanese children get higher scores on mathematics achievement tests.

Child-rearing practices reflect cultural values that vary across time and place. Do you prefer children who are independent or children who comply? If you live in a Westernized culture, the odds are you prefer independence. “You are responsible for yourself,” Western families and schools tell their children. “Follow your conscience. Be true to yourself. Discover your gifts. Set your own goals.” A half-century and more ago, Western cultural values placed greater priority on obedience, respect, and sensitivity to others (Alwin, 1990; Remley, 1988). “Be true to your traditions,” parents then taught their children. “Be loyal to your heritage and country. Show respect toward your parents and other superiors.” Cultures can change.

Many Asians and Africans live in cultures that value emotional closeness. Rather than being given their own bedrooms and entrusted to day care, infants and toddlers may sleep with their mothers and spend their days close to a family member (Morelli et al., 1992; Whiting & Edwards, 1988). These cultures encourage a strong sense of family self—a feeling that what shames the child shames the family, and what brings honor to the family brings honor to the self.
Children across place and time have thrived under various child-rearing systems. Upper-class British parents traditionally handed off routine caregiving to nannies, then sent their children off to boarding school at about age 10. These children generally grew up to be pillars of British society, just like their parents and their boarding-school peers. In the African Gusii society, babies nurse freely but spend most of the day on their mother’s back—with lots of body contact but little face-to-face and language interaction. When the mother becomes pregnant, the toddler is weaned and handed over to someone else, often an older sibling. Westerners may wonder about the negative effects of this lack of verbal interaction, but then the African Gusii would in turn wonder about Western mothers pushing their babies around in strollers and leaving them in playpens and car seats (Small, 1997). Such diversity in child-rearing cautions us against presuming that our culture’s way is the only way to rear children successfully.

**Gender Development**

As we saw in Unit 7B, we humans share an irresistible urge to organize our worlds into simple categories. Among the ways we classify people—as tall or short, fat or slim, smart or dull—one stands out: At your birth, everyone wanted to know, “Boy or girl?” Our biological sex in turn helps define our gender, the biological and social characteristics by which people define male or female. Under the influence of our culture, our gender influences our social development.

**Gender Similarities and Differences**

Having faced similar adaptive challenges, we are in most ways alike. Men and women are not from different planets—Mars and Venus—but from the same planet Earth. Tell me whether you are male or female and you give me virtually no clues to your vocabulary, intelligence, and happiness, or to the mechanisms by which you see, hear, learn, and remember. Your “opposite” sex is, in reality, your very similar sex. And should we be surprised? Among your 46 chromosomes, 45 are unisex.

**Figure 9.20 Much ado about a small difference** Janet Hyde (2005) shows us two normal distributions that differ by the approximate magnitude (0.21 standard deviations) of the gender difference in self-esteem, averaged over all available samples. Moreover, though we can identify gender differences, the variation among individual women and among individual men greatly exceeds the difference between the average woman and man.
But males and females also differ, and differences command attention. Some much talked-about differences are actually quite modest, as Janet Hyde (2005) illustrated by graphically representing the gender difference in self-esteem scores, across many studies (Figure 9.20). Some differences are more striking. Compared with the average man, the average woman enters puberty two years sooner, lives five years longer, carries 70 percent more fat, has 40 percent less muscle, and is 5 inches shorter. Other gender differences appear throughout this book. Women smell fainter odors, express emotions more freely, and are offered help more often. They are doubly vulnerable to depression and anxiety, and their risk of developing eating disorders is 10 times greater. But then men are some 4 times more likely to commit suicide or suffer alcohol dependence. They are far more often diagnosed with autism, color-blindness, attention-deficit hyperactivity disorder (as children), and antisocial personality disorder (as adults). Choose your gender and pick your vulnerability.

How much does biology bend the genders? What portion of our differences is socially constructed—by the gender roles our culture assigns us, and by how we are socialized as children? To answer those questions, let’s look more closely at some average gender differences in aggression, social power, and social connectedness.

**Gender and Aggression** In surveys, men admit to more aggression than do women, and experiments confirm that men tend to behave more aggressively, such as by administering what they believe are more painful electric shocks (Bettencourt & Kernahan, 1997). The aggression gender gap pertains to physical aggression (such as hitting) rather than verbal, relational aggression (such as excluding someone). The gender gap in physical aggression appears in everyday life at various ages and in various cultures, especially those with gender inequality (Archer, 2004, 2006). In dating relationships, violent acts (such as slaps and thrown objects) are often mutual (Straus, 2008). Violent crime rates more strikingly illustrate the gender difference. The male-to-female arrest ratio for murder, for example, is 10 to 1 in the United States and almost 7 to 1 in Canada (FBI, 2007; Statistics Canada, 2007).

Women’s 2009 representations in national parliaments ranged from 10% in the Arab States to 17% in the United States and 22% in Canada to 41% in Scandinavia (IPU, 2009).

Throughout the world, hunting, fighting, and warring are primarily men’s activities (Wood & Eagly, 2002, 2007). Men also express more support for war. The Iraq war, for example, has consistently been supported more by American men than by American women (Newport et al., 2007).

**Gender and Social Power** Around the world, from Nigeria to New Zealand, people have perceived men as more dominant, forceful, and independent, women as more deferential, nurturant, and affiliative (Williams & Best, 1990). Indeed, in most societies men are socially dominant. When groups form, whether as juries or companies, leadership tends to go to males (Colarelli et al., 2006). Men worldwide place more importance on power and achievement (Schwartz & Rubel, 2005). As leaders, men tend to be more directive, even autocratic; women tend to be more democratic, more welcoming of subordinates’ participation in decision making (Eagly & Carli, 2007; van Engen & Willemsen, 2004). When people interact, men are more likely to utter opinions, women to express support (Aries, 1987; Wood, 1987). These differences carry into everyday behavior, where men are more likely to act as powerful people often do—talking assertively, interrupting, initiating touches, staring more, and smiling less (Hall, 1987; Leaper & Ayres, 2007; Major et al., 1990).

Such behaviors help sustain social power inequities. When political leaders are elected, they usually are men, who held 82 percent of the seats in the world’s governing parliaments in 2008 (IPU, 2009). When salaries are paid, those in traditionally male occupations receive more.
Every man for himself, or tend and befriend? Gender differences in the way we interact with others begin to appear at a very young age. Oliver Eltinger/zefa/Corbis

Dex Image/Getty Images

Gender and Social Connectedness To Carol Gilligan and her colleagues (1982, 1990), the “normal” struggle to create a separate identity describes Western individualist males more than relationship-oriented females. Gilligan believes females tend to differ from males both in being less concerned with viewing themselves as separate individuals and in being more concerned with “making connections.”

Question: Why does it take 200 million sperm to fertilize one egg?

Answer: Because they won’t stop for directions.

These gender differences in connectedness surface early in children’s play, and they continue with age. Boys typically play in large groups with an activity focus and little intimate discussion (Rose & Rudolph, 2006). Girls usually play in smaller groups, often with one friend. Their play is less competitive than boys’ and more imitative of social relationships. Both in play and other settings, females are more open and responsive to feedback than are males (Maccoby, 1990; Roberts, 1991). Asked difficult questions—“Do you have any idea why the sky is blue?” “Do you have any idea why shorter people live longer?”—men are more likely than women to hazard answers rather than admit they don’t know, a phenomenon Traci Giuliano and her colleagues (1998a,b) call the male answer syndrome.

Females are more interdependent than males. As teens, girls spend more time with friends and less time alone (Wong & Csikszentmihalyi, 1991). As late adolescents, they spend more time on social-networking Internet sites (Pryor et al., 2007). As adults, women take more pleasure in talking face-to-face, and they tend to use conversation more to explore relationships. Men enjoy doing activities side-by-side, and they tend to use conversation to communicate solutions (Tannen, 1990; Wright, 1989). The communication difference is apparent even in student e-mails, from which people in one New Zealand study could correctly guess the author’s gender two-thirds of the time (Thomson & Murachver, 2001).

These gender differences are sometimes reflected in patterns of phone communication. In France, women make 63 percent of phone calls and, when talking to a woman, stay connected longer (7.2 minutes) than men do when talking...
to other men (4.6 minutes) (Smoreda & Licoppe, 2000). So, does this confirm the idea that women are just more
talkative? To check that presumption, Matthias Mehl and his colleagues (2007) counted the number of words 396
college students spoke in the course of an average day. (How many words would you guess you speak a day?) They
found that talkativeness varied enormously—by 45,000 words between their most and least talkative participants. But
counter to stereotypes of jabbering women, both men and women averaged about 16,000 words daily.

Women worldwide orient their interests and vocation more to people and less to things (Lippa, 2005, 2006, 2008). In
the workplace, they often are less driven by money and status and are more likely to choose reduced work hours
(Pinker, 2008). In the home, they provide most of the care to the very young and the very old. Women also purchase
85 percent of greeting cards (Time, 1997). Women’s emphasis on caring helps explain another interesting finding:
Although 69 percent of people say they have a close relationship with their father, 90 percent feel close to their
mother (Hugick, 1989). When wanting understanding and someone with whom to share worries and hurts, both men
and women usually turn to women, and both report their friendships with women to be more intimate, enjoyable, and
nurturing (Rubin, 1985; Sapadin, 1988).

Bonds and feelings of support are even stronger among women than among men (Rossi & Rossi, 1993). Women’s
ties—as mothers, daughters, sisters, aunts, and grandmothers—bind families together. As friends, women talk more
often and more openly (Berndt, 1992; Dindia & Allen, 1992). And when they themselves must cope with stress,
women more than men turn to others for support—they tend and befriend (Tanures et al., 2002; Taylor, 2002).

As empowered people generally do, men value freedom and self-reliance, which helps explain why men of all ages,
worldwide, are less religious (less God-focused) and pray less (Benson, 1992; Stark, 2002). Men also dominate the
ranks of professional skeptics. All 10 winners and 14 runners-up on the Skeptical Inquirer list of outstanding
twentieth-century rationalist skeptics were men. In the Science and the Paranormal section of the 2007 Prometheus
Books catalog (from the leading publisher of skepticism), one can find 94 male and 4 female authors. In one Skeptics
Society survey, nearly 4 in 5 respondents were men (Shermer, 1999). Women, it appears, are more open to spirituality
(and are far more likely to author books on spirituality than on skepticism).

“\textit{In the long years liker must they grow; The man be more of woman, she of man.}”
\begin{flushright}
Alfred Lord Tennyson, \textit{The Princess}, 1847\end{flushright}

Gender differences in power, connectedness, and other traits peak in late adolescence and early adulthood—the very
years most commonly studied (also the years of dating and mating). As teenagers, girls become progressively less
assertive and more flirtatious; boys become more domineering and unexpressive. But by age 50, these differences
have diminished. Men become more empathic and less domineering and women, especially if working, become more
assertive and self-confident (Kasen et al., 2006; Maccoby, 1998).

The Nature of Gender

\textbf{10: How do nature and nurture together form our gender?}

What explains our gender diversity? Is biology destiny? Are we shaped by our cultures? A biopsychosocial view
suggests it is both, thanks to the interplay among our biological dispositions, our developmental experiences, and our

In domains where men and women have faced similar challenges—regulating heat with sweat, developing tastes that
nourish, growing calluses where the skin meets friction—the sexes are similar. Even when describing the ideal mate,
both men and women put traits such as “kind,” “honest,” and “intelligent” at the top of their lists. But in domains
pertinent to mating, evolutionary psychologists contend, guys act like guys whether they are elephants or elephant
seals, rural peasants or corporate presidents. Such gender differences may be influenced genetically, by our differing
\textit{sex chromosomes} and, physiologically, from our differing concentrations of \textit{sex hormones}. 
Males and females are variations on a single form. Seven weeks after conception, you were anatomically indistinguishable from someone of the other sex. Then your genes activated your biological sex, which was determined by your twenty-third pair of chromosomes, the two sex chromosomes. From your mother, you received an X chromosome. From your father, you received the one chromosome out of 46 that is not unisex—either another X chromosome, making you a girl, or a Y chromosome, making you a boy. The Y chromosome includes a single gene that throws a master switch triggering the testes to develop and produce the principal male hormone, testosterone. Females also have testosterone, but less of it. The male’s greater output of testosterone starts the development of external male sex organs at about the seventh week.

Another key period for sexual differentiation falls during the fourth and fifth prenatal months, when sex hormones bathe the fetal brain and influence its wiring. Different patterns for males and females develop under the influence of the male’s greater testosterone and the female’s ovarian hormones (Hines, 2004; Udry, 2000). Recent research confirms male–female differences during development in brain areas with abundant sex hormone receptors (Cahill, 2005). In adulthood, parts of the frontal lobes, an area involved in verbal fluency, are reportedly thicker in women. Part of the parietal cortex, a key area for space perception, is thicker in men. Other studies report gender differences in the hippocampus, the amygdala, and the volume of brain gray matter (the neural bodies) versus white matter (the axons and dendrites).

Given sex hormones’ influence on development, what do you suppose happens when glandular malfunction or hormone injections expose a female embryo to excess testosterone? These genetically female infants are born with masculine-appearing genitals, which can either be accepted or altered surgically. Until puberty, such females tend to act in more aggressive “tomboyish” ways than do most girls, and they dress and play in ways more typical of boys than of girls (Berenbaum & Hines, 1992; Ehrhardt, 1987). Given a choice of toys, they (like boys) are more likely to play with cars and guns than with dolls and crayons. Most—like nearly all girls with traditionally feminine interests—become heterosexual. Moreover, the hormones do not reverse their gender identity; they view themselves as girls, not boys (Berenbaum & Bailey, 2003).

Is the tomboyish behavior of these girls due to the prenatal hormones? If so, may we conclude that biological sex differences produce behavioral gender differences? Vervet monkeys seem to suggest one answer. Male vervets, like most little boys, will spend more time playing with “masculine” toys such as trucks, and female vervets, like most little girls, will choose “feminine” toys such as dolls (Hines, 2004). Moreover, experiments with many species, from rats to monkeys, confirm that female embryos given male hormones will later exhibit a typically masculine appearance and more aggressive behavior (Hines & Green, 1991). But a more complex picture emerges when we consider social influences. Girls who were prenatally exposed to excess testosterone frequently look masculine and are known to be “different,” so perhaps people also treat them more like boys. Thus, the effect of early exposure to sex hormones is both direct, in the girl’s biological appearance, and indirect, in the influence of social experiences that shape her. Like a sculptor’s two hands shaping a lump of clay, nature and nurture work together.

“Genes, by themselves, are like seeds dropped onto pavement: powerless to produce anything.”
“Sex matters,” concludes the National Academy of Sciences (2001). In combination with the environment, sex-related genes and physiology “result in behavioral and cognitive differences between males and females.”

The Nurture of Gender

Although biologically influenced, gender is also socially constructed. What biology initiates, culture accentuates.

**Gender Roles** Sex indeed matters. But from a biopsychosocial perspective, culture and the immediate situation matter, too. Culture is everything shared by a group and transmitted across generations. We can see culture’s shaping power in the social expectations that guide men’s and women’s behavior. In psychology, as in the theater, a role refers to a cluster of prescribed actions—the behaviors we expect of those who occupy a particular social position. One set of norms defines our culture’s gender roles—our expectations about the way men and women should behave. In the United States it has, especially in previous decades, traditionally been men who initiate dates, drive the car, and pick up the check, and women who decorate the home, buy and care for the children’s clothes, and select the wedding gifts.

Gender roles exist outside the home, too. Compared with employed women, employed men in the United States spend about an hour and a half more on the job each day and about one hour less on household activities and caregiving (Amato et al., 2007; Bureau of Labor Statistics, 2004; Fisher et al., 2006). I do not have to tell you which parent, about 90 percent of the time in two-parent U.S. families, has stayed home with a sick child, arranged for the babysitter, or called the doctor (Maccoby, 1995). In Australia, women devote 54 percent more time to unpaid household work and 71 percent more time to child care than do men (Trewin, 2001).

![The gendered tsunami](image)

In Sri Lanka, Indonesia, and India, the gendered division of labor helps explain the excess of female deaths from the 2004 tsunami. In some villages, 80 percent of those killed were women, who were mostly at home while the men were more likely to be at sea fishing or doing out-of-the-home chores (Oxfam, 2005). © DPA/The Image Works

Gender roles can smooth social relations, saving awkward decisions about who does the laundry this week and who mows the lawn. But they often do so at a cost: If we deviate from such conventions, we may feel anxious.
Do gender roles reflect what is biologically natural for men and women? Or do cultures construct them? Gender-role diversity over time and space indicates that culture has a big influence. Nomadic societies of food-gathering people have only a minimal division of labor by sex. Boys and girls receive much the same upbringing. In agricultural societies, where women work in the fields close to home, and men roam more freely herding livestock, children typically socialize into more distinct gender roles (Segall et al., 1990; Van Leeuwen, 1978).

Among industrialized countries, gender roles and attitudes vary widely (UNICEF, 2006). Australia and the Scandinavian countries offer the greatest gender equity, Middle Eastern and North African countries the least (Social Watch, 2006). And consider: Would you say life is more satisfying when both spouses work for pay and share child care? If so, you would agree with most people in 41 of 44 countries, according to a Pew Global Attitudes survey (2003). Even so, the culture-to-culture differences were huge, ranging from Egypt, where people disagreed 2 to 1, to Vietnam, where people agreed 11 to 1.

Figure 9.21  
Women and the professions  
Law, medicine, and psychology have been attracting more and more women. (Data from professional associations reported by A. Cynkar, 2007.)

Attitudes about gender roles also vary over time. At the opening of the twentieth century, only one country—New Zealand—granted women the right to vote (Briscoe, 1997). By the late 1960s and early 1970s, with the flick of an apron, the number of U.S. college women hoping to be full-time homemakers had plunged. And in the three decades after 1976, the percentage of women in medical, law, and psychology programs roughly doubled (Figure 9.21).

Gender ideas vary not only across cultures and over time, but also across generations. When families emigrate from Asia to Canada and the United States, their children tend to grow up with peers from a new culture. Many immigrant children, especially girls, feel torn between the competing sets of gender-role norms presented by peers and parents (Dion & Dion, 2001).

**Gender and Child-Rearing**  
As society assigns each of us to a gender, the social category of male or female, the inevitable result is our strong **gender identity**, our sense of *being* male or female. To varying extents, we also become **gender typed**. That is, some boys more than others exhibit traditionally masculine traits and interests, and some girls more than others become distinctly feminine.

**Social learning theory** assumes that children learn gender-linked behaviors by observing and imitating and by being rewarded or punished. “Nicole, you’re such a good mommy to your dolls”; “Big boys don’t cry, Alex.” But parental modeling and rewarding of male-female differences aren’t enough to explain gender typing (Lytton & Romney, 1991). In fact, even when their families discourage traditional gender typing, children usually organize themselves into “boy worlds” and “girl worlds,” each guided by rules for what boys and girls do.
Cognition (thinking) also matters. In your own childhood, as you struggled to comprehend the world, you—like other children—formed schemas that helped you make sense of your world. One of these was a schema for your own gender (Bem, 1987, 1993). Your gender schema then became a lens through which you viewed your experiences. Social learning shapes gender schemas. Before age 1, children begin to discriminate male and female voices and faces (Martin et al., 2002). After age 2, language forces children to begin organizing their worlds on the basis of gender. English, for example, uses the pronouns *he* and *she*; other languages classify objects as masculine ("*le* train") or feminine ("*la* table").

Young children are “gender detectives,” explain Carol Lynn Martin and Diane Ruble (2004). Once they grasp that two sorts of people exist—and that they are of one sort—they search for clues about gender, and they find them in language, dress, toys, and songs. Girls, they may decide, are the ones with long hair. Having divided the human world in half, 3-year-olds will then like their own sex better and seek out their own kind for play. And having compared themselves with their concept of gender, they will adjust their behavior accordingly (“I am male—thus, masculine, strong, aggressive,” or “I am female—therefore, feminine, sweet, and helpful”). The rigidity of boy-girl stereotypes peaks at about age 5 or 6. If the new neighbor is a boy, a 6-year-old girl may just assume he cannot share her interests. For young children, gender looms large.

“You are the bows from which your children as living arrows are sent forth.”

— Kahlil Gibran, *The Prophet*, 1923

The investment in raising a child buys many years not only of joy and love but of worry and irritation. Yet for most people who become parents, a child is one’s biological and social legacy—one’s personal investment in the human future. Remind young adults of their mortality and they will express increased desire for children (Wisman & Goldenberg, 2005). To paraphrase psychiatrist Carl Jung, we reach backward into our parents and forward into our children, and through their children into a future we will never see, but about which we must therefore care.

**Parents and Peers**

To what extent is our development shaped by early stimulation, by parents, and by peers?

WE ARE NOT “BLANK SLATES,” note Douglas Kenrick and his colleagues (2009). We are more like coloring books, with certain lines predisposed and experience filling in our picture. We are formed by nature and nurture. But what are the most influential components of our nurture? How do our early experiences, our family and peer relationships, and all our other experiences guide our development and contribute to our diversity?

**Parents and Early Experiences**

The formative nurture that conspires with nature begins at conception, as we have seen, with the prenatal environment in the womb. Embryos receive differing nutrition and varying levels of exposure to toxic agents. Nurture then continues outside the womb, where our early experiences foster brain development.
Experience and Brain Development

Our genes dictate our overall brain architecture, but experience fills in the details, developing neural connections and preparing our brain for thought and language and other later experiences. So how do early experiences leave their “marks” in the brain? Mark Rosenzweig and David Krech opened a window on that process when they raised some young rats in solitary confinement and others in a communal playground. When they later analyzed the rats’ brains, those who died with the most toys had won. The rats living in the enriched environment, which simulated a natural environment, usually developed a heavier and thicker brain cortex (Figure 9.22).

Figure 9.22 Experience affects brain development

Mark Rosenzweig and David Krech raised rats either alone in an environment without playthings, or with other rats in an environment enriched with playthings changed daily. In 14 of 16 repetitions of this basic experiment, rats in the enriched environment developed significantly more cerebral cortex (relative to the rest of the brain’s tissue) than did those in the impoverished environment. (From “Brain changes in response to experience” by M. R. Rosenzweig, E. L. Bennett, and M. C. Diamond. Copyright © 1972 Scientific American, Inc. All rights reserved.)

Rosenzweig was so surprised by this discovery that he repeated the experiment several times before publishing his findings (Renner & Rosenzweig, 1987; Rosenzweig, 1984). So great are the effects that, shown brief video clips of rats, you could tell from their activity and curiosity whether their environment had been impoverished or enriched (Renner & Renner, 1993). Bryan Kolb and Ian Whishaw (1998) noted extraordinary changes after 60 days in the enriched environment; the rats’ brain weights increased 7 to 10 percent and the number of synapses mushroomed by about 20 percent.

Such results have motivated improvements in environments for laboratory, farm, and zoo animals—and for children in institutions. Stimulation by touch or massage also benefits infant rats and premature babies (Field et al., 2007). “Handled” infants of both species develop faster neurologically and gain weight more rapidly. By giving preemies massage therapy, neonatal intensive care units now help them to go home sooner (Field et al., 2006).

Stringing the circuits young

String musicians who started playing before age 12 have larger and more complex neural circuits controlling the note-making left-hand fingers than do string musicians whose training started later (Elbert et al., 1995). Courtesy of C. Brune
Both nature and nurture sculpt our synapses. After brain maturation provides us with an abundance of neural connections, our experiences trigger a pruning process. Sights and smells, touches and tugs activate connections and strengthen them. Unused neural pathways weaken and degenerate. Similar to pathways through a forest, popular paths are broadened and less-traveled paths gradually disappear. The result by puberty is a massive loss of unemployed connections.

Here at the juncture of nurture and nature is the biological reality of early childhood learning. During early childhood—while excess connections are still on call—youngsters can most easily master such skills as the grammar and accent of another language. Lacking any exposure to language before adolescence, a person will never master any language (see Unit 7B).

Likewise, lacking visual experience during the early years, people whose vision is restored by cataract removal never achieve normal perceptions (see Unit 4). The brain cells normally assigned to vision have died or been diverted to other uses. For us to have optimum brain development, normal stimulation during the early years is critical. The maturing brain’s rule: Use it or lose it.

The brain’s development does not, however, end with childhood. As we saw in Unit 3B’s discussion of brain plasticity, our neural tissue is ever changing. If a monkey is trained to push a lever with a finger several thousand times a day, the brain tissue controlling that finger will change to reflect the experience. Human brains work similarly (Figure 9.23). Whether learning to keyboard or skateboard, we perform with increasing skill as our brain incorporates the learning.

Figure 9.23 A trained brain A well-learned finger-tapping task activates more motor cortex neurons (orange area, right) than were active in the same brain before training (left). (From Karni et al., 1998.) Both photos courtesy of Avi Karni and Leslie Ungerleider, National Institute of Mental Health

“Genes and experiences are just two ways of doing the same thing—wiring synapses.”

Joseph LeDoux, The Synaptic Self, 2002

How Much Credit (or Blame) Do Parents Deserve?

Even among chimpanzees, when one infant is hurt by another, the victim’s mother will often attack the offender’s mother (Goodall, 1968).

In procreation, a woman and a man shuffle their gene decks and deal a life-forming hand to their child-to-be, who is then subjected to countless influences beyond their control. Parents, nonetheless, feel enormous satisfaction in their children’s successes, and feel guilt or shame over their failures. They beam over the child who wins an award. They wonder where they went wrong with the child who is repeatedly called into the principal’s office. Freudian psychiatry and psychology have been among the sources of such ideas, by blaming problems from asthma to schizophrenia on “bad mothering.” Society reinforces such parent-blaming: Believing that parents shape their offspring as a potter
molds clay, people readily praise parents for their children’s virtues and blame them for their children’s vices. Popular culture endlessly proclaims the psychological harm toxic parents inflict on their fragile children. No wonder that it can seem risky to have and raise children.

But do parents really produce future adults with an inner wounded child by being (take your pick from the toxic-parent lists) overbearing—or uninvolved? Pushy—or ineffectual? Overprotective—or distant? Are children really so easily wounded? If so, should we then blame our parents for our failings, and ourselves for our children’s failings? Or does all the talk of wounding fragile children through normal parental mistakes trivialize the brutality of real abuse?

Peter Neubauer and Alexander Neubauer (1990, pp. 20–21) illustrate how, with hindsight, we may inappropriately credit or blame our parents:

Identical twin men, now age 30, were separated at birth and raised in different countries by their respective adoptive parents. Both kept their lives neat—neat to the point of pathology. Their clothes were preened, appointments met precisely on time, hands scrubbed regularly to a raw, red color. When the first was asked why he felt the need to be so clean, his answer was plain.

“My mother. When I was growing up she always kept the house perfectly ordered. She insisted on every little thing returned to its proper place, the clocks—we had dozens of clocks—each set to the same noonday chime. She insisted on this, you see. I learned from her. What else could I do?”

The man’s identical twin, just as much a perfectionist with soap and water, explained his own behavior this way: “The reason is quite simple. I’m reacting to my mother, who was an absolute slob.”

Parents do matter. The power of parenting to shape our differences is clearest at the extremes—the abused who become abusive, the neglected who become neglectful, the loved but firmly handled children who become self-confident and socially competent. The power of the family environment also frequently shows up in children’s political attitudes, religious beliefs, and personal manners. And it appears in the remarkable academic and vocational successes of children of the refugee “boat people” fleeing Vietnam and Cambodia—successes attributed to close-knit, supportive, even demanding families (Caplan et al., 1992).

Yet in personality measures, shared environmental influences—including, as we have seen, the home influences siblings share—typically account for less than 10 percent of children’s differences. In the words of behavior geneticists Robert Plomin and Denise Daniels (1987), “Two children in the same family [are on average] as different from one
another as are pairs of children selected randomly from the population.‖ To developmental psychologist Sandra Scarr (1993), this implies that “parents should be given less credit for kids who turn out great and blamed less for kids who don’t.” Knowing children are not easily sculpted by parental nurture, perhaps parents can relax a bit more and love their children for who they are.

**Peer Influence**

“If you want to blame your parents for your own adult problems, you are entitled to blame the genes they gave you, but you are not entitled—by any facts I know—to blame the way they treated you....We are not prisoners of our past.”


As children mature, what other experiences do the work of nurturing? At all ages, but especially during childhood and adolescence, we seek to fit in with groups and are subject to group influences.

Consider the power of peers (Harris, 1998, 2000):

- Preschoolers who disdain a certain food often will eat that food if put at a table with a group of children who like it.
- Children who hear English spoken with one accent at home and another in the neighborhood and at school will invariably adopt the accent of their peers, not their parents. Accents (and slang) reflect culture, “and children get their culture from their peers,” notes Harris (2007).
- Teens who start smoking typically have friends who model smoking, suggest its pleasures, and offer cigarettes (J. S. Rose et al., 1999; R. J. Rose et al., 2003). Part of this peer similarity may result from a *selection effect*, as kids seek out peers with similar attitudes and interests. Those who smoke (or don’t) may select as friends those who also smoke (or don’t).

“Men resemble the times more than they resemble their fathers.”

Ancient Arab proverb

Howard Gardner (1998) concludes that parents and peers are complementary:

Parents are more important when it comes to education, discipline, responsibility, orderliness, charitableness, and ways of interacting with authority figures. Peers are more important for learning cooperation, for finding the road to popularity, for inventing styles of interaction among people of the same age. Youngsters may find their peers more interesting, but they will look to their parents when contemplating their own futures. Moreover, parents [often] choose the neighborhoods and schools that supply the peers.
As Gardner points out, parents can influence the culture that shapes the peer group, by helping to select their children’s neighborhood and schools. And because neighborhood influences matter, parents may want to become involved in intervention programs for youth that aim at a whole school or neighborhood. If the vapors of a toxic climate are seeping into a child’s life, that climate—not just the child—needs reforming.

Adolescence

MANY PSYCHOLOGISTS ONCE BELIEVED that childhood sets our traits. Today’s developmental psychologists see development as lifelong. At a five-year high school reunion, former best friends may be surprised at their divergence; a decade later, they may have trouble sustaining a conversation.

As the life-span perspective emerged, psychologists began to look at how maturation and experience shape us not only in infancy and childhood, but also in adolescence and beyond. Adolescence—the years spent morphing from child to adult—starts with the physical beginnings of sexual maturity and ends with the social achievement of independent adult status (which means that in some cultures, where teens are self-supporting, adolescence hardly exists).

In industrialized countries, what are the teen years like? In Leo Tolstoy’s Anna Karenina, the teen years were “that blissful time when childhood is just coming to an end, and out of that vast circle, happy and gay, a path takes shape.” But another teenager, Anne Frank, writing in her diary while hiding from the Nazis, described tumultuous teen emotions:

My treatment varies so much. One day Anne is so sensible and is allowed to know everything; and the next day I hear that Anne is just a silly little goat who doesn’t know anything at all and imagines that she’s learned a wonderful lot from books....Oh, so many things bubble up inside me as I lie in bed, having to put up with people I’m fed up with, who always misinterpret my intentions.

How will you look back on your life 10 years from now? Are you making choices that someday you will recollect with satisfaction?

G. Stanley Hall (1904), one of the first psychologists to describe adolescence, believed that this tension between biological maturity and social dependence creates a period of “storm and stress.” Indeed, after age 30, many who grow up in independence-fostering Western cultures look back on their teenage years as a time they would not want to relive, a time when their peers’ social approval was imperative, their sense of direction in life was in flux, and their feeling of alienation from their parents was deepest (Arnett, 1999; Macfarlane, 1964).

But for many, adolescence is a time of vitality without the cares of adulthood, a time of rewarding friendships, of heightened idealism and a growing sense of life’s exciting possibilities.

Physical Development

What physical changes mark adolescence?

Adolescence begins with puberty, the time when we mature sexually. Puberty follows a surge of hormones, which may intensify moods and which trigger a two-year period of rapid physical development, usually beginning at about age 11 in girls and at about age 13 in boys. About the time of puberty, boys’ growth propels them to greater height than their female counterparts (Figure 9.24). During this growth spurt, the primary sex characteristics—the reproductive organs and external genitalia—develop dramatically. So do secondary sex characteristics, the nonreproductive traits such as breasts and hips in girls, facial hair and deepened voice in boys, pubic and underarm hair in both sexes (Figure 9.25). A year or two before puberty, however, boys and girls often feel the first stirrings of physical attraction toward someone (McClintock & Herdt, 1996).
Throughout childhood, boys and girls are similar in height. At puberty, girls surge ahead briefly, but then boys overtake them at about age 14. (Data from Tanner, 1978.) Studies suggest that sexual development and growth spurts are beginning somewhat earlier than was the case a half-century ago (Herman-Giddens et al., 2001).

Menarche appears to occur a few months earlier, on average, for girls who have experienced stresses related to father absence or sexual abuse (Vigil et al., 2005; Zabin et al., 2005).

In girls, puberty starts with breast development, which now often begins by age 10 (Brody, 1999). But puberty's landmarks are the first ejaculation in boys, usually by about age 14, and the first menstrual period in girls, usually within a year of age 12½ (Anderson et al., 2003). The first menstrual period, called menarche (meh-NAR-key), is a memorable event. Nearly all adult women recall it and remember experiencing a mixture of feelings—pride, excitement, embarrassment, and apprehension (Greif & Ulman, 1982; Woods et al., 1983). Girls who have been prepared for menarche usually experience it as a positive life transition. Most men similarly recall their first ejaculation (spermarche), which usually occurs as a nocturnal emission (Fuller & Downs, 1990).

Just as in the earlier life stages, the sequence of physical changes in puberty (for example, breast buds and visible pubic hair before menarche) is far more predictable than their timing. Some girls start their growth spurt at 9, some boys as late as age 16. Though such variations have little effect on height at maturity, they may have psychological consequences. For boys, early maturation pays dividends: Being stronger and more athletic during their early teen years, they tend to be more popular, self-assured, and independent, though also more at risk for alcohol use, delinquency, and premature sexual activity (Lynne et al., 2007; Steinberg & Morris, 2001). For girls, early maturation
can be stressful (Mendle et al., 2007). If a young girl's body is out of sync with her own emotional maturity and her friends' physical development and experiences, she may begin associating with older adolescents or may suffer teasing or sexual harassment. It is not only when we mature that counts, but how people react to our genetically influenced physical development. Remember: Heredity and environment interact.

An adolescent’s brain is also a work in progress. Until puberty, brain cells increase their connections, like trees growing more roots and branches. Then, during adolescence, comes a selective pruning of unused neurons and connections (Blakemore, 2008). What we don’t use, we lose. It's rather like traffic engineers reducing congestion by eliminating certain streets and constructing new beltways that move traffic more efficiently.

As teens mature, their frontal lobes also continue to develop. The growth of myelin, the fatty tissue that forms around axons and speeds neurotransmission, enables better communication with other brain regions (Kuhn, 2006; Silveri et al., 2006). These developments bring improved judgment, impulse control, and the ability to plan for the long term.

Frontal lobe maturation lags the emotional limbic system. Puberty's hormonal surge and limbic system development help explain teens’ occasional impulsiveness, risky behaviors, emotional storms—slamming doors and turning up the music (Casey et al., 2008). No wonder younger teens (whose unfinished frontal lobes aren’t yet fully equipped for making long-term plans and curbing impulses) so often succumb to the lure of smoking, which most adult smokers could tell them they will later regret. Teens actually don’t underestimate the risks of smoking—or driving fast or unprotected sex—they just, when reasoning from their gut, weigh the benefits more heavily (Reyna & Farley, 2006; Steinberg, 2007).

So, when Junior drives recklessly and academically self-destructs, should his parents reassure themselves that “he can’t help it; his frontal cortex isn’t yet fully grown”? They can at least take hope: The brain with which Junior begins his teens differs from the brain with which he will end his teens. Unless he slows his brain development with heavy drinking—leaving him prone to impulsivity and addiction—his frontal lobes will continue maturing until about age 25 (Beckman, 2004; Crews et al., 2007).

In 2004, the American Psychological Association joined seven other medical and mental health associations in filing U.S. Supreme Court briefs, arguing against the death penalty for 16- and 17-years-olds. The briefs documented the teen brain’s immaturity “in areas that bear upon adolescent decision-making.” Teens are “less guilty by reason of adolescence,” suggested psychologist Laurence Steinberg and law professor Elizabeth Scott (2003). In 2005, by a 5-to-4 margin, the Court concurred, declaring juvenile death penalties unconstitutional.

**Cognitive Development**

How did Piaget, Kohlberg, and later researchers describe adolescent cognitive and moral development?
“When the pilot told us to brace and grab our ankles, the first thing that went through my mind was that we must all look pretty stupid.”

Jeremiah Rawlings, age 12, after a 1989 DC-10 crash in Sioux City, Iowa

As young teenagers become capable of thinking about their thinking, and of thinking about other people’s thinking, they begin imagining what other people are thinking about them. (Adolescents might worry less if they understood their peers’ similar preoccupation.) As their cognitive abilities mature, many begin to think about what is ideally possible and compare that with the imperfect reality of their society, their parents, and even themselves.

Developing Reasoning Power

“Ben is in his first year of high school, and he’s questioning all the right things.” Drawing by Koren; © 1992 The New Yorker Magazine, Inc.

During the early teen years, reasoning is often self-focused. Adolescents may think their private experiences are unique, something parents just could not understand: “But, Mom, you don’t really know how it feels to be in love” (Elkind, 1978).

Gradually, though, most achieve the intellectual summit Piaget called formal operations, and they become more capable of abstract reasoning. Adolescents ponder and debate human nature, good and evil, truth and justice. Having left behind the concrete images of early childhood, they may now seek a deeper conception of God and existence (Elkind, 1970; Worthington, 1989). The ability to reason hypothetically and deduce consequences also enables them to detect inconsistencies in others’ reasoning and to spot hypocrisy. This can lead to heated debates with parents and silent vows never to lose sight of their own ideals (Peterson et al., 1986).

Developing Morality

Two crucial tasks of childhood and adolescence are discerning right from wrong and developing character—the psychological muscles for controlling impulses. Much of our morality is rooted in gut-level reactions, for which the mind seeks rationalization (Haidt, 2006). Often, reason justifies passions such as disgust or liking. Yet to be a moral person is to think morally and act accordingly.
Piaget (1932) believed that children's moral judgments build on their cognitive development. Agreeing with Piaget, Lawrence Kohlberg (1981, 1984) sought to describe the development of moral reasoning, the thinking that occurs as we consider right and wrong. Kohlberg posed moral dilemmas (for example, whether a person should steal medicine to save a loved one's life) and asked children, adolescents, and adults if the action was right or wrong. He then analyzed their answers for evidence of stages of moral thinking.

His findings led him to believe that as we develop intellectually, we pass through three basic levels of moral thinking:

- **Preconventional morality** Before age 9, most children's morality focuses on self-interest: They obey rules either to avoid punishment or to gain concrete rewards.

- **Conventional morality** By early adolescence, morality focuses on caring for others and on upholding laws and social rules, simply because they are the laws and rules.

- **Postconventional morality** With the abstract reasoning of formal operational thought, people may reach a third moral level. Actions are judged
“right” because they flow from people’s rights or from self-defined, basic ethical principles.

Kohlberg claimed these levels form a moral ladder. As with all stage theories, the sequence is unvarying. We begin on the bottom rung and ascend to varying heights.

Research confirms that children in various cultures progress from Kohlberg’s preconventional level into his conventional level (Gibbs et al., 2007). The postconventional level is more controversial. It appears mostly in the European and North American educated middle class, which prizes individualism—giving priority to one’s own goals rather than to group goals (Eckensberger, 1994; Miller & Bersoff, 1995). Critics therefore contend that Kohlberg’s theory is biased against the moral reasoning of members of collectivist societies such as China and India. Moreover, people’s thinking about real-world moral choices also engages their emotions, and moral feelings don’t easily fit into Kohlberg’s neat stages (Krebs & Denton, 2005).

“I am a bit suspicious of any theory that says that the highest moral stage is one in which people talk like college professors.”

James Q. Wilson, The Moral Sense, 1993

**Moral Feeling** The mind makes moral judgments as it makes aesthetic judgments—quickly and automatically. We feel disgust when seeing people engaged in degrading or subhuman acts, and we feel elevation—a tingly, warm, glowing feeling in the chest—when seeing people display exceptional generosity, compassion, or courage.

One woman recalled driving through her snowy neighborhood with three young men as they passed “an elderly woman with a shovel in her driveway. I did not think much of it, when one of the guys in the back asked the driver to let him off there…. When I saw him jump out of the back seat and approach the lady, my mouth dropped in shock as I realized that he was offering to shovel her walk for her.” Witnessing this unexpected goodness triggered elevation: “I felt like jumping out of the car and hugging this guy. I felt like singing and running, or skipping and laughing. I felt like saying nice things about people” (Haidt, 2000).

In Jonathan Haidt’s (2002, 2007, 2008) *social intuitionist* account of morality, moral feelings precede moral reasoning. “Could human morality really be run by the moral emotions,” he wonders, “while moral reasoning struts about pretending to be in control?” Indeed, he surmises, “moral judgment involves quick gut feelings, or affectively laden intuitions, which then trigger moral reasoning.” Moral reasoning—our mind’s press secretary—aims to convince ourselves and others of what we intuitively feel.

The social intuitionist explanation of morality finds support from a study of moral paradoxes. Imagine seeing a runaway trolley headed for five people. All will certainly be killed unless you throw a switch that diverts the trolley onto another track, where it will kill one person. Should you throw the switch?

Most say yes. Kill one, save five. Now imagine the same dilemma, except that your opportunity to save the five requires you to push a large stranger onto the tracks, where he will die as his body stops the trolley. Kill one, save five?

The logic is the same, but most say no. Seeking to understand why, a Princeton research team led by Joshua Greene (2001) used brain imaging to spy on people’s neural responses as they contemplated such dilemmas. Only when given the body-perushing type of moral dilemma did their brain’s emotion areas light up. Despite the identical logic, the personal dilemma engaged emotions that altered moral judgment. Moral judgment is more than thinking; it is also gut-level feeling.
The gut feelings that drive our moral judgments turn out to be widely shared. To neuroscientist Marc Hauser (2006) this suggests that humans are hard-wired for moral feelings. Faced with moral choices, people across the world, with similar evolved brains, display similar moral intuitions. For example, is it acceptable to kill a healthy man who walks into a hospital that has five dying patients who could be saved by harvesting his organs? Most people say no. We all seem to unconsciously assume that harm caused by an action is worse than harm caused by failing to act (Cushman et al., 2006). With damage to a brain area that underlies emotions, however, people apply more coldly calculating reasoning to moral dilemmas (Koenigs et al., 2007).

**Moral Action** Our moral thinking and feeling surely affect our moral talk. But sometimes talk is cheap and emotions are fleeting. Morality involves doing the right thing, and what we do also depends on social influences. As political theorist Hannah Arendt (1963) observed, many Nazi concentration camp guards during World War II were ordinary “moral” people who were corrupted by a powerfully evil situation.

On humanity’s need to delay gratification in response to global climate change: “The benefits of strong early action considerably outweigh the costs.”

The Economics of Climate Change, UK Government Economic Service, 2007

Nevertheless, as our thinking matures, our behavior also becomes less selfish and more caring (Krebs & Van Hesteren, 1994; Miller et al., 1996). Today’s character education programs therefore tend to focus both on moral issues and on doing the right thing. They teach children empathy for others’ feelings, and also the self-discipline needed to restrain one’s own impulses—to delay small gratifications now to enable bigger rewards later. Those who do learn to delay gratification become more socially responsible, academically successful, and productive (Funder & Block, 1989; Mischel et al., 1988, 1989). In service-learning programs, teens tutor, clean up their neighborhoods, and assist older people, and their sense of competence and desire to serve increase at the same time that their school absenteeism and drop-out rates diminish (Andersen, 1998; Piliavin, 2003). Moral action feeds moral attitudes.

**Social Development**

What are the social tasks and challenges of adolescence?

Theorist Erik Erikson (1963) contended that each stage of life has its own psychosocial task, a crisis that needs resolution. Young children wrestle with issues of trust, then autonomy (independence), then initiative (Table 9.2). School-age children strive for competence, feeling able and productive. But for people your age, the task, said Erikson, is to synthesize past, present, and future possibilities into a clearer sense of self. Adolescents wonder, “Who am I as an individual? What do I want to do with my life? What values should I live by? What do I believe in?” Erikson called this quest the adolescent’s search for identity.

Table 9.2
## Erikson’s Stages of Psychosocial Development

<table>
<thead>
<tr>
<th>Stage (approximate age)</th>
<th>Issue</th>
<th>Description of Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infancy (to 1 year)</td>
<td>Trust vs. mistrust</td>
<td>If needs are dependably met, infants develop a sense of basic trust.</td>
</tr>
<tr>
<td>Toddlerhood (1 to 3 years)</td>
<td>Autonomy vs. shame and doubt</td>
<td>Toddlers learn to exercise their will and do things for themselves, or they doubt their abilities.</td>
</tr>
<tr>
<td>Preschool (3 to 6 years)</td>
<td>Initiative vs. guilt</td>
<td>Preschoolers learn to initiate tasks and carry out plans, or they feel guilty about their efforts to be independent.</td>
</tr>
<tr>
<td>Elementary school (6 years to puberty)</td>
<td>Industry vs. inferiority</td>
<td>Children learn the pleasure of applying themselves to tasks, or they feel inferior.</td>
</tr>
<tr>
<td>Adolescence (teen years into 20s)</td>
<td>Identity vs. role confusion</td>
<td>Teenagers work at refining a sense of self by testing roles and then integrating them to form a single identity, or they become confused about who they are.</td>
</tr>
<tr>
<td>Young adulthood (20s to early 40s)</td>
<td>Intimacy vs. isolation</td>
<td>Young adults struggle to form close relationships and to gain the capacity for intimate love, or they feel socially isolated.</td>
</tr>
<tr>
<td>Middle adulthood (40s to 60s)</td>
<td>Generativity vs. stagnation</td>
<td>In middle age, people discover a sense of contributing to the world, usually through family and work, or they may feel a lack of purpose.</td>
</tr>
<tr>
<td>Late adulthood (late 60s and up)</td>
<td>Integrity vs. despair</td>
<td>Reflecting on his or her life, an older adult may feel a sense of satisfaction or failure.</td>
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</table>
As sometimes happens in psychology, Erikson’s interests were bred by his own life experience. As the son of a Jewish mother and a Danish Gentile father, Erikson was “doubly an outsider,” reports Morton Hunt (1993, p. 391). He was “scorned as a Jew in school but mocked as a Gentile in the synagogue because of his blond hair and blue eyes.” Such episodes fueled his interest in the adolescent struggle for identity.

**Forming an Identity**

To refine their sense of identity, adolescents in individualistic cultures usually try out different “selves” in different situations. They may act out one self at home, another with friends or on Facebook, and still another at school or on World of Warcraft. If two situations overlap—as when a teenager brings home friends—the discomfort can be considerable. The teen asks, “Which self should I be? Which is the real me?” The resolution is a self-definition that unifies the various selves into a consistent and comfortable sense of who one is—an identity.

For both adolescents and adults, group identities often form around how we differ from those around us. When living in Britain, I became conscious of my Americanness. When spending time with my daughter in Africa, I become conscious of my minority (White) race. When surrounded by women, I am mindful of my gender identity. For international students, for those of a minority ethnic group, for people with a disability, for those on a team, a social identity often forms around their distinctiveness.

“Self-consciousness, the recognition of a creature by itself as a ‘self,’ [cannot] exist except in contrast with an ‘other,’ a something which is not the self.”

C. S. Lewis, *The Problem of Pain*, 1940
But not always. Erikson noticed that some adolescents forge their identity early, simply by adopting their parents’ values and expectations. (Traditional, less individualistic cultures inform adolescents about who they are, rather than encouraging them to decide on their own.) Other adolescents may adopt an identity defined in opposition to parents but in conformity with a particular peer group—jocks, preps, geeks, band kids, debaters.

Who shall I be today? By varying the way they look, adolescents try out different “selves.” Although we eventually form a consistent and stable sense of identity, the self we present may change with the situation. Leland Bobbe/Getty Images

Matthias Clamer/Getty Images

Most young people do develop a sense of contentment with their lives. When American teens were asked whether a series of statements described them, 81 percent said yes to “I would choose my life the way it is right now.” But others never quite seem to find themselves: The other 19 percent agreed with “I wish I were somebody else.” In response to another question, 28 percent agreed that “I often wonder why I exist” (Lyons, 2004). Reflecting on their existence, 75 percent of American collegians say they “discuss religion/spirituality” with friends, “pray,” and agree that “we are all spiritual beings” and “search for meaning/purpose in life” (Astin et al., 2004; Bryant & Astin, 2008). This would not surprise Stanford psychologist William Damon and his colleagues (2003), who contend that a key task of adolescent development is to achieve a purpose—a desire to accomplish something personally meaningful that makes a difference to the world beyond oneself.

The late teen years, when many people like you in industrialized countries begin attending college or working full time, provide new opportunities for trying out possible roles. Here is something for you to remember: Many college seniors have achieved a clearer identity and a more positive self-concept than they had as first-year students (Waterman, 1988). This could be one of the reasons why that first year of college is such a challenge. In several nationwide studies, researchers have given young Americans tests of self-esteem. (Sample item: “I am able to do things as well as most other people.”) During the early to mid-teen years, self-esteem falls and, for girls, depression scores often increase, but then self-image rebounds during the late teens and twenties (Robins et al., 2002; Twenge & Campbell, 2001; Twenge & Nolen-Hoeksema, 2002).

See Unit 8A for a complete discussion of adolescent sexuality.

Identity also becomes more personalized. Daniel Hart (1988) asked American youths of various ages to imagine a machine that would clone (a) what you think and feel, (b) your appearance, or (c) your relationships with friends and family. When he then asked which clone would be “closest to being you?” three-fourths of the seventh-graders chose (c), the clone with the same social network. In contrast, three-fourths of the ninth-graders chose (a), the one with their individual thoughts and feelings.

“She says she’s someone from your past who gave birth to you, and raised you, and sacrificed everything so you could have whatever you wanted.” © David Sipress
Erikson contended that the adolescent identity stage is followed in young adulthood by a developing capacity for **intimacy**. With a clear and comfortable sense of who you are, said Erikson, you are ready to form emotionally close relationships. Such relationships are, for most of us, a source of great pleasure. When Mihaly Csikszentmihalyi (pronounced chick-SENT-me-hi) and Jeremy Hunter (2003) used a beeper to sample the daily experiences of American teens, they found them unhappiest when alone and happiest when with friends. As Aristotle long ago recognized, we humans are “the social animal.” Relationships matter.

**Parent and Peer Relationships**

This next research finding will not surprise you: As adolescents in Western cultures seek to form their own identities, they begin to pull away from their parents (Shanahan et al., 2007). The preschooler who can’t be close enough to her mother, who loves to touch and cling to her, becomes the 14-year-old who wouldn’t be caught dead holding hands with Mom. The transition occurs gradually (**Figure 9.26**). By adolescence, arguments occur more often, usually over mundane things—household chores, bedtime, homework (Tesser et al., 1989). Parent-child conflict during the transition to adolescence tends to be greater with first-born than with second-born children (Shanahan et al., 2007).

![Figure 9.26 The changing parent-child relationship](image)

*Figure 9.26 The changing parent-child relationship* Interviews from a large, national study of Canadian families reveal that the typically close, warm relationships between parents and preschoolers loosen as children become older. (Data from Statistics Canada, 1999.)
For a minority of parents and their adolescents, differences lead to real splits and great stress (Steinberg & Morris, 2001). But most disagreements are at the level of harmless bickering. And most adolescents—6000 of them in 10 countries, from Australia to Bangladesh to Turkey—have said that they like their parents (Offer et al., 1988). “We usually get along but...,” adolescents often report (Galambos, 1992; Steinberg, 1987).

Positive parent-teen relations and positive peer relations often go hand-in-hand. High school girls who have the most affectionate relationships with their mothers tend also to enjoy the most intimate friendships with girlfriends (Gold & Yanof, 1985). And teens who feel close to their parents tend to be healthy and happy and to do well in school (Resnick et al., 1997). Of course, we can state this correlation the other way: Misbehaving teens are more likely to have tense relationships with parents and other adults.

“I love u guys.”

Emily Keyes’ final text message to her parents before dying in a Colorado school shooting, 2006

Adolescence is typically a time of diminishing parental influence and growing peer influence. Asked in a survey if they had “ever had a serious talk” with their child about illegal drugs, 85 percent of American parents answered yes. But if the parents had indeed given this earnest advice, many teens apparently had tuned it out: Only 45 percent could recall such a talk (Morin & Brossard, 1997).

Heredity does much of the heavy lifting in forming individual differences in temperament and personality, and parent and peer influences do much of the rest. Most teens are herd animals. They talk, dress, and act more like their peers than their parents. What their friends are, they often become, and what “everybody’s doing,” they often do. In teen calls to hotline counseling services, peer relationships are the most discussed topic (Boehm et al., 1999). For those who feel excluded, the pain is acute. “The social atmosphere in most high schools is poisonously clique-driven and exclusionary,” observed social psychologist Elliot Aronson (2001). Most excluded “students suffer in silence....A small
number act out in violent ways against their classmates.” Those who withdraw are vulnerable to loneliness, low self-esteem, and depression (Steinberg & Morris, 2001). Peer approval matters.

Teens see their parents as having more influence in other areas—for example, in shaping their religious faith and in thinking about college and career choices (Emerging Trends, 1997). A Gallup Youth Survey reveals that most share their parent’s political views (Lyons, 2005).

**Emerging Adulthood**

*What is emerging adulthood?*

In young adulthood, emotional ties with parents loosen further. During their early twenties, many people still lean heavily on their parents. But by the late twenties, most feel more comfortably independent and better able to empathize with parents as fellow adults (Frank, 1988; White, 1983). This graduation from adolescence to adulthood is now taking longer.

In the Western world, adolescence now roughly corresponds to the teen years. At earlier times, and still today in other parts of the world, this slice of the life span has been much smaller (Baumeister & Tice, 1986). Shortly after sexual maturity, such societies bestowed adult responsibilities and status on the young person, often marking the event with an elaborate initiation—a public *rite of passage*. With society’s blessing, the new adult would then work, marry, and have children.

When schooling became compulsory in many Western countries, independence began occurring later. In industrialized cultures from Europe to Australia, adolescents are now taking more time to finish college, leave the nest, and establish careers. In the United States, for example, the average age at first marriage varies by ethnic group but has increased more than 4 years since 1960 (to 27 for men, 25 for women).

While cultural traditions were changing, Western adolescents were also beginning to develop earlier. Today’s earlier sexual maturity is related both to increased body fat (which can support pregnancy and nursing) and to weakened parent-child bonds, including absent fathers (Ellis, 2004). Together, delayed independence and earlier sexual maturity have widened the once-brief interlude between biological maturity and social independence (*Figure 9.27*).

![Figure 9.27](image-url) *The transition to adulthood is being stretched from both ends* In the 1890s, the average interval between a woman’s first menstrual period and marriage, which typically marked a transition to adulthood, was about 7 years; in industrialized countries today it is about 12 years (Guttmacher, 1994, 2000). Although many adults are unmarried, later marriage combines with prolonged education and earlier menarche to help stretch out the transition to adulthood.
Especially for those still in school, the time from 18 to the mid-twenties is an increasingly not-yet-settled phase of life, which some now call emerging adulthood (Arnett, 2006, 2007; Reitzle, 2006). Unlike some other cultures with an abrupt transition to adulthood, Westerners typically ease their way into their new status. Those who leave home for college, for example, are separated from parents and, more than ever before, managing their time and priorities. Yet they may remain dependent on their parents’ financial and emotional support and may return home for holidays. For many others, their parents’ home may be the only affordable place to live. No longer adolescents, these emerging adults have not yet assumed full adult responsibilities and independence, and they feel “in between.” But adulthood emerges gradually, and often with diminishing bouts of depression or anger and increased self-esteem (Galambos et al., 2006).

**Adulthood**

“I am still learning.”

Michelangelo, 1560, at age 85

AT ONE TIME, PSYCHOLOGISTS VIEWED the center-of-life years between adolescence and old age as one long plateau. No longer. Those who follow the unfolding of people’s adult lives now believe our development continues.

How old does a person have to be before you think of him or her as old? The average 18-to 29-year-old says 67. The average person 60 and over says 76 (Yankelovich, 1995).

It is more difficult to generalize about adulthood stages than about life’s early years. If you know that James is a 1-year-old and Jamal is a 10-year-old, you could say a great deal about each child. Not so with adults who differ by a similar number of years. The boss may be 30 or 60; the marathon runner may be 20 or 50; the 19-year-old may be a parent who supports a child or a child who receives an allowance. Yet our life courses are in some ways similar. Physically, cognitively, and especially socially, we are at age 50 different from our 25-year-old selves.
Adult abilities vary widely Eighty-seven-year-olds: Don’t try this. In 2002, George Blair became the world’s oldest barefoot water skier, 18 days after his eighty-seventh birthday. Rick Doyle/Corbis

Physical Development
What physical changes occur during middle and late adulthood?

"Happy fortieth. I’ll take the muscle tone in your upper arms, the girlish timbre of your voice, your amazing tolerance for caffeine, and your ability to digest french fries. The rest of you can stay." © The New Yorker Collection, 1999, Tom Cheney from cartoonbank.com. All rights reserved.
Our physical abilities—muscular strength, reaction time, sensory keenness, and cardiac output—all crest by the mid-twenties. Like the declining daylight after the summer solstice, the decline of physical prowess begins imperceptibly. Athletes are often the first to notice. World-class sprinters and swimmers peak by their early twenties. Women—who mature earlier than men—also peak earlier. But most of us—especially those of us whose daily lives do not require top physical performance—hardly perceive the early signs of decline.

### Physical Changes in Middle Adulthood

Middle-aged (post-40) athletes know all too well that physical decline gradually accelerates (Figure 9.28). As a 67-year-old who plays basketball, I now find myself occasionally wondering whether my team really needs me to run for that loose ball. But even diminished vigor is sufficient for normal activities. Moreover, during early and middle adulthood, physical vigor has less to do with age than with a person’s health and exercise habits. Many of today’s physically fit 50-year-olds run 4 miles with ease, while sedentary 25-year-olds find themselves huffing and puffing up two flights of stairs.

**Figure 9.28 Gradually accelerating decline** An analysis of aging and batting averages of all twentieth-century major league baseball players revealed a gradual but accelerating decline in players’ later years (Schall & Smith, 2000). The career performance record of the great Willie Mays is illustrative. Bettmann/Corbis

“*If the truth were known, we’d have to diagnose [older women] as having P.M.F.—Post-Menstrual Freedom.*”

Social psychologist Jacqueline Goodchilds (1987)

Aging also brings a gradual decline in fertility. For a 35-to 39-year-old woman, the chances of getting pregnant after a single act of intercourse are only half those of a woman 19 to 26 (Dunson et al., 2002). A woman’s foremost biological sign of aging, the onset of menopause, ends her menstrual cycles, usually within a few years of age 50. Her expectations and attitudes will influence the emotional impact of this event. Does she see it as a sign that she is losing her femininity and growing old? Or does she view it as liberation from menstrual periods and fears of pregnancy? As is often the case, our expectations influence our perceptions.

Data from Africa support an evolutionary theory of menopause: Infants with a living maternal grandmother—typically a caring and invested family member without young children of her own—have had a greater chance of survival (Shanley et al., 2007).

“The things that stop you having sex with age are exactly the same as those that stop you riding a bicycle (bad health, thinking it looks silly, no bicycle).”

Alex Comfort, *The Joy of Sex*, 2002

Men experience no equivalent to menopause—no cessation of fertility, no sharp drop in sex hormones. They do experience a gradual decline in sperm count, testosterone level, and speed of erection and ejaculation. Some may also experience distress related to their perception of declining virility and physical capacities. But most age without such problems.

In a national survey of Canadians age 40 to 64, only 3 in 10 rated their sex life as less enjoyable than during their twenties (Wright, 2006). After middle age, most men and women remain capable of satisfying sexual activity. In another survey by the National Council on Aging, 39 percent of people over 60 expressed satisfaction with the amount
of sex they were having and 39 percent said they wished for sex more frequently (Leary, 1998). And in an American Association of Retired Persons sexuality survey, it was not until age 75 or older that most women and nearly half of men reported little sexual desire (DeLamater & Sill, 2005).

**Physical Changes in Later Life**

Is old age “more to be feared than death” (Juvenal, Satires)? Or is life “most delightful when it is on the downward slope” (Seneca, Epistulae ad Lucilium)? What is it like to grow old? To gauge your own understanding, take the following true/false quiz:

1. Older people become more susceptible to short-term illnesses.
2. During old age many of the brain’s neurons die.
3. If they live to be 90 or older, most people eventually become senile.
4. Recognition memory—the ability to identify things previously experienced—declines with age.
5. Life satisfaction peaks in the fifties and then gradually declines after age 65.

**Life Expectancy** The above statements—all false—are among the misconceptions about aging exploded by recent research. Worldwide, life expectancy at birth increased from 49 years in 1950 to 67 in 2004—and to 80 and beyond in some developed countries (PRB, 2004; Sivard, 1996). This increasing life expectancy (humanity’s greatest achievement, say some) combines with decreasing birthrates to make older adults a bigger and bigger population segment, which provides an increasing demand for cruise ships, hearing aids, retirement villages, and nursing homes.

By 2050, about 35 percent of Europe’s population likely will be over age 60 (Fernández-Ballesteros & Caparra, 2003). Clearly, countries that have depended on children to care for the aged are destined for a “demographic tsunami.” Russia and Western Europe are also headed for depopulation—from 146 million to 104 million people in Russia by 2050, projects the United Nations (Brooks, 2005). “When an entire continent, healthier, wealthier, and more secure than ever before, fails to create the human future in the most elemental sense—by creating the next generation—something very serious is afoot,” states George Weigel (2005).

![World record for longevity?](image)

French woman Jeanne Calment, the oldest human in history with authenticated age, died in 1998 at age 122. At age 100, she was still riding a bike. At age 114, she became the oldest film actor ever, by portraying herself in Vincent and Me. Georges Gobet/AP Photo

Life expectancy differs for males and females; males are more prone to dying. Although 126 male embryos begin life for every 100 females who do so, the sex ratio is down to 105 males for every 100 females at birth (Strickland, 1992). During the first year, male infants’ death rates exceed females’ by one-fourth. Women outlive men by 4 years worldwide and by 5 to 6 years in Canada, the United States, and Australia. (Rather than marrying a man older than themselves, 20-year-old women who want a husband who shares their life expectancy should wait for the 15-year-old boys to mature.) By age 100, females outnumber males 5 to 1.

But few of us live to 100. Even if no one died before age 50, and cancer, heart disease, and infectious illness were eliminated, average life expectancy would still increase only to about 85 or a few years beyond (Barinaga, 1991). The body ages. Its cells stop reproducing. It becomes frail. It becomes vulnerable to tiny insults—hot weather, a fall, a mild infection—that your body easily handles.
With age (especially when accentuated by smoking, obesity, or stress), people’s chromosome tips, called telomeres, wear down, much as the tip of a shoelace frays. As these protective tips shorten, aging cells may die without being replaced with perfect genetic replicas (Blackburn et al., 2007; Valdes et al., 2005; Zhang et al., 2007).

Why do we eventually wear out? Why don’t we, like the bristlecone pine trees, rockfish, and some social insect queens, grow older without withering? One theory, proposed by evolutionary biologists, speculates that the answer relates to our survival as a species: We pass on our genes most successfully when we raise our young and then stop consuming resources. Once we’ve fulfilled our gene-reproducing and nurturing task, there are no natural selection pressures against genes that cause degeneration in later life (Olshansky et al., 1993; Sapolsky & Finch, 1991).

The human spirit also affects life expectancy. As we saw in Unit 8B, chronic anger and depression increase our risk of ill health and premature death. Researchers have even observed an intriguing death-deferral phenomenon. For example, Mitsuru Shimizu and Brett Pelham (2008) report that, in one recent 15-year-period, 2000 to 3000 more Americans died on the two days after Christmas than on Christmas and the two days before (Figure 9.29). And the death rate increases when people reach their birthdays, as it did for those who survived to the milestone first day of the new millennium.

Figure 9.29 Postponing a date with the grim reaper? The total number of daily U.S. deaths from 1987 to 2002 increased on the days following Christmas. To researchers Mitsuru Shimizu and Brett Pelham (2008), this adds to the growing evidence of a death-deferral phenomenon.

“For some reason, possibly to save ink, the restaurants had started printing their menus in letters the height of bacteria.”

Dave Barry, Dave Barry Turns Fifty, 1998
Sensory Abilities

Although physical decline begins in early adulthood, we are not usually acutely aware of it until later life. Visual sharpness diminishes, and distance perception and adaptation to changes in light level are less acute. Muscle strength, reaction time, and stamina also diminish noticeably, as do vision, the sense of smell, and hearing (Figure 9.30). In later life, the stairs get steeper, the print gets smaller, and other people seem to mumble more. In Wales, teens’ loitering around a convenience store has been discouraged by a device that emits an aversive high-pitched sound that almost no one over 30 can hear (Lyall, 2005). Some students use that pitch to their advantage with ringtones that their instructors cannot hear (Vitello, 2006).

Figure 9.30 The aging senses Sigh, smell, and hearing all are less acute among those over age 70. (From Doty et al., 1984.) Jose Luis Pelaez/Blend Images/Jupiterimages

Most stairway falls taken by older people occur on the top step, precisely where the person typically descends from a window-lit hallway into the darker stairwell (Fozard & Popkin, 1978). Our knowledge of aging could be used to design environments that would reduce such accidents (National Research Council, 1990).

With age, the eye’s pupil shrinks and its lens becomes less transparent, reducing the amount of light reaching the retina. In fact, a 65-year-old retina receives only about one-third as much light as its 20-year-old counterpart (Kline & Schieber, 1985). Thus, to see as well as a 20-year-old when reading or driving, a 65-year-old needs three times as much light—a reason for buying cars with untinted windshields. This also explains why older people sometimes ask younger people, “Don’t you need better light for reading?”

Health

For those growing older, there is both bad and good news about health. The bad news: The body’s disease-fighting immune system weakens, making older people more susceptible to life-threatening ailments such as cancer and pneumonia. The good news: Thanks partly to a lifetime’s accumulation of antibodies, those over 65 suffer fewer short-term ailments, such as common flu and cold viruses. They are, for example, half as likely as 20-year-olds and one-fifth as likely as preschoolers to suffer upper respiratory flu each year (National Center for Health Statistics, 1990). This helps explain why older workers have lower absenteeism rates (Rhodes, 1983).

Aging levies a tax on the brain by slowing our neural processing. Up to the teen years, we process information with greater and greater speed (Fry & Hale, 1996; Kail, 1991). But compared to you, older people take a bit more time to react, to solve perceptual puzzles, even to remember names (Bashore et al., 1997; Verhaeghen & Salthouse, 1997). The lag is greatest on complex tasks (Cerella, 1985; Poon, 1987). At video games, most 70-year-olds are no match for a 20-year-old. And, as Figure 9.31 indicates, fatal accident rates per mile driven increase sharply after age 75. By age 85, they exceed the 16-year-old level. Nevertheless, because older people drive less, they account for fewer than 10 percent of crashes (Coughlin et al., 2004).
Slowing reactions contribute to increased accident risks among those 75 and older, and their greater fragility increases their risk of death when accidents happen (NHTSA, 2000). Would you favor driver exams based on performance, not age, to screen out those whose slow reactions or sensory impairments indicate accident risk?

Brain regions important to memory begin to atrophy during aging (Schacter, 1996). In young adulthood, a small, gradual net loss of brain cells begins, contributing by age 80 to a brain-weight reduction of 5 percent or so. Earlier, we noted that late-maturing frontal lobes help account for teen impulsivity. Late in life, atrophy of the inhibition-controlling frontal lobes seemingly explains older people’s occasional blunt questions (“Have you put on weight?”) and frank comments (von Hippel, 2007).

“We’re keeping people alive so they can live long enough to get Alzheimer’s disease.”

Steve McConnell, Alzheimer’s Association Vice President, 2007

In addition to enhancing muscles, bones, and energy and helping to prevent obesity and heart disease, exercising the body feeds the brain and helps compensate for cell loss (Coleman & Flood, 1986). Physical exercise stimulates brain cell development and neural connections, thanks perhaps to increased oxygen and nutrient flow (Kempermann et al., 1998; Pereira et al., 2007). That may explain why active older adults tend to be mentally quick older adults, and why, across 20 studies, sedentary older adults randomly assigned to aerobic exercise programs have exhibited enhanced memory and sharpened judgment (Colcombe & Kramer, 2003; Colcombe et al., 2004; Weuve et al., 2004). Exercise also promotes neurogenesis (the birth of new nerve cells) in the hippocampus, a brain region important for memory (Pereira et al., 2007). And exercise helps maintain the telomeres protecting the ends of chromosomes (Cherkas et al., 2008). We are more likely to rust from disuse than to wear out from overuse.

Dementia and Alzheimer’s Disease Some adults do, unfortunately, suffer a substantial loss of brain cells. Up to age 95, the incidence of mental disintegration doubles roughly every 5 years (Figure 9.32). A series of small strokes, a brain tumor, or alcohol dependence can progressively damage the brain, causing that mental erosion we call dementia. So, too, can the feared brain ailment, Alzheimer’s disease, which strikes 3 percent of the world’s population by age 75. Alzheimer’s symptoms are not normal aging. (Occasionally forgetting where you laid the car keys is no cause for alarm; forgetting how to get home may suggest Alzheimer’s.)
Alzheimer’s destroys even the brightest of minds. First memory deteriorates, then reasoning. Robert Sayre (1979) recalls his father shouting at his afflicted mother to “think harder,” while his mother, confused, embarrassed, on the verge of tears, randomly searched the house for lost objects. A diminishing sense of smell is associated with the pathology that foretells Alzheimer’s (Wilson et al., 2007). As the disease runs its course, after 5 to 20 years, the person becomes emotionally flat, then disoriented and disinhibited, then incontinent, and finally mentally vacant—a sort of living death, a mere body stripped of much of its humanity.

Underlying the symptoms of Alzheimer’s is a loss of brain cells and deterioration of neurons that produce the neurotransmitter acetylcholine. Deprived of this vital chemical messenger, memory and thinking suffer. An autopsy reveals two telltale abnormalities in these acetylcholine-producing neurons: shrunken protein filaments in the cell body, and plaques (globs of degenerating tissue) at the tips of neuron branches. In one line of research, scientists are working to develop drugs that will block proteins from aggregating into plaques or that will lower the levels of the culprit protein, much as cholesterol-lowering drugs help prevent heart disease (Grady, 2007; Wolfe, 2006).

Researchers are gaining insights into the chemical, neural, and genetic roots of Alzheimer’s (Gatz, 2007; Rogaeva et al., 2007). In people at risk for this disease, brain scans (Figure 9.33) reveal—before symptoms appear—the telltale degeneration of critical brain cells and diminished activity in brain areas affected by Alzheimer’s (Apostolova et al., 2006; Johnson et al., 2006; Wu & Small, 2006). When the person is memorizing words, they also show diffuse brain activity, as if more exertion was required to achieve the same performance (Bookheimer et al., 2000). Physically active, nonobese people are less at risk for Alzheimer’s (Abbott et al., 2004; Gustafson et al., 2003; Marx, 2005). So, too, are those with an active, challenged mind—often the mind of an educated, active reader (Wilson & Bennett, 2003). As with muscles, so with the brain: Those who use it, less often lose it.
Figure 9.33 Predicting Alzheimer’s disease During a memory test, MRI scans of the brains of people at risk for Alzheimer’s (left) revealed more intense activity (yellow, followed by orange and red) when compared with normal brains (right). As brain scans and genetic tests make it possible to identify those likely to suffer Alzheimer’s, would you want to be tested? At what age? Susan Bookheimer

Cognitive Development
How do memory and intelligence change with age?

Among the most intriguing developmental psychology questions is whether adult cognitive abilities, such as memory, intelligence, and creativity, parallel the gradually accelerating decline of physical abilities.

Aging and Memory

What experiences from your high school years do you think you may never forget? (These years, and the next few, will be among the times of your life you may remember most easily when you are 50.)

As we age, we remember some things well. Looking back in later life, people asked to recall the one or two most important events over the last half-century tend to name events from their teens or twenties (Conway et al., 2005; Rubin et al., 1998). Whatever people experience around this time of life—Barack Obama’s election, the Iraq war, the events of 9/11, the civil rights movement—becomes pivotal (Pillemer, 1998; Schuman & Scott, 1989). Our teens and twenties are a time of so many memorable “firsts”—first kiss, first job, first going to college or university, first meeting your parents-in-law.

Figure 9.34 Tests of recall Recalling new names introduced once, twice, or three times is easier for younger adults than for older ones. (Data from Crook & West, 1990.)
Early adulthood is indeed a peak time for some types of learning and remembering. In one experiment, Thomas Crook and Robin West (1990) invited 1205 people to learn some names. Fourteen videotaped people said their names, using a common format: “Hi, I’m Larry.” Then the same individuals reappeared and said, for example, “I’m from Philadelphia”—thus providing visual and voice cues for remembering their name. As Figure 9.34 shows, everyone remembered more names after a second and third replay of the introductions, but younger adults consistently surpassed older adults. Perhaps it is not surprising, then, that nearly two-thirds of people over age 40 say their memory is worse than it was 10 years ago (KRC, 2001).

But consider another experiment (Schonfield & Robertson, 1966), in which adults of various ages learned a list of 24 words. Without giving any clues, the researchers then asked some to recall as many words as they could from the list, and others simply to recognize words, using multiple-choice questions. Although younger adults had better recall, no age-related memory decline appeared on the recognition tests (Figure 9.35). So, how well older people remember depends: Are they being asked simply to recognize what they have tried to memorize (minimal decline) or to recall it without clues (greater decline)?

Figure 9.35 Recall and recognition in adulthood In this experiment, the ability to recall new information declined during early and middle adulthood, but the ability to recognize new information did not. (From Schonfield & Robertson, 1966.)

Prospective memory (“Remember to . . .”) remains strong when events help trigger memories, as when walking by a convenience store triggers a “Pick up milk!” memory. Time-based tasks (“Remember the 3:00 P.M. meeting”) prove somewhat more challenging for older people. Habitual tasks, such as remembering to take medications three times daily, can be especially challenging (Einstein et al., 1990, 1995, 1998). Teens and young adults surpass both young children and 70-year-olds at remembering to do something (Zimmerman & Meier, 2006). To minimize problems associated with declining prospective memory, older adults rely more on time management and on using reminder cues, such as notes to themselves (Henry et al., 2004).

Those who study our capacity to learn and remember are aware of one other important complication: Right through our later years, we continue to diverge. Younger adults differ in their abilities to learn and remember, but 70-year-olds differ much more. “Differences between the most and least able 70-year-olds become much greater than between
the most and least able 50-year-olds," reports Oxford researcher Patrick Rabbitt (2006). Some 70-year-olds perform below nearly all 20-year-olds; other 70-year-olds match or outdo the average 20-year-old.

But no matter how quick or slow we are, remembering seems also to depend on the type of information we are trying to retrieve. If the information is meaningless—nonsense syllables or unimportant events—then the older we are, the more errors we are likely to make. If the information is meaningful, older people’s rich web of existing knowledge will help them to catch it, though they may take longer than younger adults to produce the words and things they know (Burke & Shafto, 2004). (Quick-thinking game show winners are usually younger to middle-aged adults.) Older people’s capacity to learn and remember skills also declines less than their verbal recall (Graf, 1990; Labouvie-Vief & Schell, 1982; Perlmutter, 1983).

Aging and Intelligence

What happens to our broader intellectual powers as we age? Do they gradually decline, as does our ability to recall new material? Or do they remain constant, as does our ability to recognize meaningful material? The quest for answers to these questions makes an interesting research story, one that illustrates psychology’s self-correcting process (Woodruff-Pak, 1989). This research developed in phases.

**Phase I: Cross-Sectional Evidence for Intellectual Decline** In cross-sectional studies, researchers at one point in time test and compare people of various ages. When giving intelligence tests to representative samples of people, researchers consistently find that older adults give fewer correct answers than do younger adults. David Wechsler (1972), creator of the most widely used adult intelligence test, therefore concluded that “the decline of mental ability with age is part of the general [aging] process of the organism as a whole.”

For a long time, this rather dismal view of mental decline went unchallenged. Many corporations established mandatory retirement policies, assuming the companies would benefit by replacing aging workers with younger, presumably more capable, employees. As everyone “knows,” you can’t teach an old dog new tricks.

**Phase II: Longitudinal Evidence for Intellectual Stability** After colleges began giving intelligence tests to entering students about 1920, several psychologists saw their chance to study intelligence *longitudinally*—retesting the same people over a period of years. What they expected to find was a decrease in intelligence after about age 30 (Schaie & Geiwitz, 1982). What they actually found was a surprise: Until late in life, intelligence remained stable (**Figure 9.36**). On some tests, it even increased.
How then are we to account for the cross-sectional findings? In retrospect, researchers saw the problem. When cross-sectional studies compared 70-year-olds and 30-year-olds, it compared people not only of two different ages but of two different eras. It compared generally less-educated people (born, say, in the early 1900s) with better-educated people (born after 1950), people raised in large families with people raised in smaller families, people growing up in less affluent families with people raised in more affluent families.

According to this more optimistic view, the myth that intelligence sharply declines with age was laid to rest. At age 70, John Rock developed the birth control pill. At age 78, Grandma Moses took up painting, and she was still painting after age 100. At age 81—and 17 years from the end of his college football coaching career—Amos Alonzo Stagg was named coach of the year. At age 89, architect Frank Lloyd Wright designed New York City’s Guggenheim Museum. As everyone “knows,” given good health you’re never too old to learn.

Like older people, older gorillas process information more slowly (Anderson et al., 2005).

**Phase III: It All Depends**

With “everyone knowing” two different and opposing facts about age and intelligence, something was clearly wrong. As it turns out, longitudinal studies have their own potential pitfalls. Those who survive to the end of longitudinal studies may be bright, healthy people whose intelligence is least likely to decline. (Perhaps people who died younger and were removed from the study had declining intelligence.) Adjusting for the loss of participants, as did a study following more than 2000 people over age 75 in Cambridge, England, reveals a steeper intelligence decline. This is especially so as people age after 85 (Brayne et al., 1999).

Research is further complicated by the finding that intelligence is not a single trait, but rather several distinct abilities (Unit 11). Intelligence tests that assess speed of thinking may place older adults at a disadvantage because of their slower neural mechanisms for processing information. Meeting old friends on the street, names rise to the mind’s surface more slowly—“like air bubbles in molasses,” said David Lykken (1999). But slower processing need not mean less intelligent. When given tests that assess general vocabulary, knowledge, and ability to integrate information, older adults generally fare well (Craik, 1986). Older Canadians surpass younger Canadians at answering questions such as, “Which province was once called New Caledonia?” And in four studies in which players were given 15 minutes to fill in words in *New York Times* crossword puzzles, the highest average performance was achieved by adults in their fifties, sixties, and seventies (Figure 9.37).

![Figure 9.37 Word power grows with age](image)

*Figure 9.37 Word power grows with age* In four studies summarized by Timothy Salthouse (2004), older crossword puzzle players excelled when given 15 minutes with a *New York Times* puzzle.

“In youth we learn, in age we understand.”

*Marie Von Ebner-Eschenbach, Aphorisms, 1883*

German researcher Paul Baltes and his colleagues (1993, 1994, 1999) developed “wisdom” tests that assess “expert knowledge about life in general and good judgment and advice about how to conduct oneself in the face of complex,
uncertain circumstances.” Their results suggest that older adults more than hold their own on these tests, too. Thus, despite 30-year-olds’ quick-thinking smarts, we usually select older-than-thirties people to be president of the company, the college, or the country. Age is sage. To paraphrase one 60-year-old, “Forty years ago I had a great memory, but I was a fool.”

So the answers to our age-and-intelligence questions depend on what we assess and how we assess it. **Crystallized intelligence**—our accumulated knowledge as reflected in vocabulary and analogies tests—*increases* up to old age. **Fluid intelligence**—our ability to reason speedily and abstractly, as when solving novel logic problems—*decreases* slowly up to age 75 or so, then more rapidly, especially after age 85 (Cattell, 1963; Horn, 1982). We can see this pattern in the intelligence scores of a national sample of adults (Kaufman et al., 1989). After adjustments for education, verbal scores (reflecting crystallized intelligence) held relatively steady from ages 20 to 74. Nonverbal, puzzle-solving intelligence declined. With age we lose and we win. We lose recall memory and processing speed, but we gain vocabulary and knowledge (Park et al., 2002). Our decisions also become less distorted by negative emotions such as anxiety, depression, and anger (Blanchard-Fields, 2007; Carstensen & Mikels, 2005).

These cognitive differences help explain why mathematicians and scientists produce much of their most creative work during their late twenties or early thirties, whereas those in literature, history, and philosophy tend to produce their best work in their forties, fifties, and beyond, after accumulating more knowledge (Simonton, 1988, 1990). For example, poets (who depend on fluid intelligence) reach their peak output earlier than prose authors (who need a deeper knowledge reservoir), a finding observed in every major literary tradition, for both living and dead languages.

Despite age-related cognitive changes, studies in several countries indicate that age is only a modest predictor of abilities such as memory and intelligence. Mental ability more strongly correlates with proximity to death. Tell me whether someone is 70, 80, or 90, and you haven’t told me much about the person’s mental sharpness. But if you tell me whether someone is 8 months or 8 years from death, regardless of age, you’ll give me a better clue to the person’s mental ability. Especially in the last three or four years of life, cognitive decline typically accelerates (Wilson et al., 2007). Researchers call this near-death drop *terminal decline* (Backman & MacDonald, 2006).

**Social Development**

What themes and influences mark our social journey from early adulthood to death?

“Midway in the journey of our life I found myself in a dark wood, for the straight way was lost.”

Dante, The Divine Comedy, 1314

Many differences between younger and older adults are created by significant life events. A new job means new relationships, new expectations, and new demands. Marriage brings the joy of intimacy and the stress of merging your life with another’s. The birth of a child introduces responsibilities and alters your life focus. The death of a loved one creates an irreplaceable loss. Do these adult life events shape a sequence of life changes?

**Adulthood’s Ages and Stages**

As people enter their forties, they undergo a transition to middle adulthood, a time when they realize that life will soon be mostly behind instead of ahead of them. Some psychologists have argued that for many the *midlife transition* is a crisis, a time of great struggle, regret, or even feeling struck down by life. The popular image of the midlife crisis is an early-forties man who forsakes his family for a younger girlfriend and a hot sports car. But the fact—reported by large samples of people—is that unhappiness, job dissatisfaction, marital dissatisfaction, divorce, anxiety, and suicide do *not* surge during the early forties (Hunter & Sundel, 1989; Mroczek & Kolarz, 1998). Divorce, for example, is most common among those in their twenties, suicide among those in their seventies and eighties. One study of emotional instability in nearly 10,000 men and women found “not the slightest evidence” that distress peaks anywhere in the midlife age range (Figure 9.38). For the 1 in 4 adults who do report experiencing a life crisis, the trigger is not age, but a major event, such as illness, divorce, or job loss (Lachman, 2004).
Life events trigger transitions to new life stages at varying ages. The social clock—the definition of “the right time” to leave home, get a job, marry, have children, and retire—varies from era to era and culture to culture. In Western Europe, fewer than 10 percent of men over 65 remain in the work force, as do 16 percent in the United States, 36 percent in Japan, and 69 percent in Mexico (Davies et al., 1991). And the once-rigid sequence for many Western women—of student to worker to wife to at-home mom to worker again—has loosened. Contemporary women occupy these roles in any order or all at once. The social clock still ticks, but people feel freer about being out of sync with it.

Even chance events can have lasting significance because they often deflect us down one road rather than another (Bandura, 1982). Romantic attraction, for example, is often influenced by chance encounters. Albert Bandura (2005) recalls the ironic true story of a book editor who came to one of Bandura’s lectures on the “Psychology of Chance Encounters and Life Paths”—and ended up marrying the woman who happened to sit next to him. The sequence that led to my authoring this book (which was not my idea) began with my being seated near, and getting to know, a distinguished colleague at an international conference.

“The important events of a person’s life are the products of chains of highly improbable occurrences.”


Thus, chance events, including romantic encounters, can change our lives. Consider one study of identical twins, who tend to make similar choices of friends, clothes, vacations, jobs, and so on. So, if your identical twin became engaged to someone, wouldn’t you (being in so many ways the same as your twin) expect to also feel attracted to this person? Surprisingly, only half the identical twins recalled really liking their co-twin’s selection, and only 5 percent said, “I could have fallen for my twin’s partner.” Researchers David Lykken and Auke Tellegen (1993) surmise that romantic
love is rather like ducklings’ imprinting: Given repeated exposure to someone after childhood, you may form a bond (infatuation) with almost any available person who has a roughly similar background and level of attractiveness and who reciprocates your affections.

Adulthood’s Commitments

Two basic aspects of our lives dominate adulthood. Erik Erikson called them intimacy (forming close relationships) and generativity (being productive and supporting future generations). Researchers have chosen various terms—affiliation and achievement, attachment and productivity, commitment and competence. Sigmund Freud (1935) put it most simply: The healthy adult, he said, is one who can love and work.

“One can live magnificently in this world if one knows how to work and how to love.”

Leo Tolstoy, 1856

Love We typically flirt, fall in love, and commit—one person at a time. “Pair-bonding is a trademark of the human animal,” observed anthropologist Helen Fisher (1993). From an evolutionary perspective, relatively monogamous pairing makes sense: Parents who cooperated to nurture their children to maturity were more likely to have their genes passed along to posterity than were parents who didn’t.

Adult bonds of love are most satisfying and enduring when marked by a similarity of interests and values, a sharing of emotional and material support, and intimate self-disclosure (see Unit 14). Couples who seal their love with commitment—via (in one study) marriage for heterosexual couples and civil unions for homosexual couples—more often endure (Balsam et al., 2008). Marriage bonds are especially likely to last when couples marry after age 20 and are well educated. Compared with their counterparts of 40 years ago, people in Western countries are better educated and marrying later. Yet, ironically, they are nearly twice as likely to divorce. (Both Canada and the United States now have about one divorce for every two marriages [Bureau of the Census, 2007], and in Europe, divorce is only slightly less common.) The divorce rate partly reflects women’s lessened economic dependence on men and men and women’s rising expectations. We now hope not only for an enduring bond, but also for a mate who is a wage earner, caregiver, intimate friend, and warm and responsive lover.

Might test-driving life together in a “trial marriage” minimize divorce risk? In a 2001 Gallup survey of American twenty-somethings, 62 percent thought it would (Whitehead & Popone, 2001). In reality, in Europe, Canada, and the United States, those who cohabit before marriage have had higher rates of divorce and marital dysfunction than those who did not cohabit (Dush et al., 2003; Popenoe & Whitehead, 2002). The risk appears greatest for cohabiting prior to engagement (Kline et al., 2004).
Two factors help explain why American children born to cohabiting parents are about five times more likely to experience their parents’ separation than are children born to married parents (Osborne et al., 2007). First, cohabiters tend to be initially less committed to the ideal of enduring marriage. Second, they become even less marriage-supporting while cohabiting.

What do you think? Does marriage correlate with happiness because marital support and intimacy breed happiness, because happy people more often marry and stay married, or both?

Nonetheless, the institution of marriage endures. Worldwide, reports the United Nations, 9 in 10 heterosexual adults marry. And marriage is a predictor of happiness, health, sexual satisfaction, and income. National Opinion Research Center surveys of more than 40,000 Americans since 1972 reveal that 40 percent of married adults, though only 23 percent of unmarried adults, have reported being “very happy.” Lesbian couples, too, report greater well-being than those who are alone (Peplau & Fingerhut, 2007; Waym & Peplau, 1995). Moreover, neighborhoods with high marriage rates typically have low rates of social pathologies such as crime, delinquency, and emotional disorders among children (Myers & Scanzoni, 2005).

Marriages that last are not always devoid of conflict. Some couples fight but also shower one another with affection. Other couples never raise their voices yet also seldom praise one another or nuzzle. Both styles can last. After observing the interactions of 2000 couples, John Gottman (1994) reported one indicator of marital success: at least a five-to-one ratio of positive to negative interactions. Stable marriages provide five times more instances of smiling, touching, complimenting, and laughing than of sarcasm, criticism, and insults. So, if you want to predict which newlyweds will stay together, don’t pay attention to how passionately they are in love. The couples who make it are more often those who refrain from putting down their partners. To prevent a cancerous negativity, successful couples learn to fight fair (to state feelings without insulting) and to steer conflict away from chaos with comments like “I know it’s not your fault” or “I’ll just be quiet for a moment and listen.”

Often, love bears children. For most people, this most enduring of life changes is a happy event. “I feel an overwhelming love for my children unlike anything I feel for anyone else,” said 93 percent of American mothers in a national survey (Erickson & Aird, 2005). Many fathers feel the same. A few weeks after the birth of my first child I was suddenly struck by a realization: “So this is how my parents felt about me!”

When children begin to absorb time, money, and emotional energy, satisfaction with the marriage itself may decline. This is especially likely among employed women who, more than they expected, carry the traditional burden of doing the chores at home. Putting effort into creating an equitable relationship can thus pay double dividends: a more satisfying marriage, which breeds better parent-child relations (Erel & Burman, 1995).

Although love bears children, children eventually leave home. This departure is a significant and sometimes difficult event. For most people, however, an empty nest is a happy place (Adelmann et al., 1989; Glenn, 1975). Compared with middle-aged women with children still at home, those living in an empty nest report greater happiness and greater enjoyment of their marriage. Many parents experience a “postlaunch honeymoon,” especially if they maintain close relationships with their children (White & Edwards, 1990). As Daniel Gilbert (2006) has said, “The only known symptom of ‘empty nest syndrome’ is increased smiling.”

Work For many adults, the answer to “Who are you?” depends a great deal on the answer to “What do you do?” For women and men, choosing a career path is difficult, especially in today’s changing work environment. During the first two years of college or university, few students can predict their later careers. Most shift from their initially intended majors, many find their postcollege employment in fields not directly related to their majors, and most will change careers (Rothstein, 1980). In the end, happiness is about having work that fits your interests and provides you with a sense of competence and accomplishment. It is having a close, supportive companion who cheers your accomplishments (Gable et al., 2006). And for some, it includes having children who love you and whom you love and feel proud of.
Job satisfaction and life satisfaction  Work can provide us with a sense of identity and competence and opportunities for accomplishment. Perhaps this is why challenging and interesting occupations enhance people’s happiness.

Well-Being Across the Life Span

“I hope I die before I get old,” wrote The Who’s Pete Townshend—when he was 20.

To live is to grow older. This moment marks the oldest you have ever been and the youngest you will henceforth be. That means we all can look back with satisfaction or regret, and forward with hope or dread. When asked what they would have done differently if they could relive their lives, people’s most common answer is “Taken my education more seriously and worked harder at it” (Kinnier & Metha, 1989; Roese & Summerville, 2005). Other regrets—“I should have told my father I loved him,” “I regret that I never went to Europe”—also focus less on mistakes made than on the things one failed to do (Gilovich & Medvec, 1995).

From the teens to midlife, people typically experience a strengthening sense of identity, confidence, and self-esteem (Miner-Rubino et al., 2004; Robins & Trzesniewski, 2005). In later life, challenges arise: Income shrinks, work is often taken away, the body deteriorates, recall fades, energy wanes, family members and friends die or move away, and the great enemy, death, looms ever closer. Small wonder that most presume that happiness declines in later life (Lacey et al., 2006). But the over-65 years are not notably unhappy, as Ronald Inglehart (1990) discovered when he amassed interviews conducted during the 1980s with representative samples of nearly 170,000 people in 16 nations (Figure 9.39). Newer surveys of some 2 million people worldwide confirm that happiness is slightly higher among both young and older adults than among those middle-aged. Moreover, national studies in both Britain and Australia reveal that the risk of depression tapers off in later life (Blanchflower & Oswald, 2008; Troller et al., 2007).
Figure 9.39 *Age and life satisfaction* With the tasks of early adulthood behind them, many older adults have more time to pursue personal interests. No wonder their satisfaction with life remains high, and may even rise if they are healthy and active. As this graph, based on surveys of 170,000 people in 16 countries shows, age differences in life satisfaction are small. (Data from Inglehart, 1990.)

If anything, positive feelings grow after midlife and negative feelings subside (Charles et al., 2001; Mroczek, 2001). Consider:

- Older adults increasingly use words that convey positive emotions (Pennebaker & Stone, 2003).
- Older adults attend less and less to negative information. For example, they are slower than younger adults to perceive negative faces (Carstensen & Mikels, 2005).
- The amygdala, a neural processing center for emotions, shows diminishing activity in older adults in response to negative events, but it maintains its responsiveness to positive events (Mather et al., 2004; Williams et al., 2006).
- Brain-wave reactions to negative images diminish with age (Kisley et al., 2007).

“At twenty we worry about what others think of us. At forty we don’t care what others think of us. At sixty we discover they haven’t been thinking about us at all.”

Anonymous
Numerous biological, psychological, and social-cultural factors affect the way we age. With the right genes, we have a good chance of aging successfully if we maintain a positive outlook and stay mentally and physically active, as well as connected to family and friends in the community. Moreover, at all ages, the bad feelings we associate with negative events fade faster than do the good feelings we associate with positive events (Walker et al., 2003). This contributes to most older people’s sense that life, on balance, has been mostly good. Given that growing older is an outcome of living (an outcome nearly all of us prefer to early dying), the positivity of later life is comforting. More and more people flourish into later life, thanks to biological, psychological, and social-cultural influences (Figure 9.40).

The resilience of well-being across the life span obscures some interesting age-related emotional differences. Although life satisfaction does not decline with age, it often wanes in the terminal decline phase, as death approaches (Gerstorf et al., 2008). Also, as the years go by, feelings mellow (Costa et al., 1987; Diener et al., 1986). Highs become less high, lows less low. Thus, although we are less often depressed, and our average feeling level tends to remain stable, with age we also find ourselves less often feeling excited, intensely proud, and on top of the world. Compliments provoke less elation and criticisms less despair, as both become merely additional feedback atop a mountain of accumulated praise and blame.

“The best thing about being 100 is no peer pressure.”

Lewis W. Kuster, 2005, on turning 100

Psychologists Mihaly Csikszentmihalyi and Reed Larson (1984) mapped people's emotional terrain by periodically signaling them with electronic beepers to report their current activities and feelings. They found that teenagers typically come down from elation or up from gloom in less than an hour. Adult moods are less extreme but more enduring. For most people, old age offers less intense joy but greater contentment and increased spirituality, especially for those who remain socially engaged (Harlow & Cantor, 1996; Wink & Dillon, 2002). As we age, life becomes less an emotional roller coaster.

Death and Dying

Most of us will suffer and cope with the deaths of relatives and friends. Usually, the most difficult separation is from a spouse—a loss suffered by five times more women than men. When, as usually happens, death comes at an expected late-life time, the grieving may be relatively short-lived. (Figure 9.41 shows the typical emotions before and after a spouse’s death.) But even 20 years after losing a spouse, people still talk about the long-lost partner once a month on average (Carnelley et al., 2006).
Richard Lucas and his collaborators (2003) examined longitudinal annual surveys of more than 30,000 Germans. The researchers identified 513 married people who experienced the death of a spouse and did not remarry. They found that life satisfaction began to dip during the prewidowhood year, dropped significantly during the year of the spouse’s death, and then eventually rebounded to nearly the earlier level. (Source: Richard Lucas.)

Grief is especially severe when the death of a loved one comes suddenly and before its expected time on the social clock. The sudden illness that claims a 45-year-old life partner or the accidental death of a child may trigger a year or more of memory-laden mourning that eventually subsides to a mild depression (Lehman et al., 1987).

“Love—why, I’ll tell you what love is: It’s you at 75 and her at 71, each of you listening for the other’s step in the next room, each afraid that a sudden silence, a sudden cry, could mean a lifetime’s talk is over.”

Brian Moore, The Luck of Ginger Coffey, 1960

For some, however, the loss is unbearable. One study, following more than 1 million Danes over the last half of the twentieth century, found that more than 17,000 people had suffered the death of a child under 18. In the five years following that death, 3 percent of them had a first psychiatric hospitalization. This rate was 67 percent higher than the rate recorded for parents who had not lost a child (Li et al., 2005).

Even so, the normal range of reactions to a loved one’s death is wider than most suppose. Some cultures encourage public weeping and wailing; others hide grief. Within any culture, individuals differ. Given similar losses, some people grieve hard and long, others are more resilient (Ott et al., 2007). Contrary to popular misconceptions, however,
• terminally ill and bereaved people do not go through identical predictable stages, such as denial before anger (Nolen-Hoeksema & Larson, 1999). A Yale study following 233 bereaved individuals through time did, however, find that yearning for the loved one reached a high point four months after the loss, with anger peaking, on average, about a month later (Maciejewski et al., 2007).

• those who express the strongest grief immediately do not purge their grief more quickly (Bonanno & Kaltman, 1999; Wortman & Silver, 1989).

• bereavement therapy and self-help groups offer support, but there is similar healing power in the passing of time and the support of friends—and also in giving support and help to others (Brown et al., 2008). Grieving spouses who talk often with others or who receive grief counseling adjust about as well as those who grieve more privately (Bonanno, 2001, 2004; Genevro, 2003; Stroebe et al., 2001, 2002, 2005).

“Consider, friend, as you pass by, as you are now, so once was I. As I am now, you too shall be. Prepare, therefore, to follow me.”

Scottish tombstone epitaph

We can be grateful for the waning of death-denying attitudes. Facing death with dignity and openness helps people complete the life cycle with a sense of life’s meaningfulness and unity—the sense that their existence has been good and that life and death are parts of an ongoing cycle. Although death may be unwelcome, life itself can be affirmed even at death. This is especially so for people who review their lives not with despair but with what Erik Erikson called a sense of integrity—a feeling that one’s life has been meaningful and worthwhile.

Reflections on Three Major Developmental Issues

WE BEGAN OUR SURVEY OF DEVELOPMENTAL psychology by identifying three pervasive issues: (1) how development is steered by genes and by experience, (2) whether development is a gradual, continuous process or a series of discrete stages, and (3) whether development is characterized more by stability over time or by change. We have considered the first issue in Unit 1 and Unit 3C. It is time to reflect on all three now.

Nature and Nurture

Studies of the inheritance of temperament, and of twins and adopted children (in Unit 3C), confirm that nature and nurture influence development. Genes and environment, biological and social factors direct our life courses, and their effects intertwine.

Continuity and Stages

Do adults differ from infants as a giant redwood differs from its seedling—a difference created by gradual, cumulative growth? Or do they differ as a butterfly differs from a caterpillar—a difference of distinct stages?

Generally speaking, researchers who emphasize experience and learning see development as a slow, continuous shaping process. Those who emphasize biological maturation tend to see development as a sequence of genetically predisposed stages or steps: Although progress through the various stages may be quick or slow, everyone passes through the stages in the same order.

Are there clear-cut stages of psychological development, as there are physical stages such as walking before running? We have considered the stage theories of Jean Piaget on cognitive development, Lawrence Kohlberg on moral development, and Erik Erikson on psychosocial development (Figure 9.42). And we have seen their stage theories criticized: Young children have some abilities Piaget attributed to later stages. Kohlberg’s work reflected a worldview characteristic of educated people in individualistic cultures and emphasized thinking over acting. Adult life does not progress through the fixed, predictable series of steps Erikson envisioned.
Although research casts doubt on the idea that life proceeds through neatly defined, age-linked stages, the stage concept remains useful. The human brain does experience growth spurts during childhood and puberty that correspond roughly to Piaget’s stages (Thatcher et al., 1987). And stage theories contribute a developmental perspective on the whole life span, by suggesting how people of one age think and act differently when they arrive at a later age.

**Stability and Change**

This leads us to the final question: Over time, are people’s personalities consistent, or do they change? If reunited with a long-lost grade school friend, would you instantly recognize that “it’s the same old Andy”? Or does a person befriended during one period of life seem like a different person at a later period? (That was the experience of one male friend of mine who failed to recognize a former classmate at his 40-year college reunion. The aghast classmate to whom he spoke was his long-ago ex-wife.)

Researchers who have followed lives through time have found evidence for both stability and change. There is continuity to personality and yet, happily for troubled children and adolescents, life is a process of becoming: The struggles of the present may be laying a foundation for a happier tomorrow. More specifically, researchers generally agree on the following points:

1. The first two years of life provide a poor basis for predicting a person’s eventual traits (Kagan et al., 1978, 1998). Older children and adolescents also change. Although delinquent children have elevated rates of later work problems, substance abuse, and crime, many confused and troubled children have blossomed into mature, successful adults (Moffitt et al., 2002; Roberts et al., 2001; Thomas & Chess, 1986).
2. As people grow older, personality gradually stabilizes (Hampson & Goldberg, 2006; Johnson et al., 2005; Terracciano et al., 2006). Some characteristics, such as temperament, are more stable than others, such as social attitudes (Moss & Susman, 1980). When a research team led by Avshalom Caspi (2003) studied 1000 New Zealanders from age 3 to 26, they were struck by the consistency of temperament and emotionality across time.
3. In some ways, we all change with age. Most shy, fearful toddlers begin opening up by age 4, and most people become more self-disciplined, stable, agreeable, and self-confident in the years after adolescence (McCrae & Costa, 1994; Roberts et al., 2003, 2006, 2008). Many irresponsible 18-year-olds have matured into 40-year-old business or cultural leaders. Such changes can occur without changing a person’s position relative to others of the same age. The hard-driving young adult may mellow by later life, yet still be a relatively hard-driving senior citizen.

“As at 7, so at 70.”

*Jewish proverb*

“At 70, I would say the advantage is that you take life more calmly. You know that ‘this, too, shall pass’!

*Eleanor Roosevelt, 1954* 

Finally, we should remember that life requires both stability and change. Stability enables us to depend on others, provides our identity, and motivates our concern for the healthy development of children. Change motivates our
concerns about present influences, sustains our hope for a brighter future, and lets us adapt and grow with experience.