My friend has a **baby.** *I'm recording all the* noises *he makes so later I can ask him what he* **meant.**

STEPHEN WRIGHT

Infants are more than cute and cuddly, drooling and squirming milk-guzzlers. Between birth and the age of 2, children master an incredible array of physical, cognitive, and emotional skills and tasks. Because they are so dependent on their caregivers, however, infants are often completely underestimated in their abilities. Theorists in the field of lifespan development have viewed infants along a range of competencies, from small sponges waiting for something to absorb (Skinner), to active constructors of their own world (Piaget). Beliefs about what infants are capable of have powerful impact—on parents' views of their children, on educators' views of how infant/toddler care should be designed, and on policymakers' views of how money and resources should be allocated.

One of the most influential approaches to infant/toddler and preschool education is widely recognized in the work of educators in Reggio Emilia, Italy, who are known for their innovative approach to early education. One principle of the Reggio Emilia philosophy is that even the youngest infants exercise some control over the direction of their learning. One feature that distinguishes the municipal infant/toddler centers and preschools in Reggio Emilia is their systematic use of documentation to inform and extend the learning experiences of the children as well as the educators and families.

The images of Laura above speak to the curiosity and competency of young children and have been recorded, analyzed, and revisited by people around the world. Notice how she and the teacher are looking at a catalog, at a picture of a watch. The teacher, seeing Laura's interest in the watch, shows Laura her own wristwatch and lets Laura listen to the ticking sound the watch makes. Laura, using the new knowledge she's just acquired, puts her ear to the catalog to see if the watch in the photo also makes a ticking sound. Not even 1 year old, Laura has taken her new learning, generated a hypothesis (all watches make a ticking sound), and tested her hypothesis (if I listen to the photo of a watch, will it tick?). At the heart of the Reggio Emilia approach, exemplified in these images, is a celebration of relationships—between child and teacher, child and environment, teacher and caregiver(s), and all combinations of these participants in children's learning and development.

This chapter will help you to understand how development in infancy is viewed today. First, infants' physical development is presented, followed by specific domains of infant

perspectives on Diversity

Political Will vs. National Wealth

A CNN.com report (Green, 2006) stated that "almost all newborn and maternal deaths take place in developing nations—99 percent and 98 percent, respectively." Countries that have a history of war and other conflicts, such as Liberia, Afghanistan, Iraq, and Angola, have especially high infant mortality rates. There also seems to be a direct link between mothers and their status (health, education, and support) and infant mortality. But while we might assume that the problem lies in the wealth of a nation, Green argues that the political priorities of the country make more of a difference.

Countries that rank as rather poor countries on a global scale, such as Colombia, Mexico, and Vietnam, rank higher than many other countries in terms of infant mortality. Perhaps political and cultural factors that provide for mothers ultimately serve to protect infants as well.

development: motor, perception, cognitive, language, and social and emotional. Themes relating to biopsychosocial interactions are woven throughout the material, and you'll notice how virtually every aspect of development is affected by multiple influences. For example, early interactions between a parent and an infant are very powerful and are affected by factors such as cultural traditions, birth order, the parent's health, and the infant's temperament. Many factors influence the interactions between parent and infant; they also set the stage for interactions that will evolve over a lifetime.

Physical Development in Infancy

Infancy is a time of rapid physical development—nature's way to ensure an infant's survival and attempts to cope with the world. A typical newborn weighs about 7½ pounds and is about 20 inches long. In the year after birth, an infant's length increases by one half and its weight almost triples. While infancy is a time of rapid growth and increasing physical ability, it is also a time of extreme vulnerability. The infant morality rate is the number of deaths that occur in the first year of life for 1,000 live births. The National Center for Health Statistics reported that the U.S. infant mortality rate in 2006 was 6.3, which is 3 times higher than the infant death rate in Japan and 2.5 times higher than in Finland, Norway, and Iceland. Figure 5.1 shows the changes in infant mortality rankings from 1960 to 2009 for various countries around the world. Although infant death in the United States is often due to babies being born too small or too early, there is a link to poor mothers with less education being at a higher risk of early delivery.

FIGURE 5.1

Infant Mortality Rates

In 1960, only 11 countries could boast a lower infant mortality rate than the United States. In 2004, 28 countries surpassed the U.S. for lower infant mortality rate.

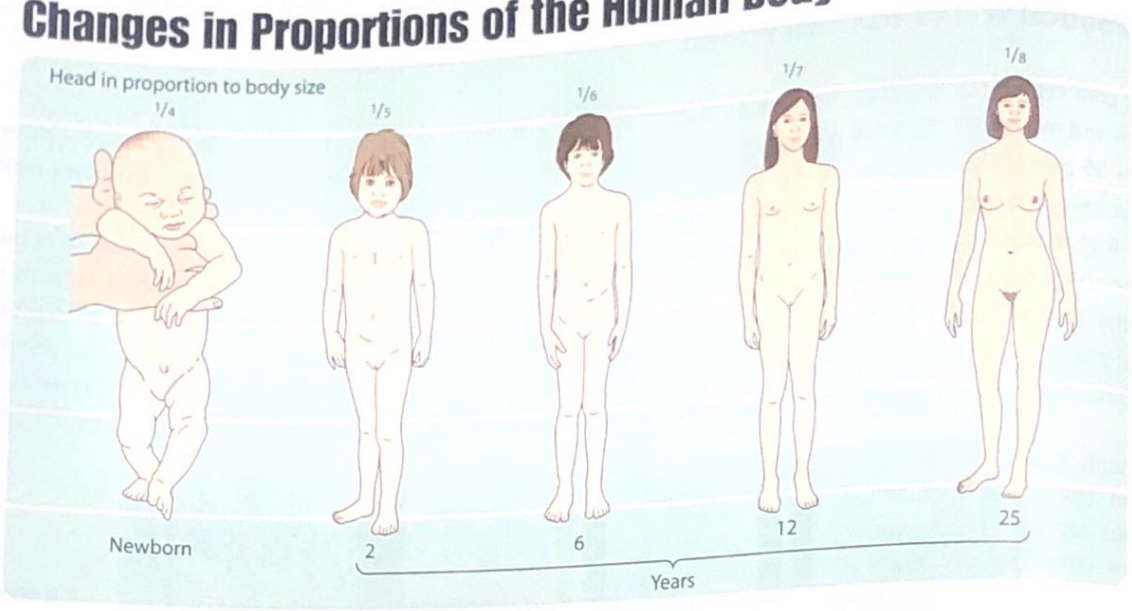
Source: Copyright 2009 The New York Times Company.

DEVELOPMENTAL MILESTONES OF INFANCY

Growing children experience rapid changes in body shape and composition, distribution of tissues, and in motor skills. For example, the infant's head at birth is about a quarter of the body's total length, but in the adult it is about one seventh of body length. The head becomes noticeably smaller compared to the rest of the body as we develop. (See Figure 5.2.) Total growth represents a complex series of changes

FIGURE 5.2

Changes in Proportions of the Human Body



that occur in developmental sequence. Underlying this rapidly unfolding and complex process is, of course, proper nutrition.

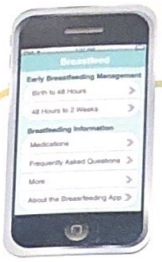
NUTRITION

Good nutrition is critical for a healthy baby, and ideally all infants would receive a balance of necessary nutrients. Yet infants' nutritional needs are quite different from adults'. Meeting ideal needs can be difficult because of an infant's small stomach and an immature digestive system (Ball & Bindler, 2006). Fortunately, until infants' bodies develop the mechanisms needed to chew, swallow, store, and digest solid food, their nutritional needs can be taken care of through liquid nutrition in the form of breast milk or formula. Just as babies do not choose the families they are born into, they also do not choose whether or not their caregivers follow a healthy diet or whether they are breast- or formula-fed. The decision to breast-feed is one that is often influenced by pressure from family and society.

Breast-Feeding Versus Bottle-Feeding

Most doctors, nurses, and mothers agree that human milk is the ideal food for infants up to six months (Leifer, 2003), and yet this belief wasn't always the dominant viewpoint. Throughout much of the 20th century, women were discouraged from breast-feeding as some medical experts believed that babies could get better nutrition through formulas. Doctors and family often actively discouraged breast-feeding, which was frowned upon in public places and banned in some of them.

Breast-feeding has definite advantages over formula-feeding. First is protection against disease. Breast-fed babies tend to experience less illness than formula-fed babies. Second, breast-fed babies are less at risk for aller-



TECH TRENDS

Podcasts for Nursing Mothers

In case mothers aren't multitasking enough, the following application for iPhone or iTouch (available via iTunes) offers free information about breast-feeding that interested women can access while exercising, driving, working . . . or nursing! Called Breastfeeding Management, this app was designed to help clinicians identify and treat common breast-feeding problems. This app has a link to the LactMed database and news about medications, which most mothers might find interesting but not use as often as other key features—frequently asked questions and links to highly respected resources, such as the World Health Organization.

gic reactions than are formula-fed babies. Other findings from research indicate that breast-fed babies have stronger bones, more advanced cognitive development, easier transitions to solid food, and lower risk for obesity than those who are formula-fed. The American Academy of Pediatrics recommends that babies have breast milk exclusively for the first six months of life and that nursing should continue for at least a year. The number of mothers who choose to nurse has dramatically increased since the 1970s.

There are specific situations, however, when a woman should not breast-feed her baby. If a woman is infected with AIDS or another infectious disease, has active tuberculosis, or is currently taking medication that could be harmful to the child, then she should not breast-feed her child.

The availability of formula is an important factor in the decision of feeding an infant. One of the advantages of formula feeding is that others, including fathers, can feed the baby. This is a relief to some mothers who, despite their wishes to breast-feed, are not able to physically. Although breast-feeding is best for babies' health and development, some mothers will need or want to bottle-feed and can be reassured that the nutrition of most formulas is sufficient. Assuming that the formula is appropriate, nutritional problems should not arise.

In the course of one year, infants progress from either breast- or bottle-feeding to eating a variety of solid foods. As infants develop, tremendous brain growth occurs that helps make advances in feeding possible, and the more diverse range of foods, in turn, fuels the brain for more growth. The motor skills needed to pick up small pieces of food, the chewing and swallowing required to digest the food, and the language skills that emerge as a child learns to ask for "more!" are all connected to the brain.

BRAIN DEVELOPMENT

infantile amnesia The inability to remember events from early in life.

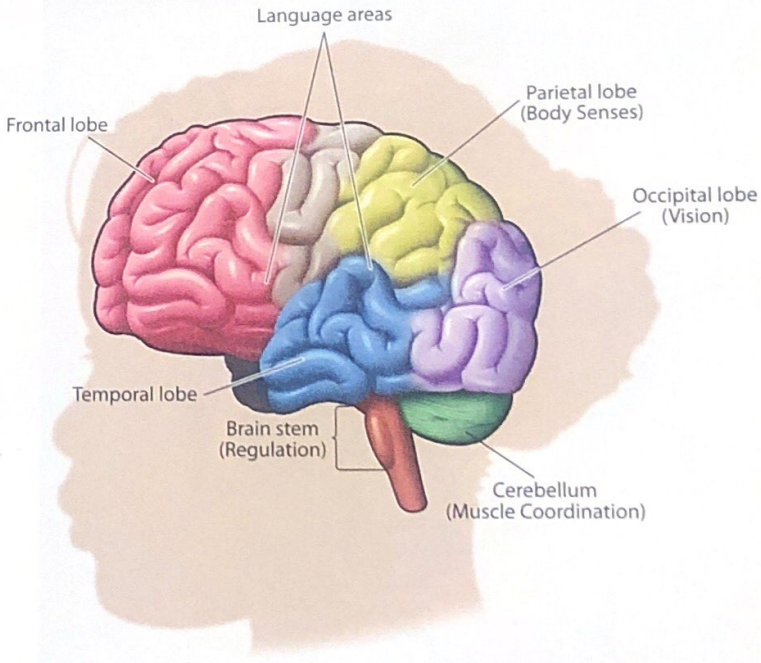
Scientists have reexamined their ideas about babies' brains. Rather than an empty vessel waiting to be filled, the baby's brain is actually more active than an adult's brain, taking in large amounts of information in short periods of time. What once had been viewed as a deficit, such as infants' undeveloped language ability or short attention span, is now considered essential to the learning process (Lehrer, 2009). Nature has taken amazing steps to ensure that a baby will be able to adapt to its challenging environment, and daily discoveries about the structure of the brain inform decisions that impact human development. Figure 5.3 illustrates the various areas of the brain.

Because babies aren't able to tell us what they're thinking or feeling, and we all experience the phenomenon called **infantile amnesia**—the inability to remember events from early in life—brain researchers rely heavily on tests that provide results they can then compare to results from an adult brain. Any conclusions that researchers make about infant brains are therefore speculative, and supported with stronger or weaker data from various techniques:

- *Electroencephalogram*. Electrodes are placed on the scalp to (1) measure neuron/nerve activity that registers as electrical signals and (2) identify different behavioral states, such as deep sleep.
- *Computed tomography (CT)*. An advanced version of X-ray techniques, the commonly used CT scan presents three-dimensional pictures of the brain.

FIGURE 5.3

The Human Brain



- *Positron emission tomography (PET).* PET scans measure the amount of blood flow associated with brain activity. Tiny radioactive elements (about the same amount of radioactivity you would receive from a chest X-ray) are injected into the bloodstream and become tracers that the PET scan can detect.
- *Magnetic resonance imaging (MRI).* The popular MRI depends on the magnetic quality of blood to measure internal structures.

EEGs are most often used with infants, because radiation poses a risk to their health and they won't stay still for an MRI. Findings from EEGs have noted bursts of activity that may correspond to bursts in cognitive and language development, and they have also been used as predictors of behavior problems in toddlers.

neurons Nerve cells that transmit information with electrochemical signals.

axons Branchlike ends of neurons that send electrochemical signals between cells.

dendrites Branchlike ends of neurons that receive and conduct the electrochemical signals between the cells.

synapse A small gap between neurons.

myelin Sheath of insulation around axons that facilitates communication between neurons.

During infancy, the baby's brain is about one fourth of its adult weight and contains billions of nerve cells, called **neurons.** Neurons transmit information by electrochemical signals, and at this age connections between neurons increase to as many as 100 to 1,000 connections for each of the billions of neurons. The brain grows from ½ pound at birth to about 1½ pounds at the end of the first year. By age 5, the brain weighs about 3 pounds and is adult size (Eliot, 2000). Because infants' neck muscles are not well developed and provide little support for their heads, any violent movement thrusts the brain back and forth in the skull and puts infants at risk for brain trauma. In the injury known as *shaken baby syndrome*, frustrated caregivers shake babies so hard that brain damage occurs, resulting in a baby's loss of control over such vital functions as heart rate, respiration, blood pressure, and temperature. The National Center on Shaken Baby Syndrome puts the number of SBS babies at about 1,300 per year.

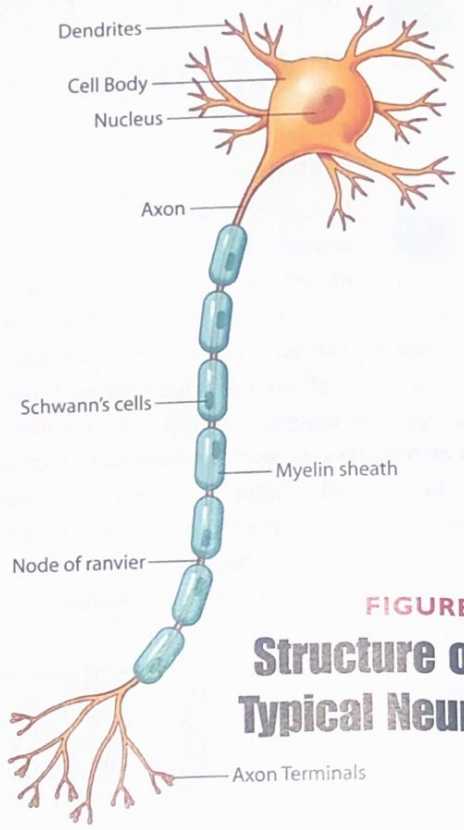


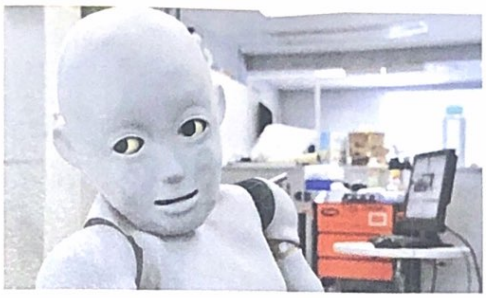
FIGURE 5.4
Structure of a Typical Neuron

Thanks to research, we know that infants shape their brains through their experience with the outside world. An infant translates information from the outside world into brain action in the following way:

- Electrical nerve impulses travel along **neurons** (see Figure 5.4), forming connections between **axons** and the **dendrites** of other neurons along their pathways. The axons send the signals from one neuron to another, and dendrites catch and conduct the electrochemical signals between the cells.
- The small gaps between neurons are called **synapses.** Each synapse allows communication between neurons to occur.
- The process is made quicker because of a sheath (coating) on the axons called **myelin,** which is like insulation around the axon that is critical for brain function. Myelination, the formation of a myelin sheath around axons, is rapid during the first 2 years of life and allows for quicker communication among axons by improving the efficiency of the signal transmission.

As infants process information from stimuli, the brain works to form connections that shape learning and develop-

Creeping and Crawling, or Just Plain Creepy?



An example of startling new breakthroughs in the applications of brain research is the work of Japanese scientists who have designed a robot that mimics infants' learning. Called the CB2, this robot is designed to develop abilities in the same manner that a human infant would, including cognitive and physical development. The research team, led by Minoru Asada and based at Osaka University, consists of engineers, brain specialists, psychologists, and experts in other fields.

CB2 can "breathe" with rhythmic movements, record images with internal processors and lump input into categories that relate to emotional states, such as happy or sad, and can recognize human touch with sensors under its "skin." The robot can even pair emotional expressions with physical movements or sensations.

The benefits of developing a "robo species" range from the altruistic (providing companions to the elderly) to the practical (a robot secretary) to sheer entertainment (creating a football team to win the World Cup Championship by 2050). While skeptics argue that a robot can never have the same emotional capacity of humans, Japanese cultural beliefs in *animism* (the belief that things in nature have souls or consciousness) may contribute to wider acceptance of a robo species.

Do you think it's possible for **artificial intelligence** (human intelligence simulated by machines) to replicate or replace human capabilities? What boundaries, if any, should be placed on such research? Do you think funding could be better aimed at human conditions—why or why not?

ment. The brain cells that receive new or familiar information survive; those that don't, die. It's as simple as that. Activity is critical to sustaining brain function in an infant's environment.

Environmental stimulation—teachers, parents, and other people and events—affect all parts of the brain. The infant's brain awaits sensory stimulation and experiences that will guide brain development. As the brain is stimulated, neurons continue to form connections, resulting in an increase in synapses. More synapses, in turn, increases communication systems in the brain that foster development of more complex skills. Neurons that are not stimulated lose their synapses in a pruning process, thereby allowing those neurons to be utilized in other synaptic connections. The warmer and more supportive the baby's environment is, the more connections in the brain the baby makes relating to emotions and relationships. The role of environment on physical and cognitive brain growth underscores the biopsychosocial model of development and implications for life experiences.

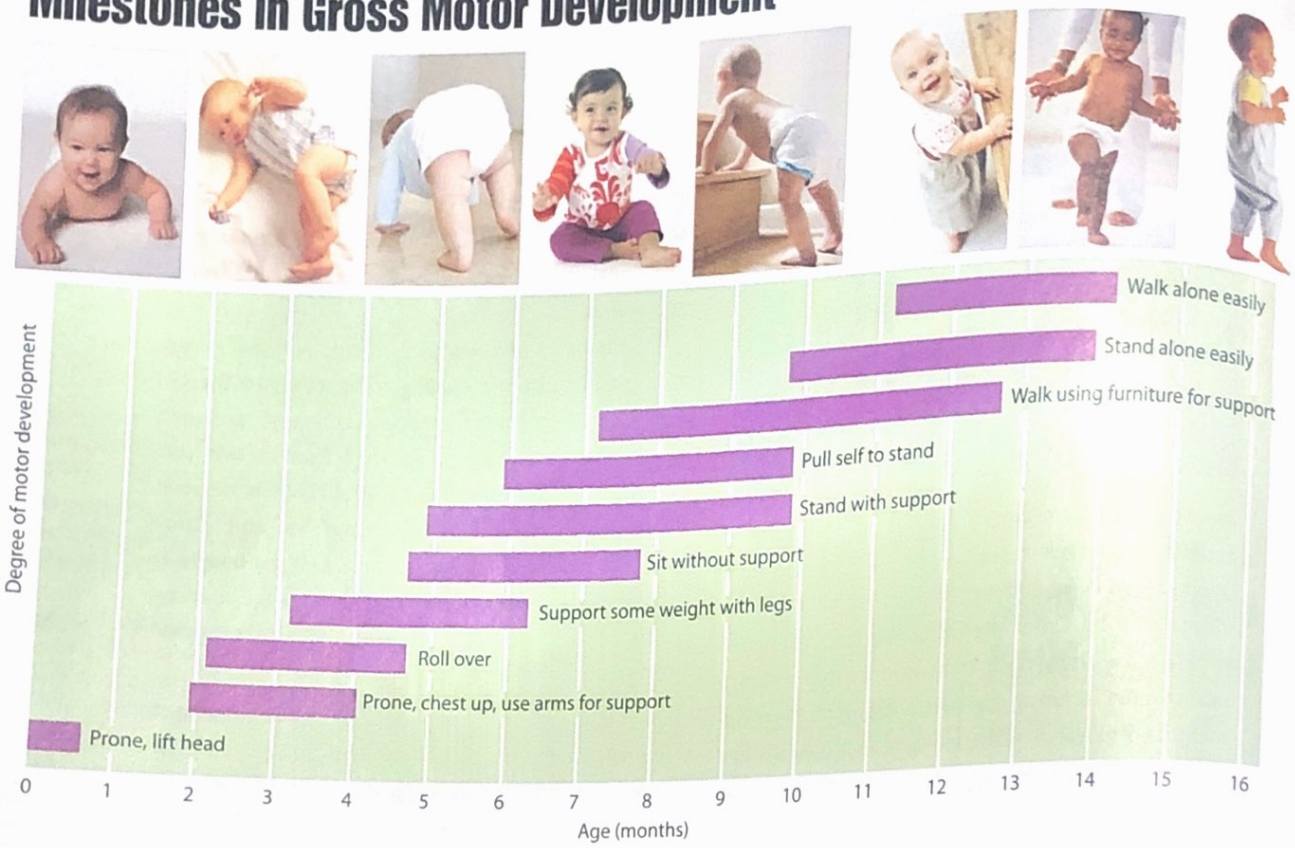
MOTOR DEVELOPMENT

Parents are fascinated by their child's motor development: Is he holding up his head? Shouldn't she be crawling by now? When will he walk? Motor development occurs in two directions—from head to feet (cephalocaudal) and from the center of the body to the arms and legs (proximodistal). In the early years, most growth occurs from the head to feet, with brain development leading the way. For example, a baby can see things and communicate about them before he can grab them or crawl to them. Likewise, a baby can control her midsection and core muscles enough to sit up before she can control her fingers. Although there is a typical

artificial intelligence
Human intelligence simulated by machines; a specific field of computer science.

FIGURE 5.5

Milestones in Gross Motor Development



progression, as shown in Figure 5.5, there is always variation among individual babies.

Important characteristics of motor control include head and body movement.

Head Control

A baby's most obvious initial head movements are from side to side, although a 1-month-old infant can occasionally lift his head when lying face down. Four-month-old infants can hold their heads steady while sitting and will lift their head and shoulders to a 90-degree angle when on their stomachs. By the age of 6 months, most babies can balance their heads quite well.

creeping Movement whereby the infant's abdomen touches the floor and the weight of the head and shoulders rests on the elbows.

crawling Movement on hands and knees; the trunk does not touch the ground.

Creeping and Crawling

Creeping and crawling are two distinct developmental phases. In **creeping,** the infant's abdomen touches the floor, and the elbows support the weight of the head and shoulders. Movement occurs mainly by arm action. The legs usually drag, although some youngsters push with their legs. Most youngsters can creep after age 7 months. **Crawling** is more advanced than creeping, because movement is on hands and knees and the middle of the body does not touch the ground. After age 9 months, most youngsters can crawl.

The typical progression is from movement on the abdomen to quick movements on hands and knees, but the sequence varies. Babies display an amusing array of positions and movements that can only be loosely grouped together.

Standing and Walking

After about age 7 to 9 months, babies, when held, support most of their weight on their legs. Coordination of arm and leg movements enables babies to pull themselves up and gain control of leg movements. First steps are clumsy waddles, with each step down heavy and deliberate. Gradually a smooth, confident step emerges. The world now belongs to the infant.

Once babies begin to walk, their attention darts from one thing to another, thus sharpening their perception. Tremendous energy and mobility, coupled with innate curiosity, drive infants to explore their world. It is an exciting time, but a watchful time for caregivers, who must draw the line between encouraging curiosity and initiative, and protecting the child from injury. The task is not easy. It is, however, a tension found in all stages of development between giving reasonable freedom and showing unreasonable restraint. All infants experience bumps and bruises, but some infants enter the world with specific challenges.

Neonatal Problems

Occasionally the typical developmental sequence does not progress smoothly. The most common newborn problems include failure to thrive, sudden infant death syndrome, sleeping disorders, and respiratory distress syndrome.

FAILURE TO THRIVE

Failure to thrive (FTT) is a condition that occurs when an infant does not grow at the expected rate. The weight and height of failure-to-thrive infants is consistently far below average. Such infants are estimated to be in the bottom 3% of height and weight measures.

There are two types of FTT: organic and nonorganic. Organic FTT accounts for 30% of FTT cases, and the problem is usually some gastrointestinal disease and occasionally a problem with the nervous system. Nonorganic FTT, much more difficult to diagnose and treat, lacks a physical cause. Researchers have identified environmental causes such as poverty, neglect, abuse, and ignorance of good parenting practices (Block et al., 2005). The seriousness of this problem is evident from the outlook for FTT infants: Almost half of these infants continue to experience physical, cognitive, and behavioral problems for several years. A follow-up study of FTT children at age 8 (Black et al., 2007) indicated that FTT negatively affected height, math performance, and study habits.

SUDDEN INFANT DEATH SYNDROME (SIDS)

One of the most devastating and perplexing problems facing parents and researchers is **sudden infant death syndrome (SIDS),** a condition in which an infant dies suddenly, usually during the night, without an apparent cause. An estimated 2,500 infants from 2 to 4 months old die each year from SIDS, and it is the primary cause of death for infants under 1 year in industrialized nations. There is little warning, although many cases are preceded by mild cold symptoms and are later connected to early physical problems such as low birth weight, weak muscle tone, irregular heartbeat, and respiratory issues. Most cases usually occur in late winter or early spring (American SIDS Institute, 2009), which is likely linked to the fact that many infants who have died from SIDS are discovered wrapped in blankets and warm clothing.

failure to thrive (FTT) Medical term for infants whose weight gain and physical growth fall far below average during the first years of life.

sudden infant death syndrome (SIDS) Unexpected death of an apparently healthy infant, usually between 2 and 4 months of age.

REM (rapid eye-movement) sleep A period of deep sleep marked by eye movements; when vivid dreams occur.

Other theories about the cause of SIDS involve impaired brain functioning, which can result in infants being unable to change their positions or turn their heads if their breathing is hindered by clothing, bedding, or spit-up. Environmental factors, such as cigarette smoking and drug abuse during and after pregnancy, increase the risk of SIDS. It is particularly devastating for parents because of the lack of warning. You can imagine the effect this has on caregivers, particularly the feelings of guilt they have. Today, special services have been established to counsel grieving families.

Although no definite answers to the SIDS dilemma have yet been found, current research encourages caregivers to put babies to sleep on their backs rather than on their stomachs or sides and to eliminate soft bedding, which could interfere with babies' breathing. Campaigns have been established, urging caregivers to be mindful of their children's sleeping and breathing. These practices have contributed to a decrease in SIDS mortality (Malloy & Freeman, 2000).

People who say they
sleep like a **baby**
usually don't have one.

LEO J. BURKE

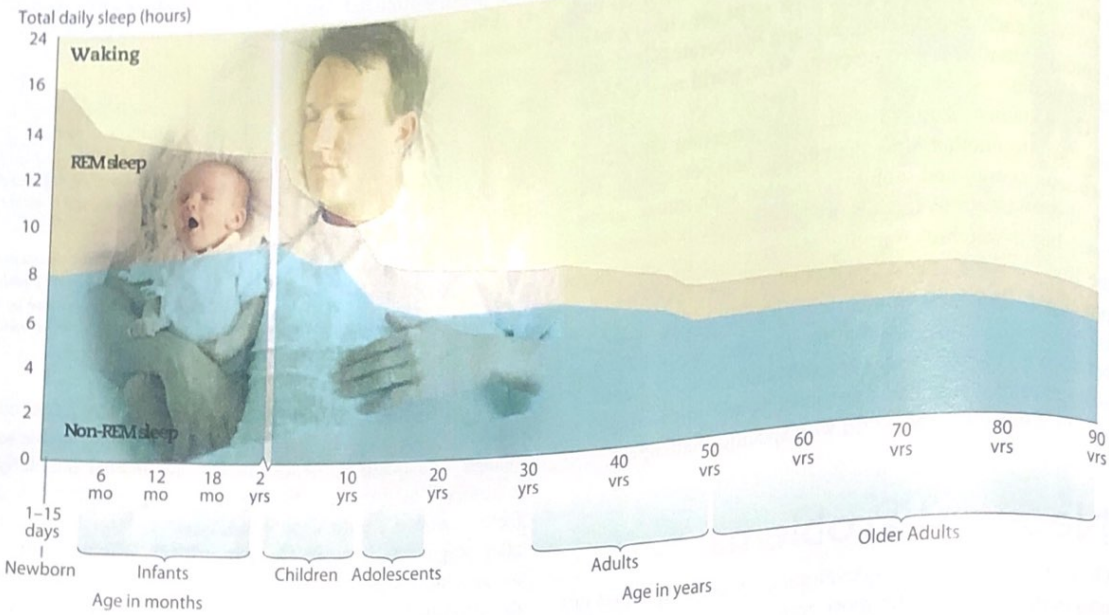
SLEEPING DISORDERS

Although less serious than FTT or SIDS, some infant sleeping problems negatively affect development. Sleep specialist Richard Ferber (2006) explains that parents often have a child between the ages of 5 months and 4 years who does not sleep readily at night and wakes repeatedly. Parents therefore become tired, frustrated, and angry and the relationship between parents becomes tense. Most often a sleeping disorder has nothing to do with parenting, and nothing is wrong with the child—physically or mentally. Yet some sleep problems do exist because of physical or psychological influences, such as a bladder infection or night terrors.

Most parents would agree that sleep becomes a precious commodity once babies arrive. Sleep patterns in infants

FIGURE 5.6

Sleep Patterns Across the Lifespan



respiratory distress syndrome (RDS) Problem common with premature babies; caused by lack of a substance that keeps air sacs in the lungs open.

perception The process of obtaining and interpreting information from stimuli.

range from about 16 to 17 hours in the first week to 13 hours at age 2, with most deep-sleep periods lasting about 20 minutes. **REM (rapid eye-movement) sleep** refers to a period of deep sleep marked by eye movements and is known to be the time when vivid dreams occur. Infants tend to spend 80% of sleep in REM sleep (compared to 20–25% in adults), and brain activity during REM sleep is similar to that when infants are awake. Perhaps the large amount of REM sleep provides infants with the extra stimulation they need to promote healthy brain development. As infants grow into toddlerhood and later childhood, the patterns of sleep change, as do patterns of brain development. Figure 5.6 shows sleep patterns from newborn to older adulthood.

Some adults choose to bring their babies into their own beds so that they can get some sleep and their children can also fall asleep feeling safe and loved in the parents' bed, but parents need to exercise caution when they take children into their own beds (called *shared sleeping* or *cosleeping*). Agreement between parents, safety considerations for the child, and a decision about when to stop cosleeping must be considered (Ferber, 2006).

RESPIRATORY DISTRESS SYNDROME

Although most common with premature infants, **respiratory distress syndrome** may strike full-term infants whose lungs are particularly immature. RDS is caused by the lack of a substance that keeps air sacs in the lungs open. When the air sacs close up, the lungs can collapse, causing severe breathing problems. Because most babies do not produce sufficient substance until the 35th prenatal week, it is a serious problem for premature infants. Full-term newborns whose mothers are diabetic and babies who have undergone a difficult birth also seem vulnerable to RDS. The good news is that today 90% of these youngsters survive, and early detection and treatment make their outlook excellent.

Perceptual Development

If you stop reading for a moment and look around, you'll see some things that you recognize immediately: this book, a lamp, shoes, paper, cell phone, and such. But you may also notice something that seems new or unfamiliar, such as a new student in class or a flyer announcing an upcoming concert. Our ability to recognize the familiar and to realize what we don't know depends on perception.

Perception is defined as the process of obtaining and interpreting information from stimuli. It is the key to our experiences in the world. It is also the basis for growth of thought, regulation of emotions, social interactions, and progress in almost all aspects of development.

Infants are quite clever at obtaining information from stimuli around them. During infancy the capacity to take in information through the major sensory channels, make sense of the environment, and assign meaning to information improves dramatically (Bornstein, 2002). In the first

perspectives on Diversity

A Global Look at the Rush to Toilet Train (or Not)

While sleep issues can drive caregivers crazy and create stress in the household, toilet training is another major source of stress for families. In the United States and most Western societies the "norm" for toilet training is to start training when a child is about 18 months old. This assumes that up until that age children aren't able to regulate their own body functions (bladder, anus) and control when and where they pee or poop.

Cultural belief systems influence the timing of toilet training. In traditionally Eastern countries such as China, toileting routines with infants are begun much earlier, even as early as 1 month old. Cultural practices typically emphasize interdependence between adult and infant, and an adult is readily available to hold an infant over the toilet. Open-crotch garments facilitate the process. Economic realities also play a role. In a small affluent family that can afford disposable diapers, the need to get children toilet trained is not urgent. A large family with less disposable income might be more motivated to get children toilet trained as early as possible.

Swedish children's characters, Kiss and Bajs (Pee and Poo).

Despite "expert" opinions on the benefits of toilet training at a certain age, families have been operating for thousands of years with varying toileting practices. Cultural and individual preferences, as well as health conditions, should be the primary considerations for when a baby is ready for the potty.

year of life, infants discern patterns, depth, orientation, location, movement, and color. During infancy, babies also discover what they can do with objects, which furthers their perceptual development.

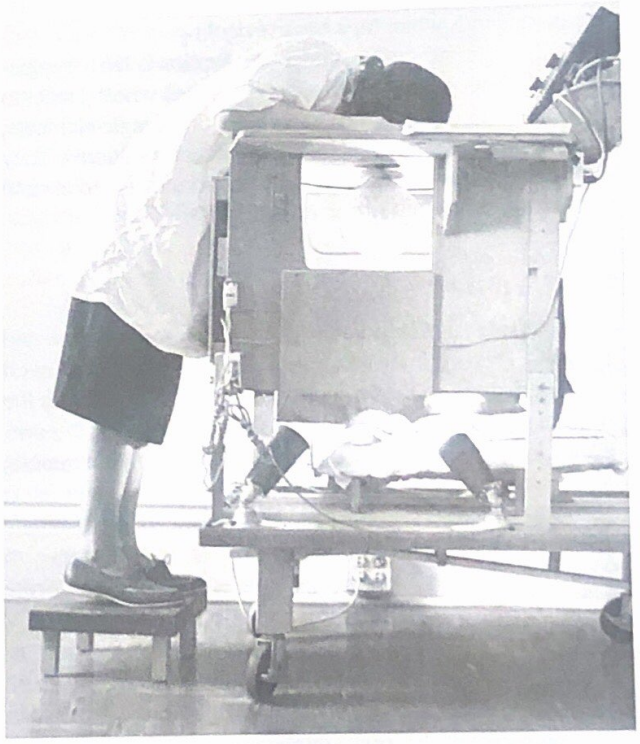
Infants are born ready to attend to changes in physical stimulation. Stimuli presented often cause **habituation,** a decrease in an infant's attention. If the stimuli are altered, the infant again pays attention, showing awareness of the difference. For example, if you show an infant an engaging picture, he or she is first fascinated, but then becomes bored; the infant has habituated. If you change the picture, you can regain the infant's attention.

Perception depends on both learning and maturation. An infant's perceptual system undergoes much development following birth, as she becomes familiar with objects and events in the world and continues to grow. Most research on infant perceptual development has emphasized vision and hearing because of their importance and rapid development.

VISUAL PERCEPTION

Infants are born able to see and quickly exhibit a preference for patterns. They tend to show definite preferences based on as much complexity as they can handle (Gibson & Pick, 2000). Robert Fantz's (1965) classic work on visual preferences revealed that children look at different things for different amounts of time. He designed a "looking chamber" so that an experimenter could see which of two images an infant looked at longer. The knowledge about babies' visual preferences is apparent today—a stroll through the newborn section of any toy store will lead you past many black, white, and red toys, and you'll also see many checkerboard, striped, and polka-dotted items. Human faces, which are remarkably complex, also capture babies' attention on mobiles and other items.

habituation A decrease in an infant's attention.



Fantz's "looking chamber"

The visual cliff

DEPTH PERCEPTION

The study of visual development sparks questions about how visual skills help infants to adjust to their environment. In their famous visual cliff experiment, Gibson and Walk (1960) reasoned that infants would use visual stimuli to gauge both depth and distance. The visual cliff consisted of a board dividing a large sheet of heavy glass. A checkerboard pattern was attached to one half of the bottom of the glass, giving the impression of solidity. The investigators then placed a similar sheet on the floor under the other half, creating a sense of depth—the visual cliff. Thirty-six infants from ages 6 to 14 months were tested. After each infant was placed on the center board, the mother called the child from the shallow side and then the cliff side. Twenty-seven of the youngsters moved onto the shallow side toward the mother. When called from the cliff side, only three infants ventured over the depth. The experiment suggests that infants discriminate depth when they begin crawling.

By 2 to 4 months of age, infant perception is fairly sophisticated. Infants perceive figures as organized wholes, react to the relationship among elements rather than single elements, perceive color, and are fascinated by complex patterns. They scan the environment, pick up information, then encode and process information (Gibson & Pick, 2000).

AUDITORY PERCEPTION

Infants display notable auditory abilities in the uterus and at birth. Hearing and auditory discrimination are well developed since sounds are carried to the fetus through the amniotic fluid as a series of vibrations. Infants display sensitivity to differences in the quality of sounds. For example, some babies may prefer music to other sounds, they can discriminate their mothers' voices from those of other women, and they can locate the direction of a sound.

egocentrism Piaget's term for the child's focus on self in early phases of cognitive development.

sensorimotor period The first 2 years of life.

circular reactions Piaget's term for infants' motor activity that is repeated in developing stages.

Infants pay special attention to speechlike sounds (Siegler & Alibali, 2005). Although significant in itself, this perceptual sensitivity underscores the importance of auditory perception in language development. For example, infants begin to differentiate the sounds of their language and tune in to the speech they hear around them (Bjorklund, 2005). It's as if nature has determined that infants must immediately attend to important information in their aural environment.

Cognitive Development

The biological basis of cognition plays a role in human behavior, such as genetic influences on behavior, the role of the brain in processing music, and biological insights into language development. The study of cognitive development must therefore examine both the brain's role and the sociocultural basis of cognitive development (Bjorklund, 2005).

PIAGET'S SENSORIMOTOR PERIOD

As you will recall from Chapter 2, the work of Jean Piaget embodies the interaction between biological, psychological, and social factors. Did you ever wonder what infants are thinking? How their interactions with their environment shape their thinking, which, in turn, shapes the structure of the brain? These are questions that Piaget addressed, and his research made a lasting impression on studies of cognitive development.

Piaget believed that the first few years of life are marked by extraordinary mental growth and influence the entire course of development. It is through the senses that an infant begins to make sense of the world. Initially, everything centers on them, and they see the world only from their point of view. **Egocentrism** describes this initial relationship of children to their world. Unlike an egocentric adult who knows that other viewpoints exist, but disregards them, the egocentric child is simply unaware of any other viewpoint.

The remarkable changes of the **sensorimotor period** (about the first 2 years of life) occur within a sequence of six stages that involve **circular reactions.** An infant experiences something through her own motor activity, even by pure chance, and tries to repeat the experience. Finally, she adds the action to a growing body of knowledge about the world and the way things work.

Stage 1

During the first stage, simple reflexes, children do little more than exercise their inborn reflexes. For example, Piaget (1952b) stated that the sucking reflex is hereditary and functions from birth. At first, infants suck anything that touches their lips, then they suck when nothing touches their lips, and then they actively search for the nipple. This involves steady development of the coordination of the eye, mouth, arm, and hand. Through these activities, patterns form in the brain—physically through neuron connections and emotionally through memory and learning—that build a foundation for forming cognitive structures.

Stage 2

Piaget referred to stage 2 (from about 1 to 4 months) as the stage of **primary circular reactions.** During stage 2, first

habits emerge as infants tend to repeat actions involving their bodies, even if the actions are accidental. For example, they have learned that they are fed when hungry, and they have mastered the sucking reflex so that it can now be done voluntarily, even when nothing is present. Infants seem to have no external goals behind these actions other than the pleasure of self-exploration, but they are learning something about their own bodies.

Stage 3

Secondary circular reactions emerge during the third stage, which extends from about 4 to 8 months. During this stage, infants direct their activities toward objects and events outside themselves. For example, a baby may accidentally swat a mobile with one hand while squirming in the crib, and the mobile makes a jingling sound and moves. The infant will try again to swat the mobile. Secondary circular reactions produce results in the environment, and not, as with the primary circular reactions, on the child's own body.

Stage 4

From about 8 to 12 months of age, infants engage in **coordination of secondary schemes** to form new kinds of behavior (Piaget & Inhelder, 1969). The baby first decides on a goal, such as finding an object that is hidden under a small blanket. Then the infant attempts to move the blanket to reach the object. In stage 4, the infant coordinates previously learned actions to carry out the desired goal. Infants use multiple senses in the process of coordinating their actions and learning about materials. They often look at and feel items, or shake and listen to items. Here we see the first signs of intentional behavior.

Stage 5

Tertiary circular reactions appear from 12 to 18 months of age. In the tertiary circular reaction, repetition occurs again, but now with variation. The infant is exploring the world's possibilities. Piaget thought that the infant purposefully attempts to provoke new results instead of merely reproducing activities. Tertiary circular reactions indicate experimentation and an interest in novelty for its own sake.

Have you ever seen a baby standing in a crib, dropping everything on the floor? Through Piaget's lens you could watch how the baby drops things, from different locations and different heights. Does it sound the same when it hits the floor as when it hits the rug? Is it as loud dropped from here or higher? Each repetition is actually a chance to learn.

Stage 6

During stage 6 (between 18 and 24 months), the last stage of the sensorimotor period, children develop a basic kind of **internalization of schemes.** They begin to use symbols (internalized representation of an event) to think about real events without actually experiencing them. For example, a budding toddler has seen her father using a leaf blower outside their house many times. She picks up a discarded paper-towel tube and moves her arm in a side-to-side motion, making a "Brrrrrrrr . . ." sound, mimicking the sound of the leaf blower.

Progress through the sensorimotor period leads to four major accomplishments:

- **Object permanence:** Children realize that objects continue to exist even when out of sight. Out of sight does not mean not gone forever. This is significant because it signals that babies have a sense that objects are separate from them.
- Sense of space: Children realize objects in the environment have a spatial relationship.
- Causality: Children realize the relationship between actions and their consequences.
- Time sequences: Children realize that one thing comes after another.

By the end of the sensorimotor period, children move from purely sensory and motor functioning to symbolic kinds of activity, in which the child takes a real-life event and recreates it according to her own ideas. This is seen as children develop their make-believe play and represent happenings from their own world in play settings.

EVALUATION OF PIAGET

Although Piaget left a major legacy, his ideas have not gone unchallenged. Piaget proposed a theory of development as a sequence of distinct stages, each of which entails important changes in the way a child thinks, feels, and behaves. However, acquiring cognitive structures may be gradual rather than abrupt and may not be a matter of all or nothing. For some theorists, a child's level of cognitive development depends more on the nature of the task than on a rigid classification system.

In one of the first important challenges to Piaget, Gelman and Baillargeon (1983) found that children can accomplish specific tasks at earlier ages than Piaget believed. Criticism that Piaget underestimated infants' abilities has led to a closer examination of the times during which children acquire certain cognitive abilities. For example, Piaget believed that infants will retrieve an object that is hidden from them (in stage 4) beginning at about 8 to 12 months. Before this age, if a blanket is thrown over a toy the infant is looking at, the child stops reaching for it as if it doesn't exist. More recent research has argued that infants can see objects as separate from themselves as early as age 3 to 4 months.

primary circular reactions Infants' actions that are focused on their own bodies and reflexes.

secondary circular reactions Piaget's term for infants' activities that are directed toward objects and events outside themselves.

coordination of secondary schemes Piaget's term for when infants combine secondary schemes to obtain a goal.

tertiary circular reaction Piaget's term for repetition with variation; the infant is exploring the world's possibilities.

internalization of schemes Children's use of symbols to think about real events without actually experiencing them.

object permanence Refers to children gradually realizing that there are permanent objects around them, even when these objects are out of sight.

INFORMATION PROCESSING IN INFANCY

Information-processing theorists propose that cognitive development occurs through the gradual refining of such cognitive processes as attention and memory. Information processing theorists share three assumptions (Munakata, 2006):

- The first assumption relates to limited capacity—we can process only so much information at any one time.
- The second assumption refers to the belief that all thinking is information processing—making sense of external stimuli. The major focus of these theories is on such functions as attention and memory, not on stages of development.
- The third assumption is that most children devise a wide variety of thinking strategies and select what they think is the most appropriate strategy. Strategies that produce successful solutions increase in frequency, whereas those that do not decrease in frequency.

The sequence of information processing is shown in Figure 5.7.

Infants and Attention

Attention strategies enable children to decide what is important, what is needed, or what is dangerous. They also help infants gradually ignore everything else. Infants attend to different stimuli for a variety of reasons: intensity, complexity of the stimuli, visual ability, and novelty. They enjoy human faces, voices, and movements.

The brain is the biological basis of attention, and when infants attend to something, a series of brain activities is activated. For example, auditory receptors pick up the sound of the mother's voice, and a structure in the brain stem brings the baby to a higher state of alertness. An inner-brain system now swings into action, which involves memory and emotion. Finally, cortical areas interpret what was said and how it was said. Was it directed at something? Was it soothing? Was it pleasant?

In terms of psychology, the following describes what attention means for the developing infant:

- *Their attention is selective*—infants can't attend to everything.
- *Their attention involves cognitive processing*—infants don't just passively accept stimuli, they actively process incoming information.
- *Their attention is limited*—infants can attend only to a limited number of things at the same time.

Adults must assume some responsibility for monitoring the sights and sounds that their infants experience to shield them from overly intense stimulation. Many caregivers intuitively read their babies' signals and react appropriately, which reflects sensitive responsiveness to a child's needs.

Infants and Memory

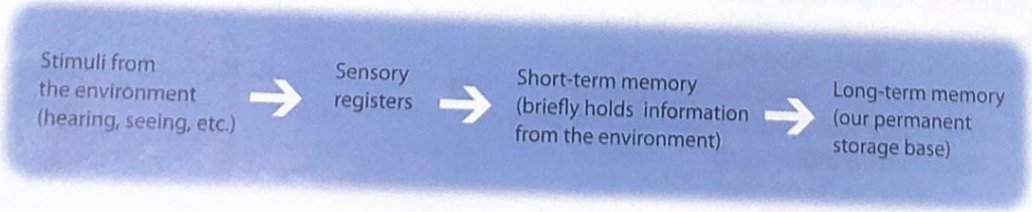
Four important discoveries should frame your thinking about infant memory:

1. The brain as a whole is involved in memory; memories don't reside in one particular location.
2. Memories are retrieved in the same manner as they were formed.
3. Memories are stored in the brain's synapses, which are the connections between neurons.
4. These synaptic connections can be strengthened through use, and learning can form new synaptic processes.

Obviously, infants must have some ability to remember, or they could never learn about their world. They love to repeat actions that bring them pleasure. Infants demonstrate one type of memory (habituation) after the first few months following birth. By the end of the second year, an infant's memory more closely resembles that of older children, and they can recall sounds that, when strung together, elicit responses from others and a mutual understanding based on a shared language.

FIGURE 5.7

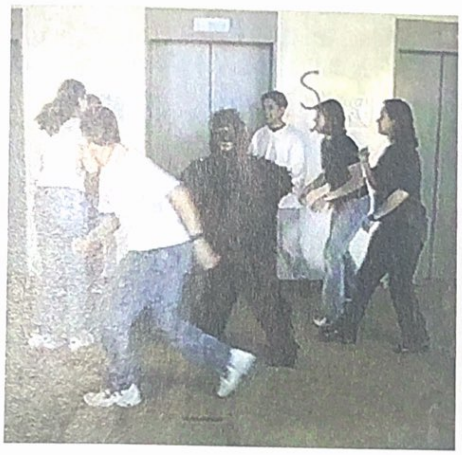
Information-Processing Model



TECH TRENDS

What Gorilla?

In an experiment on visual cognition, participants were asked to watch a video of people passing a ball to each other. The instructions directed people to count the number of times the people wearing white shirts passed the ball to each other in the video clip. At one point in the video, a person in a gorilla suit strolls right through the action. Yet, after viewing the video, when participants were asked about the gorilla, a remarkable number of people didn't remember seeing the gorilla at all!



This failure to notice the gorilla relates to the roles of attention and memory in our developing cognition. Most babies would notice the gorilla right away but would not succeed at counting the number of basketball tosses. (Not to mention the fact that babies can't count to 14!) Babies have many more neurons than adults, but they are less efficient at using their knowledge to achieve a desired goal. As babies grow, the pruning process refines the number of neurons and overall brain activity.

Go to www.theinvisiblegorilla.com/gorilla_experiment.html to view the visual cognition video (Simons, 2007).

It's my **belief** *we developed language because of our deep inner need to* **complain.**

LILY TOMLIN

Language Development

One of the most amazing accomplishments in infancy is the beginning of speech. With no formal training—in fact, often exposed to dramatically faulty language models—children learn words and meanings, and how to combine them in a logical, purposeful manner. Because all children acquire their own language in a similar manner, it's important to consider this drive toward language.

Children in all parts of the world go through a process whereby they first emit sounds, then single words, two words, and then complex sentences (see Table 5.1). By the time they are about 5 years old, they have acquired the basics of their language—a huge accomplishment.

THE PACE OF LANGUAGE ACQUISITION

How does this uniquely human achievement occur? First, children learn the rules of their language, which they then apply in a wide variety of situations. Then, by the end of the second year, children learn to apply a label to an object without anyone telling them. Even when children don't understand a word, they acquire information about it from the surrounding context, a phenomenon called **fast mapping** (Bjorklund, 2005).

The process of acquiring language goes on at a fast pace until the fundamentals have been acquired, around age 5 for most children. By the time children enter elementary school, they are remarkably sophisticated language users. Then it becomes a matter of expanding and refining language skills, a task that can often define success or failure in a formal education setting.

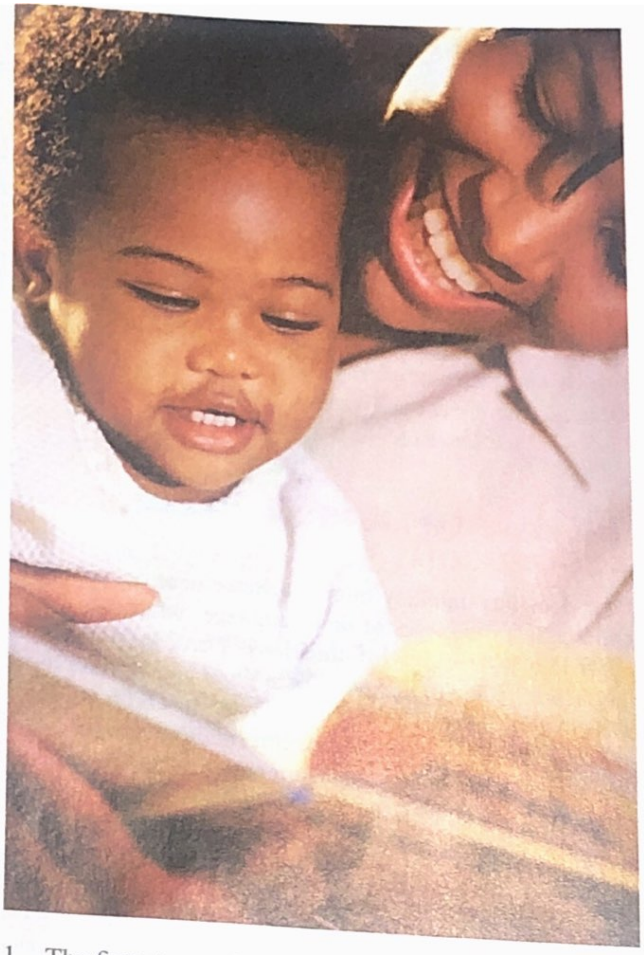
VYGOTSKY'S STAGES OF LANGUAGE DEVELOPMENT

Psychologist Lev Vygotsky emphasized the role of context in language development. He argued that language begins as preintellectual speech and develops into a sophisticated form of what he called *inner speech*. The use of speech propels cognitive development as we literally talk ourselves through a task. In *Thought and Language* (1962), Vygotsky clearly presented his views about the four stages of language development.

fast mapping Children's use of surrounding context to understand words' meaning.

TABLE 5.1
Language Development During Infancy

Language	Age
Crying	From birth
Cooing	2–5 months
Babbling	5–7 months
Single words	12 months
Two words	18 months
Phrases	2 years



1. The first stage, which he called **preintellectual speech,** refers to such early processes as crying, cooing, babbling, and bodily movements that gradually develop into sophisticated forms of speech and behavior. Although human beings have an inborn ability to develop language, they must then interact with the environment if language development is to fulfill its potential.
2. Vygotsky referred to the second stage of language development as **naive psychology,** in which children explore the concrete objects in their world. At this stage, children begin to label the objects around them and acquire the grammar of their speech.
3. At about 3 years of age, **egocentric speech** emerges, that form of speech in which children carry on lively conversations, whether or not anyone is present or listening to them.
4. Finally, speech turns inward (**inner speech**) and serves an important function in guiding and planning behavior. Inner speech often accompanies physical movements, guiding behavior. What begins as talking aloud to herself, eventually turns inward. For difficult tasks, inner speech is used to plan as well as guide behavior. For example, a child working on a jigsaw puzzle might remind herself to look for the flat-edged pieces so that she can form the border to frame the puzzle.

In many cases, children who aren't permitted these vocalizations struggle to accomplish a task. In fact, the more complex the task, the greater is the need for egocentric and inner speech.

Career Apps

As a speech therapist, how could you help families recognize children's early sounds as serious attempts at communication?

KEY MILESTONES OF LANGUAGE DEVELOPMENT

During the first 2 months, babies develop sounds associated with breathing, feeding, and crying. **Cooing** (gurgling, vowel-like) appears during the second month. Between 5 and 7 months, babies play with the sounds they can make, and this output begins to take on the sounds of consonants and syllables, the beginning of **babbling.** Babbling probably appears initially because of biological maturation. At 7 and 8 months, sounds like syllables appear—da-da-da, ba-ba-ba, a pattern that continues for the remainder of the first year (Pinker, 1994). This is a phenomenon that occurs in all languages.

First Words

Around their first birthday, babies produce single words, about half of which are for objects (food, clothing, toys). Throughout the world, children's first words express similar meanings. These words refer to people, animals, toys, vehicles, and other objects that fascinate children. Children quickly learn the sounds of their language (**phonology**), the meanings of words (**semantics**), how to construct sentences (**syntax**), and how to communicate (**pragmatics**).

At 18 months, children acquire words at the rate of 40 per week (Woodward & Markman, 1998). This rapid increase in vocabulary lasts until about 3 years of age and is frequently referred to as the **word spurt.** Vocabulary constantly expands, but estimating the extent of a child's vocabulary is difficult because youngsters know more words than they articulate. Estimates are that a 1-year-old child may use from two to six words, and a 2-year-old has a vocabulary ranging from 50 to 250 words. Children at this stage also begin to combine two words (Pinker, 1994). By first grade, children may understand 10,000 words, and by fifth grade they understand about 40,000 words (Woodward & Markman, 1998). These first words, or **holophrases,** are usually nouns, adjectives, or self-inventive words and often contain multiple meanings. The single word "ball" may mean not only the ball itself but also "Throw the ball to me."

Two-Word Sentences

At about 18 to 24 months of age, children's vocabularies begin to expand rapidly, and a form of communication

TECH TRENDS

Sound Design

For the Disney movie *WALL-E*, sound designer Ben Burtt used sounds from real-life things to create the language for the machines featured in the film. By putting pieces of sounds together to form new sounds, he and his design team re-created the process that infants use to make language. The team recorded thousands of sounds—motors, generators, and even an old crank from a 1930s bi-plane. Burtt said the technique goes back to the early days of Disney cartoons, when wind machines and blowing machines were used to make sounds that are recognizable to the human ear, but in a different context the sounds take on a new life and a new meaning.

Some examples from the film are the sounds WALL-E makes when he is surprised by something: his eyebrows make the sounds of a Nikon camera shutter and his arms are the sound of a motor on a tank.

called **telegraphic speech** appears. Telegraphic speech consists of simple two-word sentences without conjunctions, articles, and (often) verbs. For example, the phrase "Mommy milk" might stand for "Mommy, I would like to have a glass of milk."

When the two-word stage appears (any time from 18 to 24 months), children initially struggle to convey tense (past and present) and number (singular and plural). They also experience difficulty with grammar. Children usually employ word order ("me go") for meaning, only gradually mastering inflection (how language handles plurals, tenses, possessives, gender, and so on) as they begin to form three-word sentences. They use nouns and verbs initially ("doggie sleep," "mama kiss"), and their sentences demonstrate grammatical structure like that of adults.

Children begin to use multiple words to refer to the things that they previously named with single words. Rather than learning rules of word combination to express new ideas, children learn to use new word forms. Combining words in phrases and sentences suggests that children are learning the structure of their language.

Word order and inflection become increasingly important. During the first stages of language acquisition, word order is paramount. At first, children combine words without concern for inflections, and word order provides clues as to their level of syntactic (grammatical) development. Once two-word sentences are used, inflection soon appears, usually with three-word sentences ("Where *ball* go?"). The appearance of inflections seems to follow a pattern: first the plural of nouns, then tense and person of verbs, and then possessives.

The biopsychosocial model of development is evident as various phases of development converge in a child's use of language (see Table 5.2). Motor development is visible when a child runs excitedly toward her mother. Language development is visible when the child lifts her arms upon reaching her mother, saying, "Mommy, UP!" Cognitive development is visible in terms of the attachment the child displays to her mother. The integration of these developmental forces is linked to social and emotional factors that shape the infant's life.

preintellectual speech Vygotsky's category for cooing, crying, babbling, and bodily movements that develop into more sophisticated forms of speech.

naive psychology Vygotsky's stage in which children explore objects and label objects as they acquire the grammar of their speech.

egocentric speech The form of speech in which children carry on lively conversations with themselves or others.

inner speech Internal speech that often accompanies physical movements, guiding behavior.

cooing Early language sounds that resemble vowels.

babbling Infants' production of sounds approximating speech between 5 and 7 months.

phonology Sounds of a language.

semantics Meaning of words and sentences.

syntax The way in which words are put together to construct sentences.

pragmatics Ability to communicate with others.

word spurt Rapid increase of vocabulary from 18 months to 3 years.

holophrases One word that can communicate many meanings and ideas.

telegraphic speech Initial multiple-word utterances, usually two or three words.

Social and Emotional Development

Think back to the example of Laura at the beginning of this chapter and the importance of relationships in a child's development. Relationships can be considered as patterns of interactions between people over time. A baby's relationships involve many aspects of development, such as playing (physical and social), talking and communicating (language), understanding self and others (cognitive), and attachment (emotional). In other words, a relationship is a good example of the importance of biopsychosocial interactions.

TABLE 5.2

Developmental Characteristics of Infancy

Age (months)	Height (inches)	Weight (pounds)	Language Development	Motor Development	Cognitive (Piaget)
3	24	13–14	Cooing	Supports head in prone position	Primary circular reactions
6	26	17–18	Babbling: single syllable sounds	Sits erect when supported	Secondary circular reactions
9	26	20–22	Repetition of sounds signals emotions	Stands with support	Coordination of secondary schemes
12	29.5	22–24	Single words: mama, dada	Walks when held by hand	Same
18	32	25–26	3–50 words	Grasps objects accurately, walks steadily	Tertiary circular reaction
24	34	27–29	50–250 words, 2–3-word sentences	Walks and runs up and down stairs	Representation

FIGURE 5.8

The Brain and Language

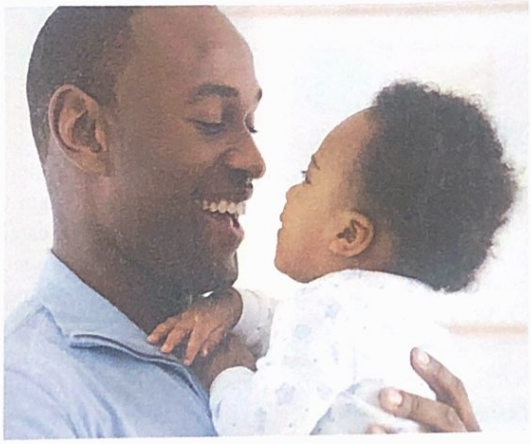
their individual temperaments. The interactions occurring among family members—parent–parent, parent–siblings, sibling–sibling—produce a ripple effect that colors the parent–child relationship. Thus, the nature of the relationships between parents and their children emerges from the temperament and characteristics of each and from the interactions that occur among them (Rubin, Bukowski, &

Nature or Nurture?

There has been ongoing debate about whether language is a biological, innate ability that all humans possess or learned through interactions in the environment. Noam Chomsky (1957) argued that humans are born prewired with the ability to acquire the rules of language, detect and re-create sounds, and receive and express meaning. He called this inborn ability a *language acquisition device (LAD),* and while not situated in a specific region of the brain (such as Broca's area, involved in producing words, or Wernicke's area, involved in comprehension), there is evidence that people in all different parts of the world develop language in the same sequence.

Behaviorists believe that environment and reinforcement are at the heart of language development. They believe that infants exposed to a certain language acquire the language based on the responses that caregivers give them. Currently, people who argue for the influence of environment on language development find that context plays a large role. For instance, a child who grows up exposed to many books and printed materials will be more likely to acquire language skills than a child who does not grow up in a print-rich environment.

Do you think biology or environment plays a bigger role in language development? What examples can you think of to support your argument? What implications does this have on children's early education?



An infant's staring, cooing, smiling, and kicking can all be used to maintain interactions. Early interactions establish the nature of the relationship between parent and child, giving it a particular tone or style.

Parents bring some preconceived ideas about the role they should play in their relationships with their children. How they exercise their power and how their children react to their suggestions and encouragements, their demands and commands, ultimately determine the success of the relationship. In an ideal world, their ideas, expectations, and sense of their roles as parents should mesh perfectly with their child's personality and abilities.

ROLE OF EMOTIONS IN DEVELOPMENT

It's easy to see how a child's life is affected by the impact of attachment and early relationships. Healthy emotional development helps children to define their individuality. During infancy, emotions generate adaptive functions that help to define the meaning of a child's experiences. How can we define emotions? According to pediatrician, psychiatrist, and author Daniel Siegel, "Emotions represent dynamic processes created within the socially influenced, value-appraising processes of the brain" (p. 123). For example, infants' emotions motivate them to either approach or withdraw from situations and to either communicate or not communicate their needs to those around them. When others respond, infants learn about social exchanges, which furthers their social development. These emotional interchanges help to explain why emotions are often referred to as the language of infancy (Emde, 1998).

Appropriate emotions and behavior are heavily influenced by cultural values. For example, in a study of Asian and American children, Cole, Bruschi, and Tamang (2002) found notable differences in emotional expression. Children from the United States expressed their anger more openly than did the children from the other cultures. Asian children demonstrated that one can feel differently than one reveals.

When we think about various emotions, we must remember that *different* responses may be made to any *one* emotion. A smile, for example, may signal joy, nervousness, or some other emotion. Also, different theorists may suggest slightly different schedules for the appearance of

various emotions, but the basic explanation of *how* they develop is identical. Emotional development occurs as the result of an infant's dispositional tendencies combined with a complex interaction between growing cognitive skills and social interactions (see Table 5.3).

In the first year of life, infants gradually develop the ability to stop or reduce the duration and intensity of emotional reactions. Two processes seem to be involved—one related to the appearance of emotions and one involving the management of emotions. Any psychological explanation of child development must recognize the importance of emotions as motivators. Emotions can help infants analyze situations and prepare themselves to act.

ANALYZING EMOTIONAL EXPRESSIONS

One of the first signs of emotion is a baby's smile, which most parents immediately interpret as a sign of happiness. Yet newborns' smiles don't indicate pleasure in the sense that the smiles of older infants do. By the baby's third week, the human female voice elicits a brief, real smile, and by the sixth week the beginnings of the true social smile appear, especially in response to the human face.

Two-month-old infants are often described as "smilers," whereas frequent and socially significant smiles emerge around 3 months (Kagan & Fox, 2006). Babies smile instinctively at faces—real or drawn—and this probably

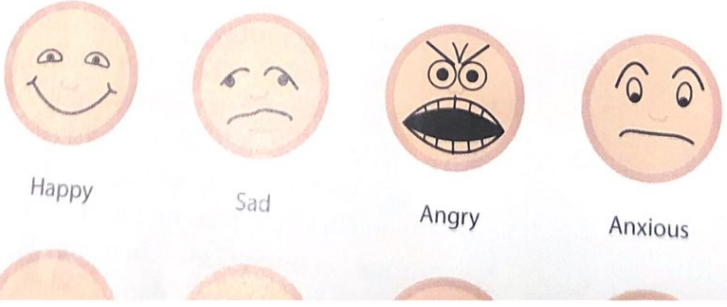


TABLE 5.3

Timetable of Emoti Development

Age	Emotion
Birth–3 months	Pleasure, distress, disgust
3–6 months	Delight, wariness, anger
6–9 months	Fear, anxiety, shyness, pleasure
9–12 months	Stranger anxiety, separation anxeity
12–18 months	Elation, security
18–24 months	Shame, defiance

reflects the human tendency to
gradually learn that familiar fac
and smiling becomes a key ele
reinforcement from those around

Finally, infants smile at any h
the human beings around them,
tionship between their behavior
world. When infants smile, they
around them and begin to asso
pleasure. Current research on er
forces the hi