

Physical Development during Early Childhood

CHAPTER

8



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Chapter Outline

PHYSICAL DEVELOPMENT
Influences on Normal
Physical Development
The Connection between
Health and Poverty
Bladder Control
Motor Skill Development
The Impact of Children's
Growth on Adults
From Preschooler to Child

Focusing Questions

- What pathway does physical growth normally take during early childhood?
- How is poverty related to children's health?
- When do children achieve bladder control?
- What motor skills do children acquire during the preschool years?
- How does children's growth affect parents and other adults?
- What are the special features and strengths of preschoolers' thinking?
- How does the language of preschool children differ from that of older children?
- What social and cultural factors account for variations in preschoolers' language and speech?
- What constitutes good early childhood education?

"Kitty run!" says Zöe, age three. She is pointing to the neighborhood cat.

"Yes," replies her father. "She's chasing a bird."

Zöe nods and says, "Bird gone now. Bad kitty?" and looks to her father for confirmation.

"It's OK this time," says her father. "The bird flew away soon enough."

At this, Zöe walks off to find the cat, curious to learn what else it might do.

Two features of this incident are especially noteworthy: Zöe’s language and her mobility. Little more than a year ago, neither could have occurred. As a preschooler, however, she is developing the ability to deal with her world in symbols, in this case through oral language. She is also developing new physical skills that serve her interests and abilities; for example, she can walk up to the cat simply to learn more about it.

In the next two chapters, we look in detail at physical and cognitive development during early childhood. Many of the examples will suggest relationships between the two domains, as well as their impact on the third domain of psychosocial development. The fact that preschoolers sleep less than they did as infants, for example, is the beginning of a lifelong trend that will affect both child and parents, creating new options for each. For the child, staying awake longer facilitates attending school; for parents, the child’s attending school makes adult-focused activities, such as a job or a hobby, easier to arrange than before their children began school. Parents who are ready for the growth and changes in their preschoolers but do not feel pressured to hurry those changes will likely influence their children’s development in many positive ways. The changes will also set the stage for even more indirect forms of parenting typical of later phases of childhood and adolescence, discussed in Chapters 13 and 16.

PHYSICAL DEVELOPMENT

Influences on Normal Physical Development

Physical growth during the preschool years is relatively easy to measure and gives a clear idea of how children normally develop during this period. Table 8.1 and Figure 8.1 show the two most familiar measurements of growth, standing height and weight. At age two, an average child in North America measures about thirty-three or thirty-four inches tall, or about two feet, ten inches. Three years later, at age five, he or she measures approximately forty-three inches, or about one-third more than before. The typical child weighs twenty-seven to twenty-eight pounds by age two but about forty-one pounds by age five. Meanwhile, other measurements change in less obvious ways. The child’s head grows about one inch in circumference during these years, and body fat decreases as a proportion of total bodily tissue.

For a preschool child who is reasonably healthy and happy, physical growth is remarkably smooth and predictable, especially compared to many cognitive and social developments. Overall, physical growth contains no discrete stages, plateaus, or qualitative changes such as those Piaget proposed for cognitive development. At the same time, however, important differences develop among individual children and among groups of children. Often the

TABLE 8.1 Average Height and Weight during Early Childhood

Age (Years)	Girls		Boys	
	Height (inches)	Weight (pounds)	Height (inches)	Weight (pounds)
2	33.5	26.5	34.1	28.6
3	37.0	30.9	37.4	31.7
4	39.8	35.0	40.2	35.3
5	42.3	39.7	42.9	40.8

Source: Centers for Disease Control and Prevention (2000).

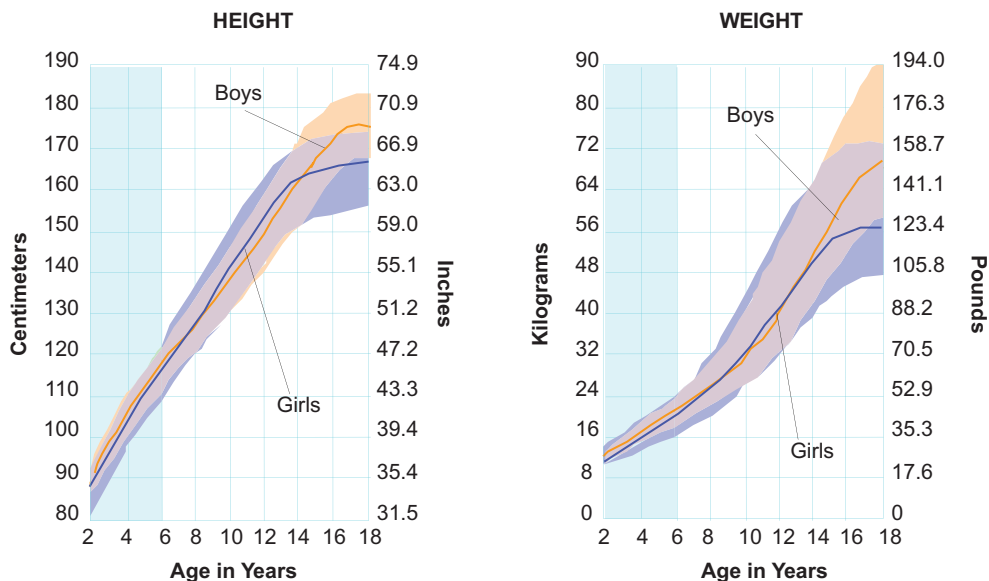


FIGURE 8.1
Growth in Height and Weight from Two to Eighteen Years

differences simply create interesting physical variety among children, but sometimes they do more than affect appearance. Being larger (or smaller) than usual, for example, can make a child stronger (or less strong) than others of the same age, and therefore more (or less) able to master certain sports or other physical activities. Size can also affect how parents and other adults respond to the child; larger children may seem older and be treated as such, whether or not they are psychologically ready. For both reasons, a child might gain (or lose) self-confidence, and even gain (or lose) popularity among peers.

The overall smoothness of growth means that childhood height and weight can predict adult height and weight to a significant extent, although not perfectly. A four-year-old who is above average in height tends to end up above average as an adult. Nevertheless, correlation between childhood height and adult height is imperfect because of individual differences in nutrition and health and, most of all, in the timing of puberty. In particular, children who experience puberty later than average tend to grow taller than children who experience it early (Sanfilippo et al., 1994; Yousefi et al., 2013)—a source of diversity that we will say more about in Chapter 13 in connection with adolescence and its impact.

Genetic Background

Most dimensions of growth are influenced substantially by heredity. Tall parents tend to have tall children, and short parents usually have short children. Weight shows similar patterns, although it can be influenced strongly by habits of exercise and diet.

Races and ethnic groups around the world also differ slightly in average growth patterns (Eveleth & Tanner, 1990), and general trends demonstrate that children born in countries with low to middle income are more likely to be low birth weight (5.5 pounds or less) and to exhibit slower growth throughout childhood (Adair et al., 2013). Children from Asian groups, such as Chinese and Japanese, tend to be shorter than European and North American children are. The latter, in turn, tend to be shorter than children from African societies are. Shape differs among these groups as well, although the differences do not always become obvious until adolescence. Asian children tend to develop short legs and arms relative to their torsos, and relatively broad hips. African children do just the opposite: they tend to develop relatively long limbs and narrow hips. Keep in mind, though, that these differences are only average tendencies. Racial and ethnic groups tend to overlap in size and shape more than they differ (that is what makes us all human!). From the point of view of parents, teachers, and other professionals, the most important physical differences among children are individual ones: there are large and small children in every racial and ethnic group, among both boys and girls, and in every community (Doherty, 1996). If you are responsible for children as individuals, recognizing their individual differences is likely to be your priority.



As a result of improvements in nutrition and health care, children in industrialized nations are often taller than in earlier times. But there are important variations among societies—even among industrialized ones—that apparently are influenced genetically.

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Nutritional Needs during the Preschool Years

For a time, a young preschooler (such as a three-year-old) may eat less than he or she did as a toddler and become much more selective about foods as well. Michael, the son of one of the authors, ate every meal voraciously as a two-year-old; a year later, he rarely finished a meal, even though he was significantly taller and heavier by then. Elizabeth, his sister, followed a similar but more pronounced pattern. As a toddler, she ate most foods except ice cream (“Too sweet,” she said!), but as a young preschooler, she sometimes hardly ate—though she did decide then that she liked ice cream. Later, their appetites returned. As a nineteen-year-old, Michael routinely ate about twice as much as other members of the family did. Elizabeth, at sixteen, was no longer a picky eater—and became especially enthusiastic about ice cream.

Parents may worry about such changes, but in fact, they are normal and result from the slowing down of growth after infancy. Preschool children simply do not need as many calories per unit of their body weight as they did immediately after birth. They do need variety in their foods, however, just as adults do, to ensure adequate overall nutrition. Given preschoolers’ newfound selectiveness about eating, providing the variety needed for good nutrition sometimes can be a challenge to parents and other caregivers.

How can one ensure healthy variety in a preschool child’s diet? Experts generally discourage coercion (“Eat your vegetables because I say so!”) because it teaches children to associate undesired foods with unpleasant social experiences (Endres & Rockwell, 1993; Ventura & Worobey, 2013). They also discourage using sweet foods and drinks as a reward for eating undesired foods (“If you eat your vegetables, then you can have your ice cream”) because it implicitly overvalues the sweets and undervalues the undesired food still further. For children who are particularly picky and who do not like to try new foods, sticker rewards for trying new foods have been successful (Corsini et al., 2013). In addition, providing many opportunities for children to try foods, even vegetables the children “don’t like,” in conjunction with nonfood reinforcement like a sticker increases liking for those vegetables (Fildes, van Jaarsveld, Wardle, & Cooke, 2014). The best strategy seems to be casual, repeated exposure to the food without insisting that the child eat it (Andrien, 1994). Getting children involved in age-appropriate food preparation, such as tearing and washing lettuce, cleaning and breaking apart cauliflower or broccoli, and weighing pasta, was linked to children eating more overall, including vegetables (van der Horst, Ferrage, & Rytz, 2014). Observations of children’s eating habits confirm what parents often suspect as well: children’s food preferences are influenced by the adult models around them. In the long term, preschoolers tend to like the same foods as their parents and other important adults. More generally, they practice many of their parents’ other health behaviors (such as exercise) as well.

The Connection between Health and Poverty

In settings of middle and high socioeconomic status, preschool children as a group are among the healthiest human beings alive, though not as healthy as they will become in childhood, adolescence, and young adulthood. They experience comparatively few major illnesses as long as they get enough of the right things to eat and as long as their parents have reasonable access to modern medical care. As parents often note, preschoolers do experience frequent minor illnesses: various respiratory infections, ear infections, and stomach flus. These typically strike a young child several times per year, which is three or four times as often as for adults and about twice as often as for school-age children (Engels, 1993). For well-fed children whose families have access to medical care, however, these illnesses rarely prove serious or life threatening. Colds and flu do cause worry, as well as create challenges for working parents in arranging childcare.

But this optimistic picture of preschoolers’ health may be misleading. Since 1997, when the Children’s Health Insurance Program (CHIP), which provides low- or no-cost insurance to children whose families make too much to qualify for Medicaid but cannot afford insurance, passed, rates of uninsured children have decreased significantly. This trend has stabilized with the passage of the Affordable Care Act (ACA), so that currently,

What Do You Think?

How do you suppose parents evaluate their child's height and weight? Explore this problem by asking two or three parents how satisfied they are with their child's height and weight. Do you think parents' feelings have any relationship to the actual size of their child?

only 5 percent of children lack health insurance coverage (Artiga & Ubri, 2017). However, most states that did not accept the Medicaid expansion of the ACA have uninsured child rates of 10 percent or higher (Kenney et al., 2014). Moreover, temporary funding of CHIP and possible repeals of ACA make many children vulnerable to losing access to medical care. Young children from these families are substantially less healthy than are those from middle- and high-SES families. Low-SES preschoolers contract 25 to 50 percent more minor illnesses than do preschoolers as a whole, and they are more often malnourished and face food insecurity, meaning that they chronically lack the quantity and quality of food to thrive, as well as essential vitamins, iron, and protein (American Academy of Pediatrics, 1993; McCurdy, Gorman, Kislner, & Metallinos-Katsaras, 2012; Wilkinson, 1996). Children growing up at or near the poverty level are also substantially more likely to be overweight or obese (McCurdy et al., 2012).

Whether in North America or around the world, minor illnesses combined with malnourishment put children's health at risk for additional illnesses, both minor and major. Malnourishment also contributes to delays in social, language, and cognitive development, possibly because it leads to lack of energy and lack of interest in new experiences. In one study based in Kenya (Africa), even a temporary food shortage (due to a few months of local drought) impaired children's health and school performance two years later (McDonald et al., 1994).

How can we counteract these problems? In general, strategies can focus either on individuals and their particular communities or on systematic reorganization of the health care system and food security systems as a whole. Among individually oriented strategies, an important one is to educate children and families about health and nutrition. For example, pamphlets can be distributed in schools or medical clinics, and public health professionals can make presentations in classrooms, community clubs, or churches. However, these efforts work best when they are multifaceted, including education in combination with improving access to high-quality food and health care. The "Focusing On" feature proposes additional alternatives.

Educational activities can be effective if they build on the knowledge of health and nutrition low-SES parents and their children already have and avoid assuming the public is completely ignorant about these matters. Good programs also improve individuals' self-efficacy about engaging in health-promoting behaviors, and as noted earlier, work best when public policy (like changes to the health care system or expanding programs such as the Supplemental Nutrition Assistance Program) makes engaging in health-promoting behaviors easier. In this sort of situation, it is helpful to organize intervention programs aimed at providing parents and children with the knowledge they need. However, such programs must respect the culture and economic situations of the families, which usually influence food preferences in major ways. Put simply, certain foods acquire symbolic meanings (such as turkey for American Thanksgiving), regardless of their precise nutritional value. Other foods may never be tried, no matter how worthwhile they are nutritionally, because they cost too much or seem too strange or foreign to a particular family or cultural group.

Bladder Control

Sometime during the preschool years, to parents' great relief, most children acquire control of their bladder. The process includes many false starts and accidents. Most commonly, daytime control comes before nighttime control, generally beginning between the ages of

Reforming Children's Health Care

In all societies, the health care system provides less help to poor families than to well-off ones. Low-SES mothers receive less medical attention during pregnancy, causing health problems in themselves or their fetuses to be overlooked, and are more likely to give birth to a low birth-weight infant (Krans & Davis, 2014). Infants of low-income mothers are less likely to receive checkups from a doctor and less likely to be seen by a doctor if they get sick (Bury, 1997; Wilkinson, 1996). However, children who have access to Medicaid and CHIP, described next, are much more likely to get checkups and to see health professionals early in an illness (Rudowitz, Artiga, & Arguello, 2014).

Why does access to health care depend so heavily on personal income? In the United States, medical services for the poor are paid through Medicaid, a federally sponsored insurance program created in the 1960s. It pays for some basic health services, such as taking a child with an ear ache to a general practitioner, but it reimburses the doctor only up to a certain point. Doctors who charge more price themselves out of the market for low-SES families, which have significantly fewer doctors and clinics to choose from but children who experience more illnesses than do children from higher-SES families (Fitzgerald et al., 1994). In 1997, the Children's Health Insurance Program (CHIP) was created, which assists states in providing insurance to children whose families cannot afford insurance but make too much money for Medicaid eligibility. As of 2017, nearly nine million children in the United States were enrolled in CHIP (Medicaid, 2018).

Though there have been significant strides in improving access to health care for children and adults alike, many children still lack access to health care. In some states, uninsured rates for children are over 15 percent, due in part to lack of parents' awareness of eligibility (Rudowitz, Artiga, & Arguello, 2014).

How can society and concerned individuals reduce these economically based inequalities in health care? Numerous reforms have been proposed centering on one of three ideas: community involvement, prevention, and reorganization of services. Reforms that focus on community involvement seek to reduce the psychological and geographical distance between medical staff and the people they serve. Some hospitals and cities have established small community health clinics in areas of greatest need (the inner city). They hire medical staff who establish rapport with the

parents and children who seek help, recruit local community members to serve on their governing and advisory boards, and charge low fees based on families' ability to pay.

Reforms that focus on primary prevention seek to keep disease from striking in the first place. These actions often deal with relatively healthy children (who have not gotten sick yet) and the conditions that make illness likely rather than illness itself. Lead poisoning is a good example: community health experts often cite lead as one of the most hazardous health threats to preschool children (Tesman & Hills, 1994). Lead accumulates in the body and eventually damages the nervous system and can cause death. People pick it up accidentally from many sources, but the most prominent culprit is the interior wall paint used in about 75 percent of all homes and apartments built before 1980. Because there is no cure for lead poisoning, prevention strategies have dominated the response of the health care profession: educating parents to the dangers, pressing for legislation outlawing lead-based paints (and lead-based gasoline), removing leaded paint in some homes, and checking/remediating local water systems when tap water tests high for lead content.

Reforms that focus on reorganization generally involve more self-conscious planning of medical services. Immunization and health-screening programs based in schools, for example, allow programs to reach a higher percentage of children than programs in community health clinics (Behrman, 1993; Behrman & Stacey, 1997; Jacob et al., 2016). "Front-line" professionals often can improve access dramatically without compromising quality of care: most childhood illnesses, for example, can be treated effectively by a nurse as long as the nurse knows when a particular illness deserves referral to the doctor and appropriate specialized services are indeed available.

What Do You Think?

1. Look back on your own elementary school hearing or eye tests from the point of view of the teachers and nurses. Can you see any limitations to "mass screening," as well as advantages to it?
2. Is there a case to be made for *limiting* health care to the poor? What would it be? And what might be the long-term implications of limiting health care?

What Do You Think?

Suppose you are a teacher or caregiver at a childcare center, and one of your children often seems hungry throughout the day. How could you tell whether the child is undernourished or simply has a big appetite? Compare your strategies for answering this question with those of a classmate.

two and three (Bloom, Seeley, Ritchey, & McGuire, 1993) and becoming reliable for most children by the age of four (Jansson, Hanson, Sillén, & Hellström, 2005), although individual children vary widely and somewhat unpredictably. Typically, too, daytime control of the bladder occurs at very nearly the same time. Some pediatricians believe this fact implies that children decide when they wish to begin exercising control, perhaps to begin feeling more grown up. In the early stages of toilet training, therefore, reminders and parent-led visits to the toilet may make little difference to most toddlers. Nonetheless, they may help in the long term as a form of behavioral conditioning: a child comes to associate seeing and sitting on the toilet with the relief of emptying a full bladder, as well as with the praise parents confer on the child for successes.

Nighttime bladder control often takes much longer to achieve than daytime control. About one-half of all three-year-olds still wet their beds at least some of the time, and as many as one in five six-year-olds do the same (American Psychiatric Association, 1994). The timing of nighttime control depends on several factors, such as how deeply children sleep and how large their bladders are. It also depends on anxiety level; worried children tend to wet their beds more often than relaxed children do. Unfortunately, parents sometimes contribute to young children's anxieties by becoming overly frustrated about changing wet sheets night after night.

Achieving bladder control reflects the large advances children make during the preschool years in controlling their bodies in general. It also reflects parents' accumulated efforts to encourage physical self-control for their children. The combined result is that children of this age can begin focusing on what they actually want to do with their bodies.

Motor Skill Development

As young children grow, they become more skilled at performing basic physical actions. Often a two-year-old can walk only with considerable effort; hence the term *toddler*. But a five-year-old can walk comfortably in a variety of ways: forward and backward, quickly and slowly, skipping and galloping. A five-year-old also can do other vigorous things that were impossible a few years earlier. Running, jumping, and climbing all occur with increasing smoothness and variety. Children can carry out certain actions that require accuracy, such as balancing on one foot, catching a ball reliably, or drawing a picture.

In this section, we examine in more detail how children reach milestones such as these. Because family conditions vary a great deal, we will make certain assumptions. In particular, we will assume children have no significant fears of being active—that they have a reasonably (but not excessively) daring attitude toward trying out new motor skills, they are in good health, and their physical growth has evolved more or less optimally. These assumptions do not hold for all children or families, as we note later in this section, but they make a good starting point for understanding motor development.

Fundamental Motor Skills

Healthy preschool children obviously have moved well beyond the confines of reflex action, which constituted the first motor skills of infancy. From ages two to about five, they experiment with the simple voluntary actions that adults use extensively for their normal activities, such as walking, running, and jumping (Kalverboer et al., 1993). For older children, these actions usually are the means to other ends. For very young children, they lie very much in the foreground and frequently are goals in themselves. Table 8.2 summarizes some of these activities.



In the long run, successful bladder control depends on both physical growth and the child's own motivation. Forcing children prematurely to control themselves may produce results, but only in the immediate future.

Source: Maurizio Milaneseio/Shutterstock.com.

What Do You Think?

Imagine how you would talk to a parent who was concerned about the child's bed-wetting at night. What would you say? If you or your instructor can arrange it, try acting out a meeting to discuss bed-wetting between a concerned parent and a childcare center worker or director.

Walking and Running

From a child's point of view, walking may seem absurd at first: it requires purposely losing balance, then regaining balance rapidly enough to keep from falling (Rose & Gamble, 1993). As older infants, children still must pay attention to these facts, even after a full year or so of practice. Each step is an effort in itself. Children watch each foot in turn as it launches (or lurches) forward; they may pause after each step before attempting the next. By their second or third birthday, however, their steps become more regular and their feet get closer together (Adolph et al., 2012). Stride, the distance between feet in a typical step, remains considerably shorter than that of a typical adult. This makes short distances easy to walk but long distances hard to navigate for a few more years.

Jumping

At first, a jump is more like a fast stretch: the child reaches for the sky rapidly, but her feet fail to leave the ground. Sometime around her second birthday, one foot, or even both feet, may finally leave the ground. Such early successes may be delayed, however, because the child may thrust her arms backward to help herself take off, as though trying to push herself off the floor. Later, perhaps around age three, she shifts to a more efficient arm movement—reaching forward and upward as she jumps—which creates a useful upward momentum.

Success in these actions depends partly on the type of jump the child is attempting. Jumping down a step is easier than jumping across a flat distance, and a flat or broad jump is easier than a jump up a step. By age five or so, most children can broad-jump across a few feet, although variations among individuals are substantial.

TABLE 8.2 Milestones in Preschool Motor Development

Approximate Age	Gross Motor Skill	Fine Motor Skill
2.5–3.5 years	Walks well; runs in straight line; jumps in air with both feet	Copies a circle; scribbles; can use eating utensils; stacks a few small blocks
3.5–4.5 years	Has a walking stride 80 percent that of adult; runs at one-third adult speed; throws and catches large ball, but is stiff-armed	Buttons with large buttons; copies simple shapes; makes simple representational drawings
4.5–5.5 years	Balances on one foot; runs far without falling; can “swim” in water for short distance	Uses scissors; draws people; copies simple letters and numbers; builds complex structures with blocks

Note: The ages given above are approximate, and skills vary with the life experiences available to individual children and with the situations in which the skills are displayed.

Source: Kalverboer et al. (1993).

Throwing and Catching

For infants and toddlers, first throws may consist of simply waving an object, releasing it suddenly, and watching it take off. Once intentional throwing begins, however, children actually adopt more stereotyped methods initially, using a general forward lurch, regardless of the ball's size or weight. As skill develops, children vary their movements according to the size of the ball. Catching proceeds through analogous phases, from stereotyped, passive extension of arms to flexible movement of hands in a last-minute response to the oncoming ball.

Fine Motor Coordination: The Case of Drawing Skills

Not all motor activities of young children involve the strength, agility, and balance of their whole bodies. Many require the coordination of small movements but not strength. Tying shoelaces calls for such **fine motor coordination**; so do washing hands, buttoning and zipping clothing, eating with a spoon, and turning a doorknob.

One especially widespread fine motor skill among young children is drawing. In North American culture, at least, virtually every young child tries using pens or pencils at some time and often tries other artistic media as well. The scribbles or drawings that result probably serve a number of purposes. At times, they may be used mainly for sensory exploration; a child may want to get the feel of paintbrushes or felt-tip pens. At other times, drawings may express thoughts or feelings; a child may suggest this possibility by commenting, "It's a horse, and it's angry." Children's drawings also probably reflect their knowledge of the world, even though they may not yet have the fine motor skills they need to convey their knowledge fully. In other words, children's drawings reveal not only fine motor coordination but also their self-concepts, emotional and social attitudes, and cognitive development.

Drawing shows two overlapping phases of development during early childhood. From about two and a half to four years of age, children focus on developing nonrepresentational skills, such as scribbling and purposeful drawing of simple shapes and designs. Sometime around age four, they begin attempting to represent objects (Coles, 1992). Yet, although representational drawings usually follow nonrepresentational ones, the two types stimulate each other simultaneously. Children often describe their early scribbles as though they referred to real things, and their practice at portraying real objects helps them to further develop their nonrepresentational skills (Coates & Coates, 2006).

Prerepresentational Drawing

Around the end of infancy, children begin to scribble. A two-year-old experiments with whatever pen, crayon, or pencil is available, almost regardless of its color or type, behaving like an infant and like a child. As with an infant, efforts focus primarily on the activity

fine motor coordination

Ability to smoothly carry out small movements that involve precise timing but not strength.



Skills that require fine motor coordination—like creating this drawing—develop through identifiable steps or stages. At first, children tend to make random marks or scribbles; later, they coordinate these into patterns; still later, they coordinate patterns into representations of objects that become increasingly recognizable by parents and teachers.

Source: borisow/Shutterstock.com.

itself: on the motions and sensations of handling a pen or pencil. But like an older child, the two-year-old often cares about the outcome of these activities: “That’s a Mommy,” he says of his drawing, whether it looks much like one or not. Contrary to a popular view of children’s art, even very young children are concerned not only with the process of drawing but with the product as well (Broughton et al., 1996).

A child’s interest in the results of her drawing shows up in the patterns she imposes on even her earliest scribbles. Sometimes, she fills up particular parts of the page quite intentionally—the whole left side, say, or the complete middle third. And she often emphasizes particular categories of strokes: lots of straight diagonals or many counter-clockwise loops. Different children select different types of motions for emphasis, so the motions are less like universal stages than like elements of a personal style.

Representational Drawing

While preschool children improve their scribbling skills, they also develop an interest in representing people, objects, and events in their drawings. This interest often far precedes their ability to do so. A three-year-old may assign meanings to scribbles or blobs in his drawing; one blob may be “Mama,” and another may be “our house.” Events may happen to these blobs, too: Mama may be “going to the store” or “looking for me.” During the early childhood years, and for a long time thereafter, the child’s visual representations are limited by comparatively rudimentary fine motor skills. Apparently, children know more, visually speaking, than their hands can portray with pens or brushes. Only as children reach school age do their drawings of people become relatively realistic.

What happens to drawing skills beyond the preschool years depends on a child’s experiences and on the encouragement (or lack thereof) received from others. Drawings in later years become even more realistic—more “photographic” or draftsmanlike in style. But not all children stay with art in the long term, due to the combined influence of competing academic interests, the priorities of friends, or even dislike of a teacher. We will discuss these types of influence again in Chapter 13 in connection with social and motivational changes during middle childhood.

Gender Differences in Physical Development

As is true during infancy, preschool boys and girls develop at almost exactly the same average rates. This applies to practically any motor skill of which young children are capable, and it applies to both gross and fine motor skills. Any nursery classroom, therefore, is likely to contain children of both sexes who can run very well and children of both sexes who can paint well or tie their shoelaces without help. This is especially true among younger preschool children (age three or four).

By the time children begin kindergarten (usually at age five), slight gender differences in physical development and motor skills appear, with boys tending to be (slightly) bigger, stronger, and faster (Kalverboer et al., 1993) and with better ball skills, while girls demonstrate better manual dexterity (Junaid & Fellowes, 2006). Yet these differences are noticeable only as averages and only by basing the averages on very large numbers of children. Despite the slight differences, therefore, more than 95 percent of children are more skillful and bigger than some members of *both* sexes, and less skillful and smaller than certain others of both sexes.

By the time children start school, a few children in any community are bigger, stronger, and faster than *any* other children, and most of them are boys. Furthermore, these few individuals may get much more than their share of attention because of their superior physical skills. This contributes to the (mistaken) impression that boys are larger and more skillful than girls *in general*. In this way (among many others) are stereotypes born.

The differences in motor skills might be more accurately called *gender* differences than *sex* differences because they probably derive partly from the social roles boys and girls begin learning early in the preschool years. Part of the role differences includes how preschool children spend their time. Preschool boys do spend more time than girls in active and rough-and-tumble play, and girls spend more time doing quiet activities such as drawing

or playing with stuffed animals. Children of both sexes, furthermore, reinforce or support one another more for engaging in gender-typed activities, behavioral shaping that is often less flexible for boys than for girls (Davies, 1991; Kite, Deaux, & Haines, 2008). These differences may create the twin impressions that boys are less capable of fine motor skills and that girls are physically weaker, or at least are less inclined toward gross motor activity.

Variations in Motor Skill Development

Although the preceding sections may have implied that young children acquire motor skills at highly similar rates, in reality they show considerable variability in both fundamental and fine motor skill development. At age three, some children already can walk fast and catch a ball skillfully, but others are still having trouble with both tasks. At age five, some children can use scissors skillfully to cut out shapes for kindergarten art projects, but others still find scissors difficult or even mystifying. Whatever the motor skill, individual children will vary at it.

Like other human differences, these probably result from variations in experience, motivation, and biological endowment. Because of family background or preschool educational experiences, some children may be encouraged more than usual toward active play. Not surprisingly, they develop the skills for active play—like running, jumping, or throwing—sooner than children who experience less encouragement for active play. Weight also plays a role. Children who are overweight or obese lag behind their normal-weight peers in gross motor skills—a gap that grows over time (D’Hondt et al., 2013). Research has demonstrated that children with parents who engage in more physical activity, particularly if that activity is with their children, are more active, skilled, and healthy (Hinkley et al., 2008; Loprinzi & Trost, 2010; Spurrier et al., 2008).

Experience also plays a large role in drawing or other fine-motor activities. Some children receive more encouragement and opportunity than others. Early successes breed satisfaction with the emerging skills and encourage the development of motivation to refine the initial skills further. Before long, as we saw earlier in the case of gender differences in motor skill development, small initial differences in opportunity and skill become larger differences in skill and motivation.

Biological and genetic background probably also plays a role in motor skill development, although for most children it is hard to sort out how strong these influences are. The most obvious evidence for biological influence—as well as for the questionability of its importance—is the experiences of children with physical disabilities. A child born with cerebral palsy (a disorder of the nervous system that impairs motor coordination) may not



On the average, boys and girls develop motor skills at almost the same rate during the preschool years, but marked differences emerge among individuals within each sex, even at this age.

Source: ESB Professional/Shutterstock.com.

What Do You Think?

Suppose you are a childcare center worker, and one of your four-year-olds seems to be especially clumsy at throwing and catching a ball. Should you do something about this, and if so, what should you do? Consult with a classmate for a second opinion. Would you feel the same way if the child seemed clumsy or “uninspired” at drawing?

learn to walk, jump, throw, or draw at the same times or to the same extent as a child who never experiences this condition. Yet contrary to common stereotypes of children with disorders, the motor development of a child with cerebral palsy is *not* determined solely by the disorder; it is also determined by the child’s opportunities and encouragement to learn new motor skills. The final motor achievements of children with this disorder will show diversity just as will the achievements of peers without disorders, and some of the diversity will be the result of education, not biology (Smith, 1998).

The Impact of Children’s Growth on Adults

Even though physical growth unfolds largely independently of other forms of development in infancy, growth interacts indirectly in a number of ways with a child’s social relationships. A child’s physical appearance and particular motor skills can affect how adults and older children respond to the child. A family’s attitudes, as well as their economic and social circumstances, can affect opportunities for children to acquire physical skills, and constrain opportunities as well.

Effects of Appearance

From birth—and despite the biases from their own parents—children vary in how attractive their faces seem to adults and other children. As a rule, some individuals look younger than others of the same age. In general, having a young-looking face depends on having large features and a large forehead; that is, facial features should be wide-set and located relatively low on the front of the skull. Even slight changes in these proportions—just a fraction of an inch—can make an adult seem many years older or younger, an infant seem six months older or younger, or a preschooler seem one or two years older or younger.

In general, younger-looking children are also rated as more attractive than older-looking children by both adults and peers, and adults tend to expect more mature behaviors from older-looking children (Parsons, Young, Kumari, Stein, & Kringelbach, 2011). This coincidence of stereotypes—of youthfulness and attractiveness—may contribute to differences in how parents and other adults respond to preschoolers as individuals. Parents and other caregivers need to be made aware of these possibilities, even if differences in response stem partly from innate human reactions to infantile (or babylike) appearance.

Effects of Motor Skills

Consider the changes in size that preschool children experience. A two-year-old often is still small enough to be handled. When necessary, parents can pick up and move a child from one place to another, physically removing the child from danger, and carrying the child (at least partway) if a distance is too far. By age five, a child often has outgrown these physical interactions, not only figuratively but literally. Parents or other adults may still lift and cuddle the child sometimes in play or in an emergency, but they probably are beginning to avoid doing so on a regular basis. To a significant extent, the child may now simply be too bulky and tall. More and more rarely can parents save the child from danger by picking the child up or by speeding the child along a long hallway by carrying the child piggyback. Parents must somehow get children to do these things for themselves.

Usually, of course, parents succeed at this task. By age five, a child can think and talk about her own actions much more than before, and these improvements help guide her own actions.

The handling that used to be literal now becomes mostly figurative. Now *handling* means negotiating and discussing with the child rather than lifting her up or carting her around.

Improvements in motor skills also change the agenda for a child's daily activities. A two-year-old may spend a good part of his day experimenting with fundamental skills: walking from one room to another, tearing toilet paper to shreds, or taking pots and pans out of a cupboard. These activities often are embedded in an active social and cognitive life: the child may smile (or frown) at his parents while he works and may "talk" about what he is doing as well. But the motor aspects of his activities absorb a significant part of his attention throughout the day. The child may return repeatedly to a staircase, for instance, as though compelled to get the hang of climbing it; no reward needs to lie at the top step except the satisfaction of a job well done.

A two-year-old's parents therefore must spend a lot of time ensuring that the child comes to no physical harm during motor explorations. They must make sure the child does not fall down the stairs, tumble into the toilet bowl, or discover a sharp knife among the pots. Their role as safety experts can dominate their contacts with the child, particularly if the child is active. Table 8.3 lists common accidents, remedies, and preventions.

By the end of early childhood, minute-to-minute physical surveillance recedes in importance, even though, of course, a concern about safety remains. Rules about dangers make their appearance ("Don't climb on that fence; it's rickety"), along with the hope that a five-year-old can remember and follow the rules at least some of the time. The shift toward rules also results from increasing confidence in the child's motor skills. Now parents are apt to believe their child can go up and down stairs without stumbling very often—and they are usually right.

During the preschool period, many parents discover a special need for patience in their dealings with their children. Simple actions such as tying shoelaces or putting on socks may take longer than before, simply because children now insist on doing many of these things themselves. For similar reasons, walking to the store may now take longer; a three- or four-year-old may prefer to push the stroller rather than ride in it, thus slowing everyone down. And preschoolers may have their own agenda on a walk, such as noticing little rocks on the sidewalk or airplanes in the sky, which differ from parents' goals. On good days, these behaviors offer some of the joys of raising children, but on bad days, they often irritate even the most patient of parents.

Effects of Differences in Families

A child's growth has a different impact on adults depending on the priorities of parents and on the circumstances of the family and community to which the child belongs. What



The new motor skills that preschoolers develop bring new risks and create new safety concerns for parents and other caregivers. What hazards may be waiting for this boy? And how should adults deal with them?

Source: Viacheslav Nikolaenko/Shutterstock.com.

TABLE 8.3 Common Accidents, Remedies, and Preventions among Preschoolers

Accidents	What to Do	How to Prevent
Drowning	Unless you are trained in water safety, extend a stick or other device. Use heart massage and mouth-to-mouth breathing when and as long as needed.	Teach children to swim as early in life as possible. Supervise children's swim sessions closely. Have children stay in shallow water.
Choking on small objects	If a child is still breathing, do not attempt to remove object; see a doctor instead. If breathing stops, firmly strike child twice on small of back. If this does not help, grab child from behind, put your fist just under his or her ribs, and pull upward sharply several times.	Do not allow children to put small objects in their mouths. Teach them to eat slowly, taking small bites. Forbid vigorous play with objects or food in mouth.
Cuts with serious bleeding	Raise cut above level of heart; apply pressure with cloth or bandage. If necessary, apply pressure to main arteries of limbs.	Remove sharp objects from play areas. Insist on shoes wherever ground or floor may contain sharp objects. Supervise children's use of knives.
Fractures	Keep injured limb immobile; see a doctor.	Discourage climbing and exploring in dangerous places, such as trees and construction sites. Allow bicycles only in safe areas.
Burns	Pour cold water over burned area; keep it clean; then cover with <i>sterile</i> bandage. See a doctor if burn is extensive.	Keep matches out of reach of children. Keep children well away from fires and hot stoves.
Poisons	On skin or eye, flush with plenty of water. If in stomach, phone poison control center doctor for instructions. Induce vomiting only for selected substances.	Keep dangerous substances out of reach of children. Throw away poisons when no longer needed. Keep syrup of ipecac in home to induce vomiting, but use <i>only</i> if advised by doctor.
Animal bites	Clean and cover with bandage; see a doctor.	Train children when and how to approach family pets. Teach them caution in approaching unfamiliar animals.
Insect bites	Remove stinger, if possible. Cover with paste of bicarbonate of soda (for bees) or a few drops of vinegar (for wasps and hornets).	Encourage children to recognize and avoid insects that sting, as well as their nests. Encourage children to remain calm in the presence of stinging insects.
Poisonous plants (e.g., poison ivy)	Remove affected clothing. Wash affected skin with strong alkali soap as soon as possible.	Teach children to recognize toxic plants. Avoid areas where poisonous plants grow.

Source: Adapted from O'Keefe (1998).

seems like a risky behavior to one parent (e.g., climbing up on a large boulder) may seem like constructive skill building to another, with consequent differences in encouragement or prohibitions for the child. What seems like a healthy amount of weight for a child to one parent may seem skinny (or plump) to another, with consequent differences in parents' unconscious appraisals of the child's attractiveness.

But settings and circumstances matter as well. In families with many children and few adults, child minding may become the responsibility of older siblings as much as (or more than) of adults. In extended families—those with nonparental relatives living at home or nearby—child minding may become partly the responsibility of other adult relatives. If parents work (or if a single parent works), relatives or other “caregivers for hire” take on much of the responsibility. All of these circumstances alter the settings in which preschoolers grow and the relationships that become prominent during early childhood. Some settings may provide the child with safer places for physical exploration than do other settings, resulting in fewer worries about safety expressed by caregivers. Some families may include so many children that differences in a particular child's physical

What Do You Think?

How did your own parents' work schedules, the number of children in your family, and family finances influence the joy or irritation they experienced? Did the *number* of parents raising you (one or more than one) make a difference?

appearance make little difference simply because caregivers are distributing their attention widely among many children or activities. Individual parents may or may not be aware that alternatives to their particular childcare arrangements exist, and because they often have not participated in the alternatives, they may find them hard to appreciate. But the range of childcare arrangements is very real, as is the range of opportunities they offer to young children (Cannella, 1997).

From Preschooler to Child

The physical changes we have talked about in this chapter create new relationships with parents and other caregivers, who in turn stimulate further changes. Preschoolers' new motor skills may stimulate adults to encourage various talents actively and with more focus than before. Once catching and throwing make their appearance, playing ball becomes a possibility; once scribbling stabilizes, skillful and interesting drawing seems just around the corner. And so parents and other interested adults encourage children toward these new skills, among others. Sometimes, the teaching and learning seem easier now, too, because adults no longer have to monitor a child's every move and can concentrate increasingly on the goals of movements. Just a few years before, "one false step" might have meant a child would literally fall. But now, this term has become only a metaphor for mistakes in general, not for physical mishaps specifically.

The cognitive developments of early childhood are equally influential on relationships, and we will investigate these changes in the next chapter.

Chapter Summary

- **What pathway does physical growth normally take during early childhood?** Between the ages of two and five, growth slows down and children take on more adultlike bodily proportions. Usually growth is rather smooth during the preschool period, though genetic, social, and nutritional differences can affect growth to some extent. Children's appetites often are smaller in the preschool years than in infancy, and children become more selective about what they eat.
- **How is poverty related to children's health?** The general health of a child is associated with the economic resources of the child's family, with higher-SES preschoolers tending to be healthier than lower-SES preschoolers. A number of possible causes for the association exist, including greater access to health care among well-off families.
- **When do children achieve bladder control?** Children tend to achieve daytime bladder control early in the preschool period. Nighttime bladder control tends to come later in the period.
- **What motor skills do children acquire during the preschool years?** Preschoolers acquire and refine many fundamental motor skills, including walking, jumping, throwing, and catching. Fine motor skills such as drawing also emerge during this period, progressing from prerepresentational to representational drawings. Children vary in motor skill development because of both their biological endowment and their experiences.
- **How does children's growth affect parents and other adults?** Preschoolers' changing facial features, size, and motor skills influence parents' responses and methods of childrearing to some extent. Because of differences in circumstances, families respond uniquely to differences in children's growth.

Key Terms

fine motor coordination (p. 191)

