

theorists accept the *clinical method*, which synthesizes information from a variety of sources into a detailed picture of the personality of a single child. (We will discuss the clinical method further at the end of this chapter.) Psychoanalytic theory has also inspired a wealth of research on many aspects of emotional and social development, including infant-caregiver attachment, aggression, sibling relationships, child-rearing practices, morality, gender roles, and adolescent identity.

Despite its extensive contributions, the psychoanalytic perspective is no longer in the mainstream of child development research (Cairns, 1998). Psychoanalytic theorists may have become isolated from the rest of the field because they were so strongly committed to the clinical approach that they failed to consider other methods. In addition, many psychoanalytic ideas, such as psychosexual stages and ego functioning, are so vague that they are difficult or impossible to test empirically (Thomas, 2000; Westen & Gabbard, 1999). Nevertheless, Erikson's broad outline of psychosocial change captures the essence of personality development during childhood and adolescence. Consequently, we will return to it in later chapters.

Behaviorism and Social Learning Theory

As the psychoanalytic perspective gained prominence, child study was also influenced by a very different perspective. According to behaviorism, directly observable events—stimuli and responses—are the appropriate focus of study. American behaviorism began with the work of psychologist John Watson (1878–1958) in the early twentieth century. Watson wanted to create an objective science of psychology and rejected the psychoanalytic concern with the unseen workings of the mind (Horowitz, 1992).

TRADITIONAL BEHAVIORISM • Watson was inspired by Russian physiologist Ivan Pavlov's studies of animal learning. Pavlov knew that dogs release saliva as an innate reflex when they are given food. But he noticed that his dogs were salivating before they tasted any food—when they saw the trainer who usually fed them. The dogs, Pavlov reasoned, must have learned to associate a neutral stimulus (the trainer) with another stimulus (food) that produces a reflexive response (salivation). As a result of this association, the neutral stimulus by itself could bring about a response resembling the reflex. Eager to test this idea, Pavlov successfully taught dogs to salivate at the sound of a bell by pairing it with the presentation of food. He had discovered *classical conditioning*.

Watson wanted to find out if classical conditioning could be applied to children's behavior. In a historic experiment, he taught Albert, an 11-month-old infant, to fear a neutral stimulus—a soft white rat—by presenting it several times with a sharp, loud sound, which naturally scared the baby. Little Albert, who at first had reached out eagerly to touch the furry rat, soon cried and turned his head away when he caught sight of it (Watson & Raynor, 1920). In fact, Albert's fear was so intense that researchers eventually challenged the ethics of studies like this one. Consistent with Locke's *tabula rasa*, Watson concluded that environment is the supreme force in development. Adults can mold children's behavior, he thought, by carefully controlling stimulus-response associations. And development is a continuous process, consisting of a gradual increase with age in the number and strength of these associations.

Another form of behaviorism was B. F. Skinner's (1904–1990) *operant conditioning theory*. According to Skinner, the frequency of a behavior can be increased by following it with a wide variety of *reinforcers*, such as food, praise, a friendly smile, or a new toy. It can also be decreased through *punishment*, such as disapproval or withdrawal of privileges. As a result of Skinner's work, operant conditioning became a broadly applied learning principle. We will consider these conditioning techniques further when we explore the infant's learning capacities in Chapter 5.

SOCIAL LEARNING THEORY • Psychologists quickly became interested in whether behaviorism might offer a more direct and effective explanation of the development of children's social behavior than the less precise concepts of psychoanalytic theory. This sparked the emergence of several approaches that built on the principles of conditioning, offering expanded views of how children and adults acquire new responses.



Social learning theory recognizes that children acquire many skills through modeling. By observing and imitating her mother's behavior, this Vietnamese preschooler is becoming a skilled user of chopsticks.

Several kinds of social learning theory emerged. The most influential, devised by Albert Bandura, emphasized *modeling*, otherwise known as *imitation* or *observational learning*, as a powerful source of development. Bandura (1977) recognized that children acquire many favorable and unfavorable responses by watching and listening to others around them. The baby who claps her hands after her mother does so, the child who angrily hits a playmate in the same way that he has been punished at home, and the teenager who wears the same clothes and hairstyle as her friends at school are all displaying observational learning.

Bandura's work continues to influence much research on children's social development. However, like the field of child development as a whole, today his theory stresses the importance of *cognition*, or thinking. Bandura has shown that children's ability to listen, remember, and abstract general rules from complex sets of observed behavior affects their imitation and learning. In fact, Bandura's (1992, 2001)

most recent revision of his theory places such strong emphasis on how children think about themselves and other people that he calls it a *social-cognitive* rather than a social learning approach.

According to this view, children gradually become more selective in what they imitate. From watching others engage in self-praise and self-blame and through feedback about the worth of their own actions, children develop *personal standards* for behavior and a *sense of self-efficacy*—the belief that their own abilities and characteristics will help them succeed. These cognitions guide responses in particular situations (Bandura, 1999, 2001). For example, imagine a parent who often remarks, "I'm glad I kept working on that task, even though it was hard," who explains the value of persistence, and who encourages it by saying, "I know you can do a good job on that homework." Soon the child starts to view herself as hardworking and high achieving and selects people with these characteristics as models. In this way, as children acquire attitudes, values, and convictions about themselves, they control their own learning and behavior.

CONTRIBUTIONS AND LIMITATIONS OF BEHAVIORISM AND SOCIAL LEARNING THEORY • Behaviorism and social learning theory have had a major applied impact. Behavior modification consists of procedures that combine conditioning and modeling to eliminate undesirable behaviors and increase desirable responses. It has been used to relieve a wide range of serious developmental problems, such as persistent aggression, language delays, and extreme fears (Pierce & Epling, 1995; Wolpe & Plaud, 1997). But it is also effective in dealing with common, everyday difficulties, including poor time management, unwanted habits, such as nail biting and smoking, and anxiety over such recurrent events as test-taking, public speaking, and medical and dental treatments. In one study, preschoolers' anxious reactions during dental treatment were reduced by reinforcing them with small toys for answering questions about a story read to them while the dentist worked. Because the children could not listen to the story and kick and cry at the same time, their disruptive behaviors subsided (Stark et al., 1989).

Nevertheless, modeling and reinforcement do not provide a complete account of development of important environmental influences. These extend beyond immediate reinforcements and modeled behaviors to children's rich physical and social worlds. Finally, behaviorism and social learning theory have been criticized for underestimating children's contributions to their own development. However, in emphasizing cognition, Bandura is unique among theorists whose work grew out of the behaviorist tradition in granting children an active role in their own learning.

Piaget's Cognitive-Developmental Theory

If one individual has influenced the contemporary field of child development more than any other, it is Swiss cognitive theorist Jean Piaget (1896–1980). North American investigators had

other social service supports are provided to parents as well. Other interventions are home based. A skilled adult visits the home and works with parents, teaching them how to stimulate a young child's development. In most programs, participating children score higher on mental tests by age 2 than do untreated controls. These gains persist as long as the program lasts and occasionally longer. The more intense the intervention (for example, full-day, year-round, and high-quality child care plus support services for parents), the better children's cognitive and academic performance during the school years (Ramey, Campbell, & Ramey, 1999).

The Carolina Abecedarian Project illustrates these positive outcomes. In the 1970s, more than one hundred 3-week- to 3-month-old infants from poverty-stricken families were randomly assigned to either a treatment group or a control group. Treatment infants were enrolled in full-time, year-round child care through the preschool years. There they received stimulation aimed at promoting motor, cognitive, language, and social skills and, after age 3, literacy and math concepts. At all ages, special emphasis was placed on rich, responsive adult-child verbal communication. All children received nutrition and health services; the primary difference between treatment and controls was the child-care experience.

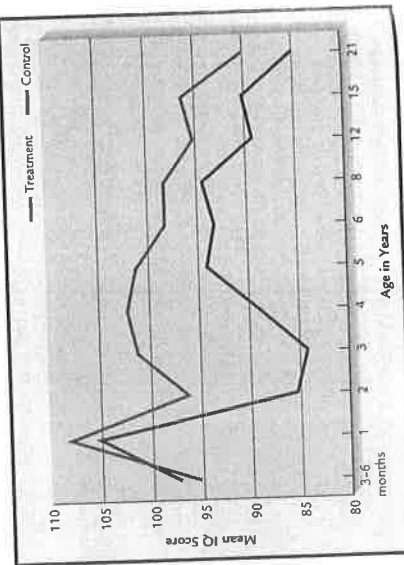
As Figure 6.9 shows, by 12 months of age, the IQs of the two groups diverged. Treatment children maintained their advantage when last tested—at 21 years of age. In addition, throughout their years of schooling, treatment youths achieved considerably better in reading and math. These gains translated into more years of schooling completed and higher rates of college enrollment and employment in skilled jobs for the treatment group than for the control group (Campbell et al., 2001, 2002; Ramey & Ramey, 1999). While the children were in elementary school, the researchers conducted a second experiment to compare the impact of early and later intervention. From kindergarten through second grade, half the treatment group and half the control group were provided a resource teacher, who introduced into the home educational activities addressing the child's specific learning needs. School-age intervention had no impact on IQ. And although it enhanced children's academic achievement, the effects were weaker than the impact of very early intervention (Campbell & Ramey, 1995).

Without some form of early intervention, many children born into economically disadvantaged families will not reach their potential. Recognition of this reality led the U.S. Congress to provide limited funding for intervention services directed at infants and toddlers who already have serious developmental problems or who are at risk for problems because of poverty. At present, available programs are not nearly enough to meet the need (Children's Defense Fund, 2003). Nevertheless, those that exist are a promising beginning.

FIGURE 6.9

IQ scores of treatment and control children from infancy to 21 years in the Carolina Abecedarian Project.

At 3 years, treatment children outperformed controls, an advantage consistently maintained through 21 years of age. The IQ scores of both groups declined gradually during the school years—a trend probably due to the damaging impact of poverty on mental development. (Adapted from Campbell et al., 2001.)



ASK YOURSELF

REVIEW

What probably accounts for the finding that speed of habituation and recovery to visual stimuli predicts later IQ better than an infant mental test score?

APPLY

Fifteen-month-old Joey's developmental quotient (DQ) is 115. His mother wants to know exactly what this means and what she should do at home to support his mental development. How would you respond to her questions?

CONNECT

Using what you learned about brain development in Chapter 5, explain why intensive intervention for poverty-stricken children beginning in the first 2 years has a greater impact on IQ than intervention at a later age.

REFLECT

Suppose you were seeking a child-care setting for your baby. What would you want it to be like, and why?

Language Development

As perception and cognition improve during infancy, they pave the way for an extraordinary human achievement—language. On the average, children say their first word at 12 months of age, with a range of about 8 to 18 months. Once words appear, language develops rapidly. Sometime between 1½ and 2 years, toddlers combine two words (Bloom, 1998). By age 6, children have a vocabulary of about 10,000 words, speak in elaborate sentences, and are skilled conversationalists.

To appreciate what an awesome task this is, think about the many abilities involved in your own flexible use of language. When you speak, you must select words that match the underlying concepts you want to convey. Then you must combine them into phrases and sentences using a complex set of grammatical rules. Next, you must pronounce these utterances correctly, or you will not be understood. Finally, you must follow the rules of everyday conversation. For example, if you do not take turns, make comments that are relevant to what your partner just said, and use an appropriate tone of voice, then no matter how clear and correct your language, others may refuse to listen to you.

Infants and toddlers make remarkable progress in getting these skills under way. How do they do so? Let's begin to address this question by examining several prominent theories, based on what we know about the beginnings of language in the first 2 years.

Three Theories of Language Development

In the 1950s, researchers did not take seriously the idea that very young children might be able to figure out important properties of the language they hear. As a result, the first two theories of how children acquire language were extreme views. One, *behaviorism*, regards language development as entirely due to environmental influences. The second, *nativism*, assumes that children are “prewired” to master the intricate rules of their language.

THE BEHAVIORIST PERSPECTIVE • Behaviorist B. F. Skinner (1957) proposed that language, like any other behavior, is acquired through *operant conditioning*. As the baby makes sounds, parents reinforce those that are most like words with smiles, hugs, and speech in return. For example, at 12 months, my older son, David, often babbled something like this: “book-a-book-a-dook-a-dook-a-book-a-nook-a-book-aaa.” One day while he

Infants are communicative beings from the start, as this interaction between a 6-month-old and his grandfather indicates. How will he accomplish the awesome task of becoming a speaker of his native language? Theorists disagree sharply on answers to this question.

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babbled away, I held up his picture book and said, "Book!" Very soon David was saying "book-aaa" in the presence of books.

Some behaviorists say children rely on *imitation* to rapidly acquire complex utterances, such as whole phrases and sentences (Moerk, 1992). And imitation can combine with reinforcement to promote language, as when the parent coaxes, "Say 'I want a cookie,'" and delivers praise and a treat after the toddler responds, "Wanna cookie!"

Although reinforcement and imitation contribute to early language development, they are best viewed as supporting rather than fully explaining it. As Carolyn remarked one day, "It's amazing how creative Caitlin is with language. She combines words in ways she's never heard before, such as 'needle it' when she wants me to sew up her teddy bear and 'alugone outside' when she has to come in." Carolyn's observations are accurate: Young children create many novel utterances that are not reinforced by or copied from others.

THE NATIVIST PERSPECTIVE • Linguist Noam Chomsky (1957) proposed a nativist theory that regards the young child's amazing language skill as etched into the structure of the human brain. Focusing on grammar, Chomsky reasoned that the rules of sentence organization are much too complex to be directly taught to or independently discovered by a young child. Instead, he argued, all children are born with a language acquisition device (LAD), an innate system that contains a set of rules common to all languages. It permits children, no matter which language they hear, to speak in a rule-oriented fashion as soon as they pick up enough words.

Are children biologically primed to acquire language? Recall from Chapter 4 that newborn babies are remarkably sensitive to speech sounds and prefer to listen to the human voice. In addition, children the world over reach major language milestones in a similar sequence—evidence that fits with a biologically based language program (Gleitman & Newport, 1996). Furthermore, efforts to teach language to nonhuman primates—using either specially devised artificial symbol systems or American Sign Language, a gestural language used by the deaf—have met with limited success (Miles, 1999). After extensive training, apes master only a basic vocabulary, and they do not acquire complex grammatical forms—findings consistent with Chomsky's view that humans are uniquely prepared for language.

Evidence for specialized language areas in the brain and a sensitive period for language development have also been interpreted as supporting Chomsky's theory. Let's take a closer look at these findings.

Language Areas in the Brain. Humans have evolved specialized regions in the brain that support language skills. Recall from Chapter 5 that for most people, language is housed in the left hemisphere of the cerebral cortex. Within it are two language-specific structures (see Figure 6.10). Broca's area, located in the left frontal lobe, controls language production. Wernicke's area, located in the left temporal lobe, is responsible for interpreting language.

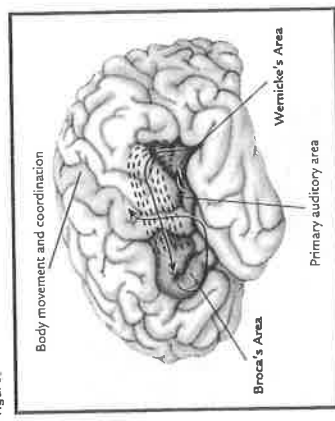
Although Broca's and Wernicke's areas have been taken as support for an LAD, we must be cautious about this conclusion. In Chapter 5 we noted that at birth, the brain is not fully lateralized; instead, it is highly plastic. As children acquire language, the brain becomes more specialized. Furthermore, if the left hemisphere is injured in the early years, other regions take over its language functions (see page 172). So rather than the brain being innately programmed for language, language-learning experience leads certain brain areas to become dedicated to language (Bates, 1999). Other research indicates that many parts of the brain participate in language activities to differing degrees, depending on the particular language skill and the individual's mastery of that skill (Huttenlocher, 2002; Neville & Bavelier, 1998).

A Sensitive Period for Language Development. Must language be acquired early in life, during an age span in which the brain is particularly responsive to language stimulation? Evi-

FIGURE 6.10

Language-specific structures in the left hemisphere of the cerebral cortex.

Broca's area controls language production by creating a detailed program for speaking, which it sends to the face area of the cortical region that controls body movement and coordinates language by receiving impulses from the primary auditory area, where sensations from the ears are sent. To produce a verbal response, Wernicke's area communicates with Broca's area through a bundle of nerve fibers, represented by dotted lines in the figure.



dence for a sensitive period that coincides with brain lateralization would support the view that babies have a biological readiness to acquire language.

To test this idea, researchers tracked the recovery of severely abused children who experienced little human contact in childhood. The most thoroughly studied is Genie, a normally developing child who said her first words just before she was isolated in the back room of her parents' house at 1½ years of age. Until she was found at 13½, no one talked to her, and she was beaten when she made any noise. With several years of training by dedicated teachers, Genie's language developed to some extent. She acquired a large vocabulary and good comprehension of conversation, but her grammar and communication skills were limited (Curtiss, 1977, 1989). Genie's case and others like it fit with the notion of a sensitive period, although a precise age cutoff for a decline in language competence has not been established.

What about acquiring a second language? Is this task harder after a sensitive period has passed? In one study, researchers examined U.S. census data, selecting immigrants from non-English-speaking countries who had resided in the United States for at least 10 years. The census form had asked the immigrants to rate how competently they spoke English, from "not at all" to "very well"—self-reports that correlate strongly with objective language measures. As age of immigration increased from infancy and early childhood into adulthood, English proficiency declined (Hakuta, Bialystok, & Wiley, 2003). Similar trends exist for adults who became deaf at varying ages and learned American Sign Language as their second language (Mayberry, 1994; Newport, 1991). Furthermore, brain-wave (EEG) and brain-imaging (fMRI) measures of neural activity indicate that second-language processing is less lateralized in older than in younger learners (Neville & Bruer, 2001). However, the capacity to acquire a second language does not drop sharply at a certain age. Instead, a gradual, age-related decrease occurs.

In sum, research on both first- and second-language learning reveals a biologically based time frame for optimum language development. However, the boundaries of this sensitive period remain unclear.

LIMITATIONS OF THE NATIVIST PERSPECTIVE • Chomsky's theory has had a major impact on current views of language development. It is now widely accepted that humans have a unique, biological predisposition to acquire language. Yet as we have seen, the biological basis of Chomsky's LAD is far from clear. And his account of development has been challenged on other grounds.

First, researchers have had great difficulty identifying the single system of grammar that Chomsky believes underlies all languages. Even seemingly simple grammatical distinctions, such as the use of the versus a in English, are made in quite different ways around the world. For example, several African languages rely on tone patterns to express these articles. In Japanese and Chinese, they are inferred entirely from sentence context. Critics of Chomsky's theory doubt the existence of an LAD that can account for such varied approaches to conveying the same meaning (Maratsos, 1998; Tomasello, 1995).

Second, Chomsky's assumption that grammatical knowledge is innately determined does not fit with certain observations of language development. Although children make extraordinary strides during the early years, they acquire many sentence constructions gradually. As we will see in Chapter 12, complete mastery of some grammatical forms is not achieved until well into middle childhood (Tager-Flusberg, 2001). This suggests that more learning and discovery are involved than Chomsky assumed.

THE INTERACTIONIST PERSPECTIVE • Recent ideas about language development emphasize interactions between inner capacities and environmental influences. Although several interactionist theories exist, all stress the social context of language learning. An active child, well endowed for acquiring language, observes and participates in social exchanges. From these experiences, children gradually discover the functions and regularities of language. According to the interactionist position, native capacity, a strong desire to interact with others, and a rich language and social environment combine to help children build a communicative system. And because genetic and environmental contributions vary across children, the interactionist perspective predicts individual differences in language learning (Bohannon & Bonvillian, 2001; Chapman, 2000).

TABLE 6.4
Milestones of Language Development During the First Two Years

APPROXIMATE AGE	MILESTONE
2 months	Infants coo, making pleasant vowel sounds.
4 months on	Infants babble, adding consonants to their cooing sounds and repeating syllables. By 7 months, babbling starts to include many sounds of spoken languages. Infants observe with interest as the caregiver plays turn-taking games, such as pat-a-cake and peekaboo.
8–12 months	Infants comprehend some words. Infants become more accurate at establishing joint attention with the caregiver, who often verbally labels what the baby is looking at. Infants actively participate in turn-taking games, trading roles with the caregiver. Infants use preverbal gestures, such as showing and pointing, to influence the behavior of others. Babbling includes sound and intonation patterns of the child's language community. Toddlers say their first recognizable word.
12 months	Vocabulary expands from about 50 to 200 spoken words.
18–24 months	Toddlers combine two words.

Even among interactionists, debate continues over the precise nature of innate language abilities. Some theorists accept a modified view of Chomsky's position. They believe that children are primed to acquire language but form and refine hypotheses about its structure on the basis of experiences (Slobin, 1997). Others believe that children make sense of their complex language environments by applying powerful, general cognitive strategies—such as searching for patterns in the buzz of talk around them—rather than strategies specifically tuned to language (Bates, 1999; Tomasello, 2003).

As we chart the course of early language development, we will see a great deal of evidence that supports interactionists' ideas. But none of these theories has yet been fully tested. In reality, biology, cognition, and social experience may operate in different balances with respect to various aspects of language: pronunciation, vocabulary, grammar, and communication skills. Table 6.4 provides an overview of early language milestones that we will take up in the next few sections.

Getting Ready to Talk

Before babies say their first word, they make impressive progress toward understanding and speaking their native tongue. They listen attentively to human speech, and they make speech-like sounds. As adults, we can hardly help but respond.

COOING AND BABBLING • Around 2 months, babies begin to make vowel-like noises, which are called cooing because of their pleasant “oo” quality. Gradually, consonants are added, and around 4 months babbling appears, in which infants repeat consonant-vowel combinations in long strings, such as “bababababa” or “mamananana.”

The timing of early babbling seems to be due to brain maturation because babies everywhere (even those who are deaf) start babbling at about the same age and produce a similar range of early sounds. But for babbling to develop further, infants must be able to hear human speech. If a baby's hearing is impaired, these speechlike sounds are greatly delayed or, in the case of deaf infants, are totally absent (Ellers & Oller, 1994; Oller, 2000).

When a baby coos or babbles and gazes at you, what are you likely to do? One day, as I stood in line at the post office behind a mother and her 7-month-old daughter, the baby babbled, and three adults—myself and two people standing beside me—started to talk to the infant. We

cooed and babbled ourselves, imitating the baby, and also said such things as “My, you’re a big girl, aren’t you? Out to help Mommy mail letters today?” The baby smiled and babbled all the more. As infants listen to spoken languages, babbling increases. Around 7 months, it starts to include many sounds of spoken languages. And by 1 year, it contains the consonant-vowel and intonation patterns of the child's language community (Levitt & Utman, 1992).

Deaf infants exposed to sign language from birth babble with their hands in much the same way hearing infants do through speech (Pettito & Marentette, 1991). Furthermore, hearing babies who are deaf, signing parents produce babblolike hand motions with the rhythmic patterns of natural language (Pettito et al., 2001). Infants' sensitivity to language rhythm, evident in both spoken and signed babbling, may help them discover and produce meaningful language units. And through babbling, babies seem to experiment with a great many sounds that they can blend into their first words.

BECOMING A COMMUNICATOR • Besides responding to cooing and babbling, adults interact with infants in many other situations. By age 4 months, infants start to gaze in the same direction as adults are looking, a skill that becomes more accurate between 9 and 15 months (Tomasello, 1999b). Adults also follow the baby's line of vision and comment on what the infant sees. In this way, they label the baby's environment. This joint attention, in which the child attends to the same object or event as the caregiver, who offers verbal information, contributes greatly to early language development. Infants and toddlers who often experience it sustain attention longer, talk earlier, and show faster vocabulary development (Carpenter, Nagel, & Tomasello, 1998; Flom & Pick, 2003; Silver, 2001). Gains in joint attention at the end of the first year suggest that infants are beginning to establish a “common ground” with the adult, just as they themselves do. This permits the child to establish a “common ground” with the adult, through which the child can figure out the meaning of the adult's verbal labels (Tomasello, 2003). Interactions between caregivers and babies also include give-and-take, as in turn-taking games such as pat-a-cake and peekaboo. At first, the parent starts the game and the baby is an amused server. Nevertheless, 4-month-olds are sensitive to the structure and timing of these interactions, smiling more to an organized than to a disorganized peekaboo exchange (Rochat, Querido, & Striano, 1999). By 12 months, babies participate actively, trading roles with the caregiver. As they do so, they practice the turn-taking pattern of human conversation, a vital context for acquiring language and communication skills. Infants' play maturity and vocalizations during games predict advanced language progress between 1 and 2 years of age (Rome-Flanders & Cronk, 1995).

As 8- to 12-month-olds become capable of intentional behavior, they use preverbal gestures to influence the behavior of others (Carpenter, Nagel, & Tomasello, 1998). For example, Caitlin held up a toy to show it and pointed to the cupboard when she wanted a cookie. Carolyn responded to her gestures and also labeled them (“That's your bear,” “Oh, you want a cookie!”). In this way, toddlers learn that using language leads to desired results. Soon they utter words with their reaching and pointing gestures, the gestures recede, and spoken language is under way (Namy & Waxman, 1998).



This 15-month-old delights in playing peekaboo with her mother. As she participates, she practices the turn-taking pattern of human conversation.

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