THE CHILD AND THE ENVIRONMENT IN LANGUAGE DEVELOPMENT

In the brief year and a half of the toddler period, most children progress from speaking a few isolated words to using a great many words in properly structured sentences. How are they able to accomplish the complex task of learning a language in such a short period of time? A long-standing debate exists between environmentalist and nativist theories of language acquisition. Environmentalist theories center on factors in the child’s environment that support language acquisition, including the language the child hears, the structure of the child’s social interactions, and characteristics of the physical environment. Nativist theories, in contrast, center on inborn, biologically based factors within the child that make language acquisition possible.

The contemporary debate between environmentalist and nativist theorists goes back to an exchange between psychologist B. F. Skinner and linguist Noam Chomsky in the late 1950s. In his book *Verbal Behavior* (1957), Skinner argued that parents and others instrumentally condition children to talk. According to Skinner, when babies begin to babble, parents smile, pay attention, and talk to them in response. This attention reinforces infants for babbling, and babbling becomes more frequent. The increased frequency of babbling raises the probability that babies will, just by chance, make sounds that resemble words. When parents hear these wordlike sounds, they reinforce them in preference to nonword sounds. Babies respond by repeating the sounds that have been reinforced, and thus words enter the baby’s repertoire of verbal behaviors. Skinner argued that grammar is acquired through similar reinforcement, with parents reinforcing grammatically correct statements and rejecting or showing confusion over incorrect ones.

At first glance, Skinner’s account of language acquisition seems reasonable, but there are problems with his explanation. Parents do not actually provide much reinforcement and feedback for children’s learning of grammar. Examining how parents respond to their young children’s speech, Brown and Hanlon (1970) found that parents are much more likely to correct statements that are untrue than statements that are grammatically incorrect. For instance, when Maggie says “Me put doggie chair,” while placing a new toy elephant on top of the sofa, Christine is apt to ignore her rough-edged grammar but tell her gently, “That’s an elephant, honey, not a dog.” This response is typical of most parents (Hirsh-Pasek, Treiman, and Schneiderman, 1984; Morgan and Travis, 1989). Despite this pattern of reinforcement, most children learn to use correct grammar anyway—even though they don’t always use it to tell the truth.
In a review of Skinner's book, Chomsky (1957) offered a strong critique of Skinner's arguments. Chomsky contended that it was impossible to pack into an entire lifetime all the reinforcement episodes needed to learn language through instrumental conditioning. Children produce a large number of different sentences, and each of these could not have been learned separately through reinforcement. Even if imitation is added as a learning mechanism, it still explains only how children learn to repeat things they have heard. But children do not simply repeat other people's sentences. One of the most important features of language, Chomsky pointed out, is that children can combine words to say things they have never heard anyone else say. In principle, there is no limit to the novel sentences that can be formed.

Chomsky's critique of Skinner's book was so compelling that most developmentalists strongly agreed with his reasoning. This is not to say that they dismissed reinforcement and imitation as irrelevant to language learning. Reinforcement and imitation remain useful principles for explaining how some of the details of language are learned (Spidel and Nelson, 1989; Whitehurst, 1982). Certainly, babies learn the sounds of their native language by imitating the speech they hear. Moreover, specific words must be learned by imitation, because the connection between a certain string of sounds and a certain meaning is entirely a matter of convention. Reinforcement and imitation alone, however, do not fully explain language acquisition.

As an alternative to Skinner's approach, Chomsky (1957) argued that all languages share structural characteristics, presumably because languages and the human brain evolved together. Our early ancestors fashioned language as they did because innate brain capacities led them to perceive and understand their world in certain ways. The same innate capacities allow very young children to extract the rules of any language they hear, especially the language's syntax. Chomsky called these innate capacities the language acquisition device (LAD). He maintained that part of the brain is specially adapted for language learning. When a toddler is exposed to language, the LAD automatically focuses on the rules that govern it.

But just as there were limitations to Skinner's explanation of language acquisition, so there were limitations to Chomsky's. Chomsky focused on the question of how children acquire syntax and had little interest in the development of other aspects of linguistic and communicative competence. In addition, because of his emphasis on innate capacities, he ignored the social contexts in which language acquisition occurs.

Today virtually no one holds a purely nativist or a purely environmentalist position on language acquisition. Instead, as in other nature-nurture issues, debate focuses on the relative contributions of inborn and environmental factors. Even researchers who are strongly oriented toward the environment admit that something must be built into the child's brain for language learning to be possible. And even the most nativist researchers acknowledge that environmental input is essential for language to be acquired. What is at issue is exactly what is built in biologically, what contribution the environment makes, and how the two sets of factors interact.

What the Child Brings to Language Acquisition

There is plenty of evidence that, as a species, humans are biologically predisposed to learn language. Language is learned so rapidly and with so little explicit teaching that it is clear the process of language acquisition must have a biological basis. In addition, there is considerable similarity in the general processes of language acquisition across cultures, despite variations in linguistic structure and socialization practices (Slobin, 1985).

One indication of the biological underpinnings of language acquisition is the apparent existence of a critical period early in life when language can be learned with the greatest ease (Lenneberg, 1967). Lenneberg and others have argued that the critical period is produced by developmental changes in the brain. Specifically, Lenneberg thought that language became increasingly difficult to learn with age because of hemispheric specialization, the process by which certain brain functions become localized in the right or left side of the cerebral cortex. There is now evidence that this process has already
begun for language within the first year of life, suggesting that hemispheric specialization cannot be the whole story.

Most likely, various processes that contribute to early brain plasticity, discussed in Chapter 4, play a role in the critical period for language (Bates, Thal, and Janowsky, 1992; Johnson, 1998). For example, several changes occur in the brain at about 8 to 9 months of age, including the establishment of long-range connections in the cerebral cortex and the emergence of adult-like patterns of metabolic activity. These changes may make possible such language-related skills as word comprehension and language-specific phonological development. At about the same time as the vocabulary spurt in the second year of life, there is a sharp increase in the density of synaptic connections, possibly increasing memory and information-processing capacity. And by about age 4, when basic grammatical development is complete, synaptic density and the rate of brain metabolism begin to decline.

It is difficult to prove a critical period exists because it is rare to find a child who can serve as a test case—a child who has received no linguistic input early in life. One exception would be severely neglected children like Victor or Genie, discussed in Chapter 2. The difficulties these children had learning language as adolescents lend some support to the critical period hypothesis, although there is no way of knowing whether they were born with cognitive impairments. Another, less problematic test case is that of deaf children with hearing parents who begin to learn sign language after early childhood. Research by Elissa Newport (1990) suggests that the earlier deaf children begin to acquire sign language, the greater their ultimate fluency.

Research on second language acquisition has produced similar findings. Jacqueline Johnson and Elissa Newport (1989) demonstrated that knowledge of English grammar among Chinese- and Korean-speaking adults depended on the age when they had first been exposed to English. Those who started to learn English before age 7 understood English grammar as well as native speakers of English. As the age of first exposure to English increased beyond age 7, the ultimate level of competence in English grammar decreased. (The box on page 256 discusses childhood bilingualism in more detail.)

Another indication that language acquisition has a biological basis is the fact that it is species-specific—an ability that all humans share as a result of their common genetic inheritance, but that is not found in members of other species. Many other species of animals (from honeybees to vervet monkeys to dolphins) have impressive communication abilities, but none of their communication systems is as abstract, flexible, or productive as human language. Attempts to teach chimpanzees to use sign language and other symbolic communication systems show that chimps probably have some symbolic abilities, but they cannot use rules of syntax to combine words into a wide variety of meaningful sentences (Lieberman, 1984; Premack, 1986). They may, however, be able to understand simple syntax and grasp the meaning of novel sentences made up of familiar words (Savage-Rumbaugh et al., 1993). Thus, their receptive language skills may surpass their productive ones, but they still do not come close to the language ability of humans.

It is not yet clear exactly what the built-in abilities are that make language acquisition possible (Maratos, 1998; Spelke and Newport, 1998). However, researchers have proposed a number of ways the human brain might be prewired for language learning. Infants appear to have certain inborn abilities and predispositions that help them detect information needed for language learning:

- Infants as young as 7 months apparently can detect rules and regularities in sequences of made-up words (Marcus et al., 1999).
- By 8 months infants appear to be able to segment words from a continuous stream of speech (Saffran et al., 1996).
- By 9 months, infants seem to be able to break down streams of speech into phrases and clauses; in laboratory experiments, they show preference for speech with pauses located at boundaries between phrases and clauses rather than within them (Hirsh-Pasek and Golinkoff, 1993; Jusczyk et al., 1992).
- Children may have a built-in predisposition to pay attention to perceptually salient stretches of speech, such as stressed syllables and beginnings and ends of words, which would help them zero in on many grammatical morphemes (Slobin, 1985).
Most Americans think bilingualism—the ability to speak two languages—is relatively rare, but from a worldwide perspective, monolingualism—speaking only one language—is the exception to the rule (Snow, 1993). Even in the United States, however, bilingualism is becoming increasingly prevalent. Nationally, about 14% of the school-age population speaks a language other than English at home; in some states, including New York, California, Texas, New Mexico, and Arizona, the percentage is much higher (U.S. Bureau of the Census, 1998).

What is language development like for native bilinguals—children who grow up learning two languages simultaneously? Until about 18 months, children exposed to two languages tend to learn isolated words from each language; it is not clear to what extent they realize words in one language can be translated into the other (Taeuschner, 1983). Once they start using grammatical morphemes and syntactic structures, however, they usually treat the languages as separate systems (de Houwer, 1995). Native bilinguals often mix their languages or switch back and forth between them, but the mixing is not random and does not indicate a lack of understanding of the boundaries between languages. Instead, it most often occurs when a child knows a word in only one language or when a concept is closely tied to experience in one language (Snow, 1993). Children exposed to two languages at home do not remain bilingual unless they have continued opportunities to use both languages. If they live in a country where only one of their languages is regularly spoken, they often begin to lose proficiency in the other language once they start school.

What effect does bilingualism have on linguistic and cognitive development? Native bilinguals tend to develop metalinguistic awareness, the ability to think about language as an arbitrary system, earlier than children who speak only one language (Hakuta and Diaz, 1985). There is also evidence for greater cognitive flexibility in bilingual children (Petel and Lambert, 1962). Bilingual preschoolers do tend to show slower than average vocabulary growth in both languages (Snow, 1993). However, one study of first graders bilingual in English and Spanish showed that many of the words they knew in one language did not overlap and that single-language tests underestimated the total size of their vocabularies (Umble et al., 1992).

In contrast to native bilinguals, some children learn one language at home and later learn a second in school. The outcome for these children depends on the type of exposure they receive to the second language. Elementary school foreign language instruction involving limited exposure to a second language is not very successful; children learn a second language from standard classroom instruction more slowly than adolescents or adults (Snow, 1993). Children are most likely to become truly bilingual if they participate in a language immersion curriculum, in which the second language is used for routine classroom interactions and instruction in other subjects.

Ideally, bilingual education programs should be designed to foster additive rather than subtractive bilingualism. Additive bilingualism involves learning a second language and staying proficient in the first; subtractive bilingualism involves learning a second language but losing proficiency in the first. One approach that seems to foster additive bilingualism is the two-way immersion program (Sleek, 1994). In this type of program, children who are native English speakers and children who are native speakers of another language, such as Spanish, are in classes together. For half of the day, instruction is in English; for the other half, it is in the second language. In this setting, both English and non-English speakers stand the greatest chance of becoming truly bilingual.

Along with built-in abilities useful for interpreting language, the human brain may come equipped with certain constraints on the conclusions that can be drawn about language structure. It is hard to imagine how children could correctly work out all the rules in any language without such constraints. The range of possible rules that could be generated from the input is simply too broad. As a result, a growing number of theorists have proposed that language learning must be governed by constraints that limit in advance what kinds of rules can be generated.

For instance, children’s learning of syntax may be constrained by a predisposition to detect fairly broad syntactic categories common to all languages, such as nouns, verbs, subjects, objects, and grammatical phrases (Pinker, 1987). Although an infant’s brain would not be specifically prewired to recognize English nouns, for example, the general concept of nouns could be built in, along with a range of possible rules for nouns.

Another built-in constraint that might assist in learning syntax is an assumption that words contain morphemes marking grammatical characteristics such as number, tense, and case (Newport, 1988). How these characteristics are marked varies from language to
language, but children would be predisposed to look for some sort of morphology. Newport has found evidence that this particular constraint may be present during a critical period early in life, when language learning normally takes place. This evidence comes from the study of people who have learned American Sign Language (ASL) at various ages. Those who learn ASL as children are more likely to break it down into morphemes and make the same sorts of overregularization errors observed in children learning spoken languages. In contrast, those who learn ASL later in life tend to learn signs in a more holistic fashion and not to recognize many morphological markings.

Researchers have also proposed built-in constraints that may help in the learning of words (Behrend, 1990; Markman, 1987; Woodward and Markman, 1998). Two that we have already mentioned are inborn assumptions that unfamiliar words are the names for objects and that new words mean something different from words already known.

General cognitive abilities and constraints wired into the human brain may contribute to language learning as well. As discussed in Chapter 4, infants seem to have an inborn ability to perceive objects, motion, and other characteristics of the world, rather than a disorganized stream of sensory information. This ability gives them an early knowledge of things to which labels can be attached. General symbolic representation and memory abilities can also aid language learning, as suggested by several studies showing correlations between toddlers’ language development and cognitive skills. Cecilia Shore (1986) found that 2-year-olds’ ability to combine two or more words is related to their block-building, memory, and symbolic-play abilities. Similarly, the ability to string words together into well-formed sentences is linked to improved capacity for remembering sequences, which occurs between ages 1 and 3. Alison Gopnik and Andrew Meltzoff (1987) found that 18-month-olds’ vocabulary spurt is specifically connected to the development of mature object permanence and to the ability to sort objects into two categories.

![Image of a toddler playing with blocks]
In summary, human infants clearly come equipped with a general predisposition to learn language. They may also have a range of more specific built-in predispositions, abilities, and constraints that make language acquisition possible. In all likelihood, children bring a number of inborn factors, both linguistic and cognitive, to the task of acquiring language.

The Environment of Language Learning

Built-in strategies, constraints, and abilities are not the whole story of how children acquire language. Environment also plays a part. Without exposure to language, after all, children cannot begin to learn to speak. Moreover, the nature of the language environment seems to make a difference. For instance, the more parents interact linguistically with their children when they are toddlers, the larger the children’s vocabularies are by the time they start school (Hart & Risley, 1995). But what about the type of speech to which young children are exposed and the structure of their interactions with adults? Can these aspects of the language environment facilitate language learning by making linguistic rules and meanings easier to decipher?

To answer this question, we must first take a look at exactly how adults talk to young children. A number of researchers have argued that adults modify their speech to toddlers in ways that make it easier for children to acquire language (e.g., Ferguson, 1964; Kerner-Nelson et al., 1989; Pine, 1994; Snow, 1972). These speech modifications are known as child-directed speech (CDS), or motherese, even though many fathers and other adults use them also (Barton & Tomasello, 1994; Gleason, 1975). The following conversation between a mother and her 19-month-old daughter provides a typical example of middle-class American CDS:

Mother: What should I draw first?
Child: Bi goggie.
Mother: A big doggie. All right. Is that big?
Child: Oggie bi. Bi gog.
Mother: What’s this? What’s this part of the doggie? Is that a big enough doggie?
Child: Bi goggie.
Mother: Well, I did make a big doggie. Look.
Child: Bi goggie.
Mother: You make a big doggie. Make a kitty.
Child: Kiki.
(Genishi & Dyson, 1984, p. 45)

English speakers’ CDS differs from adult-directed speech in several ways (Cruttenden, 1994; Fernald, 1984; Morgan, 1986; Snow, 1977):

- CDS is simpler grammatically and includes fewer grammatical errors.
- CDS is spoken in a higher than normal pitch, its intonations are more exaggerated, and it has fewer lapses in fluency.
- In CDS the boundaries between phrases and clauses are more clearly marked by pauses and intonation.
- CDS tends to focus more on objects and events discussed in the present tense, using concrete nouns. The adult frequently comments on what the child is doing or on what is going on around the child.
- CDS tends to be quite redundant. The mother in the preceding dialogue, for instance, finds many ways to repeat the words big and doggie.
- CDS typically includes many questions about objects and events.

Fathers’ speech to young children tends to differ from mothers’, at least when the father is a secondary caregiver. These fathers ask for more labels and explanations (“What’s this?” “What does it do?”), and they use more advanced vocabulary words. They also ask for more repetitions and clarifications from the child (Masur & Gleason, 1980). One reason for this is that communication breakdowns are more frequent in children’s conversations with secondary-caregiver fathers. These fathers are more likely than mothers to
ignore children’s utterances, and when they don’t understand something their child says, they most often respond with a nonspecific request for clarification (“What?”). Mothers, in contrast, more often make a specific request for clarification (“Put it where?”) (Tomasello, Conti-Ramsden, and Ewele 1990). These differences most likely arise because secondary-caregiver fathers spend less time with their children than primary-caregiver mothers do. They are therefore less familiar with their children’s speech and routines, and probably less tuned in to their communication needs. However, these fathers make a distinctive contribution to children’s linguistic environments by readying them for the broader social world, in which clarity is important and in which not all speakers structure the conversation and adjust their speech as much as mothers do (Barton and Tomasello, 1994).

Siblings and other older children also adjust their speech to toddlers in many of the ways adults do. When asked to describe the rules of a game to a younger child, 4-year-olds make their sentences less complex, speak more slowly, and repeat more often than when describing the rules to an adult (Shatz and Gelman, 1973). Even 2- and 3-year-olds use shorter sentences and more repetition when talking to infant siblings than when talking to their mothers (Dunn and Kendrick, 1982b). However, siblings’ speech to toddlers also differs from adults’ speech in some ways. Siblings’ speech adjustments to infants and toddlers are less sensitive than those made by adults. Siblings ask fewer questions, issue more directives, and put less emphasis on getting the younger child to talk (DeHart, 1990; Hoff-Ginsberg and Krueger 1991; Tomasello and Mandle, 1985).

Now let’s return to the question of whether CDS facilitates language learning. Studies have not found a relationship between CDS and overall rate of language acquisition (Newport, Gleitman, and Gleitman, 1977). However, certain particular characteristics of mothers’ speech do seem to support their children’s development of related syntactic structures (Hoff-Ginsberg, 1990). For example, mothers who ask many questions, which make auxiliary verbs especially salient, have children who use high numbers of auxiliary verbs. However, the language model provided by CDS is probably not its most important feature. Its effects on children’s language development are more likely due to the chances it gives for active participation in conversations.

Cross-cultural research on how adults talk to children also sheds light on the role of CDS in language acquisition. Although there are many similarities in the features of CDS across languages (Fernald et al., 1989), there are also some differences. For example, English speakers exaggerate their pitch and intonation more when addressing young children than speakers of most other languages do. In some cultures, CDS is limited or nonexistent. The Kaluli people of New Guinea believe it is important for infants to hear what they call “hard speech”—the language spoken by adults. They do not use baby talk with infants and young children because they do not believe it is good to teach childish forms of language. Preverbal Kaluli babies are not considered capable of communicating on their own. Rather than speaking to their babies in a special way, Kaluli mothers often speak for their babies in dialogues with other people. The mother holds her baby facing away from her, moves the baby as if he or she were conversing, and speaks for the baby in a special, high-pitched voice. This style of interaction is quite different from the middle-class American practice of face-to-face “conversations” with preverbal infants. Despite these differences from the way American mothers interact with their babies, Kaluli babies develop language on a timetable comparable to that of American babies (Schiffelin, 1990).

Some researchers have argued that CDS serves a primarily attentional or affective function in mother-child interaction—that is, mothers use it to capture their babies’ attention and to communicate with them emotionally, but it has little
or no direct impact on children’s syntactic development (Newport, et al., 1977). It is true that infants as young as 4 months attend more to CDS than to adult-directed speech and show a preference for listening to CDS (Fernald, 1985). Both English- and German-speaking mothers vary their pitch and intonation in consistent ways to engage their babies in interaction and to soothe distressed infants (Papoušek, Papoušek, and Bornstein, 1985; Stern, Spieker, and MacKain, 1982). Brown (1977) suggested that CDS arises from parents’ desires both to communicate with their infants, which leads to simplification, and to express affection toward them. In all likelihood, CDS serves more than one function in early parent-child relationships and in children’s early language development.

CDS by itself does not explain children’s language acquisition. It does simplify and structure the linguistic input children receive, which may be useful in syntactic development. In addition, the concrete, present-oriented nature of adult-child conversations may help children make connections between words and the things they refer to. The frequent questions and clear turn-taking provide opportunities for linguistic practice and the learning of conversational skills. Jerome Bruner (1983) has suggested that the ways adults structure children’s language environments should be considered a language acquisition support system (LASS)—a complement to Chomsky’s LAD. Biology and environment interact in children’s semantic and syntactic development, just as in their acquisition of the sound system of their language.

**NONLINGUISTIC ASPECTS OF SYMBOLIC REPRESENTATION**

In Piaget’s view, the principal cognitive development of toddlerhood is the emergence of *symbolic thought*, the ability to let one thing stand for another that is not physically present. Symbols can be mental representations, or they can be words, objects, or actions. When Mikey forms a mental image of a piece of candy, he is using a symbol to represent an object he wants. When Meryl tells Mrs. Jasper “Mommy go work,” she is using words as symbols for something that has already happened. When Malcolm pretends a paper plate is a steering wheel, he is using the plate and his actions as symbols for the real act of driving. When Maggie shows a newborn photo to her Aunt Sarah and proudly labels it “Baby Mikey!,” she is using the photo as a symbol for her baby brother.

Implicit in Piaget’s notion of symbols is the ability to manipulate symbols intentionally, creating new ideas and thoughts. In the case of linguistic symbols, children become able to combine words into sentences. This deliberate manipulation of symbols enables children to say anything imaginable. In Piaget’s view, a toddler’s first words are not really symbols, because they refer only to objects or events in the here and now. Not until a child begins to talk about things that are not currently present does he or she use language symbolically as Piaget defined the term. This point in language development usually occurs between 18 and 24 months of age—the age range that marks the last of Piaget’s six sensorimotor stages, as we discussed in Chapter 5.

According to Piaget, the general symbolic abilities that emerge during toddlerhood are a developmental outgrowth of sensorimotor activities. In particular, Piaget emphasized the role of imitation in the development of a toddler’s use of symbols. Consider the following observation he made of his daughter Jacqueline:

At 15 months Jacqueline was playing with a clown with long feet and happened to catch the feet in the low neck of her dress. She had difficulty in getting them out, but as soon as she had done so she tried to put them back in the same position... As she did not succeed she put her hand in front of her, bent her forefinger at a right angle to reproduce the shape of the clown’s feet, described exactly the same trajectory as the clown, and thus succeeded in putting her finger into the neck of her dress. She looked at the motionless finger for a moment, then pulled at her dress, without of course being able to see what she was doing. Then satisfied, she removed her finger and went on to something else.

(Piaget, 1962, p. 65)
Notice how Jacqueline imitates with the action of her finger the previous action of the clown’s feet. This forerunner of mature symbolic representation helps to show the origins of this important new ability. By the end of the sensorimotor period, Piaget contended, children’s imitations become more abbreviated. For example, rather than going through the whole process of imitating the clown’s feet getting caught in her dress, Jacqueline at 20 months might simply flex her finger slightly to stand for the shape of the feet. She is now able to use a symbol that bears a much less obvious relationship to the thing being symbolized. Still later she will use words (“feet caught”) to represent the incident with purely verbal symbols. Piaget maintained that the meaning of any symbol lies in the child’s current schemes for interacting with the thing symbolized. Symbols do not represent things in themselves, but rather the child’s present understanding of things.

Language development is a dramatic indication of toddlers’ emerging representational skills. But, as our examples show, language is not the only way toddlers use symbols. Three other manifestations of symbolic representation that emerge during the toddler period are pretend play, the use of gestures, and understanding iconic symbols.

**Toddlers’ Pretend Play**

Toddlers’ emerging representational ability is especially obvious in their play. Several investigators have separately demonstrated an orderly sequence in the development of symbolic play during the toddler period (Belsky and Most, 1981; McCune-Nicolich, 1981). Initially, symbolic representation is seen in behaviors directed to the self. For example, a 16-month-old may pretend to drink from a toy cup. Later, toddlers direct such acts to others (as in pretending to feed a doll). Before the end of the second year, they can combine a series of such acts around a theme (such as building a fence with blocks around pretend animals).

As representational skills develop, toddlers are able to use less and less realistic objects as symbols in their play (Fein, 1981). Between 14 and 19 months, children’s pretend play with *replica objects* (dolls, toy horses, toy cars) increases sharply, but their use of *substitute objects* (using a pillow to represent a baby, or a block to represent a car) is still rare. Between 19 and 24 months, the use of substitute objects greatly increases, and by 24 months most children can use one substitute object in a pretend scenario (using a block to feed a baby doll). *Double substitutions* (using a block as a bottle and a pillow as the baby) do not appear until later in the preschool period.

The social context has a definite effect on children’s ability to engage in pretend play. Toddlers show more advanced forms of pretend play when they are pretending with other
people than when they are pretending by themselves, particularly when the play partner is an older sibling or a parent. For example, children as young as 24 months have been observed to take on such complementary roles as mother and baby, teacher and pupil, and airplane pilot and passenger in play with their older brothers and sisters (Dunn and Dale, 1984). This more sophisticated play results partly from direction by the more skilled partner, but participation in these scenarios still requires the toddler to have some understanding of pretense and the partner’s intentions. Another reason siblings elicit advanced forms of pretend play from toddlers is that they provide an opportunity for repeated enactment of the same scenario. The familiarity of both the sibling and the particular game of pretend makes possible fairly sophisticated role playing.

**Toddlers’ Use of Gestures**

A second area in which emerging representational skills can be observed during toddlerhood is the use of gestures (Goodwyn and Acredolo, 1998; Petitto, 1992; Volterra and Eting, 1990). Simple **communicative gestures**, such as pointing, normally emerge at around 9 months. These early gestures are often accompanied by vocalizations, as when a baby points at a toy she cannot reach and whimpers. **Conventional social gestures** (such as waving bye-bye, nodding yes, and shaking the head no) usually appear between 9 and 12 months. But although these early gestures communicate meaning, they do not directly represent or symbolize actions or objects. That is, there is no resemblance between the gesture and what it communicates.

Between 12 and 18 months, toddlers begin to produce **symbolic gestures**, which do directly represent some aspect of an action or object. For example, sniffing might be used to represent a flower and moving a thumb to the mouth to request a bottle. Symbolic gestures most often develop in the context of interactive routines between child and parent, or in the course of the child’s own interactions with objects (Goodwyn and Acredolo, 1998). For example, Linda Acredolo’s daughter took the raised-arms gesture used in the common parent-infant game of “So Big!” and applied it to objects that were big in comparison to other, similar objects. Early symbolic gestures usually reflect the function of an object rather than its physical form, such as using a bouncing motion to represent a ball rather than indicating its round shape. Goodwyn and Acredolo (1998) found that toddlers tend to use symbolic gestures as requests earlier than they use them to label objects. They also found that some children combine symbolic gestures to make complicated requests. For instance, one little girl got her mother to let the dog out by panting and moving her hand as if turning a doorknob.

Another gestural advance during toddlerhood is the ability to coordinate divergent gestural and visual signals. Twelve-month-olds have trouble following an adult’s pointing gesture if the adult is not looking and pointing in the same direction, but 17-month-olds can follow the direction of a point even if the adult is looking elsewhere. Similarly, 12-month-olds tend to look in the direction of an object they are pointing at, but 18-month-olds can look at a conversational partner even while pointing at something else. The emergence of the ability to coordinate divergent signals seems to correspond roughly to the emergence of true words (Mastur, 1990).

As the ability to use gestures advances, the total frequency of a child’s gestures first rises and then falls. From about 10 months to 18 months, children gradually use more and more gestures. After 18 months the frequency of gestures declines, until it levels off at around 24 months. The early increase in gesturing seems to parallel the beginnings of word learning, while the later decline occurs at about the same time as the vocabulary spurt. Some researchers suggest that, as vocabulary size increases, language begins to replace gesturing as the child’s main channel of communication (Lock et al., 1990). But the early increase in gesturing that occurs at the same time as early word learning implies that gesturing is not just a precursor to language. Gesturing and language are apparently two separate systems that develop side by side. The fact that symbolic gestures appear around the same time as children’s first words suggests that both reflect the toddler’s emerging symbolic abilities.
The study of deaf children also reveals parallel development of gesture and language. Deaf children who are acquiring sign language produce gestures that are very similar to those produced by children who can hear. Deaf children's gestures are not more complex, despite their experience with manual signing (Petitto, 1992). In addition, they seem to keep their linguistic signs and their gestures distinct; they do not mix or confuse them. Here again we see that gestures form a communication system that remains separate even after language has emerged.

**Toddlers' Understanding of Iconic Symbols**

The ability to use symbolic representation does not emerge all at once, as demonstrated by toddlers' difficulty making use of information from most iconic symbols. These are symbols that closely resemble whatever they are supposed to represent, such as pictures and scale models.

At 9 months, babies seem confused by pictures; when shown realistic color photos of objects, they try to grasp the objects portrayed in them (DeLoache et al., 1998b). Twenty-month-olds no longer show this sort of manual exploration of pictures; they seem to understand that the objects portrayed are not physically present. However, toddlers have trouble using information contained in pictures. When shown a picture of a room and told that it shows where a toy is hidden, 2-year-olds are rarely able to find the toy in the actual room. This ability seems to develop fairly rapidly: by age 2½, children are able to find the toy about 80 percent of the time (DeLoache and Burns, 1994). Similar results are obtained when toddlers watch on a television screen as an experimenter hides an object in a neighboring room (Troseth and DeLoache, 1998). However, if they watch the same event directly, through a window into the room, even 2-year-olds can find the hidden object. The problem seems to be making a connection between the symbolic information contained in pictures or video and the real objects portrayed.

Scale models are even more difficult for toddlers to comprehend (DeLoache, Miller, and Pierroutsakos, 1998a). Three-year-olds can use information about a hidden toy's location in a scale model of a room to find the toy in the actual room, but 2½-year-olds have trouble with this task. One reason may be that toddlers find the miniature room so interesting as an object in its own right, they have trouble simultaneously thinking of it as symbolic of anything else. Interestingly, 2½-year-olds have no trouble with this task if they believe a scale model has been produced by shrinking a full-sized room or a full-sized room has been produced by making a scale model grow. This is accomplished by showing toddlers a hidden toy in a full-sized room or a model, then closing the door to the room and telling them that a special machine is going to shrink the room or make it grow. After several minutes of computer-generated sound effects and flashing lights on an instrument panel, the door is opened to reveal the predicted change in size. Under these conditions, 2½-year-olds readily find the toy, presumably because they do not have to take the extra step of thinking about the room they are seeing as a symbol of another, different-sized room.

**ADVANCES AND LIMITATIONS OF TODDLERHOOD: AN OVERVIEW**

In this chapter we have looked at the representational skills that emerge in toddlerhood—skills that involve using ideas, images, sounds, and other symbols to stand for, or represent, objects and events. Infants who knew the world through physical actions have grown into toddlers who are capable of mental actions. Just as infants actively explored objects by grasping, manipulating, and combining them, so toddlers actively manipulate symbolic elements, such as words, thereby learning about both symbols and rules for combining them.

These representational abilities build on the emerging long-term memory skills discussed in Chapter 5 (Bauer, 1995). Storage of past experience and the ability to compare past and present are the foundation for symbolic representation. At the same time, emerging
representational abilities dramatically enhance memory. Symbolic representation is an efficient way of summarizing experience for storage and retrieval.

The representational skills that emerge during toddlerhood provide the foundation for more elaborate social interactions, for pretend play, and for new kinds of problem solving. Representational skills allow toddlers to be dramatically more flexible in their behavior and to engage in much more planning of their actions than they could do as infants. These skills also enable them to think about the world in new, more complex ways. Consider a form of fantasy play that Mikey invented when he was 2½. He pretended the living room couch was a boat, the rug an ocean, the coffee table an island, and an umbrella a fishing pole. Once when Maggie walked through the room, he complained to her crossly: "No walk water!" As we have seen, the ability to engage in make-believe play grows dramatically between the ages of 1 and 3. Developmental psychologist John Flavell (1985) believes that make-believe play marks the beginning of an important awareness in the child: the awareness of a distinction between appearance and reality.

Although many cognitive advances take place during the toddler period, toddlers’ thinking is still constrained by a lack of logic in using their new mental skills, by limited memory abilities, and by difficulty distinguishing between what is real and what is not. Advances will be made in all of these areas during the preschool period that follows.

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**Chapter Summary**

**Introduction**
Toddlerhood is the period from roughly 12 to 30 months of age. One of its major cognitive developments is the emergence of a capacity for **symbolic representation**, which includes **language**.

**The Components of Language**
The components of language include:

* **phonology**, the system of sounds used in a language;
* **semantics**, the meanings of words and sentences;
* **morphology**, the rules for combining units of meaning in words;
* **syntax**, the rules for organizing words into phrases and sentences; and
* **pragmatics**, the rules for the social use of language.

Children must develop two sets of skills to use language: **productive skills** for putting ideas into words and **receptive skills** for understanding what other people say. In general, toddlers’ receptive skills are more advanced than their productive skills.

**Major Tasks in Early Language Learning**
In the first year of life, children’s vocalizations change dramatically, culminating in the ability to produce true speech. The five stages of **prelinguistic vocalization** are:

* reflexive **crying**;
* **cooing**, primarily vowel sounds expressing contentment;
* **vocal play**, when babies produce a range of sounds varying widely in pitch and volume;
* **canonical babbling**, when infants produce increasingly speechlike strings of syllables; and
* **conversational babbling**, with adultlike stress and intonation patterns.

Although toddlers’ first words often label many of the same everyday concepts, children also show differences in the purposes for which they use their first words. Some have a more **referential style** of word use, while others have a more **expressive style**.

At first children learn new words rather slowly, but at about 18 months they usually show a **vocabulary spurt**. During the preschool years, their vocabularies grow rapidly, with their receptive vocabulary outpacing their productive vocabulary.

To learn words, toddlers must first separate them out from the stream of speech they hear and then assign meanings to them. Through the process of **fast mapping**, young children are able to use context to arrive at a quick guess about a word’s meaning. This process may be aided by **joint attention** and by the **whole-object assumption** and **lexical contrast**.

Children’s early word-learning errors consist mainly of **underextensions** and **overextensions** of word meanings.

After starting to learn single words, children begin to add **grammatical morphemes** to them. The order in which grammatical morphemes are acquired depends on

* **grammatical complexity**;
* **semantic complexity**, and
* **phonological characteristics**.