

How Languages are Learned

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LANGUAGE LEARNING IN EARLY CHILDHOOD

LANGUAGE ACQUISITION is one of the most impressive and fascinating aspects of human development. We listen with pleasure to the sounds made by a three-month-old baby. We laugh and 'answer' the conversational 'ba-ba-ba' babbling of older babies, and we share in the pride and joy of parents whose one-year-old has uttered the first 'bye-bye'. Indeed, learning a language is an amazing feat—one that has attracted the attention of linguists and psychologists for generations. How do children accomplish this? What enables a child not only to learn words, but to put them together in meaningful sentences? What pushes children to go on developing complex grammatical language even though their early simple communication is successful for most purposes? Does child language develop similarly around the world? How do bilingual children acquire more than one language?

In this chapter, we will look briefly at some of the characteristics of the language of young children. We will then consider several theories that have been offered as explanations for how language is learned. There is an immense body of research on child language. Although much research has been done in middle-class North American and European families, there is a rich body of cross-linguistic and cross-cultural research as well. Researchers have travelled all over the world to observe, record, and study children's early language development. Our purpose in this chapter is to touch on a few main points in this research, primarily as a preparation for the discussion of SECOND LANGUAGE acquisition, which is the focus of this book.

The first three years: Milestones and developmental sequences

One remarkable thing about FIRST LANGUAGE acquisition is the high degree of similarity in the early language of children all over the world. Researchers have described DEVELOPMENTAL SEQUENCES for many aspects of first language acquisition. The earliest vocalizations are simply the involuntary crying that babies do when they are hungry or uncomfortable.

Soon, however, we hear the cooing and gurgling sounds of contented babies, lying in their beds looking at fascinating shapes and movement around them. Even though they have little control over the sounds they make in these early weeks of life, infants are able to hear very subtle differences between the sounds of human languages. In cleverly designed experiments, Peter Eimas and his colleagues (1971) demonstrated that tiny babies can hear the difference between 'pa' and 'ba', for example. And yet, it may be many months before their own vocalizations (babbling) begin to reflect the characteristics of the language or languages they hear.

By the end of their first year, most babies understand quite a few frequently repeated words. They wave when someone says 'bye-bye'; they clap when someone says 'pat-a-cake'; they eagerly hurry to the kitchen when 'juice and cookies' are mentioned. At twelve months, most babies will have begun to produce a word or two that everyone recognizes. By the age of two, most children reliably produce at least fifty different words and some produce many more. About this time, they begin to combine words into simple sentences such as 'Mommy juice' and 'baby fall down'. These sentences are sometimes called 'telegraphic' because they leave out such things as articles, prepositions, and auxiliary verbs. We recognize them as sentences because, even though FUNCTION WORDS and GRAMMATICAL MORPHEMES are missing, the word order reflects the word order of the language they are hearing and because the combined words have a meaning relationship that makes them more than just a list of words. Thus, for an English-speaking child, 'kiss baby' does not mean the same thing as 'baby kiss'. Remarkably, we also see evidence, even in these early sentences, that children are doing more than imperfectly imitating what they have heard. Their two- and three-word sentences show signs that they can creatively combine words. For example, 'more outside' may mean 'I want to go outside again.' Depending on the situation, 'Daddy uh-oh' might mean 'Daddy fell down' or 'Daddy dropped something' or even 'Daddy, please do that funny thing where you pretend to drop me off your lap.'

As children progress through the discovery of language in their first three years, there are predictable patterns in the emergence and development of many features of the language they are learning. For some language features, these patterns have been described in terms of developmental sequences or 'stages'. To some extent, these stages in language acquisition are related to children's cognitive development. For example, children do not use temporal adverbs such as 'tomorrow' or 'last week' until they develop some understanding of time. In other cases, the developmental sequences seem to reflect the gradual mastery of the linguistic elements for expressing ideas that have been present in children's cognitive understanding for a long time. For example, children can distinguish between singular and plural long before they reliably add plural endings to nouns. Mastering irregular plurals takes

even more time and may not be completely under control until the school years.

Grammatical morphemes

In the 1960s, several researchers focused on how children acquire grammatical morphemes in English. One of the best-known studies was carried out by Roger Brown and his colleagues and students. In a LONGITUDINAL study of the language development of three children (called Adam, Eve, and Sarah) they found that fourteen grammatical morphemes were acquired in a remarkably similar sequence. That research is reported in Brown's 1973 book. The list below (adapted from that book) shows some of the morphemes they studied.

- present progressive *-ing* (Mommy running)
- plural *-s* (Two books)
- irregular past forms (Baby *went*)
- possessive *'s* (Daddy's hat)
- copula (Annie *is* happy)
- articles *the* and *a*
- regular past *-ed* (She walked)
- third person singular simple present *-s* (She runs)
- auxiliary *be* (He *is* coming)

Brown and his colleagues found that a child who had mastered the grammatical morphemes at the bottom of the list was sure to have mastered those at the top, but the reverse was not true. Thus, there was evidence for a 'developmental sequence' or order of acquisition. However, the children did not acquire the morphemes at the same age or rate. Eve had mastered nearly all the morphemes before she was two-and-a-half years old, while Sarah and Adam were still working on them when they were three-and-a-half or four.

Brown's longitudinal work was confirmed in a CROSS-SECTIONAL study of twenty-one children. Jill and Peter de Villiers (1973) found that children who correctly used the morphemes that Adam, Eve, and Sarah had acquired late were also able to use the ones that Adam, Eve, and Sarah had acquired earlier. The children mastered the morphemes at different ages, just as Adam, Eve, and Sarah had done, but the order of their acquisition was very similar. They were similar to each other and similar to Adam, Eve, and Sarah. Many hypotheses have been advanced to explain why these grammatical morphemes are acquired in the observed order. Researchers have studied the frequency with which the morphemes occur in parents' speech, the cognitive complexity of the meanings represented by each morpheme, and the difficulty of perceiving or pronouncing them. In the end, there has been no simple satisfactory explanation for the sequence, and most researchers agree

that the order is determined by an interaction among a number of different factors.

To supplement the evidence we have from simply observing children, some carefully designed procedures have been developed to further explore children's knowledge of grammatical morphemes. One of the first and best known is the so-called 'wug test' developed by Jean Berko Gleason in the 1950s. In this 'test', children are shown drawings of imaginary creatures with novel names or people performing mysterious actions. For example, they are told, 'Here is a wug. Now there are two of them. There are two ____'. or 'Here is a man who knows how to bod. Yesterday he did the same thing. Yesterday, he ____'. By completing these sentences with 'wugs' and 'bodded', children demonstrate that they know rules for the formation of plural and simple past in English. By generalizing these patterns to words they have never heard before, they show that their language is not just a list of memorized word pairs such as 'book/books' and 'nod/nodded'.

The acquisition of other language features also shows how children's language develops systematically, and how they go beyond what they have heard to create new forms and structures.

Negation

Children learn the functions of negation very early. That is, they learn to comment on the disappearance of objects, to refuse a suggestion, or reject an assertion, even at the single word stage. However, as Lois Bloom's (1991) longitudinal studies show, even though children understand these functions and express them with single words and gestures, it takes some time before they can express them in sentences, using the appropriate words and word order. The following stages in the development of negation have been observed in the acquisition of English. Similar stages have been observed in other languages as well (Wode 1981).

Stage 1

Negation is usually expressed by the word 'no', either all alone or as the first word in the utterance.

No. No cookie. No comb hair.

Stage 2

Utterances grow longer and the sentence subject may be included. The negative word appears just before the verb. Sentences expressing rejection or prohibition often use 'don't'.

Daddy no comb hair.

Don't touch that!

Stage 3

The negative element is inserted into a more complex sentence. Children may add forms of the negative other than 'no', including words like 'can't' and 'don't'. These sentences appear to follow the correct English pattern of attaching the negative to the auxiliary or modal verb. However, children do not yet vary these forms for different persons or tenses:

I can't do it. He don't want it.

Stage 4

Children begin to attach the negative element to the correct form of auxiliary verbs such as 'do' and 'be':

You didn't have supper. She doesn't want it.

Even though their language system is by now quite complex, they may still have difficulty with some other features related to negatives.

I don't have no more candies.

Questions

The challenge of learning complex language systems is also illustrated in the developmental stages through which children learn to ask questions.

There is a remarkable consistency in the way children learn to form questions in English. For one thing, there is a predictable order in which the '*wh*-words' emerge (Bloom 1991). 'What' is generally the first *wh*-question word to be used. It is often learned as part of a CHUNK ('Whassat?') and it is some time before the child learns that there are variations of the form, such as 'What is that?' and 'What are these?'

'Where' and 'who' emerge very soon. Identifying and locating people and objects are within the child's understanding of the world. Furthermore, adults tend to ask children just these types of questions in the early days of language learning, for example, 'Where's Mommy?', or 'Who's that?'

'Why' emerges around the end of the second year and becomes a favourite for the next year or two. Children seem to ask an endless number of questions beginning with 'why', having discovered how effectively this little word gets adults to engage in conversation, for example, 'Why that lady has blue hair?'

Finally, when the child has a better understanding of manner and time, 'how' and 'when' emerge. In contrast to 'what', 'where', and 'who' questions, children sometimes ask the more cognitively difficult 'why', 'when', and 'how' questions without always understanding the answers they get, as the following conversation with a four-year-old clearly shows:

Child When can we go outside?

Parent In about five minutes.

Child 1-2-3-4-5!! Can we go now?

The ability to use these question words is at least partly tied to children's cognitive development. It is also predicted in part by the questions children are asked and the linguistic complexity of questions with different *wh*-words. Thus it does not seem surprising that there is consistency in the sequence of their acquisition. Perhaps more remarkable is the consistency in the acquisition of word order in questions. This development is not based on learning new meanings, but rather on learning different linguistic forms to express meanings that are already understood.

Stage 1

Children's earliest questions are single words or simple two- or three-word sentences with rising intonation:

Cookie? Mummy book?

At the same time, they may produce some correct questions—correct because they have been learned as chunks:

Where's Daddy? What's that?

Stage 2

As they begin to ask more new questions, children use the word order of the declarative sentence, with rising intonation.

You like this? I have some?

They continue to produce the correct chunk-learned forms such as 'What's that?' alongside their own created questions.

Stage 3

Gradually, children notice that the structure of questions is different and begin to produce questions such as:

Can I go? Are you happy?

Although some questions at this stage match the adult pattern, they may be right for the wrong reason. To describe this, we need to see the pattern from the child's perspective rather than from the perspective of the adult grammar. We call this stage 'fronting' because the child's rule seems to be that questions are formed by putting something—a verb form or question word—at the 'front' of a sentence, leaving the rest of the sentence in its statement form.

Is the teddy is tired? Do I can have a cookie?

Why you don't have one? Why you caught it?

Stage 4

At stage 4, some questions are formed by subject–auxiliary inversion. The questions resemble those of stage 3, but there is more variety in the auxiliaries that appear before the subject.

Are you going to play with me?

At this stage, children can even add 'do' in questions in which there would be no auxiliary in the declarative version of the sentence.

Do dogs like ice cream?

Even at this stage, however, children seem able to use either inversion or a *wh*- word, but not both. Therefore, we may find inversion in 'yes/no' questions but not in *wh*-questions, unless they are FORMULAIC units such as 'What's that?'

Stage 5

At stage 5, both *wh*- and 'yes/no' questions are formed correctly.

Are these your boots? Why did you do that? Does Daddy have a box?

Negative questions may still be a bit too difficult.

Why the teddy bear can't go outside?

And even though performance on most questions is correct, there is still one more hurdle. When *wh*- words appear in subordinate clauses or embedded questions, children overgeneralize the inverted form that would be correct for simple questions and produce sentences such as:

Ask him why can't he go out.

Stage 6

At this stage, children are able to correctly form all question types, including negative and complex embedded questions.

Passage through developmental sequences does not always follow a steady uninterrupted path. Children appear to learn new things and then fall back on old patterns when there is added stress in a new situation or when they are using other new elements in their language. But the overall path takes them toward mastery of the language that is spoken around them.

The pre-school years

By the age of four, most children can ask questions, give commands, report real events, and create stories about imaginary ones—using correct word order and grammatical markers most of the time. In fact, it is generally accepted that by age four, children have mastered the basic structures of the

language or languages spoken to them in these early years. Three- and four-year-olds continue to learn vocabulary at the rate of several words a day. They begin to acquire less frequent and more complex linguistic structures such as passives and relative clauses.

Much of children's language acquisition effort in the late pre-school years is spent in developing their ability to use language in a widening social environment. They use language in a greater variety of situations. They interact more often with unfamiliar adults. They begin to talk sensibly on the telephone to invisible grandparents (younger children do not understand that their telephone partner cannot see what they see). They acquire the aggressive or cajoling language that is needed to defend their toys in the playground. They show that they have learned the difference between how adults talk to babies and how they talk to each other, and they use this knowledge in elaborate pretend play in which they practise using these different 'voices'. In this way, they explore and begin to understand how and why language varies.

In the pre-school years, they also develop METALINGUISTIC AWARENESS, the ability to treat language as an object separate from the meaning it conveys. Three-year-old children can tell you that it's 'silly' to say 'drink the chair', because it doesn't make sense. However, although they would never say 'cake the eat', they are less sure that there's anything wrong with it. They may show that they know it's a bit odd, but they will focus mainly on the fact that they can understand what it means. Five year-olds, on the other hand, know that 'drink the chair' is wrong in a different way from 'cake the eat'. They can tell you that one is 'silly' but the other is 'the wrong way around'.

The school years

Although pre-school children acquire complex knowledge and skills for language and language use, the school setting will require new ways of using language and bring new opportunities for language development.

Children develop the ability to understand language and to use it to express themselves in the pre-school years. In the school years, these abilities expand and grow. Children also develop more sophisticated metalinguistic awareness. Learning to read gives a major boost to this aspect of language development. Seeing words represented by letters and other symbols on a page leads children to a new understanding that language has form as well as meaning. Reading reinforces the understanding that a 'word' is separate from the thing it represents. Unlike three-year-olds, children who can read understand that 'the' is a word, just as 'house' is. They understand that

'caterpillar' is a longer word than 'train', even though the object it represents is substantially shorter! Metalinguistic awareness also includes the discovery of such things as ambiguity. Knowing that words and sentences can have multiple meaning gives children access to word jokes, trick questions, and riddles, which they love to share with their friends and family.

One of the most impressive language developments in the early school years is the astonishing growth of vocabulary. Many words are acquired in early childhood, when the repetition of ordinary events and experiences provides frequent exposure to a limited number of words. Children enter school with the ability to understand and produce hundreds or even a few thousand words. Many more are learned at school. In both the spoken and written language at school, some words (for example, 'homework', 'ruler', and 'workbook') appear frequently in situations where their meaning is either immediately or gradually revealed. Words like 'population' or 'latitude' occur less frequently, but they are made important by their significance in academic subject matter. Vocabulary grows at a rate between several hundred and more than a thousand words a year, depending mainly on how much and how widely children read (Nagy, Herman, and Anderson 1985). The kind of vocabulary growth required for school success is likely to come from both reading for assignments and reading for pleasure, whether narrative or non-fiction. Dee Gardner (2004) suggests that reading a variety of text types is an essential part of vocabulary growth. His research has shown how the range of vocabulary in narrative texts is different from that in non-fiction. There are words in non-fiction texts that are unlikely to occur in stories or novels. In addition, non-fiction tends to include more opportunities to see a word in its different forms (for example, 'mummy', 'mummies', 'mummified'). The importance of reading for vocabulary growth is seen when observant parents report a child using a new word but mispronouncing it in a way that reveals it has been encountered only in written form.

Another important development in the school years is the acquisition of different language *REGISTERS*. Children learn how written language differs from spoken language, how the language used to speak to the principal is different from the language of the playground, how the language of a science report is different from the language of a narrative. As Terry Piper (1998) and others have documented, some children will have even more to learn. They come to school speaking an ethnic or regional *VARIETY* of the school language that is quite different from the one used by the teacher. They will have to learn that another variety, often referred to as the *STANDARD VARIETY* is required for successful academic work. Other children arrive at school speaking a different language altogether. For these children, the work of language learning in the early school years presents additional opportunities and challenges. We will return to this topic when we discuss *BILINGUALISM* in early childhood.

Explaining first language acquisition

These descriptions of language development from infancy through the early school years show that we have considerable knowledge of what children learn in their early language development. More controversial, however, are questions about how this remarkable development takes place. Over the past fifty years, three main theoretical positions have been advanced to explain it: behaviourist, innatist, and interactional/developmental perspectives.

The behaviourist perspective: Say what I say

BEHAVIOURISM was a theory of learning that was very influential in the 1940s and 1950s, especially in the United States. With regard to language learning, the best-known proponent of this psychological theory was B. F. Skinner. Traditional behaviourists hypothesized that when children imitated the language produced by those around them, their attempts to reproduce what they heard received 'positive reinforcement'. This could take the form of praise or just successful communication. Thus encouraged by their environment, children would continue to imitate and practise these sounds and patterns until they formed 'habits' of correct language use. According to this view, the quality and quantity of the language the child hears, as well as the consistency of the reinforcement offered by others in the environment, would shape the child's language behaviour. This theory gives great importance to the environment as the source of everything the child needs to learn.

Analysing children's speech: Definitions and examples

The behaviourists viewed *imitation* and *practice* as the primary processes in language development. To clarify what is meant by these two terms, consider the following definitions and examples.

Imitation: word-for-word repetition of all or part of someone else's utterance.

Mother Shall we play with the dolls?

Lucy Play with dolls.

Practice: repetitive manipulation of form.

Cindy He eat carrots. The other one eat carrots. They both eat carrots.

Now examine the transcripts from Peter, Cindy, and Kathryn. They were all about twenty-four months old when they were recorded as they played with a visiting adult. Using the definitions above, notice how Peter imitates the adult in the following dialogue.

Peter (24 months) is playing with a dump truck while two adults, Patsy and Lois, look on.

Peter Get more.

Lois You're gonna put more wheels in the dump truck?

Peter Dump truck. Wheels. Dump truck.

(later)

Patsy What happened to it (the truck)?

Peter (looking under chair for it) Lose it. Dump truck! Dump truck! Fall! Fall!

Lois Yes, the dump truck fell down.

Peter Dump truck fell down. Dump truck.

(Unpublished data from P. M. Lightbown)

If we analysed a larger sample of Peter's speech, we would see that 30–40 per cent of his sentences were imitations of what someone else had just said. We would also see that his imitations were not random. That is, he did not simply imitate 30–40 per cent of everything he heard. Detailed analyses of large samples of Peter's speech over about a year showed that he imitated words and sentence structures that were just beginning to appear in his spontaneous speech. Once these new elements became solidly grounded in his language system, he stopped imitating them and went on to imitate others. Unlike a parrot who imitates the familiar and continues to repeat the same things again and again, children appear to imitate selectively. The choice of what to imitate seems to be based on something new that they have just begun to understand and use, not simply on what is 'available' in the environment. For example, consider how Cindy imitates and practises language in the following conversations.

Cindy (24 months, 16 days) is looking at a picture of a carrot in a book and trying to get Patsy's attention.

Cindy Kawo? kawo? kawo? kawo? kawo?

Patsy What are the rabbits eating?

Cindy They eating ... kando?

Patsy No, that's a carrot.

Cindy Carrot. (pointing to each carrot on the page) The other ... carrot. The other carrot. The other carrot.

(A few minutes later, Cindy brings Patsy a stuffed toy rabbit.)

Patsy What does this rabbit like to eat?

Cindy (incomprehensible) eat the carrots.

(Cindy gets another stuffed rabbit.)

Cindy He (incomprehensible) eat carrots. The other one eat carrots. They both eat carrots.

(One week later, Cindy opens the book to the same page.)

Cindy Here's the carrots. (pointing) Is that a carrot?

Patsy Yes.

(Unpublished data from P. M. Lightbown)

Cindy appears to be working hard on her language acquisition. She practises new words and structures in a way that sounds like a student in some foreign language classes! Perhaps most interesting is that she remembers the 'language lesson' a week later and turns straight to the page in the book she had not seen since Patsy's last visit. What is most striking is that, like Peter, her imitation and practice appear to be focused on what she is currently 'working on'.

The samples of speech from Peter and Cindy seem to lend some support to the behaviourist explanation of language acquisition. Even so, as we saw, the choice of what to imitate and practise seemed determined by something inside the child rather than by the environment.

Not all children imitate and 'practise' as much as Peter and Cindy did. The amount of imitation in the speech of other children, whose development proceeded at a rate comparable to that of Cindy and Peter, has been calculated at less than 10 per cent.

Consider the examples of imitation and practice in the following conversation between Kathryn and Lois.

Kathryn (24 months)

Lois Did you see the toys I brought?

Kathryn I bring toys? Choo choo? Lois brought the choo choo train?

Lois Yes, Lois brought the choo choo train.

Kathryn (reaching for bag) I want play with choo choo train. I want play with choo choo train. (taking out slide) Want play. What's this?

Lois Oh you know what that is.

Kathryn Put down on floor. This. I do this.

(Kathryn puts the slide on the floor.)

Kathryn (taking out two cars of train) Do this. I want do this. (trying to put train together) I do this. I do this.

Lois OK. You can do it. You can do it. Look I'll show you how.

(Lois puts it together.)

Kathryn (searching in box) I get more. Get a more. No more choo choo train. Get truck. (taking out truck) Kathryn truck. Where? Where a more choo choo train?

Lois Inside. It's in the box.

Kathryn A choo choo? (taking out part of train) This is a choo choo train.

(from Bloom and Lahey 1978: 135)

Like Cindy, Kathryn sometimes repeats herself or produces a series of related 'practice' sentences, but she rarely imitates the other speaker. Instead, she asks and answers questions and elaborates on the other speaker's questions or statements.

Thus, children vary in the amount of imitation they do. In addition, many of the things they say show that they are using language creatively, not just repeating what they have heard. This is evident in the following examples.

Patterns in language

The first example shows a child in the process of learning patterns in language, in this case the rules of word formation, and overgeneralizing them to new contexts. Randall (36 months) had a sore on his hand.

Mother Maybe we need to take you to the doctor.

Randall Why? So he can doc my little bump?

Randall forms the verb 'doc' from the noun 'doctor', by analogy with farmers who farm, swimmers who swim, and actors who act.



Unfamiliar formulas

Even older children have to work out some puzzles, for example, when familiar language is used in unfamiliar ways, as in the example below. When

David (5 years, 1 month) was at his older sister's birthday party, toasts were proposed with grape juice in stemmed glasses:

Father I'd like to propose a toast.

Several minutes later, David raised his glass:

David I'd like to propose a piece of bread.

Only when laughter sent David slinking from the table did the group realize that he wasn't intentionally making a play on words! He was concentrating so hard on performing the fascinating new gesture and the formulaic expression 'I'd like to propose ...' that he failed to realize that the word he thought he knew—'toast'—was not the same toast and could not be replaced with its apparent near-synonym—'a piece of bread'.

Question formation

Randall (2 years, 9 months) asked the following questions in various situations over the course of a day.

Are dogs can wiggle their tails?

Are those are my boots?

Are this is hot?

Randall had concluded that the trick of asking questions was to put 'are' at the beginning of the sentence. His questions are good examples of Stage 3 in question development.

Order of events

Randall (3 years, 5 months) was looking for a towel.

You took all the towels away because I can't dry my hands.

He meant 'I can't dry my hands because you took all the towels away', but he made a mistake about which clause comes first. Children at this stage of language development tend to mention events in the order of their occurrence. In this case, the towels disappeared before Randall attempted to dry his hands, so that's what he said first. He did not yet understand how a word like 'before' or 'because' changes the order of cause and effect.

These examples of children's speech provide us with a window on the process of language learning. Imitation and practice alone cannot explain some of the forms created by the children. They are not merely repetitions of sentences that they have heard from adults. Rather, children appear to pick out patterns and generalize them to new contexts. They create new forms or new uses of words. Their new sentences are usually comprehensible and often correct.

Behaviourism seems to offer a reasonable way of understanding how children learn some of the regular and routine aspects of language, especially at the earliest stages. However, children who do little overt imitation acquire

language as fully and rapidly as those who imitate a lot. And although behaviourism goes some way to explaining the sorts of OVERGENERALIZATION that children make, classical behaviourism is not a satisfactory explanation for the acquisition of the more complex grammar that children acquire. These limitations led researchers to look for different explanations for language acquisition.

The innatist perspective: It's all in your mind

Noam Chomsky is one of the most influential figures in linguistics, and his ideas about how language is acquired and how it is stored in the mind sparked a revolution in many aspects of linguistics and psychology, including the study of language acquisition. A central part of his thinking is that all human languages are fundamentally innate and that the same universal principles underlie all of them. In his 1959 review of B. F. Skinner's book *Verbal Behavior*, Chomsky challenged the behaviourist explanation for language acquisition. He argued that children are biologically programmed for language and that language develops in the child in just the same way that other biological functions develop. For example, every child will learn to walk as long as adequate nourishment and reasonable freedom of movement are provided. The child does not have to be taught. Most children learn to walk at about the same age, and walking is essentially the same in all normal human beings. For Chomsky, language acquisition is very similar. The environment makes only a basic contribution—in this case, the availability of people who speak to the child. The child, or rather, the child's biological endowment, will do the rest.

Chomsky argued that the behaviourist theory failed to account for 'the logical problem of language acquisition'—the fact that children come to know more about the structure of their language than they could reasonably be expected to learn on the basis of the samples of language they hear. The language children are exposed to includes false starts, incomplete sentences, and slips of the tongue, and yet they learn to distinguish between grammatical and ungrammatical sentences. He concluded that children's minds are not blank slates to be filled by imitating language they hear in the environment. Instead, he hypothesized, children are born with a specific innate ability to discover for themselves the underlying rules of a language system on the basis of the samples of a natural language they are exposed to. This innate endowment was seen as a sort of template, containing the principles that are universal to all human languages. This UNIVERSAL GRAMMAR (UG) would prevent the child from pursuing all sorts of wrong hypotheses about how language systems might work. If children are pre-equipped with UG, then what they have to learn is the ways in which the language they are acquiring makes use of these principles.

Consider the following sentences, taken from a book by Lydia White (1989). These English sentences contain the reflexive pronoun 'himself'. Both the pronoun and the noun it refers to (the antecedent) are printed in italics. An asterisk at the beginning of a sentence indicates that the sentence is ungrammatical.

- a *John* saw *himself*.
- b **Himself* saw *John*.

In (a) and (b), it looks as if the reflexive pronoun must follow the noun it refers to. But (c) disproves this:

- c Looking after *himself* bores *John*.

If we consider sentences such as:

- d John said that *Fred* liked *himself*.
- e **John* said that Fred liked himself.
- f John told *Bill* to wash *himself*.
- g **John* told Bill to wash *himself*.

we might conclude that the noun closest to the reflexive pronoun is the antecedent. However, (h) shows that this rule won't work either:

- h *John* promised Bill to wash *himself*.

And it's even more complicated than that. Usually the reflexive must be in the same clause as the antecedent as in (a) and (d), but not always, as in (h). Furthermore, the reflexive can be in the subject position in (i) but not in (j).

- i *John* believes *himself* to be intelligent (non-finite clause).
- j **John* believes that *himself* is intelligent (finite clause).

In some cases, more than one antecedent is possible, as in (k) where the reflexive could refer to either John or Bill:

- k John showed Bill a picture of *himself*.

When we look at this kind of complexity, it seems it would be very hard to learn. And yet, most school age children would be able to correctly interpret the grammatical sentences and recognize the ungrammaticality of the others. Researchers who study language acquisition from the innatist perspective argue that such complex grammar could never be learned purely on the basis of imitating and practising sentences available in the input. They hypothesize that since all children acquire the language of their environment, they must have some innate mechanism or knowledge that allows them to discover such complex syntax in spite of limitations of the input. They hypothesize furthermore that the innate mechanism is used exclusively for language acquisition.

The innatist perspective emphasizes the fact that all children successfully acquire their native language (or languages if they live in a multilingual community). Children who are profoundly deaf will learn sign language if they are exposed to it in infancy, and their progress in the acquisition of that language system is similar to hearing children's acquisition of spoken language. Even children with very limited cognitive ability develop quite complex language systems if they are brought up in environments in which people interact with them. Children master the basic syntax and morphology of the language spoken to them in a variety of conditions—some which would be expected to enhance language development (for example, caring, attentive parents who focus on the child's language), and some which might be expected to inhibit it (for example, abusive or rejecting parents). Children achieve different levels of vocabulary, creativity, social grace, and so on, but virtually all achieve mastery of the structure of the language or languages spoken to them. This is seen as support for the hypothesis that language is somehow separate from other aspects of cognitive development and may depend on a specific module of the brain.

The Critical Period Hypothesis

Chomsky's ideas are often linked to the CRITICAL PERIOD HYPOTHESIS (CPH)—the hypothesis that animals, including humans, are genetically programmed to acquire certain kinds of knowledge and skill at specific times in life. Beyond those 'critical periods', it is either difficult or impossible to acquire those abilities. With regard to language, the CPH suggests that children who are not given access to language in infancy and early childhood (because of deafness or extreme isolation) will never acquire language if these deprivations go on for too long.

It is difficult to find evidence for or against the CPH, since nearly all children are exposed to language at an early age. However, history has documented a few 'natural experiments' where children have been deprived of contact with language. Two of the most famous cases are those of Victor and Genie.

In 1799, a boy who became known as Victor was found wandering naked in the woods in France. When he was captured, he was about twelve years old and completely wild, apparently having had no contact with humans. Jean-Marc-Gaspard Itard, a young doctor accustomed to working with deaf children, devoted five years to socializing Victor and trying to teach him language. Although he succeeded to some extent in developing Victor's sociability, memory, and judgement, there was little progress in his language ability. Victor responded only to sounds that had had meaning for him in the forest, such as the cracking of a nut, animal sounds, or the sound of rain. He eventually spoke only two words, his favourite food 'lait' (milk) and his governess's frequent exclamation 'O Dieu!' (Oh, God!). He said 'lait' only when he saw a glass of milk. He never used the word to ask for it.

Nearly two hundred years later, Genie, a thirteen-year-old girl who had been isolated, neglected, and abused, was discovered in California (Rymer 1993). Because of the irrational demands of a disturbed father and the submission and fear of an abused mother, Genie had spent more than eleven years tied to a chair or a crib in a small, darkened room. Her father had forbidden his wife and son to speak to Genie and had himself only growled and barked at her. She was beaten when she made any kind of noise, and she had long since resorted to complete silence. Genie was undeveloped physically, emotionally, and intellectually. She had no language.

After she was discovered, Genie was cared for and educated with the participation of many teachers and therapists, including Susan Curtiss (1977). After a brief period in a rehabilitation centre, she lived in a foster home and attended special schools. Genie made remarkable progress in becoming socialized and cognitively aware. She developed deep personal relationships and strong individual tastes and traits. Nevertheless, after five years of exposure to language, Genie's language was not like that of a typical five-year old. There was a larger than normal gap between comprehension and production. She used grammatical forms inconsistently and overused formulaic and routine speech.

Although Victor and Genie appear to provide evidence in support of the CPH, it is difficult to argue that the hypothesis is confirmed on the basis of evidence from such unusual cases. We cannot know with certainty what other factors besides biological maturity might have contributed to their inability to learn language. It is not possible to determine whether either of them suffered from brain damage, developmental delays, or a specific language impairment, even before they were separated from normal human interaction. However, there are some children who come from ordinary homes, yet do not have access to language at the usual time. This is the case for some profoundly deaf children who have hearing parents. Hearing parents may not realize that their child cannot hear because the child uses other senses to interact in an apparently normal way. Thus, the early childhood period may be normal and loving but devoid of language that the children can access. These children's later experience in learning sign language has been the subject of some important research related to the critical period.

Elissa Newport (1990) and her colleagues studied deaf users of AMERICAN SIGN LANGUAGE (ASL). Only 5–10 per cent of the profoundly deaf are born to deaf parents, and only these children are likely to be exposed to ASL from birth. The remainder of the profoundly deaf population begin learning ASL at different ages, often when they start attending a residential school where sign language is used for day-to-day communication.

Like oral and written languages, ASL makes use of grammatical markers to indicate such things as time (for example, past tense) and number. These

markers are expressed through specific hand or body movements. The researchers studied the ability to produce and comprehend grammatical markers in Native signers (who were exposed to ASL from birth), Early learners (who began using ASL between four and six years of age), and Late learners (who began learning ASL after age twelve).

They found no difference between the groups in some aspects of their use of ASL. However, on tests focusing on grammatical markers, the Native group used the forms more consistently than the Early group who, in turn, used them more consistently than the Late group. The researchers concluded that their study supports the hypothesis that there is a critical period for first language acquisition, whether that language is oral or gestural.

We will return to a discussion of the CPH in Chapter 3 when we look at the age issue in second language acquisition.

The innatist perspective is thus partly based on evidence for a critical period. It is also seen as an explanation for 'the logical problem of language acquisition', that is, the question of how adult speakers come to know the complex structure of their first language on the basis of language that they actually hear.

Interactionist/developmental perspectives: Learning from inside and out

Cognitive and developmental psychologists argue that the innatists place too much emphasis on the 'final state' (the COMPETENCE of adult NATIVE SPEAKERS) and not enough on the developmental aspects of language acquisition. In their view, language acquisition is but one example of the human child's remarkable ability to learn from experience, and they see no need to assume that there are specific brain structures devoted to language acquisition. They hypothesize that what children need to know is essentially available in the language they are exposed to as they hear it used in thousands of hours of interactions with the people and objects around them.

Developmental psychologists and psycholinguists have focused on the interplay between the innate learning ability of children and the environment in which they develop. These researchers attribute considerably more importance to the environment than the innatists do even though they also recognize a powerful learning mechanism in the human brain. They see language acquisition as similar to and influenced by the acquisition of other kinds of skill and knowledge, rather than as something that is different from and largely independent of the child's experience and cognitive development. Indeed, researchers such as Dan Slobin (1973) have long emphasized the close relationship between children's cognitive development and their acquisition of language.

Piaget and Vygotsky

One of the earliest proponents of the view that children's language is built on their cognitive development was the Swiss psychologist/epistemologist, Jean Piaget (1951/1946). In the early decades of the twentieth century, Piaget observed infants and children in their play and in their interaction with objects and people. He was able to trace the development of their cognitive understanding of such things as object permanence (knowing that things hidden from sight are still there), the stability of quantities (regardless of changes in their appearance (knowing that ten pennies spread out to form a long line are not more numerous than ten pennies in a tightly squeezed line)), and logical inferencing (figuring out which properties of a set of rods—size, weight, material, etc.—cause some rods to sink and others to float on water). It is easy to see from this how children's cognitive development would partly determine how they use language. For example, the use of certain terms such as 'bigger' or 'more' depend on the children's understanding of the concepts they represent. The developing cognitive understanding is built on the interaction between the child and the things that can be observed or manipulated. For Piaget, language was one of a number of symbol systems that are developed in childhood. Language can be used to represent knowledge that children have acquired through physical interaction with the environment.

Another influential student of child development was the psychologist Lev Vygotsky (1978). He observed interactions among children and also between children and adults in schools in the Soviet Union in the 1920s and 1930s. He concluded that language develops primarily from social interaction. He argued that in a supportive interactive environment, children are able to advance to a higher level of knowledge and performance. Vygotsky referred to this metaphorical place in which the children could do more than they would be capable of independently as the ZONE OF PROXIMAL DEVELOPMENT (ZPD). He observed the importance of conversations that children have with adults and with other children and saw in these conversations the origins of both language and thought. Vygotsky's view differs from Piaget's. Piaget saw language as a symbol system that could be used to express knowledge acquired through interaction with the physical world. For Vygotsky, thought was essentially internalized speech, and speech emerged in social interaction.

Cross-cultural research

Since the 1970s, researchers have studied children's language learning environments in a great many different cultural communities. The research has focused not only on the development of language itself, but also on the ways in which the environment provides what children need for language acquisition. Starting in the mid-1980s, Dan Slobin has edited a series of

volumes devoted to international research on language acquisition, providing examples and analyses of child language and the language learning environment from communities around the world. One of the most remarkable resources for child language researchers is the Child Language Data Exchange System (CHILDES), where researchers have contributed millions of words of child language data in dozens of languages in recorded and transcribed forms (MacWhinney 1995; <http://chilides.psy.cmu.edu/>).

One result of the crosscultural research is the description of the differences in childrearing patterns. Catherine Snow (1995) and others have studied the apparent effects on language acquisition of the ways in which adults talk to and interact with young children. In middle-class North American homes, researchers observed that adults often modify the way they speak when talking to little children. This CHILD-DIRECTED SPEECH may be characterized by a slower rate of delivery, higher pitch, more varied intonation, shorter, simpler sentence patterns, stress on key words, frequent repetition, and paraphrase. Furthermore, topics of conversation emphasize the child's immediate environment, the 'here and now', or experiences that the adult knows the child has had. Adults often repeat the content of a child's utterance, but they expand or RECAST it into a grammatically correct sentence. For example, when Peter says, 'Dump truck! Dump truck! Fall! Fall!', Lois responds, 'Yes, the dump truck fell down.'



Researchers working in a 'language socialization' framework have studied language acquisition in children from a variety of cultural groups. They have found that the kind of child-directed speech observed in middle-class American homes is by no means universal. In some societies, adults do not engage in conversation or verbal play with very young children.

For example, Bambi Schieffelin (1990) found that Kaluli mothers in Papua New Guinea did not consider their children to be appropriate conversational partners. Martha Crago (1992) observed that in traditional Inuit society, children are expected to watch and listen to adults. They are not expected or encouraged to participate in conversations with adults until they are older and have more developed language skills. Other researchers have observed that in some societies, young children interact primarily with older siblings who serve as their caregivers. Even within the United States, Shirley Brice Heath (1983) and others have documented substantial differences in the ways in which parents in different socioeconomic and ethnic groups interact with their children. Thus, the patterns of parent-child interaction and child-directed speech that were first observed in middle-class North American families are far from universal. Nevertheless, in every society, children are in situations in which they hear language that is meaningful to them in their environment. And they achieve full competence in the community language. Thus, it is difficult to judge the long-term effect of the modifications that some adults make in speech addressed to children.

The importance of interaction

The role of interaction between a language-learning child and an INTERLOCUTOR who responds in some way to the child is illuminated by cases where such interaction is missing. Jacqueline Sachs and her colleagues (1981) studied the language development of a child they called Jim. He was a hearing child of deaf parents, and his only contact with oral language was through television, which he watched frequently. The family was unusual in that the parents did not use sign language with Jim. Thus, although in other respects he was well cared for, Jim did not begin his linguistic development in a normal environment in which a parent communicated with him in either oral or sign language. A language assessment at three years and nine months indicated that he was well below age level in all aspects of language. Although he attempted to express ideas appropriate to his age, he used unusual, ungrammatical word order.

When Jim began conversational sessions with an adult, his expressive abilities began to improve. By the age of four years and two months most of the unusual speech patterns had disappeared, replaced by structures more typical of his age. Jim's younger brother Glenn did not display the same type of language delay. Glenn's linguistic environment was different in that he had his older brother as a conversational partner.

Jim showed very rapid acquisition of the structures of English once he began to interact with an adult on a one-to-one basis. The fact that he had failed to acquire language normally prior to this experience suggests that impersonal sources of language such as television or radio alone are not sufficient. One-

to-one interaction gives the child access to language that is adjusted to his or her level of comprehension. When a child does not understand, the adult may repeat or paraphrase. The response of the adult may also allow children to find out when their own utterances are understood. Television, for obvious reasons, does not provide such interaction. Even in children's programmes, where simpler language is used and topics are relevant to younger viewers, no immediate adjustment is made for the needs of an individual child. Once children have acquired some language, however, television can be a source of language and cultural information.

Connectionism

Another recent view of language acquisition comes from CONNECTIONISM. Connectionists differ sharply from the Chomskyan innatists because they hypothesize that language acquisition does not require a separate 'module of the mind' but can be explained in terms of learning in general. Furthermore, connectionists argue that what children need to know is essentially available to them in the language they are exposed to. Some of the research has involved computer simulations in which language samples are provided as input to a fairly simple program. The goal is to show that the computer program can 'learn' certain things if it is exposed to them enough. The program can even generalize beyond what it has actually been exposed to and make the same kinds of creative 'mistakes' that children make, such as putting a regular *-ed* ending on an irregular verb, for example, *eated*.

Researchers such as Jeffrey Elman and his colleagues (1996) explain language acquisition in terms of how children acquire links or 'connections' between words and phrases and the situations in which they occur. They claim that when children hear a word or phrase in the context of a specific object, event, or person, an association is created in the child's mind between the word or phrase and what it represents. Thus, hearing a word brings to mind the object, and seeing the object brings to mind the word or phrase. Eventually any of the characteristics of the object or event may trigger the retrieval of the associated word or phrase from memory. For example, a child may first recognize the word 'cat' only in reference to the family pet and only when the cat is miaowing beside the kitchen door. As the word is heard in more contexts—picture books, furry toys, someone else's cat—the child recognizes and uses the word as the label for all these cats. However, at a later point, the word may be generalized to other furry creatures as well, indicating that connections have been made to characteristics of the cat and not to an entity that adults know as 'cat'. Then there is another learning process involved in 'pruning' the connections so that 'cat' applies only to felines—at least until more metaphorical meanings are learned later in life.

In a connectionist model, language acquisition is not just a process of associating words with elements of external reality. It is also a process of associating words and phrases with the other words and phrases that occur with them, or words with grammatical morphemes that occur with them. For example, children learning languages in which nouns have grammatical gender learn to associate the appropriate article and adjective forms with nouns. Similarly, they learn to associate pronouns with the verb forms that mark person and number. They learn which temporal adverbs go with which verb tenses. According to connectionist theory, all this is possible because of the child's general ability to develop associations between things that occur together.

Of particular importance to the connectionist hypothesis is the fact that children are exposed to many thousands of opportunities to learn words and phrases. Learning takes place gradually, as the number of links between language and meaning are built up. They argue that acquisition of language, while remarkable, is not the only remarkable feat accomplished by the child. They compare it to other cognitive and perceptual learning, including learning to 'see'.

Language disorders and delays

Although most children progress through the stages of language development without significant difficulty or delay, there are some children for whom this is not the case. A discussion of the various types of disabilities—including deafness, articulatory problems, dyslexia, etc.—that sometimes affect language development is outside the scope of this book. It is essential that parents and teachers be encouraged to seek professional advice if they feel that a child is not developing language normally, keeping in mind that the range for 'normal' is wide indeed.

While most children produce recognizable first words by twelve months, some may not speak before the age of three years. In very young children, one way to determine whether delayed language reflects a problem or simply an individual difference within the normal range is to determine whether the child responds to language and appears to understand even if he or she is not speaking. For older children, delays in learning to read that seem out of keeping with a child's overall intellectual functioning may suggest that there is a specific problem in that domain. Some children seem to begin reading almost by magic, discovering the mysteries of print with little direct instruction. For most children, instruction that includes some systematic attention to sound-letter correspondences allows them to unlock the treasure chest of reading. Both groups fall within a normal range. For some children, however, reading presents such great challenges that they need expert help beyond what is available in a typical classroom.

As Jim Cummins (1984, 2000) and others have pointed out, one particular group of children who have often been misdiagnosed as having language delays or disorders are children who arrive at their first day of school without an age-appropriate knowledge of the language of the school. This includes immigrant children who speak another language at home, minority language children whose home language is different from the school language, and children who speak a different variety of the school language. Unfortunately, it often happens that these children's knowledge of a different language or language variety is interpreted as a lack of knowledge of language in general. As a result, they are sometimes placed in remedial or special education classes. It is often the case that the school is not equipped to provide an adequate assessment of children's ability to use their home language. Schools may not have programmes for second language learners that allow them to continue to use their home language. The development of bilingual or second language learning children is of enormous importance. Indeed, the majority of the world's children are exposed to more than one language, either in early childhood or from the time they enter school. Researchers have recently made important progress in providing guidelines that can help educators distinguish between disability and diversity (Seymour and Pearson 2004).

Childhood bilingualism

Early childhood bilingualism is a reality for millions of children throughout the world. Some children learn multiple languages from earliest childhood; others acquire additional languages when they go to school. The acquisition and maintenance of more than one language can open doors to many personal, social, and economic opportunities.

Children who learn more than one language from earliest childhood are referred to as 'simultaneous bilinguals', whereas those who learn another language later may be called 'sequential bilinguals'. There is a considerable body of research on children's ability to learn more than one language in their earliest years. We sometimes hear people express the opinion that it is too difficult for children to cope with two languages. They fear that the children will be confused or will not learn either language well. However, there is little support for the myth that learning more than one language in early childhood is a problem for children (Genesee, Crago, and Paradis 2004). Although some studies show minor early delays for simultaneous bilinguals, there is no evidence that learning two languages substantially slows down their linguistic development or interferes with cognitive and academic development. Indeed many simultaneous bilinguals achieve high levels of proficiency in both languages. Ellen Bialystok (1991,

2001) and other developmental psychologists have found convincing evidence that bilingualism can have positive effects on abilities that are related to academic success, such as metalinguistic awareness. Limitations that may be observed in the language of bilingual individuals are more likely to be related to the circumstances in which each language is learned than to any limitation in the human capacity to learn more than one language. For example, if one language is heard much more often than the other or is more highly valued in the community, that language may eventually be used better than, or in preference to, the other.

There may be reason to be concerned, however, about situations where children are cut off from their family language when they are very young. Lily Wong-Fillmore (1991) observed that when children are 'submerged' in a different language for long periods in pre-school or day care, their development of the family language may be slowed down or stalled before they have developed an age-appropriate mastery of the new language. Eventually they may stop speaking the family language altogether.

Wallace Lambert (1987) called this loss of one language on the way to learning another **SUBTRACTIVE BILINGUALISM**. It can have negative consequences for children's self-esteem, and their relationships with family members are also likely to be affected by such early loss of the family language. In these cases, children seem to continue to be caught between two languages: they have not yet mastered the one language, and they have not continued to develop the other. During the transition period, they may fall behind in their academic learning. Unfortunately, the 'solution' educators sometimes propose to parents is that they should stop speaking the family language at home and concentrate instead on speaking the school language with their children. The evidence suggests that a better solution is to strive for **ADDITIVE BILINGUALISM**—the maintenance of the home language while the second language is being learned. This is especially true if the parents are also learners of the second language. If parents continue to use the language that they know best, they are able to express their knowledge and ideas in ways that are richer and more elaborate than they can manage in a language they do not know as well. Using their own language in family settings is also a way for parents to maintain their own self-esteem, especially as they may be struggling with the new language outside the home, at work, or in the community. Maintaining the family language also creates opportunities for the children to continue both cognitive and affective development in a language they understand easily while they are still learning the second language. As Virginia Collier (1989) and others have shown, the process of developing a second language takes years. But teachers, parents, and students need to know that the benefits of additive bilingualism will reward patience and effort.

Summary

In this chapter we have focused on some of the research on children's language that has influenced second language acquisition research. We have described three broad theoretical perspectives for explaining first language acquisition. In Chapter 2, we will look at the theoretical perspectives that have been proposed to explain second language acquisition.

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