THEORIES OF LANGUAGE ACQUISITION

IMITATION

Language acquisition has long been thought of as a process of imitation and reinforcement. Children learn to speak, in the popular view, by copying the utterances heard around them, and by having their responses strengthened by the repetitions, corrections, and other reactions that adults provide. In recent years, it has become clear that this principle will not explain all the facts of language development. Children do imitate a great deal, especially in learning sounds and vocabulary; but little of their grammatical ability can be explained in this way. Two kinds of evidence are commonly used in support of this criticism – one based on the kind of language children produce, the other on what they do not produce.

The first piece of evidence derives from the way children handle irregular grammatical patterns. When they encounter such irregular past-tense forms (p. 90) as *went* and *took*, or such plural forms as *mice* and *sheep*, there is a stage when they replace these by forms based on the regular patterns of the language. They say such things as *wented*, *taked*, *mices*, *mouses*, and *sheeps*. Evidently, children assume that grammatical usage is regular, and try to work out for themselves what the forms 'ought' to be – a reasoning process known as *analogy* (p. 332). They could not have learned these forms by a process of imitation. Adults do not go around saying such things as *wented* and *sheeps*!

The other kind of evidence is based on the way children seem unable to imitate adult grammatical constructions exactly, even when invited to do so ('elicited imitation', p. 234). The best-known demonstration of this principle in action is the dialogue reported by the American psycholinguist, David McNeill (1933–), where a child proved unable to use a pattern, even though the parent presented the correct adult model several times:

CHILD: Nobody don't like me.
MOTHER: No, say 'Nobody likes me.'
CHILD: Nobody don't like me.
(*Eight repetitions of this dialogue.*)
MOTHER: No, now listen carefully; say '*Nobody likes me.*'
CHILD: Oh! Nobody don't likes me.

The child, at this point in its learning of grammar, was clearly not ready to use the 'single negative' pattern found in this dialect of English. Such examples suggest that language acquisition is more a matter of maturation than of imitation.

INNATENESS

The limitations of an imitation/reinforcement view of acquisition led in the 1960s to an alternative proposal, arising out of the generative account of language (§65). It was argued that children must be born with an innate capacity for language development: the human brain is 'ready' for language, in the sense that when children are exposed to speech, certain general principles for discovering or structuring language automatically begin to operate. These principles constitute a child's 'language acquisition device' (LAD).

The child uses its LAD to make sense of the utterances heard around it, deriving from this 'primary linguistic data' hypotheses about the grammar of the language – what the sentences are, and how they are constructed. This knowledge is then used to produce sentences that, after a process of trial and error, correspond to those in adult speech: the child has learned a set of generalizations, or rules, governing the way in which sentences are formed. This sequence of events can be summarized in the following way:

INPUT		LAD		OUTPUT
Primary linguistic data (adult speech)	→ General language learning principles	→ Grammatical knowledge (rules)	→	Child's speech

Jean Piaget (1896–1980)

There have been many differences of opinion over how best to characterize LAD. Some have argued that LAD provides children with a knowledge of linguistic universals (§14), such as the existence of word order and word classes; others, that it provides only general procedures for discovering how language is to be learned. But all of its supporters are agreed that some such notion is needed in order to explain the remarkable speed with which children learn to speak, and the considerable similarity in the way grammatical patterns are acquired across different children and languages. Adult speech, it is felt, cannot of itself provide a means of enabling children to work out the regularities of language for themselves, because it is too complex and disorganized (p. 52). However, it has proved difficult to formulate the detailed properties of LAD in an uncontroversial manner, in the light of the changes in generative linguistic theory that have taken place in recent years; and meanwhile, alternative accounts of the acquisition process have evolved.

COGNITION

The main alternative account argues that language acquisition must be viewed within the context of a child's intellectual development. Linguistic structures will emerge only if there is an already-established cognitive foundation – for example, before children can use structures of comparison (e.g. *This car is bigger than that*), they need first to have developed the conceptual ability to make relative judgments of size. Several early child language scholars maintained that such a relationship exists, but the most influential account stems

from the model of cognitive development proposed by the Genevan psychologist Jean Piaget (1896–1980).

Several controlled studies have been carried out investigating the link between the stages of cognitive development proposed by Piaget and the emergence of linguistic skills. The links have been most clearly shown for the earliest period of language learning (up to 18 months), relating to the development of what Piaget called 'sensori-motor' intelligence, in which children construct a mental picture of a world of objects that have independent existence. For example, during the later part of this period, children develop a sense of object permanence – they will begin to search for objects that they have seen hidden – and some scholars have argued that the ability to name classes of objects (i.e. to give them a comparably 'permanent' linguistic status) depends on the prior development of this cognitive ability. However, it is difficult to show precise correlations between specific cognitive behaviours and linguistic features at this early age. The issue is a highly controversial one, which increases in complexity as children become linguistically – and cognitively – more advanced.

INPUT

For many years, in the wake of the innateness hypothesis, the importance of the language used by adults (especially mothers) to children was minimized. But studies of 'motherese', as it came to be called in the 1970s, showed that maternal input is by no means as complex and fragmentary as proponents of innateness theory claimed it to be. Many parents do not talk to their children in the same way as they talk to other adults. Rather, they seem capable of adapting their language to give the child maximum opportunity to interact and learn. Several of these adaptations have been noted (after C. A. Ferguson, 1977).

- The utterances are considerably simplified, especially with respect to their grammar and meaning. Sentences are shorter: one study showed that the average length of maternal sentences to 2-year-olds was less than four words – half that found when the mothers talked to other adults. There is a more restricted range of sentence patterns, and a frequent use of sentence 'frames', such as *Where's –?* or *That's a –*. The meanings are predominantly 'concrete', relating to the situation in which mother and child are acting.
- There are several features whose purpose seems to be clarification. Extra information is provided that would be considered unnecessary when talking to other adults. Sentences are expanded and paraphrased and may be repeated several times. The speed of speaking is much slower than that used to other adults.
- There is also an expressive, or affective, element in motherese, shown by the use of special words or sounds. Diminutive or reduplicative words (e.g. *doggie, choo-choo*) are common. English makes particular use of a *y / ie* ending, and similar forms have been noted in several other languages, such as Japanese *-ko*, Gilyak *-k / -q*, Berber *-ʃ/-ʃtt*. Occasionally, totally different words will be used, e.g. *bunny* for 'rabbit'. There may be special use of individual sounds, such as the use of rounded lips in English, or special palatal sounds in Latvian and Marathi.

Some of these features also seem to function as ways of holding the child's attention, or of identifying particular words and sounds. This may well be the reason for the very common use of high, wide pitch-range in maternal speech. Mothers also devote a great deal of time to obtaining feedback from their children, especially in the first three years. Their speech contains a very high frequency of question forms, and many utterances have a high rising intonation (*yes?, all right?*).

These modifications are evidently important ways of establishing and maintaining meaningful communication with the child, as they can be found in the earliest mother–child interactions (§39). It has even been suggested that these features are universal, but this claim is premature in the absence of empirical studies, and there is already some counter-evidence from other cultures – several of these features are lacking in Samoan and Quiché Mayan, for instance. However, the highly structured character of maternal input is not in doubt, and its possible influence on the course of language acquisition is now taken very seriously.

Unfortunately, it is difficult to show correlations between the features of motherese and the subsequent emergence of these features in child speech, and even more problematic to move from talk about correlations to talk about causes. Some studies, searching for such relationships, have found very few; others have found occasional correlations between specific structures, though often with an appreciable time gap between the use of a feature by the mother and its subsequent use by the child; yet others argue that input structures are very closely tailored to the needs of the child (the 'fine tuning' hypothesis). The use of different research methodologies clouds the picture, but it is now plain that the nature and frequency of linguistic features in maternal input can no longer be neglected in devising theories of language acquisition.

CONCLUSIONS

It is not possible, in the present state of knowledge, to choose between these various approaches. The number of definite, general facts known about language acquisition is still very small. In particular, much more information is needed about the way children learn languages other than English. Doubtless imitative skills, a general language-learning-mechanism, cognitive awareness, and structured input all play their part in guiding the course of language acquisition. Unravelling the interdependence of these factors constitutes the main goal of future child language research.

MOTHERESE – OR OTHERESE?

The term 'motherese' seems a natural one, given the important role of mothers in early child development. However, it would be more accurate to refer to 'parentese', as fathers are also able to adapt their speech when talking to children, and use very similar strategies. Motherese and 'fatherese' are not identical, however. Fathers tend to be more intense and demanding in their communication, using more direct questions and a wider range of vocabulary.

But even 'parentese' is too specific a notion. Some of the characteristics of motherese can be found in other adults too – and even in 4-year-olds, when they talk 'down' to younger children. Moreover, in some non-Western cultures (e.g. Western Samoa), the primary caregivers may not be the parents at all, and the developing child may receive most of its linguistic stimulation from siblings, other adult relatives, or neighbouring families. A more neutral term, such as 'baby talk', is thus preferred by some researchers – though its ambiguity (speech *by* children or *to* children?) limits its usefulness. 'Caretaker speech' is also widely used.

Very little study of the nature of cultural differences has taken place. In the Samoan case, for example, many of the features of Anglo-American motherese (such as the use of simplified structure, expansions, and diminutives) were found to be absent. The turn-taking pattern was also different, often taking the form: child talks to mother → mother talks to older sibling → sibling attends to child. Such differences have important implications for the development of any theory of language acquisition in which motherese plays a part. (After E. Ochs, 1982.)

39 · THE FIRST YEAR

For many parents, a child's first words, uttered at around 1 year of age, mark the first real evidence of language development – the child has 'started to talk'. But this is to ignore a great deal of early progress during the first year, without which no first word would emerge at all. This progress has to be made in three main areas: sound production, speech perception, and speech interaction.

SOUND PRODUCTION

Between birth and 12 months, a vast change takes place in a baby's sound-producing abilities, and several stages of development have been proposed.

Stage I (0–8 weeks): Basic biological noises

Over the first few weeks of life, a baby's vocal sounds directly reflect its biological state and activities. States of hunger, pain, or discomfort that cause crying and fussing are known as *reflexive noises*. Breathing, eating, excreting, and other bodily actions concerned with survival cause a wide range of *vegetative* noises, such as sucking, swallowing, coughing, and burping. Infant reflexive cries have been studied in detail. The normal 'basic' cry consists of a series of 1-second pulses separated by brief pauses. The vocal folds (§22) vibrate strongly, and the pitch of the voice falls sharply with each pulse. The quality of the sound is similar to that of an [a] vowel.

It is not easy to attribute clearly different functions to cries at this age. Hunger and pain cries tend to merge into a single distress cry, though pain cries are often much tenser and have a different rhythm. Discomfort cries are usually much shorter ($\frac{1}{2}$ sec) and occur in brief sequences. Vegetative noises are even shorter ($\frac{1}{4}$ sec) and contain more consonant-like sounds.

There is nothing language-specific about these early sounds. However, they do have some features in common with later speech. An air-stream mechanism (§22) is being used to produce noise; there is rhythmical vocalization; the vocal folds are being used to produce pitch patterns: all of these are fundamental characteristics of later speech.

Stage II (8–20 weeks): Cooing and laughing

Between 6 and 8 weeks, the first cooing sounds are produced, generally when the baby is in a settled state. These sounds develop alongside crying, gradually becoming more frequent and more varied, as the child responds to the mother's smiles and speech. They are quieter, lower pitched, and more musical than crying, usually consisting of a short, vowel-like sound preceded by a consonant-like sound made towards the back of the mouth. Many have nasal quality.

Later in this period, cooing sounds are strung together - often 10 or more at a time. These strings are not pronounced in a rhythmical way; there are no clear intonational contours. However, some of the sequences (such as [ga] and [gu]) do begin to resemble the syllables of later speech. Then, at around 4 months, the first throaty chuckles and laughs emerge.

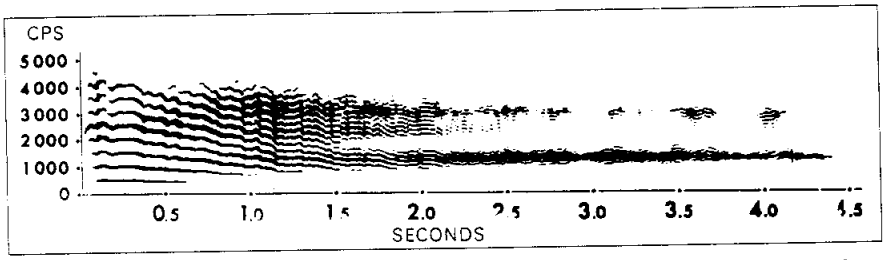
During the cooing stage, babies seem to be performing the first gross activities required for the production of speech. The tongue begins to move vertically and horizontally, and the vocal folds begin to be used in coordination with it. There is a great deal of lip movement and tongue thrusting, which it is thought may be a form of imitation.

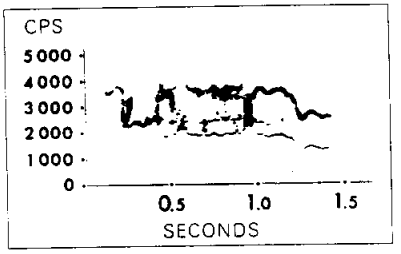
Stage III (20–30 weeks): Vocal play

The sounds of vocal play are much steadier and longer than those of cooing. Most segments are over 1 second, and consist of consonant + vowel-like sequences that are frequently repeated. They are usually at a high pitch level, and involve wide glides from high to low. A considerable range of consonant and vowel qualities is apparent, including nasal and fricative sounds made in

GOOD TALKERS?

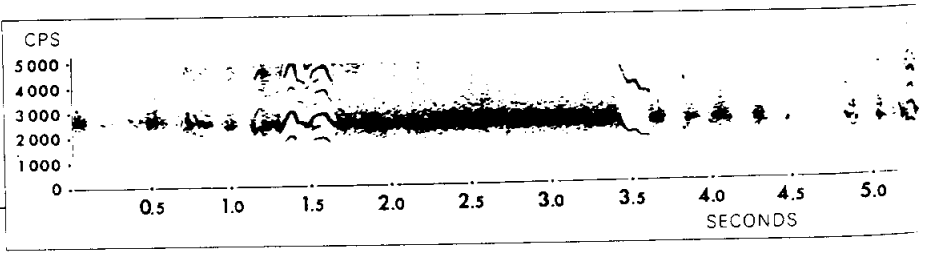
Frequent and varied vocal play and babbling is sometimes thought to be the sign of a good talker, or an indication of superior intelligence, memory, or personality. There is no evidence that any such correlations exist. There have been many quiet babies whose subsequent language development has been rapid; and, conversely, there are certain areas of mental subnormality (such as Down's syndrome) in which a good range of babbling can be heard. No-one has been able to discover a direct link between early vocalization and later intellectual or linguistic development (§7).





Acoustic analysis (p. 135) is essential in the analysis of early vocalizations. The upper trace (a) is a spectrogram of the first part of a pain cry (such as might be caused by an injection or other sudden stimulus) from a normal, healthy child: it shows a steady, full-bodied, falling pitch movement over some 4 seconds of expired breath. The infant then pauses for more air, and further expirations follow (not shown here).

Abnormal pain cries sound and look very different. Trace (b) is a cry from a baby born with a degree of brain damage: its main feature is a high-pitched, erratic phonation. Trace (c) is part of a long, strident cry (the expiration lasts for nearly 10 seconds) from a baby with meningitis. (After O. Wasz-Höckert, *et al*, 1968.)



various parts of the mouth (§27). There are many individual differences in the order of emergence of these sounds, and several changes in the focus of the activity during the period – on some days uvular sounds may be the dominant sounds heard; on other days it may be labial sounds. In due course, the sounds combine into longer sequences, to produce the first babbled utterances.

There seems to be a strong element of practice in the activities of this period, but anyone who has observed it will recognize that it also provides a great deal of enjoyment for parent and child alike.

Stage IV (25–50 weeks): Babbling

Babbling is much less varied than the sounds of vocal play, in the early part of this period. A smaller set of sounds is used with greater frequency and stability, to produce the [bababa] and other sequences known as *reduplicated* babbling (because of the repeated use of the same consonant sound). About half-way through the period, this develops into *variegated* babbling, in which consonants and vowels change from one syllable to the next (e.g. [adu]). The rhythm of the utterance and the syllable length at this point are much closer to that found in speech. Babbled utterances seem to have no meaning, though some may resemble the words of later speech.

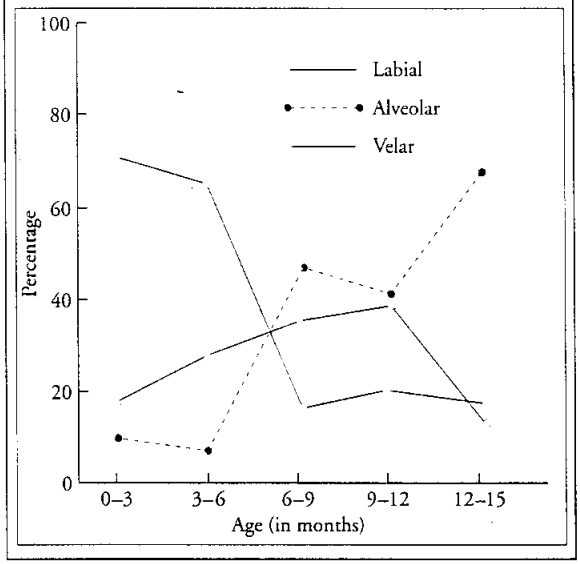
It used to be thought that there was no link between babbling and spoken language. The child was imagined to be trying out every possible sound in a random manner, and that babbling would stop before speech began. Recent studies have shown that this view does not hold. In many cases, babbling continues long after speech begins – sometimes as late as 18 months. Nor are the sounds of babbling a random selection: most of babbling consists of a small set of sounds very similar to those used in the early language to be spoken by the child. The brain seems to be controlling the development of babbling and early speech in a similar way, so that a set of well-practised sounds is available for use at the time when children become intellectually capable of using sound for the communication of meaning.

Stage V (9–18 months): Melodic utterance

Variations in melody, rhythm, and tone of voice (§29) become a major feature of child utterance towards the end of the first year. Parents begin to sense intentions behind these utterances, with their more well-defined shape, and often attribute meanings to them, such as questioning, calling, greeting, or wanting. Games and rituals may develop their own melodic contours. Individual syllables come to be used with a fixed melody, producing 'proto-words', where the sounds are clear, but it is not possible to be sure what they mean. These are the first real signs of language development, and children growing up in different language environments begin to sound increasingly unlike each other.

EARLY VOCALIZATION

Which consonant sounds (§27) do infants use most often in their early vocalizations? In the first six months, back (velar) consonants predominate. Then, between six and nine months, alveolar sounds become dominant. Labial sounds are never the most frequent. This pattern stabilizes at around nine months. Children seem to have the physical capability to produce the words of a language long before these sounds are used in speech. (After B. L. Smith & D. K. Oller, 1981.)



BABBLING IN DIFFERENT LANGUAGE ENVIRONMENTS

There is a considerable similarity in infant babbling patterns, whatever their language environment. The table below shows the occurrence of English or English-like consonant segments in the babbling of infants reared in 15 language environments. The consonants have been divided into two groups of 12: consonants which are heard frequently in English babbling (accounting in fact for about 95% of all consonants heard); and those which are heard infrequently. It can be seen that there is a very close correspondence between the different languages, though there is no identity. Only [m] and [b] turn up in all language environments.

The similarities are impressive. However, it should be noted that the numbers of children involved in these studies are very small – often only one child, and rarely more than five. The comparative picture may become more complex as the database increases. (After J. J. Locke, 1983.)

Environment	Age in months	Frequent English consonants h	d	b	m	t	g	s	w	n	k	j	p
Afrikaans	11–12	*	*	*	*	*		*		*	*		*
Mayan	9	*	*	*	*	*				*			*
Luo	12	*	*	*	*		*			*		*	
Thai	10–11		*	*	*	*				*		*	*
Japanese	9–12		*	*	*	*	*		*		*		*
Hindi	9–10	*		*	*		*	*			*		*
Chinese	8–11	*		*	*	*	*			*	*	*	*
Slovenian	11		*	*	*	*	*		*	*			*
Dutch	11	*		*	*		*		*		*		*
Spanish	9	*	*	*	*	*			*	*			*
German	10–12		*	*	*	*				*	*	*	*
Arabic	6–10	*	*	*	*				*			*	*
Norwegian	0–12	*	*	*	*	*	*	*		*	*	*	*
Latvian	6–12	*	*	*	*	*	*		*	*	*	*	*
English	1–15	*	*	*	*		*		*	*	*		

	Age in months	Infrequent English consonants v	l	θ	z	f	ʃ	ð	ŋ	ʒ	r	ʧ	ʤ
Afrikaans	11–12		*				*				*		
Mayan	9												
Luo	12		*						*				
Thai	10–11												
Japanese	9–12	*											
Hindi	9–10												
Chinese	8–11								*				
Slovenian	11		*										
Dutch	11								*				
Spanish	9												
German	10–12										*		
Arabic	6–10	*			*								
Norwegian	0–12	*	*	*				*	*				
Latvian	6–12	*											
English	1–15	*	*			*							

SPEECH PERCEPTION

Very young babies present an extraordinary range of auditory abilities. There have been several experiments in which different sounds are played to babies, and their responses monitored. For example, day-old babies have been played their mother's voice speaking normally, the same voice speaking abnormally (in a monotone), and a stranger's voice: only the first caused them to attend. Other studies have shown how babies turn their heads towards the source of a sound within the first few days of life, and prefer human voices to non-human sounds as early as 2 weeks. Abilities of this kind are so apparent that some researchers have concluded that auditory training must begin within the womb.

The question of when babies learn to distinguish the sounds of speech is controversial. An auditory ability to discriminate certain pairs of consonants or vowels (e.g. [pa] vs [ba]) is present from around 4 weeks, and this ability to discriminate becomes increasingly sophisticated in subsequent months. An early finding was that infants seem able to perceive these distinctions in the same way as adults. Adults make a sharp, categorical distinction between such sounds as [pa] and [ba] in perception experiments (p. 147). When 1-month-old infants were presented with sets of sounds that also varied only in the degree of consonant voicing, they too made categorical distinctions (P. D. Eimas *et al.*, 1971). By careful monitoring of the babies' responses (see below), it was shown that presentations of two kinds of [pa] or two kinds of [ba] caused no reaction, whereas [pa] vs [ba] did.

On the basis of such findings, the investigators hypothesized that children's perceptual apparatus is in some way 'programmed' to discriminate speech sounds – that they are born with special 'feature detectors' that respond to the acoustic properties of speech. A great deal of research has since focused on this issue, in an attempt to determine whether the children are displaying a general auditory ability (which might be shared by certain other species – experiments on both chinchillas and rhesus monkeys have shown comparable responses), or whether it is a specific ability tuned to phonetic distinctive features. The amazingly early age at which infants begin to make auditory discriminations is now accepted, but the critical issue – how these basic perceptual capacities come to be affected by the infants' emerging experience of language – is not yet resolved.

Speech comprehension

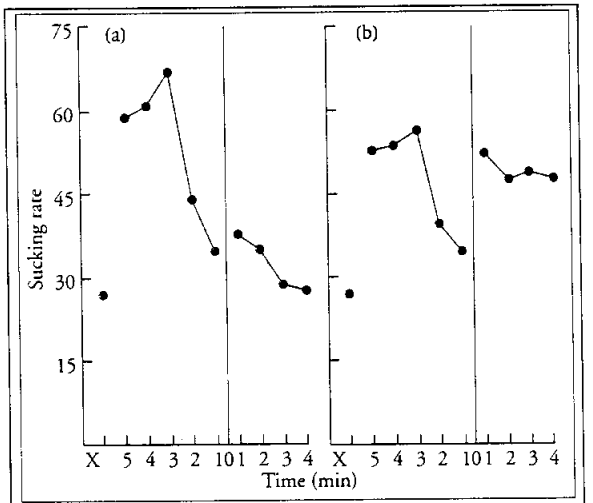
Between 2 and 4 months, babies begin to respond to the meaning of different tones of voice, such as angry, soothing, or playful voices. From around 6 months, different utterances begin to be related to their situations, e.g. *Bye-bye*, *Clap hands*, or pointing in response to questions. Some individual words may be recognized, such as names of family members, or basic responses (e.g. *No*). Most children understand several words by the end of the first year. In one study of eight children, six showed clear evidence of understanding up to 20 words by the end of the first year, and one child understood as many as 60 (H. Benedict, 1979). In all cases, this comprehension ability was at least a month ahead of the appearance of the children's first words.

HABITUATION EXPERIMENTS

A widely used technique in infant speech perception is to play sounds to the baby through a pair of headphones or a loudspeaker, and then to monitor the baby's responses, such as the speed of its heart-beat. In this approach, a sound is played several times to the child, and the heart-rate is monitored. There is an initial 'orienting response' and a period of heart-rate deceleration, as the child gets used to the stimulus. This effect is known as 'habituation'. A second sound is then played. If the child notices the difference, there will be a new orienting response.

There are many methodological problems in this kind of research, especially with very young babies. Moreover, there is still some way to go before the findings about the perception of isolated syllables can be related to the perception of these syllables in connected speech. But the habituation paradigm has shown how it is possible to make a beginning in answering the difficult question: when are linguistic contrasts first perceived?

A 1-month-old infant sucking on a special nipple while listening to a recording of different syllables. The child's normal sucking rate is first established, then sequences of sounds are presented. As the child hears the first sound, the rate of sucking increases. During subsequent repetitions of the same sound, the sucking rate shows a gradual decrease. A new sound is then played to the child. If no distinction is perceived, the sucking rate will continue to decrease; but if a change is perceived, it will show a sudden increase.



What happens when the difference between a pair of auditory stimuli is (a) ignored and (b) perceived by a group of children. The line at 0 represents the point when the sound stimulus is changed. The different presentations are shown at 1-minute intervals. X shows the normal sucking rate before the stimuli are presented. In the first case, two kinds of [ba] or two kinds of [pa] produce hardly any change in sucking rate. In the second case, the change from [pa] to [ba] (or vice versa) is clearly shown. (After P. D. Eimas *et al.*, 1971.)

SPEECH INTERACTION

From the moment a baby is born, a mother holds it in front of her, and talks to it – despite the fact that she knows it does not yet have any language! Mothers seem to have an instinct to promote communication as soon as possible, using the child's earliest biological noises (p. 238) as stimuli. Cries, burps, sneezes, and other vocalizations are seized upon and interpreted, as the extract (see box, right) shows. The mother is very ready to ascribe intentions to the baby's utterances and to build them into a conversation – something she does not do with its non-vocal activities, such as head movements or arm waving. The conversational pressure can be quite intense: in one study, over 100 questions, comments, and other utterances were used by a mother while attempting to elicit a burp from a 3-month-old: *Where is it?, Come on, come on, come on, You haven't got any, I don't believe you*, etc. (C. Snow, 1977).

It would seem that the foundations of conversation are being laid in these early interactions. The mother's behaviour is not random. She uses a large number of questions, followed by pauses, as if to show the baby that a response is expected and to provide an opportunity for it to respond. She continually greets the baby, even after very short periods of separation. Moreover, she talks to the child at length only when the child is (in principle) in a position to reply. While the baby is feeding, for example, mothers tend to remain silent, taking up the conversation only when the baby ceases to suck or needs to be winded. This cyclical pattern of speech and silence anticipates the fundamental structure of older conversations.

There are many changes in conversational style during the first year. At around 5 weeks, the exchanges become more emotive, as smiling develops. The mother's utterances change as the baby's vocalizations grow. At around 2 months, the emergence of cooing elicits a softer voice. Some time later, the baby begins to laugh, and the mother's voice becomes more varied in response. As the child starts to take interest in the environment and looks around, the mother speaks more loudly, drawing attention to different objects. Her intonation becomes more exaggerated, and she often repeats her sentences. Simple face-to-face games are played (such as peekaboo), promoting a great deal of communication.

After 6 months, the baby's more purposeful movements and explorations produce more extended commentaries by the mother. She no longer responds to every vocalization that is produced, but focuses special attention on those that are more structured in character – in particular, the first babbled utterances. Between 8 and 10 months, babies attempt to attract the attention of others by pointing. They begin to 'follow' adult conversations, looking first at one person, then at the other. By the time their first words appear, babies have learned a great deal, both from observation and from practice, about what a conversation is and how to participate within it.

ONE-SIDED CONVERSATIONS

Michael (3 months): (*Loud crying.*)

Mother: (*Enters room*) Oh my word, what a noise! What a noise! (*Picks up baby.*)

Michael: (*Sobs.*)

Mother: Oh dear, dear, dear. Didn't anybody come to see you? Let's have a look at you. (*Looks inside nappy.*) No, you're all right there, aren't you.

Michael: (*Spluttering noise.*)

Mother: Well, what is it, then? Are you hungry, is that it? Is it a long time since dinnertime?

Michael: (*Gurgles.*)

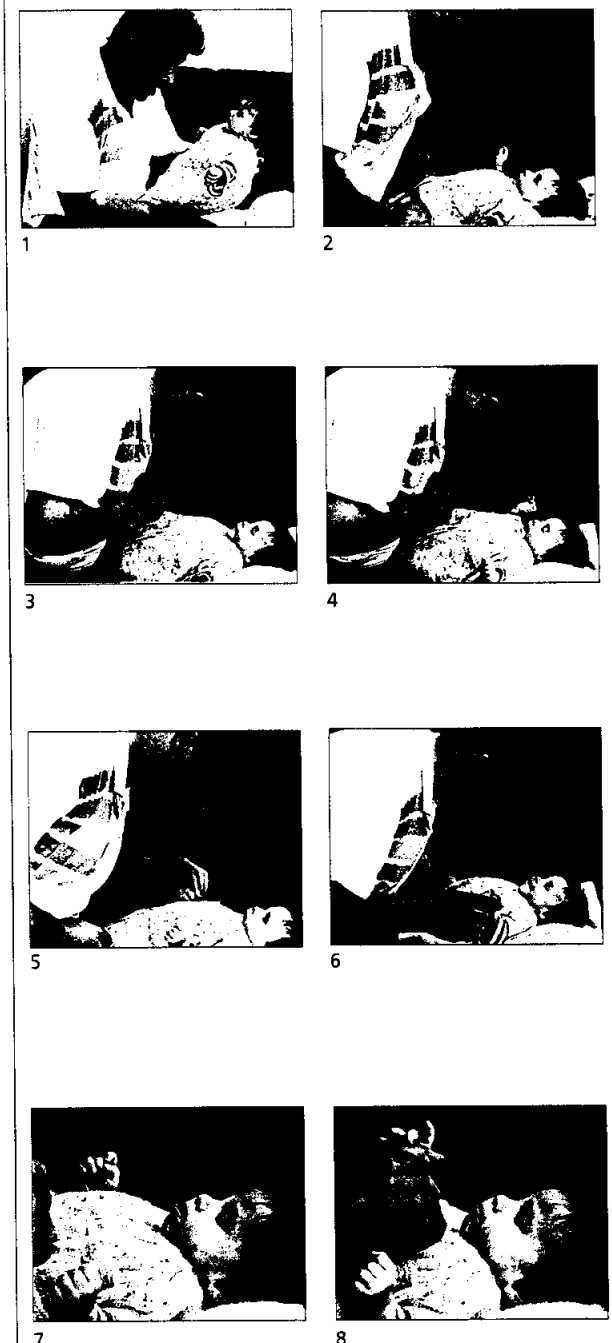
Mother: (*Nuzzles baby.*) Oh yes it is, a long long time.

Michael: (*Cooing noise.*)

Mother: Yes, I know. Let's go and get some lovely grub, then...

(D. Crystal, 1986, p. 51.)

A CONVERSATIONAL CYCLE AT AGE 10 WEEKS



Conversational cycles involve fathers too. These stills from a documentary video are taken from a proto-conversation between a Turkish father Youssouf (Y) and his 10-week-old baby girl, Hande (H). The commentary is based on work by Colwyn Trevarthen (1993).

The sequence shows Y and H gazing into each other's eyes and trading expressions of sympathy in proto-conversation. They phrase their utterances, and take turns, clearly showing their interest in one another and their feelings for the other's changing states of assertion and apprehension, uttering and attending.

1 Y takes H in his arms, looks at her eyes and speaks to her, questioning with raised eyebrows. H, complaining, meets his eyes with intense concentration, knit brows and clenched hands.
2 Placed in front of him on the couch, H addresses Y, meeting his smile and gesturing with her right hand.
3–4 She watches his hand when he speaks, then closes her eyes, grimaces, and gestures again while he moves closer, watches her, and smiles.
5–6 Y questions again with raised eyebrows, grasping H's hand as she stares at him, and they laugh together as he takes her other hand.
7–9 While H is making a serious utterance with mouth and hands, Y reaches forward to stroke her on the chin.

40 · PHONOLOGICAL DEVELOPMENT

By the time children are a year old, they have learned a great deal about the way adults use sounds to express differences in meaning (§28), but their own ability to produce these sounds lags some way behind. Some 1-year-olds can recognize several dozen words, involving a wide range of vowel and consonants, but their own ability to pronounce these words may be restricted to just two or three consonants and a single vowel. One child at 13 months could use only [b], [d], and [a], but he used these sounds to express a variety of words – for example, [ba] was used for *baby*, *bath*, *cup*, and *Peter*. By 15 months, he had added [m], [p], and [u] to his repertoire, and was thus able to distinguish a much larger number of words. He also began to use some of these consonants at the ends of words as well as at the beginning; for example, [pu] was used for a nasty smell, and [ʌp] was used for *up*. By age 2, he was using over a dozen consonants and vowels, and was able to pronounce over 200 words in an intelligible (though often immature) manner.

It is not possible, at present, to make precise predictions as to the order in which children come to use new sounds. Some children have 'favourite' sounds, which they introduce into many words, whether the sound is in the adult version or not; others 'avoid' sounds – for example, persistently dropping certain consonants at the ends of words. There may also be a great deal of variation in the way target sounds are produced - one child pronounced *blanket* as [bwati], [bati], [baki], and [batit], within a few hours of each other. Another produced ten different forms of *pen* within a single half-hour!

Nonetheless, as a result of several studies involving large numbers of children, certain general trends can be shown. For example, consonant sounds are more likely to be first used correctly at the beginnings of words; final consonants emerge later (though there are exceptions, such as the early use of final [f] and [s] in English). A 1971 survey of 100 English children showed that, during the second year, [p], [b], [k], [n], [f], [d], [g], [m], and [h] were commonly used word-initially; but only the first five of these sounds were developing word-finally (D. Olmsted, 1971). This survey also showed that at least eight vowels or diphthongs were usually in use by the end of the second year: [ɪ], [iː], [a], [ʊ], [ɒ], [ɔː], [ɑː], and [aɪ]. By age 4, all the vowels and diphthongs were in use, and only a few consonants were still posing problems – [θ], [ð], [ʤ], and [ʒ], and certain uses of [l], [ŋ], [t], and [z].

It is also possible to see trends in the way children change the sounds of the language, when they attempt to use them. These trends include:

- Fricative consonants (p. 159) tend to be replaced by stops, e.g. *see* is pronounced [tiː].
- Velar consonants (p. 157) tend to be replaced by alveolar consonants, e.g. *gone* is pronounced [dɒn].
- Consonant clusters are avoided, e.g. *sky* is pronounced [kaɪ].
- Consonants at the ends of words are often omitted, e.g. *hat* is pronounced [ha].
- Unstressed syllables are often dropped, e.g. *banana* becomes [nana].
- As words become longer, sounds in one part of a word can alter the pronunciation of sounds in other parts. This tendency for sounds to 'harmonize' (p. 163) is found with both consonants and vowels. Consonant harmony is found in such pronunciations of *dog* as [gɒg] or [dɒd], with identical (or near-identical) consonants. Vowel harmony would be heard if window were pronounced for example as [wʊʊwʊʊ] or [wada].
- There is a preference for [w] and [j] sounds to be used instead of [l] and [r], e.g. *leg* as [jeg].

THE 'FIS' PHENOMENON

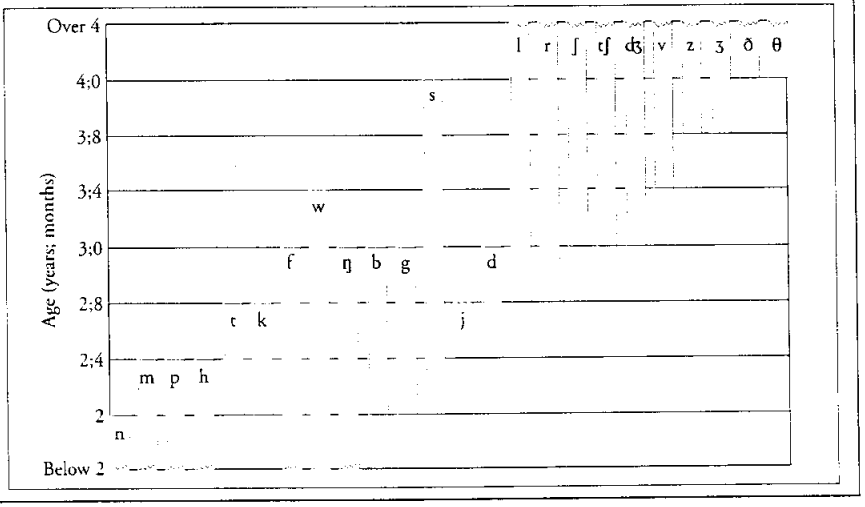
Several studies have reported intriguing conversations between a young child and an adult, showing that there may be a big difference between what children hear and what they can say. The phenomenon was first reported in the following way:

One of us, for instance, spoke to a child who called his inflated plastic fish a *fis*. In imitation of the child's pronunciation, the observer said: 'This is your *fis*?' 'No,' said the child, 'my *fis*.' He continued to reject the adult's imitation until he was told, 'That is your fish.' 'Yes,' he said, 'my *fis*.' (J. Berko & R. Brown, 1960, p. 531.)

The effect has been referred to as the '*fis* phenomenon' ever since. Such reports indicate that children know far more about adult phonology than their own pronunciation suggests.

THE EMERGENCE OF CONSONANTS

Most English consonants begin to be acquired between 2 and 4 years of age. This diagram shows the order of emergence as found in a study which elicited pronunciations of words from 20 children, using photographs of familiar objects. The periods shown are averages, and the upper age-limit is based on a correct pronunciation by 90% of the children. The diagram also shows that some sounds were already being produced correctly by the majority of the children at age 2; and others were still not being said correctly at age 4.
(After E. M. Prather *et al.*, 1975.)



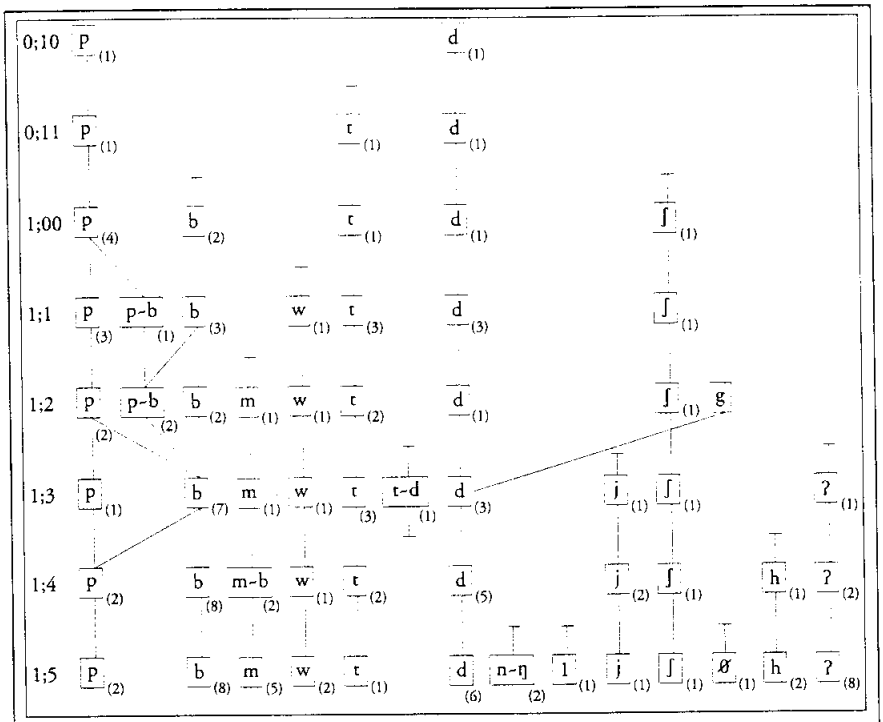
REDUPLICATION

During the second year, an effect known as *reduplication* (p. 177) is an important feature of children's phonologies: the different syllables of a word are pronounced in the same way. In one child, *water* was pronounced [wowo], *bottle* as [bubu], and *window* as [mumu]. Even monosyllabic words can be reduplicated, as when *ball* becomes [bobo].

Children do not all reduplicate to the same extent. With some children, most words are affected, and the process can be observed for several months. In other cases, there may be very few words involved, and the effect may last only a few days. The difference can be seen in the following word-lists, taken from two children, *A* and *B*. *A* is a reduplicator: the list contains ten complete reduplications and five items where there is only a small change between the syllables. *B* uses just one reduplicated word (*kitten*). (After R. G. Schwartz *et al.*, 1980, p. 79.)

A:	
Christmas	dᶻɪdᶻɪ
necklace	nɛkɛ
hungry	hʌːn
chip	tɪ
water	wɔwɔ
chicken	kɪkə
banana	mɪmɪ, mimɪ
thank you	dɛtɛː
sister	sɪsʌː
belly button	bɛbə
mouth	mɑmav
clock	kɑk
candy	kɛɪː
money	mimɪ
house	dɪdɪ
Tigger	tɪdɪ
scissors	dɪdɪ
take	kɛkɛ
Angie	næno
B:	
Snoopy	supɪ, nupɪ
necklace	nɛkɪs
hungry	hʌŋkɪ
chip	tɪp
water	wɔt
chicken	tʃɪk
drop	dʌp
sock	ʃɑp
Francie	fæ˜tɪ
hospital	pit
hair	heɪr
truck	tʌk
kitten	kɪkɪ
powder	pav
pencil	pɛtə
burger	bɔ˞gə
outside	aʊsaɪd
boat	bɔt
Eleanor	ənɔ

The purpose of reduplication has been much discussed. It may be partly motivated simply by the need to play with sounds or to practise them. But it is more likely that the process helps children as they try to cope with the pronunciation of more complicated words. It has been argued that a word like *tiger*, with its changes of consonant and vowel, would be difficult for a 1½-year-old to learn at one go: reduplication would give the child a chance to master the pronunciation in stages, by first producing the word's syllable structure and stress, along with the most noticeable phonetic features. A more precise pronunciation would come later, after this phonetic outline had been learned.



Phone trees So many things happen at once in a developing phonological system that it is always difficult to follow what is going on. 'Phone trees' are an attempt to visualize the emerging relationships between different types of phonetic segment, or *phone* (§27) over a period of time. The trees illustrated (above) show the initial consonant system of a child, *H*, between 10 months (0;10) and 17 months (1;5), based on a series of recorded samples. Development of different classes of phones over time is shown vertically, and the set of phones used by *H* at any one point is shown horizontally.

The procedure grouped together all *H*'s versions of a given word, as well as all *H*'s words that began with the same phones. Each class of phones is summarized within a box: for example, [p] (4) means that *H* used 4 tokens beginning with [p] in a given session; [p ~ b] (2) means that there were 2 cases of variation between [p] and [b]. If successive samples contained the same word, the boxes are joined by a solid vertical line; if a phone was being used in different words (e.g. *mama*, *milk*), they are linked by a dotted line. We can thus see how *H*'s phonological inventory increases over time, as well as the variation affecting individual words. (From C. A. Ferguson & C. B. Farwell, 1975.)

Diagrams of this kind have proved to be very useful in the study of phonological acquisition, as they clearly show the difficulty of making simple generalizations about how individual phonemes are learned.

INTONATION – EARLY AND LATE

Most children have begun to make some use of their language's intonation patterns (§29) before the end of the first year. Different tones of voice are used to express such meanings as questioning, demanding, calling, greeting, warning, recognition, and surprise. During the second year, as two-word sentences develop (p. 244), a wider range of attitudes is expressed, and prosody begins to signal differences in emphasis. At this point, it becomes possible to distinguish such general sentences as *Daddy gone* from the contrastive ***Daddy*** *gone* (i.e. not someone else).

As the child's grammatical and social abilities develop, so new uses of intonation emerge. For example, the contrast between rising and falling tones differentiates the two functions of a tag question in English ('asking', as in *He's outside, isn't he?*, and 'telling', as in *He's outside, isn't he!*), and this is learned during the third year, along with the grammar.

What is surprising is that the learning of intonation goes on for so long. Children seem to master the formal patterns of intonation quite early on, but their awareness of the range of meanings that these patterns convey is still developing as they approach their teens. This was first shown in a study of the way British radio and TV announcers read out football results (e.g. *Everton 3, Liverpool 3*). By listening to the intonation of the first part of the result, it is possible for adults to predict whether the score is going to be a draw, a home win, or an away win (p. 56). When this task was given to children aged 7 to 11, it was found that the youngest children were hardly able to do it, and even the oldest children did not reach the level of competence shown by the adults. In fact, only one child out of 28 got all the results right (A. Cruttenden, 1974).

The implications of this experiment go well beyond the world of football, for the intonation patterns used are to be found in everyday speech also. It seems that aspects of the intonation system are not only the first phonological features to be learned, but also some of the last. Even teenagers have been shown to have difficulty understanding the difference, signalled by intonation and pause, between such sentences as *she dressed, and fed the baby* (i.e. the person dressed herself, and then fed the baby) and *she dressed and fed the baby* (i.e. the baby is both dressed and fed). There can be few clearer examples of the differences that can exist between production and comprehension skills (p. 234).

41 · GRAMMATICAL DEVELOPMENT

SINGLE-WORD UTTERANCES

The earliest stage of grammatical development hardly seems like grammar at all, since only single words are involved – utterances such as *Gone, More, Dada,* and *Bye-bye.* Sometimes longer-sounding utterances are heard (such as *Allgone* or *All-fall-down*), but these are deceptive: they have been learned as whole phrases, and children use them as if they were single units.

Most of the words used at this stage (about 60%) seem to have a naming function and will develop into nouns. About 20% express actions. Many of these will develop into verbs, though not all. When a child says *In!,* holding a brick and gesturing violently at a container, we have to interpret this as an action utterance, even though the word class (p. 91) is a preposition. Other word classes are also found at this stage (such as adjectives and adverbs), along with several words that it is difficult to assign to any word class (such as *Bye-bye*).

The 'one-word' stage is usually most noticeable between 12 and 18 months. But to talk about it solely in terms of 'words' is misleading. In many respects, these early utterances function as if they were sentences (and they have been given capital letters above, to represent this interpretation). For example, one child used the word *dada* in three different ways: as he heard someone approach outside, he said *Dada?,* with a rising intonation; as he saw that it was indeed daddy, he said *Dada,* with a triumphant, falling intonation; and then he said *Da-da!,* with an insistent, level, intonation, with his arms outstretched. At a later stage in development, these three functions would be called 'question', 'statement', and 'command'. At this stage, these utterances do not have a distinctive grammatical form, but the use of prosody and gesture conveys the force of these sentence types nonetheless. In such cases, many scholars are happy to talk about 'one-word sentences', or *holophrases.*

TWO-WORD SENTENCES

Most people think of 'real' grammar as beginning when children string two or more words together, which takes place around 18 months. This tends not to happen abruptly. There is usually a transitional period, in which words are brought together, but the sequence is not uttered as a single, rhythmical unit, as in *Daddy. Gone.* Lengthy sequences of such words can often be heard: one child said *Daddy. Garden. See. Daddy. Daddy. Garden* in quick succession. But soon two-word sentences emerge with great confidence – and increasing frequency.

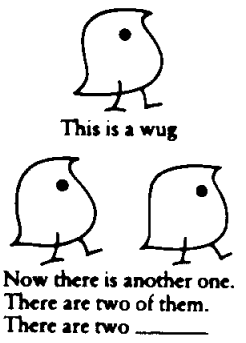
ON WUGS, AND OTHER THINGS

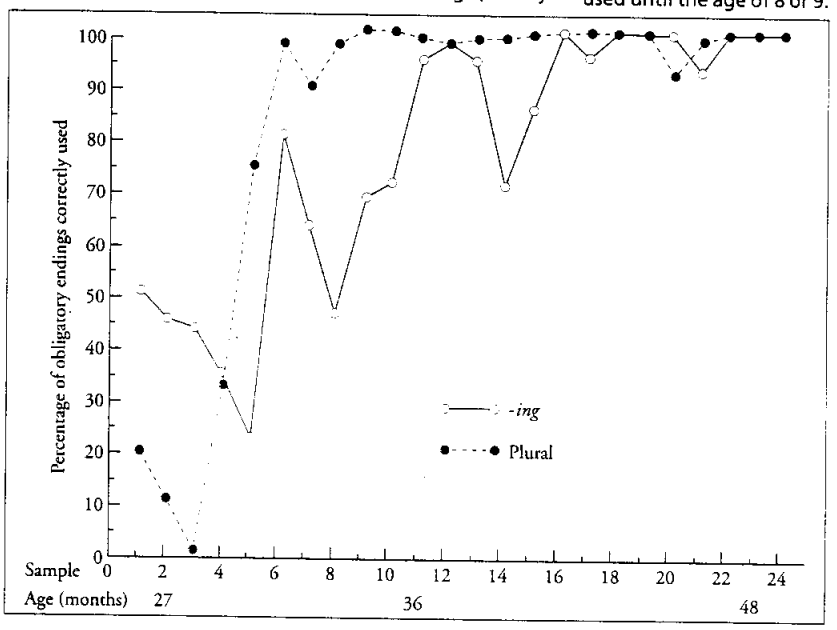
Languages often make use of a system of word endings to express grammatical meanings (§§16, 50). English has around a dozen such endings (*-ing, -s, -ed,* etc.). When do children learn about these morphological aspects of grammar?

One of the best-known early studies in child language investigated this question (J. Berko, 1958). The experimenter elicited from the children a series of forms which required different grammatical endings, such as plurals and past tenses. The instructions were all of the type illustrated in the picture (right), which was the first item in the study. The experimenter would show the child the picture and read out the text, leaving the child to supply the missing word in the sentence 'There are two-.' If the children said *wugs,* it was inferred that they had learned the plural ending. If they said *wug,* they had not.

It is important to use nonsense words in experiments of this kind, to guarantee a genuine response. If real words had been used (e.g. showing a picture of a cow, and asking for *cows*), a correct answer by a child would prove very little. The child might have learned the form *cows* by heart at some point, and might not really know that it was composed of *cow* + *-s.* Invented words get round this problem.

There have now been several studies of children's learning of English morphology. They show that some word endings (usually *-ing* and plural) first appear at around 18 months, but take several months to be used correctly. Other endings appear at intervals over the subsequent two years, and show a similarly gradual pattern of development. Many irregular inflectional patterns (e.g. comparative forms such as *worse*) may not be correctly used until the age of 8 or 9.





One child's development of the *-ing* and plural inflections between age 27 and 48 months. The diagram shows the gradual nature of morphological acquisition. The plural ending takes only a short time to reach the 90% level of correct use, whereas the *-ing* ending takes 16 months to get from a 50% level (at sample 1) to the 100% level (in sample 16). There are several dips in the child's performance, probably due to fluctuations in the number of instances that turned up in the various samples, but the general trend is rising. The curves start to flatten out at around the 90% level, which has led several investigators to conclude that this is the point when 'acquisition' of a feature can be confidently asserted.
(After R. Brown, 1973.)

Several studies have been made of the meanings expressed by these two-word sentences. They include such sequences as the following:

an Actor performs an Action	*Daddy kick.*
an Action affects an Object	*Shut door.*
an Object is given a Location	*There teddy.*
an Object or Person is Described	*She cold.*

These sentences could also be described in more traditional grammatical terms. *Daddy kick*, for example, has the clause structure (p. 95) Subject + Verb; *She cold* could be analysed into Pronoun + Adjective word classes. However, not all sentences uttered by children at this stage are capable of a clear grammatical or semantic analysis. One child looked at a photograph of her father and said *Daddy Mummy*; another put a car in a garage and said *Car want*. We may hazard plausible meanings to such sequences, but definite interpretations are often out of the question.

SENTENCE STRUCTURE

At around 2 years of age, many children produce sentences that are three or four words in length (p. 235), and combine these words in several different ways to produce a variety of grammatical constructions. Typical sentences at this stage include *Man kick ball*, *Him got car*, *Where daddy going?*, and *Put that on there*. Questions and commands are being used as well as statements, and different clause patterns are now evident. By the end of the third year, clause structures of four or five elements can be heard, as in *You give me my car now*.

The 'telegraphic' character of early sentences has often been noted in many children – an impression derived from the omission of grammatical words (such as *the* and *is*) and word endings (such as *-ing*). By the end of the third year, this character has largely disappeared, and children's sentences more closely resemble their adult counterparts.

Towards the age of 3, there is a major grammatical advance, with the appearance of sentences containing more than one clause. A large proportion of these sentences are coordinate clauses (p. 95), linked mainly by *and* – a pattern which, once learned, produces utterances that go on and on:

Daddy have breaked the spade all up and – and – and it broken – and – he did hurt his hand on it and – and - and – it's gone all sore and...

Sentences involving subordination (p. 95) are also increasingly found at this age, using such words as '*cos*, *so*, *if*, *after*, *what*, and *when*:

I let go 'cos it hurted me.
Tell me what it's called.

A great deal of grammatical knowledge is required before these constructions are used correctly, and it is common to find errors and non-fluency as children attempt to handle longer sequences. For example, this child of 3 years 9 months gets into trouble with his sequence of tenses, as he tries to express a complicated thought:

If Father Christmas come down the chimney, and he will have presents when he came down, can I stay up to see him?

The sorting out of grammatical errors is a particular feature of 4-year-old speech. Many of the irregularities of syntax and morphology are being mastered around this age, though it can take several years before such errors as the following are eliminated:

You bettern't do that.
That's more better.
Are there much toys in the cupboard?
It just got brokened.
Are we going on the bus home?

The study of errors is important, because they show children breaking fresh grammatical ground. They provide the main evidence of how children go about actively learning new constructions.

More advanced grammatical constructions continue to be acquired throughout the early school years. Around the age of 7, more sophisticated forms of sentence connection begin to emerge, using such words as *really*, *though*, *anyway*, and (at later ages) *for instance*, *actually*, and *of course*. Children begin to distinguish different underlying meanings for sentences that look the same (e.g. *Ask John what time it is* vs *Tell John what time it is*). And they consolidate their awareness of the way sentences may have the same meaning even though they look very different – for example, the relationship between active and passive sentences (*The girl chased the boy* ↔ *The boy was chased by the girl*), which is not thoroughly sorted out until the ninth year. A popular impression of grammatical learning is that it is complete by age 5; but recent studies have shown that the acquisition of several types of construction is still taking place as children approach 10 or 11.

SAYING NO

Several studies have been made of the expression of negation by young children.

1. The first negative words emerge in the second year – usually *no* or *not* as a one-word sentence.

2. The negative words combine with other words to make two-word sentences: *No sit*, *Gone no*, *Not there*. Several different meanings can be expressed at this stage – in particular, non-existence, e.g. *No car* (while looking for a toy); rejection, e.g. *No drink* (while pushing a drink away); and denial, e.g. *Not mine* (pointing to someone else's coat). (L. M. Bloom, 1970.)

3. During the third year, negative words come to be used within constructions, e.g. *You no do that*, *Mummy not got it*. At the same time, such verbs as *can't* and *won't* appear.

4. The negative words and endings come to be used more accurately: *not* replaces *no*, and *n't* is used with more verbs, e.g. *You've not got one*, *She isn't going*. 'Double' negatives for emphasis (§1) are a normal development, e.g. *Nobody don't like to go in*.

5. A few advanced negative constructions are not acquired until the early school years, e.g. the use of *some* vs *any* (cf. *I've not got any* rather than **I've got any*), or the use of *hardly* and *scarcely*.

ASKING QUESTIONS

One of the first topics to be studied by child language researchers was how children learn to ask questions. Three main stages have been proposed for English, and similar developments have been noted in several other languages:
1. The earliest stage makes use of intonation (§29), e.g. *Daddy there?*, spoken with a high rising tone, in effect asks 'Is Daddy there?'
2. During the second year, children start to use question words. *What* and *where* are usually the first to be acquired, with *why*, *how*, and *who* coming later. These questions become more complex as the third year approaches, e.g. *Where Daddy going?*, *What you doing in there?*
3. A major advance comes with the learning of the verb *to be*, and such auxiliary verbs as *have* and *do*. Children discover the apparently simple rule that turns statements into questions by changing the order of the Subject and Verb (e.g. *That is a car* → *Is that a car?*), and then learn that it is not so simple after all (e.g. it cannot be **Went he to town?*, but *Did he go to town?*). Sentences that use question words pose particular problems: *Where is Daddy going?* has in fact *two* forms indicating its status as a question – the word *where* and the inversion *is Daddy*. Children often rely on the first alone, and for a while produce such sentences as *Where Daddy is going?*. (After R. Brown *et al.*, 1968.)

The complexity of question formation can be seen from the following selection of errors, all made by 2-year-olds:

Whose is that is?
What are you did?
What did you bought?
Is it's my car?
Don't he wanted it?

Despite this complexity, most of these difficulties are overcome before the age of 3.