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The Effect on Language Development of the Special Characteristics of Speech Addressed to Children

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Studies of adults' speech to children indicate that adults make a number of modifications in their speech when interacting with a young child and that some of these modifications may facilitate the child's language acquisition. Modified repetitions of the child's utterances, along with certain syntactic, semantic, and cognitive simplifications, appear to be potentially effective language-teaching devices. However, the special lexicon, phonological simplification, and higher pitch that also characterize this "baby-talk" style are much less likely to play important roles in the child's language learning. The child's role in affecting these modifications in adult speech is briefly discussed, and an optimal pattern of adult-child language interaction is suggested.

INTRODUCTION

In order to acquire a first language, the young child needs to be exposed to and interact with persons whose language use is more advanced than his own. The speech of adults and of older children and that heard on radio and television are all potential sources of linguistic data for the child learning to speak. Of these sources, the speech of adults has been studied most thoroughly. Indeed, in the past decade we have learned much about how adults process language. But until recently, we have known very little about the characteristics of the adult speech that is addressed to children, nor have

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we understood how adult-child verbal interactions might influence the child's language development. In fact, it was largely assumed that the speech that adults addressed to children was highly similar to that of normal adult usage. This adult speech was described by many transformational linguists as usually ungrammatical, and interlaced with errors, interruptions, false starts, and slips of the tongue (Bever *et al.,* 1965), which made the learning of language by inductive generalization virtually impossible (Shipley *et al.,* 1969). And following Chomsky, it was argued that, in part because these irregularities in the child's environment would fail to provide him with enough useful input to foster language development, then the child must possess certain innate language capacities.

However, in the past several years, there has been a growing body of literature indicating that adults as well as older children introduce a number of modifications into the speech they address to young children (A-C speech). The results of these studies show that, in contrast to the irregularities of adult-adult speech (A-A speech), the young child usually hears well-formed utterances that are short, internally consistent, redundant, and related to the immediate situation (Berko Gleason, 1973; Blount, 1972; Halliday, 1972; Shatz and Gelman, 1973; Snow, 1972). These studies have helped lead to a disenchantment with the view that language acquisition is largely an innate process, and have served to focus new research on the effects of language input on the child's language learning.

This article describes the characteristics of A-C speech and examines the extent to which these modifications in adult language usage may assist or impede the child in his efforts to master the language. We begin by reviewing cross-cultural evidence for the presence of a distinct style of adult speech to children. This review sets the stage for a discussion of the role of A-C speech in language learning. Later, we examine in depth those aspects of A-C speech that might facilitate or inhibit language growth. Finally, this consideration of the role of A-C speech in language acquisition leads to a hypothesis concerning the optimal input for the child learning language.

CHARACTERISTICS OF ADULT-TO-CHILD SPEECH

During the last few decades, the presence of a number of distinctive aspects of A-C speech has been documented by more than a score of investigators examining a wide variety of language communities. The stability and the breadth of this evidence suggest that "baby talk" (a popular term for adult speech to children between the ages of 1 and 4 years) may play an important role in the child's linguistic development.

Cross-cultural researchers have reported baby talk styles in European, Asian, American, and African languages, both in nonliterate and in literate communities (Austerlitz, 1956; Casagrande, 1948; Ferguson, 1964, 1974; Kelkar, 1964). In the United States, systematic modifications in speech to children have been found in communities as diverse as suburban Boston (Brown, 1973) and inner-city Oakland (Drach, 1969). Indeed, Slobin (1969) suggests that there may be a standard way of simplifying English. Adults, even while talking to each other, sometimes modify their speech in the presence of children. The modifications that mothers introduce have been emphasized most, but fathers, too, use a special style of speech with children (Bates, 1973; Berko Gleason, 1973), as do women who are not mothers (Snow, 1972). Even children perhaps as young as 4 years of age adopt a baby talk style to address younger children (Andersen and Johnson, 1973; Berko Gleason, 1973; Ervin Tripp, 1970; Shatz and Gelman, 1973; Slobin, 1969; Weeks, 1971). Systematic modifications do not appear to be limited only to spoken language—deaf parents reportedly adjust their signing in particular ways to deaf children (Cicourel and Boese, 1972).

The data from 31 studies (see Table I) converge to yield a fairly consistent description of A-C speech (see Table II). These data indicate that adults frequently address children in short, high-pitched sentences spoken clearly and slowly. This A-C speech often includes its own unique lexicon of about 20-60 items (Ferguson, 1964; Voegelin and Robinett, 1954), as well as numerous words which are modifications of those that normally occur in adult speech. This special vocabulary usually includes kinship terms, animal names, nicknames, words referring to body parts and functions, terms for basic qualities (such as *good*, *bad*, and *dirty*), and names of games and playthings. Also characteristic of the baby talk lexicon are diminutives and terms of endearment (Berko Gleason, 1973; Ferguson, 1964; Kelkar, 1964; Weeks, 1971). When unmodified A-A words do occur in the speech to children, they are sometimes used in different ways. For example, adults name certain objects differently for children than for other adults. The terms that children hear are often the less specific ones (Anglin, 1975).

In comparison to the speech that adults address to each other, A-C speech is simplified phonologically (reduplication, lengthened vowels, distinctive consonant-vowel clusters, etc.) and syntactically (fewer subordinate and coordinate clauses, fewer embeddings and conjoinings, more "content" words, etc.). Baby talk reduces cognitive complexity, too. There are at least three types of evidence for this conclusion. First, mothers usually speak to children about recently completed actions or about immediately present objects and pictures (Phillips, 1973). This emphasis on the here-and-now introduces a verbal-contextual redundancy that may allow the child to grasp

Table I. Baby Talk Studies

Investigator	Speaker-addressee[a]	Language
Andersen and Johnson (1973)	8–A, 8–C	American English
Austerlitz (1956)	A–C	Gilyak
Bates (1973)	A–A; F–23 mo	American English
Berko Gleason (1973)	A, 8, 4, and 2 to each other	American English
Berko Gleason (1974)	A, 18 mo to each other	American English
Blount (1972)	A–2½	Luo and Samoan
Brown (Adam, Eve, and Sarah data) Bever *et al.* (1965) Brown and Bellugi (1964) Brown and Hanlon (1970) Pfunderer (1969) Slobin (1968)	A, 18-48 mo to each other	American English
Casagrande (1948)	A–C	Comanche
Drach (1969)	A–A; A–26 mo	Black English
Ferguson (1964, 1974)	A-C	American English, Arabic, Comanche, Gilyak, Marathi, Spanish
Gelman and Shatz (1974)	4–A, 4–2	American English
Glanzer and Dodd (1975)	A, 20-30 mo to each other	American English
Halliday (1972)	A, 9-24 mo (one child)	American English
Kelkar (1964)	A–C	Marathi
Kobashigawa (1969)	A–A; A–26 mo	Black English
Lord (1975)	A, E, 6-18 mo to each other	American English
Masur (1975)	4, 2 to each other	American English
Moerk (1972)	A–20-60 mo	American English
Nelson (1973)	A, 10-27 mo to each other	American English
Phillips (1973)	A–8 mo, 18 mo, and 28 mo	American English
Sachs *et al.* (1972)	A–2; A–E	American English
Shatz and Gelman (1973)	4–A; 4–2	American English
Snow (1972)	Mothers and nonmothers–2 and 10	American English
Snow (1974)	A–23-35 mo	Dutch
Voegelin and Robinett (1954)	A–C	Hidatsa
Weeks (1971)	21 mo, 3, and 5 to each other	American English

[a]A–2, adult speaking to a 2-year-old; E, experimenter; C, child; F, father.

the meaning of a sentence without necessarily understanding its structure (Snow, 1974). Second, younger children are more likely than older children to be asked questions with known answers–probably a cognitively less demanding task than answering other types of questions (Blount, 1972).

Table II. Characteristics of Adult-to-Child Speech

Characteristic	Investigator
Short sentence length	Andersen and Johnson; Bates; Berko Gleason; Brown and Bellugi; Drach; Lord; Nelson; Phillips; Sachs *et al.*; Shatz and Gelman; Snow
More short sentences; fewer long (more than four words) sentences	Shatz and Gelman
Sentence length less variable	Drach
Clear enunciation	Casagrande; Voegelin and Robinett; Weeks
Slow rate of speaking	Drach; Kelkar; Sachs *et al.*; Voegelin and Robinett; Weeks
Rate of production less variable	Drach
High pitch, exaggerated intonation	Andersen and Johnson; Berko; Gleason; Drach; Kelkar; Phillips; Sachs *et al.*; Weeks
More varied intonation	Drach; Sachs *et al.*
Phonological simplification	Casagrande; Ferguson; Weeks
Simplification of consonant clusters	Austerlitz
Simplification of initial sounds of words	Kelkar
Distinctive CVC or CVCV consonant-vowel combinations	Austerlitz; Ferguson
Lengthened vowels	Voegelin and Robinett
Reduplication	Austerlitz; Casagrande; Ferguson; Kelkar
Semantic simplification	Glanzer and Dodd
Fewer types of semantic relations	Snow (1974)
Unique lexicon	Ferguson; Voegelin and Robinett
Terms of endearment, diminutives	Berko Gleason; Ferguson; Kelkar; Weeks
Vocabulary includes more words with concrete referents	Berko Gleason; Phillips; Shatz and Gelman
Vocabulary is less diverse	Andersen and Johnson; Blount; Drach; Phillips
Syntactic simplification	Blount; Sachs *et al.*
Fewer subordinate clauses	Bates; Drach; Shatz and Gelman; Snow
Fewer compound verbs	Bates; Snow
Shorter mean preverb length	Bates; Snow
Fewer verbs, verb forms, and modifiers; more content words	Phillips
Fewer function words	Andersen and Johnson; Phillips
Fewer coordinate clauses; fewer *that-* and *wh-* complementizers	Shatz and Gelman
Fewer transformations	Drach
Fewer embeddings and conjoinings	Pfuderer

Finally, adults seem to communicate fewer concepts per unit of time to children than to other adults (Sachs *et al.*, 1972).

A-C speech often includes repetitions and expansions of the child's utterances. The exact proportion of repetitions and expansions in different samples of baby talk, however, is not consistent. Thirty percent of the children's utterances in one American study (Brown, 1973) prompted parental expansions (Slobin, 1968), but only 5% of the utterances of Luo and Samoan children were followed by any sort of repetition or expansion (Blount, 1972). However, in the latter study, the parents appeared to be actively controlling the verbal interaction, rather than reacting to and elaborating on the child's sentences, as was the case with Brown's data. Thus it is not surprising to find that all but 3-11% of the Luo and Samoan children's utterances were elicited by adult utterances.

The evidence on adults' use of different sentence types is also inconclusive. In four different A-C speech samples (Blount, 1972; Drach, 1969; Ervin Tripp, 1970; Sachs *et al.*, 1972), there is a preponderance of interrogative forms. Two of these (Drach and Blount) also include a high frequency of imperatives—a rare occurrence in A-A speech. In contrast to these findings, Brown and Hanlon (1970) report many more simple active affirmative declaratives than negatives and interrogatives combined. The difficulties in obtaining clear indices of sentence types are probably magnified by the demand effects of the task structure (the adults in the Sachs study, for example, were told to elicit the child's attention, and may have asked more questions as a result) and by the parents' concern with possible evaluation of their child (Blount notes that the Luo girl's parents were preoccupied with showing the experimenter how well the child could carry out instructions; hence they produced a large number of imperatives).

Adults modify their speech to children regardless of the complexity of the experimental task (Snow, 1972) or the sex of the child addressed (Phillips, 1973). These A-C speech modifications are exaggerated when the child is actually present, as compared to conditions in which adults are simply told to speak in a manner appropriate to an imagined 2-year-old (Snow, 1972). In addition, the prevalence of A-C speech features generally is inversely related to the age of the child (Phillips, 1973).

Several investigators have asserted that, in terms of grammatical structure, A-C speech is nearly flawless (Brown and Bellugi, 1964; Halliday, 1972; Pfuderer, 1969). In contrast to A-A speech, for example, A-C speech includes very few false starts (Drach, 1969). However, transcripts of A-C speech often include utterances such as "There's the a . . . who was supposed to land on the moon?" and "Let's see, um . . . want some, something to

drink . . . I guess I'm, I have to . . ." (Moerk, 1972). It has also been observed that baby talk often omits required inflections (Ferguson, 1964) and in some cases substitutes more common verb endings when the irregular endings are clearly appropriate (Kelkar, 1964). Although these observations make it clear that A-C speech is not entirely flawless, in comparison with A-A speech it is much more likely to be grammatically correct. More extensive analyses of the grammaticalness of A-C speech, recorded in different settings and on different occasions, are necessary.

The linguistic data available to the language-learning child appear to be varied stylistically as well as grammatically if the child's total verbal environment (sibling's conversations, adult-adult interactions, television, radio, etc.) is considered. Berko Gleason (1973) discusses some of this diversity. Mothers, she claims, have a particular style of speaking to their 2-year-olds which is different from their style of speaking either to their husbands, their 8-year-olds, or their 4-year-olds. Fathers speak differently to 2-year-olds, too, but their differences don't necessarily parallel those of the mothers. Five- to eight-year-olds are in the process of learning baby talk, and consequently don't expand 2-year-old utterances in the same way that mothers do. Four-year-olds still haven't mastered all of the grammatical constructions in A-A speech, and may not even attempt to switch to a baby talk style. A more recent study (Bates, 1973) reported some of the specific differences between mother-to-child speech and father-to-child speech. The fathers' speech included more pronouns and more commands than the mothers'; in contrast, the mothers' speech to children involved more questions. There were, however, only slight differences in mean length of utterance (MLU), mean proverb length, and syntactic complexity. It would be interesting to determine whether these differences between parents were the result of differential exposure to the child and whether they had any effects on the child's productivity.

COMPARISONS OF A-C SPEECH WITH CHILDREN'S SPEECH

The results of a number of recent studies reveal many parallels between the speech addressed to children and the language the children actually use. Children's speech often preserves the stress, the rhythm, and the intonation of the adult's most recent utterance. This finding is reported both in studies that elicited imitations from the children and in those that recorded spontaneous speech (Slobin, 1968; Slobin and Welsh, 1968). There are similarities in content, too. Mothers speak primarily about their children and the events

going on around them; children, in turn, talk mostly about themselves and their immediate activities (Brown and Bellugi, 1964; Nelson, 1973). Two studies demonstrate the close correspondence between the semantic relations expressed in children's speech and those expressed in their mother's speech. Glanzer and Dodd (1975) reported a correlation of +0.91 between the relative frequencies with which mothers and children used categories of verbs classified according to semantic intent. A similar result was reported by Snow (1974), who compared semantic relations present in mothers' speech to their children (age 23-35 months) with those reported to occur in young children's stage I speech (Brown, 1973). Snow found that more than two-thirds of the semantic relations in children's utterances involved those prevalent in mother's A-C speech. One final similarity between A-C speech and the child's speech is that the MLU of 2-year-olds is positively correlated with the mean length of their mothers' A-C utterances (Nelson, 1973).

The occurrence of parallels between A-C speech and the child's own speech does not necessarily imply that children will adopt any linguistic form that adults model. At different points in his development, the child appears to attend to different perceptual categories (Maratsos, 1974) and to use different strategies to process linguistic information (Blank, 1975; Sinclair and Bronckart, 1972; Strohner and Nelson, 1974). The appropriateness of the child's perceptual and cognitive approach may determine the accuracy of his comprehension of a linguistic structure. Syntactic forms which are misinterpreted will be difficult for the child to reproduce (Bever, 1970). Hence the usefulness to a child of a certain sample of language input must be assessed with respect to the child's current level of cognitive and perceptual skills. If linguistic input becomes too complex, the child may simply not respond at all (Shipley *et al.*, 1969).

One approach to understanding this interaction between frequency of adult modeling and the child's cognitive development in language acquisition has been to compare the frequency of a certain linguistic form in adult speech with either frequency or order of acquisition of this form in the child's speech. For example, one aspect of the child's language that does not appear to depend very much on frequency or exposure is inflections—the order of emergence of inflections in children's speech correlates weakly with the frequency with which adults model those inflections (Brown, 1973). More highly correlated are the frequencies of syntactic constructions in the samples of mother-child pairs. For instance, in both the children's speech and in A-C speech, there is a predominance of simple active affirmative declarative sentences; similarly, negatives, yes-no interrogatives, and *wh*-interrogative sentences occur less frequently in both, and properly constructed passives are

even more rare (Brown *et al.*, 1969). In fact, some features of child language appear to depend almost entirely on their frequency of occurrence in adult language. Snow (1974) cites a recent analysis by Klein (1974) which showed that a child's adoption of the order of arrangement of subject, verb, and object was clearly determined by the adult's language. When the adult's language allowed for several possible orders, the frequency of the child's usage corresponded exactly with the frequency of usage by his mother. A similar result indicating the importance of adult modeling on grammatical development was reported by Nelson (1975). This study demonstrated that children can learn certain grammatical constructions they have never used before if adults frequently model those constructions, including the use of the constructions in expansions of the child's sentences.

The possible effect of an absence, or a relative dearth, of adult-child language interaction can be seen in the retarded linguistic development of a young hearing child of deaf parents (Sachs and Johnson, 1972). The child's parents did not use the sign language of deaf in his presence, as they wanted him to learn spoken English only. Thus, during the first 4 years, the child was exposed to language only while watching television, playing with young neighborhood children, and participating in a program of group activities. It is unlikely that the language used by either the television programs, the young playmates, or the group supervisors incorporated many aspects of A-C speech or encouraged the child's own productivity. As a result, the paucity of A-C speech modifications appears to have had a marked effect on the boy's language growth—even after being placed in a special intervention program, he could form only rudimentary sentences.

Among the many specific aspects of A-C speech that might help the child learn the relationships between the adult grammatical construction and the structure of his own utterances are the adults' use of "occasional" questions and incomplete sentences. The occasional question is a request that the child repeat an unintelligible word or phrase or provide a missing answer. Two subsets of this form of question are the "say constituent again" interaction:

Child: I want milk.
Mother: You want what?
Child: Milk.

and the "constituent prompt":

Mother: What do you want?
Child: (no answer)
Mother: You want what? (Brown *et al.*, 1969, p. 71)

Children more frequently give appropriate responses to an occasional form of a question than to regular question forms, and the use of the occasional form by parents is positively correlated with grammatical development (Brown *et al.*, 1969; Moerk, 1972). Apparently the recasting of the question and the prompting of the child to reply aid the child's understanding of constituent structure and help the child infer the antecedents of words like *what* and *it*. It is likely that a similar effect is produced by a related language-teaching device, the incomplete sentence, which probably focuses the child's attention on the missing sentence constituent in his mother's utterance. For example:

> Child: I want milk.
> Mother: You want . . .?
> Child: Milk. (Moerk, 1972, p. 247).

The slower pace of A-C speech may also prove helpful to the child. McNeill (1970) cites an unpublished study by Psotka (1969) which tested children's comprehension at rates of 0.5 word/sec, 1 word/sec (the rate at which the children in the study spoke), and 3 words/sec (the experimenter's rate of speaking). Children's understanding was best at their own production rate and poorest at the slowest rate. This study suggests that the helpfulness of the A-C rate modification cannot be determined from a comparison of A-A and A-C rates alone; the child's own rate of speaking must also be considered. This implication is true of other features of A-C speech as well—an A-C sentence which is shorter than the average A-A sentence, for example, may still be longer than the average utterance produced by the child. Further research should evaluate each baby talk feature in terms of A-A speech and the child's speech.

A-C SPEECH AS A DYNAMIC INTERACTION

As the child grows older, his utterances become longer and more complex. One important question, then, pertains to the interaction between the child and the adults around him: Are the adults "constantly shifting and readjusting [their speech] to complement the child's emerging competence" (Berko Gleason, 1974, p. 8), or do they use one unchanging style over a relatively long period of time? The results of a number of recent studies, focusing primarily on mother-child interaction, show that adults are quite sensitive to changes in the child's productions and alter their speech (though probably not consciously) to keep pace with the child's development.

There is some evidence that adults gauge their speaking styles to the child's age and linguistic level. For example, the speech addressed to

5-year-old Luo and Samoan children was more complex than that used with the 2-year-olds. The adults in these cultures acknowledged the different linguistic levels of their children by asking different types of questions. The less advanced children (in terms of MLU) were asked questions that required few semantic distinctions. The child with the longest MLU was asked not only to label things but also to deal with abstract relations (Blount, 1972). Other examples of adult sensitivity to children's linguistic level include one mother's provision of increased semantic and syntactic information as her child's language became more sophisticated (Pfuderer, 1969), and another mother's anticipation in her own linguistic input of her child's use of prepositions (Brown *et al.*, 1969).

A-C speech can be sensitive to an age difference of as little as 10 months: adults' speech to 28-month-olds contains more words per utterance, more verbs and modifiers, and a greater lexical variety than their speech to 18-month-olds (Phillips, 1973). Even 4-year-olds use more complex forms with children a few months older than 28 months than with children a few months younger (Shatz and Gelman, 1973). At the same time, there are no significant differences between the speech to 8- and 18-month-olds, although the former seems to be stylistically more diverse (Phillips, 1973).

The differences in linguistic input between the ages of 18 and 28 months probably are greater than the differences between 8 and 18 months because the response of the child himself is different—the 8-month-old provides very little verbal feedback. In the absence of sufficient information regarding her child's linguistic competence, a mother produces a set of utterances that tends to be slightly longer and more complex than that which she will later use when her child produces his first word. As the child's MLU increases and he participates more extensively in conversations and responds more frequently to his mother's utterances, changes in his mother's speech coincide with his development. Corresponding to the increase in complexity of the child's speech is a decrease in the gap between the mother's and the child's MLU, and those utterances that are direct responses to the child's speech are even shorter than average. Apparently, the mother uses her child's feedback to adapt her speech more effectively to his level (Glanzer and Dodd, 1975; Lord, 1975; *cf.* Masur, 1975, for similar interactions of 4-year-olds with 2-year-olds). Another method the child may use to modify his mother's speech is to simply not respond at all; this may elicit a repetition (Berko Gleason, 1974) or serve as a signal to the mother to decrease the complexity of her speech (Shatz and Gelman, 1973).

Differences in the speech to children of different ages are probably, in part, a function of the different meanings that speakers attempt to

communicate to listeners of different levels. In conversing with adults, 4-year-olds often describe their thoughts and wishes and readily request information. In contrast, when speaking to children 2 years younger, 4-year-olds more frequently use language to direct the interaction. These differences affect the rate of occurrence of various grammatical constructions (Gelman and Shatz, 1974). Gelman and Shatz contend that 4-year-olds, in attempting to communicate different meanings to 2-year-olds than to adults, are acknowledging the linguistic and cognitive limitations of younger listeners. It has yet to be demonstrated, however, that a greater degree of cognitive or linguistic maturity is necessary to comprehend an expression of desire or a request for information than a statement which directs an interaction.

Adults often respond to their child's utterances by repeating most of the utterance. One form of this imitation process hypothesized to be especially helpful to the child's language learning is expansion. In their simplest form, expansions "retain the [child's] words in the order given, and add those functors that will result in a well-formed simple sentence that is appropriate to the circumstances" (Brown and Bellugi, 1964, p. 147). Often, however, parents' expansions add contentives, too. Slobin (1968) pointed out that when Brown's subjects, Adam and Eve imitated their parents' expansions, they picked up something from the expansion and added it to their original utterance about 50% of the time. Further evidence of the possible facilitating role of expansions is suggested by the fact that Adam and Eve's parents expanded their children's utterances much more often than Sarah's parents, and Adam and Eve's language developed much more rapidly than Sarah's.

Several investigators have examined the relationship between expansions and language development more systematically in a series of language intervention studies (Cazden, 1965; Feldman, 1971; Gonzales, 1973; Nelson *et al.*, 1973). Only one of these studies (Nelson *et al.*, 1973) provided some evidence of the effectiveness of expansions in prompting the child's mastery of syntax. However, the number of children in each experiment was quite small, and the language intervention itself was generally limited to only a small percentage of the child's total language exposure.

In the Cazden study, the children who received the expansion treatment had all of their utterances expanded. Since the adults expanded every utterance that the child produced, they may have misinterpreted a number of the children's statements. In these cases, their expansions may have been confusing rather than helpful. Feldman tried to take this into account by adding a treatment group in which utterances were expanded only if the meanings were clear, but there were no resulting differences in language performance among the groups. Another important factor in both the Cazden

and the Feldman studies is that the children were from lower-class black families. Hence the expansions provided in the experiments may not have taken into account the dialect differences between Standard English and the Black English that the children probably heard at home. The possibility of misinterpretation and dialect differences was probably reduced in the Gonzalez study, in which the utterances of two Mexican-American children were expanded by their own mothers. However, four tests of language proficiency failed to reveal any clear differences between these two children and their two controls. In the Nelson *et al.* study, children in a "recast-sentence" group had their grammatically incomplete sentences expanded, while their complete sentences were followed by a sentence with the same semantic reference expressed in a different syntactical form (e.g., an interrogative might follow a child's declarative). This recast-sentence group performed significantly better than the control group on measures of sentence imitation and on two measures of predicate complexity. The recast-sentence group also scored higher on both verb measures than those children who heard new sentences modeled by the experimenters.

The mutual modifications of responses that characterize the adult-child interaction may provide the richest type of data for the child learning the language. However, as seen in the studies of adult expansions of the child's utterances, the effects of these patterns of interaction on the child's language growth remain unclear. Such interactions, in fact, do not appear indispensable to acquiring language comprehension. The child Lenneberg (1962) described who was physiclly incapable of producing verbal feedback showed no impairment of understanding. [However, this child could have provided other types of responses (no action, appropriate action, inappropriate action) which were functionally similar to verbal feedback.] More generally, as yet there is no strong evidence that any particular kinds of A-C speech or adult-child interaction are necessary for language acquisition. Instead, the data are primarily correlational, showing that both children's speech and the speech of others to children change with the child's increasing age.

FACILITATING AND INHIBITING EFFECTS OF A-C SPEECH

In the preceding sections, we have described the different properties of A-C speech and reviewed evidence of the effects of A-C speech modifications on language development. As we have stated, this evidence, in most instances, remains inconclusive. However, many hypotheses as to which types of linguistic input are helpful and which are not have been suggested. Those ideas

will be examined in this section, beginning with the aspects of input which are believed to facilitate language growth and continuing with a discussion of those aspects which are hypothesized to have an inhibitory function.

A number of properties of A-C speech indicate that adults are sensitive to the child's immature skills. The patterns of reduplication, pitch, stress, and rhythm in baby talk are similar to those which occur when the child practices speech by himself (Weir, 1962; Moerk, 1972; Casagrande, 1948). The use of those elements in A-C speech may not only reflect a sensitivity on the part of parents to the child's own tendencies but also facilitate the child's comparisons between the structure of his utterance and that of an adult's. The intonation, stress, and rhythm of the parents' speech probably contribute to the definition of lexical categories and syntactic boundaries (Sachs *et al.*, 1972; Shipley *et al.*, 1969). Furthermore, if A-C speech is consistently spoken with a higher voice than is A-A speech, high pitch may come to function as a signal to the child that the utterance is addressed to him; that is, it may become a cue to the child to attend to the sentence (Sachs *et al.*, 1972).

Since the pauses in spontaneous A-A speech do not correspond to the boundaries of phrases (Maclay and Osgood, 1959), hearing A-A speech probably will not help the child to define the units of a sentence. In simplified A-C speech, on the other hand, it is possible that certain classes of words occur in certain positions more consistently than they do in A-A speech (e.g., nouns are the last word in an utterance much more frequently than are adjectives). The range of word meanings may also be more limited in A-C speech; the nouns in A-C speech frequently refer to concrete objects, events, and persons, and the verbs to motion. This limited domain of referents may help the child "to discover the semantic correlates of the various parts of speech . . . this discovery enables the listener to use the part-of-speech membership of a new word as a first cue to its meaning" (Brown, 1957, p. 5). The tendency of mothers to repeat nouns rather than to substitute the appropriate third person pronoun may also assist the child by making the subject-verb rule more apparent (Snow, 1972). Thus, if syntactic and semantic regularities are in fact exaggerated in A-C speech, the child's language learning might thereby be facilitated. A similar conclusion is advocated by Snow (1972) with respect to the limited number of inflections in A-C speech—those that do occur may be more readily noticed and remembered by the child.

Sentences with center-embedding and left-branching are reportedly difficult even for adults to understand (Gaer, 1969; Miller, 1962), as are sentences without meaningful verbs (Herriot, 1968). Consequently, the lower mean preverb length of A-C speech probably indicates less complexity and an earlier appearance of a meaningful verb, thereby rendering the child's

sentence-processing task less confusing. Furthermore, in such syntactically simpler sentences, the subject-verb-object relationship probably becomes more salient. There are several indications that the abbreviated length of A-C utterances is a helpful modification for the child. Analyses of mother-child interactions reveal that the mean length of utterances that children imitate is lower than the MLU of the total A-C speech sample (Lord, 1975). Similarly, Glanzer and Dodd (1975) observed that mothers most effectively elicit responses from their children when they adapt the length of their utterances to the child's level.

The facilitative effects of repetition, recasting, and expansion have been argued in more detail theoretically than empirically. Imitation, recasting, and expansion all have the advantages of relevancy and timing (Brown *et al.,* 1969); the adult's utterance follows the child's at once, and deals with events with which the child is concerned enough to have verbally encoded. Structural similarity between the mother's sentences and the child's may make it easier to process the additional information (Moerk, 1972). Since the context remains unchanged during the course of expansions, the child is free to concentrate on the syntactic aspects of the utterances (Slobin, 1968). Brown and Bellugi (1964) point out that "by adding something to the words that the child has produced one confirms his response insofar as it is appropriate. In addition, one takes him somewhat beyond that response but not greatly beyond it" (p. 148). In imitation with reduction, what the mother repeats is often a related set of words (e.g., a noun phrase); hence the child may learn the boundaries of sentence units. The mother's repetition of her own or the child's utterances gives the child more processing time, and also more opportunities to notice the details of an utterance which he may not have attended to the first time (Snow, 1972). Since a mother's repetitions of her own utterances are rarely identical (Kobashigawa, 1969), the child may observe the same basic meaning expressed in several different ways; these different paraphases also increase the likelihood that the child will comprehend at least one of them (Sachs *et al.,* 1972). Recasting likewise seems to involve sets of sentences which are similar in meaning although syntactically diverse (Nelson *et al.,* 1973). When recasting entails a transformation from a declarative to an interrogative, the auxiliary (frequently a difficult item for the child) is often exhibited in the perceptually salient initial position (Sachs *et al.,* 1972).

Finally, occasional questions are another feature of A-C speech that might facilitate the child's learning of the membership of constituent sentence units (noun phrases, for example, are sentence units that can be replaced by the word *what* in occasional questions such as "You want what?"). Like

expansions and recastings, constituent prompts often may relate superficially diverse surface expressions to similar underlying base structures.

Another approach to the study of A-C speech is to ask if it in any way inhibits optimal language growth or underestimates the child's capacities. The child's tendency to match his mother's language patterns suggests several such questions. For example, does inflection production lag behind because such markers are sometimes omitted in A-C speech? Is the child following his mother's example when he limits his conversation to ongoing events and seldom uses abstract nouns? Are the phonemes that children have the most trouble with the ones that adults simplify and distort in adopting a baby talk style? Kelkar (1964) suggests that these types of effects can indeed occur and persist over long periods of time:

> baby talk considered as an adaptation of adult speech may affect the relative frequency of competing grammatical markers and vocabulary items in the adult speech of the next generation. A form that is avoided by adults in speaking to a child may later be avoided by the child himself when he grows up because he never feels himself completely "at home" with it. (p. 54)

If the child learns language by drawing analogies from linguistic data, he will probably find the learning of complex constructions a very difficult task if there are few of them in the language he hears. There is some evidence that exposure to a variety of speech styles may facilitate language growth. For example, the number of times the child leaves the house and the amount of time he spends with adults other than his mother are positively correlated with the child's progress in language development (Nelson, 1973). The unexpected result of the Cazden experiment (i.e., that the group receiving 100% expansions did not develop more rapidly than the modeling group) might be further evidence that the richness of the linguistic data available to the child is an important variable. Expansions often add only functors. The speech of an adult who is not expanding every utterance probably offers a more diverse sampling of vocabulary and of grammatical constructions. Similarly, the "new sentence" group in the Nelson *et al.* study (1973) might also have been suffering from an emaciated data base—their utterances were followed primarily by short, simple, affirmative declarative sentences. One implication of the "richness" hypothesis might be that the adult is not assisting the child by addressing him in a simple and repetitive style.

Exposure to A-A speech in addition to A-C speech may, because this A-A speech adds complexity, enhance rather than hinder the child's progress. For example, A-A repetitions may serve to introduce a wider range of word categories to the young child. These repetitions usually involve articles,

possessive pronouns, personal pronouns, and conjunctions (Maclay and Osgood, 1959)–just those parts of speech that emerge late in the child's linguistic development. It is possible that a child exposed to normal A-A speech would learn functors more rapidly than a child hearing only A-C speech. It is also true that the false starts in A-A speech often involve the inappropriate repetition of content words; this, however, may pose no problem to the child, who, when imitating, may simply ignore semantically irrelevant words (Slobin and Welsh, 1968).

Ferguson's (1964) hypothesis that it is helpful to the child to learn lexical items which he will eventually have to discard as he learns to converse in normal A-A style has not yet been empirically supported. Indeed, why should such a process–which seems to involve minimal or negative transfer of training–be conducive to language learning? Similarly, many of the consonant-vowel-consonant clusters common in baby talk will have to be abandoned as the child learns to verbally interact in an A-A manner.

The hypothesis that pitch acts as a cue to the child to attend to certain utterances may also be interpreted to imply that the child also learns to disregard other low-pitched, non-baby talk utterances which contain valuable linguistic data. It has been posited that A-C patterns of intonation, pauses, and stress make grammatical units more salient; actually, the relation may be the reverse–perhaps it is proper sentence fragmentation that the child learns first, and which determines where he hears pause, stress, and intonation (*cf.* Bever *et al.,* 1965). With respect to sentence length, it may be more beneficial for the child to be exposed to speech samples of varying MLUs than to be addressed with consistently short utterances. As the child's MUL grows, he imitates increasingly long A-C utterances, even if the adult's MLU remains stable or increases less rapidly than the child's (Lord, 1975). Finally, the child might acquire a more differentiated vocabulary if he were to hear objects named for him in the same way as they are named for other adults (*cf.* Anglin, 1975).

ATTENTION, ACTIVITY, AND MODERATE NOVELTY

The elements of baby talk seem to fall into two categories:(1) those that play no obvious facilitative role in the child's language learning–the squeaky voice, the phonological distortions, the diminutives, the unique lexicon of "bow-wow," "beddie-bye," etc.; and (2) those that may promote linguistic development–shorter MLUs (Glanzer and Dodd, 1975; Lord, 1975), slower rates (Psotka, 1969), recast sentences (Nelson *et al.,* 1973), occasional

questions (Brown *et al.*, 1969; Moerk, 1972), and perhaps a few other components. Perhaps a linguistic sample constructed with elements from the second category might be most effective if it is (a) designed in such a way as to invite the child to be an attentive and active participant in verbal exchanges, and (b) moderately novel, in comparison to the child's linguistic output. These are not independent factors; input which is moderately novel is most likely to hold the child's attention (Kagan, 1972).

Expansions are hypothesized to be especially effective because they are emitted at a time when the child is particularly likely to be attentive. One possible reason why Cazden's group did not excel is that they were overexposed to expansions and consequently ceased to attend to them. The role of recastings in facilitating language growth has been documented experimentally (Nelson, 1975; Nelson *et al.*, 1973). Like other types of expansions, recastings might derive their potency from the interest and attention they elicit from the child, who is listening to a reworked version of his own words. Shipley *et al.* (1969) postulate that the low frequency of appropriate response to commands beginning with nonsense words may be a result of the child's failure to attend to a sentence that begins with meaningless items. Even the 4-year-olds in the Shatz and Gelman study (1973) seem alert to the importance of the variable of attention—they used significantly more attentional devices with 2-year-olds than with adults.

Shipley *et al.* (1969) also document the significance of the activity dimension: when a child actively repeats a command, he is more likely to obey it than when he just passively listens. In contrast, the absence of active involvement by the child in language learning may account for the little progress reported for a hearing child of deaf parents—his exposure to television did not appear to encourage his active participation (Sachs and Johnson, 1972). [Nelson (1973) reports a negative correlations (r = -0.45) between time spent watching television and rate of acquisition.]

Questions and incomplete sentences almost demand that the child take an active role in verbal intercourse. Frequency of questions in A-C speech is positively correlated with comprehension ($r = 0.68$ at 20 months) and with later linguistic maturity ($r = 0.51$ for MLU, 0.60 for vocabulary, Nelson, 1973). Cazden's modeling group, which performed slightly better than the expansion group on posttest measures, may have been exposed to more interrogatives than the expansion group. Those expansions which add only functors are thematically unimaginative (they merely repeat the same meaning that the child has already encoded) and interactionally passive (they request no particular response); from the child's point of view, they may simply be unworthy of his attention.

The "new sentences" in the study by Nelson *et al.* (1973) were predominantly declaratives; in the recast group, on the other hand, the reply to the child's utterance was frequently a question. Using the activity dimension as a predictor, it is not surprising that the recast group showed more marked improvements. Rather than comparing expansion with modeling or recasting with new sentences, it may be more appropriate to contrast forms which encourage active participation in verbal exchanges—sentence-completion items, "say constituent again," constituent prompts, and other questions—with forms such as imitations, expansions, and recastings not in the interrogative form, which allow the child to assume a less active role.

Because the child's comprehension usually outdistances his production (Fraser *et al.*, 1963), perhaps his mother's speech should not match the child's but instead stay a step or so ahead. Adam's mother's sentences, for example, are, on a very general level, the type that Adam himself will produce the following year (Brown and Bellugi, 1964). Equal or better understanding of slightly more complex adult speech by young children is seen in the study by Shipley *et al.* (1969). Those children who were themselves producing holophrastic utterances responded just as well to two-word commands as to one-word commands, while the children who were producing telegraphic utterances responded best to mature adult forms (involving a verb, one or two function words, and a noun). As the authors note, "just those utterances that they [the children] themselves did not use were more effective as commands" (p. 331). Brown and Hanlon (1970) "suspect that the only force toward grammaticality operating on the child is the occasional mismatch between his theory of the language and the data he receives" (p. 50). The maximally sensitive adult may respond differentially to children of different ages and different MLUs, and may even adjust his speech to the details of the child's progress: for example, some adults may provide different linguistic input to a child who has mastered the possessive inflection than to one who has not. Such an A-C interaction, if it occurs, is a far cry from the initial characterization of baby talk along static, global dimensions.

In addition, it should be noted that adult verbal interaction with children is, in most cases, a phenomenon of staggering proportions. One recent estimate (Suppes *et al.*, 1974) of the total amount of adult speech heard by a child between the ages of 2 and 3 or 3-1/2 years is about 1 million words. In addition, the child's corresponding productions were estimated at 1/2 million words. Clearly, the language-learning child is exposed to an enormous amount of speech, which may facilitate his induction of the rules of his language, and he is also actively producing a large quantity of his own utterances.

In summary, although the studies reviewed above are only the first steps toward an adequate model of the role of adult speech modifications in children's language acquisition, there is every reason to believe that as more detailed investigations are completed the specific effects of such modifications will be much better understood. Regardless of the exact form of the final model, the above studies make clear that some of the special characteristics of the language spoken to a child may play an important role in the child's language development. Indeed, if one were to design a language-teaching device for a young child, one would probably try to incorporate those aspects of the baby talk style that appear to encourage the child to be an active and attentive language learner, and that challenge him to deal with utterances that are slightly more complex than his own.

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