MOTHERS' SPEECH TO CHILDREN LEARNING LANGUAGE

CATHERINE E. SNOW

McGill University

SNOW, CATHERINE E. Mothers' Speech to Children Learning Language. CHILD DEVELOPMENT, 1972, 43, 549–565. *The assumption that language acquisition is relatively independent of the amount and kind of language input must be assessed in light of information about the speech actually heard by young children. The speech of middle-class mothers to 2-year-old children was found to be simpler and more redundant than their speech to 10-year-old children. The mothers modified their speech less when talking to children whose responses they could not observe, indicating that the children played some role in eliciting the speech modifications. Task difficulty did not contribute to the mothers' production of simplified, redundant speech. Experienced mothers were only slightly better than nonmothers in predicting the speech-style modifications required by young children. These findings indicate that children who are learning language have available a sample of speech which is simpler, more redundant, and less confusing than normal adult speech.*

The speech young children hear is their only source of information about the language they are to learn. As such, it must be taken into account in any attempt to explain the process of language acquisition. Despite its unquestioned importance for language learning, very little is actually known about the kind of language which is addressed to children. Developmental psycholinguists have assumed that children hear a random sample of adult utterances, characterized by all the stutters, mistakes, garbles, inconsisten-

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cies, and complexities which are common in adults' speech to other adults (Chomsky 1965, 1968; Lenneberg 1969; McNeill 1970). This assumption about the primary linguistic data has been offered as a key bit of evidence in support of the view that infants must be largely preprogrammed for the task of language learning.

Considering the theoretical importance of the child's early linguistic environment, not only to students of language acquisition, but also to those trying to explain social class differences in linguistic ability (Bernstein 1970; Hess & Shipman 1965; Olim 1970), it seemed valuable to study the language actually heard by young children. Accordingly, the present experiments were performed in order to investigate: (*a*) whether the speech of mothers to children just learning to talk differed from the speech of those same mothers to older children, (*b*) whether speech-style modifications for young children depended on the presence of the child with the mother, as opposed to the mother's mere intention to address a 2-year-old, (*c*) whether the difficulty of the tasks for the child affected the mother's production of speech-style modifications, and (*d*) whether nonmothers differed from mothers in their ability to modify their speech for young children.

EXPERIMENTAL INVESTIGATIONS

Subjects

The women who served as subjects were all college graduates who volunteered after being contacted through their alumni association. The women were told that the experiments dealt with "how children learn to talk." Apparently none of them suspected that her own speech and not the child's behavior was of primary interest. Twelve of the women tested had children in the age range 9-5 to 12-4. These children participated with their mothers in experiment 1, serving as the stimulus children for the 10-year-old condition. Twenty-four of the subjects had children ranging in age from 2-0 to 3-4. Twelve of these mothers and their children participated in experiment 1; and 12, in experiment 2. Six women who had no children and who were not frequently in the company of children participated in experiment 3.

Scoring Procedure

Tape recordings of all experimental sessions were transcribed, and scoring of the following nine measures was done on the typewritten transcriptions.

1. Quantity of speech: total number of words spoken.
2. Mean length of utterance: ratio of the total number of words spoken to the total number of utterances. Utterances were scored by listening to the tapes and marking the transcriptions as indicated by the phonetic cues and pauses in the mothers' speech. Run-on sentences were scored as two or more utterances. Phrases and sentence fragments were accepted as utterances if

they were characterized by a complete intonation pattern. Thus, what was scored as a complete utterance often was not a complete sentence as defined by traditional grammar.

3. Sentence complexity: ratio of the number of compound verbs plus subordinate clauses to the total number of utterances.

4. Mean preverb length: ratio of the total number of words before the main verb in all clauses to the total number of clauses. Imperatives were excluded from both these counts.

5. Incidence of utterances without verbs: ratio of the number of utterances that did not contain verbs to the total number of utterances.

6. Incidence of third-person pronouns: ratio of the total number of occurrences of the pronouns he, she, it, they, him, her, them, his, her, hers, its, their, and theirs to the total number of words.

7. Incidence of complete repetitions: ratio of the number of complete repetitions of sentences (i.e., utterances which contain both subject and verb) to the total number of utterances. Repetitions were scored only if they occurred within three utterances of the original.

8. Incidence of partial repetitions: ratio of the number of repetitions of one or more major units within an utterance (e.g., repetition of the subject phrase or a subordinate clause) or of an entire utterance without a verb to the total number of utterances. If all major units were repeated, a complete repetition was scored. If only some of the units were repeated, a partial repetition was scored. Again, the repetition was scored only if it occurred within three utterances of the original.

9. Incidence of semantic repetitions: ratio of the number of repetitions of the meaning of a previous utterance which did not include repetition of any of its grammatical units to the number of utterances. An utterance was scored as a semantic repetition only if it was a true paraphrase and did not qualify as a complete or partial repetition. The repetition was scored only if it occurred within three utterances of the original.

Measures 1–6 were simple counting procedures and were scored in all cases by the experimenter. Since measures 7, 8, and 9 involved some subjective judgment, an independent observer also scored these. The reliability coefficients for the experimenter and the independent judge ranged from .7 to .9 and were in all cases highly significant, so a mean of the two scores was assigned as the subject's score.

Experiment 1

The primary purpose of experiment 1 was to investigate whether mothers modified their speech styles when addressing young children. Second, the absence or presence of the child in the room with the mother was varied in an attempt to separate the effects of the mothers' expectations about the linguistic capabilities of young children from the effects of any implicit demands the children might make on the adult speakers.

Method.—Appointments were scheduled so that a mother of a 2-year-

old came to the laboratory with her child at the same time as a mother of a 10-year-old came with her child. Each of the two mothers then performed three verbal tasks with both children. In addition to performing the tasks with the child of either age group actually present in the room, the mother was asked to perform the tasks while speaking into a tape recorder in the absence of the child, but as if she were speaking to a child of the appropriate age group. Thus, each mother performed the tasks four times, with an absent 2-year-old, a present 2-year-old, an absent 10-year-old, and a present 10-year-old. The three tasks consisted of (*a*) making up and telling a story to the child, based on a picture provided by the experimenter, (*b*) telling the child how to sort a number of small plastic toys in several ways, and (*c*) explaining a physical phenomenon to the child. The speech during the three tasks was pooled for scoring. Half the mothers performed the tasks first with their own children, and half performed the tasks first with a 2-year-old. All the mothers performed the absent condition for each age before the present condition for that age. The experimenter was not present during any of the testing.

Results.—Each measure was analyzed separately with a three-way analysis of variance. A small number of missing scores which resulted from mechanical failure of the tape recorder or from recalcitrance among the 2-year-olds were estimated using the procedure described in Winer (1962), so that an analysis for repeated measures could be applied. Degrees of freedom were subtracted from the error terms to compensate for the effects of estimation. The groups factor (mothers of 2-year-olds versus mothers of 10-year-olds) yielded no significant differences, so the two groups will be considered together in discussion of the results. Whenever the analysis of variance showed overall significance, cell means within the presence and age factors were compared using Scheffé (1953) tests.

The analysis of variance for quantity of speech indicates that mothers talked longer when a child was present in the room and that mothers talked longer to 2-year-olds than to 10-year-olds (see table 1). The age × presence interaction was significant, reflecting a much greater effect of the presence of the child in the 2-year-old than in the 10-year-old condition. Results of the Scheffé tests (indicated by lines between the cell means in table 1) show that the 2-year-old present condition was significantly different from all the others, and that the 10-year-old present condition was significantly different from the 10-year-old absent condition. The primary reason for quantity-of-speech differences was probably the greater difficulty of the tasks for the younger children and the greater interest of the tasks for the mothers in the present condition.

Mean length of utterance, sentence complexity, and mean preverb length are all measures of the grammatical complexity of speech. In each case, a higher score indicates more complex speech. For every measure, the absent condition elicited more complex speech than the present condition, and the 10-year-olds elicited more complex speech than the 2-year-olds. All the differences were significant except the difference between the 2-year-old

TABLE 1

RESULTS OF THREE-WAY ANALYSES OF VARIANCE AND SCHEFFÉ TESTS, EXPERIMENT 1

MEASURES	MEANS		ANOVA SIGNIFICANT EFFECTS		
	2-Year-Olds	10-Year-Olds	Age	Presence	Age × Presence
Quantity of speech:					
Absent	426.7	390.0	.01	.01	.05
Present	1448.2	861.2			
Mean length of utterance:					
Absent	9.839	11.245	.01	.01	...
Present	6.596	9.633			
Sentence complexity:					
Absent	0.473	0.543	.01	.01	.05
Present	0.189	0.464			
Mean preverb length:					
Absent	2.685	2.594	...	.01	.01
Present	2.044	2.448			

TABLE 1 (*Continued*)

Measures	Means		ANOVA Significant Effects		
	2-Year-Olds	10-Year-Olds	Age	Presence	Age × Presence
Utterances without verbs:					
Absent	0.074	0.043	.05	.01	...
Present	0.165	0.121			
Third-person pronouns:					
Absent	0.049	0.062	.01	.01	...
Present	0.039	0.051			
Complete repetitions:					
Absent	0.008	0.003	.01	.01	...
Present	0.029	0.007			
Partial repetitions:					
Absent	0.284	0.138	.01	.01	...
Present	0.157	0.105			
Semantic repetitions:					
Absent	0.059	0.032	.01	.01	.05
Present	0.136	0.049			

Note.—Scheffé test results are indicated by lines between cell means: ———, $p < .01$; ....., $p < .05$.

and the 10-year-old conditions for mean preverb length, which approached significance. Mean preverb length and sentence complexity showed significant age × presence interactions; both these interactions reflect a much greater difference between present and absent scores in the 2-year-old than in the 10-year-old condition. Scheffé tests for all three measures show an identical pattern; there were no significant differences among the 2-year-old absent, 10-year-old absent, and 10-year-old present conditions, but all of these differed significantly from the 2-year-old present condition. On every measure of complexity, the speech produced in the 2-year-old present condition was significantly simpler than that produced in any other condition.

All three repetition measures showed significant age and presence effects. In all cases, mothers made more repetitions to 2-year-olds than to 10-year-olds. Also, complete repetitions and semantic repetitions occurred more frequently in the present than in the absent condition. Scheffé tests for these two repetition measures show the same pattern as for the complexity measures; more repetitions occurred in the 2-year-old present condition than in any other condition, and the other conditions did not differ from one another. This pattern is confirmed by the significant age × presence interaction for semantic repetitions. However, the results for the presence factor were reversed for incidence of partial repetitions; there were more partial repetitions in the absent condition than in the present condition. Scheffé tests indicate that there were more partial repetitions in the 2-year-old absent condition than in any other condition. The 2-year-old present condition also elicited more partial repetitions than the 10-year-old present condition. The production of more partial repetitions in the absent condition indicates that mothers predicted the need for this kind of repetition, though they were unable to predict the need for complete repetitions, paraphrases, or grammatical simplification. Why this should be the case is unclear.

Significantly fewer third-person pronouns were used in the present and in the 2-year-old conditions. Scheffé tests indicate that fewer third-person pronouns were used in the 2-year-old present condition than in either 10-year-old condition, and fewer were used in the 2-year-old absent than in the 10-year-old absent condition. Mothers tended to repeat nouns, especially subject and direct object nouns, when speaking to 2-year-olds rather than substituting pronouns for them.

Incidence of utterances without verbs was higher in the 2-year-old condition and in the present condition. Scheffé tests show that the 2-year-old present condition elicited more utterances without verbs than either absent condition, and the 10-year-old present condition elicited more utterances without verbs than the 10-year-old absent condition. This suggests that mothers did not maintain formal correctness in their speech to 2-year-olds. Rather, they produced sentence fragments, many of which were repetitions of phrases from preceding sentences.

Cell means for measures which showed significant groups × age interactions are given in table 2. These interactions can perhaps best be understood as differences between mothers talking to their own children and

TABLE 2

CELL MEANS FOR THE MEASURES WHICH SHOWED GROUPS × AGE INTERACTIONS IN EXPERIMENT 1

MEASURES AND CONDITION	MEANS		SIGNIFICANCE LEVEL
	Mothers of 2-Year-Olds	Mothers of 10-Year-Olds	
Quantity of speech:			
2-year-old	1084.7	790.2	.05
10-year-old	567.7	680.8	
Mean length of utterance:			
2-year-old	7.833	8.603	.01
10-year-old	11.399	9.479	
Sentence complexity:			
2-year-old	0.284	0.379	.01
10-year-old	0.578	0.429	

strangers' children. The interaction for quantity of speech occurred because mothers of 2-year-olds talked more to their own children than to the older children, while mothers of 10-year-olds talked about the same amount to both groups of children. The two complexity measures, mean length of utterance and sentence complexity, reveal that mothers of 2-year-olds used less complex language when speaking to the younger children and more complex language when speaking to the older children than did the mothers of 10-year-olds. The mothers of 10-year-olds simplified their speech somewhat for 2-year-olds but also spoke more simply to the 10-year-olds than did the other group of mothers. In general, it seems that the mothers of 2-year-olds were more sensitive than the mothers of 10-year-olds to the demands for simplified speech made by 2-year-old children.

Experiment 2

Experiment 2 was performed with two purposes in mind. The first was to confirm the results found for the presence factor in experiment 1. The procedure for the absent condition was changed somewhat in an attempt to motivate the mothers maximally to produce the speech modifications. The second purpose was systematically to vary task difficulty to ensure that the differences between the 2-year-old and 10-year-old conditions found in experiment 1 were not simply a result of greater difficulty of the tasks for the 2-year-olds.

Method.—Each of 12 mothers performed a number of tasks with her own 2-year-old child. In the first task, called block selection, the mother described a specific block (chosen by the experimenter) in terms of its size, its color, and the animal(s) pictured on it. The child had to pick out the block described from among a group of several similar blocks. The easy level of the task consisted of finding a small block with only one animal pictured

on it from among 12 alternatives; the difficult level consisted of finding a large block with two animals pictured on it from among 24 alternatives. In the pattern-construction task, the mother described a pattern composed of light and dark wooden blocks of different sizes and shapes so that the child could reproduce the pattern with the blocks. In the easy task, the pattern consisted of five or six easily described blocks; in the difficult task the pattern consisted of 14–16 blocks, including shapes for which the children had no names. Each mother performed an easy and a difficult version of each task with her child in both the absent and the present condition. To ensure maximum similarity of the absent and present conditions, the mothers were warned that the tapes made in the absent condition would actually be played to the children, and this was done. Half the mothers performed the absent condition first and half performed the present condition first. The mothers scored the children's responses in all the tasks; the experimenter was not present during the testing.

Results.—Each measure was analyzed separately with a two-way analysis of variance. The two tasks were analyzed separately because of the problem of ranking difficulty within the two disparate tasks. The cell means and levels of significance for the analyses of variance are given in table 3.

In general, the findings for the presence factor were the same as those of experiment 1, except that some of the measures which showed an absent-present difference in experiment 1 no longer showed this difference under the more rigorous conditions of experiment 2. As predicted from experiment 1, quantity of speech was greater in the present condition. Significantly less complex speech occurred in the present condition in the pattern-construction task, as reflected in mean length of utterance and mean preverb length. For the block-selection task, however, only mean length of utterance decreased significantly in the present condition. Results for repetition measures were similar to those obtained in experiment 1. Complete repetitions increased in the present condition, and partial repetitions decreased. There were no significant differences for semantic repetitions. Whereas incidence of third-person pronouns, incidence of utterances without verbs, and incidence of semantic repetitions showed presence effects in experiment 1, these were not affected by the absence of the child in experiment 2. Thus, it seems that experienced mothers under properly motivating conditions can predict to some extent what kinds of speech modifications their children will require. They can produce speech in the absent condition which is in some ways similar to their normal speech to children, but the presence of the child remains a potent factor in eliciting still more extensive modifications.

The difficulty factor had only scattered effects, as indicated by the fact that for any given measure the difficulty factor was never significant for both tasks. As might be expected, quantity of speech increased with more difficult problems. This was only true for the pattern-construction task, however, where greater difficulty was partly a function of the need for more steps to solve the problem. Of the speech-complexity measures, sentence complexity increased in the difficult condition in the pattern-construction

TABLE 3

RESULTS OF TWO-WAY ANALYSES OF VARIANCE IN EXPERIMENT 2

MEASURES AND TASK[a]	MEANS				ANOVA SIGNIFICANT EFFECTS		
	Absent		Present				
	Easy	Difficult	Easy	Difficult	Presence	Difficulty	Presence × Difficulty
Quantity of speech:							
A	147.2	148.9	321.0	269.0	.05	...	...
B	181.6	631.3	398.8	889.2	.05	.01	...
Mean length of utterance:							
A	8.555	8.497	6.314	6.037	.01	...	...
B	9.851	10.180	6.497	6.749	.01	...	...
Sentence complexity:							
A	0.214	0.163	0.118	0.104	...	...	...
B	0.195	0.246	0.126	0.171	...	.05	...
Mean preverb length:							
A	2.111	2.353	2.003	2.101	...	.01	...
B	2.260	2.598	2.204	2.242	.01	...	...
Utterances without verbs:							
A	0.163	0.247	0.212	0.213	...	...	...
B	0.159	0.122	0.191	0.176	...	...	...
Third-person pronouns:							
A	0.052	0.029	0.044	0.025	...	.01	...
B	0.039	0.034	0.034	0.046	...	...	...
Complete repetitions:							
A	0.030	0.022	0.055	0.087	.05	...	...
B	0.042	0.031	0.057	0.085	.05	...	...
Partial repetitions:							
A	0.259	0.325	0.164	0.134	.01	...	.05
B	0.273	0.208	0.182	0.143	.05	...	...
Semantic repetitions:							
A	0.016	0.027	0.015	0.022	...	...	...
B	0.047	0.030	0.026	0.013	...	...	...

[a] Task A denotes the block-selection task; task B denotes the pattern-construction task.

task, and mean preverb length increased in the difficult condition in the block-selection task. Mean length of utterance tended to increase in the difficult condition in the pattern-construction task, but this difference did not reach statistical significance. If the mothers in experiment 1 were responding to the children's difficulty with the tasks, they would be expected to have simplified their speech in the difficult condition; instead they produced more complex speech in this condition, suggesting that it was in fact the children's linguistic immaturity that was crucial in stimulating the mothers' speech modifications.

No repetition measures showed any difficulty effects in either of the tasks. Incidence of third-person pronouns decreased in the difficult condition only in the block-selection task. Incidence of utterances without verbs was not affected by difficulty.

The only presence × difficulty interaction effect occurred for incidence of partial repetitions in the block-selection task. Mothers produced more partial repetitions in the difficult condition if the child was absent, but not if the child was present to offer some feedback about the kind of information needed.

Experiment 3

In experiment 3, the speech of highly motivated mothers in the absent condition was compared to the speech of nonmothers who had had very little experience with children. This was done in order to determine whether their past experience in talking to children had taught the mothers who served as subjects in experiments 1 and 2 anything about the speech modifications that young children require.

Method.—Nonmothers were asked to make stimulus tapes for 2-year-old children, for use in "an experiment in cognitive development." They recorded instructions, only in the absent-condition, for the same tasks as used in experiment 2. These tapes were compared to absent-condition data collected from mothers in experiment 2.

Results.—The most striking finding was the general absence of differences between the speech of mothers and nonmothers (see table 4). Only quantity of speech, mean length of utterance, and incidence of utterances without verbs showed significant differences; in the first two cases nonmothers' scores were higher; in the last case, lower. Inspection of the protocols reveals that nonmothers' speech was more detailed, precise, and formal-sounding than mothers' speech. Nonmothers' speech was also more complex and less repetitive, but not significantly so.

The difficulty factor produced three differences. Quantity of speech increased in the difficult condition, as it had in experiment 2. Mean length of utterance was significantly greater in the difficult condition in both tasks. Comparison of easy and difficult conditions for the other complexity measures indicates that, although the differences were not significant, almost all of them were in the direction of greater complexity in the difficult condi-

TABLE 4

RESULTS OF TWO-WAY ANALYSES OF VARIANCE IN EXPERIMENT 3

MEASURES AND TASK[a]	MEANS				ANOVA SIGNIFICANT EFFECTS		
	Mothers		Nonmothers				
	Easy	Difficult	Easy	Difficult	Groups	Difficulty	Groups × Difficulty
Quantity of speech:							
A	147.2	148.9	192.2	157.3	...	...	...
B	181.6	631.4	472.2	1328.0	.01	.01	.05
Mean length of utterance:							
A	8.555	8.497	9.747	12.640	.05	.05	.05
B	9.851	10.180	10.008	11.242	...	.05	...
Sentence complexity:							
A	0.214	0.163	0.218	0.267	...	...	...
B	0.195	0.246	0.327	0.341	...	...	...
Mean preverb length:							
A	2.111	2.353	2.582	2.587	...	...	...
B	2.260	2.598	2.733	2.947	...	...	...
Utterances without verbs:							
A	0.163	0.247	0.019	0.022	.01	...	...
B	0.159	0.122	0.051	0.065	.05	...	...
Third-person pronouns:							
A	0.052	0.029	0.040	0.031	...	...	...
B	0.039	0.034	0.035	0.041	...	...	...
Complete repetitions:							
A	0.030	0.022	0.014	0.014	...	...	...
B	0.042	0.031	0.011	0.016	...	...	...
Partial repetitions:							
A	0.259	0.325	0.177	0.227	...	.01	...
B	0.273	0.208	0.227	0.178	...	...	...
Semantic repetitions:							
A	0.016	0.027	0.036	0.011	...	...	...
B	0.047	0.030	0.014	0.010	...	...	...

[a] Task A denotes the block-selection task; task B denotes the pattern-construction task.

tion. There were significantly more partial repetitions in the difficult condition in the block-selection task. However, in the pattern-construction task, there were fewer partial repetitions in the difficult condition, although this was not a significant difference. No other repetition measures showed any difficulty effects.

There were two significant groups × difficulty interaction effects. The increase in quantity of speech in the difficult condition in the pattern-construction task was much greater for nonmothers than for mothers. Mothers' mean length of utterance decreased slightly in the difficult condition in the block-selection task, while nonmothers' mean length of utterance increased substantially. In both cases, the difference between the conditions affected the nonmothers more than it affected the mothers.

DISCUSSION

To recapitulate the findings of the present experiments: (*a*) mothers' speech to young children was simpler and more redundant than their normal speech, (*b*) these modifications in mothers' speech styles depended to some extent on the reactions of the child being addressed, (*c*) task difficulty did not contribute to the mothers' production of simplified, redundant speech, and (*d*) experienced mothers were only slightly better than nonmothers in predicting the speech-style modifications required by young children.

The present findings strongly suggest that middle-class children such as those included in this study do not learn language on the basis of a confusing corpus full of mistakes, garbles, and complexities. They hear, in fact, a relatively consistent, organized, simplified, and redundant set of utterances which in many ways seems quite well designed as a set of "language lessons." It might be useful to explore in some detail how these speech-style modifications function as tutorial devices.

Potential Value of Grammatical Simplification

One striking feature of mothers' speech in the presence of young children was the reduction in the length of their utterances. Since run-on sentences were scored as two or more utterances, the shorter utterances which were produced in the presence of 2-year-olds were, on the average, less elaborated than normal utterances. Elaboration can occur in many ways. Sentence complexity scores were lower in the 2-year-old present condition, indicating less use of subordinate clauses and compound verbs. Incidence of utterances without verbs was greater, indicating increased use of constructions so simple they did not even qualify as sentences. Mean preverb-length scores were lower, indicating less left-branching and self-embedding. It is clear that the number of words before the verb is very high in a left-branching sentence such as, "Bill who is the son of the woman who lives next door cuts my lawn." Such sentences occurred very rarely in speech to 2-year-olds. Similarly, self-embedded sentences such as, "The rat that the cat that the

dog worried killed ate the malt," never occurred in speech to 2-year-olds. Whatever the specific changes leading to shorter utterances, it seems clear that, in general, these changes are correlated with grammatical (and semantic) simplicity. This means that the surface structure, which the child hears, is related by a smaller number of steps to the base structure, which must be reached if the sentence is to be interpreted correctly. Further, the child's work in searching for the major units in a sentence is considerably lightened if there are fewer minor units to process. Finally, there are fewer inflections in a shorter sentence; this may improve the chances that the child will notice, remember, and induce the rules governing the inflections that do occur.

Mothers used fewer subordinate clauses and compound verbs when speaking to young children; for example: "That's a lion. And the lion's name is Leo. Leo lives in a big house. Leo goes for a walk every morning. And he always takes his cane along." If there are fewer clauses in a sentence, then the child is faced with fewer subject-verb and subject-verb-object relations to puzzle out, and related subjects and verbs are more likely to follow one another directly. Thus, the child might discover the subject-verb-object rule for sentence production with greater ease than if he were faced with sentences composed of many interembedded clauses. Evidence presented by Slobin and Welsh (1968) suggests that children do process sentences by searching out the subject and verb. If the subject or verb were somehow obscured in the sentences offered to their subject for imitation, she would treat the sentence as a word list. But she could extract a subject, verb, and object from a scrambled sentence if she could identify two nouns and a verb which had some semantically acceptable relationship.

Mean preverb length was shorter in speech addressed to 2-year-olds. Greater mean preverb length can result from center-embedding or left-branching; such sentences are known to be more difficult to process for children (Gaer 1969) and for adults (Miller 1962). Since the subject is normally the first element in an English sentence, greater mean preverb length would often involve separation between the subject and the verb. This kind of sentence is probably both difficult and confusing to a child who is just mastering a subject-verb rule for forming sentences. Furthermore, considering the evidence that a meaningful verb is important in making it possible for children to process sentences (Herriot 1968), sentences in which the verb is placed toward the end may be more difficult to understand.

About 16% of the utterances spoken to 2-year-olds were simple phrases, which were not produced on the basis of a subject-verb rule. This is quite a high percentage for a child who will have to deduce subject-verb rules for producing sentences. Inspection of the protocols indicates that much of the increase of utterances without verbs in the 2-year-old condition can be attributed to repetition of important phrases from preceding sentences; for example: "Put the red truck in the box now. The red truck. No, the red truck. In the box. The red truck in the box." The value of this kind of repetition for guiding the child's behavior is obvious. Grammatically, it may have

yet another value. It gives information about the boundaries of units within utterances, since only complete units—noun phrases and prepositional phrases, primarily—are repeated in this way. A major step in decoding a sentence is assigning a phrase structure to it. Information about the limits of subunits within the sentence is extremely valuable in this task.

Fewer third-person pronouns were used in speech to young children. Mothers repeated the subjects and objects of their sentences rather than substituting pronouns for them. Thus, the children were not required, in the early stages of rule formation, to deal with the difficulties of pronoun reference. Furthermore it is possible that the existence of subject-verb relations in sentences is somewhat obscured when a pronoun is substituted for the subject noun phrase, which has a more obvious semantic reference to an actor or a topic. The difficulties would be especially great for a child who is not yet sure which pronouns refer to which classes of nouns.

Potential Value of Repetition

Repetition of complete sentences was about four times as frequent for 2-year-olds as for 10-year-olds. Depending on the task, 3%–8% of the utterances that 2-year-olds heard were repeated shortly afterwards. Short-term memory limits the time available for processing input. Repetition of a sentence would give added processing time, thus increasing the child's chances of successfully processing the sentence. For example, if a child had decoded the major components of a sentence at first hearing, repetition would give him an opportunity to pay attention to the more minor constructions, such as modifiers and subordinate clauses. Perhaps the function of these unstressed constructions in long sentences first becomes obvious to the child only following repetition of the sentence.

Repetition of phrases was much more common in speech addressed to 2-year-olds. As discussed above, the repetition of noun and prepositional phrases is clearly of value, assuming that one of the child's tasks is to assign a phrase structure to what he hears. Often, when mothers repeated phrases, they used a new frame for the repeated phrase; for example: "Pick up the red one. Find the red one. Not the green one. I want the red one. Can you find the red one?" This is a valuable object lesson in the basic linguistic skill of rearranging units to form new utterances. Interestingly, it is quite similar to language games that children themselves play with their newly learned words (Weir 1962).

In experiment 1, 14% of mothers' utterances to 2-year-olds in the present condition were paraphrases of preceding utterances; for example: "Give mummy all the red toys. I would like all the things that look like this. Can you give me all the red things?" This is more than twice as many paraphrases as in the absent condition and three times as many as provided for 10-year-olds. Some of this was undoubtedly due to the child's failure to comprehend the mother's first statement. Thus, the mother was required to find a new way to say what she meant. Interestingly, the mothers did not

predict this need as readily as they predicted the need for partial repetition. The ability to paraphrase represents another basic feature of language. The relationship between sound and meaning is arbitrary, and therefore several different sound signals can have the same meaning. Thus, it makes no sense to memorize sentences; new ones meaning the same thing can always be created without waste of memory stores. Hearing adults paraphrase their own utterances could be a valuable demonstration of this basic feature of language to a child whose vocabulary and grammar are still so small that he has only one way to say most things. Furthermore, if the child has figured out the meaning of the sentence, he needs less time to interpret its paraphrase and thus can spend more time decoding grammatically less important units of the paraphrase.

CONCLUSIONS

The modifications which mothers produce for young children may be valuable in at least two ways. The first value, no doubt intended by the speaker, is to keep his speech simple, interesting, and comprehensible to young children. The second value, unintended by the adult but potentially as important as the first, is that simplified speech is admirably designed to aid children in learning language. This makes it somewhat easier to understand how a child can accomplish the formidable task of learning his native language with such relative ease. The willingness of the child's parents to produce simplified and redundant speech, combined with the child's own ability to attend selectively to simple, meaningful, and comprehensible utterances (Shipley, Gleitman, & Smith 1969; Snow 1971; also see Friedlander 1968, 1970; Turnure 1971), provide the child with tractable, relatively consistent, and relevant linguistic information from which to formulate the rules of grammar.

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