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AUTHOR Granskog, Dorothy
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ABSTRACT

This study investigated how reading begins in speech. The subjects were nonreading kindergarten children divided into a control group of 20 students and an experimental group of 20 students. Both groups had an equal amount of discrimination practice upon the same sentences prior to test for word identification. The sentences for the experimental group differed from those for the control group in that the subjects and objects of the verb in their sentences had exchanged places. The results indicated that the subjects in both groups succeeded in identifying words as wholes, as predicted. The experimental group, as predicted, identified more words than did the control group. The mean number of responses per subject capable of responding did not differ significantly. Also, the data suggested that phrase structure indicators, "the" and "did," tended to be identified more often by a higher number of experimental subjects and that once these words were identified, several other identifications also occurred. (WR)

THE EFFECT OF SYNTACTICAL STRUCTURE ON WORD IDENTIFICATION BY KINDERGARTEN CHILDREN

By

Dorothy Granskog

Elementary Education

Knox College

This paper deals with research conducted by the writer for the purpose of shedding some light upon the issue of how reading begins in speech for nonreading kindergarten children.[1]

THEORETICAL STANCE

Heretofore, the proposition that reading begins in speech has seemed to be too obvious to initiate much research.[2] Recently, however, Eleanor J. Gibson has suggested that this proposition be approached as a piece of natural history, somewhat as an ethologist looks at behavior.[3] She has been engaged in research on reading and on developmental processes for some time; as a result, she has been able to lay out some principles of perceptual learning and development in keeping with the "natural history" viewpoint.[4] She has also offered an analysis of the relationship between reading and speech.[5] Other researchers have found some uniformities among languages with respect to language

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[1]Dorothy Granskog, "The Effect of Syntactical Structure on Word Identification by Kindergarten Children," (unpublished Ph. D. dissertation, Michigan State University, East Lansing, 1974).

[2]Eleanor J. Gibson, "The Ontogeny of Reading," American Psychologist, XXV (1970), p. 136.

[3]Ibid.

[4]Eleanor J. Gibson, Principles of Perceptual Learning and Development (New York: Appleton-Century-Crofts, Educational Division, Meredith Corporation, 1969), 537 pp.

[5]Gibson, "Ontogeny of Reading," p. 136.

structure and native language learning.[6] This study was designed with these two bodies of research in mind.

What is meant by the term meaning is crucial in examining the relationship between reading and speech. Monroe explained the relationship as "Talk wrote down." in such a way that the word, not the sentence or the grammatical unit to which it belongs, is taken as the unit.[7] Beyond this emphasis upon the word, the term meaning is not really taken into account. Since her analysis calls into play experiences and thoughts associated with them, this failure to be explicit is an important omission.

Gibson, on the otherhand, makes no mention of words or meaningful experiences whatsoever. She sees words as constituents of higher order units. They result from the grammatical breakdown of the sentence taken as a whole. This breakdown occurs in accordance with phrase structure rules.[8] These rules are used to divide sentences into grammatical units for basic sentence relations, such as the subject of the sentence, the predicate of the sentence,

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[6]Charles A. Ferguson and Dan I. Slobin (eds.), Studies of Child Language Development, (New York: Holt, Rinehart, and Winston, Inc., 1973), 645 pp.

[7]Marion Monroe, Growing into Reading (Chicago: Scott Foresman and Company, 1951), pp. 207-221.

[8]Noam Chomsky, Syntactic Structures (The Hague: Mouton, 1957), pp. 26-27.

and the object of the verb.[9] In her analysis of the relationship between reading and speech, children begin by segmenting acoustical or printed information into units like basic sentence relations. It is this ability to segment by rule that accounts for the relationship between reading and speech. Meaning, in this case, derives from grammar. It is symbolic and abstract.[10]

Since meaning is assumed to be symbolic and abstract, the kind of word identification that might be expected to take place in such an event should be specified. The ability to identify words as wholes has been shown to be predictive of success in beginning reading. Chall investigated the research on "meaning" and "coding" approaches, but she did not also attempt to state how reading originated in speech. Consequently, she never did explain why the ability to identify words as wholes should be predictive of success in the first place.[11] In this study, it was assumed that <u>if</u> meaning operated from rules of grammar, children would identify words as wholes. Because such meaning is symbolic and abstract, the sentences used were deliberately made grammatical but also anomalous with respect to meaningful thoughts or experiences.

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[9]Gibson, <u>Principles of Perceptual Learning</u>, pp. 428-441.

[10]Gibson, "Ontogeny of Reading," p. 136.

[11]Jeanne Chall, <u>Learning to Read: The Great Debate</u> (New York: McGraw-Hill, Inc., 1967), 362 pp.

THE PROBLEM, DESIGN, AND HYPOTHESES

The Problem

Studies on forty different languages have shown that there are several uniformities among them for language structure and native language learning. For example, all languages seem to have a way of expressing what is meant in English by terms such as noun phrase, verb phrase, subject of the sentence, predicate of the sentence, and object of the verb. For all of these languages, young children went through the same set of stages. In short, all languages had the same general definition for form and function. Young children seem to grasp what this definition is as soon as they learn to speak.[12] Imitation was found to be a useful research technique in that it permitted control over adult input so that child output could be compared with it.[13] But despite these uniformities, the classes that children use belong, not to adult, but to child grammars. This being the case, it may not be possible to predict what children will do with the grammar of the writing system from their speaking habits.[14] It is possible, however, to predict the use of

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[12]Dan I. Slobin, "Cognitive Prerequisites for the Development of Grammar," in Studies of Child Language Development, ed. by Charles A. Ferguson and Dan I. Slobin (New York: Holt, Rinehart, and Winston, Inc., 1973), pp. 175-208.

[13]Dan I. Slobin and Charles A. Welsh, "Elicited Imitation as a Research Tool in Developmental Psycholinguistics," in Studies of Child Language Development ed. by Charles A. Ferguson and Dan I. Slobin (New York: Holet, Rinehart, and Winston, Inc., 1973), pp. 485-496.

[14]Dan I. Slobin, Psycholinguistics (Glenview, Ill.: Scott Foresman and Company, 1971), pp. 40-60.

rules even though the output of these rules for children and adults may not be exactly the same. What is needed is (1) a generalized set of rules that incorporate both adult and child grammars; (2) the use of imitation-of-oral reading as a task to provide discrimination practice; and (3) an analysis of the basic speech processes that yield the origins of reading in speech together with a theory for the way perceptual learning takes place.

Design

An experimental descriptive design was used. It consisted of pretest, discrimination practice, and test for word identification. A pretest was prepared to eliminate children who might already be able to read. For discrimination practice, a set of active-voice-transitive-verb sentences was prepared and manipulated by exchanging the subjects of the verbs with the objects of the verbs so that the predicates would be marked off. This manipulation made it possible to assign a control group to discrimination practice upon sentences representative of common usage and an experimental group to discrimination practice representative of uncommon usage--the sentences in which subjects and objects of the verb exchanged places. An imitation-of-oral reading task was devised as a means for giving discrimination practice. Word identification test was provided for by constructing a new set of sentences containing the words previously presented during discrimination practice.

Hypotheses

Since children have command of phrase structure rules before they start to school,[15] the use of these rules to segment printed information represents an improvement in discrimination abilities that they already have. This being the case, it was hypothesized that there would be subjects in both the control and the experimental groups who would succeed in identifying words as wholes on word identification test. But because the experimental subjects had had the advantage of discrimination practice upon sentences in which the grammatical units had been marked off through the exchange of subjects with the objects of the verbs, these subjects were predicted to identify significantly more words than the control subjects. Student's t, two-tailed test, for mean difference was the statistic to be used.

Additional hypotheses were needed to explicate in further detail how reading begins in speech. These hypotheses were descriptive in nature. For these hypotheses, it was necessary to separate the data for the number of subjects responding from the data on the way words were being responded to. For these hypotheses also, the experimental group was predicted to produce the superior performance. These

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[15]Paula Menyuk, "A Descriptive Study of the Syntactic Structures in the Language of Children: Nursery School and First Grade" (unpublished Ed.D. thesis, Boston University, 1961).

hypotheses were (1) an economy of effort would be apparent; (2) that words introducing grammatical units would be identified on word identification test; and (3) that the perception that had occurred during discrimination practice would reflect how the grammar had been attended to.

RESULTS AND CONCLUSIONS

Results

There were two groups of subjects, a control group and an experimental group. There were twenty subjects in each group. Only children who could not already read on pretest were accepted as subjects. Both groups had had an equal amount of discrimination practice upon the same sentences prior to test for word identification. The sentences for the experimental group differed from those for the control group in that in their sentences, the subjects and objects of the verb had exchanged places.

Word Identification

Children in both groups succeeded in identifying words as wholes as predicted. The experimental group also identified significantly more words as hypothesized. Student's *t*, two-tailed test, for mean difference was significant at the .05 per cent level of confidence. The scores are given in Table 1.

Insert Table 1 about here

Table 1. Scores and Means for Word Identification

Experimental Group		Control Group	
subjects	score	subjects	score
1. Kathleen	3	Victor	0
2. Scott	0	Mary	2
3. Becky	0	Gary	0
4. Bobbi (female)	1	Chris (female)	0
5. Mike	2	Richard	0
6. Chuck	11	Mike	0
7. Annette	2	Scott	0
8. Joe	0	Roxanne	0
9. Steve	0	Kathryn	0
10. Donald	0	Eddie	0
11. Danny	1	Kate	2
12. Delores	0	Mike	0
13. Judy	0	Meredith (female)	0
14. Beth	0	James	0
15. Sue	1	Tom	0
16. Daphne	1	Linda	2
17. Crystal	3	Joe C.	0
18. Robert	10	Anne	0
19. Lisa	2	Joe	0
20. Kate	0	Julie	0
Total number of words	37		6
Mean number of words	1.85		.20
Student's $t = \pm 2.18$	(Student's t must $= \pm 2.025$ for .05 per cent level)		

Examination of the scores indicated the possibility of an interaction of treatment with the sex of the subject. Only girls succeeded in identifying words in the control group. Although both boys and girls identified words in the experimental group, the mean number of words seems higher for the boys ($\bar{X}$ = 3.00) than for the girls ($\bar{X}$ = 1.08). Because sex differences have not been noted with respect to native language learning, this possibility of an interaction of treatment with sex was unexpected.[16] Even though only kindergarteners were used, age may also have been a factor for the control group. Mean ages for the control and experimental groups were 5.78 years and 5.74 years respectively. Yet, for the control group, the youngest subject capable of identifying words was seventy-four months, whereas, for the experimental group, the youngest was sixty-three months.

Economy of Effort

If a word is the end product of a grammatical breakdown in terms of a hierarchical organization, economy of effort should result from regarding words as parts of this form of grammatical organization. For this hypothesis, two different scores on word identification test were used: those words identified correctly and those words recognized but not correctly identified. The data are reported for the number of subjects and the number of responses to words separately. The number of subjects capable of responding was greater for

[16] Ibid.

the experimental group (85% as opposed to 60%). The mean number of responses per subject capable of responding did not differ. However, the experimental subjects gave at least one correct identification for each word recognition, whereas the control subjects gave only one correct identification for every five word recognitions. The data are given in tables 2, 3, and 4.

Insert tables 2, 3, and 4 about here

Words Introducing Grammatical Units

This hypothesis predicted that if subjects were attending to syntactical structure of sentences, they would identify the particular words introducing grammatical units. These words were called phrase structure indicators. Two words were singled out: the for the noun phrase and did for verb phrases. The frequencies for word identifications are given in table 5 and the frequencies for subjects in table 6. The data suggest that the and did tended to be identified more often by a higher percentage of experimental subjects (77% versus 33%), and that once these words were identified, several other identifications also occurred. As support for this thinking was examined, it was found that the sentence administered first during discrimination practice had exerted some influence on word identification test.

Table 2. Word Identifications and Word Recognitions

	Number of Words	
	Experimental	Control
Word Identifications	37	6
Word Recognitions	36	32
Total	73	38
Proportion of Identifications to Recognitions	37/36=100	6/32=19

Table 3. Responding by Subjects

	Number of Subjects
Experimental Group	17 of 20 subjects gave word identifications and recognitions 17/20=85% responded meaningfully 11 of these 17 gave word identifications 6 of 17 gave word recognitions
Control Group	17 of 20 subjects responded 5 of 17 gave meaningless letter names 3 of 17 gave word identifications 9 of 17 gave word recognitions 12/20=60% responded meaningfully

Table 4. Means for Word responses

	Experimental	Control
Word Identifications	37	6
Word Recognitions	36	32
Total	73	38
Means	73/17=4.29	38/12=3.17

Insert tables 5 and 6 about here

Perception of Grammatical Units During Discrimination Practice

Imitation-of-oral reading was the task used to provide discrimination practice prior to word identification. On this task, a child could (1) name the word correctly; (2) point to a word where he/she wanted help; (3) omit or simply skip over a word in his/her imitation. These were the three response measures recorded and summed for each word in turn across the sentence. It was predicted that a pattern for perceptual content, the grammatical units being responded to, would emerge for the experimental group. Figures 1 and 2 give the data for the two groups. For the experimental subjects, a two-word unit in the position of the predicate has been marked off, and where naming drops out pointing and omitting responses pick up.

Insert figures 1 and 2 about here.

Conclusions

In this study, the origin of reading in speech was investigated with Eleanor J. Gibson's theory and her "natural history" viewpoint in mind. The use of an experimental descriptive design was possible because the theory gave (1) a

Table 5. Frequencies for Word Identifications

	Number of Word Identifications	
	Experimental	Control
1. the	16	2
2. did	5	0
3. chief	7	2
4. legal	3	2
5. mongrel	1	0
6. matters	1	0
7. weapons	1	0
8. rest	1	0
9. tutor	2	0
Totals	37	6

Table 6. Frequencies for Subjects

Subjects Identifying Phrase Structure Indicators	
Experimental Group	11 gave word identifications 8 of these gave 21 identifications for the words <u>the</u> and <u>did</u> 77% of these subjects identified these words
Control Group	3 subjects identified words 1 of these identified <u>the</u> twice 33% of these subjects identified these words
Subjects Recognizing Phrase Structure Indicators	
Experimental Group	6 subjects recognized words 3 of these located <u>did</u> and <u>the</u> 50% located <u>did</u> and <u>the</u>
Control Group	9 subjects recognized words 5 of these located <u>did</u> or <u>the</u> 55% located <u>did</u> or <u>the</u>

Figure 1

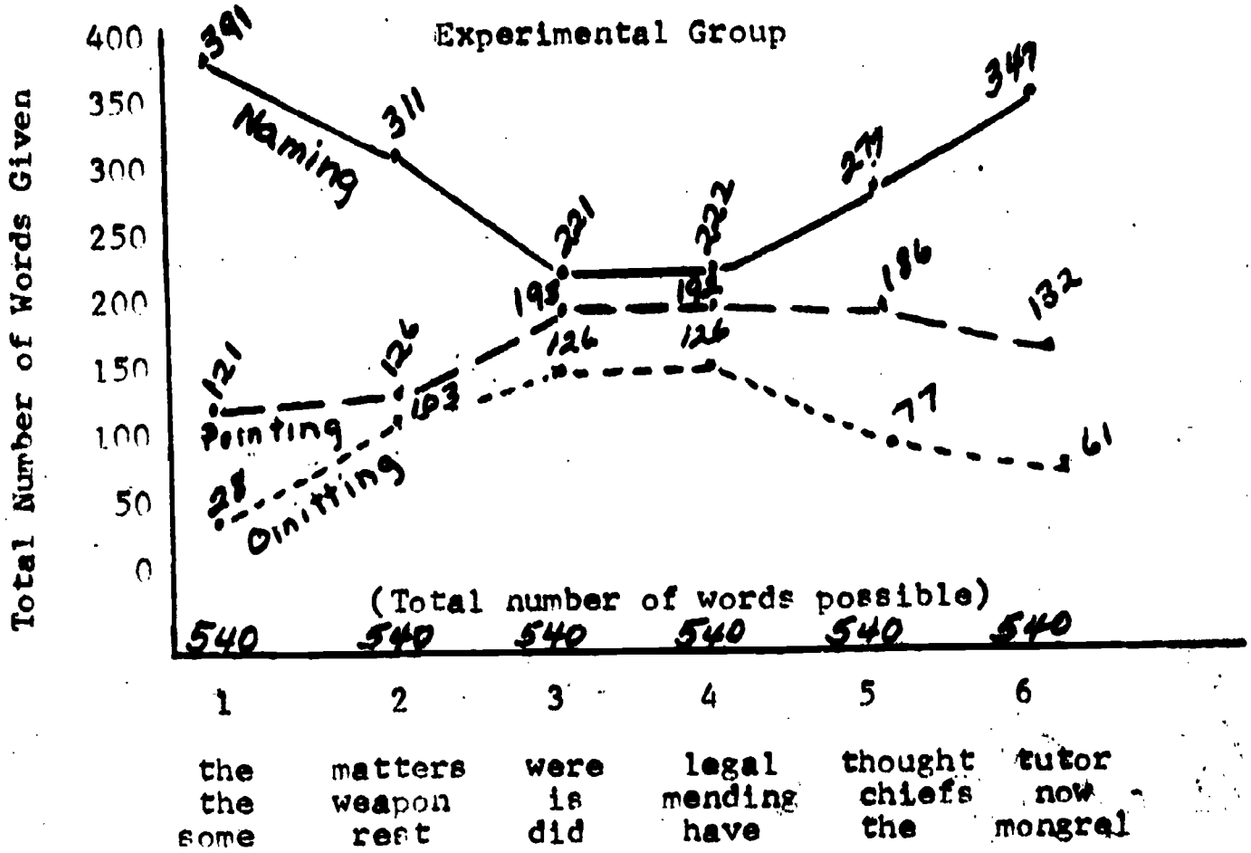
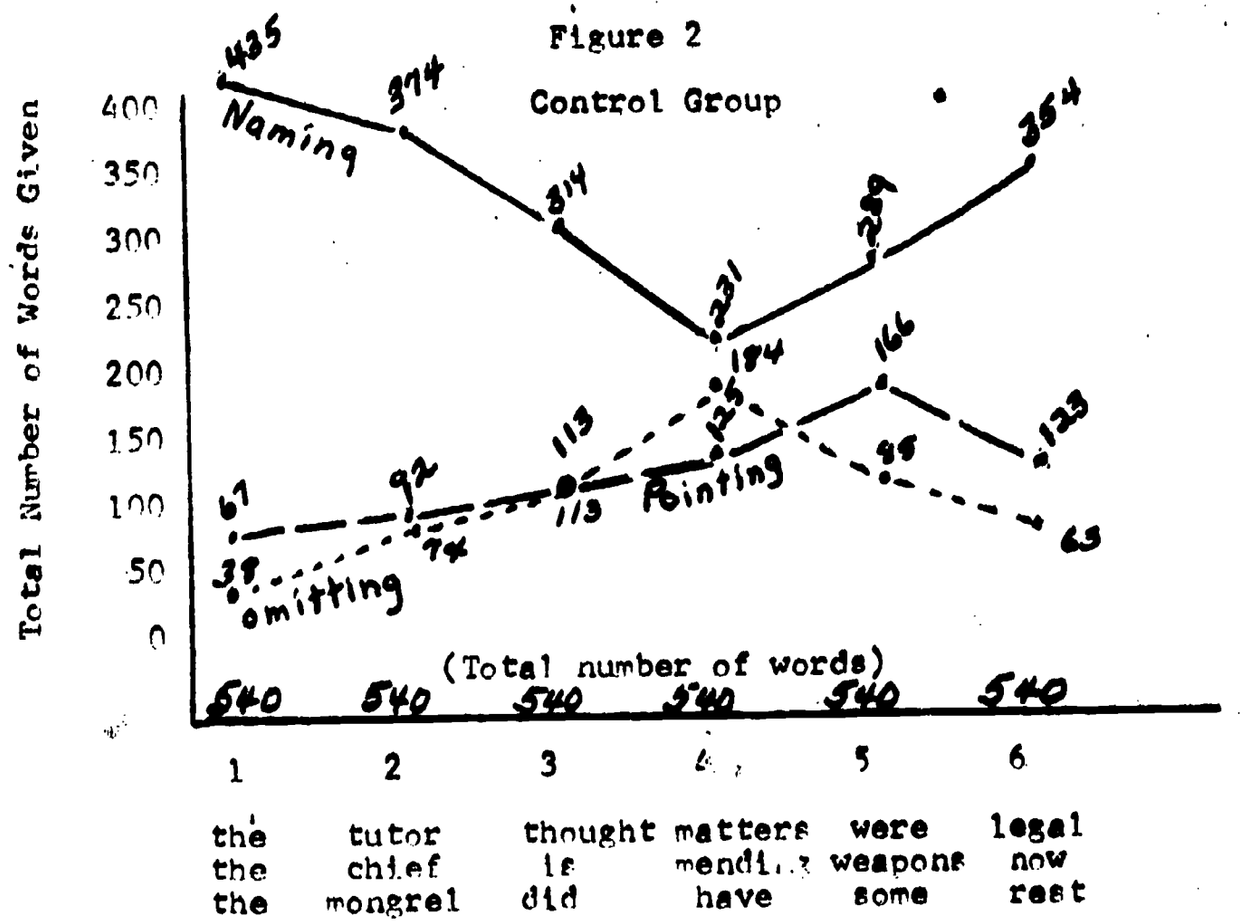


Figure 2



definition of meaning; (2) the manner in which words would be identified; (3) the means of devising tasks and materials; (4) methodology for conducting the study; and (5) a way of interpreting results. An adequate theory together with research evidence seems indispensible in attacking the proposition that reading begins in speech. The fact that three unanticipated factors emerged suggested that much additional research is needed. It is also advisable to replicate the study with a larger sample of subjects and with sentences that have not been deliberately made anomalous.

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