DOCUMENT RESUME

ED 101 307 CS 001 598

AUTHOR Samuels, S. Jay; And Others
TITLE Effect of Pictures and Contextual Conditions on Learning to Read. Occasional Paper No. 25.
INSTITUTION Minnesota Univ., Minneapolis. Research, Development, and Demonstration Center in Education of Handicapped Children.
SPONS AGENCY Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.
BUREAU NO 332189
PUB DATE Mar 74
GRANT OEG-09-332189-4533(032)
NOTE 19p.

EDRS PRICE MF-$0.76 HC-$1.58 PLUS POSTAGE
DESCRIPTORS Elementary Education; Grade 1; Grade 2; *Paired Associate Learning; *Pictorial Stimuli; Reading; *Reading Research; Reading Skills; *Word Recognition

ABSTRACT

The purpose of this study was to resolve the focal attention versus context controversy. Eighty first-grade and 84 second-grade children from a metropolitan school system served as subjects. Subjects in each grade were randomly assigned to each of four experimental conditions: picture-word, no picture-word, picture-sentence, and no picture-sentence. Test stimuli for all four conditions were identical. Four index cards each contained a single word, either "cup," "cat," "bat," or "bed," printed in an artificial alphabet. The procedure of testing consisted of a warm-up period, a training period, and a testing period, all completed at one sitting. Subjects were told to look at the word, put a finger under it, and state what the word was. No feedback was given on the test trials. The results indicated that the word-alone treatment required significantly fewer trials to criterion. Furthermore, more correct responses were given with this treatment when compared with all other conditions. (WR)

Occasional Paper #25

Project No. 332189
Grant No. OE-09-332189-4533 (032)

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S. Jay Samuels & Jean Spiroff
University of Minnesota

Harry Singer
University of California

Research, Development and Demonstration
Center in Education of Handicapped Children
University of Minnesota
Minneapolis, Minnesota

March 1974

The research reported herein was performed pursuant to a grant from the Bureau of Education for the Handicapped, U. S. Office of Education, Department of Health, Education, and Welfare to the Center for Research and Development in Education of Handicapped Children, Department of Special Education, University of Minnesota. Contractors undertaking such projects under government sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opninions stated do not, therefore, necessarily represent official position of the Bureau of Education for the Handicapped.

Department of Health, Education and Welfare

U. S. Office of Education

Bureau of Education for the Handicapped

RESEARCH AND DEVELOPMENT CENTER
IN EDUCATION OF HANDICAPPED CHILDREN
Department of Special Education
Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455

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EFFECT OF PICTURES AND CONTEXTUAL CONDITIONS ON LEARNING TO READ

Harry Singer[1]
University of California, Riverside

S. Jay Samuels[2] and Jean Spiroff
University of Minnesota

In teaching children to recognize new words, teachers may either present them alone, in association with a picture, embedded in a sentence, or in a combination of sentence context plus a picture. Evidence has been presented regarding the efficacy of each of these conditions on the acquisition of reading responses. But, the evidence is contradictory; consequently, some explanations and prescriptions for teaching children to recognize printed words are in direct conflict.

On one side of the controversy, Samuels (1967) found that in comparison with words alone, pictures in association with words apparently interfered with acquisition of reading responses. His explanation was that pictures distracted children from focussing attention on the printed words, which is critical if an individual is to acquire reading responses. However, Hartley (1970) concluded from her experimental instruction of beginning first graders that she could not generalize about the relative effectiveness of word alone, word plus picture, or word plus oral context on the identification of printed words.

In contrast to Samuels' focal attention hypothesis, Goodman (1965) formulated a linguistic or contextual hypothesis based on his demonstration

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[1,2]This research was supported by grants from the Research Committee of the Academic Senate, University of California, Riverside and from the National Institutes of Child Health and Human Development to the Minnesota Reading Research Project. The Center for Research in Human Learning, at the University of Minnesota, has also supported this research.

that contextual constraints facilitated identification of words children could not recognize when the words were presented in isolation. He explained that performance on the novel words improved because the syntactic and semantic constraints of the sentence provided cues for anticipating the unknown words. Consequently only a confirming response from perceiving all or part of the word was necessary for the reader to progress. Or, if negative feedback was obtained from testing the selected word for consistency of meaning with the direction of thought, then spontaneous correction of the erroneous response would occur. Weber (1970) did observe that in reading connected discourse, errors made by first graders during oral reading were often predictable from syntactic or semantic constraints in the words preceding the error.

In an observational study of reading development Biemiller (1970) concluded that during grades one and two children progressed through three stages in learning to recognize printed words. In the first stage, children used contextual constraints for anticipating or guessing unknown words. In the second stage, if children could not use analytical techniques to recognize unknown words, they gave no response. The third stage represented an integration of the first two stages and resulted in a superior performance in word recognition. Barr (1973) related the development of these stages to a concomitant shift in instruction from emphasis on context for recognizing the whole word to stress upon a more analytical response, such as use of grapheme-phoneme correspondence rules.

The focal attention hypothesis acknowledges that pictures or context can cue or prompt a correct response to printed words. But, if the reader depends upon these cues to anticipate the unknown words, he may not acquire

appropriate responses to the graphic features of the word itself. Consequently, in connected discourse, he may seem to know the word because he correctly anticipates it, but when tested on the word in isolation, his inability to identify the word will reveal he did not acquire an accurate response to the word itself. In contrast, Goodman's contextual hypothesis states that children do not need to have the word presented in isolation; presenting new words in context is all that is needed for children to acquire correct oral responses to them.

The purpose of the present study was an attempt to resolve the focal attention versus context controversy. Pedagogically, the controversy can be reduced to the question of what instructional conditions will best help a child learn to recognize a new word. For example, in learning to recognize new words, what effect do pictures have? Similarly, in learning to recognize new words, what effect does context have? Furthermore, does a combination of pictures and context enhance the recognition of new words?

Designwise, we can say that this is a two factor study with grade level and the experimental treatments as factors. Grades 1 and 2 were used in order to determine whether developmental changes occur in the use of cues for identifying words.

METHOD AND PROCEDURES

Subjects: 80 first grade and 84 second grade children from a metropolitan school system were used during the seventh month of the school year.

Design: A 2 (grades 1 and 2) x 4 (treatment) factorial design was used. Subjects in each grade were randomly assigned to each of the four experimental conditions. The four conditions were picture-word, no picture-word, picture-sentence, and no picture-sentence.

Materials: The warm-up materials consisted of two 5x8 index cards, each with a picture of a girl and her name printed below in an artificial alphabet.

Training stimuli for the picture-word treatment consisted of four 5x8 cards. Each card had either a picture of a cup, cat, bat, or bed on it and the corresponding word beneath in an artificial alphabet. Training stimuli for the no picture-word treatment had four cards with the same words, but no picture. Training stimuli for the picture-sentence condition had four cards with a picture of either a cup, cat, bat, or bed, and a sentence using the word. All words were printed in the standard English alphabet, except for the words cup, cat, bat, and bed. The sentences were "Fill the cup," "The cat sleeps," "The bat flies," and "The bed is pretty." Training stimuli for the no picture-sentence condition consisted of four cards, without pictures and the same sentences referred to previously.

Test stimuli for all four conditions were identical. There were four 5x8 index cards, each containing a single word, either cup, cat, bat, or bed printed in the artificial alphabet. The cards were bound on a ring. Each set of four training cards was followed by a set of four test cards. Training and test cards were arranged in three random orders on the ring. Each of the treatments was on a separate ring.

Procedure: The entire procedure--warm-up, training, and testing--was completed by the examiner at one sitting working individually with the subjects. In the experiment proper a study-test procedure was used. During the study trials, the subject was asked to look at the word, put his finger under the word, and to tell the examiner what the word was. If no response was forthcoming within seven seconds the subject was told the word by the examiner. If the response was incorrect, the correct response was given.

During the test trials, only the four target words were shown in the artificial alphabet. All four treatment groups received the same conditions on the test trials. The subject was told to look at the word, put his finger under it, and to state what the word was. No feedback of any kind was given on the test trials. Study and test trials were alternated for a maximum of twelve trials. However, if the child got all four correct on two successive trials, the procedure was stopped.

RESULTS

Two separate analyses were computed: one for the trials to criterion and the other for number of correct responses in the test trials.

An analysis of variance, Tables 1A and 1B, shows that for both trials to criterion and for number of correct responses grade level and treatments were significant. However, the grade level by treatment interactions were not significant for either trials to criterion or for number correct in the test trials. In other words, the pattern of responses for children in both grade levels was the same. Because there was no interaction effect, the results for grades 1 and 2 were combined in order to compare the differences among the treatments.

Insert Tables 1A & 1B about here

The means and standard deviations for trials to criterion and number of correct responses for each of the four treatments are shown in Table 2.

Insert Table 2 about here

Table 2 reveals that the word-no picture condition had the fewest trials to criterion, 8.02. The means then rise for word-picture, 9.69; sentence-no

picture, 10.32; and sentence-picture, 11.45. As shown in Table 3, a Neuman-Keuls test on trials to criterion indicated that the word-no picture treatment required significantly fewer trials to criterion compared with each of the other treatments. The word plus picture required significantly fewer trials in comparison with sentence plus picture. There was no significant difference between word plus picture and sentence-no picture. But, there was no difference between the sentence-no picture and the sentence plus picture treatment.

On number of correct responses, the word-no picture condition had an average of 34.98 correct responses, while the other treatments had 28.43 for word plus picture, 26.23 for sentence-no picture, and 23.29 for sentence plus picture. As indicated in Table 3, the Neuman-Keuls test showed that the word-no picture condition had significantly more correct responses than any other conditions. None of the other conditions were significantly different from each other.

DISCUSSION

The results disclosed that the word alone treatment required significantly fewer trials to criterion. Furthermore, more correct responses were given with this treatment when compared with all the other conditions. Moreover, as shown in Figures 1a and 1b, as the number of cues which were associated with the target word increased from pictures to sentence, and from sentence to sentence plus pictures, the number of trials required to reach to criterion consistently increased and the number of correct responses in the test trials consistently decreased. Thus, the results of the present study support Samuels' focal attention hypothesis, namely, to facilitate the acquisition of word recognition responses, visual attention must be focused on the printed word.

However, in Samuels' (1967) previous study, word plus picture was superior in the study trials, but not in the test trials. That is, in the word plus picture condition, children tended to use the picture to correctly anticipate the target words. Hence, they were learning to use pictures as a type of context cue to identify the target words, which is analogous to using sentence cues to anticipate words as fluent readers usually do in the process of reading. But, in the word condition, children had only the target word to attend to and hence learned to identify the target word better. In short, the word plus picture group was learning to use the picture as a cue to identify the target word while the word only group had to learn to respond only to the graphic stimuli of the target word.

In the present study, the context condition consisted of a printed sentence. In three of the four sentences, definite syntactic and semantic constraints were available for predicting the target words. If contextual constraints are sufficiently predictive, the child may be able to give the correct response to the target words without having to perceive the words themselves. A question arises whether the teacher by providing the context orally can facilitate a correct response without distracting the child's attention from the printed word. However, Hartley (1970) tested the effect of oral context on word recognition and found that oral context was not superior to word alone or word plus picture in the study trials nor in the test trials.

In general, the evidence does not support Goodman's (1965) contention that sentence context facilitates acquisition of correct responses as compared with recognition of the unknown word in isolation. Even though he did demonstrate that adding sentence context to unknown words enables

individuals to identify words they could not recognize when the same words were presented in isolation, he did not provide any evidence that through use of context, readers had, in fact, learned to recognize the unknown word. Nevertheless, the evidence in the present experiment clearly shows that many individuals eventually reached criterion and exhibited correct responses under each treatment, but the addition of pictures, context, or pictures plus context makes the learner less efficient in acquiring reading responses.

A question which we may wish to consider is why do the picture and context conditions make the learner less efficient? The answer seems to lie in the fact that on the study trials pictures as well as context enabled the student to give the correct response without having to visually attend to the graphemes. On the test trials, when the pictures and the verbal context were no longer present, the learner was unable to identify the words because the eliciting cues had been removed. Apparently, then, the pictures and verbal context provided sufficient cues for the student to give the correct oral response. On the other hand, the superiority of the word only condition is explained by the fact that the only cues that the child could attend to were the graphic stimuli of the words themselves, and visual attention is an essential condition needed for learning to identify the words.

The paired-associates laboratory paradigm used in this study is analogous to some of the instructional processes used in the classroom to teach children to recognize words. In a test of the focal attention hypothesis for reading acquisition in a classroom situation, Samuels (1967) found that learning to recognize words was superior when no picture was present. Furthermore, he found that poor readers were significantly more distracted by pictures than were good readers. The good readers had apparently learned

that pictures were an irrelevant cue and that, in order to recognize a word, attention had to be focused on the target word itself.

According to Zeaman and House (1967), one of the major constructs which can be used to explain differences in acquisition rate is that of focal attention strategies. In fact, Estes (1970) states that the construct of focal attention is more useful than the construct of individual differences in intelligence to explain variation in rate of acquisition. If we apply the focal attention construct to reading, high I.Q. children, who also tend to be the better readers, seem to learn at a faster rate because they focus their attention on the relevant attributes of the stimulus sooner than low I.Q. children. Use of contrastive spelling patterns may also serve to focus attention on relevant attributes of graphic stimuli (Fries, 1962). Indeed, use of such distinctive features was successful in laboratory instruction for learning and transfer of grapheme-phoneme correspondences (Gibson, 1965). Also, Skailand (1970) found that low socioeconomic kindergarten pupils taught to respond to stimuli arranged in contrastive spelling patterns recalled about twice as many syllables and words as those children who were taught by the whole-word method or by single grapheme-phoneme combination.

Thus, the evidence consistently supports Samuels' focal attention hypothesis. When confronted by a novel word, the poor reader who has pictures or context available, but does not know which are the relevant stimuli nor how to respond to them, tends to search for or rely upon pictures or contextual cues for eliciting a correct oral response for the unknown word. If the word can be correctly identified from these cues alone, the reader no longer has a need to attend to the word itself. Under these conditions, he is less likely to acquire and associate responses to the graphic stimuli.

While this study has demonstrated that for the purpose of teaching children to identify a word it is best to present that word in isolation, we do not wish to imply that this is the only method which should be used in teaching children to read. We also recognize the need for the child to get ample practice reading meaningful and interesting material in context so that he will develop strategies for using semantic and syntactic constraints in passages as aids in word identification. Indeed, to become a fluent reader, an individual must be able to mobilize semantic and syntactic constraints for anticipating words. He must also learn how to test his predictions by using the graphemic cues present in the test. There is evidence, at the present time, that these strategies which facilitate the word identification process can be trained (Dahl, Samuels, and Archwamety, 1973).

Summary and Conclusions

The purpose of the present investigation was to test Samuels' focal attention hypothesis for learning to recognize printed words. A four treatment (word-no picture, word-picture, sentence-no picture, and sentence-picture) by two levels (Grades 1 and 2) factorial design was used to test the effects of the treatments on learning to recognize words printed in an artificial alphabet; a whole-word method, employing a paired-associate anticipation procedure, was the technique used for teaching 80 first and 84 second graders who were randomly assigned to the four treatments.

The analysis of variance indicated that grade level and treatment effects were significant for trials to criterion and for correct responses on the test. The results were interpreted as supporting Samuels' focal attention hypothesis for acquiring reading responses for novel words. In general, efficiency in learning to associate responses to graphic stimuli is

significantly greater when the word is presented in isolation than when presented in sentence context or in association with a picture, or both.

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Table 1a.

Analysis of Variance for Effect of Four Treatments at Two Grade Levels on Trials to Criterion

Source of Variance	Degrees of Freedom	Sum of Squares	F-Ratio	P-value
Grade	1	57.90	6.14	<.01
Treatment	3	253.24	8.95	<.001
Grade x Treatment	3	28.14	.99	<.39
Error	156	1471.92		

Table 1b.

Analysis of Variance for Effect of Four Treatments at Two Grade Levels on Number of Correct Responses on Test Trials

Source of Variance	Degrees of Freedom	Sum of Squares	F-Ratio	P-value
Grade	1	1020.59	7.23	<.007
Treatment	3	3375.86	7.97	<.001
Grade x Treatment	3	104.18	.25	<.86
Error	156	22021.03		

Table 2

Means and Standard Deviations for Total Sample on Trials to Criterion and Number of Correct Responses for Four Treatments

	Treatments			
	Word - No Picture	Word - Plus Picture	Sentence - No Picture	Sentence - Plus Picture
Trials to Criterion				
Mean	8.0	9.69	10.32	11.45
SD	3.78	3.55	3.08	1.41
Number Correct				
Mean	34.98	28.43	26.23	23.29
SD	11.43	12.52	13.61	10.78

Table 3

Newman-Keuls Comparisons of Treatments

Number of Correct Responses

	Sentence - Plus Picture	Sentence - No Picture	Word - Plus Picture	Word - No Picture
Sentence - Plus Picture		NS[I]	NS	$p < .01$
Sentence - No Picture			NS	$p < .01$
Word - Plus Picture				$p < .05$

Trials to Criterion

	Word - No Picture	Word - Plus Picture	Sentence - No Picture	Sentence - Plus Picture
Word - No Picture		$p < .05$	$p < .01$	$p < .01$
Word - Plus Picture			NS	$p < .05$
Sentence - No Picture				NS

[I] NS = not significant

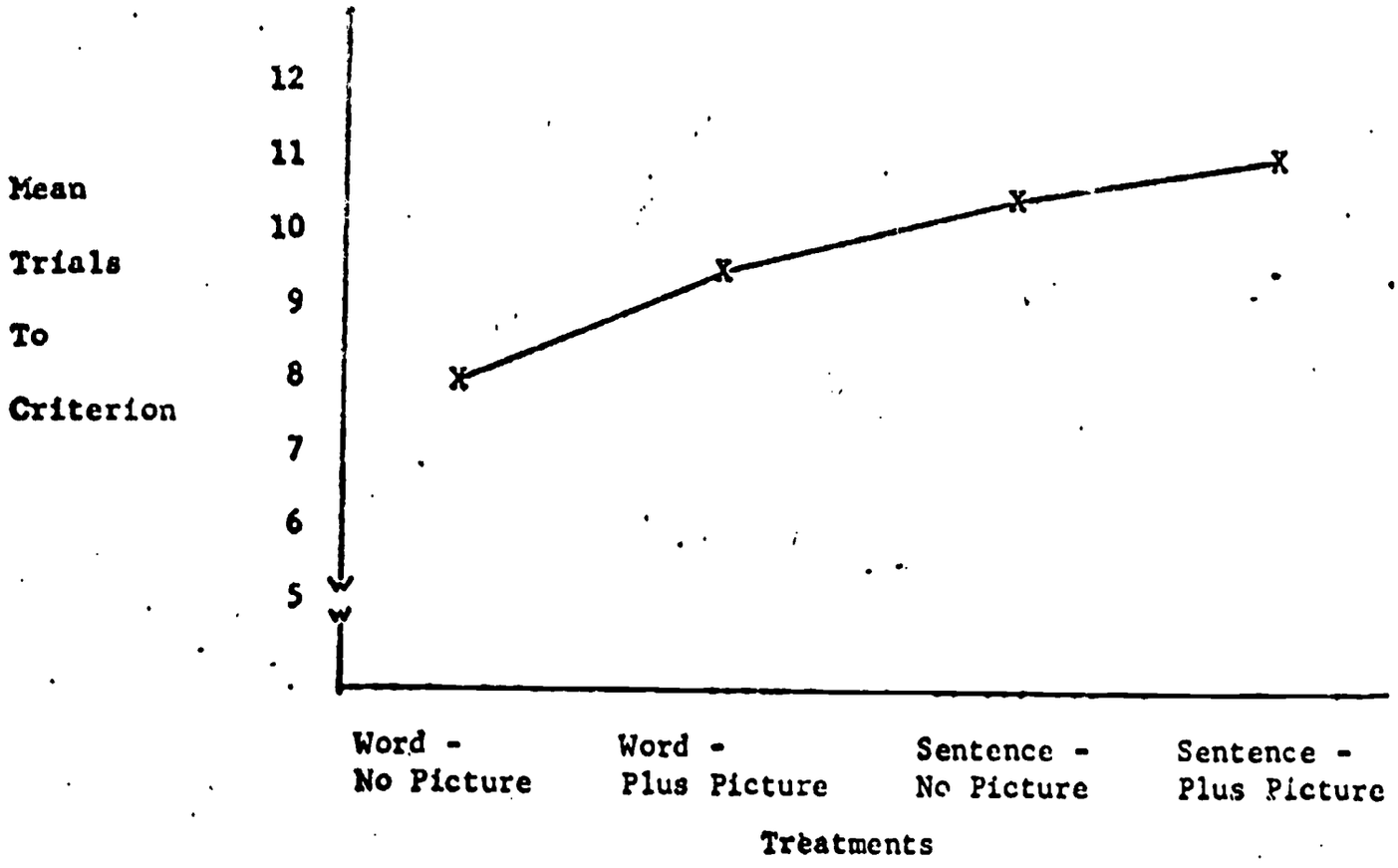

Fig. 1a. Mean Trials to Criterion for Four Treatments

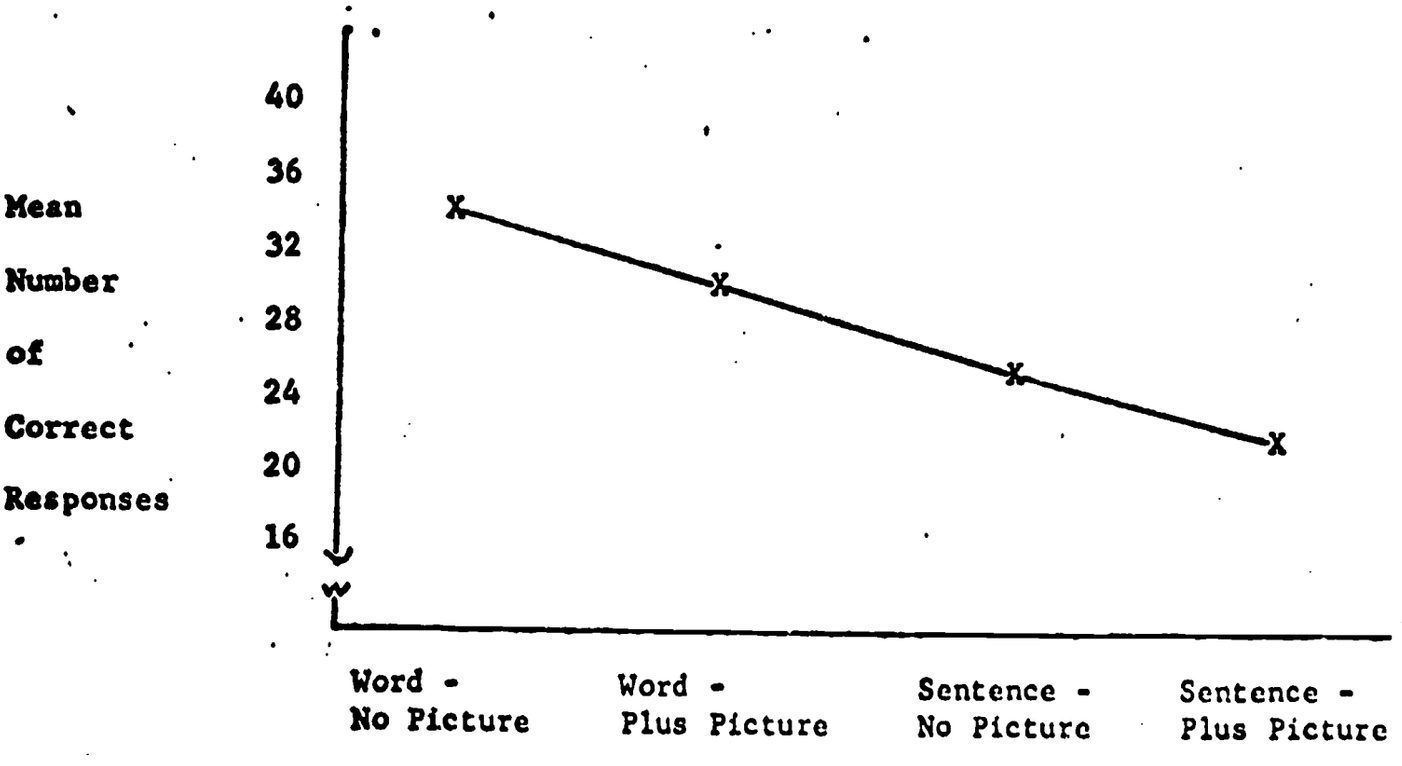

Fig. 1b. Mean Number of Correct Responses for Four Treatments