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ABSTRACT

Oral reading errors of 10 learning disabled children (9-11 years old) were examined in order to describe the type of errors, the use of graphic, syntactic, and semantic information, and the implementation of correction strategies. Tape recordings were made of individual oral reading sessions, and errors were classified according to substitution, omission, insertion, reversal, and complex combination. Results indicated that Ss used graphic, syntactic, and semantic information for reading in a manner consistent with previous research findings on children with no reading difficulties. Findings suggested the possibility of using analysis of oral reading errors as a diagnostic tool for learning disabled students. (CL)

A Psycholinguistic Analysis of Oral Reading Errors of Children with Learning Disabilities

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Psycholinguistic Analysis

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Based upon recent psycholinguistic models of the reading process, oral reading errors of ten children with learning disabilities were examined in order to describe type of errors, use of graphic, syntactic and semantic information and correction strategies. Results indicate that the children utilize graphic and linguistic information in a manner similar to previous research findings on children with no reading difficulties. It is suggested that in setting up programs to remediate reading difficulties, specific information is needed about how individual children process printed material.

A Psycholinguistic Analysis of Oral Reading Errors of Children with Learning Disabilities

According to recent models of reading (K. Goodman, 1967; Ryan and Semmel, 1969; Smith, 1971), proficient reading does not result from precise perception and identification of all constituent letters and words. Rather, it is an active process in which the reader, using his cognitive and linguistic knowledge, samples from numerous sources of information available to him and selects the minimal cues necessary to anticipate portions of the text.

The reading act requires the processing of visual symbols in conjunction with the use of language. Kenneth Goodman (1972) maintained that the reader is at all times utilizing three sources of information interdependently:

(a) Grapho-phonic information

(b) Syntactic information

(c) Semantic information

The present study analyzed oral reading errors made by ten children with learning disabilities. It specifically focused on the types of information and strategies used by the children when reading. The investigation sought to identify trends in (a) type of error, (b) use of graphic information, (c) use of syntactic information, and (d) use of semantic information. In addition, self-correction strategies were examined.

BACKGROUND

A substantial portion of studies concerning various aspects of reading

behavior has utilized the analysis of oral reading errors as a research device. Early studies of reading errors involved counting and classifying errors in order to provide norms for evaluating reading difficulties (Monroe, 1928; Payne, 1930). In general, errors were perceived as undesirable characteristics of oral reading suggesting imperfect learning or inadequate skills.

Studies concerned with identifying types of errors were influenced considerably by the Orton hypothesis. Orton (1928) believed that reversals of letters (e.g., p for q) and the order of letters in words (e.g., was for saw) could be attributed to the failure to establish dominance in one hemisphere of the brain. He felt that the analysis of reading errors, especially reversals, would provide a means of recognizing retarded readers.

In response to the notion that poor readers could be identified by a particular pattern of errors, Malmquist (1958) examined the errors of readers of different levels of proficiency in Sweden. No difference in the proportion of substitutions, omissions, additions and reversals was observed between good, average and poor readers. Malmquist concluded that reversals were only one of several types of errors made by all readers and that reversals tended to disappear with maturity and experience.

Weber (1968), in an extensive review article on oral reading errors, summarized the classification systems used in studies and the deficiencies in the systems. Because of the variability in the number and definitions of the categories employed comparison of the findings was not feasible.

She reported that the basic unit of classification used in the majority of the studies was either the word or the letter with little concern for the linguistic function of the errors.

One of the few exceptions to the early studies was provided by Bennett (1942). The study included an analysis of over 34,000 errors made by retarded readers in an attempt to discover the types of information used in recognizing words. She found that dominant letters or word parts were important cues in word recognition but that the context so shaped responses that an error was usually the same part of speech. She also noted that 41 percent of the error responses were closely associated in meaning with the written words.

Based on the premise that reading is a continuous language process, recent researchers have examined the influence of language on the processing of visual symbols. For example, K.S. Goodman (1965) found that young readers recognized words in context with greater accuracy than words presented in lists. He first presented the children with a list of words and recorded their errors. Then, he presented the children with a reading passage containing the same words. Of the words missed on the lists, first graders missed only one third of them in the stories, second graders missed one fourth and third graders missed one fifth. Goodman concluded that children do make use of the syntactic and semantic constraints of language when reading.

Clay (1968) indicated that beginning reader's guesses at uncertain words were guided by the syntactic aspects of the sentence rather than by the phoneme-grapheme relationships in words. In her study, of single

word substitution errors, only 41% showed a phoneme-grapheme correspondence while 79% were grammatically equivalent to the stimulus word. In addition she found that grammatical competency was the significant source of cues for self-correction behavior.

In a similar study, Weber (1970) examined the strategies that first grade readers used to identify words. The errors of weaker readers were compared to those of stronger readers. She reported that in making substitutions, the better readers used responses more similar graphically to the stimulus words than did slower readers. Both strong and weak readers made responses that were grammatically acceptable to preceding context about ninety per cent of the time. With regard to self-correction, she found that good readers corrected errors that did not conform to the grammatical structure of the sentence more frequently than they did unacceptable errors. The poor readers, however, corrected both acceptable and unacceptable errors to the same degree.

In the more recent investigations, errors have not been treated as symptoms of reading difficulty, but as infomation about the reading process itself. It is assumed that all reading responses, whether or not they are correct, are cued. Errors, therefore, are not accidental or capricious, but result from the interaction of the reader with the graphic display. Through a comparison of the ways errors (observed responses) are the same or different from the printed text (expected responses), it is possible to determine the various sources of information and reading strategies used by a particular reader. The study of reading errors therefore, can provide valuable insight into the nature of the reading

process and in this way, contribute to a substantive rationale for both basic and remedial instruction in reading.

THE STUDY

The present study was designed as a preliminary investigation of oral reading errors of children with learning disabilities. Because the number of subjects studied was limited, the results must be viewed as tentative.

Subjects

Subjects for the study were obtained from two intermediate level learning disabilities classrooms in the Madison, Wisconsin, public schools. Children with a first grade reading level or above were selected to participate in the study. Reading level was determined by three criteria: (1) teacher estimate of the pupil's instructional reading level; (2) performance on the graded word lists and (3) oral selections of the Classroom Reading Inventory (Silvaroli, 1973). The ten children, six boys and four girls, ranged in age from 9 years, 5 months to 11 years, 8 months. (Refer to Table 1 for descriptive data for the subjects). All of the children had been classified by the school district as having learning disabilities.

Procedure

Each child read a complete story at his instructional reading level aloud to the experimenter. Stories were selected from the appropriate grade level text of The Open Court Basic Readers (Trace and Carus (Eds.), 1971.)

Prior to reading the story, the youngsters were told that the investigator, a former student teacher, wanted to hear the children read to see how they were progressing in reading. The children were tested individually in a separate area of the room. The experimenter explained to each child that she would not help him with any difficult words and that the child should do his best to figure out the words by himself. All performances were tape recorded.

Data Collection and Analysis

Data for the study were errors observed in oral reading. An error was defined as an instance where the observed reading of the child differed from the printed text. The initial response of the child was of particular interest in the study. Therefore, self-corrections were counted as errors. However, the case in which a child changed an initially correct response to an incorrect one was also recorded as an error. Hesitations and repetitions were noted but not considered to be errors.

The errors were transcribed in normal English orthography from the tape recordings onto printed copies of the selection. Procedures suggested by Goodman and Burke (1972) were used for coding and recording the errors. All errors were classified into the following categories:

a. Substitution: A nonword or differing word is supplied in place of the expected word

b. Omission: No response is given to an expected word(s)

c. Insertion: Word(s) is added which does not appear in the text

d. Reversal: Order of words is not the same as in the text

e. Complex Combination: A combination of the above types of errors involving multiple words.

Analysis was performed on the first 25 errors for each subject. To insure that each subject was reading at his appropriate instructional level an error rate was computed for each child by totaling the number of words read through the 25th error and computing the number of errors per hundred words. Participation in the study was restricted to children with an error rate of 5.0 to 10.0. The total number of errors analyzed was 250; 25 for each of the ten children.

RESULTS

The reliability of the coding and observation system was determined by having two observers independently transcribe and record entries for all errors. Their agreement ranged from 91.2 to 100 percent for the observations.

Data concerning error rate, sex, reading level and age for all subjects is presented in Table 1. The mean error rate for the group was 7.7 errors per hundred words. It was necessary to eliminate two students from an original sample of 12 subjects because of an error rate in excess of 10.0.

Insert Table 1 about here

Type of Error

Substitution of a differing word for the expected word was the predominant type of error comprising 80.4% of the total. This finding is consistent

with previous investigations, in particular the 79.9% found by Weber (1970) in her study of first grade students. Nearly 10% of the remaining errors were omissions (9.6%), 2.4% were insertions and 7.2% complex combinations involving multiple words. Only one reversal of word order was observed. It is difficult to compare these results to past research because of differing classification systems. It should be noted that the proportion of insertions is substantially lower than that found in most studies.

Of the 201 substitution errors, 12.4% were classified as nonsense or nonwords. Individual data revealed that each student supplied at least one nonword and one student accounted for 8 of the 26. Bennett (1942) reported that none of the 34,394 words analyzed in her study were nonsense words.

In contrast to the frequently held belief that the reading of learning disabled children is characterized by frequent reversals, this phenomenon was found to be a negligible proportion of the substitution errors. Reversals of the order of letters were found in the reading of only two students, accounting for 1.5% of the substitution errors.

Use of Graphic Information

For each of the single word substitution errors, the observed response was compared with the expected response to determine the degree of graphic resemblance between the two responses. Each of the sets of two words were divided into three parts - beginning, middle and ending and a judgement was made concerning the degree of similarity between the word parts. Table 2 presents the frequencies and percentages of responses in various combinations of graphic matches. Over half (54.7%) of the responses matched

on two word parts and were considered to be highly similar. Responses similar in one part (partially similar) comprised 23.4% of the total substitutions and 21.9% did not resemble the expected response in any way. Clay (1968) reported equivalence of 41% of substitutions in two

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Insert Table 2 about here

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morphemes or morpheme sequences.

Based upon a score of 2 for words matching in two parts, 1 for words matching in one part and zero for words matching in no parts, the mean score for the substitution errors was 1.30 with individual averages ranging from .93 to 1.53. Substantial variation between individuals in the use of graphic information was observed.

The most common type of error observed was one which matched in the initial and final positions. Extrapolation from Table 2 revealed that 66.2% of the responses were similar to the initial word part, 39.3% matched in the final portion and 27.4% matched in the medial position. A further breakdown of the responses showed that in the initial position, 66.2% of the responses matched the first letter in the expected response and 38.8% matched the first two letters. Examination of matches at the end of the words revealed that 39.3% shared the same final letter while 15.9% shared the last two letters. This finding is in agreement with research showing that the initial portion of a word provides the most salient cue in word recognition followed by the final portion and finally by the middle portion of the word (Weber, 1968).

Further examination of the word pairs revealed 56 words (27.9%) which differed from the expected response by [illegible]r. Of these words 22 involved the insertion of a lett[illegible]ion of a letter and 17 the substitution of a differing letter. Thirty differed in the word ending, 14 in the beginning and 12 in the middle. The majority (43) involved a consonant while 13 involved vowels.

The sets of responses were also examined to ascertain the number of words which shared the same word stem (e.g., small/smallest). Of the 42 words falling into this category, 16 were varying verb forms (2 involved regular inflection; 14 irregular forms of inflection). Thirteen errors involved the plural form of nouns with eleven of these related to the addition or omission of a final s.

Use of Syntactic Information

Analysis was conducted to determine the role of syntax as a source of information in word recognition. If the syntactic structure of the sentence served as a cue in identifying words, it was assumed that erroneous responses would not violate the constraints imposed by the grammatical context. For each error a judgement was made as to whether or not the error produced a sentence which was grammatically acceptable. Each error was analyzed in terms of its acceptability to preceding context (i.e., could a grammatically acceptable sentence be constructed from the point where the error occurred). Of the total number of errors, 84.4% were found to be acceptable in terms of the preceding portion of the sentence while 15.6% did not produce an acceptable syntactic structure. Of the errors acceptable to prior context, 61.1% also conformed to the syntactic

of the complete sentence. This finding is slightly lower than the 91% (preceding acceptability) and 63.7% (proportion of preceding acceptable responses which were also acceptable to the entire sentence) figures reported by Weber (1970).

For the substitution errors, each observed response was compared to the expected response to determine if the two responses served the same grammatical function. Each response was coded as to the following parts of speech: noun, pronoun, noun modifier, verb, adverb, and function word. Similar grammatical functions were found for 71.1% of word pairs with 22.4% having differing functions (6.5% were impossible to determine). Clay (1968) reported 79% grammatically equivalent substitutions and Weber (1970) found 63.9% of substitutions to be the same part of speech as the expected response.

Table 3 presents a comparison of the graphic similarity value scores of substitution errors to the grammatical acceptability of the same errors.

Insert Table 3 about here

Of the errors having no graphic similarity, 52.3% were acceptable to the preceding portion of the sentence and 40.9% to the entire sentence. Only 6.8% of the responses had no grammatical acceptability. Of the substitutions not grammatically acceptable, 91.1% had some degree of graphic resemblance. 8.8% had none. It was concluded that in most cases the readers used some combination of graphic and syntactic information. When there

was no graphic match the responses tended to be grammatically acceptable and when the responses were not grammatically acceptable the readers tended to use graphic information.

All errors were analyzed, regardless of correction, to determine the effect of the error on the meaning of the sentence. Half of the errors were found to produce a change in the syntactical structure of the sentence.

Use of Semantic Information

All erroneous responses were evaluated to determine the degree to which the reader produces meaningful sentences. As with grammatical acceptability, each error was judged as to semantic acceptability to the context preceding the error and to the whole sentence. Less than one third (29.6%) were found to be not acceptable to the meaning of the sentence. Errors semantically acceptable to the preceding text comprised 70.4% of the total with 53.4% of those errors also acceptable to the entire sentence. A change of intended meaning occurred in 59.2% of errors even though the error may have produced a sentence which conveyed meaning.

Grammatically acceptable errors were compared to semantically acceptable errors to determine the degree of overlap between the two categories. Of the grammatically acceptable errors, 82.9% were also acceptable to the meaning of the sentence. It appears that syntax and semantics are highly related as a source of information in oral reading with syntax having a more restraining function.

Correction Strategies

A significant factor in the analysis of an error is whether or not the error is corrected. For the total errors considered in the study, no attempt was made to correct 62.8% of the errors. Attempts to correct an erroneous response were made for 35.6% of the errors; 27.6% were successful, 8% unsuccessful. In only four instances (1.6%) was a correct response changed to an incorrect one.

The fact that only one third of the errors were corrected is not particularly meaningful information. It is considered important to examine the conditions under which attempts were made to correct erroneous responses. Tables 4 and 5 indicate the number and percentages of correction attempts in relation to syntactic and semantic acceptability. It

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Insert Tables 4 and 5 about here

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can be seen that for errors which were entirely acceptable to the grammar or semantics of the sentence, there was no attempt made to correct the errors nearly three fourths of the time. It is perplexing that of the unacceptable errors, corrections were attempted only 40% of the time. The greatest rate of correction was found for errors which were acceptable to the preceding syntax (53.7%) or semantics (47.6%) but which violated the remainder of the sentence.

As previously report, not all errors resulted in a change in sentence syntax or meaning. Tables 6 and 7 present frequencies and percentages of correction attempts in relation to semantic and syntactic change.

Insert Tables 6 and 7 about here

Of the 157 errors not corrected, 40.8% involved changed syntax and 54.1% involved changed meaning. However, of the 89 errors for which a correction was attempted, over two thirds involved changed meaning or syntax. These data suggest that the readers tended to correct errors when dissonance in grammar and/or meaning occurred. Since the number of responses corrected was nearly the same for the two categories, it is impossible to say which is the stronger source of information as to when an error should be corrected. It may be possible that syntax plays the greater role in that when syntax was not changed, no attempt at correction was made for the majority of the errors. The reverse was true for changed meaning.

LIMITATIONS

Two major limitations of this study bear noting. The first pertains to the number of children involved in the analysis. Detailed analysis was judged to be needed at this point in the investigation of the use of strategies by learning disabled children. Time considerations limited the number of children that could be studied in depth. Therefore, results from this exploratory investigation should be viewed with some

caution until replication. The second limitation is that the study did not assess the subjects' understanding of the reading selections. While comprehension is considered to be highly important, it was not included in the design of the study.

CONCLUSIONS AND IMPLICATIONS

The data from the study suggest the following conclusions:

(1) Substitutions comprised the greatest type of error category. Reversals were found to be a negligible proportion of the total;

(2) The use of graphic information was observed in nearly 80% of all errors. The strongest source of information as found to be in the initial portion of the word, followed by the final portion;

(3) The majority of errors produced acceptable sentences in terms of syntax and semantics. Meaning was violated more often than grammar.

(4) Some errors did not result in a change of syntax or a change in meaning of the sentences.

(5) The majority of errors were not corrected. Corrections tended to be attempted when dissonance in grammar and/or meaning occurred.

In general, the results of the study indicate that learning disabled children utilize graphic, syntactic and semantic information while reading in a manner similar to the findings of previous studies (Clay, 1968; Weber, 1970). However, it was observed that the use of group data masked the individual variation found between subjects. Often a weakness in one child was counterbalanced by a strength in another to produce uniform data. For example, one child produced only 9 errors

which were semantically acceptable in contrast to another who made 21 semantically acceptable errors. Therefore, error analysis is considered to be more valuable in individual analysis than in group analysis. Thus a major implication of this study is the possibility of using oral reading error analysis as a diagnostic tool for children with learning disabilities.

Results of this study and recent psycholinguistic literature suggest that many of the ideas just finding their way into special education practice are rapidly being superseded by completely different notions and procedures for dealing with reading instruction. The major concepts or constructs are:

(a) Error definitions and categories

(b) Criteria for behavior of a good reader

(c) Heirarchical sequencing of reading skills

(d) Phonics and Sight Words as the primary subskills of reading

(e) Teaching isolated reading skills

(f) Reading levels based on Informal Reading Inventories

(g) Validity of tests of reading ability.

If new methods are to be developed, a better understanding of the reading process of special education students must first be obtained. It is hoped that this study will provide teachers of learning disabled children some understanding of individual strengths and weaknesses in reading behavior and provide information concerning the use of reading strategies.

Table 1. Description of subject characteristics

Subject	Sex	Reading Level	Age	EPHW
1	F	1	10-5	-
2		1	10 6	8.3
3	M	2	10-6	10.0
4	M	2	9-8	6.3
5	M	2	11-0	6.6
6	M	2	9-5	9.1
7	M	2	11-8	7.8
8	F	2	10-5	7.2
9	F	3	9-10	8.2
10	M	3	10-4	5.5

Table 2. Graphic Similarity of Errors

Beginning	Middle	Ending	Number	Percentage
+	+	-	40	19.9
+	-	+	55	27.4
+	-	-	38	18.9
-	+	+	15	7.5
-	+	-	0	0
-	-	+	9	4.5
-	-	-	44	21.9

Table 3. Frequency and Percentage of Grammatically Acceptable Errors in relation to Graphic Value

Graphic Value	Grammatical Acceptability		
	Entire	Preceding	None
2	53 26.4	39 19.4	18 9.0
1	27 13.4	7 3.4	13 6.5
0	18 9.0	23 11.4	3 1.5

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Table 4. Frequency and Percentage of Correction Attempts in relation to Grammatical Acceptability

Correction	Grammatic . Acceptability: Preceding	Entire	None
Successful	40 16.0	20 8.0	10 4.0
Unsuccessful	4 1.6	11 4.4	5 2.0
Change	0 0	4 1.6	0 0
No Attempt	38 15.2	94 37.6	24 9.6

Table 5. Frequency and Percentage of Correction Attempts in relation to Semantic Acceptability

Correction	Preceding	Entire	None
Successful	35 14.0	18 7.2	16 6.4
Unsuccessful	4 1.6	3 1.2	13 5.2
Change	0 0	3 1.2	1 .4
No Attempt	43 17.2	70 28.0	44 17.6

Table 6. Frequency and Percentage of Correction Attempts in relation to Syntactic Change

Correction	Syntactic Change: Yes	Syntactic Change: No
Successful	50 20.0	19 7.6
Unsuccessful	9 3.6	11 4.4
Change	2 .8	2 .8
No Attempt	64 25.6	93 37.2

Table 7. Frequency and Percentage of Correction Attempts in relation to Semantic Change

Correction	Semantic Change: Yes	Semantic Change: No
Successful	43 17.2	26 10.4
Unsuccessful	17 6.8	3 1.2
Change	3 1.2	1 .4
No Attempt	85 34.0	72 28.8

REFERENCES

Bennett, A. An analysis of errors in word recognition made by retarded readers. Journal of Educational Psychology, 1942, 33, 25-38.

Clay, M. A syntactic analysis of reading errors. Journal of Verbal Learning and Verbal Behavior, 1968, 7, 434-438.

Goodman, K. A linguistic study of cues and miscues in reading. Elementary English, 1965, 42, 639-643.

Goodman, K. Reading: A psycholinguistic guessing game. Journal of the Reading Specialist, 1967, 6, 126-135.

Goodman, K. The reading process: Theory and practice. In Language and Learning to Read: What teachers should know about language, R.E. Hodges & E.H. Rudorf, Eds., Boston: Houghton Mifflin Co., 1972.

Goodman, Y. and Burke, C. Reading Miscue Inventory: Manual of procedure for diagnosis and evaluation. New York: Macmillan, 1972.

Malmquist, E. Factors related to reading disabilities in the first grade of the elementary school. Stockholm: Almqvist and Wiksel, 1958.

Monroe, M. Children who cannot read. Chicago: University of Chicago Press, 1932.

Orton, S.T. An impediment to learning to read--a neurological explanation of the reading disability. School and Society, 1928, 8, 286-290.

Payne, C. The classification of errors in oral reading. Elementary School Teacher, 1930, 31, 142-146.

Ryan, E. and Semmel, M. Reading as a constructive language process. Reading Research Quarterly, 1969, 5, 59-83.

Silvaroli, N. Classroom reading inventory. Dubuque: Wm. C. Brown Co., 1973.

Smith, F. Understanding reading -- A psycholinguistic of analysis of reading and learning to read. New York: Hont Rinehart and Winston, 1971.

Trace, A. and Carus, M., (Eds.) Open Court Basic Readers. La Salle, Ill.: Open Court Publishing Co., 1971.

Weber, R.M. The study of oral reading errors: A survey of the literature. Reading Research Quarterly, 1968, 4, 96-119.

Weber, R.M. A linguistic analysis of first grade reading errors. Reading Research Quarterly, 1970, 5, 427-451.