DOCUMENT RESUME

ED 357 323 CS 011 290

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TITLE Differential Categorization of Words by Learning Disabled, Gifted, and Non Disabled Students.
PUB DATE [90]
NOTE 21p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Developmental Stages; Elementary Education; Elementary School Students; Gifted; Grade 1; Grade 5; Learning Disabilities; Reading Achievement; Reading Diagnosis; Reading Research; Syllables; *Word Recognition
IDENTIFIERS California (North); Words

ABSTRACT

To understand more fully the nature of children's difficulties in reading single words, a study investigated whether learning disabled students attend to different word features than nondisabled students, and whether there is a developmental sequence in the word features focused on by disabled and nondisabled children. Word sorts were used to determine if a significant difference existed between 145 first- and fifth-grade learning disabled and nondisabled groups of children from a middle socio-economic area of northern California. Results indicated that learning disabled students were more likely to provide no response or to rely on less sophisticated responses than nondisabled peers. Results also indicated that older children were: (1) able to attend to a greater variety of word features; (2) more likely to focus on recognizable meaning; and (3) more able to use syllabication as a tool for sorting than were younger children. Findings suggest that word sorting may be not only a viable approach to diagnosis when children are attending to written words, but also a useful method for helping children focus on such salient word features as numbers and characteristics of syllables. (Six tables of data are included.) (RS)

Differential categorization of words by learning disabled, gifted, and non disabled students

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Running Head : Categorization

Abstract

To understand more fully the nature of children's difficulties in reading single words, this research sought to answer: (1) Do learning disabled students attend to different word features than non disabled students? (2) Is there a developmental sequence in the word features focused on by disabled and nondisabled children? Word sorts were used to determine if a significant difference existed between first and fifth grade learning disabled and non disabled groups. Results indicated that learning disabled students were more likely to provide no response or to rely on less sophisticated responses than nondisabled peers. Older children were able to attend to a greater variety of word features, were more likely to focus on recognizable meaning and were more able to use syllabication as a tool for sorting than were younger children. Significant differences were, therefore, noted between grade and ability groups. Implications for practical application and further research are discussed.

Differential Categorization of Words

by Learning Disabled, Gifted and Nondisabled Students

Children who exhibit academic disabilities consistently have been found to have difficulty reading individual words. Deficits in phonemic and syllabic awareness actually precede reading comprehensive difficulties. Children who do not decode effortlessly are forced to divert attentional resources to decoding that could otherwise be used to read with comprehension and enjoyment. Difficulties in reading comprehension may, then, stem from the failure to automatize the reading of individual words through efficient word decoding (Spear and Sternberg, 1987).

Frank Smith (1978), a proponent of the psycho-linguistic approach to understanding and teaching reading indicates that "words, like letters, can be identified directly from the distinctive features that are the visual information of print" (p. 131). In addition, Gillet and Temple (1982a) suggest that a developmental sequence of word feature recognition exists. They believe that successful teaching of reading may depend partially on matching instruction to the stage of word feature recognition most characteristic of the child at his or her age. Children "appear to move from visual matching of word elements through phonological matching of elements to sorts based on meaning relations" (p. 139). They note, however, that this sequence of word feature recognition as determined through categorization of words may be highly variable.

Furthermore, Barnes (1989) suggests that there may be a relationship between children's attention to features of words and their ability to spell. He states that "children can become such efficient users of contextual cues that they can safely ignore some features

of words, preventing a thorough internalization of a word's correct spelling" (p.293).

In an attempt to understand more fully the nature of children's difficulties reading individual words, this research sought answers to the following questions: (1) Do learning disabled students attend to different word features than nondisabled students? (2) Is there a developmental sequence in the word features on which disabled and nondisabled children focus? (3) Is the word sort a viable tool for diagnosing and remediating deficits in word decoding?

Word sorts can be used to let students demonstration what word features draw their attention and their action. Gillet and Temple (1982b) suggest that word sorts can be a powerful diagnostic tool assisting observers in understanding what word features children do perceive and how they go about developing word analysis skills. Therefore, this research was designed to determine if children designated as learning disabled attend to different feature characteristics of words than do children who have not been identified as learning disabled. The study also examined the relationship between attention to word features and development and ability levels.

Methodology

Subjects. The total sample for this study of 145 students consisted of 89 boys and 56 girls drawn from first and fifth grade classes in a middle socio-economic area of northern California. Of these, 54 were identified as learning disabled, 61 identified as "normal" or nonlearning disabled and 30 as gifted. Sixty-seven were first graders and 78 were in fifth grade. It is unfortunate that it was not possible to further classify the learning disabled students. We were told by the teachers of the learning disabled that their primary deficits

were in the language area; particularly reading and spelling. If any of the students were so classified due to a disability in any one specific academic area, we were not able to identify these children. Basic characteristics of the students participating in this study are found in Table 1.

Insert Table 1 about here

Procedure. The learning disabled children in this study were first and fifth graders enrolled in self-contained classes for the learning disabled in five schools. The nonlearning disabled children were chosen through a process of matching with the learning disabled children according to sex, age, race, and scores on the Peabody Picture Vocabulary Test-R (Dunn and Dunn, 1981). The gifted children were studied as a discrete group and were chosen because they had previously been identified as having an I.Q. of 130 or more and were enrolled in the first or the fifth grade.

As in the research of Gillet and Temple (1982), a word sort was used as the means of investigating children's attention to word features. In a word sort, the child categorizes words written on individual cards by physically grouping them. With this method, children are left to discern for themselves the features that the stimulus words have in common. The subjects were asked to sort a stack of 15 meaningful words and 15 non-meaningful (or nonsense) words. The meaningful words were chosen from words commonly found in word lists at the back of grade level reading texts. As the study was conducted in May of the academic school year. it was felt that these words were likely to be in the sight vocabulary of the subjects. This was found by the investigators to be true. However, all

investigators were instructed to tell students any words that they could not automatically decode. The nonsense words were chosen by equating word features such as length of words, initial letters, number of syllables and configuration with meaningful words. Table 2 contains the words used in both sorts.

Insert Table 2 about here

Subjects were given the following directions:

> Here are some cards with words I would like you to sort into groups. There is no right way or wrong way to sort these words. We are just trying to learn how boys and girls of different ages think these words should be sorted. Here is the first set. Please sort these words in any way you'd like. I will tell you any words which are new to you. (If their sorting pattern was not obvious, the researchers would inquire as to why they sorted them in the way that they did).

After the first sort, the word cards were shuffled into a pile and the subjects were asked if they could think of another way to sort the words. The cards were again shuffled and the process continued until the subjects could no longer think of any other way to sort the cards. The researchers gave no clues but continued to ask, "Can you sort them in any other way?" After completing the meaningful sorts, the subjects were given the following directions in order to sort the non-meaningful (nonsense) words.

> I have another set of words which I would like you to sort. This time, I can't tell you any of the words which are new to you. Remember, there is no right way and no wrong way to sort the words. Just sort them in as many ways as you can.

The results of each sort were analyzed to determine if significant differences existed between grade levels and if there were differences among the learning disabled, the nonlearning disabled, and the gifted children in the word features which received maximum attention while they were sorting. It should be noted that information on any children who were totally unable to respond or categorize in any way was eliminated from the analysis. This included seven students with learning disabilities, five from first grade (3 girls, 2 boys) and two boys from fifth grade. It was believed that these seven students could not understand or follow the directions and did not comprehend the semantic processing task. In addition, prior to initiation of data collection, the investigators selected likely sort categories. When analyzing the data, any categories which were not used by any children were eliminated from the presented results.

Results

Table 3 indicates that there was some similarity in word sorting strategies used by all children. In sorting meaningful words, students most often focused on meaning, initial letters, and ending letters. The responses for meaningful words fell into 12 basic categories as noted on the left axis of the table. It is obvious that the greatest percentage of "no response" was evident in the learning disabled at both the first and the fifth grade level. It is also readily apparent that the older children were able to attend to a greater variety of word features than the younger children. This, of course, is a developmentally appropriate result.

Insert Table 3 about here

Table 4 indicates that there were significant differences in word sorting strategies between groups when sorting meaningful words. A significant difference was noted between the younger and the older children in their ability to sort by recognizable meaning. Not only were the older children more likely to attend to recognizable word meaning, but the normal and gifted appeared to use recognizable meaning significantly more often than did the learning disabled at both grade levels. Only the older nondisabled students sorted words according to the number of syllables within each word. A few of the older children attended to the number of letters in the words.

Interestingly, the "other" category which included all strategies not pre-determined by the research term was the one where learning disabled students rated significantly higher than nondisabled peers. Younger children also tended to use the non pre-determined categories significantly more often than older children. These non pre-determined categories were those random categories that were not consistent from one child to the next and were not readily logical in nature. These were playful in nature and appeared to have little or no relationship to the actual words themselves.

Insert Table 4 about here

Table 5 illustrates children's performance when recognizable meaning was taken away as a possible category of attention. At both grade levels, students relied on attention to

the initial and ending letters of the nonsense words. In general, younger children tended not to use any of the pre-determined strategies. They tended to either pay attention to the first letter of the word or sort by random, non pre-determined categories. As exhibited in Table 6, older children did attend to number of syllables and the same first vowel significantly more often than did younger children.

Insert Tables 5 and 6 about here

Discussion

When considering whether students classified as learning disabled attend to different word features than nonlearning disabled students, results indicate some significant differences between groups. Learning disabled students at both grade levels were more likely to provide no response than nonlearning disabled peers. They were also more likely to rely on "other" random responses rather than on use of recognizable meaning. Both of these tendencies were also characteristic of the younger children, in general. On the other hand, nondisabled children were much more likely to attend to recognizable meaning when categorizing words. The older nondisabled children also sorted by number of syllables while none of the younger or learning disabled children attended to the number of syllables in the meaningful words.

In response to the possible developmental sequence in word features receiving attention, significant differences were noted between grade levels. The older children were able to attend to a greater variety of pre-determined word features, were more likely to focus on recognizable meaning and were able to note the number of syllables; even within

"nonsense" words. The younger children relied more on "other" non pre-determined categories and were almost unable to perform on the nonsense words. At the first grade level, attention to initial letters is solidly incorporated into decoding processes and some are beginning to focus on ending letters and the overall number of letters. In other words, there may be a developmental progression in attention to word features as suggested by such researchers as Gillet and Temple (1982b) and others. This would make logical sense given that children are expected to become more proficient in word analysis skills as they grow and mature.

What is of particular interest is the tendency for the learning disabled to perseverate in the use of the same, but less sophisticated strategies at older ages. While, they recognize the importance of word meaning in grouping words, like younger children, they tend to accept readily divergent and unrecognizable meaning categories. This tendency may interfere with their ability to accurately decode words. Such behavior might also be expected of children who have learned to attack words only through phonetic decoding and tend to rely heavily on context to give meaning to individual words.

The learning disabled also exhibited the greatest number of "no responses" suggesting less experience and less flexibility in conceptualization. Gillet and Kita (1978) have indicated that the mental operations required for this kind of fluid sorting involve holding a relationship in mind while making comparisons. Learning disabled children may be experiencing information overload, may not have adequate attentional resources, memory efficiency, or the capacity to deal with multiple operations. Further research, including systematic observational recordings, is necessary to determine if the "no responses" could be related to such factors as low self-esteem, lack of motivation, or inadequate approaches

to problem solving.

Finally, older and nondisabled children tend to give attention to the number of syllables when categorizing words. Normal children even tended to attempt to focus on syllables in the nonsense words suggesting that syllabication has become a useful tool for them. As Spear and Sternberg (1987) point out, children with reading disabilities are much less aware of the syllabic structure of language. Even the older learning disabled children do not appear to have been developmentally ready to benefit from lessons in syllabication characteristic of third and fourth grade curriculum.

This may be the most significant result of the study in terms of implications for diagnosis and remediation. New approaches to helping the learning disabled use syllabication as a decoding tool need to be developed. Barnes (1989) and Henderson (1981) outline procedures for conducting word sorts which give students opportunities to play with and examine word features. Similar procedures can be developed to focus on syllabication which, indeed, appears to be a challenge to the learning disabled.

Summary

In summary, it does appear that there may be a developmental hierarchy in visual word features to which children attend, and that nondisabled and older students attend to a greater variety of word features than do learning disabled or younger students.

Of significance is the finding that through the word sort task it was possible to determine that the learning disabled students in the study did not appear spontaneously to make use of what they have been taught about the use of syllabication as a tool for word analysis. While previous research has found that disabled readers have been found

deficient at segmenting words into syllables, they have usually relied on tasks requiring subjects to respond to words orally pronounced (Spear and Sternberg, 1987). This study suggests that word sorting may be not only a viable approach to diagnosis when children are attending to written words, but also a useful method for helping children focus on such salient word features as numbers and characteristics of syllables.

Additional research which more clearly defines the nature of the learning disability population is necessary before generalizing about the tendency for the older learning disabled children to continue to attend to word features in a manner characteristic of much younger children. However, in the meanwhile, time should not be lost in seeking and using creative methods to help children utilize syllabication as an essential decoding tool.

References

Barnes, W.G. (1989). Word Sorting: The cultivation of rules for spelling in english. Reading Psychology: An International Quarterly, 10, 293-307.

Dunn, L.M. & Dunn, L.M. (1981). The Peabody Picture Vocabulary Test - Revised. American Guidance Service: Circle Pines. Minnesota.

Gillet, J.W. & Kita, M.J. (1979). Words, kids, and categories. The Reading Teacher. 538-542.

Gillet, J.W. & Temple, C. (1982). Developing word knowledge: A cognitive view. Reading World, 132-140.

Gillet, J.W. & Temple, C. (1982). Understanding Word Problems. Boston: Little Brown and Co.

Henderson, E.H. (1981). Learning to read and spell: A child's knowledge of word. DeKalb, IL: Northern Illinois University Press.

King, J.R. (1984). Levels of categorization and sight word acquisition. Reading Psychology: An International Quarterly, 5, 129-138.

Morris, D. (1983). "Word Sort": A categorization strategy for improving word recognition ability. Reading Psychology: An International Quarterly, 3, 247-259.

Rosch, E. (1975). Cognitive representation of semantic categories. Journal of Experimental Psychology: General, 3, 192-233.

Rosch, E. Mervis, C., Gray, W., Johnson, D.M., & Boyes, Braem, P. (1976). Basic objects in natural categories. Cognitive Psychology, 8, 382-439.

Smith, F. (1978). Understanding Reading. New York: Holt Rinehart and Winston.

Spear, L.C. & Sternberg, R.J. (1987). An information processing framework for understanding reading disability. In S.J. Ceci (Ed.) Handbook of Cognitive, Social, and Neuropsychological Aspects of Learning Disabilities. Hillsdale, NJ: Erlbaum Associates.

Table 1. Subject Characteristics

	Learning Disabled	Nondisabled	Gifted
Grade 1			
Males	18	21	3
Females	6	7	12
Total	24	26	15
Grade 5			
Males	19	23	5
Females	11	10	10
Total	30	33	15

Table 2. Words Used in Word Sorts

First Grade Words:		Fifth Grade Words:	
Meaningful	Nonsense	Meaningful	Nonsense
bear	bier	shrine	shrome
cow	cun	palace	petuce
rabbit	raddet	cathedral	cuthatrit
baby	bibe	hate	hibst
child	cholt	disgust	daspest
mother	midlor	satisfied	sotasfeit
bread	bried	cheese	cheeme
cake	cide	peanut	piesot
milk	mald	hamburger	hintergor
bed	bot	coach	ceash
chair	chean	doctor	dinbar
rug	rin	professor	prefanner
blue	blie	skunk	stosh
black	blint	hamster	hinsdor
brown	breun	crocodile	cranatile

Table 3. Means and Standard Deviations for Meaningful Word Sort Strategies

	Grade 1						Grade 5					
	LD n=24		Non LD n=26		Gifted n=15		LD n=30		Non LD n=33		Gifted n=15	
	x	sd	x	sd	x	sd	x	sd	x	sd	x	sd
Meaning	.02	.10	.14	.30	.20	.21	.26	.39	.48	.37	.47	.32
Other Meaning	.19	.36	.26	.37	.18	.31	.55	.38	.24	.35	.14	.19
Initial letter	.17	.35	.21	.34	.23	.18	.19	.29	.10	.21	.14	.19
Ending letter			.05	.12	.07	.14	.05	.11	.03	.06	.03	.13
Number of syllables									.03	.10	.07	.13
Number of letters							.01	.04	.02	.05	.01	.05
Configuration									.02	.09		
Same first vowel					.04	.10	.03	.12	.01	.05		
Number vowels							.01	.04	.01	.03	.02	.07
Two vowels together					.02	.09						
Begins with two consonants			.01	.04	.03	.12						
Other Strategy	.62	.44	.33	.38	.22	.28	.20	.30	.07	.13	.11	.17

Table 4. Analysis of Variance for Significant Differences Found with Meaningful Word Sorts

	Meaning Strategy		
	Mean Square	Degrees of freedom	F value
Grade Level (G)	2.89	1	29.79*
Ability Level (A)	.57	2	5.87*
Interaction (GXA)	.03	2	.32
Error	.10	137	
Total	.12	142	

	Number of Syllables Strategy		
	Mean Square	Degrees of freedom	F value
Grade Level (G)	.03	1	6.95*
Ability Level (A)	.02	2	3.74*
Interaction (GXA)	.01	2	3.42*
Error	.00	137	
Total	.00	142	

	Number of Letters Strategy		
	Mean Square	Degrees of freedom	F value
Grade Level (G)	.01	1	5.11*
Ability Level (A)	.00	2	0.50
Interaction (GXA)	.00	2	0.40
Error	.00	137	
Total	.00	142	

	Other Strategies		
	Mean Square	Degrees of freedom	F value
Grade Level (G)	2.99	1	31.89*
Ability Level (A)	.79	2	8.45*
Interaction (GXA)	.25	2	2.69
Error	.09	137	
Total	.13	142	

* $p < 0.05$

Table 5. Means and Standard Deviations for Nonsense Word Sort Strategies

	Grade 1						Grade 5					
	LD n=24		Non LD n=26		Gifted n=15		LD n=30		Non LD n=33		Gifted n=15	
	x	sd	x	sd	x	sd	x	sd	x	sd	x	sd
Initial Letter	.25	.44	.20	.37	.32	.31	.27	.35	.14	.27	.21	.30
Ending letter			.03	.10	.15	.23	.12	.23	.07	.14	.08	.15
Number of Syllables							.01	.03	.07	.20	.08	.16
Number of letters			.03	.12	.03	.13	.01	.03	.07	.21	.05	.11
Configuration												
Same first vowel							.06	.16	.02	.07	.02	.06
Number of vowels							.01	.03	.01	.03	.03	.07
Two vowels together									.01	.05		
Number of consonants									.01	.03	.01	.04
Two consonants together									.01	.05	.02	.06
Begins with two consonants	.02	.10	.01	.05	.02	.06						
Other Strategy	.60	.5	.50	.5	.42	.40	.43	.42	.37	.42	.31	.28

Table 6. Analysis of Variance for Significant Differences Found with Nonsense Word Sorts

	Number of Syllables Strategy		
	Mean Square	Degrees of freedom	F value
Grade Level (G)	.08	1	6.63*
Ability Level (A)	.02	2	1.91
Interaction (GXA)	.02	2	1.60
Error	.01	137	
Total	.01	142	

	Same First Vowel Strategy		
	Mean Square	Degrees of freedom	F value
Grade Level (G)	.05	1	6.38*
Ability Level (A)	.01	2	1.10
Interaction (GXA)	.01	2	0.92
Error	.01	137	
Total	.01	142	

* $p < 0.05$