DOCUMENT RESUME

ED 116 172 CS 002 336

AUTHOR Marzano, Robert J.
TITLE In Search of the Major Skill of Comprehension.
PUB DATE 75
NOTE 9p.

EDRS PRICE MF-$0.76 HC-$1.58 Plus Postage
DESCRIPTORS Elementary Secondary Education; *Readability; *Reading Comprehension; Reading Research; *Reading Skills; Semantics; Sentence Structure; *Structural Analysis; Syntax

ABSTRACT

The purposes of this study were to identify the best predictor or predictors of paragraph comprehensibility and to attempt to interpret that predictor as a skill. Forty-two passages of differing readability (ranging from grade 2.5 to 10.0) were analyzed for within word, within sentence, and between sentence characteristics. The measures used for quantifying these characteristics were: index 1, average semantic load per word; index 2, average depth of within sentence modification; and index 3, average depth of between sentence modification. Each index represents a hypothesis as to the nature of the major skill of comprehension. A multiple regression analysis was conducted using indexes 1, 2, and 3 as predictor variables and passage readability as the criterion. Results show that index 2 was the only significant predictor of the criterion, that index 2 accounted for 76 percent of the variance in comprehension levels of the passages, and that indexes 2 and 3 are highly correlated with each other. Thus, the major skill of reading comprehension can be described as one of identifying main and subordinate ideas within and between sentences. An empirical test of this single skill model should be conducted. (JM)

IN SEARCH OF THE MAJOR SKILL OF COMPREHENSION

by
Robert J. Marzano

University of Colorado at Denver

Research efforts to identify the skills of comprehension have met with little success. Most efforts have been factor analytic in nature (Spearritt, 1972; Davis, 1944).

That is, most researchers have attempted to identify the skills of comprehension by administering a battery of comprehension related tests and then determining which factors (skills) were measured in common by the tests. Virtually all of the studies have identified one major factor which accounts for most of the variance in comprehension. A few studies have identified some minor factors or skills of comprehension, but those skills account for such little variance that their importance must be considered minimal.

Unfortunately, the one major skill of comprehension is rather "nebulous" to say the least. It has been termed a G (General) factor which, roughly translated, means a general reasoning ability. Such a description gives little direction for the teacher. It would, thus, seem beneficial to describe more specifically the basic skill of comprehension.

Apparently efforts to identify the common elements in a group of comprehension tests have failed to produce results which are interpretable in terms of a single skill. Another method which might facilitate the description of the major skill would be to identify the best predictor of paragraph comprehensibility. Perhaps, if we could identify what makes one passage more difficult than another, we might be able to interpret that difference in terms of the major skill. Thus, it was the purpose of this study to identify the best predictor(s) of paragraph comprehensibility and to attempt to interpret that predictor as a skill.

Procedure

Forty-two passages of differing readability were analyzed. Passages

were selected from the Gray (1967) Gilmore (1968) and Miller (1974) reading tests. Passage readabilities ranged from grade 2.5 to 10.0. Each passage was analyzed for its (1) within word, (2) within sentence and (3) between sentence characteristics. The following measures were used as a means of quantifying the above characteristics:

Index 1: average semantic load per word (within word)

Index 2: average depth of within sentence modification (within sentence)

Index 3: average depth of between sentence modification (between sentence)

Each index represents a hypothesis as to the nature of the major skill of comprehension.

Index 1 was calculated by identifying the number of possible meanings (via the dictionary) for each form class word (noun, adjective, adverb, verb) and then calculating the average number of possible meanings (semantic load) per word. The index was selected to test the hypothesis that the major skill of comprehension is the identification of each word's correct meaning, as stipulated by context, from the many possible meanings the word can take. This hypothesis has been suggested by Moffett (1968) who believes that reading is basically word recognition.

Index 2 (average depth of modifiers) was calculated by assigning a weight to each modifier and then determining the average weight per modifying element. For example, there are two modifiers in the following sentence:

The boy bought a bright blue car.

Blue has a weight of 1 because it is a first level modifier. That is, it modifies a grammatical element, car, that is part of the basic sentence pattern (S - V - D.O.). Bright has a weight of 2 because it modifies an

element with a weight of 1 (blue). Index 2 was chosen to test the hypothesis that comprehension is primarily a function of how well a reader understands the meaning of an utterance conveyed by the inter-relationship among modifiers. Recently it has been shown that depth of modification accounts for a large portion of the variance in composition quality (Marzano, 1975). Fagan (1971) has also shown a relationship between the number of embedding transformation (which produce modifiers) and a sentence's comprehensibility.

Index 3 (between sentence modification) was calculated by assigning a weight to each sentence (see Index 2) based on the fact that within a paragraph sentences act as modifiers of other sentences. This, of course, is a direct extension of the within-sentence modification concept. Index 3 was selected to test the hypothesis that comprehension is a process of determing the between-sentence relationships that exist among a set of sentences. Bormuth (1967) has shown that a knowledge of between sentence relationships is probably an aspect of the comprehending process. Indeed, the validity of the cloze method of testing hinges on this assumption.

Data Analysis

A multiple regression analysis was conducted using indices 1, 2, and 3 as predictor variables and passage readability as the criterion. The intercorrelations among indices is reported in table 1.

Table 1

Intercorrelations among Predictors and Criterion

	Index 1	Index 2	Index 3
Index 2	.01		
Index 3	.04	.50	
Criterion	.05	.87	.53

The results of the multiple regression equation are reported in table 2.

Table 2

Multiple Regression Equation

Variable	Beta	Probability
Index 1	.02	.90
Index 2	.14	.00
Index 3	.81	.27

Index 2 was the only significant predictor ($p < .01$) of the criterion. Index 3 had a significant correlation with the criterion but it was not a significant predictor when entered in the regression equation. At first glance this might seem impossible; one would naturally assume that any index which has a significant correlation with a criterion would also be a significant predictor of the criterion in a multiple regression equation. The answer to this apparent contradiction lies in the fact that index 2 and 3 are highly correlated with each other (.50). Roughly translated this means that 25% of what is measured by Index 2 is also measured by Index 3, and, apparently, whatever that common trait is, it has a strong relationship with paragraph comprehensibility. During a multiple regression analysis predictors are entered into the equation in the order of their predictive strength. Index 2 had the highest correlation with the criterion and was, therefore, entered into the equation first. When Index 3 was entered into the equation, its predictive power had already been accounted for by Index 2. Index 3 had virtually no predictive stength which was unique from that of Index 2. Therefore, it added no new information to the regression equation when it was entered. Of course, Index 1 had no relationship with the criterion and, therefore, had no predictive power.

Discussion

The results of the data analysis provide for a surprisingly straightforward interpretation in terms of the major skill of comprehension. Index 2 (depth of within sentence modification) accounted for 76% of the variance in the comprehension levels of the passages. This indicates a strong relationship between passage difficulty and modification. Couple this with the information that: (1) between sentence modification is related to within sentence modification and (2) semantic load has little relationship with comprehensibility, and one can hypothesize a very logical model for the basic skill of comprehension.

It seems quite probable that the major skill of comprehension is related to the reader's ability to recognize the differing units and levels of modification within and between sentences. This has a great deal of intuitive appeal. Given this model, consider the way a reader might process the following sentence:

"Considering the condition of his health, John looked fairly happy." There are three levels of modification in the sentence. Visually those levels can be diagrammed in the following manner:

John looked happy

-Considering the condition/fairly (level 1)

-of health (level 2)

-his (level 3)

It might be that the reader stores information in groups or "chunks" analogous to the above diagram. That is, the reader might first process the main idea of a sentence as carried by the main clause and then, secondarily processes the modifying elements in the units in which they are stated (clauses, phrases and single words). If so, then the major

skill of reading can be described as one of identifying main and subordinate ideas within and between sentences.

An empirical test of this single skill model should, of course, be conducted. Students could be given training in recognizing the main idea and modifying concepts within and between sentences. If this type of training increases students' comprehension ability (as compared to a control group), the model would be partially validated.

Once the major skill of comprehension is well defined, teaching techniques can be developed to foster that skill. Certainly the concept of modification, between and within sentences, lends itself to many forms of instruction.

REFERENCES

Bormuth, J. Comparable cloze and multiple-choice comprehension test scores, Journal of Reading (Feb., 1967) 261-269.

Davis, F.B. Fundamental factors of comprehension in reading. Psychometrika, 1944, 9, 185-197.

Fagan, W.T. Transformations and comprehension. The Reading Teacher (Nov., 1971). 169-172.

Gilmore, J.V. and Gilmore, E.C. Gilmore Oral Reading Test, New York: Harcourt, Brace and World, Inc. 1968.

Gray, W.S. Gray Oral Reading Test. New York: The Bobbs-Merrill Co., 1967.

Marzano, R.J. The sentence-combining myth, English Journal, 1976, in-press.

Miller, W. Reading Diagnosis Kit. New York: Center for Applied Research, 1974.

Moffett, J. A Student-Centered Language Arts Curriculum. New York: Houghton Mifflin Company. 1968.

Spearritt, D. Identification of subskills of reading comprehension by maximum likelihood factor analysis. Reading Research Quarterly, 1972, 8, no. 1, 92-111.