COMPREHENSION OF PROSE: STRATEGIES AFFECTING GOOD AND POOR HIGH SCHOOL READERS

DISSERTATION

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The problem of this study was to investigate how good and poor comprehenders utilize passage structure and task instructions to acquire information from a prose passage. To give a more detailed picture of what type of information processing occurred during reading, both verbatim and paraphrase items were used to assess comprehension.

Students in the eleventh grade were given the Stanford Diagnostic Reading Test, Brown Level, Test 2. On the basis of the results of this test, two groups were formed, using the grade equivalent scores between 8.5 and 11.5 to designate good readers and scores between 3.5 and 7.5 to designate poor readers. One hundred and twenty students (60 good and 60 poor) participated in the final experiment. The subjects in each of the two groups were randomly assigned to one of six treatment conditions.

The study employed two versions of a passage and three versions of instructions. The first form of the passage, called the "Mixed Passage," was taken directly from a published description of chimpanzee behavior. The second form, called the "Structured Passage," was the same text
rewritten with an emphasis on ideational organization.
Two sets of task instructions directed the reader to pay
particular attention to either attributes of the chimpanzees
or to relationships among chimpanzees. Students in the con-
trol conditions were simply told to read the passage.

A multiple-choice test consisting of both verbatim and
paraphrase items was used to assess comprehension. The
data for each of three treatments in the experiment were
analyzed by a two-way analysis of variance.

The first treatment examined the effects of passage
organization on the ability of good and poor readers to
acquire information from a prose passage. The good readers
were not affected by passage structure, but the poor readers
receiving the "Structured Passage" scored significantly
higher than those receiving the "Mixed Passage."

The second treatment examined the differences in the
ability of good and poor readers to answer verbatim and para-
phrase items used to measure comprehension. Although
performance by the good readers was substantially better
than that of the poor readers on both the verbatim and para-
phrase questions, scores on paraphrase questions were lower
than scores on verbatim items for both groups.

The final treatment examined the effect of written task
instructions on the ability of good and poor readers to com-
prehend text. The findings indicated that neither the good
nor the poor readers received significantly different scores according to the task instructions that they received.

There were two strong but nonsignificant patterns in the data for task instructions. Poor readers were sensitive to both attribute and relation instructions. Good readers, however, were not affected by attribute instructions, but were sensitive to relation instructions. The results for good readers tentatively suggest that they encode attributes as a natural part of reading, but only encode relationships when they are specifically instructed to do so.

Based on these results, three observations were made. First, good readers appear not to be easily affected by text organization, but poor readers may be aided in comprehension by slight improvements in the organization of the text. Second, all students need more assistance and practice in drawing inferences from the text. Third, written instructions may be a weak aid for increasing the comprehension of poor readers and may help good readers attend to information they would normally miss.
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CHAPTER I

INTRODUCTION

Problem and Background

The problem of this study was to investigate how good and poor comprehenders utilized two types of cues—passage structure and task instructions—to acquire information from a prose passage.

The acquisition of knowledge in most school situations depends on the student's ability to comprehend text. One of the important tasks of educators must be, therefore, to assist students of varying abilities in gaining knowledge from prose more efficiently. Although considerable research has focused on the comprehension of prose, in the last two decades the emphasis has shifted from identifying comprehension skills (Davis, 1944; Gray, 1946) to identifying strategies actually used in comprehension (Goodman & Niles, 1970; Smith, 1971). The theoretical contributions of learning psychologists and psycholinguists have assisted researchers in asking questions concerning which elements assist pupils in the comprehension process.

Some scholars have recently divided the elements that influence comprehension into two categories. Pearson and Johnson (1978) refer to what happens "inside the head" and "outside the head." Frank Smith (1971) discusses these same
two categories as "what the brain tells the eye" and "what the eye tells the brain." Rothkopf (1976) refers to learning from written material resulting from a combination of the processing activities of the learner and the stimulus characteristics of text. These categories are not separate or mutually exclusive, but a distinction between them makes the process of comprehension more understandable.

The first general category of variables inside the learner would include such aspects as linguistic competence, interest, motivation, and reading ability. The second general category of variables extrinsic to the learner would include such items as the characteristics of text and the factors in the environment. Whether comprehension occurs is a result of the interaction of what the reader brings to the text and the constraints of the environment and the text itself.

Reading educators and psychologists have been especially interested in what characteristics of written materials appear to facilitate comprehension of text. One area of research on written materials which has been the focus of considerable attention over the last several years involves the effects of ideational organization of text on the comprehension process (O. R. Anderson, 1967; Dyer & Kulhavy, 1975; Frase, 1970, 1973; Kittrell, 1977; Mason & Kendall, 1978; Mayer, 1977; Myers, Pezdek, & Coulson, 1973; Peters, 1975-1976; Shultz & DiVesta, 1972; Tobias, 1973). Another
group of researchers has studied the effect of task instructions on the ability of students to comprehend material (Frase, 1975; Rothkopf & Kaplan, 1972; Stein & Nezworksi, 1978). Generally, the investigators in the above two areas have treated the subjects as a total group without differentiating between those with high and low comprehension ability. However, Cronbach and Snow (1977) have called attention to the possibility of an interaction between learners' abilities and the instruction provided to them. They suggest that research which examines variance due to individual differences may yield important results. Recently, the effects of sampling from two separate reading populations were reported by Drum (1979) and by Ryan and Willows (1979) on the elementary level and by Marshall and Glock (1978-1979) on the college level. Results of these studies suggest that research which examines variance due to stratified sampling may yield important results.

Significance of the Study

Consistent with the recent emphases in reading research, this study focused on the structure of text and task instructions. In addition, the design provided for measuring of the effects of sampling from two separate reading populations. This design feature was in distinct contrast to the common practice in comprehension studies of randomly selecting readers from a single population.
The particular benefits of the present study are
1. The study gives insight into the way good and poor comprehenders process features of text in attempting to comprehend written discourse.
2. The study provides direction to curriculum developers for the design of written materials.
3. The study provides guidelines as to how instructional materials can best be modified to accommodate those students who score low on measures of reading comprehension.
4. The study provides insight as to how adjunct devices such as task instructions can be used to adapt general textbook material to the specific needs of a classroom. A school can take advantage of the economics of centrally produced material and adapt it to local purposes.

**Purposes of the Study**

The purposes of this study were (a) to ascertain the effect of text organization on good reader's ability to comprehend prose, (b) to ascertain the effect of text organization on poor reader's ability to comprehend prose, (c) to determine if good and poor comprehenders differ in their level of comprehension, (d) to ascertain whether good comprehenders use task instructions to obtain specified information from a passage, and (e) to ascertain whether
poor comprehenders use task instructions to obtain specified information from a passage.

Hypotheses

Given the complex nature of the design, numerous statistical hypotheses could have been tested. Not all of these, however, were of substantive interest. The following hypotheses represent the major questions which flowed from a review of the research on comprehension.

Treatment 1--Passage and Aptitude Effects of Total Comprehension

1. Students in the good group will achieve a significantly higher score on total comprehension than the students in the poor group.

2. Students receiving the structured passage will score significantly higher on total comprehension than students receiving the mixed passage.

3. There will be a significant interaction effect such that poor students receiving the mixed passage will score significantly lower than the other groups.

Treatment 2--Effects of Levels of Comprehension

4. Scores for both groups on paraphrase items will be significantly lower than scores on verbatim items of comprehension.

5. Students in the poor group will score significantly
lower on the paraphrase items than on the verbatim items of the comprehension measure.

Treatment 3—Instructional Effects on Content Scores of Comprehension

6. All students receiving the attribute instructions will score significantly higher on the attribute items of the comprehension test than the students receiving the relation instructions or the control instructions.

7. Students in the good group receiving the attribute instructions will not earn a significantly different score on the attribute items of the comprehension test than students in the good group receiving the relation instructions or control instructions.

8. There will be a significant interaction effect such that students in the poor group receiving the attribute instructions will earn a significantly higher score on the attribute items of the comprehension test than students in the poor group receiving the relation or control instructions.

9. All students receiving the relation instructions will score significantly higher on the relation items of the comprehension test than the students receiving the attribute instructions or the control instructions.
10. Students in the good group receiving the relation instructions will not earn a significantly different score on the relation items of the comprehension test than students in the good group receiving the attribute instructions or control instructions.

11. There will be a significant interaction effect such that students in the poor group receiving the relation instructions will score significantly higher on the relation items of the comprehension test than students in the poor group receiving the attribute and control instructions.

Definition of Terms

The following terms have restricted meaning and are thus defined for this study:

1. Good comprehenders are defined as those students who had grade equivalent scores between 8.5 and 11.5 on the Stanford Diagnostic Reading Test, Brown Level, Test 2: Reading Comprehension.

2. Poor comprehenders are defined as those students who had grade equivalent scores between 3.5 and 7.5 on the Stanford Diagnostic Reading Test, Brown Level, Test 2: Reading Comprehension.

3. Structured passage is defined as a passage taken from the text and rewritten so that characters and
their attributes and relationships are introduced in a specified order.

4. **Mixed passage** is defined as the passage as it appeared in its original form in the text.

5. **Attribute instructions** are defined as the set of instructions that asks students to pay particular attention to the attributes of chimpanzees and of friendships.

6. **Relation instructions** are defined as the set of instructions that asks students to pay particular attention to the effect of relationships between chimpanzees.
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CHAPTER II

REVIEW OF THE LITERATURE

Several areas of research in reading and educational psychology have contributed to the development of this experiment. The significant research is discussed in the following four areas: (a) aptitude of students, (b) text structure, (c) orienting instructions, and (d) assessment of comprehension.

Aptitude of Students

This section contains a general discussion of research on the aptitude of students and its relationship to comprehension. Specific studies involving good and poor readers and their relation to text structure or orienting stimuli are discussed under those topics.

Three important summaries of research recently appeared which addressed the topic of the relationship between aptitudes and reading comprehension. The first was Cronbach and Snow's (1977) comprehensive review of research on aptitude X treatment interaction (ATI). This type of research is especially relevant to the problem of matching instruction with characteristics of the student. One of the most important findings of this review was that the degree of prompting and structuring in instruction interacts with the
ability level of the students. As more assistance, in the form of advance organizers, inserted questions, or greater structure, is provided for the less able learners, the effect of general ability on achievement is reduced. This interplay between aptitudes and instructional treatments suggests that structured teaching would appear to compensate for the lack of skills that low achievers bring to the instructional setting. In continuing their review, Cronbach and Snow note that the possibility of aptitude-treatment interaction is often overlooked in educational research. Commenting specifically on reading, they observed that it is "only now being subjected to truly penetrating analysis. . . . As aptitude data have almost always been collected, the frequent failure to examine ATI is a missed opportunity" (p. 244).

The second important summary was Golinkoff's (1975-1976) review of research on good and poor comprehenders and the processes that they use in reading. She found that the literature was not consistent about what constitutes a "good" and a "poor" comprehender. Many of the studies relied on a standardized reading test to divide the subjects into good and poor readers. Depending on the age of the group, it appeared that a wide variety of standardized tests was chosen. Further, there was no consistency as to how the results of the standardized tests were interpreted in terms of good and poor readers. Some studies used percentiles.
For instance, Perfetti and Hogaboam (1975) defined fifth grade good readers as those between the 60th and 95th percentile and poor readers as those between the 15th and 30th percentile. Other studies used grade level. Golinkoff and Rosinski (1976) defined good readers in the fifth grade as those having an average grade equivalent score of 7.09 and poor readers as those having an average grade equivalent score of 3.59. Another study (Weber, 1970) combined percentile and grade level in identifying good and poor readers while still another used teacher selection (Denner, 1970). Thus, there appears to be no well established methodology for dividing subjects into groups of good and poor comprehenders.

A second area of interest found in the studies reviewed by Golinkoff (1975-1976) was the grade level of the subjects that had participated in previous experiments. The majority of the studies was done in grades one through five. The next largest group was college freshmen. No studies were done with high school subjects.

In summary, although the interaction of aptitude with achievement appears to be a fruitful area to study, there is little reading research with children beyond elementary age, and there is no established methodological tradition for stratifying subjects into groups.

A third review of research was done by Perfetti and Lesgold (1977). Their own study and their comprehensive
review of other studies focused on the processes that readers employ in order to understand discourse. They contrasted skilled and less skilled readers. The three areas of possible individual differences in discourse comprehension which the researchers examined were (a) use of discourse structure, (b) short-term memory capacity, and (c) verbal coding speed. They concluded that skilled comprehension depends on short-term memory capacity and verbal coding speed. While the researchers suggested that skilled and less skilled comprehenders may differ on structure-related strategies, they could find no structure that presented a direct problem to less skilled readers. To clarify the importance of short-term memory capacity and verbal coding speed, Perfetti and Lesgold (1977) used the following example:

Reading is not the only skill for which the relative roles of short- and long-term memory have been confused. It was traditional for people to assume that the master chess player was better at chess because he could think ahead many moves. Mentally rehearsing a series of even three or four moves becomes a major STM feat because of the combinatorial explosion of possible moves and counter moves. There now is evidence that the master chess player thinks no further ahead than less skilled players . . . .

The skilled language comprehender may be good for similar reasons. Perhaps for the skilled comprehender, discourse macrostructures, grammatical forms, and lexical information are well learned, both in quality and in number. Hence, all of the specifics of a given message are quickly and accurately encoded (p. 172).
Thus, the speed of retrieving word meanings is the source of difference between good and poor comprehenders. Less skilled readers are slower and less efficient in the encoding and decoding of information in short-term memory. The ability of skilled readers to use thematic information is important to overcome the limitations of short-term memory.

In addition to the above reviews of research, there were recent comprehension studies that sample from two or more populations in order to examine what made some students better comprehenders than others. Comprehension studies which sample from stratified populations have been conducted by Drum (1979) and by Ryan and Willows (1979) on the elementary level and by Marshall and Glock (1978-1979) on the college level.

Ryan and Willows (1979) studied within-grade and across-grade comparisons of fourth, fifth, and sixth grade boys. Their subjects were matched with respect to age on each grade level and on non-verbal intelligence scores across grade levels. The population was divided into skilled and less skilled readers by using the results of the Gates-MacGinitie Reading Comprehension Test. The results of the research indicated that the skilled readers at all three grade levels made greater use of syntactically and semantically appropriate responses. This last result indicates that the difference between skilled and less skilled
readers in their use of semantic and syntactic information is a relatively stable characteristic.

Drum (1979) divided thirty-two fourth grade students into two ability groups based on story-telling ability, word recognition skills, and the Gray Oral Informal Reading Inventory. Each child read two of the following passages: an original version from the fourth grade reader, a semantically rewritten version, a syntactically rewritten version, and a combined syntactic semantic rewritten version. In one section of the study, the words each subject recalled after reading the stories were sorted into categories. The results indicated, first, that in the category of text recall (same content words or synonyms from the text) the more able readers were more likely to repeat propositions in the text than the less able readers. Second, reading skill did not affect the ability to recall text entailed responses (statements that added or summarized information in the text). Third, text evoked responses (responses that are related to the topic with no specific text reference) were more likely to be made by less able readers, but the difference was not significant. In the area of story structure, the semantically rewritten version assisted both groups of fourth grade boys in making more appropriate entailed responses.

Marshall and Glock (1978-1979) designed a study to ascertain how manipulation of certain aspects of the text
structure would affect the written recalls of Ivy League and community college students. They found that the manipulations, such as placing the main idea either at the beginning or the end of the text and the use of either explicit or implied if-then clauses in the text, affected the community college students, but not the Ivy League college students. In fact the patterns of recall that the community college students produced confirmed most of the predicted hypotheses, while the patterns of recall of Ivy League students failed to confirm most of the hypotheses. Since recall was so different for the two groups of subjects, the researchers concluded they were sampling from two different populations.

Although the means of designing contrastive studies of good and poor comprehenders have not been clearly established, there is evidence supporting the effectiveness of considering the aptitude of students when aspects of comprehension are being studied.

Effect of Text Structure

As a result of Bruner's (1962) proposition that the structure of subject matter can facilitate its acquisition, a number of studies appeared which examined the various ways that sequencing of learning material can assist in the acquisition of knowledge. The concept of kinetic structure was proposed by O. R. Anderson (1966, 1969). He used the term stimulus kinetic structure to refer to the sequence in which
materials are presented. He theorized that high kinetic structure in lessons will produce greater recall than low structured lessons. Also considered was the degree to which new information was related to the content preceding it. Based on this theory, Anderson derived a formula to analyze the structure of material numerically. In a 1967 study, he found that highly structured programmed instruction produced greater acquisition of scientific knowledge than low structured lessons. However, high-IQ subjects were better able to compensate for the low structure in the materials than were subjects with a low IQ. Other research using the same structural formula (O. R. Anderson & Lee, 1975; Browne & Anderson, 1974; Kittrell, 1977; Trindade, 1972) verified that communications with high kinetic structure result in a greater acquisition of knowledge than communications with low structure.

Mayer (1977) reviewed the literature on text organization as it affects comprehension and found conflicting results. Three studies indicated that this contradictory information may be explained by the degree of familiarity the subjects had with the content of the materials being presented. In a study by Tobias (1973), which was replicated by Dyer and Kulhavy (1974), this appeared to be the case. Tobias (1973) found that logical sequence was important for novel or unfamiliar subject matter, but not for familiar material. The effect of sequence is modified by the
subjects' prior familiarity with the content. It appeared that, when the subjects were familiar with the topic, they had a general outline into which they could fit the material. On new, unfamiliar content, however, subjects were unlikely to have an organizational scheme into which the new information could be fit. Dyer and Kulhavy (1974) reached similar conclusions. They stated that sequence should receive close attention when preinstruction familiarity is low and the material is not redundant. Lewis (1978) also stressed this idea:

Prior knowledge appears to help the organization process along, but it may not be necessary if all the information that is needed for text comprehension and organization is present in the text in a highly organized and structured form (p. 17).

The organizational characteristics of text have also been studied by grouping sentences according to different schemata. Frase (1973) found that organization by either name or attributes resulted in better comprehension than a random sequence of sentences. Myers, Pezdek, and Coulson (1973) found that a text organized by attributes was better recalled than when it was grouped according to names, while Schultz and DiVesta (1972) found name organization of countries facilitated greater recall than attribute organization. Thus, it is not possible to determine whether name or attribute organization is better, but either is more successful than random organization.
The type of information recalled may also be affected by the text organization. Frase (1970) found that logical ordering assisted subjects in drawing inferences. One group of adult subjects learned a text written in logical order, while a second group learned a text that was not logically ordered. Although both groups could recall the text, the group that had the logically ordered text could more easily combine information and draw inferences than the other group.

A study exploring the interaction between students' ability and their approach to text was done by Meyer, Brandt, and Bluth (1978). In a study of ninth graders, they found that those students who were rated as high in comprehension by their teachers and by standardized tests organized their recall using the same schema as the authors of the passage. Those students rated as low in reading comprehension did not use the same schema for organizing their recall protocols as the author.

The effect of text structure manipulation on good and poor readers was reported in two experiments. Mason and Kendall (1978) conducted an experiment with fourth graders. When major propositions in the material were set apart as separate sentences or on separate lines, low-ability readers obtained comprehension scores that were closer to those obtained by the better readers. The high-ability readers were not helped by manipulation of the text. On the other
hand, Peters (1975-1976) found that social studies textbook material that was restructured for ninth graders resulted in consistently better comprehension for both good and poor readers.

In summary, text structure manipulation appears to be an aid to comprehension. The effect of text organization would seem to be especially apparent in the case of poor readers.

Effect of Orienting Stimuli

Two types of orienting stimuli for prose learning are discussed in this section: advance organizers and task instructions. An advance organizer is a general conceptual statement about a subject area; task instructions refer to a specific goal to be accomplished. Ausubel (1960, 1963) has studied the effects of advance organizers on the retention of prose. He demonstrated that advance organizers increase a pupil's acquisition and retention of specific facts in unfamiliar but meaningful verbal materials. For example, a study by Fitzgerald and Ausubel (1963) found that students scored higher on an achievement test for a passage if they were given an advance organizer encouraging subjects to understand a point of view as compared to control subjects who were given an introductory paragraph.

The idea of an advance organizer is strengthened by the fact that subjects simply instructed to think about the concepts prior to reading a passage (Wittrock, 1963) obtained
better results on achievement tests than control subjects. In addition, Bransford and Johnson (1972) found that subjects who were given a title prior to reading a passage retained more of the ideas in the passage than subjects who were given the title after they read the passage.

The results of the large amount of research testing Ausubel's theory (reviewed by Sledge, 1978; Lawton & Wanaska, 1977; Barnes & Clawson, 1975) debate the efficacy of advance organizers as a general method. There appears to be an advantage to using advance organizers with specific groups of students. On the basis of her review, Sledge states:

Of the studies which found significant differences, the majority of the authors concluded that there were differences based upon ability, particularly to the advantage of the less able student (p. 55).

The assumption that advance organizers are more helpful to the less able student appears to be compatible with Ausubel's theory. It may be the less able student who needs a subsuming framework on which to attach incoming information.

There are also studies which suggest that interspersed questions may be used as organizers to aid the students in the retention of prose material. In fact, there is evidence to suggest that questions may have differential effects on students of different abilities (Sanders, 1973; Allen, 1970). Those who have a lower grade point average or a lower IQ tend to benefit more from advance organizers or interspersed
questions than those with high grades or IQ. In view of his own research and the evidence in the field, Rickards (1975-1976) suggested that "it would seem fruitful to study the use of interspersed advance organizers or high level questions as aids for such poor readers in the comprehension of reading material" (p. 620).

Some researchers (Ausubel & Fitzgerald, 1962; Shavelson, Berliner, Ravitch, & Loeding, 1974) have found an interaction effect between verbal ability and the ability to use interspersed questions or advance organizers. In fact, Shavelson et al. (1974) found that while inserted questions in the text appear to aid subjects with low vocabulary scores, they may interfere with prose learning for those students with high verbal ability.

Mayer's 1978 study found an interaction effect between text organization and advance organizers. He found that given an advance organizer, subjects reading a poorly organized text could perform better on a posttest than control subjects, but there was no positive effect for advance organizers used with logically organized text. The advance organizer used in the two studies by Mayer was a four-by-four matrix of blank squares in which the rows were labeled with attributes of countries and the columns were labeled with names of countries. He hypothesized that the advance organizers gave the subjects an "anchor" onto which incoming ideas may be hooked when there was little organization of
ideas in the text itself. In the second part of Mayer's study, low ability subjects were significantly aided by advance organizers on questions requiring integration of information from several paragraphs. The high ability subjects apparently could generate their own method for integrating incoming material.

Another type of orienting stimuli, task instructions, is discussed in the literature. In this area, Frase (1975) demonstrated that there was a match between learning directions and items learned in a text. His experiment used two sets of learning directions, one set referring to eleven sentences in a passage and the other set to another eleven sentences. In all the experimental groups, there was a significant difference between the information recalled which was relevant to the instructions rather than incidental to the instructions. Within each set of learning directions, there were four types of instructions. Two types, called "Word Directions," were cued to the initial words of sentences to be learned. The other two types, called "Topical Directions," were cued to topics to be learned. Recall from the text occurred with word directions, but not with topical directions.

A study using learning directions was also done by Rothkopf and Kaplan (1972). They found that specific learning directions made a significant difference in the amount of material recalled compared with general learning
directions or no directions. If there is a match between learning directions and items learned as the above research indicates, directions can be used as a control over learning outcomes.

Another experiment involving instructions and text structure was done by Stein and Nezworski (1978). Their subjects listened to stories and answered the questions orally rather than reading them. They found that instructions affected the amount of recall when there was a large discrepancy between text structure and an ideal structure, but the accuracy of recall did not improve with instructions when a story was well formed or when it was only slightly disordered.

In view of the above research, it would seem that under certain conditions the use of advance organizers or specific task instructions can serve as an aid in the comprehension of text. These effects are particularly beneficial for low ability students.

Assessment of Comprehension

Bloom and his associates (1956), in the now classic Taxonomy of Educational Objectives, ordered categories of the various types of knowledge that may be obtained. Bormuth (1970) put Bloom's taxonomy into action by devising a system of definitions and rules to derive test items. Gagné (1970) suggested that a two-stage measurement is necessary in instruction. The first stage is called
learning, and it is measured by the student's ability to successfully answer verbatim questions from the lesson. The second stage is transfer, and it is measured by the student's ability to successfully answer transformed statements of the principles and new examples of the principles.

Relying on the work of these scholars, R. C. Anderson (1970, 1972) described procedures for generating two types of questions, verbatim and paraphrase, to assess comprehension. Verbatim questions ask the subject to recall points that are explicitly stated by the author. Paraphrase questions ask the subject to correctly classify or recognize new examples of incidents in the passage.

The theme of R. C. Anderson's work was that "whether a test item measures comprehension depends upon the relationship of the wording of the test item to the wording of the instructions" (1972, p. 167). He argued that all investigators should clearly state what type of recall or testing of comprehension they are using.

To summarize, literature was reviewed in four areas: aptitude of students, text structure, orienting instructions, and assessment of comprehension. It was found that research which considers the aptitude of students when aspects of comprehension are being studied is beginning to yield important results. In the case of poor readers, text structure and task instructions appear to be an aid to comprehension while these two variables are less effective
with good readers. Finally, in order to clarify the type of learning taking place, the research must delineate the type of test items being used to measure comprehension.


Barnes, B. R., & Clawson, E. V. Do advance organizers facilitate learning? Recommendations for the further


Meyer, B. J. R., Brandt, D. M., & Bluth, G. J. Use of author's textual schema: Key for ninth graders'


Shavelson, R. J., Berliner, D. C., Ravitch, M. M., & Loeding, D. Effects of position and type of question on


CHAPTER III

METHOD

Sample

This section will discuss the city, school district, school, and classrooms from which the sample was drawn. The figures used are taken from A Self-Evaluation Study prepared by the administration and staff of Nimitz High School (1977).

City

The city of Irving, located in Dallas County, is in the heart of the Dallas-Fort Worth area. It is approximately ten miles west of downtown Dallas and twenty miles east of downtown Fort Worth. The census data of 1976 shows a population of 110,000 for the city. The estimated population of Irving in 1979 was 116,000.

The city has more than fifty manufacturers, numerous banking facilities, commercial amusement parks, and recreational sites. There is one university and one community college located within the city of Irving, plus several colleges and universities within commuting distance.

School District

The Irving Independent School District covers an area of 48.5 square miles and is divided into attendance areas
according to geographic boundaries. In 1977, there were approximately 25,000 students in twenty-four different school plants—fifteen elementary schools, six junior high schools, and three senior high schools. The total enrollment in the senior high schools (grades nine through twelve) was approximately 7,550.

School

Nimitz High School serves approximately the southern one-third of the Irving Independent School District. It is a senior high school serving grades nine through twelve. The enrollment for the 1978-1979 school year was approximately 2,300.

In 1977, the identifiable ethnic groups that composed the student body were outlined. Table I shows these groups.

TABLE I

ETHNIC COMPOSITION OF NIMITZ HIGH SCHOOL

<table>
<thead>
<tr>
<th></th>
<th>Per Cent of Student Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian</td>
<td>.50</td>
</tr>
<tr>
<td>Asian</td>
<td>.25</td>
</tr>
<tr>
<td>Black</td>
<td>4.50</td>
</tr>
<tr>
<td>Mexican American</td>
<td>10.50</td>
</tr>
<tr>
<td>Other</td>
<td>84.25</td>
</tr>
</tbody>
</table>

Also in 1977, a survey was conducted to determine the educational status of the parents of students at Nimitz High School. Table II shows the results.
In the 1970 census, fifty-two percent of the national population were high school graduates. Table II indicates that the educational level of parents at Nimitz High School is above the national norms.

The student population at Nimitz High School appears to be unusually stable. A study completed in 1975 showed that 82.5 per cent of the seniors had been at Nimitz High School for all four years.

**TABLE II**

**EDUCATIONAL LEVEL OF PARENTS OF STUDENTS**
**AT NIMITZ HIGH SCHOOL**

<table>
<thead>
<tr>
<th>Per Cent of Parents</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal education in elementary school only</td>
<td>9</td>
</tr>
<tr>
<td>Partial but incomplete high school attendance</td>
<td>20</td>
</tr>
<tr>
<td>Complete high school attendance</td>
<td>37</td>
</tr>
<tr>
<td>Some formal education beyond high school but other than college</td>
<td>6</td>
</tr>
<tr>
<td>Some college education but without a degree</td>
<td>16</td>
</tr>
<tr>
<td>A bachelor's degree</td>
<td>8</td>
</tr>
<tr>
<td>Advanced degrees</td>
<td>4</td>
</tr>
</tbody>
</table>

**Classrooms**

The students from eight English III classes at Nimitz High School were used in this experiment. All teachers were asked if they were willing to have their classes take part in a study, and all agreed to participate. Although the teachers remained in the classroom while the instruments were being administered, they did not take part in conducting the study.
Research Design and Measurement

The study employed a standardized test, two versions of a passage, three versions of instructions, and a multiple-choice test. The conceptual model used for data collection purposes is shown in Figure 1 (page 38).

Standardized Test

The Stanford Diagnostic Reading Test, Brown Level, Test 2: Reading Comprehension, Form A was given to all students. The test was selected because it is appropriate for use with high school students who are poor readers (Karlsen, Madden, & Gardner, 1976b). Also, this test was specifically designed to identify pupils' strengths and weaknesses in particular areas of reading such as comprehension (Karlsen, Madden, & Gardner, 1976b). Although the test provides a subtest score on literal, inferential and total reading comprehension, only the total read comprehension score was used.

The reliability of the Stanford Diagnostic Reading Test, Brown Level, Test 2: Reading Comprehension, Form A as determined by the Kuder-Richardson Formula #20 is .97 for ninth grade students. The criterion-related validity of the Stanford Diagnostic Reading Test, Brown Level, Test 2: Reading Comprehension, Form A as obtained by correlating this test with the Reading Comprehension subtest of the Stanford Achievement Tests, 1973 edition is .86.
<table>
<thead>
<tr>
<th></th>
<th>Good Comprehenders</th>
<th>Poor Comprehenders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Structured Passage</td>
<td>Structured Passage</td>
</tr>
<tr>
<td></td>
<td>Mixed Passage</td>
<td>Mixed Passage</td>
</tr>
<tr>
<td>Attribute Instructions</td>
<td>Relation Instructions</td>
<td>Attribute Instructions</td>
</tr>
<tr>
<td>Control Instructions</td>
<td>Relation Instructions</td>
<td>Control Instructions</td>
</tr>
</tbody>
</table>

Fig. 1--Research design
The passage for this experiment was chosen from In the Shadow of Man, by Jane Van Lawick-Goodall. It was selected because ethology—the study of animal behavior—is a subject in which high school students are not likely to have had prior instruction. The particular passage was about the complex social organization of a chimpanzee community. It is highly unlikely that the students would have had prior information about the content of the text.

Two forms of the passage were used in this experiment. The first form, called the "Mixed Passage," was exactly as it appeared in the book.

The second form, called the "Structured Passage," was rewritten with an emphasis on the ideational organization of the text. The outline used to construct this passage consisted of the following four main ideas listed in the order in which they occur: (1) friends and their characteristics, (2) friends who are siblings, (3) the effect of friendship on position in the social structure, and (4) the effect of friendship as a means of emotional support.

For instance, in the "Mixed Passage" one paragraph discussed two pairs of chimpanzees who were friends, and how one pair had attained their position in the social structure of the community. Another pair of friends was discussed in a paragraph that occurred later in the passage. In the "Structured Passage," each of the three pairs of chimpanzees
who were friends were discussed in a single paragraph. How the chimpanzees attained their position in the social structure of the community was discussed later in the passage. When possible the same words and sentences were used in the "Structured Passage" as were used in the original text.

The readability level of both passages was 9-10th grade as determined by the Dale Chall formula (1948). See Appendix A for an example of the two passages.

**Task Instructions**

The three sets of task instructions used in the study were the following:

**Attribute Instructions**—The instructions told the subjects the general composition of the passage and asked them to pay particular attention to the attributes of chimpanzees and of friendships.

**Relation Instructions**—The instructions told the subjects the general composition of the passage and asked them to pay particular attention to the effects of relationships on life in the chimpanzee community.

**Control Instructions**—The instructions told the subjects the general composition of the passage and asked them to read the passage and to answer the questions following it.

See Appendix B for an example of the instructions.
Measures of Comprehension

To assess comprehension of the passage, a written test was given to each subject. The test consisted of 20 four-alternative, multiple-choice questions. Questions 1-10 contained information cued to the attributes of chimpanzees and of friendships, with questions 1-5 being verbatim questions and 6-10 being paraphrase questions. Questions 11-20 contained information cued to the effects of relationships on life in the chimpanzee community, with questions 11-15 being verbatim questions and 16-20 being paraphrase questions. Measures of comprehension used in this study were (a) total comprehension scores, (b) verbatim and paraphrase scores, and (c) attribute and relation scores.

The multiple-choice items for this research were constructed according to the procedures recommended by R. C. Anderson (1972). He described methods for generating several types of verbatim and paraphrase items to assess comprehension. Verbatim questions asked the subject to recall points that are explicitly stated by the author. Paraphrase questions asked the subject to summarize a main idea, classify a subject, or recognize new examples of incidents in the passage. The two conditions that a paraphrase item met were that it did not have any substantive words in common with the original text, and that it was equivalent in meaning. Distinguishing between verbatim and paraphrase items gave a more detailed picture of what
type of information processing is occurring. See Appendix C for an example of the comprehension instrument.

**Validation of Instruments**

The content validity of the attribute and relation items of the comprehension test was judged by a panel of eight doctoral-level students pursuing a degree with a major in reading. All of the panel members had a knowledge of prose processing. Through careful examination of the test content, the panel determined that the two groups of items adequately measured the attribute and relation dimensions expressed in the passage.

The structured passage was evaluated by the same panel. They judged the structure of the passage with emphasis on the ideational organization of the text. Seven of the panel members strongly agreed that Passage II was more structured than Passage I. One panel member was undecided.

In a pilot study, a thirty-five-item multiple-choice test was given to a group of good and poor comprehenders as defined in the study. An item analysis was performed to determine (a) the success of the group on each item (what per cent got it right); and (b) the discriminating power of each item (based on how many more high-scoring than low-scoring students got it right). On three items, fewer than thirty per cent of the group members scored correctly and these items were discarded as being too difficult. On one item, more than ninety per cent of the group members scored
correctly, and it was discarded as being too easy. Five items were judged as being non-discriminating, and they were discarded. Also, a single item on one question was revised because it caused the question to be non-discriminating.

The thirty-five multiple-choice items were also given to thirty students who had not read the passage. This was done to ascertain whether the items were passage-dependent. Six items were answered correctly by more than forty per cent of the students without reading the passage. They were discarded from the test. Anderson and Biddle (1975) found that students could get thirty-four per cent of both verbatim and paraphrase multiple-choice items correct without reading the passage.

Procedures for Collecting Data

Data collection was accomplished in two phases: first, the Stanford Diagnostic Reading Test, Brown Level, Test 2: Reading Comprehension, was administered to all students in the eight classrooms; and second, the passages and multiple-choice comprehension test were administered. All participants in the second phase of the study had to meet the criterion of obtaining grade equivalent scores on the Stanford Diagnostic Reading Test, Brown Level, Test 2: Reading Comprehension between 3.5 and 7.5 or between 8.5 and 11.5. The subjects in each of the two groups formed on the basis of the results of the test were randomly assigned to one of the six treatment conditions.
The two phases of data collection were conducted two weeks apart. During each phase of data collection, all participating classrooms in the building were tested in a single day. This was done to minimize the possibility of those students already tested communicating about the test to the students not yet tested.

In order to equalize the number of persons in the various cells, it was necessary to randomly drop eleven students from nine different cells. One hundred and twenty students composed the final sample.

Procedures for Analysis of Data

The results of the comprehension test were recorded as mean proportion correct for each group of subjects. Proportion correct is used by Frase (1975) and R. C. Anderson and Biddle (1975) in similar experiments. The data generated were analyzed in three different ways.

Treatment 1.—The design was a 2 X 2 factorial design, with the factors being Comprehension Ability (good or poor), and Passage Structure (mixed or structured). The dependent variable was the proportion correct of the total score on the comprehension measure.

Treatment 2.—The design was a 2 X 2 factorial design, with the factors being Comprehension Ability (good or poor), and Level of Comprehension (verbatim or paraphrase). The dependent variable was the proportion of the verbatim or paraphrase items correct.
Treatment 3.—The design was a 2 X 3 factorial design, with the factors being Comprehension Ability (good or poor), and Task Instructions (cued to attributes of chimpanzees, cued to relations of chimpanzees, and control).

This treatment had the following two parts:

Part 1—The dependent measure was the proportion of attribute items correct

Part 2—The dependent measure was the proportion of relation items correct.

In each of the factorial designs, two-way analysis of variance was used with row means, column means, and interaction effect (Ferguson, 1976, p. 421). Since all hypotheses in this study were directional, the analysis of variance tests relevant to specific hypotheses were evaluated at the .05 level of significance and employed a one-tailed test. The data were analyzed in various combinations in this experiment. Consequently, the possibility of having a false positive existed. Following a significant F for interaction, an analysis of simple main effect consisting of three levels, the Newman-Keuls' test was the multiple comparison procedure used.
CHAPTER BIBLIOGRAPHY


CHAPTER IV

RESULTS

Treatment 1

The first treatment examined the effects of passage structure on the ability of good and poor readers to acquire information from a prose passage. The following hypotheses were tested:

1. Students in the good group will achieve a significantly higher score on total comprehension than the students in the poor group.

2. Students receiving the structured passage will score significantly higher on total comprehension than students receiving the mixed passage.

3. There will be a significant interaction effect such that poor students receiving the mixed passage will score significantly lower than the other groups.

In this treatment, the independent variables were Comprehension Ability (good or poor) and Passage Structure (mixed or structured). The dependent variable was the proportion of all items correct on the comprehension measure. Means and standard deviations on the dependent measure for the four groups in this treatment are shown in Table III.
TABLE III
GROUP MEANS AND STANDARD DEVIATIONS FOR STRUCTURED OR MIXED PASSAGES

<table>
<thead>
<tr>
<th>Passage Types</th>
<th>Reader Types</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good (n=60)</td>
<td>Poor (n=60)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Structured Passage</td>
<td>87.00</td>
<td>11.50</td>
<td>55.00</td>
</tr>
<tr>
<td>Mixed Passage</td>
<td>87.83</td>
<td>10.06</td>
<td>40.00</td>
</tr>
</tbody>
</table>

The 2(Passage Structure) X 2(Comprehension Ability) analysis of variance for this treatment is summarized in Table IV. The analysis yielded a significant main effect for structure of the passage, $F(1,116) = 7.91, p < .01$, and for comprehension ability of the reader, $F(1,116) = 251.30, p < .001$. These findings supported hypotheses one and two.

TABLE IV
ANALYSIS OF VARIANCE SUMMARY TABLE FOR PASSAGE STRUCTURE

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passage Structure</td>
<td>1</td>
<td>1505.21</td>
<td>7.91</td>
<td>.006</td>
</tr>
<tr>
<td>Comprehension Ability</td>
<td>1</td>
<td>47800.21</td>
<td>251.30</td>
<td>.000</td>
</tr>
<tr>
<td>Structure X Ability</td>
<td>1</td>
<td>1880.21</td>
<td>9.89</td>
<td>.002</td>
</tr>
<tr>
<td>Within</td>
<td>116</td>
<td>190.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The interaction was significant, $F(1,116) = 9.89$, $p < .01$. An analysis of simple effects indicated that there was a significant difference between the good and poor readers on both the structured passage, $F(1,116) = 80.75$, $p < .001$, and the mixed passage, $F(1,116) = 180.44$, $p < .001$. Within the comprehension ability factor, there was no significant difference between the good readers receiving the structured passage and the good readers receiving the mixed passage, $F(1,116) = .055$, but the poor readers receiving the mixed passage obtained significantly lower scores, $F(1,116) = 17.74$, $p < .001$, than the poor readers receiving the structured passage. For a graphic display of the effects of passage structure on good and poor readers, see Figure 2. These findings supported hypothesis three.

**Treatment 2**

The second treatment examined differences in the ability of good and poor readers to answer verbatim and paraphrase items used to measure comprehension. Verbatim items contained the same wording used in the passage. In paraphrase items, equivalent meanings were retained but the wording was changed. The following hypotheses were tested:

4. Scores for both groups on paraphrase items will be significantly lower than scores on verbatim items of comprehension.
5. Students in the poor group will score significantly lower on the paraphrase items than on the verbatim items of the comprehension measure.

Means

![Graph showing the effects of passage structure on good and poor reader's ability to acquire information from a prose passage.](image)

**Fig. 2**—The effects of passage structure on good and poor reader's ability to acquire information from a prose passage.

In this treatment, the independent variables were Comprehension Ability (good or poor) and Level of Comprehension (verbatim or paraphrase). The dependent variable was the proportion of the verbatim or paraphrase items correct. Means and standard deviations on the dependent measure for the four groups in this treatment are shown in Table V.
TABLE V
GROUP MEANS AND STANDARD DEVIATIONS FOR VERBATIM OR PARAPHRASE QUESTIONS

<table>
<thead>
<tr>
<th>Question Types</th>
<th>Reader Types</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(n=60)</td>
<td>(n=60)</td>
</tr>
<tr>
<td>Verbatim Questions</td>
<td>M</td>
<td>90.33</td>
<td>51.33</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>9.56</td>
<td>20.38</td>
</tr>
<tr>
<td>Paraphrase Questions</td>
<td>M</td>
<td>84.50</td>
<td>43.67</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>14.90</td>
<td>21.86</td>
</tr>
</tbody>
</table>

The 2(Level of Comprehension) X 2(Comprehension Ability) analysis of variance is summarized in Table VI. The analysis yielded a significant main effect for level of comprehension (verbatim or paraphrase questions), F(1,236) = 9.07, p < .01, and for comprehension ability of the reader (good or poor), F(1,236) = 317.03, p < .001. These findings supported hypothesis four.

The interaction between level of comprehension and comprehension ability predicted in hypothesis five was not supported, F(1,236) = 0.17, NS. The good and poor comprehenders did not differ in the degree to which they were able to answer verbatim and paraphrase questions. However, the evidence indicated that for both groups of readers paraphrase items were more difficult to answer than verbatim items.
Treatment 3

The final treatment examined the effect of written task instructions on the ability of good and poor readers to comprehend text. With the passage students received one of the following instructions: (1) attribute instructions which cued the reader to the attributes of chimpanzees and of friendships; (2) relation instructions which cued the reader to the effects of relationships on life in the chimpanzee community; and (3) control instructions. The results from this treatment will be discussed in two parts—attribute items correct and relation items correct.

Part One: Attribute Items Correct

In part one, attribute items correct, the following hypotheses were tested:
6. All students receiving the attribute instructions will score significantly higher on the attribute items of the comprehension test than the students receiving the relation instructions or the control instructions.

7. Students in the good group receiving the attribute instructions will not get a significantly different score on the attribute items of the comprehension test than students in the good group receiving the relation instructions or control instructions.

8. There will be a significant interaction effect such that students in the poor group receiving the attribute instructions will get a significantly higher score on the attribute items of the comprehension test than students in the poor group receiving the relation or control instructions.

In this treatment, the independent variables were Comprehension Ability (good or poor) and Task Instructions (cued to attributes of chimpanzees, cued to relations of chimpanzees, or control). The dependent variable was the proportion of attribute items correct. The means and the standard deviations on the dependent measure for the six groups in this treatment are shown in Table VII.
TABLE VII

GROUP MEANS AND STANDARD DEVIATIONS FOR ATTRIBUTE ITEMS CORRECT

<table>
<thead>
<tr>
<th>Instruction Types</th>
<th>Good (n=60)</th>
<th>Poor (n=60)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Attribute Instructions</td>
<td>88.50</td>
<td>12.68</td>
</tr>
<tr>
<td></td>
<td>58.00</td>
<td>17.95</td>
</tr>
<tr>
<td>Relation Instructions</td>
<td>89.50</td>
<td>12.34</td>
</tr>
<tr>
<td></td>
<td>43.50</td>
<td>21.59</td>
</tr>
<tr>
<td>Control Instructions</td>
<td>89.00</td>
<td>12.10</td>
</tr>
<tr>
<td></td>
<td>45.00</td>
<td>23.28</td>
</tr>
</tbody>
</table>

A 2(Comprehension Ability) X 2(Task Instruction) analysis of variance, summarized in Table VIII, yielded a significant main effect for comprehension ability of the reader (good vs. poor), $F(1,114) = 162.26$, $p < .001$, but no effect for task instructions, $F(2,114) = 1.90$, NS, or for the interaction of ability and instructions, $F(2,114) = 2.38$, NS. Hypothesis six, which predicted a significant main effect for task instructions, was not supported by the findings. Hypothesis seven predicted that comprehension scores for good readers would not differ significantly across task instructions. The data supported this prediction. Hypothesis eight predicted that poor readers would score differently according to the task instructions they received. Since there was no interaction effect, the findings did not support this hypothesis. An examination of mean scores for the poor readers (see
Table VII indicates a general pattern in the predicted direction. Poor readers receiving attribute instructions scored higher than those receiving either relation instructions or control instructions. This difference was not significant, however.

**TABLE VIII**

**ANALYSIS OF VARIANCE SUMMARY TABLE FOR ATTRIBUTE TASK INSTRUCTIONS**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attribute Task Instructions</td>
<td>2</td>
<td>565.83</td>
<td>1.90</td>
<td>.155</td>
</tr>
<tr>
<td>Comprehension Ability</td>
<td>1</td>
<td>48400.83</td>
<td>162.26</td>
<td>.000</td>
</tr>
<tr>
<td>Instructions X Ability</td>
<td>2</td>
<td>710.83</td>
<td>2.38</td>
<td>.097</td>
</tr>
<tr>
<td>Within</td>
<td>114</td>
<td>298.29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Part Two: Relation Items Correct**

In part two, relation items correct, the following hypotheses were tested:

9. All students receiving the relation instructions will score significantly higher on the relation items of the comprehension test than the students receiving the attribute instructions or the control instructions.

10. Students in the good group receiving the relation instructions will not get a significantly different
score on the relation items of the comprehension test than students in the good group receiving the attribute instructions or control instructions.

11. There will be a significant interaction effect such that students in the poor group receiving the relation instructions will score significantly higher on the relation items of the comprehension test than students in the poor group receiving the attribute and control instructions.

In this treatment, the independent variables were Comprehension Ability (good or poor) and Task Instructions (cued to attributes of chimpanzees, cued to relations of chimpanzees, and control). The dependent variable was the proportion of the relation items correct. The means and the standard deviations on the dependent measure for the six groups in this treatment are shown in Table IX.

A 2(Comprehension Ability) X 2(Task Instruction) analysis of variance yielded a significant main effect for comprehension ability of the reader $F(1,114) = 167.48, p < .001$. There was also a significant main effect for task instructions, $F(2,114) = 4.34, p < .05$. This analysis is summarized in Table X.
TABLE IX

GROUP MEANS AND STANDARD DEVIATIONS FOR RELATION ITEMS CORRECT

<table>
<thead>
<tr>
<th>Instruction Types</th>
<th>Good (n=60)</th>
<th>Poor (n=60)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reader Types</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Attribute Instructions</strong></td>
<td>M 85.00</td>
<td>43.00</td>
</tr>
<tr>
<td></td>
<td>SD 11.00</td>
<td>19.49</td>
</tr>
<tr>
<td><strong>Relation Instructions</strong></td>
<td>M 91.00</td>
<td>53.50</td>
</tr>
<tr>
<td></td>
<td>SD 10.21</td>
<td>18.72</td>
</tr>
<tr>
<td><strong>Control Instructions</strong></td>
<td>M 81.50</td>
<td>42.00</td>
</tr>
<tr>
<td></td>
<td>SD 16.94</td>
<td>21.18</td>
</tr>
</tbody>
</table>

TABLE X

ANALYSIS OF VARIANCE SUMMARY TABLE FOR RELATION TASK INSTRUCTIONS

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relation Task Instructions</td>
<td>2</td>
<td>1222.50</td>
<td>4.34</td>
<td>.015</td>
</tr>
<tr>
<td>Comprehension Ability</td>
<td>1</td>
<td>47203.33</td>
<td>167.48</td>
<td>.000</td>
</tr>
<tr>
<td>Instructions X Ability</td>
<td>2</td>
<td>50.83</td>
<td>0.18</td>
<td>.835</td>
</tr>
<tr>
<td>Within</td>
<td>114</td>
<td>281.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The significant main effect for task instructions supported hypothesis nine. Probing with the Neuman-Keuls procedure revealed that differences between relation items ($M = 72.25$) and control items ($M = 61.75$), as well as
relation items \((M = 72.25)\) and attribute items \((M = 64.00)\),
were significant \((p < .05)\), with the relation items being
higher in both cases. These results suggest that there was
a match between learning instructions and the items learned
in a passage.

Hypothesis ten predicted that the scores for the good
readers would not differ significantly according to the task
instructions that they received. An examination of mean
scores for good readers (see Table IX) indicates that mean
scores for relation instructions were higher than those for
attribute or control instructions. A one-way analysis of
variance was used to compare the proportion of relation items
correct for each of the three types of instructions given to
the good readers. The results are shown in Table XI.

<table>
<thead>
<tr>
<th>TABLE XI</th>
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</table>

ANALYSIS OF VARIANCE SUMMARY TABLE FOR
RELATION ITEMS CORRECT
OF GOOD READERS

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>2</td>
<td>461.68</td>
<td>2.70</td>
<td>.076</td>
</tr>
<tr>
<td>Within Groups</td>
<td>57</td>
<td>170.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The \(F\) score of 2.70 was not significant at the .05
level (its probability being .08). Although there was a
trend apparent in the scores for the good readers, the sample means did not differ significantly from one another. Hypothesis ten was therefore accepted.

Hypothesis eleven predicted that poor readers would score differently according to the task instructions that they received. An examination of mean scores for the poor readers (see Table IX) indicates a general pattern in the predicted direction. Poor readers receiving the relation instructions scored higher than those receiving either attribute or control instructions. The analysis summarized in Table X indicates that the interaction between comprehension ability and relation task instructions was not significant, $F(2,114) = .18$, NS. Since there was no interaction effect, the findings did not support the hypothesis.
CHAPTER V

DISCUSSION

The results of the study are discussed in terms of the three dependent variables examined: 1) effects of passage structure and aptitude on total comprehension; 2) differences by levels of comprehension; and 3) effects of instructions on content scores of comprehension.

Treatment 1

Findings

Treatment 1 examined the effects of passage structure on the ability of good and poor comprehenders to acquire information from a prose passage. The results indicate that a passage with a greater degree of structure was helpful to poor comprehenders, but did not influence the ability of good comprehenders to obtain information from a passage.

Interpretation

Poor comprehenders are affected by the structure of a text, while good comprehenders are not. Apparently, the good comprehenders do not rely on the structure of a passage to obtain information from the text. Indeed, Perfetti and Lesgold (1977) argue that skilled readers have the ability
to provide a structure to information in short-term memory. This ability to use thematic information is important. As a result the information is quickly and accurately retrieved. Poor comprehenders, on the other hand, appear to lack this ability.

This interpretation must be qualified by two features of the passages used in this study. First, the differences in structure between the two passages were not large. Information in the "structured" passage was simply more carefully ordered than information in the "mixed" passage. Second, the passages were short—approximately 950 words. In longer passages with greater differences in structure, effects on the performance of good readers might have appeared. On the other hand, poor readers appear to be affected by even slightly unordered passages.

Implications

Clarity and order in the structure of prose appear to be important for poor comprehenders. Material written for poor comprehenders would seem to require careful attention to the structure of the information. In addition, teachers need to assist students in providing an organization to information in a passage. It may be necessary to begin with short passages having clear and direct structures and gradually proceed to more complicated materials.
Findings

Treatment 2 examined the effect of verbatim and paraphrase questions on the performance level of good and poor comprehenders. When the questions required subjects to recognize explicit or verbatim information from the passage, both good and poor comprehenders produced significantly more correct answers. The hypothesis predicted that the degree of explicitness of information required by the questions would not affect the good comprehenders, but this was not confirmed. Although performance by the good readers was substantially better than that of the poor readers on both the verbatim and paraphrase questions, the paraphrase questions proved to be more difficult for the good group as they were for the poor group. The difference between the total mean scores on the good reader's verbatim and paraphrase questions was 5.83 while the difference between the total mean scores on the poor readers verbatim and paraphrase questions was 7.66. In other words, the distance between the scores on the two types of questions for both groups was similar.

Interpretation

These results are consistent with Frase's (1970, 1971) finding that subjects have more difficulty remembering inferential material (combined text information) than text
assertions on recognition tests. Anderson and Biddle (1975) also found that subjects attained significantly higher verbatim than paraphrase scores for questions asked immediately after reading a passage. However, Anderson and Biddle found in addition that after a one week interval there was a greater decline in verbatim scores than in paraphrase scores. They hypothesized that there are at least two types of memories: a close-to-surface memory code with a relatively short life, and a more permanent memory code requiring a greater degree of text processing.

These results may reflect the fact that students get less practice in inferential processing. Gall (1970) concluded from his review of the research that at least sixty per cent of a teacher's questions require students to recall facts. Godbald (1970) and Lanier and Davis (1972) found that literal questions compromise two-thirds of the questions that teachers ask.

**Implications**

These results indicate that it may be necessary for teachers to stress inferential reading skills for all students. One method of doing this was described by Lucking (1976) whose research indicates that systematic practice can be beneficial. He found that the types of questions teachers ask have a significant impact on the cognitive processes of tenth grade students of both high and low reading ability. When teachers followed a plan of moving systematically
from factual to higher-order questions, students learned to make more interpretational responses. The same effect did not occur for a random order of questions.

Treatment 3

Findings

Treatment 3 examined the effect of written task instructions on the ability of good and poor readers to comprehend text. The results indicate that task instructions had a significant main effect in part two (relation instructions) of the treatment, but not in part one (attribute instructions). For all groups combined, subjects receiving relation instructions scored significantly higher on the relation items of the comprehension measure than those receiving attribute or control instructions. On the other hand, subjects receiving the attribute instructions did not score differently on the attribute items of the comprehension measure than those receiving the relation or control instructions. When the two groups of readers were examined independently, the task instructions did not have a significant effect in either part of this treatment.

Although there were no significant results within the good or poor groups of readers, there were two strong trends in the data that warrant examination. First, in both part one and part two of this treatment, the poor comprehenders were sensitive to task instructions. In part one, poor
readers receiving written attribute instructions scored higher on the attribute items of the comprehension measure than those receiving relation or control instructions. There was little difference in the scores of the latter two groups. In part two, the poor readers receiving written relation instructions scored higher on the relation items on the comprehension measure than those receiving attribute or control instructions. Again the latter two groups performed at nearly equal levels.

Second, the good readers were sensitive to task instructions in part two of this treatment but were not affected in part one. In part two, good readers receiving written relation instructions scored higher on the relation items of the comprehension measure than those receiving written attribute or control instructions. The latter two groups had lower and similar scores on the relation items. Also in part two, the variance on the relation items of the comprehension measure for the good readers receiving the relation instructions was smaller than the variance for the good readers receiving the control instructions. In part one, the task instructions did not affect the scores of the good readers and variance was uniform across instructions.

**Interpretation**

From one perspective, these findings appear contrary to those which support task instructions as a means to increase comprehension under certain conditions (Frase,
A possible explanation for this contradiction may be that general directions were used in the present study. Rothkopf and Kaplan (1972), for instance, found that specifically stated objectives produced more learning than generally stated objectives. These findings are consistent, however, with Sledge's (1978) review of research, in which she concludes that advance organizers have no clear positive or negative effects at the secondary level.

The results would seem to offer interesting possibilities for further research if they are interpreted within an information processing framework. The pattern in the data for poor readers indicates that they were reacting, although to a limited degree, to the task instructions and were using this information to process the text. However, the results for good readers suggest that they encode attributes as a natural part of reading but only encode relations when they are specifically told to do so, i.e., instructions. There are two qualifications that must be placed on this interpretation. First, the text used may have sensitized good readers to attributes rather than relations. Second, the mean score for good controls on the attribute items was 89.0 and for good controls on the relation items was 81.5. The attribute items may simply have been easier, thus weakening any specific effect for attribute instructions.
Implications

These results suggest tentatively that poor readers benefit in some small measure at least from task instructions. Good readers, on the other hand, benefit from task instructions only for information they might normally miss. These possibilities represent a provocative area for further research.

Suggestions for Future Research

Some suggestions for future research have already been discussed. Additional issues will be raised in this section.

Only one aptitude measure (comprehension ability) was examined in this aptitude-treatment interaction study. In future studies of information processing in reading, it would be informative to expand the aptitude measure to include such indicators as decoding ability and logical thinking ability and to evaluate whether similar interactions occur for these constructs.

Also, future research might alter the method used for the assessment of comprehension. In the present study, the multiple-choice questions measured the subject's ability to recognize the correct answer. An assessment measure using free recall would assess another dimension of comprehension, namely, characteristics of recall versus recognition.

Finally, it is important to note that the definition of good and poor comprehenders used in the present study
necessarily limits the generalizability of the results. The good readers in this study were on or slightly below grade level and the poor readers were significantly below grade level. Further exploration is needed with skilled readers who are above grade level.

Summary

The acquisition of knowledge in most school situations depends on the student's ability to comprehend text. One of the important tasks of educators must, therefore, be to assist students of varying abilities in gaining knowledge from prose more efficiently. The results of this study are important in three respects. First, the findings suggest that good readers are not easily affected by text structure, but poor readers may be aided in comprehension by slight improvements in the structure of the text. Teachers, therefore, must be especially careful in preparing materials for poor readers. Second, the fact that both good and poor readers had more difficulty answering the paraphrase items than the verbatim items of the comprehension measure indicates that all students need more assistance and practice in drawing inferences from the text. Third, written instructions may be a weak aid for increasing the comprehension of poor readers and may help good readers attend to information they would normally miss. Further study of how written instructions can be designed to influence comprehension would seem to be an important area for helping teachers improve student achievement.
CHAPTER BIBLIOGRAPHY


APPENDIX

Appendix A

Structured Passage

Firm friendships seem to be particularly prevalent among male chimpanzees. Mike and the irascible, testy old J. B. traveled about in the same group very frequently. When I first knew them, J. B. was the higher-ranking of the two, but Mike's strategies with the kerosene cans served to subordinate J. B. along with the other males. Leakey and Mr. Worzle were two other males who frequently traveled together. In temperament they were very different. Leakey, like his namesake, was robust, high-ranking, and usually good-natured. Mr. Worzle, on the other hand, was always nervous, both in his dealings with other chimps and with human beings. He was very low-ranking and, even before he became really decrepit previous to his death, was subordinate to all the other adult males—and some of the adolescent males also. Nevertheless, the two spent hours in each other's company, grooming one another, feeding, and moving from place to place together, building their nests in the same or neighboring trees. Goliath and David Graybeard were also friends. Goliath has been the top-ranking male, but he lost his dominant position to Mike.
These examples show that friendships between male chimpanzees did not depend upon equal rank or similar personalities.

With the exception of David and Goliath, who bore no resemblance at all to each other, we have been able to detect similarities in either physical make-up or behavioral characteristics—or both—in all of the pairs of male friends that we have known. This was particularly striking in the case of Leakey and Mr. Worzle. Mr. Worzle had extraordinary eyes, for the part around the iris was white instead of being heavily pigmented with brown as in other chimpanzees. His eyes therefore exactly resembled those of a man. Leakey also showed the same unusual lack of pigmentation, though to a much lesser extent than Mr. Worzle. We suspect, therefore, that pairs of male friends may often be siblings.

Once friendships were formed they often affected an individual's place in the social structure. When Mike was secure in the top-ranking position, it became apparent that J. B. had also risen in the social ladder. When he was in a group with Mike, J. B. was able to dominate Goliath as well as other males who had held a higher rank than he before Mike's rise. These other males quickly accepted J. B. as second only to Mike, but Goliath asserted his old superiority over J. B. on many occasions when Mike was not part of the group. I well remember one day when Goliath threatened J. B., who had approached his box of bananas.
J. B. at once moved away but began to scream loudly, looking across the valley in the direction that Mike had taken earlier. Mike must have been quite close, because within a few minutes he appeared, his hair on end, looking around to see what had upset his friend. Then J. B. ran toward the box where Goliath sat, and Goliath, with submissive pant-grunts, hastened to vacate his place—even though Mike took no further active part in the dispute.

Friendships also provided emotional support. When Leakey was with him, Mr. Worzle always seemed far more relaxed and confident. But friendships of this sort are beneficial not only to the lower-ranking of the pair. One day, during the period when Goliath was losing his top-ranking position, he arrived in camp alone. He was tense and obviously anxious about something; every so often he stood upright to stare back along the way from which he had come, and he jumped at every sudden sound.

All at once Hugo and I noticed three males, one of whom was the high-ranking Hugh, standing at the top of a slight rise looking toward Goliath. They all had their hair slightly on end, and as they began running down the slope they reminded us of a gang of thugs. Goliath did not wait to see what they would do. With great speed and silence he ran in the opposite direction and vanished into the thick vegetation surrounding camp. The three rushed after him, and for the next five minutes they bustled about
noisily in the undergrowth, obviously searching for Goliath. They were unsuccessful and ultimately emerged and began to eat bananas. Suddenly Hugo pointed. There, a short distance up the slope, I saw a head peeping cautiously from behind a tree trunk—Goliath's. Every time one of the three looked up Goliath bobbed back behind his tree, only to peer out after a few moments. Eventually we saw him moving off quietly up the slope.

The chimps slept near camp that night and very early, almost before dawn, we heard a sudden burst of pant-hooting from the direction of Goliath's nest. Hugh and the other two males were the first to arrive in camp, dark shapes in the gray light. While they were eating bananas we heard a burst of calling from the slope. A moment later Goliath charged down, dragging a huge branch and hurling it forward as he crossed the clearing. Without pausing he rushed at Hugh and began to attack him. It was a fierce battle, and Hugh came off very much the worst. Usually a male pounds his victim for a few seconds only, but this time the two combatants rolled over and over, grappling and hitting. Goliath then managed to leap onto Hugh, hanging on to his shoulder hair and stamping on his back with both feet.

It was just after the start of the fight that Hugo and I realized why Goliath was suddenly brave: we heard the deep, characteristic pant-hoots of David Graybeard and glimpsed his charging in his slow and magnificent fashion
across the clearing and past the battling males. David
must have joined his friend early that morning, and by his
presence alone given Goliath the courage to face Hugh and
his gang.
Firm friendships, like that between Goliath and David Graybeard, seem to be particularly prevalent among male chimpanzees. Mike and the irascible, testy old J. B. traveled about in the same group very frequently. When I first knew them, J. B. was the higher-ranking of the two, but Mike's strategies with the kerosene cans served to subordinate J. B. along with all the other males. However, once things had settled down, with Mike secure in the top-ranking position, it became apparent that J. B. had also risen in the social ladder. When he was in a group with Mike, J. B. was able to dominate Goliath as well as other males who had held a higher rank than he before Mike's rise. These other males quickly accepted J. B. as second only to Mike, but Goliath asserted his old superiority over J. B. on many occasions when Mike was not part of the group. I well remember one day when Goliath threatened J. B., who had approached his box of bananas. J. B. at once moved away but began to scream loudly, looking across the valley in the direction that Mike had taken earlier. Mike must have been quite close, because within a few minutes he appeared, his hair on end, looking around to see what had upset his friend. Then J. B. ran toward the box where Goliath sat, and Goliath, with submissive pant-grunts, hastened to vacate his place—even though Mike took no further active part in the dispute.
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Appendix B

Attribute Instructions

A chimpanzee community is an extremely complex social organization. Read the following passage about adult males in a chimpanzee community. Pay particular attention to characteristics of individuals and to signs of friendship. Who are friends? How do we know that they are friends? How are friends the same and how do they differ? After you have read the passage, answer the multiple-choice questions as they apply to the passage. Do not turn back to the passage once you have started the questions.

Relation Instructions

A chimpanzee community is an extremely complex social organization. Read the following passage about adult males in a chimpanzee community. Pay particular attention to the incidents involving friends. What effect does friendship have on the emotional state of an individual? After you have read the passage, answer the multiple-choice questions as they apply to the passage. Do not turn back to the passage once you have started the questions.

Control Instructions

A chimpanzee community is an extremely complex social organization. Read the following passage about adult males in a chimpanzee community. Answer the multiple-choice
questions as they apply to the passage. Do not turn back to the passage once you have started the questions.
Appendix C

Comprehension Measure

1. Two chimpanzees that were friends were:
   A. Mike and J. B.
   B. Mike and Goliath
   C. Mike and David Graybeard
   D. J. B. and David Graybeard

2. David and Goliath were an exception to the theory that friends tend to:
   A. walk alike
   B. fight alike
   C. groom alike
   D. look alike

3. Male chimpanzees who are friends tend to:
   A. like the same type of vegetation
   B. have equal rank
   C. travel together
   D. be the same age

4. Leakey's temperament was robust and usually good natured. His friend, Mr. Worzle's temperament was:
   A. good natured
   B. nervous
   C. relaxed
   D. robust

5. Mr. Worzle and Leakey both had extraordinary:
   A. courage
   B. size
   C. tempers
   D. eyes

6. How do we know that two male chimpanzees are friends?
   A. they spend time together
   B. they wrestle with each other
   C. they bring food to one another
   D. they utter pant-hoots in each other's presence
7. Friendship as it applies to the chimpanzee community might be best described as:

A. stern and severe  
B. secret and private  
C. protective and respectful  
D. confused and unsteady

8. The friendship between Leakey and Mr. Worzle illustrates that friendships may be formed between males of:

A. similar coloring  
B. approximately the same size  
C. equal rank in the community  
D. different dispositions

9. When Goliath lost his position as top-ranking male:

A. David Graybeard was no longer his friend  
B. David Graybeard continued to be his friend  
C. Mike became his friend  
D. Mike and J. B. shared his friendship

10. If Mr. McGregor and Rodolf are friends, it is likely that they are:

A. related  
B. the same age  
C. similar in personality  
D. of equal rank

11. When Mike became the top-ranking male in the community, who rose in the social ladder?

A. J. B.  
B. Goliath  
C. Leakey  
D. David Graybeard

12. When Leakey was feeding with Mr. Worzle:

A. Mr. Worzle got more to eat  
B. Leakey was able to get bananas for both of them  
C. Mr. Worzle was more relaxed and confident  
D. Leakey was able to find food for both of them
13. Goliath was given courage to fight by:

A. having the forest nearby  
B. being able to get a huge branch  
C. being able to stamp on Hugh  
D. having David Graybeard near

14. Friendships in the chimpanzee community are beneficial:

A. only to the lower-ranking of the pair  
B. only to the higher-ranking of the pair  
C. to both members of the pair  
D. to neither member of the pair

15. Goliath's attempting to assert his old superiority over J. B. was illustrated by Goliath's:

A. chasing J. B.  
B. charging J. B.  
C. approaching J. B.'s box of bananas  
D. dragging a branch toward J. B.

16. An individual chimpanzee's social status may change as a result of his:

A. becoming older  
B. associations  
C. size  
D. choosing a mate

17. In the social structure of the chimpanzee community, each animal seems to know his relationship compared to:

A. only those chimpanzees above him  
B. only those chimpanzees below him  
C. only one other chimpanzee  
D. all other chimpanzees in the community

18. Hugh had courage to attack Goliath because:

A. he had a huge branch to drag  
B. his two friends were with him  
C. he was near the undergrowth  
D. Goliath had lost his top-ranking position
19. Although Mike was the top-ranking male, he did not give Goliath courage in the fight because:

A. he did not want Goliath to rise in social rank  
B. he was afraid of Hugh  
C. they were not friends  
D. he did not like Goliath  

20. In case of fights, friends are likely to:

A. join in the fight  
B. fight another member of the group  
C. be present, but not fight  
D. ignore the fight and walk away from it
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Publications of Learned Organizations


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Test