THE RELATIONSHIP OF ASSEMBLING SCRAMBLED WORDS AND SENTENCE COMPLETION ACTIVITIES TO THE READING COMPREHENSION SCORES OF SECOND GRADE STUDENTS

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ABSTRACT

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By

Donna Jean Read

The Problem

The need for teaching reading in American schools has been emphasized since the seventeenth century. However, early instruction in reading was aimed at orthoepy, or the art of pronouncing words correctly. It was not until the late nineteenth and early twentieth century that instruction in reading comprehension became just as important as pronouncing words correctly. Close examination of reading materials currently used in American schools reveals that nearly all educators and publishers incorporate reading comprehension as a major component of their reading programs.

Because the teaching of reading comprehension is so widely accepted by educators and publishers, there exists a plethora of suggested activities for teaching reading comprehension. However, the research to support many conclusions about how to teach reading comprehension

is almost nil. Consequently, in addition to the need for more research in reading comprehension, the necessity for investigating the effectiveness of various activities used in schools for the purpose of improving reading comprehension is important. The basic goal of this study was to explore the effectiveness of two reading comprehension activities, Assembling Scrambled Words and Sentence Completion Activity, which are used in schools to improve reading comprehension.

Purpose of Study

Since there is a paucity of research about instructional activities used for developing reading comprehension, the purpose of this study was to explore the relationship of two different reading activities to the reading comprehension scores of second grade students. The two activities include: (1) Assembling Scrambled Words and (2) Sentence Completion Activity. Since previous research with regard to sex and its relationship to reading comprehension ability is inconclusive, this variable was also considered in the analysis of the data.

Sample

The sample was composed of nine second grade classrooms or approximately 250 children from six middle-class schools in Saginaw, Michigan.

Classes were randomly assigned to the control or experimental group. The distribution of the sample by sex was nearly equal. There were a total of three major groups (E^1, E^2, Control) consisting of three classrooms each.

Methodology and Statistical Analysis

The main focus of this study was to explore the effectiveness of two reading comprehension activities using second grade students. The basic procedures consisted of the development of the reading comprehension activities used in the study, pre-testing of all groups (E^1, E^2, Control), presentation of the experimental activities, and post-testing of the groups used in the study.

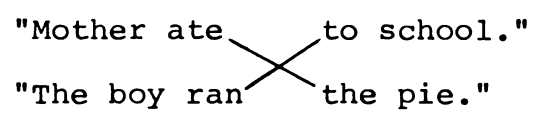
The development of the activities Assembling Scrambled Words and Sentence Completion Activity was of crucial importance to the study. In order to account for differences of varying reading levels, a core primer level vocabulary was used. This core vocabulary consisted of 355 words from the Houghton-Mifflin reader, Rainbows. This primer reader was used because it was part of the adopted series used in the entire school system.

A total of 150 simple sentences was written from this core vocabulary for the skillsheets in the study.

The activity for the E^1 group resulted in thirty skillsheet lessons on Assembling Scrambled Words. Each

skillsheet contained five sentences in which words were scrambled. Students were expected to read each word group and then unscramble it by rewriting the words into a meaningful sentence order. For example, the word group sentence, "ate Mother the pie" should be arranged into the sentence, "Mother ate the pie."

The activity for the E^2 group, Sentence Completion Activity, also consisted of thirty lessons with five sentences per skillsheet. The students were expected to read carefully incomplete clauses or phrases on each skillsheet. They were then expected to match all the incomplete phrases or clauses by drawing a line so a meaningful sentence would be made. For example,



The same words were used for both Assembling Scrambled Words and Sentence Completion Activity in each skillsheet lesson.

All classes in the study were pre-tested using the Iowa Test of Basic Skills, Level 7, Form 5.

In the next phase of the study the reading comprehension activities designed for the study were presented to the E^1 and E^2 group. This consisted of a total of thirty lessons, three times per week over a period of ten weeks. The control group used traditional activities

suggested in the basal reading program, excluding those similar to Assembling Scrambled Words and Sentence Completion Activity.

All groups were post-tested using the Iowa Test of Basic Skills, Level 7, Form 6 upon completion of the study.

Six hypotheses were tested to determine the relationship of the activities, Assembling Scrambled Words and Sentence Completion Activity, to the reading comprehension scores of second grade students. The statistical tools used to measure the treatment and sex effects in this study were analysis of variance and analysis of covariance.

Major Findings

1. The growth in reading comprehension as a result of the activity, Assembling Scrambled Words, does not vary significantly from the growth in reading comprehension as a result of the activity, Sentence Completion Activity, or a control classroom in which neither activity is part of the instructional program.

2. The growth in reading comprehension as a result of the activity, Assembling Scrambled Words, does not vary significantly with regard to sex from the growth in reading comprehension as a result of the

activity, Sentence Completion Activity, or a control classroom in which neither activity is part of the instructional program.

The findings from this investigation do not support the assumption that reading comprehension activities alone influence growth in reading comprehension. Evidently, other factors need to be considered when evaluating growth in reading comprehension. The results of this study do not support the assumption that girls are superior to boys in achievement of reading comprehension. The implication here is that instruction in reading comprehension need not be altered for boys in order to produce gains in reading comprehension.

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By

Donna Jean Read

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DEDICATED TO

My husband Jim, Michigan State Trick Ski Champion, who will finally have a full-time skiing partner, and for his continual encouragement and patience throughout this academic endeavor.

My entire family who helped promote my desire for knowledge.

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CHAPTER I

THE PROBLEM

The American Society is one in which reading ability and accomplishment are almost synonymous. There are many closed doors for those who cannot read. Nearly all work demands some reading, whether it involves following directions, reading signs, or examining the ideas of other individuals. Persons in such a society can hardly ever avoid reading in their lifetime.

Reading ability is not only a necessary prerequisite to life work; its importance is also stressed long before a child reaches the labor force. Recognition of its importance is exemplified in the time allotted for reading instruction in public schools. It is not unusual to find a school that devotes one-third to one-half of its curriculum to reading instruction at beginning grade levels.

Despite the fact that our rapidly changing society is focusing attention on new technology and media as a basis for learning, the need for reading ability will

continue in the future. Toffler emphasizes this continuing need for reading proficiency:

> Any program of diversification must therefore be accompanied by strong efforts to create common reference points among people through a unifying system of skills. While all students should not study the same course, imbibe the same facts, or store the same set of data, all students should be grounded in certain common skills needed for human communication and social integration. . . . This is not intended as an anti-cultural statement or a plea for total destruction of the past. Nor does it suggest that we can ignore such basics as reading, writing, and math.[1] (Italics mine)

Background of the Problem

Learning to read is a complex process. Learning about the nature of reading is also complicated. However, educators continually seek ways to clarify, explore, and improve reading instruction.

What is reading? Gray[2] indicates that reading consists of four major areas. These include (1) word perception, (2) comprehension, (3) reaction to what is read, and (4) assimilation of new ideas with previous knowledge. A diagram consisting of concentric circles, the inner one being "word perception," helps one better visualize the reading process. Gray places "word perception" in the

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[1]Alvin Toffler, Future Shock (New York: Bantam Books, Inc., 1970), pp. 409, 413.

[2]William S. Gray, "The Major Aspects of Reading," in Sequential Development of Reading Abilities, ed. Helen M. Robinson, Supplementary Educational Monographs, 90 (Chicago: University of Chicago Press, 1960), pp. 8-24.

center because without it the other aspects of reading cannot function. A band representing "comprehension" surrounds the inner circle of "word perception." Within the band of "comprehension" Gray includes three facets: (1) ability to read the lines, (2) ability to read between the lines, and (3) ability to read beyond the lines; "reaction to what is read" is the next band which surrounds "comprehension" and "word perception." As the skills of word perception and comprehension are achieved, critical reading can take place. The final band of the diagram consists of "fusion of new and old ideas." It is here that concepts are clarified and new insights acquired.

For Gray, then, word perception is not enough to describe the reading process--comprehension is extremely important since it influences future thinking and reading activities.

Spache claims that reading is such a complex process that it should not be thought of as a list of skills. "Reading is not a bundle of separate thinking skills."[3] He includes five major aspects of the reading process: (1) skill development, (2) a visual act, (3) perception, (4) reflection of cultural background, and (5) an act involving higher mental processes. He contends that none of these acts takes place alone; they are interdependent.

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[3]George Spache, Reading in the Elementary School (Boston: Allyn and Bacon, Inc., 1969).

Reading is a total act which is influenced by the readers' reasoning capacities, experiences, and reading ability. Spache also feels that the teacher prompts the reader to think by the kinds of questions he asks. This of course implies that questions asked, discussion, and material used may promote or hinder the reading process. It is evident that Spache, like Gray, combines many aspects, including comprehension, into a concept of reading.

Learning to read, according to Harris, encompasses not only the discovery that printed words talk but that " . . . meaningful response is the very heart of the reading process."[4] Harris suggests that a large number of interrelated skills are involved. These include both word recognition and comprehension and mastery of these skills is influenced by experience, language background, mind set, and reasoning ability of the reader. In addition, reading develops from a less mature level to a more mature level over a period of many years.

Prominent authorities in the field of reading all believe something in common. They include comprehension as one of the ultimate goals of reading instruction. It is not enough to be able to say or call words. Reading is meaning, and without meaning no communication takes place.

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[4]Albert J. Harris, How To Increase Reading Ability (New York: David McKay Company, Inc., 1970).

While it has been suggested that comprehension is important in reading instruction, available research provides little insight into ways of understanding the processes or techniques used to improve reading comprehension. A thorough review of the literature reveals a paucity of research studies in the area of comprehension. Many of those which were done were completed over twenty years ago and revolved around identifying different skills in different content areas using secondary and college students as subjects. While the main body of current research in reading comprehension examines skills related to content areas, it also includes some work in the areas of critical reading, readability, language, rate of reading, and theory. Although some interest has been generated by these studies, investigation into the effectiveness of specific strategies for improving comprehension for elementary school students is rare.

Studies dealing with improving critical or creative understanding are alwo few but deserve to be mentioned. Nardelli[5] attempted to determine the effect of instruction upon the ability of sixth grade students to make inferences and recognize propaganda devices in reading

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[5]Robert R. Nardelli, "Some Aspects of Creative Reading," Journal of Educational Research, 50 (March 1957): 495-508.

material. He found that lessons developed for recognizing propaganda devices did improve reading for that purpose.

In another study in creative understanding, Covington[6] examined making inferences, sensitivity to factual discrepancies, and question asking. In the fifth graders that he studied he discovered that the experimental group which was instructed did better in every area when compared with the control group which did not receive instruction. His data also revealed that children of lower I.Q. ability (below 100) can benefit to a substantial degree from such comprehension training. The research by Nardelli and Covington suggests that critical reading skills can be taught and do influence the reading comprehension of students.

In an effort to examine instructional procedures, Holmes[7] compared the value of undirected reading of a selection with reading guided by specific questions in the field of English literature and science using college students. Using the index of statistical significance or the quotient of the difference between the

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[6]Martin V. Covington, "Some Experimental Evidence on Teaching for Creative Understanding," The Reading Teacher, 20 (February 1967): 390-96.

[7]Eleanor Holmes, "Reading Guided by Questions Versus Careful Reading and Re-reading Without Questions," School Review, 39 (May 1931): 261-71.

means for the two groups divided by the probable error of that difference, Holmes concluded that reading a selection guided by questions significantly surpasses careful reading and re-reading of a selection without questions.

There has also been some interest in the relationship between word analysis, verbal learning, and reading comprehension. Working with first, second, and fourth grade students, McCullough[8] reports that some correlation between literal comprehension and creative reading exists and suggests the possibility of a common factor pervading all these comprehension types. She recommends, however, that the different abilities should be practiced and tested separately. She also feels that the students' scores on the comprehension questions were affected by teaching emphasis as well as thought processes required to answer test questions.

Benz and Rosemier[9] attempted to measure the relationship between performance on tests designed to measure certain word analysis skills and reading comprehension. Using 1,402 fourth grade students they found

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[8]Constance M. McCullough, "Responses of Elementary School Children to Common Types of Reading Comprehension Questions," Journal of Educational Research, 51 (September 1957): 65-70.

[9]Donald Benz and Robert Rosemier, "Word Analysis and Comprehension," The Reading Teacher, 21, 6 (March 1968): 558-63.

that high readers or those who scored between 6.0 - 9.2 on the Gates Level of Comprehension Test, Type LC did better than middle readers (4.6 - 5.9) and that middle readers did better than low readers (2.0 - 4.5) on six-word analysis skills used: words in context, rhyming sounds, syllabication, root words, word elements, and beginning sounds. Of the skills studied, those of words in context, rhyming sounds and syllabication had higher partial correlation coefficients with reading comprehension than the other analysis skills.

A few studies have focused on the organization of material and how it affects reading comprehension. To examine this factor, Cromer[10] investigated the possibility of changing the structure or organization of reading materials to see if it would benefit students who were below grade level in reading comprehension ability. To accomplish this, he asked one group of fifth grade students who had a vocabulary deficit and another group of fifth graders who did not have vocabulary difficulties to read stories in which sentences were organized in various ways. For example,

a. "Mary had a little lamb"

b. "Mary had a little lamb"

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[10]Ward Cromer, "The Difference Model: A New Explanation for Some Reading Difficulties," Journal of Educational Psychology, 61 (1970): 471-83.

His major finding suggests that when the story is presented in regular sentence form (a), there are marked differences between the two groups. The poor vocabulary reading group did very poorly when compared to the good vocabulary reading group using regular sentences (a). However, when phrase grouping (b) was used, the students with low vocabulary improved their reading comprehension to the point where the performance of both groups was nearly the same. Thus, the organization of printed material aids in the performance of the poor reader.

Using college students, Kissler and Lloyd[11] studied the learning of factual information when paragraphs with high sentence interrelations were presented in regular and in scrambled forms. A nonrelated and related paragraph sample is shown below:

a. Several problems often prevent models from becoming useful tools. The model may be based upon relationships which will no longer hold after a particular management decision.

b. The type of information processing which attempts to predict future data based upon a set of related events, is called assimilation model. Assimilation model describes the problem with a set of conditional relationships.

They found that when the learning was measured by short-answer essay tests, logical presentation (b) was

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[11]Gerald Kissler and Kenneth Lloyd, "Effect of Sentence Interrelation and Scrambling on the Recall of Factual Material," Journal of Educational Psychology, 64, 2 (January 1973): 187-90.

more important for recall when compared to one-word completion tests. That is, the test results with short-answer essay items suggested that logical sequence of sentences (b) did improve recall.

Both of the studies by Cromer and Kissler and Lloyd suggest that organization of material may affect comprehension.

The studies presented here provide insight into some of the factors that may influence reading comprehension. Although interest in researching reading comprehension is growing, the amount of data available on the effectiveness of specific methods or techniques for improving reading comprehension is extremely limited.[12]

Importance of the Study

According to Chall, "Reading instruction in all schools starts from a similar basis; basal readers from

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[12]A careful examination of sources of reading research was conducted. It was discovered that in the 20 Year Annotated Index to The Reading Teacher which included 816 studies, only 26 fell under the heading Comprehension, Interpretation, and Creative Reading. Of the 26 studies reported, only 8 deal directly with suggested strategies for improving reading comprehension on a literal or interpretation level. These numbers are alarming in light of the fact that the index encompasses 20 years of articles published in The Reading Teacher.

The same trend can be seen in the Encyclopedia of Educational Research where Harris (1969) summarizes only 10 studies that deal with comprehension out of a total of 346 studies in the section on reading.

The Reading Research Quarterly, Wientraub (1973), includes two research summaries under the heading, Comprehension, from a total of 302 investigations in the

a graded series are used by 98 percent of first grade teachers and by 92-94 percent of second and third grade teachers on all or most days of the year."[13]

Since basal programs are so popular with teachers and administrators, it seems important that these materials achieve the objectives they are intended for, one being improving reading comprehension.

In many cases, basal programs as well as other supplementary materials offer a wide variety of activities teachers may use to help children comprehend their reading better. Two very typical activities are "Assembling Scrambled Words" and "Sentence Completion Activities." The rationale for using these activities or similar activities rests on the assumption (whether stated or implied) that such activities are designed to improve reading comprehension and do, in fact, improve reading comprehension.

Unfortunately, for most of these activities there is little or no scientific proof of their effectiveness for improving reading comprehension.[14]

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area of reading. It seems the proportion of the number of studies reported on comprehension is indeed minute in comparison with other topics in reading.

[13]Jeanne Chall, Learning to Read--The Great Debate (New York: McGraw-Hill, Inc., 1967), p. 188.

[14]Ibid.

Purpose of the Study

The study was undertaken to investigate the relationship of two different sentence reading activities to the reading comprehension scores of second grade children:

(1) Assembling Scrambled Words (ASW)--The student is asked to assemble scrambled words by writing them in a meaningful sentence order.

(2) Sentence Completion Activity (SCA)--The student is asked to select the appropriate clause or phrase to complete a sentence.

Definition of Terms

Assembling Scrambled Words.--An activity whereby children are given simple sentences to read with scrambled words and then asked to write the words into meaningful sentences. The abbreviation used for this activity is ASW--Assembling Scrambled Words.

Sentence Completion.--An activity whereby children are given incomplete phrases to read and then asked to draw a line to the appropriate clause or phrase to complete the sentences. The abbreviation for this activity is SCA--Sentence Completion Activity.

Simple Grammatical Sentence.--A sentence is a group of words expressing a complete thought. All

sentences used in the activities designed for the study are classified as simple according to their make-up or structure. Thus, a simple sentence contains one main clause and no subordinate clauses.[15] For example:

> "The visiting dignitaries from Europe were met at the airport by the President."

Reading Comprehension.--The definition of reading comprehension used for this study includes the processes involved in literal understanding of sentences, or making sense out of sentences, rather than paragraphs, stories, etc. It does not include understandings beyond the literal level and it does not include passages longer than sentences.

Design and Methodology

Although Chapter III contains a more thorough explanation of the design of the study, a brief explanation of procedures used is included here.

Three groups were used in the study: two experimental groups and one control group.

In Phase I of the study, activities (skillsheets) were designed to be used by the experimental groups. Only vocabulary from the Houghton-Mifflin Reader, Rainbows, a book suggested for use by the average

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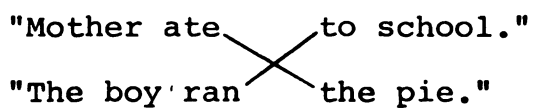
[15] John Warriner and Francis Griffith, English Grammar and Composition (New York: Harcourt, Brace and Company, Inc., 1957), p. 58.

first grade student, was used to lessen word recognition difficulties for the second graders used in the study. There were 200 sentences written from this core vocabulary of which 150 were used for the skillsheets.

The first activity (E^1 group) included thirty lessons (skillsheets) on Assembling Scrambled Words. Each skillsheet contained five sentences in which words were scrambled. Students were expected to read each word group and then unscramble it by rewriting the words into a meaningful sentence. For example, the word group sentence "ate Mother the pie" should be arranged into the sentence, "Mother ate the pie."

The second activity (E^2 group) Sentence Completion Activity also consisted of thirty individual lessons (skillsheets) with five sentences per skillsheet. The students were expected to read carefully incomplete clauses or phrases on the skillsheet. They were then expected to match all the incomplete phrases or clauses by drawing a line so meaningful sentences would be made. For example,



It should be noted that the same words for both ASW and SCA were used in each lesson.

The control group was also given training in reading comprehension, but this included traditional

reading comprehension activities suggested in the basal reader, excluding those similar to Assembling Scrambled Words and Sentence Completion Activity.

After the experimental and control groups were randomly selected, Phase II of the study revolved around pre-testing all groups and then administering the activities (skillsheets) to the experimental groups.

Phase III of the study consisted of collecting all skillsheets completed by the experimental groups, post-testing all of the groups in the study and analyzing the data.

In summary, students in the experimental groups responded to thirty activities (either ASW or SCA) three times each week for a period of ten weeks.

Hypotheses

To examine the effects due to training, a one-way analysis of variance with one repeated measure tests the hypotheses with which this study is concerned. The class is the unit of analysis.

If there is a difference between the treatment groups on the difference scores of the reading comprehension pre- and post-test, post hoc procedures will be used to test the mean differences between treatment groups.

The hypotheses in the study are:

Hypothesis 1:

H_{1a}: There will be a difference between the reading comprehension gain means of the Assembling Scrambled Words group (E^1), Sentence Completion Activity group (E^2), and the Control (C) group on the post-test using raw scores.

H_{1b}: There will be a difference between the reading comprehension gain means of the Assembling Scrambled Words group (E^1), Sentence Completion Activity group (E^2), and the Control (C) group on the post-test using grade equivalent scores.

Hypothesis 2:

H_{2a}: There will be a difference between the reading comprehension mean raw score of the boys and the mean raw score of the girls.

H_{2b}: There will be a difference between the reading comprehension mean grade equivalent score of the boys and the mean grade equivalent score of the girls.

Hypothesis 3:

H_{3a}: There will be a treatment x sex interaction using mean raw score differences.

H_{3b}: There will be a treatment x sex interaction using mean grade equivalent score differences.

Analysis of the Data

A one-way analysis of variance with one repeated measure will be used for this study.

There are two independent variables. One independent variable is the treatment variable which has two levels: (1) Assembling Scrambled Words Group and (2) Sentence Completion Activity Group.

The other independent variable is sex.

The one dependent variable is the difference between the reading comprehension pre- and post-test grade equivalent scores.

Since the classroom is the unit of analysis, the variable of sex will need to be considered as a repeated measure.

Educational Implications

It is currently assumed by some educators that reading comprehension activities such as Assembling Scrambled Words and Sentence Completion Activities found in basal reading programs and other supplementary materials do improve reading comprehension. This study investigates the validity of this assumption. The findings of the study may have some direct implications for selecting activities to improve the reading comprehension of students.

Limitations

1. Findings of this study will be limited to the reading comprehension activities
   (a) Assembling Scrambled Words
   (b) Sentence Completion Activity
2. Findings of this study will be limited to the population used or similar populations.

3. Findings of this study will be limited to situations in which the same or similar learning environments are employed.

Organization of the Study

The format of the study consists of five chapters, appendices, and a bibliography.

Chapter I includes the introduction, background to the problem, importance of the study, purpose of the study, definition of terms, design and methodology, hypotheses, analysis of data, educational implications, limitations, and organization of the study.

In Chapter II research on specific techniques for developing comprehension theory and related research in reading comprehension are examined.

The methodology and design for the study are explained in Chapter III. These procedures include data development and use, data gathering, and methods of analyses.

Research findings, presentation and analysis of collected data are presented in Chapter IV.

Chapter V includes the summary, conclusion, implications, and recommendations for future research.

CHAPTER II

A REVIEW OF THE LITERATURE IN READING COMPREHENSION

Introduction

Since 1683 when the New England Primer was introduced by Benjamin Harris as the first reading textbook for American children, our schools have been reading schools.[16] Since that time, of course, the emphasis on reading instruction has changed, but the teaching of reading has always remained a major portion of the curriculum in American schools.

A review of the history of reading instruction during the seventeenth, eighteenth, and nineteenth centuries reveals that instruction was aimed at orthoepy, or the art of pronouncing words correctly. Word recognition, oral reading, and memorization of material for speaking purposes was most important. It was not until 200 years after the New England Primer was first introduced that reading comprehension became just as important as learning word recognition skills.

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[16]Nila B. Smith, American Reading Instruction (Newark: International Reading Association, 1962), p. 18.

The need for emphasizing comprehension in reading instruction was evidenced by leading authorities such as Edmund Burke Huey, who is credited with providing the first scientific contribution to reading instruction. In 1908 he published The Psychology and Pedagogy of Reading and wrote:

> Reading as a school exercise has almost always been thought of as reading aloud, in spite of the obvious fact that reading in actual life is to be mainly silent reading. The consequent attention to reading as an exercise in speaking and it has usually been a rather bad exercise at that, has been heavily at the expense of reading as the art of thought getting and thought manipulating.[17]

A few years later in 1917, another prominent authority, Edward Thorndike, contributed greatly to the growth of reading comprehension through his experimental studies and theorizing about reading comprehension. Thorndike analyzed the errors made by elementary students in writing the answers to simple questions based on short paragraphs. He found that although students could provide meanings for individual words, many could not answer questions about the paragraph. From this he theorized that "to read" is "to think," and wrote: "Understandably a printed paragraph is then a matter of habits, corrections, mental bonds, but these have to be selected from so many others and given weights so

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[17]Ibid., p. 160.

delicately, and used together in so elaborate an organization, that "to read" is "to think. . . . "[18]

About the same time that Thorndike made his famous remarks about reading comprehension, instructional reading programs such as those written by Gray[19] were published. Other professional books such as Scudder's Literature in the School and Arnold's Reading: How To Teach It were also published for teachers.[20] In addition, some research investigating reading comprehension was accomplished, but was still very meager when compared to that done in word recognition or other aspects of teaching reading. Unfortunately, a review of the literature in the area of reading comprehension indicates the same condition exists today.

In order to improve the understanding of reading comprehension and since "We cannot reject our present procedures for teaching reading comprehension but we must voice grave doubts about their efficacy,"[21] this study was designed to seek the relationship between

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[18]Edward L. Thorndike, "The Understanding of Sentences," Elementary School Journal, 18 (1917): 114.

[19]Smith, Reading Instruction, p. 154.

[20]Ibid., p. 122.

[21]John Bormuth et al., "Children's Comprehension Between and Within Sentence Sentactic Structure," Journal of Educational Psychology, 61 (October 1970): 349-57.

two instructional strategies, Assembling Scrambled Words and Sentence Completion Activity to reading comprehension.

For purposes of clarification, the review of the literature is divided into three major sections. The first section presents theoretical views and models of reading comprehension. The second section offers pertinent research and discussion related to reading comprehension. The final section includes a summary of the chapter.

A Review of Theoretical Development and Models of Reading Comprehension

Describing and measuring the reading process is extremely difficult. Helen Robinson has recently stated, "An unsolved problem is to understand and describe the reading process. While there is speculation about the process and models of it, little is known except from inferences."[22]

Despite its complexity, however, it is worthwhile to examine what leading authorities espouse with regard to the act of reading. In this way, clarification and thus better understanding about the nature of reading will result. In addition, when implications for teaching are suggested by various authorities, critical evaluation

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[22]Helen M. Robinson, "Significant Unsolved Problems in Reading," in Reading: Today and Tomorrow, ed. Amelia Melnik and John Merritt (Morristown, N.J.: General Learning Press, 1972), p. 481.

of the material will aid in the rejection of irrelevant data and the danger of over-generalizations from theory can be avoided.

What is reading? Clymer[23] points out that there exists a multitude of definitions for reading, but few are comprehensive in nature. Most are partial definitions which explain reading as decoding skills, appreciation, or emphasize spelling patterns, etc.

For example, Stauffer[24] feels that reading is a thinking process and that students can be trained to read critically and reflectively. He places great emphasis on the instructional methods used to promote reading in his "group directed reading-thinking activities."

Gates describes the reading process as:

> . . . not a simple mechanical skill; nor is it a narrow scholastic tool. Properly cultivated it is essentially a thoughtful process. However, to say that reading is a "thought getting" process is to give it too restricted a description. It should be developed as a complex organization of patterns of higher mental processes. It can and should embrace all types of thinking, evaluating, judging,

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[23]Theodore Clymer, "What Is Reading? Some Current Concepts," in Innovation and Change in Reading Instruction, ed. Helen M. Robinson, Sixty-seventh Yearbook National Society for the Study of Education, Part II (Chicago: University of Chicago Press, 1968), pp. 7-30.

[24]Russell Stauffer, Teaching Reading as a Thinking Process (New York: Harper and Row Pub., 1969), pp. 12-15.

> imagining, reasoning and problem solving. Indeed it is believed that reading is one of the best media for cultivating many techniques of thinking and imagining.[25]

Although a survey of definitions of reading does not reveal "total consensus" as Clymer suggests, the concept of "meaning" or "thought getting" is evident in most definitions of reading. Nearly all authorities include reading comprehension as an important part of the reading act.

Just as definitions of the reading process vary, so do definitions of reading comprehension. Some definitions are highly abstract, articulate, and testable. Others are specific, or partial definitions, seeking to explain only one aspect of reading comprehension which may not provide testable hypotheses to further scientific investigation into reading comprehension.

In 1961, Kingston presented one of the first conceptual models of reading comprehension. Since that time there has been a proliferation of models of reading comprehension.[26] Although these models differ greatly in their articulation, prediction, and creativity, they

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[25]Arthur Gates, "Character and Purposes of the Yearbook," in Reading in the Elementary School, Forty-eighth Yearbook, National Society for the Study of Education, Part II (Chicago: University of Chicago Press, 1949), p. 3.

[26]Harry Singer and Robert Ruddell, Theoretical Models and Processes of Reading (Newark: International Reading Association, 1970), 334 pp.

do aid in further study of reading comprehension. A diversity of viewpoints, even though they describe different phenomena, may lead to more careful evaluation and scientific understanding of reading comprehension. Kingston supports this view:

> It seems likely that we must seek bold new conceptual frameworks and theoretical designs if we are to make progress. We have discovered that we cannot adequately define it (reading) by merely listing its observable attributes. Similarly, we cannot explain it by using equally complex and abstract terms. A possible solution to our dilemma may be found in the method of the logical empiricists and in the use of operational definitions such as those employed in the physical sciences.[27]

After extensive evaluation of nearly fifty different concepts of reading comprehension, thirty-two theories and/or models were categorized into twelve classifications. Figure 2.1 (page 26) represents these classifications of reading comprehension. Since it is felt that each classification adds in some way to the understanding of reading comprehension, a summary of one model or theory from each classification is given here. All of the theories or models presented deal with the problem of how a reader gains meaning from reading.

Since it is the purpose of this section to investigate theories and models of reading comprehension, it is important to define these terms as they relate to this study.

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[27]Albert Kingston, "A Conceptual Model of Reading Comprehension," in Phases of College and Adult Reading, ed. E. Bliesmer and A. Kingston, Tenth Yearbook, National Reading Conference (1961), p. 163.

COMPREHENSIVE	TAXONOMY	SKILLS	LINGUISTIC
McCullough Strang Cleland Spache Robinson-Gray	Barrett Bloom	Smith	Bloomfield Fries LeFevre

TRANSFORMATIONAL-GENERATIVE GRAMMAR	PSYCHOLINGUISTIC	PSYCHOMETRIC	PSYCHOLOGICAL
Chomsky Ruddell	Goodman Venesky Calfee	Holmes Singer	Gagne Skinner Staats Athey

ENVIRONMENT	PHYSICAL	COGNITIVE	INFORMATION PROCESSING
Kingston	Gibson Buswell Elkind	Guilford Rystrom Stauffer Taba	Carver Smith

Fig. 2.1. Theories and models of reading comprehension

According to Lachman[28] a model is a separate system from a formal theory and more than one model generally functions for a theory. There are four types of models: (1) representational, a new way of thinking about objects and events, e.g., the model for conditioning theory; (2) inferential, a system of relationships and rules by which theoretical symbols are manipulated to arrive at new relations, e.g., rules for inferring one sentence from another; (3) interpretational, an explanation and test of a theory in terms of a model, linking theory to experiment, as in the establishment of empirical definitions of a theory; (4) pictorial visualization, reproduction of a theoretical construct in terms of a visual image, a first step towards theory construction or useful at least as a didactic technique.

The term theory as it is used here is the definition suggested by Schutz.[29] In this definition, theory refers to a group of hypotheses about a topic which meets these requirements: (a) a theory must be falsifiable, i.e., it must be clear what kind of data will confirm or deny it; (b) a theory must be perfectly explicit, i.e.,

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[28]Roy Lachman, "The Model in Theory Construction," Psychological Review, 67 (1960): 113-29.

[29]Robert Schutz, "Testing Theories of Reading Instruction," in Research Designs in Reading, ed. John Bormuth (Newark: International Reading Association, 1967), pp. 1-8.

all terms and relations must have explicit definitions; (c) a theory must be comprehensive, i.e., it must include a description of the entire system it purports to explain; (d) a theory must possess descriptive adequacy, i.e., it must describe all the facts accurately; (e) a theory must be internally consistent, i.e., none of its parts may contradict one another.

In general, a model is more like a skeleton whereas a theory is far more complete or comprehensive. It is apparent upon examination of the various theories and models presented that comprehension research is still in an embryonic stage of development. The reason for lack of progress in comprehension research may be due to many factors, including poor research methodology, lack of descriptions of the mental processes involved in reading comprehension since it involves so many covert processes, or inability to adequately distinguish between behavior that reflects comprehension from other psychological processes such as attitude, motivation, etc.

For convenience, the theory and model classifications reviewed in this chapter are presented as they appear in Figure 2.1. They include (1) Comprehensive, (2) Taxonomy, (3) Skills, (4) Linguistics, (5) Transformational Generative Grammar, (6) Psycholinguistics, (7) Psychometric, (8) Psychological, (9) Environment, (10) Physical, (11) Cognitive, and (12) Information Processing.

The theory of reading comprehension advanced by Tinker and McCullough[30] may be termed comprehensive because of the many dimensions mentioned to describe reading comprehension. These dimensions include: a description of organizing a program for developing reading comprehension in the school; a description of the characteristics necessary for the mature reader, such as motivation, attitude, and past experiences; a description of skills necessary for developing reading comprehension; a description of tests used to diagnose reading comprehension, and instructional procedures favorable to reading comprehension.

In organizing a program for developing reading comprehension, Tinker and McCullough believe there are five factors that need to be considered. These factors involve the individual and materials used in the comprehension process. Briefly, they include: (1) Size or length of unit or material to be read; (2) Degree of comprehension or level of difficulty of the material; (3) Depth of comprehension or degree to which the student grasps the meanings intended by the author; (4) Speed of reading; and (5) Adaptation to material to be read.

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[30]Miles Tinker and Constance McCullough, Teaching Elementary Reading (3rd ed.; New York: Appleton-Century Crofts, 1962), pp. 185-203.

The characteristics necessary for the mature reader revolve primarily upon past experiences according to Tinker and McCullough. "Meaning is built upon experience. As the student reads, meanings recalled evolve from experiences in the past."[31] Accuracy of comprehension is improved by constantly relating reading to observation, conversation, and other experiences. Thus, for effective understanding, the student needs many and varied experiences for reading to be meaningful.

Other characteristics the individual must possess that need to be considered are intellectual ability, good word identification skills, and flexibility or utilization of different approaches for reading a variety of books, such as math, science, or biography books, etc.

Tinker and McCullough believe that reading comprehension and thoughtful interpretation are closely related and interdependent. Therefore they include not only word recognition, word knowledge and concepts, and speed of comprehension as necessary skills, but also interpretation skills such as identifying cause and effect relationships, identifying the purpose of a written selection, identifying motivation of characters, etc. in their theory of comprehension.

For diagnostic purposes, Tinker and McCullough emphasize that standardized tests are useful for

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[31]Ibid., p. 191.

diagnosing a student's grade level in sentence and paragraph comprehension. However, for determining specific needs, informal procedures are suggested.

With regard to instructional procedures, McCullough emphasizes that the teacher must be concerned with:

(1) Removing Impediments--This refers to discovering and eliminating deficiencies a child may have, so reading is enjoyable. Developing confidence and teaching specific skills such as word meanings aids in understanding also.

(2) Content--In this area the teacher must be aware of the range of difficulty of material so appropriate material is used.

(3) Preparation--The third condition McCullough feels is important for instruction is to make students aware of the purpose of reading. Pronunciation, word meanings, and preliminary discussion of material to be used is important in this stage.

(4) Motivation--McCullough believes motivation is due to a variety of factors. Some of these factors are desire to do well, related past experiences, curiosity, or enthusiasm of the teacher. McCullough feels so strongly about

these four conditions for instructional purposes that she states, "Comprehension of material in any area of knowledge requires recognition of these four conditions."[32]

Tinker and McCullough include many different aspects of the reading process in their theory of reading comprehension. On the one hand they are concerned about program organization and implementation within a school or school system. They are also concerned about the instructional procedures a teacher might use to enhance reading comprehension of students. Finally, they feel the individual plays a large role in the comprehension process through various qualities such as intelligence, motivation, experience, and knowledge of the reading strategies they feel are necessary for a mature reader.

Another unique model of reading comprehension is the Taxonomy of Reading Comprehension developed by Barrett.[33] Although Barrett's taxonomy of reading comprehension includes some of the ideas of Bloom, unlike Bloom's taxonomy, Barrett concentrates on the planning, teaching, and evaluation of reading comprehension.

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[32]Ibid., p. 194.

[33]Thomas C. Barrett, "Taxonomy of Cognitive and Affective Dimensions of Reading Comprehension," unpublished paper sent and used by permission.

Barrett's taxonomy consists of four classifications:

(1) Literal Recognition or Recall of Reading--This includes tasks such as recall of details, or sequence or main idea which is explicitly stated in the material.

(2) Inferential Comprehension--The student must use literal content, personal knowledge, intuition, and imagination to respond to reading material. Tasks the student might be expected to deal with include inferring supporting details, inferring sequence, predicting outcomes, etc.

(3) Evaluation--This occurs when the student makes judgments about the context. Tasks in this area include making judgments of reality or fantasy, or discerning between fact and opinion, or determining validity, etc.

(4) Appreciation--Appreciation consists of cognition and the aesthetic dimension of reading. Tasks designed here include emotional response to content, imagery, etc.

The most important aspect of Barrett's taxonomy is that it is designed to aid instruction in reading comprehension. This is accomplished in two ways: (1) To help teachers examine the kinds of ideas they require of

students reading, and (2) To help teachers design specific tasks to help students develop comprehension abilities. In other words, through careful evaluation of teaching and then using the classifications of the taxonomy, the teacher is able to structure the learning process to enhance reading comprehension.

Since Barrett seems to place so much emphasis on using the taxonomy as an aid to instruction for reading comprehension, his theoretical framework was used in the formulation of this study.

Helen K. Smith[34] views reading comprehension as a hierarchy of skills at two levels: literal and implied. According to this model, within each of these levels there are a series of skills and subskills essential for reading comprehension.

For example, the hierarchy begins with the skill of understanding relevant and important details or facts. The second step in the hierarchy of reading comprehension skills consists of understanding the main idea or thought in a passage. Other skills that follow in this hierarchy include: (1) understanding sequence of time, place, ideas, and events; (2) reading to follow directions; (3) reading for implied meaning and drawing inferences;

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[34]Helen K. Smith, "Sequence in Comprehension," in Sequential Development of Reading Abilities, ed. H. M. Robinson, Proceedings of the Annual Conference on Reading at the University of Chicago (Chicago: University of Chicago Press, 1960), pp. 51-63.

(4) reading to understand characterization and setting; (5) reading to sense relationship of time, place, and cause; (6) reading to anticipate outcomes; (7) understanding an author's tone, mood, and interest; (8) understanding and making comparisons and contrasts; (9) reading to draw conclusions; and (10) reading to locate specific information, as in skimming.

Smith's model of reading comprehension also suggests systematic training in each of these skills.

> Pupils do not acquire an adequate mastery of all the skills involved in comprehension without systematic training . . . just as there appears to be a hierarchy of the different skills, there also appears to be sequential growth within each skill.[35]

In summary, Smith's model of reading comprehension provides a very structured list of skills that she feels are necessary for comprehension of reading material.

In 1942, Leonard Bloomfield[36] outlined an approach for beginning reading instruction that has influenced linguists and some reading authorities ever since. In general, Bloomfield suggested that a very rigid vocabulary be used with beginning readers. This vocabulary consisted of words with regular spellings only, such as "hat" or "cat," where each grapheme represented the sound usually associated with that letter.

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[35]Ibid., p. 53.

[36]Leonard Bloomfield, "Linguistics and Reading," Elementary English Review, 19, 125 (1942): 183-86.

Bloomfield felt his method was superior to phonics instruction and rejected phonics instruction because:

> The error of the phonic methods is that of isolating the speech sounds. The authors of these methods tell us to show the child the letter, for instance t and to make him react by uttering the t sound; that is, the English speech sound which occurs at the beginning of a word like "two" or "ten." This sound to be uttered either all by itself or else with an obscure vowel sound after it.[37]

Since Bloomfield's introduction of linguistic "regular spelling," other linguists such as Fries[38] have developed materials using a similar spelling approach with one-syllable words. Unfortunately, neither Bloomfield nor Fries are concerned with meaning of words since there is almost no story line with such limited use of regularly spelled English words.

A few years after Bloomfield developed his linguistic materials, another linguist, Carl LeFevre wrote Linguistics and the Teaching of Reading and stressed the need for meaning. "The basic fault in poor reading is poor sentence sense. . . . "[39] LeFevre's work on

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[37]Leonard Bloomfield and Clarence Barnhart, Let's Read, A Linguistic Approach (Detroit: Wayne State University Press, 1961), p. 28.

[38]Charles Fries, Linguistics and Reading (New York: Holt, Rinehart and Winston, 1963).

[39]Carl LeFevre, Linguistics and the Teaching of Readings (New York: McGraw-Hill Book Company, 1964).

structure words (service words such as and, this, a, etc.) has suggested that although these words do not convey meaning alone, used in sentences they do affect meaning. From this LeFevre concluded that these irregularly spelled words which are used frequently in reading must be taught to students.

Thus it can be established that despite Bloomfield's and Fries' narrow view of linguistics as it relates to reading comprehension, other linguists such as LeFevre disagree and do stress the importance of the meaning aspect in learning to read.

Noam Chomsky[40] and Kenneth Goodman,[41] two prominent authorities in the fields of transformational generative grammar and psycholinguistics, offer yet another theory of reading comprehension.

Chomsky's theory of linguistics helps to describe the process of comprehension. It was his work on transformational generative grammar that developed into an exploration of psycholinguistics. "I have tried to suggest that the study of language may very well, as was

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[40]Noam Chomsky, Language and Mind (New York: Harcourt, Brace and Jovanovich, 1968).

[41]Kenneth Goodman, "A Linguistic Study of Cues and Miscues in Reading," Elementary English, 42 (1965): 639-43.

traditionally supposed, provide a remarkably favorable perspective for the study of human mental processes."[42]

Chomsky investigated syntactic and semantic theory. His work on the relationship of sentences suggests that syntax operates on two levels: a surface level related to the phonological structure of a sentence and a deep level related to its semantic interpretation. In other words, Chomsky asserts that comprehension involves the transformation of surface structure of sentences into deeper structures which reveal underlying meanings.

Goodman states that reading comprehension involves an interaction between thought and language. In his research with first graders, Goodman found children use syntactic as well as semantic information in reading comprehension. Goodman attempted to reveal the complexity of reading comprehension through his miscue analysis. Using an informal inventory for examining reading errors, he draws attention not only to the number and kind of errors a student makes, but speculates on why they have been made. Reading comprehension for Goodman includes far more than a series of word perceptions.

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[42]Chomsky, Language, p. 84.

Psycholinguists have offered another view towards studying reading comprehension where language plays an important role that may aid in future research of reading comprehension.

Psychometric theory was developed by Holmes[43] and Singer.[44] This theory which is termed the "Substrata Factor Theory" suggests that reading is an audio-visual verbal processing skill. This theory hypothesizes that as an individual learns to read, he develops a sequential and hierarchical organized mental structure of neuro-psychological subsystems. As the purposes for reading change, these subsystems reorganize into many different working systems for speed and power of reading. Of course motivation, instruction, and experience all help to improve an individual's subsystems.

From the Substrata Factor Theory, three models have been developed: (1) Neurological, (2) Statistical, and (3) Psychological. In general, substrata factors are neurological subsystems of brain cell assemblies,

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[43]Jack Holmes, "The Substrata Factor Theory of Reading: Some Experimental Evidence," in Theoretical Model and Processes of Reading, ed. H. Singer and R. Ruddell (Newark: International Reading Association, 1970), pp. 187-97.

[44]Harry Singer, "Theoretical Models of Reading: Implications for Teaching and Research," in Theoretical Models and Processes of Reading, ed. H. Singer and R. Ruddell (Newark: International Reading Association, 1970), pp. 147-82.

storing information. When reasoning occurs, these different neurological subsystems of brain cell assemblies work simultaneously when stimulated by the printed page. As the substrata factors work together, their interfacilitation increases and efficiency in reading develops.

Holmes and Singer feel that the reasoning process in reading depends not only on genetics (nature and number of neuro-configurations), but also upon the "associative logic of the conceptualizing activity of perception stimulated within the brain and by the meaningfulness of the sequential input at the time of presentation and reception."[45]

The Substrata Factor Theory of reading comprehension is one of the most abstract and most articulated theories presented in this study. Fortunately, the theory provides models to illustrate its hypotheses which aids in understanding the theory. However, much more research on the statistical, neurological, and psychological aspects needs to be accomplished to provide credibility to the theory.

One authority interested in the psychological aspect of learning to read is Gagne.[46] Gagne stresses

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[45]Holmes, "Substrata-Factor Theory," p. 191.

[46]Robert Gagne, The Conditions of Learning (New York: Holt, Rinehart and Winston, 1970).

phases of learning and provides a model to describe the initial reading process. This process includes (1) Stimulus Response Learning, (2) Chaining, (3) Verbal Sequence Learning, and (4) Multiple Discrimination Learning. His model describes how each of these phases applies to the "decoding" process in reading.

According to Gagne, reading comprehension skills constitute another entire domain in the reading process that involve skills such as predicting sequences of thought, detecting irrelevant ideas, formulating the main idea, etc. He terms these comprehension skills "higher-level rules."

Gagne compares the higher-level rule of "predicting sequences of thought" in reading to that of predicting sequences in English. For example, sequences of English are just as predictable as sequences of reading. This can easily be seen in the sentence, "The woman's hat was blown off _____ _____ _____." Gagne feels that predicting sequences of English enhances predicting sequences of reading and vis-a-vis. The task of unlocking every word in reading becomes easier since the reader is able to make better predictions of what a sentence means.

Another higher-order rule is "principles of ordering." This includes learning organization of paragraphs, sections, and chapters. Gagne does not describe these rules in detail. He states, "All such principles

are quite complex and are typically learned not as formally stated rules, but by a process of discovery from the act of reading."[47]

Another model of reading comprehension is that proposed by Kingston.[48] His model is labeled "Environment" because he feels meaning is developed primarily through learning experiences throughout the life span of an individual. Kingston suggests that the psychological dimension of learning be considered in developing reading comprehension. He feels motivation, interest, anxiety, prejudices, and biases of an individual affect reading comprehension. Kingston states that many of these factors are learned as a result of interaction with the environment. He believes that reading comprehension is a product of communication that results between the reader and the writer. Therefore he stresses the need for writers to use language and vocabulary with common meanings the reader will understand and keep material at a level of concreteness so comprehension will take place.

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[47]Ibid., p. 273.

[48]Albert Kingston, "A Conceptual Model of Reading Comprehension," in Phases of College and Adult Reading, ed. E. Bliesmer and A. Kingston, Tenth Yearbook of the National Reading Conference (1961).

A theorist who presents a perceptual view of reading comprehension is Eleanor Gibson.[49] Gibson describes her theory in four phases. The first phase stresses receiving communication or the comprehension of language. This includes knowledge of both the semantic and syntactic aspects of language. She believes that in learning to read, the child has already acquired knowledge in these areas.

The second phase of Gibson's theory includes learning distinctive features of letters much like visual discrimination of the alphabet. It is this phase that Gibson restricts most of her research to and thus emphasizes it more than her other phases. The third and fourth phases consist of decoding graphic symbols to speech and obtaining meaning from the printed page.

Gibson focuses her attention on phases two and three, and thus does not stress the meaning aspect of reading. She feels that the child has mastered this before the teaching of reading takes place.

Of all the theories of reading comprehension presented thus far, only Gibson's theory stresses the meaning of distinctive features as the most important aspect of reading.

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[49]Eleanor Gibson, "Learning to Read," Science, 145, 3 (May 21, 1965): 1066-72.

One cognitive theory that has application to the teaching of reading is Guilford's "Structure of the Intellect."[50] Guilford suggests there are five basic operations which function during reading. These consist of (1) Cognition, (2) Memory, (3) Divergent Thinking, (4) Convergent Thinking, and (5) Evaluation. Guilford feels that if the teacher is aware of the major types of thinking (divergent, convergent, and evaluation) he can take advantage of the opportunity to improve the intellectual abilities of students. In other words, through skillful questioning and careful examination of material to be read by students, the teacher can structure the learning situation so comprehension takes place.

While much of reading comprehension theory rests on a behavioristic approach, the Information Processing Theory by Carver[51] does not. Information Processing Theory derives its potential from the use of the computer.

Carver explains information processing theory by presenting an analogy between a computer and the dimensions of the individual, the verbal material, the learning strategy, and the learning time.

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[50]Joy Guilford, "Frontiers In-Thinking That Teachers Should Know About," The Reading Teacher, 13 (February 1960): 176-83.

[51]Ronald Carver, "A Computer Model of Reading and Its Implications for Measurement and Research," Reading Research Quarterly, 6, 4 (Summer 1971): 449-71.

In this theory, the individual is viewed as a computer. Not all computers are alike. Some have more storage capacity than others. The potential capabilities of computers vary even if made by the same company. Carver claims these inherent differences are analogous to the biological and physiological characteristics that a human inherits at birth. No two will be alike.

Carver states, "The programming of computers is analogous to the process of learning in an individual or the process of education in general."[52] This helps explain how environment affects individual differences.

The verbal material an individual processes during reading is analogous to the input data (key-punched data, tape that provides input for a computer). Given an individual (computer) and reading material (data) the next important factor is the learned capabilities of the individual. These learned capabilities are considered to be analogous to the stored program of a computer.

Finally, the time an individual needs to read is analogous to the running time of a computer to process data. Processing time is dependent upon the computer used, programs, and input data. Similarly, the reading time is dependent upon inherited and learned individual differences and what is being read.

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[52]Ibid., p. 454.

Carver provides much detailed information for each dimension of his information processing model of reading comprehension. He stresses the need for examining not only reading behaviors but new methods for developing and measuring reading comprehension. He feels if output of stored data could be measured, then performance of the program could be better evaluated.

Like most instructional programs for developing reading comprehension skills, the basal program used in this study does not incorporate all of the models or theories of reading comprehension presented here. However, many of those skills suggested by researchers in their models or theories are included in the Houghton Mifflin reader used in this study. Some of these reading comprehension skills include:

a. Choosing a correct word meaning
b. Drawing a conclusion
c. Identifying a topic
d. Making sense out of scrambled words
e. Making words make sense
f. Noting and remembering details
g. Noting sequence
h. Using context to get word meaning[53]

The reading comprehension exercises designed for this study emphasized the reading comprehension skills of (1) Making sense out of scrambled words, and (2) Making words make sense. As mentioned earlier, Barrett's

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[53]William K. Durr, Jean LePere, and Mary Lou Alsin, The Houghton-Mifflin Readers (Boston: Houghton-Mifflin Company, 1971), level 6.

"Taxonomy of Reading Comprehension" served as the theoretical framework in the formulation of these exercises.

In an effort to better understand the development of reading comprehension, this section summarized various models and theories of reading comprehension. The next section presents pertinent research related to instruction and reading comprehension.

A Review of the Research Related to Instruction of Reading Comprehension

While it has been suggested that reading comprehension is important to reading instruction, there appears to be insufficient research in this area when compared to other aspects of the reading process. "Perhaps one reason for the paucity of research on comprehension in reading is that we are not exactly sure what comprehension is."[54] The first section of this chapter supports this view if one examines the attempts made by researchers to clarify the concept of reading comprehension.

Just as investigators range widely in the study of theory on reading comprehension, those involved in

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[54]Harold Covell, "Applying Research Findings in Comprehension to Classroom Practice," in Forging Ahead in Reading, ed. A. Figurel, Proceedings of the Twelfth Annual Convention of the International Reading Association, 12, 1 (Neward: International Reading Association, 1968), p. 614.

experimental research seem to be just as diversified in searching for factors that influence reading comprehension. Consequently, the review of literature presented here spans six decades and encompasses a variety of factors that relate to reading comprehension.

In an effort to grasp the significance of research in reading comprehension, a cross section of studies representing the most significant factors related to this study are summarized here. This research is presented in the following manner: the relationship between instructional methods and materials and reading comprehension; the relationship of format, organization, and content of material as it relates to reading comprehension; the relationship of word recognition skills to reading comprehension; and the relationship of sex to reading comprehension ability.

Methods and materials used for developing reading comprehension have been the concern of some researchers. In an effort to examine instructional procedures, Holmes[55] compared the value of undirected reading of a selection with reading guided by specific questions in the field of English literature and science. She concluded that reading guided by questions significantly surpassed careful reading and re-reading without questions.

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[55]Eleanor Holmes, "Reading Guided by Questions Versus Careful Reading and Re-Reading Without Questions," School Review, 39 (May 1931): 261-71.

Other studies have reported similar findings. Covington[56] examined the skills of making inferences, sensitivity to factual discrepancies, and question asking.

He discovered that the experimental group which was instructed did better in every area when compared to the control group which did not receive instruction. His data also revealed that children of lower I.Q. ability did benefit to a substantial degree from such comprehension training.

Nardelli[57] attempted to determine the effect of instruction upon the ability of sixth grade students to make inferences and recognize propaganda devices in reading material. He found that lessons developed for recognizing propaganda devices did improve reading for that purpose.

Kamm and Askov[58] examined the instructional efforts of a classification-based context clue

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[56]Martin Covington, "Some Experimental Evidence on Teaching for Creative Understanding," The Reading Teacher, 20 (February 1967): 390-96.

[57]Robert Nardelli, "Some Aspects of Creative Reading," Journal of Educational Research, 50 (March 1957): 495-508.

[58]Karlyn Kamm and Eunice Askov, "Does Teaching a Classification System of Context Clues Make a Difference?" unpublished paper presented at the Annual Conference of International Reading Association, April, 1974.

curriculum. The assumption made was that teaching a classification system would help children use context clues and subsequently enhance their reading comprehension. Using the classification scheme employed by the Wisconsin Design for Reading Skill Development and working with third, fourth, and fifth grade students, the experimental group was taught cause and effect and direct description context clues. The control group received no special instructional program in context clues during the two-week study. Significant differences between the experimental and control group supported the assumption that teaching a classification of context clues such as cause and effect and direct description did promote the students' ability to determine the meaning of an unknown word in a sentence and thus improve reading comprehension.

In a study investigating material for improving reading comprehension, Doctor[59] attempted to determine whether reading workbooks were helpful or not. Using thirty-six classrooms from eighteen randomly selected elementary schools during one year, he found that in first grade significant differences were apparent between workbook and nonworkbook groups. On this grade level, results indicated children taught with nonworkbook

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[59]Robert Doctor, "Reading Workbooks: Boon or Busywork?" Elementary English, 39, 3 (March 1962): 224-31.

material made significantly greater gains in reading comprehension and vocabulary skills than did children who used workbook materials. However, in grades two and three the results were reversed. The workbook groups made significantly greater gains in both reading comprehension and vocabulary skills. In the fourth grade significant differences favored the workbook group on the comprehension part of the test only. No significant differences in the development of reading comprehension skills existed between the workbook and nonworkbook groups at grades five and six.

Questioning as a method for improving thinking and reading skills has been suggested by Sanders[60] and Taba.[61] Using a taxonomy of questions as a guide, Sanders suggests students be exposed to seven levels of questioning. These levels include (1) Memory, (2) Translation, (3) Interpretation, (4) Application, (5) Analysis, (6) Synthesis, and (7) Evaluation. Sanders' work in questioning resulted from five years of field development with some 100 teachers from eight school systems. His major goal was improving instruction

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[60]Norris Sanders, Classroom Questions (New York: Harper and Row, 1966), 176 pp.

[61]Hilda Taba, Hilda Taba Teaching Strategies Program (Miami, Florida: Institute for Staff Development, 1971), Units 1-4.

through the art of questioning because, "There is a marked difference in the competence of teachers in the art of questioning . . . good questions are directed toward learning and evaluative thinking rather than determining what has been learned in a narrow sense."[62]

Various studies by Taba resulted in the Hilda Taba Strategies Program.[63] This program stresses techniques and strategies for leading discussions. Goals are designed to provide insights into how students learn to think and secondly, to provide opportunities for teachers to learn from each other particular teaching strategies that are successful in helping students develop thinking and reading skills. The Taba strategies consist of (1) Concept Development, (2) Interpretation of Data, (3) Application of Generalizations, (4) Feelings, Attitudes, and Values. Each strategy is developed thoroughly with the aid of a guide book that helps direct teachers through the questioning process for enhancing thinking and reading skills in students.

Most studies concerning methods and materials on the secondary level have investigated the effects of specific skill instruction on reading comprehension.

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[62]Sanders, Questions, p. xi.

[63]Taba, Strategies Program, Units 1-4.

Howell[64] examined the results of training students in skills of map reading and found instruction did improve understanding in that area. Along the same line, Sayre[65] conducted an experiment to determine if devoting one period per week in social studies to the development of basic reading skills using current events would improve reading comprehension. Like Howell, he found that specific skill training did improve reading comprehension of the particular subject.

Other researchers such as Pressy and Moore,[66] Dresher,[67] Artley,[68] and Phipps[69] investigated teaching

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[64]Wallace Howell, "Work Study Skills of Children in Grades IV to VIII," Elementary School Journal, 50 (March 1950): 384-89.

[65]Harrison M. Sayre, "Teaching Reading in the Current Events Class," Journal of Educational Research, 33 (April 1940).

[66]L. C. Pressy and W. S. Moore, "Growth of Mathematical Vocabulary from the Third Grade Through High School," School Review, 40 (June 1932): 449-54.

[67]Richard Dresher, "Training in Mathematics Vocabulary," Educational Research Bulletin, Ohio State University, 12 (November 14, 1934): 201-04.

[68]Sterl A. Artley, "General and Specific Factors in Reading Comprehension," Journal of Experimental Education, 45 (March 1948): 181-88.

[69]William R. Phipps, "An Experimental Study in Developing History Reading Ability with Sixth Grade Children Through Development of History Vocabulary," The John Hopkins Studies in Education, 24 (Baltimore: The John Hopkins Press, 1940).

specialized vocabulary in various content fields. From these investigations it can be concluded that familiarizing students with specialized vocabulary does enhance reading comprehension in the content field subjects.

From the representative studies reported here, there appears to be substantial agreement that instruction using specific methods or materials influences reading comprehension.

Another area of interest to researchers of reading comprehension is that of format, content, and organization of material. As mentioned in Chapter I, Cromer[70] investigated sentence structure or organization of reading material in an attempt to determine if it would benefit students who were poor in reading comprehension. He discovered that organization of material in phrases instead of regular sentence form aided in the comprehension of poor readers.

Kissler and Lloyd[71] also investigated organization of material as it relates to reading comprehension. In their study they concluded that scrambled words in

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[70]William Cromer, "The Difference Model: A New Explanation for Some Reading Difficulties," Journal of Educational Psychology, 61 (1970): 471-83.

[71]Gerald Kissler and Kenneth Lloyd, "Effect of Sentence Interrelation and Scrambling on the Recall of Factual Material," Journal of Educational Psychology, 64, 2 (January 1973): 187-90.

independent sentences did not hinder comprehension. They did find, however, that interrelated sentences that were scrambled affected reading comprehension adversely.

In addition to the literature investigating organization of reading material, some research has been done in visual imagery as an effective organizational strategy for improving reading comprehension. Levin[72] hypothesized that success of organization depends upon the extent to which increased contextual meaning and imagery are produced. For example, the sentence, "The boy gave the dog the bone" is more concrete and imageable than the sentence, "The interaction between the individual and animal was most interesting." In other words, Levin found the latter type of sentence produced a longer time period to form a mental image of the content of the sentence as well as recall of general meaning of the sentence. A similar conclusion was reached by Paivio who examined the concreteness and imagery of learning materials.[73]

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[72]Joel Levin, "Comprehending What We Read: An Outsider Looks In," Journal of Reading Behavior, 4, 14 (Fall 1971-72): 18-28.

[73]Allen Paivio, "Concreteness and Imagery in Sentence Meaning," Journal of Verbal Learning and Verbal Behavior, 8 (1969): 821-27.

In another study, Anderson[74] also discovered that visual imagery improved reading comprehension. Using high school seniors, a written passage was asked to be read. One group was asked to visualize what they were reading and the other group was not given any specific instructions in visualizing the passage. Results indicated that those who reported the use of imagery extensively recalled more of what they read than those who reported having used little or no imagery.

The importance of word meaning as it relates to reading comprehension is exemplified in the Downing[75] study of children's notions of technical vocabulary used in teaching reading. While Downing attributes inability to define word or sound to the abstractness of the words, another researcher did not come to this conclusion. Francis[76] conducted a similar study and suggested that the words sentence, letter, sound, and word were difficult to define not so much because of complexity for understanding but because the use of these

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[74]Robert Anderson, "Imagery and Sentence Learning," Journal of Educational Psychology, in press.

[75]John Downing, "Children's Concepts of Language in Learning to Read," Educational Research, 12 (1970): 106-12.

[76]Hazel Francis, "Children's Experience of Reading and Notions of Units of Language," The British Journal of Educational Psychology, 43 (February 1973): 17-23.

terms varies according to the task. For example, the word sound may have so many different meanings that Francis suggests it is the multitude of meanings that hinders comprehension.

Organization of material interested Danks[77] who investigated sentence processing as it relates to grammar and meaning. Findings indicate that syntax and semantics do influence reading comprehension because the processing time was greater in the experimental group than in the control group. Experimenting further with appropriate and inappropriate grammar and meaning, Danks also concluded that the effect of meaning on the processing of individual words was significant. Thus, appropriate grammar and meaning does affect comprehension.

Danks' conclusions are supported by Nurss[78] who discovered that there is a relationship between oral reading errors a student makes and the syntactic complexity of the sentences read. In her study with second graders, she found that students had much more difficulty grasping grammatical structure and syntax of complex sentences than they did with less complex sentences.

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[77]Joseph Danks, "Grammaticalness and Meaningfulness in the Comprehension of Sentences," Journal of Verbal Learning and Verbal Behavior, 8 (1969): 687-96.

[78]Joanne Nurss, "Oral Reading Errors and Reading Comprehension," The Reading Teacher, 23, 3 (December 1969): 523-27.

To better understand grammar and meaning and how it affects reading comprehension, some investigators have explored the types of sentence structure students use. Templin[79] for example measured oral sentence development of kindergarten children and found that children use both simple and complex sentence structures. She also found that through an examination of incomplete sentences and grammatical errors, that grammatical structures vary greatly and thus attributes the variation to the way language is used in the home.

Strickland[80] also investigated sentence development of students and found that the best readers used a significantly greater number of complex sentences than did the poorest readers.

Zeman[81] reported in his exploration of the relationship between silent reading comprehension and writing of second and third graders that all sentence structural types, i.e., simple, compound, complex, and

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[79]M. Templin, Certain Language Skills in Children (Minneapolis: University of Minnesota Press, 1951).

[80]Ruth Strickland, "The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children," Indiana University School of Education Bulletin, 38, 4 (1962).

[81]Samuel Zeman, "Reading Comprehension and Writing of Second and Third Graders," The Reading Teacher, 23, 2 (November 1969): 144-50.

compound-complex are used by students. He also discovered that the simple sentence was used most frequently, and the compound-complex sentence structure was used least frequently by students. Other findings include that as the level of silent reading comprehension increases, the frequency of use of simple sentences decreases.

The above studies indicate that in general, format, content, and organization of material does influence reading comprehension.

Some investigators have been interested in the relationship between word analysis skills and reading comprehension. McCullough[82] suggests that there is some correlation between literal comprehension and creative reading and feels a common factor may pervade these levels of reading comprehension. In another study Benz and Rosemier[83] measured the relationship between performance on word analysis tests and reading comprehension. Of six skills studied, they found that words in context, rhyming sounds, and syllabication had the highest partial correlation coefficients with reading comprehension.

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[82]Constance McCullough, "Responses of Elementary School Children to Common Types of Reading Comprehension," Journal of Educational Research, 51 (September 1957): 65-70.

[83]Donald Benz and Robert A. Rosemier, "Word Analysis and Comprehension," The Reading Teacher, 21, 6 (March 1968): 558-63.

Unfortunately the research investigating the relationship between word analysis skills and reading comprehension is inconclusive.

The relationship of sex and reading achievement has been investigated over the past five decades. A review of the literature in this area indicates that emphasis has been placed upon reading achievement in general rather than specific components of the reading process such as reading comprehension. In addition, there seem to be more studies concentrating on beginning reading achievement than on reading success in middle or upper grades.

Anderson[84] and others conducted a study comparing chronological age at which boys and girls begin to read. They then measured "rate of progress" after a certain level of reading ability was attained. These researchers report a significant difference favoring girls in the early years, but in middle and upper grades no difference between boys' and girls' rate of advancement was found.

Robinson[85] studied factors which affect success in reading and believed that research supports the

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[84]Irving Anderson, "The Rate of Reading Development and Its Relation to Age of Learning to Read, Sex and Intelligence," Journal of Educational Research (March 1957): 481-94.

[85]Helen M. Robinson, "Factors Which Affect Success in Reading," Elementary School Journal (January 1955): 266-70.

hypothesis of sex differences in reading achievement in the primary grades but cautions that: "At present it is not clear whether just being a girl gives a young child a better chance for early reading success or whether something inherent in the school setting militates against the progress of boys."[86]

In another study, Wozencraft[87] used 364 students in grade three and 603 students in grade six to investigate sex differences and reading success. He found that sex differences significantly favored girls on the Stanford Reading Test in grade three, but this was not true in grade six.

Stroud and Lindquist[88] also examined the relationship between sex and achievement, including reading comprehension. They found that using mean difference scores in grades three through eight, girls were superior in grades three and four; but these differences diminished in grades five and six.

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[86]Ibid., p. 266.

[87]Marian Wozencraft, "Sex Comparisons of Certain Abilities," Journal of Educational Research, 57 (1963): 21-27.

[88]J. B. Stroud and E. F. Lindquist, "Sex Differences in Achievement in the Elementary and Secondary School," Journal of Educational Psychology (1942): 657-67.

In another study comparing sex to achievement in reading comprehension, Hughes[89] measured reading comprehension ability of boys and girls in grades three through eight. She discovered that girls achieved more in grades three and four. In grades five through eight girls still scored higher than boys, but the differences were not statistically significant.

Additional studies confirm the results reported by Hughes. Prescott[90] used the Metropolitan Readiness Test for grade one with 15,000 students and found that girls were superior to boys in comprehension ability.

In another study by Gates[91] girls' and boys' mean scores on three reading subtests in grades two through eight were compared. In every comparison made, the girls' mean scores were significantly higher than boys.

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[89]Mildred Hughes, "Sex Differences in Reading Achievement in the Elementary Grades," Clinical Studies in Reading: Supplementary Educational Monographs, 77 (Chicago: University of Chicago Press): 102-06.

[90]George A. Prescott, "Sex Differences in Metropolitan Readiness Test Results," Journal of Educational Research (April 1955): 605-1610.

[91]Arthur Gates, "Sex Differences in Reading Ability," Elementary School Journal (May 1961): 431-34.

In a U.S. Office of Education Study conducted by Bond and Dykstra[92] girls were rated superior to boys on the readiness test and the reading achievement test given at the end of the first grade.

In general, it is apparent that the research reported on sex differences and reading achievement is still inconclusive and warrants further investigation.

This section presented an investigation into related factors that may influence instruction in reading comprehension. These factors consist of methods and materials, organization of material, word recognition skills, and sex as they relate to reading comprehension ability. It is apparent that specific methods and materials designed for the purpose of improving reading comprehension do influence reading comprehension ability. In some instances, the organization or presentation of the material affects reading comprehension ability. The research on the relationship of word recognition skills to reading comprehension indicates some correlation between skills such as rhyming sounds and syllabication and reading comprehension, but again lack of research indicates findings are inconclusive. The research on sex and the relationship of reading comprehension reveals

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[92]Guy Bond and Robert Dykstra, "The Cooperative Research Program in First Grade Reading Instruction," Reading Research Quarterly (Summer 1967): 5-142.

that in some studies girls are more successful than boys in reading comprehension ability but this is still under investigation.

Summary and Conclusions

In an effort to better understand the process of reading comprehension, this chapter summarized the results of research in two major areas: (1) the development of theoretical models of reading comprehension and (2) the relationship of reading comprehension to instruction as it relates to methods and materials, format, organization and content of material, word recognition skills, and sex.

Theories of reading comprehension were reviewed because they generally lay the foundation for research in the field. The review indicated that a variety of viewpoints exists about reading comprehension. Some theorists view reading comprehension as a general term covering a wide range of topics. Other theorists view reading comprehension in a very specific manner, emphasizing one aspect of the entire process. It is apparent that these theorists do not agree in total about what reading comprehension involves.

The second section presented research related to instruction and reading comprehension. Since there are so many factors that may affect instruction in reading comprehension and since there exists a paucity of research

in this area, a summary of the most pertinent research related to this study was presented.

A review of the literature in reading comprehension suggests that the study of comprehension is in an embryonic stage of development when compared to other aspects of the teaching of reading. The need for further research into theory and factors related to the instruction of reading comprehension is indicated by the lack of research in this area. Consequently, this study was designed to investigate the relationship of two instructional strategies, Making Sense Out of Scrambled Words and Sentence Completion Activity to reading comprehension. Chapter III presents the procedures used in this study.

CHAPTER III

METHODOLOGY AND DESIGN

Introduction

Numerous instructional activities exist for teachers to use with students for improving reading comprehension. However, despite the many suggested activities for improving reading comprehension, there is a paucity of scientific research regarding these activities as explained in Chapter I.[93]

Consequently, it would seem beneficial to publishers, administrators, teachers, and students to investigate the effectiveness of various activities used in schools for the purpose of improving reading comprehension. The basic goal of this study was to explore the effectiveness of two reading comprehension activities, Assembling Scrambled Words and Sentence Completion Activity, which are used in schools to improve reading comprehension.

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[93]Jeanne Chall, Learning To Read--The Great Debate (New York, N.Y.: McGraw-Hill Inc., 1967), p. 189.

It is the purpose of this chapter to describe the methods, procedures, and instrumentation used in the study.

Development of Activities

The development of reading comprehension activities used by the experimental groups was one of the first steps in formulating the study. Of crucial importance to the development of the activities was the vocabulary employed to compose these activities. Since both of the activities used, i.e., Assembling Scrambled Words and Sentence Completion Activity, were geared to investigating reading comprehension and not word recognition, the words used had to have a high probability of being recognized by all of the second grade children selected for the study. Because some of these children were reading below a second grade level, the vocabulary used had to be below a second grade level.

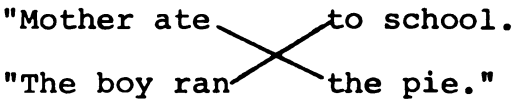
In order to account for the differences of varying reading levels, a primer level vocabulary was used. This core vocabulary consisted of 355 words from the Houghton-Mifflin Reader, Rainbows. This Houghton-Mifflin primer reader was used because it was part of the adopted series used in the entire school system.

Nearly 200 sentences were written from this core vocabulary of which 150 were used for the skillsheets in the study. Care was taken so almost all the words

in the core vocabulary were used. Some words such as mother, father, go, etc. were used more frequently than others because sentences could be more easily written using them.

The first activity for the E^1 group resulted in thirty skillsheet lessons on Assembling Scrambled Words. Each skillsheet contained five sentences in which words were scrambled. Students were expected to read each word group and then unscramble it by rewriting the words into a meaningful sentence order. For example, the word group sentence, "ate Mother the pie" should be arranged into the sentence, "Mother ate the pie."

The activity for the E^2 group, Sentence Completion Activity, also consisted of thirty lessons with five sentences per skillsheet. The students were expected to read carefully incomplete clauses or phrases on each skillsheet. They were then expected to match all the incomplete phrases or clauses by drawing a line so a meaningful sentence would be made. For example,



It should be noted that the same words for both Assembling Scrambled Words and Sentence Completion Activity were used in each lesson. These activities are described in greater detail later in this chapter.

Before the sentences were written for the reading comprehension exercises used in the study, an exploration of the research dealing with the types of sentence structure children use was completed.

As mentioned in Chapter II, one intensive study in the area of sentence development of students was done by Templin.[94] Templin measured oral sentence development of kindergarten children and found that some children used primitive sentence structures and others used complex ones. Through the examination of incomplete sentences and grammatical errors, she also found that grammatical structures vary greatly and that the variation is largely due to the way language is used in the home.

In another study on sentence development of students, Strickland reported that the best readers used a significantly greater number of elaborated sentences than did the poorest readers.[95]

In a more recent study mentioned previously, Zeman explored the relationship between reading

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[94]M. Templin, Certain Language Skills in Children (Minneapolis: University of Minnesota Press, 1951).

[95]Ruth Strickland, "The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children," Indiana University School of Education Bulletin, 38, 4 (1962).

comprehension and writing of second and third graders.[96] More specifically, the purpose of his study was to describe the relationship between measured silent reading comprehension and the basic sentence structural patterns in compositions written by second and third grade children.

Using 180 students from a sample of 410 second and third graders, each student was given a reading comprehension test and then asked to write an ending to an unfinished story. After all the testing was completed, the compositions were analyzed using four basic sentence structural patterns, i.e., the simple sentence, the complex sentence, the compound sentence, and the compound-complex sentence.

Zeman's research revealed that all sentence types were used by the students. However, the frequency of use of sentence types from highest to lowest was (1) Simple, (2) Complex, (3) Compound, and (4) Compound-Complex.

In addition, he found that second graders made more frequent use of the simple sentence and less frequent use of the complex sentence than did the third graders. Other results indicate that the mean proportional frequency of simple sentences for below average

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[96]Samuel Zeman, "Reading Comprehension and Writing of Second and Third Graders," The Reading Teacher, 23, 2 (November 1969): 144-50.

grade level readers was higher than that of the above average grade level readers. It is interesting to note from this study that, as the level of reading comprehension increases, the frequency of use of simple sentences decreases. Whether this is due to the sentence structural patterns found in reading material or oral language ability of students or some other factor is not known. However, additional research in this area might prove fruitful for a better understanding of reading comprehension.

In order to better determine the types of sentences to incorporate into the reading comprehension activities in this study, a pilot project was conducted by the researcher.

Two urban and suburban second grade groups of thirty children each were chosen. Ten students from each group were randomly selected to participate in the study.

Students were asked to describe a picture presented by the researcher. The picture was taken from Richard Scarry's[97] Best Word Book Ever because of the color and variety of activities presented. The picture included an entire neighborhood, a house, a farmer in a field, a grocery store, a policeman, etc. Objects and events represented in the picture were felt to be in

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[97]Richard Scarry, Best Word Book Ever (New York: Golden Press, 1963), pp. 10-11.

the spoken vocabulary of the students. A tape recording of each student's oral response was made.

Directions given by the researcher were: See this picture? There are all kinds of things happening in it. Tell me as much as you can about it.

Language samples were later analyzed using quantitative and qualitative criteria. These included (1) number of words used to describe the picture, (2) number of sentences used to describe the picture, (3) number and kind of sentences used, i.e., simple, compound, complex, compound-complex, and (4) number of incomplete sentences used to describe the picture.

In brief, the results of this pilot project were similar to those reported by Zeman. All forms of sentence types were used by the students. It was also found that simple sentences were used much more frequently than either compound, complex, or compound-complex sentences. Whether this phenomenon is due to oral language use in the home, material read in school or some other factor is not certain.

In order to keep problems with syntax to a minimum for all second graders in the study, only simple sentences were used for the exercises, Assembling Scrambled Words and Sentence Completion Activity.

Treatment

As mentioned previously, thirty lessons for the reading comprehension activities, Assembling Scrambled Words and Sentence Completion Activity, were written for both experimental groups used in the study.

Before the initiation of the ten-week study, each teacher was visited individually and given specific instructions concerning the research.

Since both the control and experimental groups used the same basal reading materials, the teachers in the control group were asked to omit any activities in the basal program or other supplementary materials that were similar to those designed for the experimental groups.

The teachers in the experimental groups were asked to present thirty lessons, three times per week over a ten-week period. All lessons were given to the entire class for fifteen minutes during the morning reading session. With the exception of the first lesson, no direct instruction by the teacher was necessary.

The first lesson (trial) was introduced by the teacher using specific directions and skillsheets provided by the researcher. This was intended to familiarize the students with the activities so directions could easily be understood later in the study.

Teachers were asked to answer any questions the students might have during the session. After the assignment was completed, the teacher was directed to discuss acceptable responses with the students so errors could be discovered. All skillsheets were collected by the teacher.

The skillsheets were dated and numbered 1-30 and became increasingly difficult according to the sentence length. They were distributed once every two weeks by the researcher. Those completed were also collected by the researcher at this time.

Each lesson (skillsheet) contained five simple sentences using the core vocabulary from the Houghton-Mifflin primer reader, Rainbows. The vocabulary from this book was used because it is a primer level book used in the entire school system and thus word recognition difficulties would be minimized for the second graders used in the study.

As mentioned previously, the three classes in the control group used traditional reading comprehension activities suggested in the basal reading program, excluding those similar to Assembling Scrambled Words and Sentence Completion Activity.

The three classes in the E^1 group, Assembling Scrambled Words, were given a skillsheet for every lesson that consisted of five simple sentences in which the

words were scrambled. All students were asked to unscramble the words by writing them in a meaningful sentence order.

Any Sentence Completion Activities which were a part of the basal reading program and were similar to those used with the E^2 group were omitted from the E^1 group activities during the study.

Upon completion of the activity, responses were discussed with the teacher so corrections could be made. The teacher collected the skillsheets for the researcher. See Appendix C for a sample of these skillsheets.

The second treatment group, E^2, which consisted of three classrooms also, was given Sentence Completion Activity. Any Assembling Scrambled Words activities were omitted for the duration of the study. In the E^2 group, the students were given a skillsheet for each lesson with five incomplete sentences. The students were asked to draw a line to the appropriate clause or phrase provided to complete the sentence. Upon completion of the activity, responses were discussed with the teacher so errors could be discovered by the student. The teacher then collected the skillsheet for the researcher.

Sample

The sample was composed of nine second grade classrooms or approximately 250 students from six middle class schools in Saginaw, Michigan.

Two major criteria were used to delineate the classrooms used in the study. The first criteria was that each classroom be composed of second graders only. The nine classrooms used in the study were chosen from a total of twenty-one classrooms. However, after the elimination of all second grade combination classrooms (1-2, 2-3) only nine classrooms existed that were composed totally of second graders.

The second criteria used to identify the sample for the study was that all middle class schools be used. According to community characteristics based on 1970 Census Results, the guidelines used were average family income, average value of houses, and percentage of families with incomes below the poverty level. In this sample, the schools chosen included families where the income range was $10,600 - $15,700. The average value of the houses ranged from $12,050 - $26,040. The percentage of families with incomes below the poverty level ranged from 1.6 per cent to 9.7 per cent. None of the schools used in the study qualified or participated in Title 1 or Chapter III programs.

The nine classrooms used for the study were randomly assigned to the control or experimental groups. There were a total of three major groups consisting of three classrooms each. The E^1 group (ASW) consisted of 89 students, 43 girls and 46 boys. The E^2 group (SCA)

consisted of 67 students, 26 girls and 41 boys. The control group consisted of 74 students, 34 girls and 40 boys. There was a total of 103 girls and 127 boys in the sample.

Instrumentation

The evaluation procedures focused on one major area, achievement in reading comprehension. Achievement data were obtained from the pre- and post-test results of the Iowa Test of Basic Skills,[98] Level 7, Forms 5 and 6. The Iowa Test of Basic Skills was chosen because of all the reading comprehension tests examined on the primary level; it was the most thorough with three subtests in the area of reading comprehension.

The Iowa Test of Basic Skills tests three major areas of reading comprehension: (1) Picture Interpretation, or the understanding of explicit and implied actions and relationships--27 items; (2) Sentence Comprehension, or the understanding of relationships expressed in simple vocabulary--16 items; (3) Story Comprehension, or the understanding of ideas expressed or implied in a passage--23 items. The combined tests resulted in a total of 66 items with a grade equivalent range of 0.1 - 5.6.

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[98]A. N. Hieronymus and E. F. Lindquist, Iowa Test of Basic Skills (Boston: Houghton-Mifflin Company, 1972).

Level 7 was chosen because the pre- and post-testing took place after the middle of the school year, and this level represents an average achievement in grades 1.7 - 2.5.

The pre-test for the Iowa Test of Basic Skills, Level 7, Form 5 was administered to all classes during the week of January 7, 1974. The post-test, Form 6, of the same level was given during the week of March 25.

Analysis of Data

To examine the effects of two different reading comprehension activities, a one-way analysis of variance with one repeated measure was used with the class as the unit of analysis. In addition, an analysis of covariance was conducted using the pre-test as a covariate.

The hypotheses in the study are:

Hypothesis 1:

H_{1a}: There will be a difference between the reading comprehension gain means of the Assembling Scrambled Words group (E^1), Sentence Completion Activity group (E^2), and the Control (C) group on the post-test using raw scores.

H_{1b}: There will be a difference between the reading comprehension gain means of the Assembling Scrambled Words group (E^1), Sentence Completion Activity group (E^2), and the Control (C) group on the post-test using grade equivalent scores.

Hypothesis 2:

H_{2a}: There will be a difference between the reading comprehension mean raw score of the boys and the mean raw score of the girls.

H_{2b}: There will be a difference between the reading comprehension mean grade equivalent score of the boys and the mean grade equivalent score of the girls.

Hypothesis 3:

H_{3a}: There will be a treatment x sex interaction using mean raw score differences.

H_{3b}: There will be a treatment x sex interaction using mean grade equivalent score differences.

All of the hypotheses were tested at the .05 level of significance. The results of the statistical analyses are summarized in Appendix A and explained more thoroughly in Chapter IV.

Summary

The focus of this study was to explore the effectiveness of two different reading comprehension activities. To accomplish this, six middle class elementary schools in Saginaw, Michigan participated in the study.

Nine classes were randomly assigned to one of three groups. The E^1 group which consisted of three classes received instruction in Assembling Scrambled Words. The E^2 group which also consisted of three classes received instruction in Sentence Completion Activity. The last group of three classes served as the control group. All of the students were given a pre- and post-test in reading comprehension from the Iowa Test of Basic Skills, Level 7, Forms 5 and 6.

A one-way analysis of variance with one repeated measure was used to test whether differences existed between groups with regard to treatment, sex, and treatment x sex interaction. In addition, the post hoc procedure, analysis of covariance using the pre-test as a covariate, was used to remove any bias that may have existed. The following chapter describes the results of these analyses.

CHAPTER IV

RESEARCH FINDINGS

Introduction

The effects of three different reading comprehension activities using second grade students was the focus of the hypotheses in this study. The hypotheses were designed to explore whether or not reading comprehension varies with regard to treatment and sex. This chapter presents the two analyses, i.e., analysis of variance and analysis of covariance used in the study. The first section states the hypotheses presented in Chapter I. The second section presents the analysis of variance with one repeated measure used to test the hypotheses in the study. Results of the statistical analysis are reported separately for raw scores and grade equivalent scores. The third section contains the analysis of covariance used to test the hypotheses. The final section includes a summary of the results of the study.

Hypotheses

The hypotheses in the study are reiterated:

Hypothesis 1:

H_{1a}: There will be a difference between the reading comprehension gain means of the Assembling Scrambled Words group (E^1), Sentence Completion Activity group (E^2), and the Control (C) group on the post-test using raw scores.

H_{1b}: There will be a difference between the reading comprehension gain means of the Assembling Scrambled Words group (E^1), Sentence Completion Activity group (E^2), and the Control (C) group on the post-test using grade equivalent scores.

Hypothesis 2:

H_{2a}: There will be a difference between the reading comprehension mean raw score of the boys and the mean raw score of the girls.

H_{2b}: There will be a difference between the reading comprehension mean grade equivalent score of the boys and the mean grade equivalent score of the girls.

Hypothesis 3:

H_{3a}: There will be a treatment x sex interaction using mean raw score differences.

H_{3b}: There will be a treatment x sex interaction using mean grade equivalent score differences.

All of the hypotheses were tested at the .05 level of significance using analysis of variance and analysis of covariance.

Analysis of Variance

To examine the general hypothesis and question in the study, a one-way analysis of variance with one repeated measure was used. In essence, analysis of variance tests whether there are significant differences between the mean levels of the groups involved.[99]

For this study, three hypotheses were potentially testable. The first hypothesis tested whether or not there were any differences between the three treatment groups on the difference scores of the reading comprehension pre- and post-test.

The second hypothesis tested for any treatment differences when girls were compared to boys using reading comprehension scores.

The third hypothesis which was tested within the context of this design was the test for interaction effects of treatment and sex.

Although there are only three hypotheses, there are two separate analyses for each of these hypotheses. One of the analyses used the raw scores, the other used grade equivalent scores. To aid the reader, both analyses are presented for each hypothesis, beginning with the treatment main effect hypothesis. Thus, for the first

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[99]David Fox, The Research Process in Education (New York: Holt, Rinehart and Winston, Inc., 1969), pp. 305-06.

hypothesis, the analysis using raw scores will be reported first, then the same analysis using grade equivalent scores. The analysis for the other two hypotheses will be presented in the same manner.

All of the original data for the analysis of variance are summarized in Appendix A, Sections 1 and 2.

Hypothesis 1:

H_{1a}: There will be no significant differences between the reading comprehension gain means of the Assembling Scrambled Words group (E^1), Sentence Completion Activity group (E^2), and the Control group (C) on the post-test using raw scores.

Examination of the marginal means in Table 4.1 reveals that although the E^2 group and the control group scored higher than the E^1 group, the differences were not significant.

TABLE 4.1.--Analysis of variance, raw scores, means of difference scores

	Boys (N = 127)	Girls (N = 103)	
E^1	3.3178 (N = 46)	4.487 (N = 43)	3.902
E^2	6.687 (N = 41)	6.288 (N = 26)	6.487
Control	7.973 (N = 40)	5.888 (N = 34)	6.930

The analysis of variance based on the raw score difference score with two and six degrees of freedom resulted in an F ratio of 0.006. (See Table 4.7.) Since the computed F ratio 0.006 does not exceed the critical F ratio 5.14,[100] the null hypothesis is not rejected. This means that the evidence does not support the hypothesis that there will be any differences between the groups when raw scores are used.

H_{1b}: There will be no significant differences between the reading comprehension gain means of the Assembling Scrambled Words group (E^1), Sentence Completion Activity group (E^2), and the Control group (C) on the post-test using grade equivalent scores.

Examination of the marginal means in Table 4.2 reveals that although the E^2 group and the control group scored higher than the E^1 group, the differences were not significant.

The analysis of variance based on the grade equivalent difference score, with two and six degrees of freedom resulted in an F ratio of 0.49. (See Table 4.8.) Since the computed F ratio 0.49 does not exceed the critical F ratio 5.14, the new hypothesis is not rejected. This means that the evidence does not support

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[100]Robert Kirk, Experimental Design: Procedures for the Behavioral Sciences (Belmont, Calif.: Brooks/Cole, 1968), p. 242.

the hypothesis that there will be any differences between the groups when grade equivalent scores are used.

TABLE 4.2.--Analysis of variance, grade equivalent scores, means of difference scores

	Boys (N = 127)	Girls (N = 103)	
E^1	0.2460 (N = 46)	0.3710 (N = 43)	.3085
E^2	0.5407 (N = 41)	0.4687 (N = 26)	.5047
Control	0.5986 (N = 30)	0.4430 (N = 34)	.5208

Hypothesis 2:

H_{2a}: There will be no significant differences between the reading comprehension mean raw score of the boys and the mean raw score of the girls.

Examination of the marginal means in Table 4.3 reveals that although the boys scored higher than the girls, the differences were not significant.

The analysis of variance for the sex main effect hypothesis using raw scores with one and six degrees of freedom resulted in an F ratio of 0.060. (See Table 4.7.) Since the computed F ratio 0.060 does not exceed the critical F ratio 5.99, the null hypothesis is not rejected. This means that the evidence does not support the hypothesis that there will be any differences between the

mean raw score of the boys when compared to the mean raw score of the girls.

TABLE 4.3.--Analysis of variance, raw scores, means of difference scores

	Boys (N = 127)	Girls (N = 103)
E^1	3.318 (N = 46)	4.487 (N = 43)
E^2	6.687 (N = 41)	6.288 (N = 26)
Control	7.973 (N = 40)	5.888 (N = 34)
	5.993	5.554

H_{2b}: There will be no significant differences between the reading comprehension mean grade equivalent score of the boys and the mean grade equivalent score of the girls.

Examination of the marginal means in Table 4.4 reveals that although the boys scored higher than the girls, the differences were not significant.

The analysis of variance for the sex main effect hypothesis using grade equivalent scores with one and six degrees of freedom resulted in an F ratio of 0.060. (See Table 4.8.) Since the computed F ratio 0.060 does not exceed the critical F ratio 5.99, the null hypothesis is not rejected. This means that the evidence does not support the hypothesis that there will be any differences

between the mean grade equivalent score of the boys when compared to the mean grade equivalent score of the girls.

TABLE 4.4.--Analysis of variance, grade equivalent scores, means of difference scores

	Boys (N = 127)	Girls (N = 103)
E^1	0.2460 (N = 46)	0.3710 (N = 43)
E^2	0.5407 (N = 41)	0.4687 (N = 26)
Control	0.5986 (N = 40)	0.4430 (N = 34)
	0.4618	0.4276

Hypothesis 3:

H_{3a}: There will be no significant treatment x sex interaction using mean raw score differences.

Examination of Table 4.5 reveals that although girls in the E^2 group scored higher than the girls in the E^1 or Control group the differences were not significant. The boys in the Control group scored higher than the boys in the E^1 or E^2 group but the differences were not significant.

The analysis of variance for the treatment x sex interaction hypothesis using raw score differences with two and six degrees of freedom resulted in an F ratio of .209. (See Table 4.7.) Since the computed F ratio .209 does not exceed the critical F ratio 5.14, the null

hypothesis is not rejected. This means that the evidence does not support the hypothesis that there will be a significant treatment x sex interaction using raw score differences.

TABLE 4.5.--Analysis of variance, raw scores, means of difference scores

	Boys (N = 127)	Girls (N = 103)
E^1	3.3177 (N = 46)	4.487 (N = 43)
E^2	6.687 (N = 41)	6.288 (N = 26)
Control	7.9727 (N = 40)	5.888 (N = 34)

H_{3b}: There will be no significant treatment x sex interaction using mean grade equivalent score differences.

Examination of Table 4.6 reveals that although the girls in E^2 group scored higher than the girls in the E^1 or Control group, the differences were not significant. The boys in the Control group scored higher than the boys in E^1 or the E^2 group, but the differences were not significant.

The analysis of variance for the treatment x sex interaction hypothesis using grade equivalent score differences with two and six degrees of freedom resulted in an F ratio of 0.36. (See Table 4.8.) Since the computed F ratio 0.36 does not exceed the critical F ratio

5.14, the null hypothesis is not rejected. This means that the evidence does not support the hypothesis that there will be a significant difference in the treatment x sex interaction using grade equivalent scores.

TABLE 4.6.--Analysis of variance, grade equivalent scores, means of difference scores

	Boys	Girls
E^1	0.2460	0.3710
E^2	0.5407	0.4687
Control	0.5986	0.4430

Analysis of Covariance

An analysis of covariance was also used to examine the general hypothesis and question in the study. Analysis of covariance is a statistical control that enables one to remove potential sources of bias from an experiment that may not be eliminated by experimental control.[101]

Since the analysis of variance revealed no significant differences for the general hypothesis and question, it was felt that lack of power, i.e., small number of classes used, may have been part of the cause. Therefore, in an attempt to gain more power or precision, an analysis of covariance was conducted using the pretest as a covariate.

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[101]Ibid., pp. 455-57.

Conclusions based on the analysis of covariance for the general hypothesis and question were identical to those using analysis of variance. That is, the hypotheses regarding treatment, sex, and treatment x sex interaction resulted in no significant differences when the pre-test was used as a covariate.

In order to avoid redundancy and since the conclusions were the same using analysis of variance and analysis of covariance, the reader is asked to see Tables 4.9 and 4.10 and Appendix B, Section 1 and Section 2 for a summary of the results.

Summary of Results

The analysis of variance used to test for treatment effects, sex effects, and treatment x sex interaction revealed no significant results at the .05 level of significance. In addition, there were no significant differences with regard to treatment, sex, and treatment x sex interaction when analysis of covariance was used. This means that there is little support for differences in the effectiveness of the instructional activities investigated in the study.

The next and final chapter summarizes the results of the study. In addition, implications and recommendations for future research based on this study will be discussed.

TABLE 4.7.--Analysis of variance table for raw scores (ANOVA on repeated measures design)

Sources of Variation	d.f.	Sum of Squares	Mean Squares	Computed F	Tabled F (.05)
Treatment	2	32.091	16.045	.006	5.14
Class : Treatment	6	158.990	26.498		
Sex	1	.862	.862	.060	5.99
Treatment X Sex	2	7.943	3.971	.209	5.14
Sex X Class : Treatment	6	80.682	13.446		

TABLE 4.8.--Analysis of variance table for grade equivalent scores (ANOVA on repeated measures design)

Sources of Variation	d.f.	Sum of Squares	Mean Squares	Computed F	Tabled F (.05)
Treatment	2	.168	.084	0.49	
Class : Treatment	6	1.022	.170		
Sex	1	.005	.005	0.06	
Treatment X Sex	2	.063	.031	0.36	
Sex X Class : Treatment	6	.518	.086		

TABLE 4.9.--Analysis of covariance for raw scores (ANCOVA on repeated measures design)

Sources of Variation	d.f.	Adj. SS.	Adj. MS.	Computed F	Tabled F (.05)
Treatment	2	6.1263	3.0632	0.6234	5.79
Class : Treatment	5	24.5701	4.9140		
Sex	1	10.8672	10.8672	1.7112	6.61
Treatment X Sex	2	26.4647	13.2324	2.0836	5.79
Sex X Class : Treatment	5	31.7538	6.3508		

TABLE 4.10.--Analysis of covariance table for grade equivalent scores (ANCOVA on repeated measures design)

Sources of Variation	d.f.	Adj. SS.	Adj. MS.	Computed F	Tabled F (.05)
Treatment	2	0.0254	0.0127	0.2405	5.79
Classroom : Treatment	5	0.2642	0.0528		
Sex	1	0.0416	0.0416	0.8815	6.61
Sex X Treatment	2	0.1597	0.0799	1.7000	5.79
Sex X Class : Treatment	5	0.2348	0.0470		

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The effectiveness of two reading comprehension activities was the major focus of the general hypothesis and question investigated in this study. The results and implications of the findings are presented in this final chapter.

Summary

This study was designed to explore the effectiveness of two reading comprehension activities using second grade students. The sample was composed of nine classrooms from the Saginaw Public School System. Three classrooms were randomly assigned for each group: Assembling Scrambled Words (E^1), Sentence Completion Activity (E^2), and Control. The first experimental group received three lessons for ten weeks in the activity, Assembling Scrambled Words. The second experimental group received three lessons for ten weeks in Sentence Completion Activity. The control group received no special

lessons, but all lessons similar to Assembling Scrambled Words and Sentence Completion Activity were excluded during the study.

All classes in the study were pre- and post-tested using the Iowa Test of Basic Skills, Level 7, Form 5 and 6.

The statistical techniques of analysis of variance with one repeated measure and analysis of covariance were used to test significant differences between treatment main effect, sex main effect, and treatment x sex interaction effect.

In essence, the conclusions indicate there are no significant differences in the effectiveness of the two reading comprehension activities explored in this study.

Conclusions

1. The growth in reading comprehension as a result of the activity Assembling Scrambled Words does not vary significantly from the growth in reading comprehension as a result of the activity Sentence Completion Activity or a control classroom in which neither activity is part of the instructional program.
2. The growth in reading comprehension as a result of the activity Assembling Scrambled Words does not vary significantly with regard to sex from

the growth in reading comprehension as a result of the activity Sentence Completion Activity or a control classroom in which neither activity is part of the instructional program.

Implications

Since Thorndike's[102] classic statement "to read is to think" was first published in 1917, the need for stressing reading comprehension in American schools has been emphasized in the teaching of reading. Close examination of reading programs reveals that nearly all educators and publishers incorporate reading comprehension as a major component in their reading programs.

Because the teaching of reading comprehension is so widely accepted by educators and publishers, there exists a plethora of suggested activities for teaching reading comprehension. It is also commonly assumed that such teaching improves reading comprehension. However, the research to support many conclusions about how to teach reading comprehension is almost nil. Davis stresses this problem, "Despite the long standing interest in teaching reading as a thought getting process, there has

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[102]Edward L. Thorndike, "The Understanding of Sentences," Elementary School Journal, 18 (1917): 114.

been a surprisingly small number of experimental studies on the nature of mental skills involved in comprehension.[103]

In addition to the need for more research in the area of reading comprehension, the need for scrutiny of existing instructional procedures and activities is suggested by Chall[104] who cautions that the effectiveness of many activities needs to be questioned.

After a review of the literature in reading comprehension, it is obvious that researchers today are asking the same questions about reading comprehension that were asked in 1917. Ruddell[105] reiterates the need for learning more about the reading process: "Until such information is available, our theoretical formulations of the reading process will remain extremely weak. It is obvious we have far to go."

This study has not provided a definitive answer to that important question. It is apparent in this study that the instructional activities Assembling Scrambled Words and Sentence Completion Activity, when used as

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[103]Frederick Davis, "Research in Comprehension of Reading," Reading Research Quarterly, 3, 4 (Summer 1968): 501.

[104]Jeanne Chall, Learning To Read: The Great Debate (New York: McGraw-Hill Inc., 1967), p. 189.

[105]Robert Ruddell, "Language Acquisition and the Reading Process," Theoretical Models and Processes of Reading, ed. Harry Singer and Robert Ruddell (Newark: International Reading Association, 1970), pp. 1-19.

previously described, did not improve reading comprehension for the sample groups. There are several explanations as to why there were no significant differences in this investigation.

Perhaps one of the most obvious problems was lack of power in the study. This may be expressed in the small number of classes used in the investigation. If the number of classes is exceedingly small, a weakness exists which would hinder the possibility of obtaining significant results in the study. The implication here is that if more than nine second grade classrooms were used with more than three classrooms each in the E^1, E^2, and control group, a larger number of classes may have produced significant results.

Another possibility is that the study was not long enough to produce significant results. The implication here is that in order for reading comprehension to improve significantly, a longer period than ten weeks is needed. It may be that the instructional activities Assembling Scrambled Words and Sentence Completion Activity require so many complex reading skills that a gain in reading comprehension cannot be determined after only ten weeks of study. Perhaps an extension of ten more weeks or one-half of the school year would have produced significant results.

Although the instructional activities Assembling Scrambled Words and Sentence Completion Activity are popular activities with teachers and publishers for developing reading comprehension, it is possible that reading comprehension ability is better developed through a combination of these activities with other aspects of the comprehension process such as other instructional materials or games and specific teacher questioning.

Another reason this study may have produced no significant results is because the pre- and post-test used tested more than what this study was concerned with. Although care was taken to choose the best standardized reading comprehension test available, it is possible that the skills tested did not relate well to the learning expected upon completion of the study. Careful examination of the standardized test used in the study reveals that it did test more than sentence meaning, which is what this study was primarily concerned with. The Iowa Test of Basic Skills, Level 7 actually includes three different tests: (1) Picture Interpretation, (2) Sentence Comprehension, and (3) Story Comprehension which when combined yields one total score for reading comprehension. The possibility of using the separate raw scores for the sentence meaning test and converting them to grade equivalent scores was considered. However, in a conversation with the testing consultant for the Iowa

Test of Basic Skills, this procedure was definitely discouraged and stated as highly inappropriate. Consequently, the test on sentence comprehension, at least with regard to this study, was masked by the other two portions of the test, i.e., Picture Interpretation and Story Comprehension which may have contributed to the lack of significant differences found in the study. Perhaps using a criterion-referenced reading comprehension test designed by the researcher rather than a standardized reading comprehension test would have been more appropriate. Of course, another implication here is that reading comprehension is so complex that its measurement is impossible at this stage since so little is known about the process of comprehension in general. If this is so, no amount of testing can truly reveal growth in reading comprehension.

Other explanations for no significant results in this study may revolve around characteristics of the students involved in the investigation. The need for attending to student characteristics such as I.Q., attitude, motivation, and experiential background and how this relates to reading comprehension needs to be researched more thoroughly. Current research indicates a high correlation between I.Q. and reading achievement. It is possible that certain student

characteristics which were not examined in this study would be correlated with beneficial results for the experimental procedures used.

The results of this study indicate that girls and boys are relatively equal with respect to growth in reading comprehension ability. This, of course, does not support the hypothesis that girls are superior to boys in growth in achievement in reading comprehension. The implication here, at least with regard to this study, is that instruction in reading comprehension need not be altered for boys in order to produce gains in reading comprehension.

A review of the results of this study reveals that a wide variety of factors need to be considered when evaluating growth in reading comprehension. It is not enough to present students with instructional activities such as Assembling Scrambled Words or Sentence Completion Activity as was done in this study and expect significant gains in reading comprehension. The importance of this implication is stressed in a remark by Josephine Wolf, "Thus, it should be clearly understood that there is no single method or single device for developing comprehension. It is the use the reader makes of each method with emphasis being on all."[106]

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[106]Josephine Wolf, "Applying Research Findings in Comprehension to Classroom Practice," in Forging Ahead in Reading, ed. A. Figurel, Proceedings of the

Future Recommendations

The following recommendations are made on the basis of the entire study, including the review of the literature, the activities designed for the study, and analysis of the data.

1. Replication of the study to check the validity of the results and conclusions. A larger number of classes from more school districts might reveal significant results in reading comprehension using these instructional activities.

2. Replication of this study over a longer period of time using the same achievement test, the Iowa Test of Basic Skills, or another test that stresses only sentence meaning. Perhaps the two and one-half month period was too short to measure gains that could have been achieved after four or six months of treatment.

3. Replication of this study using the individual as the unit of analysis might prove fruitful. In this way, factors such as I.Q., motivation, attitude, etc., could be examined as they relate to reading comprehension.

Twelfth Annual Convention of the International Reading Association, 12, 1 (Newark: International Reading Association, 1968), p. 614.

4. New investigations could be accomplished using the same basic question, but using a variety of instructional methods such as skillsheets, games, specific questioning procedures, etc. Perhaps more variety of activities would produce significant gains in reading comprehension. The findings from such an investigation could then be compared to this study.

Within the limitations of this investigation, it is evident that neither of the reading comprehension activities, Assembling Scrambled Words and Sentence Completion Activity, is superior to the other nor is either superior to a control classroom in which those activities are not used when reading comprehension is considered. It seems the most important conclusion in this study is that these activities alone do not improve reading comprehension. Consequently, future research must be attuned to other variables that may influence reading comprehension.

APPENDICES

APPENDIX A

Section 1

ANALYSIS OF VARIANCE TABLES

APPENDIX A

Section 1

TABLE A.1.--Raw scores, original data for analysis of variance and analysis of covariance

		Boys (N = 127)		Girls (N = 103)	
		Pre	Post	Pre	Post
E_1 (N = 89)	C_1	47.875	52.938	45.286	51.143
	C_2	50.357	51.071	52.313	57.250
	C_3	44.471	48.647	53.000	55.667
E_2 (N = 67)	C_4	29.214	35.667	27.250	42.000
	C_5	42.867	46.667	49.091	48.455
	C_6	38.818	48.364	45.875	50.625
Control (N = 74)	C_7	52.556	56.222	53.000	55.692
	C_8	40.909	46.455	36.846	44.000
	C_9	30.000	44.706	32.364	40.182

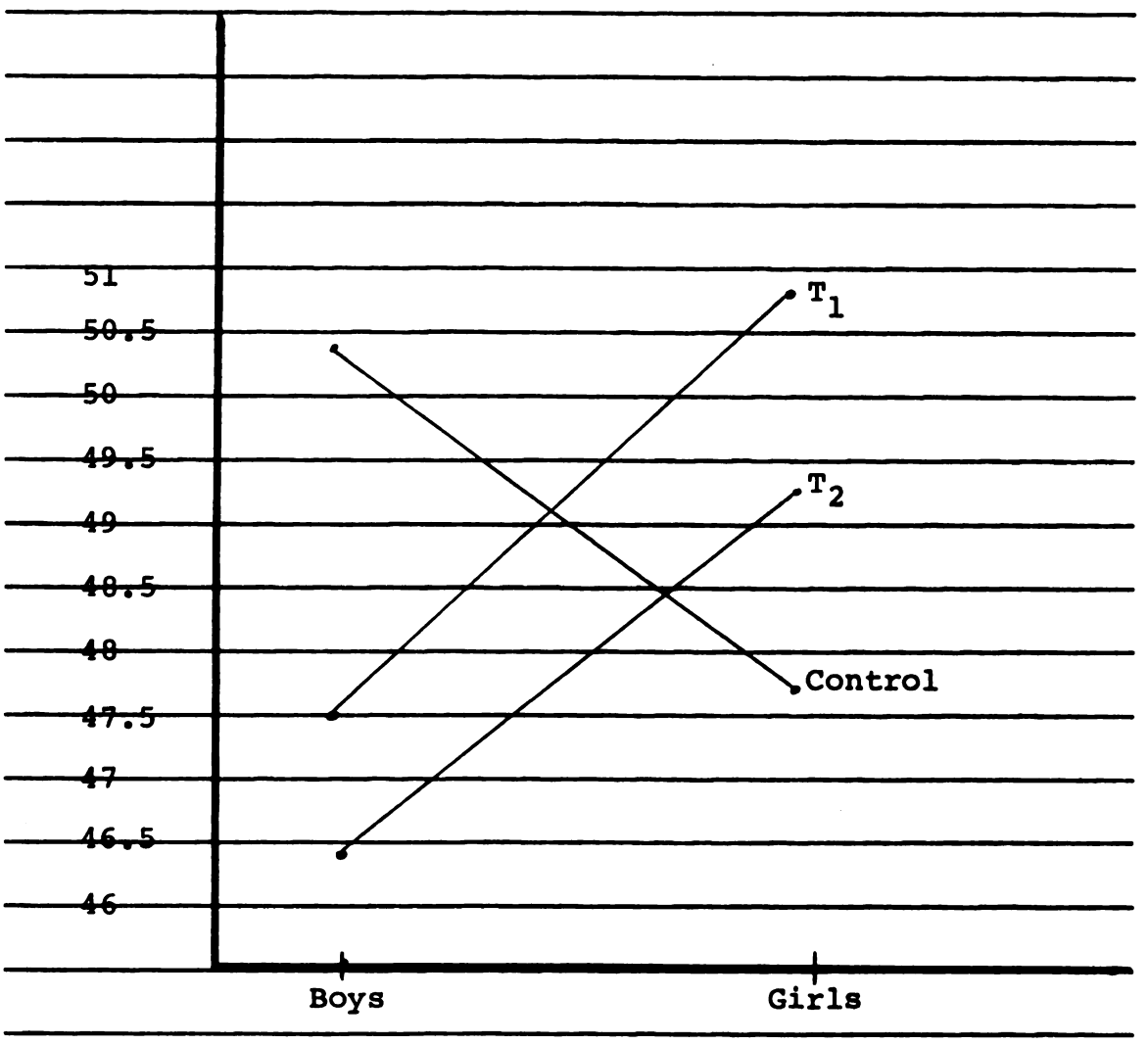


Fig. B.1.--Analysis of covariance, raw scores, graph of adjusted means.

TABLE B.2.--Analysis of covariance, raw scores, sums of squares needed for the adjustment for analysis of covariance

Sources of Variation	SS(X)	SS(XY)	SS(Y)
Treatment	336.0311	237.9491	171.963
Classroom : Treatment	853.4726	514.7305	335.0048
Sex	318.115	13.9823	10.9122
Sex X Treatment	14.0833	21.6840	37.2296
Sex X Classroom : Treatment	66.9825	9.7402	33.1702

APPENDIX A

Section 2

APPENDIX A

Section 2

TABLE A.3.--Original data for grade equivalent scores for analysis of variance and analysis of covariance

		Boys (N = 127)		Girls (N = 103)	
		Pre	Post	Pre	Post
	C_1	3.094	3.513	2.964	3.421
E_1 (N = 89)	C_2	3.300	3.343	3.450	3.881
	C_3	2.853	3.129	3.608	3.833
	C_4	1.750	2.236	1.575	2.688
E_2 (N = 67)	C_5	2.753	3.007	3.218	3.136
	C_6	2.436	3.318	2.963	3.338
	C_7	3.500	3.800	3.638	3.815
Control (N = 74)	C_8	2.555	2.945	2.254	2.769
	C_9	1.753	2.859	1.936	2.573

TABLE A.4.--Analysis of variance, grade equivalent scores, pre- and post-test cell and marginal means

	Boys (N = 127)		Girls (N = 103)	
	Pre	Post	Pre	Post
E_1 (N = 89)	3.0823	3.3283	3.3407	3.7117
E_2 (N = 67)	2.3130	2.8537	2.5853	3.0540
Control (N = 74)	2.6027	3.2013	2.6093	3.0523
	2.666	3.1278	2.8451	3.2727

E_1 (Pre) = 3.2115 E_1 (Post) = 3.520

E_2 (Pre) = 2.4492 E_2 (Post) = 2.9538

Control (Pre) = 2.6060 Control (Post) = 3.1268

APPENDIX B

Section 2

TABLE B.3.--Analysis of covariance, grade equivalent scores, table of adjusted means

	Boys (N = 127)	Girls (N = 103)	
E_1 (N = 89)	3.0712	3.4062	3.2387
E_2 (N = 67)	3.0683	3.2176	3.1429
Control (N = 74)	3.2942	3.1440	3.2191
	3.1446	3.2559	

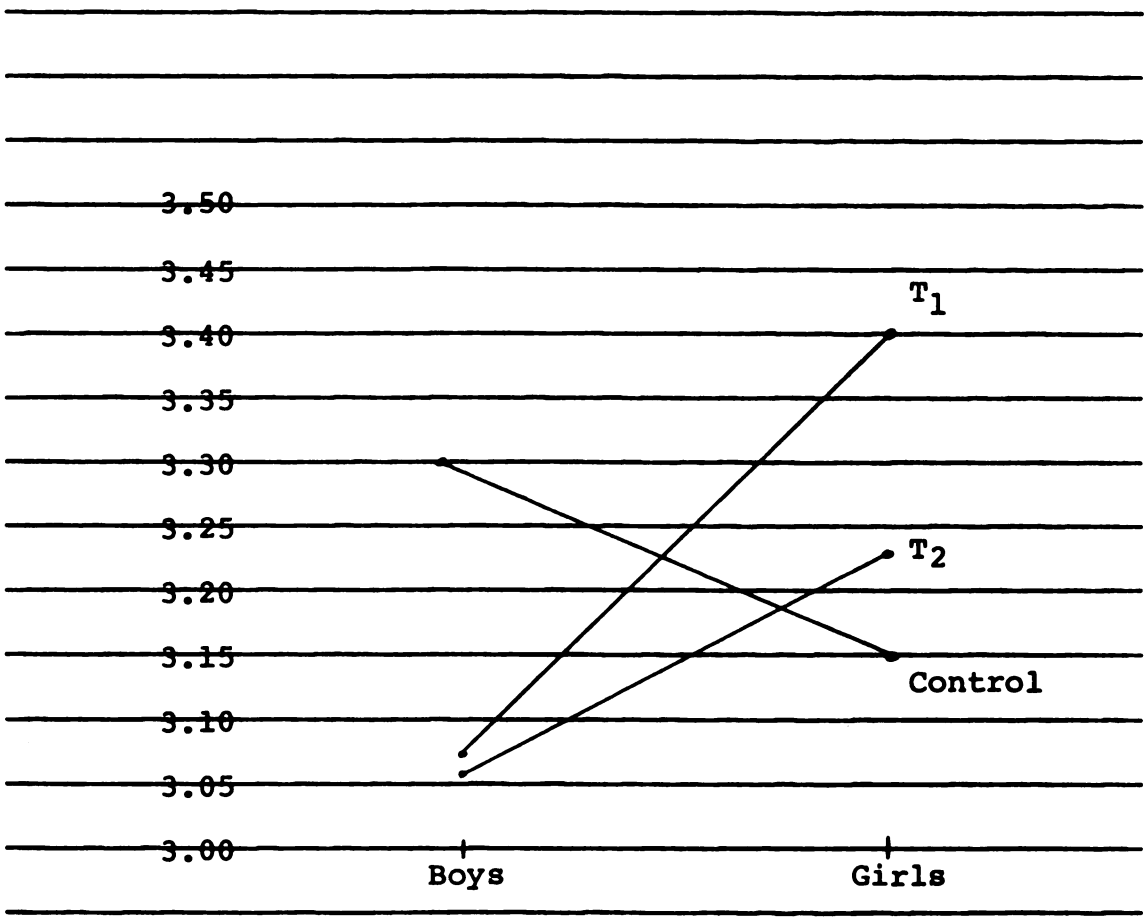


Fig. B.2.--Analysis of covariance, grade equivalent scores, graph of adjusted mean scores.

TABLE B.4.--Analysis of covariance, grade equivalent scores, sums of squares needed for the adjustment for analysis of covariance

Sources of Variation	SS(X)	SS(XY)	SS(Y)
Treatment	1.9447	1.3936	1.0101
Classroom : Treatment	5.1548	3.1808	2.2269
Sex	0.1443	0.1168	0.0945
Sex X Treatment	0.0671	0.1121	0.2194
Sex X Classroom : Treatment	0.4271	0.0801	0.2498

APPENDIX C

READING COMPREHENSION ACTIVITIES

APPENDIX C

ORIENTATION SESSION E^1

SCRAMBLED WORDS

TEACHER DIRECTIONS

I. "Today we are going to learn how to make sense out of scrambled words. Listen carefully so you can learn how to do this."

PRINT WORDS ON BOARD

you did Santa what bring?

"See these words? They are all mixed up. Who can read the words for us? Now if we have to make a sentence using all of these words, what might it be? Who will write the sentence on the board for us?"

What did Santa bring you?

"Good! Did we use all of the words to make the sentence? (yes) Does the sentence make sense?" (yes) IF CHILDREN MAKE ERRORS WRITE THEM ON THE BOARD SO THEY CAN DISCOVER THEIR MISTAKES.

PASS OUT SKILLSHEET 1

II. "Here is a sheet with five scrambled sentences. Read each sentence and use all of the words to make a sentence like we just did. Let's do the first one together. Read the words on line 1 to yourself. Make a sentence using every word in

that line. Use only the words in that line. Write your sentence under line 1. What did you write?"

The boy ate the apple.

"Do all of the other sentences the same way. Be sure they all make sense! Turn your paper over when you are done."

III. Allow 10-15 minutes to complete, then discuss all of the answers with the children immediately after they finish.

IV. Please collect all papers for Mrs. Read.

ORIENTATION SESSION E^2

SENTENCE COMPLETION

TEACHER DIRECTIONS

I. "Today we are going to learn how to make sense out of sentence parts. Listen carefully so you can learn how to do this."

PRINT SENTENCE PARTS ON BOARD

1.	When does	lost his bike.
2.	Where does	Santa come?
3.	The poor boy	your friend live?

"See these numbered sentence parts on the left of the board? At the right are the last parts of those sentences, but they are not where they should be. Let's see if we can match the right parts together. Read all the sentence parts. Who will draw a line to the correct sentence part for each sentence?"

"Good! Do all the sentences make sense? (yes) Did you use all the parts of the sentences?" (yes)

II. PASS OUT SKILLSHEET 1

"Here is a skillsheet with five more sentence parts that need to be matched. Read each one carefully and draw a line to the part that best completes the sentence. Be sure they all make sense! Turn your paper over when you are done.

III. Allow 10-15 minutes to complete, then discuss all answers with the children immediately after they finish.

IV. Please collect all papers for Mrs. Read.

E[1]

NO._____

NAME_____

DATE_____

DIRECTIONS: READ THE SCRAMBLED WORDS. NOW WRITE THEM SO THEY MAKE SENSE.

1. boy the apple the ate.

_____

2. big made mama cake a.

_____

3. very grass the was green.

_____

4. have pet do a you?

_____

5. you bike can a ride?

_____

Note: Accept any reasonable answer.

1. the boy ate the apple.

2. mama made a big cake.

3. the grass was very green.

4. do you have a pet?
   you do have a pet?

5. can you ride a bike?
   you can ride a bike?

NO. 1

NAME _____

DATE _____

DIRECTIONS: READ THE SENTENCE PARTS WITH NUMBERS BY THEM. READ THE PART OF THE SENTENCES WITH LETTERS BY THEM. NOW DRAW A LINE TO THE PART THAT FINISHES THE SENTENCE. DOES IT MAKE SENSE?

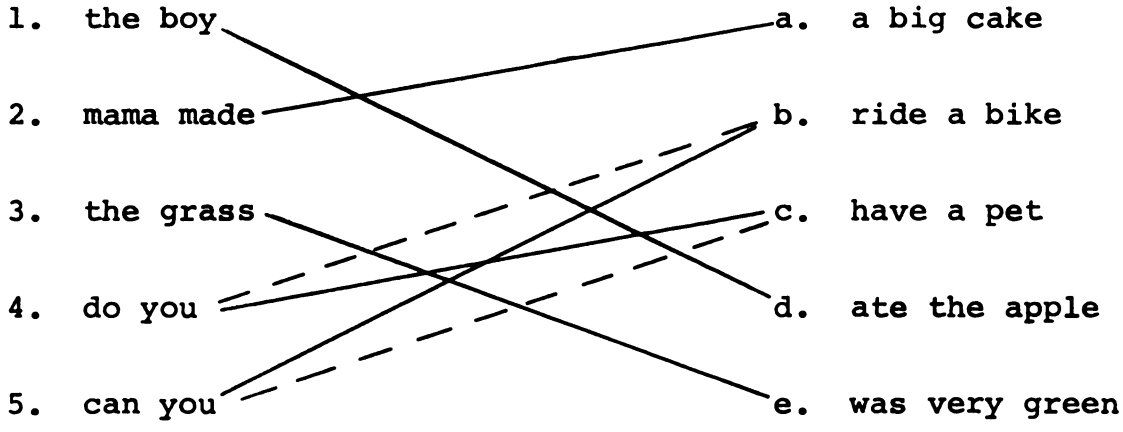
1. The boy	a. a big cake.
2. Mama made	b. ride a bike?
3. The grass	c. have a pet?
4. Can you	d. ate the apple.
5. Do you	e. was very green.

KEY

E^2

NO. 1

Note: Accept any reasonable answer. The dotted lines indicate alternative answers.



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