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SOME EFFECTS OF VISUAL IMAGERY ON THE READING COMPREHENSION OF THIRD GRADE CHILDREN

By

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ABSTRACT

SOME EFFECTS OF VISUAL IMAGERY ON THE READING COMPREHENSION OF THIRD GRADE CHILDREN

By

Beth Bossenbroek Schipper

This study investigated the application of visual imagery in teaching reading to third grade children and reports the observed effects on their reading comprehension.

This study was designed to be administered to nine classrooms of third grade students from a private school system in the Midwest. One group, the experimental group, received instructions in the use of visual imagery as an aid in reading comprehension. The other group, the control group, received no instructions or suggestions regarding visual imagery. Both the experimental and the control group read the same ten-paragraph prose selection and responded to the same question on that selection. Immediately after reading the selection, half of the experimental group and half of the control group were tested on their verbatim memory and reading comprehension. These groups were designated as E-1 and C-1. The other half of each group was not immediately tested. These groups were

designated as E-2 and C-2. One week later all subjects of both groups received the same test to measure comprehension and recall.

The results were analyzed with a univariate analysis of repeated measures designed to determine whether the visual imagery instructions given to the treatment groups resulted in significantly higher comprehension scores. It was hypothesized that the group receiving instructions in visual imagery would score significantly higher on semantic comprehension and verbatim recall tests than the group receiving no instructions in the use of visual imagery. Five major hypotheses were tested to determine the relationship of visual imagery on verbatim memory and semantic comprehension, on both immediate and delayed tests.

Conclusions

1. Instructions in the use of visual imagery and encouragement to use it while reading a selection does not significantly affect verbatim memory or semantic comprehension when students are tested immediately after reading the selection or when they are tested one week later without having taken an immediate test.

2. Instructions in the use of visual imagery in conjunction with the reinforcement of an immediate test does significantly affect long-term verbatim memory; however, it does not significantly affect long-term semantic comprehension.

3. The use of an immediate test is not significantly more effective than the use of visual imagery when either long-term verbatim memory or long-term semantic comprehension was measured.

4. The use of an immediate test significantly improves the scores on both a delayed verbatim memory test and a semantic comprehension test.

This study has shown, for the population and methods used, that the use of a combination of visual imagery and immediate testing improves long-term verbatim memory when compared with an immediate test and no visual imagery. Although the differences were not statistically significant, the difference in means also suggests that a combination of visual imagery and immediate testing may also be beneficial for long-term semantic memory when compared with an immediate test and no visual imagery.

Although this study did not focus on the effects of an immediate test or delayed verbatim memory or semantic comprehension, it did show a significant effect on the scores of both tests for the population and methods used.

Dedicated to

David Fisher for his love,
support, encouragement, and,
above all, his patience.

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CHAPTER I

THE PROBLEM

Our world of the twentieth century has been built and held together in great part by the written word. Consider the contracts, advertising, treaties and treatises, love letters, newspapers, notes to the milkman, specifications and reports, instructions and directions, great literature and bad literature, correspondence, examinations, medicine bottle labels, dissertations, job applications, and inspiration for lonely people. Any list demonstrating the importance of the written word, especially in today's environment of advanced technologies, heightened sensitivities, and omnipresent media, would indeed be long, if not endless.

The corollary is, of course, that in order for all these written words to be of any value, someone must read them and understand them. Most of us do that, fortunately, because we've been taught the skills of reading and have experienced the rewards of the entire process from a fairly early age. The ability to read is now something most of us take for granted in our various daily pursuits.

Yet, a 1969 U.S. census report indicated that 31 million adults 25 years and older were at or below a marginal survival threshold in literacy.[1] A 1971 Harris survey for the U.S. Department of Health, Education and Welfare showed that over 15 percent of our people beyond the age of 16 were illiterate, functionally illiterate, or suffered from deficiencies in their reading ability.[2] The need to upgrade basic standards of literacy in the United States has become a recognized national issue and millions of taxpayer dollars are being spent to improve reading achievement standards in the United States by 1980.[3] These funds are not only reinforcing the priority of reading instructions in elementary school curriculums; they are also being used to supplement secondary and college curriculums where inadequate reading skills have become apparent as well. It has become clear that while the great part of our citizenry can read well enough to help themselves and our society, there is still a significant number of people among us that cannot read or, if they can, they cannot read well enough. Those that cannot are at an obvious

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[1]Wanda D. Cook, Adult Literacy Education in the United States (Newark, Delaware: International Reading Association, 1977), p. 105.

[2]Roger DeDrow, Adult Reading Development (Washington, D.C.: National Reading Center Foundation, 1972), p. 4.

[3]Ibid., p. 108.

disadvantage when it comes to giving and receiving their fair share within our system. The need to remedy their situation is apparent.

Unfortunately, the remedy is not one that is immediately at hand. Research by educators and psychologists has been going on in the field of reading since the turn of the century. But only within the last decade has really significant attention been devoted to reading comprehension, the process a person goes through in order to extract meaning from written text. Current research efforts are designed to find procedures for improving that process. But the relatively young field is still formative and hampered by a complexity of ideas, theories, and processes difficult to verify by direct observation or measurement. Research experiments in reading comprehension are necessarily matters of practical application where various techniques are tried out on readers in controlled laboratory and classroom situations and attempts made to determine which techniques might really be helpful in teaching people to read with comprehension.

This paper outlines one such study. It deals with the application of visual imagery in teaching reading to eight-year-old elementary students and reports some of the observed effects on some aspects of their reading comprehension.

Background to the Problem

Reading is a complex cognitive process. Its complexity makes reading research difficult. Exploration is further complicated because the cognitive process involved in reading cannot be directly observed or empirically measured. Educators and psychologists continue to explore and define their processes and their components but their conclusions thus far about the reading process are diverse. Definitions cover a wide spectrum with authorities in the field of reading offering different views in the attempt to clarify what reading is. But they do share one common central conclusion: comprehension is the ultimate goal. As Durr points out:

> Reading is comprehending; unless the reader understands what he reads, he is not, in the truest sense of the word, reading. Although others may define reading as nothing more than pronouncing words on the printed page, the teacher cannot afford the luxury of such a loose definition. If our goal is to teach boys and girls to read, we must clearly understand that we have not yet achieved the goal until we have taught them to understand the printed page.[4]

But there is yet no consensus among researchers as to the elements of reading comprehension. Ekwall states, "Research to date has generally shown that we are not able to accurately differentiate more than about two

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[4]William K. Durr, ed., Reading Instruction: Dimensions and Issues (Boston: Houghton-Mifflin Co., 1967), p. 126.

or three broad factors (in comprehension)."[5] George and Evelyn Spache stress that

> Reading is not a group of separate skills to be practiced in isolation and later blended together into the total act. It is rather a total act from beginning, limited, of course, by the reader's reasoning capacities, his experiences and his reading abilities.[6]

For Spache and Spache, word identification is not enough to describe the reading process. Most important are the factors involved in word meanings, the relationships between ideas, and the mental processes used in reasoning. Dechant[7] views reading as two processes: the mechanical process of perception and the interpretation of the symbols by the reader. Dechant emphasizes that the reading process is not complete until the reader grasps the significance of the meaning. Dechant, like Spache, agrees that reading is more than one process and comprehension is the critical element. Gray[8] also views reading as a multi-faceted process

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[5]Eldon E. Ekwall, Diagnosis and Remediation of the Disabled Reader (Boston: Allyn and Bacon, Inc., 1976), p. 53.

[6]George Spache and Evelyn Spache, Reading in Elementary School (Boston: Allyn and Bacon, Inc., 1969), p. 8.

[7]Emerald V. Dechant, Improving the Teaching of Reading (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970), p. 400.

[8]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, 1966).

consisting basically of word perception and comprehension. Gray believes that the reader directs his attention to the printed page with his mind on meaning. The meaning may go beyond the literal level to critical levels of thinking--thus a reaction and fusion of new ideas with former experiences and ideas take place.

Although comprehension is the goal of the reading process, "we know far less about factors that influence comprehension of sentences and longer passages of discourse in reading than we do about factors that influence the recognition of individual words."[9] And reviews of the literature reveal few research studies in the area of reading comprehension until the last decade.

Neither is there agreement as to a single theoretical model of the comprehension process. Gibson and Levin state, "If there is no single reading process--but instead many reading processes, there can be no single model for reading."[10] Although no consensus has been reached regarding a theoretical model of comprehension, researchers have moved on to investigate the effectiveness of specific strategies for improving comprehension. Their investigations regarding instructional strategies and other

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[9]Eleanor J. Gibson and Harry Levin, The Psychology of Reading (Cambridge, Mass.: MIT Press, 1976), p. 392.

[10]Ibid., p. 438.

factors affecting comprehension fall into two categories. The first category of research focuses on the manipulation or organization of the text itself. The second category focuses on the effects of instructional or pre-learning strategies on the characteristic behaviors of the student.

Cromer[11] experimented by changing the structure of reading materials to see if it would benefit those who had poor comprehension but had adequate decoding and vocabulary skills. He organized a story in two ways. In the first, the sentences appeared in regular form. In the second, the sentences were organized according to agreed upon phrase boundaries as prescribed by LeFevre.[12] Cromer found that sentences in the regular form produced significant differences in the comprehension of good and poor readers. However, when the phrasing format was imposed on the sentences, the poor readers' comprehension was equal to that of the good readers. Thus, changing the organization of printed material proved effective for poor readers.

Ruddell[13] showed that more comprehension takes place when the material read resembles the sentence

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

[12]Carl A. LeFevre, Linguistics and the Teaching of Reading (New York: McGraw-Hill, 1964).

[13]Robert B. Ruddell, "The Effect of the Similarity of Oral and Written Patterns on Language Structure on Reading Comprehension," Elementary English 42 (1964): 403-10.

structure of the reader's own oral language pattern than when sentence patterns are strange. Rohwer and Matz[14] experimented with children from lower and middle class groups. Both groups differed in IQ and in reading achievement. Stories were read to the subjects with accompanying printed sentences or sketched pictures. The comprehension of both groups was greater when the stories were accompanied by pictures rather than printed sentences. This increase in comprehension was most pronounced and significant within the group of poor readers. Since the pictures seemed to aid comprehension of both good and poor readers, it seems plausible to ask what significance imposed pictures (as in Rohwer and Matz's study) or induced pictures play in reading comprehension. All of these studies suggest that organization of material may affect comprehension.

Farley and Eischens[15] studied the effect of adjunct questions on the reading comprehension of students in grades three to six. Adjunct questions inserted in prose passages proved to enhance comprehension both immediately

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[14]William D. Rohwer, Jr., and Robert D. Matz, "Improving Aural Comprehension in White and in Black Children: Pictures versus Print," Journal of Experimental Child Psychology 19 (1975): 23-36.

[15]Frank H. Farley and R. R. Eischens, "Children's Processing of Prose: The Effects of Question Arousal, Text Complexity and Learner Strata on Short- and Long-Term Retention," Technical Report No. 201, Wisconsin Research and Development for Cognitive Learning (1971).

and one week later for children in grades four to six. The results from children in grade three are unclear. These studies suggest that adjunct questions call attention to important facts or principles, thereby enhancing comprehension.

The second category of research focuses on the effects of instructional or prelearning strategies on the characteristic behavior of the reader. The emphasis of this research is upon the cognitive strategies the reader employs as a result of instructions given by an experimenter.

One such instructional strategy which has received some experimentation is the effect of visual imagery on comprehension. Many studies have shown that visual imagery can be put to conscious use and enhance the learning of paired associates.[16] These studies test the learning of lists of unrelated words to which the subjects must apply their own structure. For instance, to learn the paired

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[16]Richard C. Anderson, "Encoding Processes in the Storage and Retrieval of Sentences," Journal of Experimental Psychology 91 (1971): 338-40; Gordon H. Bower, "Imagery as a Relational Organizer in Associate Learning," Journal of Verbal Learning and Verbal Behavior 9 (1970): 529-33; Bergen R. Bugelski, "Images a Mediator in a One-Trial Paired-Associate Learning II: Self-Timing in Successive Lists," Journal of Experimental Psychology 77 (1968): 328-34; J. C. Yuille and Allan Paivio, "Imagery and Verbal Mediation Instructions in Paired-Associate Learning," Journal of Experimental Psychology 78 (1968): 436-41.

associate vase-bird, the subject might visualize a vase with a bird sitting on it. The use of visual imagery seems to help form these relationships between discrete items and aid in their recall. It is hypothesized that one item is recalled and acts as a retrieval cue for the associated item, thus generating the whole. The research here suggests that visual imagery may provide the organizational structure for remembering discrete items. Yet, even though the use of visual imagery has been proven to be a helpful memory strategy in learning unrelated words, little has been done with visual imagery as a strategy for the comprehension of prose.

The comprehension of prose involves cognitive processes about which little is actually known. Research to date has not proven that visual imagery is as effective a tool for comprehending prose as it is for memory of discrete items. There are two major distinctions between the recall of discrete items and the comprehension of prose which require further investigation. The most obvious distinction is the difference between isolated words or phrases and prose. Prose is characterized by its inherent organization. It is not a list of unrelated words or phrases. The words of prose are arranged in units according to certain rules of grammar and syntax in order to create relationships between words which in turn convey meaning. These meaningful or "semantic" units express the

ideas or concepts to be comprehended. The semantic unit to be comprehended is already embedded in the organizational structure provided by the text. The use of visual imagery as an additional device for organizing the whole to aid in comprehension and recall is still in question and the subject for additional research.

The second distinction is less clear. It involves the difference, if any, between comprehension and recall. If one recalls something, does it also mean that one has comprehended it? Are "recall" and "comprehension" interchangeable terms for the purpose of measuring the ability to extract meaning from written text? The literature shows differing views. In this study and paper the term "recall" will not be taken to mean comprehension, as "recall" can also mean the result of rote memory or verbatim recall, which does not necessarily involve true comprehension or understanding.

The research discussed above provides some insight into the factors that may influence reading comprehension. But further study of these factors is required in order to validate the new strategies and techniques which are to be included in actual instructional programs. This paper is a further investigation into the possibilities the application of visual imagery may have in enhancing reading comprehension.

Importance of the Study

Although there is an increased interest in research on reading comprehension, there remains a need for studies which are applicable to the classroom setting. The majority of studies regarding the factors which influence reading comprehension have been done in a laboratory setting. Furthermore, most of the research has been done with adults and is applicable only to adults. In order for the effectiveness of instructional strategies to be verified for the classroom teacher, research must be conducted with children in the classroom setting. Venezky states,

> If reading research is to influence instruction, then more experimental psychologists will have to be persuaded to interact professionally with educational planners and developers to concern themselves with the practical side of reading.[17]

Visual imagery has been studied by psychologists since the beginning of the century, but the relevance visual imagery may have for reading comprehension has been recognized only recently. Scientific proof of the effectiveness of visual imagery as a strategy to facilitate reading comprehension in children must still be obtained.

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[17]Richard L. Venezky, "A History on Research on Reading," Theoretical Paper No. 56, Wisconsin Research and Development Center for Cognitive Learning (1975).

Definition of Terms

Visual imagery--a mental picture response that occurs as a result of an extrinsic stimulus found in the context of written discourse.

Semantic comprehension--The definition of semantic comprehension for this study includes the processes involved in arriving at a literal understanding of text. Comprehension in this study does not include rote memory of words or sentences. (See verbatim memory.) It does include a complex cognitive process used in extracting the meaning from a text and its relation to an established system of knowledge.

Verbatim memory--recall of words or phrases as stated in the text. The author of this study does not define verbatim memory as comprehension.

Direction--The definition in this study refers to a command to carry out a set of actions; i.e., "use visual imagery."

Instructions--In this study instructions include the training or lessons given prior to performance. In this study the training of visual imagery was done through modeling.

Long-term--In this study long-term refers to a one-week period of time.

Purpose of the Study

The purpose of this study is to investigate the effects of instructions in visual imagery on the reading comprehension of third grade children.

Hypotheses

Hypothesis 1A: Pupils with visual imagery instructions will have significantly greater verbatim memory on an immediate test than pupils without visual imagery instructions.

Hypothesis 1B: Pupils with visual imagery instructions will have significantly greater semantic comprehension on an immediate test than pupils without visual imagery instructions.

Hypothesis 2A: When there is no immediate test for either group, pupils with visual imagery instructions will have significantly greater verbatim memory on a delayed test than pupils without visual imagery instructions.

Hypothesis 2B: When there is no immediate test for either group, pupils with visual imagery instructions will have significantly greater semantic comprehension on a delayed test than pupils without visual imagery instructions.

Hypothesis 3A: When there is an immediate test for both groups, pupils with visual imagery instructions will have significantly greater verbatim memory on a delayed test than pupils without visual imagery instructions.

Hypothesis 3B: When there is an immediate test for both groups, pupils with visual imagery instructions will have significantly greater semantic comprehension on a delayed test than pupils without visual imagery instructions.

Hypothesis 4A: Pupils with visual imagery instructions and no immediate test will have significantly greater verbatim memory on a delayed test than pupils without visual imagery instructions and an immediate test.

Hypothesis 4B: Pupils with visual imagery instructions and no immediate test will have significantly greater semantic comprehension on a delayed test than pupils without visual imagery instructions and an immediate test.

Hypothesis 5A: When both groups receive visual imagery instructions, pupils who have had an immediate test will have significantly greater verbatim memory on a delayed test than those with no immediate test.

Hypothesis 5B: When both groups receive visual imagery instructions, pupils who have had an immediate test will have significantly greater semantic comprehension on a delayed test than those with no immediate test.

Analysis of the Data

A univariate analysis of repeated measures design was used for this study. The independent variable is the type of treatment: imagery or non-imagery. The two

dependent variables are the scores on the verbatim and semantic tests.

Educational Implications

Research has just begun to verify the effects visual imagery may have as a strategy for improving comprehension of prose. This study investigates that possibility. The findings of this study may have implications for procedures to be incorporated in the instruction of reading.

Organization of the Study

The contents of Chapter I include an introduction, background to the problem, importance of the study, definition of terms, design and methodology, hypotheses, analysis of data, educational implications, and a summary of the organization of the study.

Chapter II presents a review of the literature related to the study. The review includes viewpoints and research relative to visual imagery and reading comprehension.

Chapter III is a description of the methodology and design used in the study. This includes a description of the sample, procedures for gathering data, and methods of analysis.

The research findings and analysis of the data are given in Chapter IV.

Chapter V summarizes and discusses the conclusions and recommendations for further study.

CHAPTER II

REVIEW OF THE LITERATURE

The research identified in the preceding chapter establishes the need for further study on the effects visual imagery may have on the comprehension of prose. A review of the literature shows research on the effects of visual imagery in paired associate learning but research has only just begun on the effects visual imagery may have on reading comprehension. The literature review for this study will deal specifically with the following areas:

1. Theoretical rationale for visual imagery as facilitator of learning;
2. The relationship of visual imagery to sentence recall; and
3. The relationship of visual imagery to the comprehension of prose.

Theoretical Viewpoints

The first research dealing with visual imagery and reading was begun 70 years ago by Edmund Huey.[1] Huey dealt

[1]Edmund B. Huey, The Psychology and Pedagogy of Reading (New York: Macmillan, 1908; reprinted, Cambridge, Mass.: MIT Press, 1968).

briefly with imagery and reading comprehension. He theorized that reading for meaning involved the arousal of images and feelings. He abandoned further work when he found it difficult to explain the imaging of prepositions, conjunctions, and adjectives.

Bugelski[2] continued Huey's work. He extended Huey's research to sentences and hypothesized that the reader stores meaning of the whole sentence in the form of a mental image rather than an image for each individual word. At the time of recall these mental images are revived and in turn restore the original associations.

Current theories of imaginal facilitation generally fall in two categories, the dual-coding approach and the relational organizer approach.[3] Similarities exist in these two general theories and brief descriptions of each are given below to show the groundwork upon which some empirical studies are based. Still other studies suggest that in some cases the paired associate learning theory has been prematurely extended to reading comprehension and that further research is required before the validity of that extension can be verified.

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[2]Bergen R. Bugelski, "Images as a Mediator in One-Trial Paired Associate Learning; II: Self-Timing in Successive Lists," Journal of Experimental Psychology 77 (1968): 328-34.

[3]Bergen R. Bugelski, "Words and Things and Images," American Psychologist 25 (1970): 1002-12.

Paivio[4] theorizes two independent but interconnected systems for processing information. One system is essentially a nonverbal imaginal system and the other a verbal or linguistic system. Paivio distinguishes between processing concrete material and processing abstract material. The meaning of concrete material is not tied to specific words but to a world of objects and events to which the words refer. Meaning for concrete material is mentally stored in both the linguistic and nonverbal imagery memories. Memory for concrete meaning depends on the arousal of these stored verbal associations and images. The meaning of abstract material, however, is tied to the verbal sequences and to store the meaning in memory is to retain the sequential wording itself. Therefore, memory for concrete material which is stored twice will exceed memory for abstract material which is stored once. Paivio and others have substantiated the dual-process theory with several studies.[5] Bower[6] theorizes that imagery is an

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[4]Allan Paivio, Imagery and Verbal Processes (New York: Holt, Reinhart and Winston, 1971).

[5]C. H. Ernest and Allan Paivio, "Imagery and Verbal Associative Latencies as a Function of Imagery Ability," Canadian Journal of Psychology 25 (1971): 83-90; Allan Paivio and Kalman Csapo, "Picture Superiority in Free Recall: Imagery or Dual Coding?" Cognitive Psychology 5 (1973): 176-206; Ian Begg and Allan Paivio, "Concreteness and Imagery in Sentence Meaning," Journal of Verbal Learning and Verbal Behavior 8 (1969): 821-27.

[6]Gordon H. Bower, "Mental Imagery and Associative Learning," in Cognition in Learning and Memory, ed. L. W. Gregg (New York: John Wiley and Sons, 1972), p. 263.

effective facilitator for learning as a result of its abilities to represent spatial relationships between paired associates and to act as an organizer of discrete information. In one study by Bower,[7] subjects who were instructed to learn paired associates by integrating the items as a whole (e.g., "whale-cigar" is visualized by a whale smoking a cigar) recalled significantly more than subjects who were instructed to visualize the paired referents separately. Begg supports Bower's findings and states, ". . . images aroused by discrete verbal stimuli can be combined into complex images . . . [and these] complex images are . . . functionally unitary, integrated memory structures."[8]

Lesgold states that imagery may be the mediator which enables the reader to attach meaning or relationships between the paired word referents. But sentences already have meaningful relationships among their component words as well as intersentence association and meaningfulness. Therefore he concludes: "If imagery mediation works by rendering the meaningless meaningful, then it should have

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[7]Gordon H. Bower, "Imagery as a Relational Organizer in Associative Learning," Journal of Verbal Learning and Verbal Behavior 9 (1970): 529-33.

[8]Ian Begg, "Recall of Meaningful Phrases," Journal of Verbal Learning and Verbal Behavior 11 (1972): 431.

less benefits as the materials become more like natural communication."[9]

The above theoretical approaches deal primarily with imaginal facilitation of paired associate learning. The rationale that these theories can be extended to the comprehension of sentences of prose may appear obvious but is not necessarily valid. To do so would equate the laboratory paired-associative task with all learning. This assumption conflicts with knowledge we have of learning and, more specifically, reading comprehension. Evidence based on the theories stated above concerning the nature and function of imagery in cognitive memory and comprehension is still unclear. It appears that the processes cannot be defined in more analytic terms and more research is needed, especially regarding the role of visual imagery in the learning from prose, before practical application in instructional programs can be supported.

Visual Imagery in Sentences

Although there is some disagreement among theorists regarding the understanding of imagery in cognitive processes, there have been studies demonstrating an imagery effect. The review which follows deals with an imagery effect in phrase and sentence recall.

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[9]Allan M. Lesgold and others, "The Role of Mental Imagery in Text Comprehension: Preliminary Studies" (paper presented at the Annual Meeting of the American Educational Research Association, 1974), p. 6.

Anderson and Hidde[10] asked a group of high school students to rate a set of sentences on imageability. Another group was asked to rate the same set of sentences on pronounceability. The incidental learning of the imagery group was three times that of the pronounceability group. Learning, in this case, was measured in terms of word-by-word recall. (Verbatim recall of words does not necessarily indicate "comprehension" as defined in this study.)

An additional study by Anderson[11] demonstrates an imagery effect in adult readers where those using visual imagery while reading sentences had a significantly higher level of recall than those using rote repetition of the same sentences.

James[12] compared students' recall of the objects and subjects from sentences containing high imagery or low imagery nouns. Recall of concrete nouns with a high imagery rating was greater than abstract nouns. These studies show a facilitation effect for imagery in verbatim recall of words in sentences.

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[10]Richard C. Anderson and Janet L. Hidde, "Imagery and Sentence Learning," Journal of Educational Psychology 62 (1971): 526-30.

[11]Richard C. Anderson, "Encoding Processes in the Storage and Retrieval of Sentences," Journal of Experimental Psychology 91 (1971): 338-40.

[12]C. T. James, "Theme and Imagery in the Recall of Active and Passive Sentences," Journal of Verbal Learning and Verbal Behavior 11 (1972): 205-11.

This research concerning visual imagery as a facilitator of learning in general and its use in recall of discrete words, phrases, and sentences is useful as a starting point for additional research. But there is a need for further investigation in order to determine whether visual imagery is really useful when it comes to extracting real meaning from a whole text.

Visual Imagery and Comprehension of Prose

The data summarized in Chapter I and the above studies clearly indicate that imagery facilitates the learning of concrete information which can be represented spatially in single word referents or in sentences. These previously analyzed studies dealt with the recall of items not bound together by the inherent organization found in prose. The readers applied their own organization and relational structures to the words or phrases by using imagery. Here lies a major distinction.

Prose differs from paired associates and single sentences. Prose is meaningful as a result of the relationships expressed within the passage and intersentence associations present an inherent organizational structure. The following studies demonstrate that there is still a real question as to whether imagery is equally as effective a facilitator for prose learning as it is for paired associates.

Anderson and Kulhavy[13] completed a study in which high school seniors were given directions to form vivid images while reading a 2000-word textbook passage. Comprehension was tested by a multiple-choice test and a short-answer test. Items were graded correct if the subject used paraphrased answers. Results did not show significant differences for students receiving imagery instructions. However, on a post-experiment questionnaire the students were asked if they used imagery and to what extent they used it. Half of the control group reported using imagery and two-thirds of the imagery group reported using imagery. Using this information, the scores were reanalyzed and those receiving imagery instruction who reported using imagery throughout half or all the selection did significantly better than those who reported not using or using little imagery while reading the selection.

Farley[14] found similar results with third, fourth, and fifth grade children who read a 230-word passage and were given visual imagery directions. Both short- and long-term retention were tested on 10 literal and 10

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[13]Richard C. Anderson and Raymond W. Kulhavy, "Imagery and Prose Learning," Journal of Educational Psychology 63 (1972): 242-43.

[14]Frank H. Farley, "Children's Learning from Discourse: Arousal and Imagery Effects on Literal and Inferential Comprehension," Technical Report No. 266 (Madison: Research and Development Center for Cognitive Learning, Wisconsin University, 1972).

inferential multiple-choice questions. Results showed a significant imagery effect of visual imagery on short-term inferential comprehension, but the effect of visual imagery was not present one week later. Imagery instructions seemed to impair long-term literal comprehension. Farley concludes that the use of visual imagery as a pedagogical device is not supported by his findings.

Levin and associates[15] have done considerable research in the facilitation effects of visual imagery on comprehension. One study found that fourth grade children (who possess adequate decoding skills and vocabulary but perform poorly in reading tasks because they fail to "integrate" text) benefit from an instruction to form mental images while reading individual sentences of a prose passage. The reading task in Levin's experiment consisted of reading sentences one at a time. This exercise only approximates an actual reading situation. The significance of the results in terms of reading comprehension for a whole text therefore remains in question.

Levin and Hawkins[16] conducted a further study. In this study, fourth grade children were separated into two

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[15]Joel R. Levin, "Inducing Comprehension in Poor Readers: A Test of a Recent Model," Journal of Educational Psychology 65 (1973): 19-24.

[16]Joel R. Levin and Patricia Divine Hawkins, "Visual Imagery as a Prose-Learning Process," Journal of Reading Behavior 6 (1974): 23-30.

experimental groups. In one experimental group the children listened to a story after receiving directions to use imagery. The other experimental group read a story after receiving directions to use imagery. After each read or listened to the story they responded orally to questions. Two control groups followed the same activities but received no imagery instructions. The results showed imagery instruction to be significant in comprehension in both the reading and listening groups. Imagery in the listening experimental group was most significant. Levin hypothesized that students who made mental images as they listened may have comprehended more than students who made mental images as they read because the listening group did not have the added task of processing the written word while imaging.

Kulhavy and Swenson[17] studied the effects of visual imagery on the comprehension of prose. Fifth and sixth grade children read a 20-paragraph text and were tested on verbatim and semantic recall both immediately and one week later. The experimental group was given directions to use visual imagery. Imagery learners performed significantly better on a delayed test, and analysis

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[17]Raymond W. Kulhavy and Ingrid Swenson, "Imagery Instructions and the Comprehension of Text," British Journal of Educational Psychology 45 (1975): 47-51.

proved that retention effects were not due to the presence of an immediate test.

Lesgold, Golinkoff and McCormick[18] completed a study with third and fourth grade children. Subjects in Lesgold's first study read six prose passages. The imagery group was instructed to draw cartoons of the events in the story when they completed their reading. The control group worked mazes. Following the reading-drawing cycles, the subjects were given key word clues and asked to recall what the passage was about. There was no significant difference between the groups.

Lesgold's second experiment included a four-week training procedure in which the children were taught "to coordinate verbal and pictorial representations by having them read passages, illustrate them with stick-figures cartoons, and use the illustrations as prompts in recalling passage content." Results were significantly in favor of the cartoon group on paraphrase recall but there was no transfer to other passages unless the children were reminded to use their new skills. In summary, it seems that the development of a cartoon drawing skill does not necessarily develop the use of internal or self-induced mental imagery.

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[18]Alan M. Lesgold and others, "The Role of Mental Imagery in Text Comprehension: Preliminary Studies" (paper presented at the Annual Meeting of the American Educational Research Association, 1974).

Pressley[19] expanded the concept of training eight year olds in the use of visual imagery. Children practiced forming images of progressively longer passages and saw slides of how their mental images might look. Following the 20-minute training session, the experimental subjects read a 950-word story divided into 17 segments and were instructed to form mental images following the reading of each segment. During the reading of the test booklet, oral directions to form mental pictures were given every minute. The comprehension of both groups was measured with a short-answer test of literal questions. Experimental subjects answered significantly more short-answer questions than the control group.

The work of Lesgold and Pressley indicates that primary children benefit from training in forming mental images. It also shows that the use of imagery does not become automatic at the outset and must be practiced before transfer to other reading selections takes place.

Summary and Conclusions

This chapter presented a review of literature addressing three major topics: theoretical viewpoints for visual imagery as a facilitator of learning; the relationship

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[19] G. Michael Pressley, "Mental Imagery Helps Eight-Year-Olds Remember What They Read," Journal of Educational Psychology 68 (1976): 355-59.

of visual imagery to sentence recall; and the effect of visual imagery on the comprehension of prose.

The first section suggested a perspective for the topic by describing the theoretical viewpoints for the effect visual imagery has on cognitive processes involved in learning. These theories have implications for the possible extension of a rationale for visual imagery as a facilitator for better reading comprehension. Recently, increased attention is being directed toward this goal.

The second section discussed the preliminary studies which showed an imagery effect for sentences. The studies by Anderson and James indicate that recall of words in sentences is directly related to concreteness of words and imagery.

In the final section, studies relating visual imagery to the comprehension of prose were reviewed. Results of a positive imagery effect in reading comprehension are not entirely clear from the studies by Anderson and Kulhavy and by Farley. Both studies were based on the assumption that students had an understanding of visual imagery and the experimenters merely gave directions to use it while reading. Levin's study has limited implications for imagery's effect on comprehension as a result of sentence-by-sentence exposure to the story. Implications for cognitive processing of visual imagery while reading were made in later studies by Levin and Divine-Hawkins.

Kulhavy and Swenson, Lesgold, and Pressley's results showed a facilitative imagery effect for reading comprehension and the importance of training in visual imagery was evident in Lesgold and Pressley's studies.

This review of existing literature reveals inconclusive findings regarding the benefits of using visual imagery as a strategy in enhancing reading comprehension. Some studies are supportive of visual imagery; others are not supportive or, at most, are weak. The need for further research, particularly in a primary-level classroom setting through an actual reading task, is evident. The study conducted and presented in this paper investigates the training of visual imagery and its effect on reading comprehension at the third grade level. The procedures used in this study are presented in Chapter III.

CHAPTER III

METHODOLOGY AND DESIGN

Research to date suggests that visual imagery is sometimes an influential factor in enhancing reading comprehension. But additional study is required in order to validate its use as a strategy or technique in actual instructional programs. This study directs further investigation toward that end. It is an inquiry into the effects of visual imagery on the reading comprehension of a selected population of third grade students. This chapter will describe the methodology and design of the study.

Overview

The study was designed to be administered to two different groups of third grade students. One group, the experimental group, received instructions in the use of visual imagery as an aid in reading comprehension. The other group, the control group, received no instructions or suggestions regarding visual imagery. Both the experimental and the control groups read the same 10-paragraph prose selection and responded to the same questions on that selection. Immediately after reading the selection, half of the experimental group and half of the control group

were tested on their verbatim memory and reading comprehension. These groups were designated as E-1 and C-1. The other half of each group was not immediately tested. These groups were designated as E-2 and C-2. One week later, all subjects of both groups received the same test to measure comprehension and recall. The results of the tests were then analyzed to determine whether the visual imagery instructions given to the one group affected their reading comprehension. It was hypothesized that the group receiving instructions in visual imagery would score significantly higher on comprehension and recall tests than the group receiving no instructions or suggestions regarding the use of visual imagery.

Development of the Study

There were basically six functions or steps to consider in the development of this study:

1. Selecting the reading material,
2. Formulating the test,
3. Selecting and screening the student sample,
4. Formulating instructions in visual imagery,
5. Administering the reading selection and the test, and
6. Analyzing test results.

These steps are explained more fully in this chapter.

Selecting the Reading Material

The selection of material to be read by both the experimental and control groups was the first step in developing the study. Since the use of visual imagery was crucial to the study, a selection was chosen which met several criteria. First, it is a narrative story which easily allows the reader to form mental pictures or images. Several studies have shown that the ability to form mental images is enhanced by the use of concrete nouns as opposed to abstract nouns.[1] The story chosen contains such sentences as, "Herman smiled to himself as he steered his new orange sports car along the crowded highway," and, "Slowly, Herman climbed the ladder to the diving board."

Second, the actions and objects described in the story were geared to the experiential background of all students in the test population. The reading selection did not contain foreign or strange ideas which might inhibit the ability to form mental images while reading and, thus, adversely affect comprehension. Harlan J. Shores[2] points

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[1]Allan Paivio and J. C. Yuille, "Changes in Associative Strategies and Paired-Associate Learning Over Trials as a Function of Word Imagery and Type of Learning Sets," Journal of Experimental Psychology 79 (1969): 458-63; Ian Begg and Allan Paivio, "Concreteness and Imagery in Sentence Meaning," Journal of Verbal Learning and Verbal Behavior 8 (1969): 821-27.

[2]Harlan J. Shores, "Dimensions of Reading Speed and Comprehension," Elementary English 45 (1968): 23-28.

out that the most important factors in speed and comprehension are those factors that relate the reader to the material he is reading, such as the reader's background of experience with the material.

Third, the story chosen was new and unknown to the readers so the comprehension test scores would not be influenced by previous exposure.

Fourth, the reading difficulty level of the selection was appropriate for most third grade children. The story selected met a readability of grade three when tested on the Fry Scale of Readability.

Last, the selection had no pictorialization, only printed text. One study which shows that the comprehension of text was aided by accompanying pictures was done by Matz and Rohwer.[3] Therefore, in order to ensure the resulting comprehension test scores reflected only results of self-induced visual imagery, the additional stimulus of pictures was avoided.

The reading selection meeting the above criteria was a 10-paragraph story titled "What Makes Herman Run?"

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[3]Robert D. Matz and William D. Rohwer, Jr., "Visual Elaboration of Text" (paper presented at the Annual Meeting of the American Educational Research Association, New York, March 1971).

from a recently published third grade basal reader from the Reading House Series.[4] (See Appendix A.)

Formulating the Test

The second step in the development of the study was to write the test which measured retention and comprehension of the story. The test consisted of 10 questions. Five questions were completion questions requiring one-word answers. The other five were open-ended paraphrased questions regarding story content.

The five one-word completion questions were items taken as directly as possible from the story and tested verbatim recall. Some studies cited earlier were measuring rote/verbatim memory of elements of sentences or paragraphs. To be able to quote elements of the story back from memory does not necessarily mean that the reader extracted meaning from the text and related it to his/her existing system of knowledge. It is possible that a reader could have no or very little understanding of the whole story yet still have sufficient rote memory on a verbatim recall test. This distinction between verbatim recall and comprehension is important in considering the results of this study.

The five open-ended questions were answered with one word, a phrase, or a sentence. The choice was left to

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[4]Allen S. Cohen and Joan Hyman, "What Makes Herman Run?" You Don't Know Big Until You Weigh a Whale and Other Selections (New York: Random House Publishing Co., 1977).

the individual subject. These five questions were lexical paraphrases of actual content within the story. They showed meanings similar to the story with no substantive words in common other than names or articles. An example of a paragraph from the story together with a verbatim recall question and a paraphrased question is as follows:

> Herman smiled to himself as he steered his new orange sports car along the crowded highway. He was going to the big city to be on TV. Lizzie Quizzie had called him to help her on the Mounds of Sounds Show.
>
> Lizzie was the star of the show. She asked people questions and if they gave the right answers, they won prizes. Maybe Lizzie would make him a star on the show, too, Herman thought.

Verbatim - 1. Herman was going to the city to be on _____.

Semantic - 2. What did Herman hope to become when he got to the city?

(See Appendix B.)

A second test was written to serve as a placebo test. It consisted of 10 questions totally unrelated to the story read. The questions were completion type and of a personal nature such as: "The game I like to play most is _____." The placebo test was given immediately following the reading to the experimental and control groups E-2 and C-2 being tested for comprehension by the delayed test only. Both types of tests were covered with a blank page to prevent subjects from recognizing different test copies (Appendix C).

Selecting and Screening the Student Sample

The population sample for this study was composed of nine third grade classrooms, approximately 120 students, from three middle-class private schools in the Midwest.

While all the subjects are of one particular religious faith, they seem to represent the general population from middle-class homes. All of the students appeared to be from stable homes, where parents actively encouraged and supported their educational achievements.

Two criteria were used to screen the students. The first criterion was that each student should have a third grade reading ability as measured by the Gates-MacGinitie Test C.[5] All students in the classrooms selected were given the test prior to the study treatment and those whose scores were below grade 3 level were not used in the study. The second criterion was that all students in the study had, to the best of their teacher's knowledge, normal hearing, vision, and writing skills.

The screened students were randomly assigned to one of the four treatment groups: 33 in group E-1, 29 in group E-2, 33 in Group C-1, and 29 in group C-2.

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[5] Gates-MacGinitie Reading Test, Primary C Form 1 (New York: Teachers College, Columbia University, 1964).

Formulating Instructions in Visual Imagery

Because it could not be assumed that the third grade subjects already had an understanding of "visual imagery" or "forming mental pictures" about the text, it was necessary to formulate instructions in order to train them in the use of visual imagery. Lesgold[6] and Pressley[7] also point out the importance of giving young children detailed instructions in how to form visual images for the purposes of their studies.

The instructions to the experimental groups began with an explanation by the experimenter of the process she goes through when reading and an explanation of the need that all readers have to remember what was read. The experimenter then read a short paragraph to the treatment groups (E-1 and E-2 only) and followed with a verbal explanation of the pictures she formed in her mind as she read.

The children were then asked to form their own mental images as they listened to a short paragraph and then a longer passage read to them. The students then gave oral descriptions of what they saw in their minds as they listened to the two selections.

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[6]Alan M. Lesgold, "Imagery Training and Children's Prose Learning," Journal of Educational Psychology 5 (1975): 663-67.

[7]G. Michael Pressley, "Mental Imagery Helps Eight-Year-Olds Remember What They Read," Journal of Educational Psychology 68 (1976): 355-59.

Following these oral exercises, the students were directed to read the text selection and form mental pictures as they had just done in the oral examples. Before handing out the test booklets the experimenter asked two children to repeat the directions so there was no misunderstanding (Appendix D).

Administering the Reading Selection and the Test

The treatment was administered in each of the three schools during the same week. A classroom of approximately 30 students was tested at a time.

The first classroom consisted of experimental groups E-1 and E-2 and received the instructions in visual imagery. Following the imagery instructions, the children received the reading selection, "What Makes Herman Run?". Upon completing the reading, each student brought the story booklet to the experimenter and received a test booklet. Half of the students (group E-1) received the reading test booklets. The other half (group E-2) received the placebo test booklets. The E-2 group was not tested until one week later. The purpose of the placebo test was to prevent interference with the students in group E-1 who were taking an immediate reading test. The test booklets, both real and placebo, were randomly distributed to the students in the classroom.

Next, the experimenter brought the story booklets and test booklets to the classroom of control groups C-1 and C-2. These students were told they were going to receive a story to read. They received no visual imagery instructions. They were directed only to: "Please read carefully." The same procedure was used in distributing the story booklets to the control groups as was used for the experimental groups. Upon completing the reading task, the control groups received the test booklets. Half of the students (group C-1) received the immediate test booklet. The other half (group C-2) received the placebo test booklet. Again, both types of test booklets were distributed randomly.

To summarize, all treatment groups (E-1, E-2, C-1, and C-2) read the same story booklet. Groups E-1 and C-1, however, received a test immediately after reading the story while groups E-2 and C-2 received only a placebo test immediately after reading the selection.

One week later all treatment groups (E-1, E-2, C-1, and C-2) were given the identical test to determine long-term retention. This delayed test was the same test given to groups E-1 and C-1 immediately after they read the story one week earlier.

Analysis of Data

To determine the effects of the instructions in visual imagery given to groups E-1 and E-2, this study used

a univariate analysis of repeated measures design. The independent variable is the type of treatment: imagery or non-imagery. The two dependent variables are the scores on the verbatim (fill-in-the-blank) test and the semantic (open-ended question) test.

The hypotheses in the study, again, are:

Hypothesis 1A: Pupils with visual imagery instructions will have significantly greater verbatim memory on an immediate test than pupils without visual imagery instructions.

Hypothesis 1B: Pupils with visual imagery instructions will have significantly greater semantic comprehension on an immediate test than pupils without visual imagery instructions.

Hypothesis 2A: When there is no immediate test for either group, pupils with visual imagery instructions will have significantly greater verbatim memory on a delayed test than pupils without visual imagery instructions.

Hypothesis 2B: When there is no immediate test for either group, pupils with visual imagery instructions will have significantly greater semantic comprehension on a delayed test than pupils without visual imagery instructions.

Hypothesis 3A: When there is an immediate test for both groups, pupils with visual imagery instructions will

have significantly greater verbatim memory on a delayed test than pupils without visual imagery instructions.

Hypothesis 3B: When there is an immediate test for both groups, pupils with visual imagery instructions will have significantly greater semantic comprehension on a delayed test than pupils without visual imagery instructions.

Hypothesis 4A: Pupils with visual imagery instructions and no immediate test will have significantly greater verbatim memory on a delayed test than pupils without visual imagery instructions and an immediate test.

Hypothesis 4B: Pupils with visual imagery instructions and no immediate test will have significantly greater semantic comprehension on a delayed test than pupils without visual imagery instructions and an immediate test.

Hypothesis 5A: When both groups receive visual imagery instructions, pupils who have had an immediate test will have significantly greater verbatim memory on a delayed test than those with no immediate test.

Hypothesis 5B: When both groups receive visual imagery instructions, pupils who have had an immediate test will have significantly greater semantic comprehension on a delayed test than those with no immediate test.

Summary

One experimental and one control group were used for this study. The experimental group contained two separate treatment groups (E-1 and E-2) as did the control group (C-1 and C-2). The experimental treatment groups E-1 and E-2 received instructions in visual imagery while the control treatment groups C-1 and C-2 did not. All of the treatment groups read the identical 10-paragraph story. Only experimental treatment group E-1 and control treatment group C-1 were tested for reading comprehension and verbatim memory immediately after reading the story. However, all treatment groups (E-1, E-2, C-1, and C-2) were tested in the same way for long-term comprehension and verbatim memory one week after reading the story.

Analysis of the resulting data was done to determine whether instructions in visual imagery had any significant effect on test results.

CHAPTER IV

RESEARCH FINDINGS

Introduction

The effects of instructions in visual imagery on the comprehension of third grade students is the focus of the hypotheses in this study. The hypotheses were designed to explore whether or not reading comprehension varies with regard to the treatment of visual imagery instructions. This chapter presents the analysis of variance used in this 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. The third section includes a summary of the results of the study.

Hypotheses

Hypothesis 1A: Pupils with visual imagery instructions will have significantly greater verbatim memory on an immediate test than pupils without visual imagery instructions.

Hypothesis 1B: Pupils with visual imagery instructions will have significantly greater semantic comprehension

on an immediate test than pupils without visual imagery instructions.

Hypothesis 2A: When there is no immediate test for either group, pupils with visual imagery instructions will have significantly greater verbatim memory on a delayed test than pupils without visual imagery instructions.

Hypothesis 2B: When there is no immediate test for either group, pupils with visual imagery instructions will have significantly greater semantic comprehension on a delayed test than pupils without visual imagery instructions.

Hypothesis 3A: When there is an immediate test for both groups, pupils with visual imagery instructions will have significantly greater verbatim memory on a delayed test than pupils without visual imagery instructions.

Hypothesis 3B: When there is an immediate test for both groups, pupils with visual imagery instructions will have significantly greater semantic comprehension on a delayed test than pupils without visual imagery instructions.

Hypothesis 4A: Pupils with visual imagery instructions and no immediate test will have significantly greater verbatim memory on a delayed test than pupils without visual imagery instructions and an immediate test.

Hypothesis 4B: Pupils with visual imagery instructions and no immediate test will have significantly greater semantic comprehension on a delayed test than pupils without visual imagery instructions and an immediate test.

Hypothesis 5A: When both groups receive visual imagery instructions, pupils who have had an immediate test will have significantly greater verbatim memory on a delayed test than those with no immediate test.

Hypothesis 5B: When both groups receive visual imagery instructions, pupils who have had an immediate test will have significantly greater semantic comprehension on a delayed test than those with no immediate test.

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

Analysis of Variance

To examine each 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.

For this study five major hypotheses were tested. The first hypothesis related to significant differences between experimental and control groups on immediate verbatim and semantic tests.

The second hypothesis related to significant differences between experimental and control groups on delayed verbatim and semantic tests when no immediate test was given.

The third hypothesis related to significant differences between experimental and control groups on delayed verbatim and semantic tests when an immediate test was given.

The fourth hypothesis related to significant differences between experimental groups without an immediate test and control groups with an immediate test on delayed verbatim and semantic tests.

The fifth hypothesis related to significant differences between experimental groups with an immediate test and experimental groups without an immediate test on delayed verbatim and semantic tests.

Although there are five hypotheses, there are two separate analyses for each. One of the analyses used the verbatim memory raw scores; the other used the semantic comprehension raw scores.[1] For each hypothesis the analysis using raw scores of the verbatim memory will be reported first and the analysis for the semantic comprehension test will follow.

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[1]David Fox, The Research Process in Education (New York: Holt, Reinhart and Winston, Inc., 1969), pp. 305-306.

Hypothesis 1

H1a: There will be no significant differences on an immediate verbatim memory test between pupils receiving visual imagery instructions (E^1) and those receiving no visual imagery instructions (C^1).

The result of the comparison, shown in Table 4.1a, reveals that, although the students receiving visual imagery instructions (E^1) had a higher mean score on an immediate verbatim memory test than students who did not receive visual imagery instructions (C^1), the difference between the groups was not significant.

Table 4.1a.--Comparison of group receiving visual imagery instructions with group receiving no visual imagery instructions: Immediate verbatim test.

	Raw Score Means	F Ratio
E^1	3.6670 (N=33)	
		1.7456
C^1	3.2727 (N=33)	

The analysis of variance based on the raw scores with 1 and 64 degrees of freedom resulted in an F ratio of 1.7456. Since the computed F ratio of 1.7456 does not exceed the critical F ratio 4.000 the null hypothesis is not rejected. This means that there was no significant difference on the immediate verbatim test between pupils

receiving visual imagery instructions (E^1) and those receiving no imagery instructions (C^1).

H1b: There will be no significant differences on an immediate semantic comprehension test between pupils receiving visual imagery instructions (E^1) and those receiving no visual imagery instructions.

The result of the comparison shown in Table 4.1b reveals that, although students receiving visual imagery instructions (E^1) had a higher mean score on an immediate semantic comprehension test than students not receiving visual imagery instructions (C^1), the difference between groups was not significant.

Table 4.1b.--Comparison of group receiving visual imagery instructions with group receiving no visual imagery instructions: Immediate semantic test.

	Raw Score Means	F Ratio
E^1	3.8485 (N=33)	
		1.3742
C^1	3.4242 (N=33)	

The analysis of variance based on the raw scores with 1 and 64 degrees of freedom resulted in an F ratio of 1.3742. Since the computed F ratio 1.3742 does not exceed the critical F ratio 4.000 the null hypothesis is not rejected. This means that there was no significant

difference on the immediate semantic test between pupils receiving visual imagery instructions (E^1) and those receiving no visual imagery instructions (C^1).

Hypothesis 2

H2a: When there is no immediate test for either group there will be no significant difference on a delayed verbatim memory test between pupils receiving visual imagery instructions (E^2) and those receiving no visual imagery instructions (C^2).

The result of the comparison shown in Table 4.2a reveals that, although students receiving no visual imagery instructions (C^1) had a higher mean score on a delayed verbatim memory test than students receiving visual imagery instructions (E^2), the difference between groups was not significant.

Table 4.2a.--Comparison of group receiving visual imagery instructions and no immediate test with group receiving no visual imagery instructions and no immediate test: Delayed verbatim test.

	Raw Score Means	F Ratio
E^2	2.1379 (N=29)	
		.7744
C^2	2.2414 (N=29)	

The analysis of variance based on the raw scores with 1 and 56 degrees of freedom resulted in an F ratio

of .7744. Since the computed ratio .7744 does not exceed the critical F ratio 4.000 the null hypothesis is not rejected. This means that there was no significant difference on a delayed verbatim memory test between pupils receiving no visual imagery instructions (C^2) and pupils receiving visual imagery instructions (E^2) when no immediate test was given either group.

H2b: When there is no immediate test for either group there will be no significant difference on a delayed semantic comprehension test between pupils receiving visual imagery instructions (E^2) and those receiving no visual imagery instructions (C^2).

The result of the comparison shown in Table 4.2b reveals that, although students receiving visual imagery instructions (E^2) had a higher mean score on a delayed semantic comprehension test than students not receiving visual imagery instructions (C^2), the difference between groups was not significant.

Table 4.2b.--Comparison of group receiving visual imagery instructions and no immediate test with group receiving no visual imagery instructions and no immediate test: Delayed semantic test.

	Raw Score Means	F Ratio
E^2	2.7931 (N=29)	
		2.8996
C^2	2.1371 (N=29)	

The analysis of variance based on the raw scores with 1 and 64 degrees of freedom resulted in an F ratio of 2.8996. Since the computed F ratio 2.8996 does not exceed the critical F ratio 4.000 the null hypothesis is not rejected. This means that there was no significant difference on a delayed semantic comprehension test between pupils receiving visual imagery instructions (E^2) and those receiving no visual imagery instructions (C^2) when no immediate test was given either group.

Hypothesis 3

H3a: When both groups (E^1 and C^1) are given an immediate test, there will be no significant difference on a delayed verbatim test between pupils receiving visual imagery instructions (E^1) and those receiving no visual imagery instructions (C^1).

The result of the comparison shown in Table 4.3a reveals that students receiving visual imagery instructions and an immediate test (E^1) had a significantly higher mean score on a delayed verbatim memory test than students not receiving imagery instructions and an immediate test (C^1).

The analysis of variance based on the raw scores with 1 and 64 degrees of freedom resulted in an F ratio of 6.6656. Since the computed F ratio does exceed the critical F ratio 4.000 the null hypothesis is rejected. This means that when students received visual imagery instructions and an immediate test (E^1) they scored significantly

higher on a delayed verbatim test than students receiving no visual imagery (C^1) and an immediate test.

Table 4.3a.--Comparison of group receiving visual imagery instructions and an immediate test with group receiving no visual imagery instructions and an immediate test: Delayed verbatim test.

	Raw Score Means	F Ratio
E^1	3.6364 (N=33)	
		6.6656
C^1	2.6667 (N=33)	

H3b: When both groups (E^1 and C^1) are given an immediate test there will be no significant difference on a delayed semantic test between pupils receiving visual imagery instructions (E^1) and those receiving no visual imagery instructions (C^1).

The results of the comparison shown in Table 4.3b reveal that, although students receiving visual imagery instructions and an immediate test (E^1) had a higher mean score on a delayed semantic comprehension test than students not receiving visual imagery instructions and an immediate test (C^1), the difference was not significant.

The analysis of variance based on the raw scores with 1 and 64 degrees of freedom resulted in an F ratio of 3.1201. Since the computed F ratio does not exceed the critical F ratio 4.000 the null hypothesis is not rejected.

This means that there was no significant difference on a delayed semantic test between pupils receiving visual imagery instructions (E^1) and those receiving no visual imagery instructions (C^1) when an immediate test was given both groups.

Table 4.3b.--Comparison of group receiving visual imagery instructions and an immediate test with group receiving no visual imagery instructions and an immediate test: Delayed semantic test.

	Raw Score Means	F Ratio
E^1	3.9394 (N=33)	3.1201
C^1	3.2727 (N=33)	

Hypothesis 4

H4a: There will be no significant difference on a delayed verbatim test between pupils receiving visual imagery instructions and no immediate test (E^2) and pupils receiving an immediate test and no visual imagery instructions (C^1).

The result of the comparison shown in Table 4.4a reveals that, although students receiving no visual imagery instructions and an immediate test (C^1) had a higher mean score on a delayed verbatim memory test than students receiving visual imagery instructions and no immediate test (E^2), the difference was not significant.

Table 4.4a.--Comparison of group receiving visual imagery instructions and no immediate test with group receiving no visual imagery instructions and an immediate test: Delayed verbatim test.

	Raw Score Means	F Ratio
E^2	2.1379 (N=29)	
		1.7883
C^1	2.6667 (N=33)	

The analysis of variance based on the raw scores with 1 and 60 degrees of freedom resulted in an F ratio of 1.7883. Since the computed F ratio 1.7883 does not exceed the critical F ratio 4.000 the null hypothesis is not rejected. This means that there is no significant difference on a delayed verbatim test between pupils receiving visual imagery instructions and no immediate test and pupils receiving an immediate test and no visual imagery instructions.

H4b: There will be no significant differences on a delayed semantic test between pupils receiving visual imagery instructions and no immediate test (E^2) and pupils receiving an immediate test and no visual imagery instructions (C^1).

The result of the comparison shown in Table 4.4b reveals that, although students receiving no visual imagery instructions and an immediate test (C^1) had a higher mean score on a delayed semantic comprehension test than students

receiving visual imagery instructions and no immediate test (E^2), the difference was not significant.

Table 4.4b.--Comparison of group receiving visual imagery instructions and no immediate test with group receiving no visual imagery instructions and an immediate test: Delayed semantic test.

	Raw Score Means	F Ratio
E^2	2.7931 (N=29)	
		1.2437
C^1	3.2727 (N=33)	

The analysis of variance based on the raw scores with 1 and 60 degrees of freedom resulted in an F ratio of 1.2437. Since the computed F ratio 1.2437 does not exceed the critical F ratio 4.000 the null hypothesis is not rejected. This means that there is no significant difference on a delayed semantic test between pupils receiving visual imagery instructions and no immediate test and pupils receiving an immediate test and no visual imagery.

Hypothesis 5

H5a: When both groups receive visual imagery instructions there will be no significant difference on a delayed verbatim test between those pupils receiving an immediate test (E^1) and those pupils receiving no immediate test (E^2).

The result of the comparison shown in Table 4.5a reveals that students receiving visual imagery instructions and an immediate test (E^1) had a significantly higher mean score on a delayed verbatim memory test than students receiving visual imagery instructions and no immediate test (E^2).

Table 4.5a.--Comparison of group receiving visual imagery instructions and an immediate test with group receiving visual imagery instructions and no immediate test: Delayed verbatim test.

	Raw Score Means	F Ratio
E^1	3.6364 (N=33)	
		19.486
E^2	2.1379 (N=29)	

The analysis of variance based on the raw scores with 1 and 60 degrees of freedom resulted in an F ratio of 19.486. Since the computed F ratio 19.486 does exceed the critical F ratio 4.000 the null hypothesis is rejected. This means that when students received visual imagery instructions and an immediate test (E^1) they scored significantly higher on a delayed verbatim test than students receiving visual imagery instructions and no immediate test (E^2).

H5b: When both groups receive visual imagery instructions there will be no significant difference on a delayed semantic test between pupils receiving an immediate test (E^1) and those pupils receiving no immediate test (E^2).

The results of the comparison shown in Table 4.5b reveal that students receiving visual imagery and an immediate test (E^1) had a significantly higher mean score on a delayed semantic comprehension test than students receiving visual imagery and no immediate test (E^2).

Table 4.5b.--Comparison of group receiving visual imagery instructions and an immediate test with group receiving visual imagery instructions and no immediate test: Delayed semantic test.

	Raw Score Means	F Ratio
E^1	3.9394 (N=33)	
		15.8789
E^2	2.7931 (N=29)	

The analysis of variance based on the raw scores with 1 and 60 degrees of freedom resulted in an F ratio of 15.8789. Since the computed F ratio of 15.8789 does exceed the critical F ratio 4.000 the null hypothesis is rejected. This means that when students received visual imagery instructions and an immediate test (E^1) they scored significantly higher on a delayed semantic test than students

receiving visual imagery instructions and no immediate test (E^2).

Summary of Results

Hypothesis 1a: There was no significant difference on the immediate verbatim test between pupils receiving visual imagery instructions (E^1) and those receiving no imagery instructions (C^1).

Hypothesis 1b: There was no significant difference on the immediate semantic test between pupils receiving visual imagery instructions (E^1) and those receiving no visual imagery instructions (C^1).

Hypothesis 2a: There was no significant difference on a delayed verbatim memory test between pupils receiving no visual imagery instructions (C^2) and pupils receiving visual imagery instructions (E^2) when no immediate test was given either group.

Hypothesis 2b: There was no significant difference on a delayed semantic comprehension test between pupils receiving visual imagery instructions (E^2) and those receiving no visual imagery instructions (C^2) when no immediate test was given either group.

Hypothesis 3a: When students received visual imagery instructions and an immediate test (E^1) they scored significantly higher on a delayed verbatim test than students receiving no visual imagery (C^1) and an immediate test.

Hypothesis 3b: There was no significant difference on a delayed semantic test between pupils receiving visual imagery instructions (E^1) and those receiving no visual imagery instructions (C^1) when no immediate test was given either group.

Hypothesis 4a: There is no significant difference on a delayed verbatim test between pupils receiving visual imagery instructions and no immediate test (E^2) and pupils receiving an immediate test and no visual imagery instructions (C^1).

Hypothesis 4b: There is no significant difference on a delayed semantic test between pupils receiving visual imagery instructions and no immediate test (E^2) and pupils receiving an immediate test and no visual imagery instructions (C^1).

Hypothesis 5a: When students received visual imagery instructions and an immediate test (E^1) they scored significantly higher on a delayed verbatim test than students receiving visual imagery instructions and no immediate test (E^2).

Hypothesis 5b: When students received visual imagery instructions and an immediate test (E^1) they scored significantly higher on a delayed semantic test than students receiving visual imagery instructions and no immediate test (E^2).

Table 4.6a.--Analysis of variance for raw scores on immediate verbatim tests comparing treatment group E^1 to control group C^1.

Sources of Variation	d.f.	Sum of Squares	Mean Square	Computed F	Tabled F (.05)
Between Groups	1	2.5606	2.5606	1.7456	4.000
Within Groups	64	93.8788	1.4669		
Total	65	96.4394			

Table 4.6b.--Analysis of variance for raw scores on immediate semantic tests comparing treatment group E^2 to control group C^2.

Sources of Variation	d.f.	Sum of Squares	Mean Square	Computed F	Tabled F (.05)
Between Groups	1	2.9697	2.9697	1.3742	4.000
Within Groups	64	138.3030	2.1610		
Total	65	141.2727			

Table 4.7a.--Analysis of variance for raw score on delayed verbatim test comparing treatment group E^2 to control group C^2.

Sources of Variation	d.f.	Sum of Squares	Mean Square	Computed F	Tabled F (.05)
Between Groups	1	.1552	.1552	.0829	4.000
Within Groups	56	104.7586	1.8707		
Total	57	104.9138			

Table 4.7b.--Analysis of variance for raw scores on delayed semantic tests comparing treatment group E^2 to control group C^2.

Source of Variation	d.f.	Sum of Squares	Mean Square	Computer F	Tabled F (.05)
Between Groups	1	6.2241	6.2241	2.8996	4.000
Within Groups	56	120.2069	2.1466		
Total	57	126.4310			

Table 4.8a.--Analysis of variance for raw scores on delayed verbatim tests comparing treatment group E^1 and control group C^1.

Sources of Variation	d.f.	Sum of Squares	Mean Square	Computed F	Tabled F (.05)
Between Groups	1	15.5152	15.5152	6.6656	4.000
Within Groups	64	148.9697	2.3277		
Total	65	164.4848			

Table 4.8b.--Analysis of variance for raw scores on delayed semantic test comparing treatment group E^1 and control group C^1.

Sources of Variation	d.f.	Sum of Squares	Mean Square	Computed F	Tabled F (.05)
Between Groups	1	7.3333	7.3333	3.1201	4.000
Within Groups	64	150.4242	2.3504		
Total	65	157.7576			

Table 4.9a.--Analysis of variance for raw scores on delayed verbatim tests comparing treatment group E^2 and control group C^1.

Sources of Variation	d.f.	Sum of Squares	Mean Square	Computed F	Tabled F (.05)
Between Groups	1	4.3152	4.3152	1.7883	4.000
Within Groups	60	144.7816	2.4130		
Total	61	149.0968			

The next and final chapter will summarize the results and give implications and recommendations for future research.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The effect of visual imagery instructions on the reading comprehension of eight-year-olds was the focus of the general hypotheses of this study. The results and implications of the findings are presented in this final chapter.

Summary

This study was designed to test the effectiveness of instructions in visual imagery on reading comprehension. The sample was composed of nine classrooms from a private school system in the Midwest. The pupils of nine classrooms in each school were randomly assigned to one of the four groups: visual imagery instructions with an immediate and delayed test (E^1), visual imagery with only a delayed test (E^2), no visual imagery instructions with an immediate and a delayed test (C^1), and no visual imagery instructions and only a delayed test (C^2). The treatment groups (E^1 and E^2) received 20 minutes of instructions on how to form visual images before reading the selection and were encouraged to

make mental images as they read. The control groups (C^1 and C^2) received no visual imagery instructions.

All of the groups received the same delayed test, consisting of five verbatim memory questions and five semantic comprehension questions. One imagery group and one control group received the same test immediately after reading the selection.

Analysis of variance with one repeated measure was used to test significant differences between treatment effects on verbatim memory and semantic comprehension.

Conclusions

1. Instructions in the use of visual imagery and encouragement to use them while reading a selection do not significantly affect verbatim memory or semantic comprehension when students are tested immediately after reading the selection or when they are tested one week later without having taken an immediate test.

2. Instructions in the use of visual imagery in conjunction with the reinforcement of an immediate test do significantly affect long-term verbatim memory; however, they do not significantly affect long-term semantic comprehension.

3. The use of an immediate test is not significantly more effective than the use of visual imagery when either long-term verbatim memory or long-term semantic comprehension was measured.

4. The use of an immediate test significantly improves the scores on both a delayed verbatim memory test and a semantic comprehension test when students have received visual imagery instructions.

Implications

During the last decade the area of reading comprehension has received increasing emphasis in research. Almost without exception, reading programs incorporate reading comprehension as a major part of the instructional activities. Many types of activities are suggested by publishers and educators to increase comprehension of materials. However, many of the activities suggested are not supported by research. The majority of activities used are those which follow the reading of a selection, such as those found in workbooks or those used during discussions with the teacher. Few instructional strategies which may establish an organized cognitive pattern of behavior applicable by the reader to any selection in order to improve comprehension are used prior to the reading of a selection. Further, much of the research done in comprehension has been completed in laboratory settings. There remains the need for proven instructional strategies which are useful in the classroom by the classroom teacher.

The use of visual imagery is one such strategy that has been regarded as a relevant aid to learning by some

psychologists; however, only recently has there been an interest by researchers in the use of visual imagery to increase the comprehension of prose.

This study attempted to explore the possibility that the use of visual imagery while reading would improve the immediate and delayed verbatim memory and semantic comprehension of students.

This study has shown, for the population and methods used, that the use of a combination of visual imagery and immediate testing improves long-term verbatim memory when compared with an immediate test and no visual imagery. Although the differences were not statistically significant, the difference in means also suggests that a combination of visual imagery and immediate testing may also be beneficial for long-term semantic memory when compared with an immediate test and no visual imagery.

Although this study did not focus on the effects of an immediate test on delayed verbatim memory or semantic comprehension, it did show a significant effect on the scores of both tests for the population and methods used.

This study has not, however, provided a definitive answer regarding the application of visual imagery to the comprehension of prose. There are several limitations connected with this study which may explain why there were few significant differences between the compared test groups in this study.

Limitations

The most obvious limitation in this study may have been the small size of the sample. If the number of children used in this study had been greater than 124, more results might have been significant.

Another limitation is the inability to directly observe the use of visual imagery. It is possible that many of the pupils in the control groups were already naturally incorporating the use of imagery while reading. Thus, the differences in scores may not be reflective of the use of imagery by the treatment groups only.

In addition, although a 20-minute instruction in how to use imagery was given to the treatment groups, it may have been inadequate to significantly affect children in the third grade. Instructions and practice over several days may have made the use of the imagery strategy a more natural behavior while the child reads the selection.

Another possible limitation in this study may be the inadequacy of the test which attempted to measure semantic comprehension. Until research more clearly defines how to measure comprehension, we must rely on methods used today.

Significant results might also have been received if the treatment included four or five different reading selections done over a period of time.

A last limitation affecting the results of this study may have been the lack of preparation time for the control groups which might have paralleled the imagery instruction time of the treatment groups.

Instructional Significance

Although few of the test results had scores which significantly reflected the influence of visual imagery on semantic comprehension, the trend in scores may nonetheless have instructional significance. Until further research clarifies the strategy investigated in this study, it may have some value in instructional programs in reading. Other studies similar in nature to this one have shown significant results for imagery instructions.

It might be hypothesized that visual imagery may give an added stimulus to the memory or understanding of a prose selection by storing the elements of the text in a unitized representation which is later retrieved during recall. This study attempted to support the hypothesis that the comprehension of information is not achieved by storing the verbatim lexical wording from a prose selection but is achieved by storing the unitized image of the semantic "whole" or meaning. Therefore, it was hypothesized that imagery would significantly affect long-term semantic comprehension and that the verbatim memory for the lexical wording of a selection would fade more quickly over time,

and the meaning of selection might be more easily retrieved if it had been stored as a unitized whole through imagery--thus semantic comprehension has occurred.

Although results of this study supported only Hypotheses 3A, 5A, and 5B, there was a trend in Hypotheses 2A, 2B, and 3B in favor of imagery. This recall and comprehension, reinforced by imagery, has been shown in similar research to be especially facilitated in passages containing concrete nouns or specified spatial relations rather than abstract ideas. Gibson states,

> Content obviously plays a role in learnability. Some ideas are inherently more difficult than others, perhaps because of their abstractness. Concrete examples, illustrations, and metaphor should help if we can extrapolate from laboratory learning where imagery has been brought in as an aid to remembering.[1]

When combined with visual imagery instructions, the effects of an immediate test on delayed verbatim memory and semantic comprehension as measured in this study were significant.

Although the effects of immediate testing were not the focus of this investigation, its effect on the scores of both verbatim memory and semantic comprehension is significant. It appears that an immediate test may also give an added stimulus to reinforcing memory. To theorize on the effects of an immediate test as used in this study

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[1]Eleanor J. Gibson and Harry Levin, The Psychology of Reading (Cambridge, Mass.: MIT Press, 1976), p. 437.

would, however, be in question. It is in question because the test used for both the immediate and delayed test was identical; therefore a "practice effect" may have been present.

The effects of imagery and the effects of an immediate test pose interesting questions for future research.

Recommendations for Future Studies

There are many aspects and variables in a study of this nature which call for further investigation.

1. Future studies might use larger numbers of students to check the validity of the results.

2. A replication of this study might include several sessions of instructions in how to incorporate the visual imagery process while reading. This may insure that the strategy to be used by the pupils is a more natural behavior while reading.

3. A more thorough study regarding the evaluation and measurement of comprehension is needed. The processes of comprehension and memory are not yet known. These must be determined.

4. Since many factors may affect the comprehension of a particular selection (such as interest), it is suggested that several reading selections be used. This may insure a more valid measure than one selection.

5. Future research may look at the effects of immediate testing as a strategy for enhancing comprehension.

In conclusion, we have not identified a major effect of visual imagery alone on comprehension. Therefore, future research should continue to direct its attention toward clarifying the effect of visual imagery on comprehension.

APPENDICES

APPENDIX A

READING SELECTION

APPENDIX A

READING SELECTION

"What Makes Herman Run?"[1]

Herman smiled to himself as he steered his new orange sports car along the crowded highway. He was going to the big city to be on TV. Lizzie Quizzie had called him to help her on the Mounds of Sounds Show.

Lizzie was the star of the show. She asked people questions and if they gave the right answers, they won prizes. Maybe Lizzie would make him a star on the show, too, Herman thought.

Herman Henry the star. "No," he thought, "that sounds terrible. I'll have to think of a new name. Maybe I will call myself Handsome Herman or even Hollering Herman. Every time someone wins a prize on Lizzie's show, I could holler."

Looking in the car mirror, Herman thought of how it would feel to hear crowds of people shouting, "We love you Herman!" The truck driver behind Herman shouted, "Look at the road, not the mirror, you silly fool!"

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[1]S. Allen Cohen and Joan Hyman, "What Makes Herman Run?" You Don't Know Big Until You Weigh a Whale and Other Selections (New York: Random House Publishing Co., 1977).

Herman jumped. "Oh, I will never get to the city driving like this. I think I will stop for the night." He steered his orange sports car off the road and into the driveway of a motel. After he got to his room, he was so tired that he fell asleep right away.

He woke up early the next morning and looked out the window. "What a nice place this is," he thought, "and that pool outside my room looks great. I think I will go for a swim. That will wake me up. I can do a running dive right from my room. Everyone out there can watch and cheer as I dive into the pool."

Quickly, Herman opened his suitcase and got out his new purple bathing suit. He smiled at himself in the mirror. "My, oh my, I am a handsome thing!" he thought as he put on his bathing suit and his red robe. "Everyone will love Herman the TV star. I know they will clap their hands and cheer when they see me. Get ready, world, here I come," he said and stepped outside.

The people at the pool were surprised as the funny-looking man in the long red robe ran across the grass. "Look at me, look at me! I am a TV star," he shouted. "I'm Hollering Herman, star of the Mounds of Sounds show. Watch me as I do a beautiful dive into the pool!"

Slowly, Herman climbed the ladder to the diving board. He walked out to the edge of the board. "Oh, dear,

this is high," he thought, "but I cannot let them know that I am afraid. A TV star is not afraid."

"Look at me!" he shouted as he took off his long red robe. "Look at me!" Everyone looked at Herman and started to laugh. They laughed and laughed. "Why are they laughing?" thought Herman. Then he looked down. "Oh, my! Oh, dear! Oh, no!" he hollered. "I forgot to take off my pajamas before I put on my bathing suit." He ran and he ran and he ran!

APPENDIX B

VERBATIM MEMORY AND SEMANTIC COMPREHENSION TEST

APPENDIX B

VERBATIM MEMORY AND SEMANTIC COMPREHENSION TEST

Name_____

What Makes Herman Run?

1. Herman was going to the city to be_____.
2. What did Herman hope to become when he got to the city?
3. When someone wins a prize Herman thought he could _____.
4. What was Herman doing that made the truck driver yell at him?
5. What did Herman do right after the truck driver yelled at him?
6. Herman looked out of the window in the morning and saw a _____.
7. How did Herman think he looked in his suit and robe?
8. As Herman ran across the grass he_____.
9. Herman did not want the people to know he was_____.
10. Why did Herman run back to his room?

APPENDIX C

PLACEBO TEST

APPENDIX C

PLACEBO TEST

P. TEST II

Form 2

Directions: Fill in each blank. Spell the words the way they sound.

1. When my mother tells me I did something well I feel _____.
2. My favorite color is _____.
3. The story I like best is called _____.
4. My last name is _____.
5. In the summer I like to _____.
6. When I have to get up in the morning I feel _____.
7. The sky is _____.
8. If I had a pet snake I'd name him _____.
9. The season I like best is _____.
10. If I could go on a trip I'd go to _____.

APPENDIX D

VISUAL IMAGERY INSTRUCTIONS

APPENDIX D

VISUAL IMAGERY INSTRUCTIONS

Boys and Girls, sometimes when I read a story my mind can be far away. Even though my eyes are seeing all the words my mind is not thinking about the words I'm seeing. Then I have to start reading all over again. Has this ever happened to you?

Reading and not paying attention isn't going to help us learn is it? Today I'm going to teach you a new trick to help you remember what you are reading. Then you won't have to waste time re-reading like I often do. Would you like that?

Please listen to this paragraph. It's part of a story about a fire.

I. Willy watched the frightened girl.
She was afraid to jump.
She didn't move. She just stood still.
Then suddenly, she jumped way up,
Right off the window sill.

While I was reading that, boys and girls, I saw pictures in my mind. This is what I saw.

I saw a little girl high in a window of a big apartment building. Dark puffs of smoke are coming from the roof. She has long blonde braids and a pink dress on. She has this terribly frightened look on her face. She is not moving because she is so scared and looking far down to the ground. Then I see her suddenly push away and went falling thru the air--legs and arms held close to her body.

Did any of you see something like the picture I saw? Shut your eyes and try to see it. Open your eyes; can you still see it?

Let's give you a try at seeing pictures in your mind. Be ready to tell me what you saw when I am finished reading.

Once, there was a boy named David. He was wearing blue pants, and a striped shirt.

What did you see? Can you tell me?

(Call on 2 or 3 children.)

Let's try again: Listen to the words so you can make pictures.

David was carrying a bat and ball. He started to run down the street.

What did you see this time? Can someone else tell me what they saw?

Let's try again. Use the words to help you make a picture. This will help you remember.

Kate heard a whistle. The train was coming and the bridge was washed out. Then she ran to the tracks and waved her lantern at the train. It stopped just in time. Later a new bridge was built over the river. It was called the Kate Shelley bridge.

Who can tell me what about the pictures you saw in your mind?

(Call on 1 child.)

Did anyone see something a little different?

(Call on 1 more child.)

The pictures will help you remember what you have read. Now I am going to pass out a short story to you. I would like you to read it carefully and make pictures in your mind while you are reading. Can you remember to do that through the whole story?

Who wants to tell me what you are going to do?

(Call on 1 or 2 children until you get a satisfactory reply.)

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