5-1989

The Contribution of Mental Imagery to Performance in Specific Targeted Comprehension Skills

Barbara Yarrington Doore
The College at Brockport

Follow this and additional works at: https://digitalcommons.brockport.edu/ehd_theses
Part of the Educational Methods Commons, and the Language and Literacy Education Commons

To learn more about our programs visit: http://www.brockport.edu/ehd/

Repository Citation
https://digitalcommons.brockport.edu/ehd_theses/990

This Thesis is brought to you for free and open access by the Education and Human Development at Digital Commons @Brockport. It has been accepted for inclusion in Education and Human Development Master's Theses by an authorized administrator of Digital Commons @Brockport. For more information, please contact kmyers@brockport.edu.
THE CONTRIBUTION OF MENTAL IMAGERY TO PERFORMANCE IN SPECIFIC TARGETED COMPREHENSION SKILLS

THESIS

Submitted to the Graduate Committee of the Department of Education and Human Development State University of New York College at Brockport

In Partial Fulfillment of the Requirements for the Degree of Master of Science in Education

by

Barbara Yarrington Doore

State University of New York College at Brockport Brockport, New York

May, 1989
SUBMITTED BY:

Barbara Y. Doore

APPROVED BY:

Sandra J. Regy 5/8/89

Thesis Advisor  Date

Arthur E. Smith 5/25/89

Second Faculty Reader  Date

Mima Beem  5/25/89

Chairman, Graduate  Date

Policies Committee
Abstract

This study was designed to examine the effect mental imagery had on comprehension of poetry, prose and content area reading, and to develop one strategy to teach mental imagery.

Fifty-three sixth graders from a rural, middle public school in Western New York State participated in a mental imagery treatment program. The program was designed to determine if mental imagery was effective in significantly increasing the comprehension scores of the participants.

The pre-treatment and post-treatment comprehension tests consisted of questions which tested the five targeted areas: (1) detail, (2) finding the main idea, (3) comparison/contrast, (4) sequence, and (5) recall. To best determine the students' comprehension of the test, a short answer format was utilized.

The treatment consisted of six hours of instruction to be spread over six weeks divided up into 15 to 20 minute daily sessions.

The treatment sessions followed an alternating pattern of researcher reading one day and students silently reading similar material the next day to take into consideration the different learning styles of the students. Reading material was selected from fiction, poems, and content area textbooks.
After each time period where drawing took place, the students discussed similarities and differences in the drawings.

Appropriate statistical measures (independent and dependent t-tests) were used to determine the contribution of mental imagery to performance in specific targeted comprehension skills.

A further informal analysis was made through the entire treatment as the researcher looked at the students' daily drawings to determine if the individual drawings were accurate representative pictures of that day's text.

Three of the four null hypotheses were retained. There was no statistical significant difference in the posttest means. The results were inconclusive as far as recommending a mental imagery treatment over a traditional reading program.

There was no statistical significant difference, therefore, no educational importance.

Further research is needed: to develop tests to determine the ability to use mental imagery, to determine the necessary length of a mental imagery treatment, to discover for whom imagery works best, and under what environmental conditions imagery activities are best received.
# Table of Contents

<table>
<thead>
<tr>
<th>Chapter I</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement of the Problem</td>
<td>1</td>
</tr>
<tr>
<td>Purpose</td>
<td>2</td>
</tr>
<tr>
<td>Need for the Study</td>
<td>3</td>
</tr>
<tr>
<td>Question to be Answered</td>
<td>4</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>5</td>
</tr>
<tr>
<td>Limitations of the Study</td>
<td>6</td>
</tr>
<tr>
<td>Summary of the Chapter</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter II</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of the Literature</td>
<td>8</td>
</tr>
<tr>
<td>Purpose</td>
<td>8</td>
</tr>
<tr>
<td>Pictorial Illustrations in Instruction</td>
<td>8</td>
</tr>
<tr>
<td>Mental Imagery</td>
<td>11</td>
</tr>
<tr>
<td>Reading Ability</td>
<td>11</td>
</tr>
<tr>
<td>Age</td>
<td>12</td>
</tr>
<tr>
<td>Imagery Helpful</td>
<td>15</td>
</tr>
<tr>
<td>Why Mental Imagery?</td>
<td>20</td>
</tr>
<tr>
<td>Teaching Mental Imagery</td>
<td>22</td>
</tr>
<tr>
<td>Summary of the Chapter</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter III</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Design of the Study</td>
<td>26</td>
</tr>
<tr>
<td>Purpose</td>
<td>26</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>26</td>
</tr>
</tbody>
</table>
Chapter 1

Statement of the Problem

Mental imagery (forming mentally visual images of objects not present to the eye) has been used successfully in many fields: to improve memory, to set life goals, to create, to build ego, and to expand consciousness, just to name a few. More detailed examples of the usefulness of mental imagery come to mind. In medicine the patient imagines the medicine going to the sick part of the body and promoting healing. In sports the athlete (basketball player or Olympic medalist) pictures victory. When using biofeedback, a type of stress management, a person imagines him/herself at a favorite place (woods, seashore, etc.) in a relaxed state thus controlling body temperature. For self-improvement a person pictures a slim body. When using rehearsal imaging, one imagines approaching a supervisor with an innovative idea, and receiving praise for this unique idea. For problem solving a person uses imagery to work through to a successful solution.

In education, imagery has been successful. Imagery involves the often ignored right hemisphere of the brain. In research studies imagery has improved
vocabulary, attention to detail, and recall. Students with different reading ability levels use different amounts of imaging. Studies (Johnston, 1980; Lesgold, McCormick & Golinkoff, 1975) show that children with a lower level of reading ability need training, experiences and reminders in order to successfully employ mental imagery.

Research suggests that classroom teachers must encourage students to generate images themselves instead of constantly imposing preconceived images on their students (Gerler, 1984; Levin, 1977). Greeson and Zigarmi (1985) stated that:

More of an effort must be made to induce the learner to generate pictorial representations through internal visual imagery. Images can be induced in poetry, literature, science, and even mathematics classes, as well as in art and music experiences. (p.45).

Purpose

The purpose of this study was to examine the effect mental imagery had on comprehension of poetry, prose and content area reading.

A second purpose of this study was to develop one strategy to teach mental imagery.
Need for the Study

Mental imagery is perhaps not understood and therefore neglected in classroom instruction. Contemporary education fails to make the student aware of his or her own capacity for mental imagery and does not provide much opportunity to develop this inner resource. Levin (1977) states that classroom teachers must encourage students to generate images themselves instead of constantly imposing preconceived images on their students.

"As the child matures and the capacity for anticipatory images develops, he or she must have the opportunity to develop the skills of drawing and imagining recombinations of different images" (Greeson & Zigarmi, 1985, p. 47).

Imaging is not effective if the child or adult is a poor imager. The poor or resistant imager needs first to develop the ability to conjure up images before he can be shown how to utilize the skill. Imagery enhancement aids include: dream recall, listening to descriptive stories, playing memory games, and all forms of drawing. Next determine visual imagery ability by asking the subject to close his eyes and try to conjure up specific images (parent’s face,
light bulb, etc.). Then try to move the image around or change its color (Forrest, 1981).

Evidence suggests that mental images contribute significantly to achievement in most, if not all, school subjects (Gerler, 1984). Research shows students had better recall, retention and understanding of the text if they practiced mental imagery. High ability readers used mental imagery as an organizational strategy. Average to low ability readers required training, experience and reminders to use mental imagery.

Mental imagery can be used to create a relaxed state. Learning takes place when the student is relaxed.

An abundance of research has been based on imagery used to learn words, or pairs of words. Much less research has dealt with the result of mental imagery on comprehension of prose.

**Question to be Answered**

Does mental imagery, during the reading of prose, contribute to performance in specific targeted comprehension skills (detail, main idea, comparison/contrast, sequence and recall)?
Definition of Terms

BASIC ID - acronym for the factors that govern human development: behavior, affect, sensation, imagery, cognition, interpersonal relations, and diet/physiology.

IMAGING or MENTAL IMAGERY - forming mentally visual images of objects not present to the eye

INTACT CLASSROOM - untouched, whole group of students

INTERACTIVE IMAGERY - make a cumulative picture in which a mental picture of each new item was added to interact with the mental pictures of previous items.

In a paired-association - a mental picture that included both members of each pair joined in some way.

PARTIAL PICTURES - depicting only a portion of the story contents

SEPARATE IMAGERY - make a mental picture of each individual item presented. In a paired-association to make a picture of each individual member of each pair

TARGETED READING COMPREHENSION SKILLS - for the purpose of this study the targeted skills were: (1) detail, (2) finding the main idea, (3) comparison/contrast, (4) sequence, (5) recall
VISUAL RECALL - the ability to remember by conjuring up a visual image based on past input when current input is no longer present.

VISUAL RECOGNITION - the ability to remember by matching a current visual input against an internal image reconstructed from a similar past input.

VISUALIZATION - forming in the mind a mental picture of the ideas presented by the author, such as main idea, supporting details, etc. and using this mental picture to help understand the author's purpose and organization.

Limitations of the Study

The following were variables that could have limited the results of the study:

1. The nature of the participants, a rural community may not be representative of a normal population.

2. The availability of a norm-referenced test of comprehension measuring the targeted skills, as opposed to a researcher-designed test measuring the same skills, may have influenced the validity and reliability of the results.
3. The researcher conducted the imaging treatment rather than the sixth grade teacher, thus limiting the true effects of a imaging treatment program.

Summary

Mental imagery has been used successfully in many fields including education. In research studies imagery has improved vocabulary, attention to detail, and recall.

Research in mental imagery indicates that the ability to use imagery meaningfully is a developmental process, increasing with age and education. Students must have the opportunity to develop the skills of drawing and imagining. Some students need instruction in imaging techniques.

Evidence suggests that mental images contribute significantly to achievement in school subjects. Research shows students had better recall, retention and understanding of the text if they practiced mental imagery.

An abundance of research has been based on imagery used to learn words, or pairs of words. Much less research has dealt with the result of mental imagery on comprehension of prose.
Chapter II

Review of the Literature

Purpose

The purpose of this study was to examine the effect mental imagery had on comprehension of poetry, prose and content area reading.

A second purpose of this study was to develop one strategy to teach mental imagery.

The research related to this study focused on the development of specific reading ability levels and the relationship between mental imagery and reading comprehension.

Pictorial Illustrations in Instruction

Research dealing with the effectiveness of illustrations on learning is abundant. The findings are not all in agreement.

Samuels (1967) cited research by Silverman, Davids and Andrews (1963) and Baker and Madell (1965), which found that performance by the less capable student was affected by distracting stimuli. Samuels' (1967) results showed that poor readers with no picture present, learned more words than students using an illustrated text. The difference among better readers
was not significant.

Koenke and Otto (1969) found that with sixth grade students, pictures facilitated the retention of factual information but not the comprehension of content. Holliday (1975), stated "that a certain kind of picture - simplified line drawings - can significantly facilitate a form of verbal comprehension" (p.79).

Levie (1973) stated that "many researchers have found that the ability to learn from pictures increases with age and education" (p.43). This finding may explain the conflict in the research concerning the effectiveness of illustrations.

Doane (1979) based a thesis on the effect of pictures and context cues on the acquisition and retention of sight words. Her findings suggested the use of pictures does not distract children from learning sight words. Neither does the use of context cues distract children. The rate of learning tended to be slower for children of low abiltiy. The retention of words was greater for children of high abilitiy than for children of low ability.

Wilkenson (1980) studied interactions between grade level and oral reading versus looking and listening. The results suggested a three-stage model in the development of skilled reading.
In the first stage the child reads accurately but slowly so that there is loss of comprehension and memory. At the second stage, at about the fourth grade, the child is able to read at a rate equal to normal speaking rate, and recognition of words is no more demanding visually than auditorily. At this stage understanding is equivalent in reading and listening. At the third stage, finally, the child is able to read efficiently and rapidly, so that when engaged in a looking-listening task the child can listen and read simultaneously, and is thus able to review and clarify important information.

Gustafsson (1982) studied how gender can cause a difference concerning how a task was approached. The observation was "that females more often then males adopt verbal-analytical strategies in solving spatial problems" (p.23). Females approached the task in a verbal manner.

Lesgold, Levin, Shimron, and Guttman (1975) showed that first graders remember more of an orally-presented story when it is combined with illustrations. If children constructed the illustration from text related cutout objects, the recall was equal to the illustration group. In a later study first graders using cutout objects produced better recall for both long and short passages. This study suggested that previous arguments (see Samuels), which state that illustrations do not help and sometimes decrease
learning from prose, are not completely correct (Lesgold, DeGood, and Levin, 1977).

Research that favors the use of illustrations in text outweighs the research that favors no illustrations in text. The natural progression seems to be if concrete illustrations are helpful, are partial pictures helpful?

Rohwer (1973) found partial pictures increased children's prose recall by about 30%. Less-than-complete pictures can function as effective children's prose-learning aids (Riding & Shore, 1974).

Mental Imagery

To continue the progression, if concrete illustrations and partial pictures are helpful, is mental imagery helpful? Should mental imagery be limited to certain age groups, specific reading ability levels, and or certain content areas?

Reading Ability

Children first must comprehend individual words before they can use visual imagery to their advantage while reading (Levin, 1973). Levin demonstrated while subject-generated visual imagery improves reading comprehension in general, the effectiveness of such a strategy depends largely upon the skills of the
student. Children who learned better from pictures than from words benefited from imagery. Fourth graders who could decode and derive meaning from words benefited from instructions on how to generate organizational images on a reading task. Children experiencing decoding/vocabulary problems at the word level did not benefit from such an imagery strategy. Levin stated "the effectiveness of a visual imagery strategy may well depend on the concreteness of the to-be-read passage" (p.23).

Wickens and Engle (1970) found that memory performance on concrete, high-imagery words was superior to performance on abstract words. A pictorial representation of text is more easily learned than is a printed representation (Matz & Rohwer, 1971). "The same comparison may be made with regard to the role of subject-generated visual imagery in paired-associate learning and in reading comprehension" (Levin, Divine-Hawkins, Kerst & Guttman, 1974, p.300). If concrete materials are imaged, both paired-associate learning and reading comprehension improve.

Age

Guttman, Levin, and Pressley (1977) suggest that
from kindergarten through the primary grades, children develop the ability to organize text information with less external pictorial support. Third graders did well when asked to construct a mental image without pictorial prompts. Levin and Pressley (1978) believe that inferences about the effect of various prose-learning strategies must be made with reference to the age range on which the research was based.

In a paired associate learning study (subjects given unrelated word pairs to learn) by Levin, Davidson, Wolff and Citron (1973) 7 year old second graders were able to recall the missing word of the pair after the learning session. Subjects were instructed to make up a picture in their minds of the words in each pair doing something together. The major finding of the study was "that children as young as 7 or 8 (second graders) were able to employ an induced visual-imagery strategy to facilitate paired-associate learning" (p.308). Previous research has indicated that children younger than this are unsuccessful (Wolff & Levin, 1972).

Levin and Divine-Hawkins (1974) noted that children may try to read and image at the same time and that children may not be able to read verbal messages and image the spatial relationships described by those
passages simultaneously. They suggest that reading may suppress visualization because reading and visualization may compete for the same neural pathways (relating to a nerve, neuron, or nervous system).

Pressley (1976) wanted to assess whether young children can improve their memory for prose that they read by constructing mental images. His study taught 8-year-olds a strategy which produced successive (in contrast to simultaneous) reading and imaging. Before the experiment, children were given only several minutes of training-practice in making up internal images. During the experiment the children were told to read the first page, turn to the blank page which followed and make up a picture of what they just read. The results of the study reported that when 8-year-old children are given practice at forming mental images, and are told to use mental imagery to help their memory of prose, then mental imagery can improve their memory of a very concrete, easily imageable story. This study suggests that mental imagery training can be taught in the classroom and improve children’s memory of passages they read.

The difference between the experimental and control groups were small in the study done by Pressley. This suggests that many control subjects
were imaging anyway. Levin and Divine-Hawkins (1974) noted that many children spontaneously used mental imagery when presented with concrete prose passages.

Lesgold, McCormick and Golinkoff (1975) did an experiment with third and fourth graders. The children read passages and illustrated them with cartoons over a time period of 12 training sessions. The experiment ended with the students taking two paraphrase recall tests. During the second test, students were reminded to "keep in mind a mental picture of passage as they read" (p. 664). The results of improved performance appeared to be jointly dependent on imagery training and on a prompt at the time of reading to use imagery.

**Imagery Helpful**

Anderson and Hiddle (1971) argued that imagery instructions facilitate performance by forcing attention to meaning, since an image cannot be formed without dealing with the meaning of the sentence. In their study "sentences which evoked vivid images were better recalled than sentences which evoked vague images, but the effect was not strong" (p. 527). The chief finding of the study "was that people instructed to form images of the events described in sentences recalled more than three times as many words on a
surprise test as people who merely pronounced the sentences" (p.527).

Anderson and Kulhavy (1972) wanted to discover if imagery instructions similarly facilitated learning from prose passages of the type found in textbooks. They asked 62 high school seniors if they used mental pictures to learn. If they answered yes, another question asked if they imaged at just the beginning, for half of the passage, or for the entire passage. "One third of the group that received imagery instructions reported not using imagery or doing so only at the beginning of the passage (p.243). The subjects that used imagery through the complete passage learned more from the prose passage by forming images of the things and events described in the passage. Anderson and Kulhavy suggest that future research concern itself with procedures to evoke and maintain imaging.

Sixty-three undergraduate students took part in an experiment to determine which of two methods could influence factual recall, reader generated drawn pictures or researcher constructed questions interspersed through text. Results were that the pictures were as effective as questions in facilitating retention (Snowman & Cunningham, 1975).
The results of three experiments by Jorm (1977) confirmed that children with a specific reading disability find high-imagery words easier to read than low-imagery words. Word imagery was related to reading difficulty because it facilitates learning to read by whole word methods. When learning to read words by a whole word method, word imagery predicts ease of learning for both good and poor readers.

Bender and Levin (1978) summarized imagery studies and the results pertaining to age.

Not until about third grade can normal children successfully employ an imagery strategy to improve their prose learning. This is in contrast to the paired associate results, where children about 2 or 3 years younger benefit from an imagery strategy. This lag (between paired-associate and prose learning) in children's ability to employ an imagery strategy may be due to the additional requirement of keeping track of the theme of the story, including intersentence relationships. Having to process sentence-by-sentence information while simultaneously keeping track of intersentence information, story structure, and theme would certainly be expected to place heavier demands on subjects' limited working memories.

(p. 584).

Bender and Levin (1978) did an experiment to see how illustrations, mental imagery and repetition would affect the recall of educable mental retardates (EMR). The experiment used 96 EMR adolescents (ages 10 to 16 years). The results were the illustration subjects
recalled 89%, superior to subjects in all other groups. One assumption of the study was "the complex process of generating and regenerating images while keeping track of the theme and events of a story is too great a requirement for educable mental retardate children" (p.587).

In studies conducted by Koser and Natkin (1972) and Anderson and Kelhavy (1972) subjects benefited more from a prose passage if they formed images as they read. Other studies said imagery had a positive relationship to the recall of passages read (Anderson & Hilde,1971; Andre & Sola,1976; and Pressley,1976).

As a result of studies conducted early in the 1970's by Levin, imagery emerged an organizational tool relating to reading comprehension (Levin,1973).

Johnston (1980) completed a visual organization treatment with adult education students. The treatment started with comparison/contrast, followed by a discussion of similarities and differences. The treatment began at the concrete level, followed by pictorial, then symbolic. The next step covered comparing and contrasting within a known category to include new items, comparing to explain new material, and visual comparisons with charts, graphs, etc.
Two of the implications of Johnston's study pertain to this researcher's mental imagery treatment:

Students seem to respond to concrete and pictorial experiences as a basis for forming visual images and organization which can help them move on to deal with symbolic experiences successfully. Training with visual organization is a reading strategy which can be used to help poorer readers have success in dealing with reading materials.

(p. 8)

Cramer (1981) conducted a study to investigate the relation between learning performance and the self-reported use of imagery, in conditions in which subjects either have or have not been given imagery instructions; the effects of induced imagery on single-item recognition; and to determine whether different kinds of imagery instructions affect different aspects of the learning process. The subjects were fifth graders and first graders. Fifth graders recalled more pairs than did first graders, and the fifth grade subjects with interactive imagery instructions recalled more than did those with neutral instructions. Subjects who reported using interactive imagery had higher recognition scores than subjects who reported no imagery. The results were

The only statistically significant effects of imagery instructions on learning occurred with fifth graders given interactive instructions. Interactive imagery
instructions facilitated both single-item and paired-associate learning. Separate imagery instructions did not facilitate learning in either grade.

(p.171)

Why Mental Imagery?

Paivio (1971) contends that certain images serve as mental "pegs" to which associated information is hooked for comprehension and retrieval.

Kaufmann (1979, 1980) developed a theory that visual imagery is functionally significant in general problem solving, particularly in unfamiliar or novel situations. If his theory holds true for the utilization of problem solving strategies in the reading of stories, imaging may well function as a strategy in story comprehension.

Imagery can develop thinking skills and accelerate mastery of cognitive material. Imagery can be used as a tool for awareness and acceptance of self and others. When an image of success is imprinted in the brain, the person's actions will follow positive directions. Imagery activities seem to expand the range of intellectual capabilities and increase students' interest in curricular offerings. "Guided imagery as a powerful agent for affecting physical and emotional health, as well as for intellectual acuity, is sufficient testimony to the validity of imagery as a
major curricular intervention in education"
(Galyean, 1983, p.58).

Mental imagery can be used in the classroom to alleviate undue anxiety and tension among students. McBrien (1978) reported success in using peaceful images to help a hyperactive child relax.

Studies have demonstrated that the two hemispheres of the brain process information in separate ways for parallel streams of thought. Split-brain research demonstrates that although the left hemisphere can process information verbally, only the right hemisphere can visualize. Both must work together to deal adequately with and describe a given object such as a staircase (Buck, 1976; Sage, 1976).

Experiments suggest that the left brain functions by processing information verbally, primarily in a linear, sequential, and logical fashion, whereas the right hemisphere processes information spatially and holistically and seems to be the locus of artistic capabilities in music and art.

(Greeson & Zigarmi, 1985, p.44)

The right hemisphere, which is primarily responsible for visual information processing, has been vastly underestimated concerning its capacity for perceiving, remembering, thinking, and problem solving (Sage, 1976).
Educators must assume the responsibility for presenting information so that students can practice integrating information from both hemispheres and students not grasping the concept could receive clarification by the presentation of stimulus input to the most effective brain hemisphere. (Greeson & Zigarmi,1985,p.47)

If some readers can benefit from mental imagery strategy, perhaps more extensive training in the use of mental imagery is needed to produce consistent positive results. Effective prose strategies also require clever delivery on the part of the instructor, including the matching of strategies to materials and students. (Finch,1982,p.11)

Teaching Mental Imagery

Instructing students to generate visual images to represent the content of concrete narrative passages has proven successful (Levin & Pressley,1978). However, if a passage is long, its beginning may be forgotten before the student can image and draw. Drawing on a sentence-by-sentence basis would serve to overcome this problem.

Teachers should use mental rehearsal (the combining of visual and verbal rehearsal) as a means to improving or maintaining classroom competence. Verbal rehearsal has been advocated by memory experts as a preparation strategy for giving speeches or taking tests. (Hortin & Bailey,1983,p.72)
A step-by-step routine is recommended before mental rehearsal. 1. Relax. 2. Set your goals. 3. Concentrate on images. Re-create positive past experiences; look for alternatives; see the problem/situation from different viewpoints; see yourself participate in the action (Hortin & Bailey, 1983). Next suggest that students image receiving an A on a test, and receiving praise from teacher and peers, etc. Follow by a discussion of the students emotions during imaging.

The few attempts to provide children with extended instruction in the use of a visual imagery strategy have not yielded overly impressive returns (Pressley, 1976) especially when the children are transferred to slightly different contexts (Lesgold, McCormick & Golinkoff, 1975).

Ortiz (1977) states that students are not able to make the transfer from one kind of material to the other because they are not fully aware of what they do when they listen or read well. They may not have the images to evoke. This occurs with unfamiliar words or material which is out of his or her experience, or grammatical constructions not habitually used by student (Ortiz, 1977). Ortiz went on to say the teacher may need to help students acquire experience either
with subject matter, specialized vocabulary or different language styles. They have learned how to comprehend if they speak the language. Students should draw pictures for sentences to transfer to reading what they do while listening.

Summary

Children first must comprehend individual words before they can use visual imagery to their advantage while reading. If concrete materials were imaged both paired-associate learning and reading comprehension improved.

Inferences about the effect of various prose-learning strategies must be made with reference to the age range on which the research was based.

Research suggested that mental imagery training could be taught in the classroom to improve children's memory of passages they read. Imagery instructions facilitated performance by forcing attention to meaning, since an image cannot be formed without dealing with the meaning of the sentence. Subjects who used imagery through a complete passage learned more from the prose passage by forming images of the things and events described in the passage.
As a result of studies conducted early in the 1970's imagery emerged as an organizational tool relating to reading comprehension.

Visual imagery was found to be functionally significant in general problem solving. It helped develop thinking skills and was used to alleviate undue anxiety and tension among students.

Split-brain research demonstrated that although the left hemisphere can process information verbally, only the right hemisphere can visualize. The right hemisphere has been underestimated concerning its capacity for perceiving, remembering, thinking, and problem solving.

Some students were not able to make the transfer from one kind of material to content area material, because they were not aware of what they did when they listened or read well. The teacher needed to help students acquire experience either with subject matter, specialized vocabulary or different language styles.

An abundance of research has been based on imagery used to learn words, or pairs of words. Limited research has dealt with the result of mental imagery on comprehension of prose.
Chapter III

Design of the Study

Purpose

The purpose of this study was to examine the effect mental imagery had on comprehension of poetry, prose and content area reading.

A second purpose of this study was to develop one strategy to teach mental imagery.

Hypotheses

The hypotheses investigated in this study were as follows:

1. There was no statistically significant difference between the pretest scores (on the researcher-designed comprehension test) of the sixth grade treatment group receiving instruction in a mental imagery technique and the sixth grade control group.

2. There was no statistically significant difference between the means of the pretest and posttest of the sixth grade treatment group (mental imagery instruction).

3. There was no statistically significant difference between the means of the pretest and posttest of the sixth grade control group.
4. There was no statistically significant difference between the means of the posttests of the sixth grade treatment group (mental imagery instruction) and the sixth grade control group.

Methodology

Subjects

The subjects were 53 sixth graders from a rural, middle public school in Western New York State. The treatment group (18 students) was an intact (whole) sixth grade class reading at a beginning sixth grade level. The control group (35 students) was two intact sixth grade reading classes reading at a level just below (12 students) and just above (23 students) the treatment group.

Instruments

Encyclopedia Brown Takes The Cake: A Cook And Case Book by Donald J. Sobol with Glenn Andrews was the source of reading selections included in the researcher-designed test of targeted reading comprehension skills. Readability levels of the selections were checked using the SMOG Formula and selections were chosen that were suitable for a sixth grade reader at a beginning sixth grade level.
The pre-treatment and post-treatment comprehension tests consisted of 10 questions which tested the five targeted areas: (1) detail, (2) finding the main idea, (3) comparison/contrast, (4) sequence, and (5) recall. To best determine the students' comprehension of the text, a short answer format was utilized.

Each test session consisted of the researcher reading a fiction selection to the class. This was followed by the researcher reading a copy of the ten questions, after which the students wrote down their responses.

Materials

Reading material was taken from fiction story books, magazines, fairy tales, literature, poems, and content area textbooks.

Procedure

The treatment consisted of six hours of instruction spread over six weeks divided up into 15 to 20 minute daily sessions. The six weeks were interrupted at midpoint by a two week school vacation. The treatment was preceded by a researcher-designed test of reading comprehension focusing on the targeted reading skills. The pre-treatment test was administered on February 27, 1989. The six week
treatment was followed by a similar comprehension test which was administered on April 21, 1989.

The treatment sessions followed an alternating pattern of researcher reading one day and students silently reading similar material the next day to take into consideration the different learning styles of the students.

If a student did not feel s/he had the ability to draw what s/he was imaging, s/he could write down a description. The students often labeled sections of their drawings to enable the researcher to correctly interpret the drawings.

The students could draw as they listened to the researcher read the selection. Individuals sometimes requested that the oral reading be interrupted to allow them to complete a section of their drawing. When reading a selection as individuals they could draw at their own pace.

After each time period where drawing took place, the students discussed similarities and differences in the drawings.

The 24 sessions were divided into the following segments: 5 sessions of imaging a chosen topic, 6 sessions of imaging fiction, 6 of imaging poetry, 2
sessions of imaging social studies textbook, 2 sessions of imaging science textbook, 2 sessions of mental rehearsal, and one session for a mid-treatment comprehension test.

During most of the sessions students drew what they were imaging as they listened or read. Sometimes ideas about their images were written down and discussed as a group.

After each session the researcher collected the students' drawings/ideas. These drawings were identified by the date they were completed and the reading selection on which they were based.

**Statistical Analysis**

Appropriate statistical measures were used to determine the contribution of mental imagery to performance in specific targeted comprehension skills. The mean comprehension scores of the students in the treatment group and the control group were calculated. Hypotheses One (which compared the pretest scores of the treatment group and the control group) and Four (which compared the posttest scores of the treatment group and the control group) were analyzed using an independent t-test. Similarly, a dependent t-test was employed to test Hypotheses Two and Three (which
compared the pretest and posttest scores in the treatment and the control groups).

A further informal analysis was made through the entire treatment as the researcher looked at the students' daily drawings to determine if the individual drawings were accurate representative pictures of that day's text.

**Summary**

Fifty-three sixth graders from a rural school district were administered a test of reading comprehension focusing on five targeted skills.

The treatment group received twenty-four sessions of instruction in mental imagery. Reading material was selected from fiction, poems, and content area textbooks.

During most of the sessions students drew what they were imaging as they listened or read. Sometimes ideas about images were written down and discussed as a group.

After each session's discussion, the researcher collected the students drawings/ideas.

The effectiveness of the mental imaging technique was later measured by the scores on a test of reading comprehension. The resulting scores were compared and analyzed.
Chapter IV

Statistical Analysis of Data

Purpose

The purpose of this study was to examine the effect mental imagery had on comprehension of poetry, prose and content area reading.

A second purpose of this study was to develop one strategy to teach mental imagery.

Analysis of the Findings

The researcher scored the test of reading comprehension. Means were then calculated for both the treatment group (mental imagery) and the control group (no mental imagery treatment). Means were then calculated for the specific targeted comprehension skills (main idea, detail, sequence, comparison/contrast and recall) (See Table 1).

Each of the four hypotheses proposed in this study was tested in the null form and analyzed using the data obtained from the reading comprehension test scores.

The following is a restatement of hypothesis one:

1. There is no statistically significant difference between the pretest scores of group A (mental imagery treatment) and group B (no mental
imagery control group) tested at the 95% confidence level.

Using an independent *t* test, a calculated *t* score of 0.408 was obtained. Since the *t* required for 51 degrees of freedom at the *P*<.05 level is ±2.01 and since the *t* obtained is 0.408, the null hypothesis is retained. The result was no statistically significant difference between the means of the pretest scores of group A and group B tested at the 95% confidence level. This established the equivalence of the two groups in terms of reading comprehension at the time of the pretest.

The following is a restatement of hypothesis two:

2. There will be no statistically significant difference between the means of the pretest and posttest of the mental imagery treatment group tested at the 95% confidence level.

Using a dependent *t* test, a calculated *t* score of 1.089 was obtained. Since the *t* required for 17 degrees of freedom at the *P*<.05 level is ±2.11 and since the *t* obtained is 1.089, the null hypothesis is retained. The result was no statistically significant difference between the means of the pretest and
posttest of the mental imagery treatment group tested at the 95% confidence level.

The following is a restatement of hypothesis three:

3. There will be no statistically significant difference between the means of the pretest and posttest of the no mental imagery control group tested at the 95% confidence level.

Using a dependent $t$ test, a calculated $t$ score of -2.05 was obtained. Since the $t$ required for 34 degrees of freedom at the $P < .05$ level is ±2.03 and since the $t$ obtained is -2.05, we must reject the null hypothesis. The result was a statistically significant difference between the means of the pretest and posttest of the no mental imagery control group tested at the 95% confidence level. The pretest mean was 7.34 and the posttest mean was 7.77. While the posttest gain was statistically significant the increase of .4 of a point in reading comprehension can not be considered an educationally important gain.

The following is a restatement of hypothesis four:

4. There will be no statistically significant difference between the means of the posttests of group A (mental imagery treatment) and group B (no mental
imagery control group) tested at the 95% confidence level.

Using an independent t test, a calculated t score of -0.992 was obtained. Since the t required for 51 degrees of freedom at the P<.05 level is ±2.01 and since the t obtained is -0.992, the null hypothesis is retained. The result was no statistically significant difference between the means of the posttests of group A and group B tested at the 95% confidence level. The posttest mean of group A was 7.28 and the posttest mean of group B was 7.77.

**Interpretation of Data**

An examination of the mean comprehension scores on both the pretest and the posttest resulted in the following:

**Table 1**

<table>
<thead>
<tr>
<th>Mean Scores of Targeted Comprehension Skills</th>
<th>Main Idea</th>
<th>Detail</th>
<th>Sequence</th>
<th>Comparison/Contrast</th>
<th>Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Treatment</td>
<td>0.778</td>
<td>0.759</td>
<td>0.833</td>
<td>0.694</td>
<td>0.756</td>
</tr>
<tr>
<td>Posttest Treatment</td>
<td>0.889</td>
<td>0.694</td>
<td>0.500</td>
<td>0.861</td>
<td>0.728</td>
</tr>
<tr>
<td>Pretest Control</td>
<td>0.629</td>
<td>0.752</td>
<td>0.771</td>
<td>0.686</td>
<td>0.734</td>
</tr>
<tr>
<td>Posttest Control</td>
<td>0.971</td>
<td>0.733</td>
<td>0.543</td>
<td>0.929</td>
<td>0.777</td>
</tr>
</tbody>
</table>
Gains were shown in two of the targeted skill areas for the treatment group, and the control group. The treatment group showed a mean gain of 0.111 in main idea, while the control group showed a mean gain of 0.342. The treatment group showed a mean gain of 0.167 in comparison/contrast, while the control group showed a mean gain of 0.243. The treatment group and control group showed a mean loss in both detail and sequence. The treatment group showed a mean loss of 0.028 in recall while the control group showed a mean gain of 0.043.

Both groups had the most difficulty with questions asking them about details of the selection and sequence.

**Summary**

Three of the four null hypotheses were retained. There was no statistical significant difference in the posttest means. The results are inconclusive as far as recommending a mental imagery treatment over a traditional reading program.

There is no statistical significant difference, therefore, no educational importance.
Chapter V

Conclusions and Implications

Purpose

The purpose of this study was to examine the effect mental imagery had on comprehension of poetry, prose and content area reading.

A second purpose of this study was to develop one strategy to teach mental imagery.

Conclusions

Three of the four null hypotheses were retained. The results of the data indicate no significant differences between the two methods of teaching reading comprehension. Both methods (mental imagery or traditional method) appeared to effectively teach reading comprehension.

One purpose of this study was to develop a strategy to teach mental imagery. The mental imagery group was cooperative through the entire treatment. However, they were cautious and reserved the first two sessions. Their individual drawings showed understanding of the daily selection. Many drawings were done in colored pen or pencil. The students were encouraged to label parts of their drawings to clarify
the pictures. The detail contained in many of the
drawings was impressive. The drawings accurately
portrayed the sequence of the reading selections.
Comparison and contrast was correctly depicted in the
drawings pertaining to the differing sizes of objects.
The drawings helped the researcher understand the
different schemata of the students. Over a period of
time the more reserved students entered into the class
discussion (by the 5th week). During the fifth week
the group was asked to write down what they saw, not to
draw what they saw. Most of the girls easily wrote
down ideas, while most of the boys had written
statements illustrated by small sketches. The girls
whose previous drawings had been correct but simple
line sketches, now wrote over a full page of what they
saw.

The group was attentive when read to. When they
were to read a selection (two pages) some groaned but
still the drawings and class discussions were good.
The poetry sessions were greeted with less enthusiasm
than the short story selections.

When the group used mental imagery to review
feudalism in their social studies textbooks, they said
that referring to their notes and drawings would help in future class discussion or studying for tests.

The last week of the treatment, the group used mental imagery to cover the topic of storms in their science textbook. Some individuals expressed frustration when the researcher directed the group to write down ideas, not drawings. So to relieve frustration the directions were changed to include drawings. Once again the girls papers were more verbal, while the boys were detailed drawings.

When tornadoes and hurricanes were dealt with in the science text, the assignment started out routinely-read four pages individually, write down similarities and differences. Then draw a weather map of the fronts. The researcher had a list of sixteen differences and three similarities. The class discussion generated 25 differences and 5 similarities. At least one student kept the information to transfer into a science notebook. The science teacher reminded the class when they covered this same topic two days ago the class only came up with six differences. The chart remained on the blackboard for an afternoon science class. The next session the group was instructed to incorporate these 25 differences and 5
similarities into one diagram-type drawing. The results were a correct condensation of four pages of science text into one drawing of review material.

During the last session the students listened to an explanation concerning mental rehearsal. This was followed by think time, then a drawing which showed the student being successful in an event. This one time they chose not to discuss their drawings but to hand them in to the researcher.

During the entire treatment some new authors were introduced, and were received with enthusiasm. The group enjoyed the special attention and vocalized discontent if a session were not scheduled for that day.

**Implications for Research**

Further investigations into the use of mental imagery as a strategy to contribute to performance in specific targeted comprehension skills are warranted. More comprehensive research in the following areas is necessary.

1. The treatment program could be extended for a longer period of time in future studies, eliminating any results altered by the Hawthorne effect.
2. Future studies could develop better controls in research design. A pre-treatment test could be given to determine which students are already successful at imagery. Only the students who do not use imagery would be placed in the treatment group. In the present study forty-seven out of fifty-three students (89%) reported that they saw mental pictures during the pretest story.

3. The posttest could be changed from one ten question test to three or four ten question tests. Each test could still test for comprehension in the five targeted areas. However, the results of the tests would be averaged to achieve a more valid score.

4. Future studies could make corrections for possible sampling error. The present study's control group consisted of 35 students from two intact reading classes (12 students below and 23 students above the treatment group). The control group might have had a disproportion of good readers compared to the treatment group. This could explain why the control group achieved higher scores.

5. Further research is needed to discover: for whom imagery works best, the long-term cognitive and personal gains from prolonged exposure to imagery work,
under what environmental conditions imagery activities seem to be best received, and if there are individuals who should not work with inner imagery (Galyean, 1983).

**Implications for Classroom Practice**

When including mental imagery in the reading curriculum, instructors should account for the following:

1. Success with mental imagery as a strategy comes with age and the development of basic reading skills.
2. Instructors should not assume that all students can or are using mental imagery. Often it is necessary to teach students how to use mental imagery with different types of reading material.
3. Instructors should provide a model which reflects the various functions that mental imagery can serve.
4. Instructors should provide positive reinforcement throughout the mental imagery sessions.
5. The students in this study preferred to use colored pencils, pens and felt-tipped markers. Instructors should allow students to choose their own tools for drawing.
6. The students should be allowed and encouraged to discuss their drawings.
7. The instructor should use a variety of reading selections.

8. The students should be encouraged not only to draw their mental picture, but write a summary statement of its theme. This could make for an easier transfer of information from mental pictures to study notes.

**Summary**

The basic purpose of this study was to determine the effectiveness of mental imagery versus a traditional method of teaching reading comprehension. The analysis of data indicated no significant difference between the two methods of reading instruction.

Reviewing individual student's pretest versus posttest results, exactly 50% of the treatment group showed some improvement, while 43% of the control group showed some improvement.

The students in this study reacted positively to encouragement, acceptance, honesty, and praise throughout the mental imagery sessions. The students were cooperative, and enjoyable. Their classroom teacher was supportive and gave validity to the treatment by participation in the drawing activities.
Further research is needed: to develop tests to determine the ability to use mental imagery, to determine the necessary length of a mental imagery treatment, to discover for whom imagery works best, and under what environmental conditions imagery activities are best received.
REFERENCES


