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# The Effectiveness of a Visual-Verbal Literacy Technique on Certain Targeted Comprehension Skills of Seventh Grade Students

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THE EFFECTIVENESS OF A VISUAL-VERBAL LITERACY TECHNIQUE  
ON CERTAIN TARGETED COMPREHENSION SKILLS OF  
SEVENTH GRADE STUDENTS

THESIS

Submitted to the Graduate Committee of the  
Department of Curriculum and Instruction  
Faculty of Education  
State University College at Brockport  
in Partial Fulfillment of the  
Requirements for the Degree of  
Master of Science in Education

by

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## Abstract

Forty seventh grade students from a rural community participated in a picture comprehension treatment program. The program was designed to determine if a visual-verbal literacy technique was effective in significantly increasing the inferential comprehension scores of the participants.

Materials included a written comprehension test in two forms, one serving as a pretest, the other a posttest. Also included was a packet of 40 simple line drawings and a test measuring picture comprehension.

For ten consecutive days, those students showing a deficiency on the pretest were exposed to a visual-verbal literacy technique. This technique consisted of a discussion of the simple line drawings with regard to the four targeted skills: (1) main idea, (2) cause and effect, (3) comparing and contrasting, and (4) predicting outcomes. Students were then tested on these four skills with a written posttest and a test measuring picture comprehension.

Results indicated that students were able to significantly increase their inferential comprehension scores following the treatment program. These students were also able to master these targeted skills on a test of picture comprehension, indicating that they were able to derive meaning from pictures without text accompaniment.

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## Chapter I

### Statement of the Problem

Pictures have had historical significance in education. As early as the 16th century, catechisms were issued that contained marginal pictures depicting the life of Christ. In this country, the use of pictures in textbooks can be traced back to 1729 when the New England Primer incorporated pictures with the text (Samuels, 1970).

Although research investigating pictorial illustrations began at the turn of the century, it was not until the early sixties that analysts, such as Allen (1960), began to combine research trends of the past in an effort to direct priorities for the future.

Recent trends in picture research seemed to indicate that the ability to learn from pictures increases with age and education (Asso & Wyke, 1970; Brown, 1969; Dilley & Paivio, 1968; Mackworth & Bruner, 1970; Mandler & Robinson, 1978; Travers & Alvarado, 1970). Researchers also maintained that realistic pictures flood the viewer with too much visual information that must be filtered out before pertinent information can be stored (Broadbent, 1958, 1965; Bruner et al., 1965; Dwyer, 1967, 1972; Miller, 1957; Miller & Allen, 1957; Santostefano, Rutledge & Randall, 1965; Travers et al., 1964, 1970). Consequently, simple line drawings have been designated the best conveyers of messages (Attneave, 1954; Bloomer, 1960; Dwyer, 1967, 1972;

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Paivio, Rogers & Smythe, 1968; Travers et al., 1964; Travers & Alvarado, 1970; Wicker, 1970).

After studying the relationship between reading comprehension and pictures, researchers have not formed any solid conclusions. Some studies have shown a positive correlation between pictures and the comprehension of text (Denburg, 1976; Jahoda, 1976; Lesgold, DeGood & Levin, 1977; Peeck, 1974; Read & Barnsley, 1977; Rohwer & Harris, 1975; Rohwer & Matz, 1975; Schallert, 1976). Other research indicated a negative relationship between picture usage and reading comprehension (Dwyer, 1972; Goodykoontz, 1936; Samuels, 1967, 1970; Weintraub, 1960). Still others, Miller (1938), Koenke (1968), and Pederson (1970) found no difference in the comprehension skills between students who used illustrated material and those who did not.

#### Purpose

The purpose of this study was to examine the effectiveness of a visual-verbal literacy technique (picture comprehension) on certain targeted comprehension skills (inferential) tested visually on seventh grade students.

The secondary purpose was to determine if this technique of visual-verbal literacy (picture comprehension) transferred to the comprehension of written material.

#### Need for the Study

After investigating the role of illustrations in reading comprehension, researchers have come up with contradictory conclusions. Evidently a great deal of information still needs to be gathered



concerning the components of pictorial illustrations that lead to greater learning. How can illustrations be used in ways that will activate cognitive processes and increase the learning of reading comprehension skills?

Kolers (1973) felt that one must learn how to read a picture just as one learns how to read a text. Individual differences in children may account for their ability to use pictures to their maximum benefit. Specifically, Kolers felt that some children may need to be taught how to interpret pictures and how to infer information essential to understanding.

Similarly, Debes (1969) demonstrated the need for visual skills to be taught formally. He stated that visual literacy skills should be approached as a subject to be taught in the schools.

Allen (1960) indicated the need to study the kind of content best communicated by still pictures and the best technique to be employed in teaching this technique.

Previous studies in picture research have concentrated on the picture as an adjunct aid to the written text (Samuels, 1970; Weintraub, 1960). The following study was unique in that it isolated the picture from the text and used it as an active teaching instrument.

Having been designated the best conveyer of messages, the simple line drawing was utilized in this study as the instructional tool. Similarly, previous studies (Bloomer, 1960; Dwyer, 1972) stressed the importance of simple line drawings in instruction.

### Definition of Terms

Visual-Verbal Literacy Technique: The method of instruction whereby a simple line drawing is displayed and students are taught to fully comprehend the meaning of the drawing through visual study and discussion.

Inferential Reading Comprehension: The comprehension of material that is not directly stated in the passage or drawing.

Targeted Reading Comprehension Skills: For the purpose of this study the targeted skills were: (1) finding the main idea, (2) determining a cause and effect relationship, (3) comparing and contrasting, (4) predicting the outcome.

Visual Literacy: A set of skills or abilities developed that enable a person to discriminate and interpret visual objects in the environment and communicate the meaning to others (picture comprehension).

### Limitations of the Study

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

1. The nature of the participants, since a small, rural community may not be representative of a normal population.
2. The placing of the students into a treatment program on the results of one testing situation may not have been a true indication of their academic needs.
3. The length of the treatment plan (10 days) may have been too short, thus limiting the true effects of a picture treatment program.

4. 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.

#### Summary

It is difficult to evaluate the importance of pictures in instruction. Researchers have come up with contradictory conclusions while investigating the role of illustrations in relation to reading comprehension.

Research in picture perception indicates that the ability to use visuals meaningfully is a developmental process, increasing with age and education.

This study developed a new visual-verbal technique which incorporated the simple line drawing as an instructional tool to develop certain targeted comprehension skills.

Limitations of this study included: the nature of the sample, treatment time, criteria for placement, and the design of the testing instrument.

## Chapter II

### Review of the Literature

#### Purpose

The purpose of this study was to examine the effectiveness of a visual-verbal literacy technique (picture comprehension) on certain targeted comprehension skills (inferential thinking) tested visually on seventh grade students.

The secondary purpose was to determine if this technique of visual-verbal literacy (picture comprehension) transferred to the comprehension of written material.

The research related to this study focused on the development of picture perception in children, simple line drawings and the relationship between pictures and reading comprehension.

#### The Development of Picture Perception in Children

Crucial to the understanding of how children acquire information from pictures is a general knowledge of how perception develops in the child.

Research indicates that the ability to learn from pictures increases with age and education (Asso & Wyke, 1970; Dilley & Paivio, 1968; Mackworth & Bruner, 1970; Mandler & Robinson, 1978).

In studying children's responses to Rorschach inkblots, Ames et al. (1953) found the perception of children to be global in nature. Children were more influenced by the configuration of the stimulus than

by specific details. As the children matured, attention was directed to the major details of the blots and then focused on the blot as a whole again. Disputing these findings, Travers (1969) stated that perception develops from the perception of details to the perception of larger and larger concepts.

A study by Elkind, Koegler and Go (1964) used well defined drawings of fruits and vegetables. Here data demonstrated that parts of an object were perceived at an earlier age than wholes, and that parts had become integrated into the whole by age nine. Full development of picture perception was not reached until age ten (Ames, Learned, Metraux & Walker, 1953; Brown, 1969; Travers & Alvarado, 1970). Findings from the Elkind study and the Ames study coincide with what is known about perception. Research has established (Travers & Alvarado, 1970) that as a child grows older his capacity to handle complex stimuli increases, as does his preference for complexity. The perception of a complex display seen as a whole is a more difficult task than is the perception of a small component. More relationships have to be recognized when the parts have to be integrated into a whole than when a part is separately recognized. A closely related conceptualization of the development of perception was hypothesized by Piaget (1926). He postulated that in the development of perception it was necessary to first "decenter" before focusing on the highly specific aspects of the perceptual field.

Thomas (1976) reported that there seemed to be a consistent performance for complexity across a wide age range. Similarly, it was demonstrated that five year old children study simple figures

longer, eleven year old children view complex figures longer, but eight year old children show no difference in viewing times.

Santostefano, Rutledge and Randall (1965), in comparing good and poor readers (aged eight through thirteen) used pictures surrounded by line drawings of distractors. The poor readers were unable to selectively attend to appropriate items in the picture. When the picture was taken away, the poor readers recalled a greater number of distractors than the better readers. It was concluded that the poor readers may be delayed in their development of the skills necessary to select relevant information from pictures.

In the development of picture perception children encounter problems in many areas. Dilley and Paivio (1968) found children experienced difficulty in translating pictorial information into verbal responses. Ames et al. (1953) found that children interpreted movement in pictures at a late age. A study by Brown (1969) demonstrated that children find difficulty in recognizing picture cues represented by dimension. Organization of unfamiliar data in pictures presented problems for children in a study by Mandler and Robinson (1978).

Research by Vurpillot (1976) demonstrated the relationship between child development and the use of pictures. Her study suggested that the amount of information extracted from pictures is influenced by the extent of the child's visual exploration. The child's perceptual and representational structure determines what is internalized from such exploration. Ultimately, the child's stage of cognitive development limits what is seen and processed.

Generally, there is a slight trend with age in the direction to major details of the stimulus, a strong trend toward more accurate identification of these parts, more response to color aspects of the stimulus and an increased ability to combine form and color. The tendency to see movement in non-moving stimuli increases, as does the differentiation of fine shadings within the black and white areas and the identification of tiny details (Ames et al., 1953). As the child develops there is an increasing tendency for him to give responses that are appropriate for the stimulus presented. The child begins to see and identify visual stimuli in the orientation of an adult. As an adult, the individual "reads" pictures by activating memories and experiences from the visual world and testing the pictured image through tentative projections (Gregory, 1970).

Research indicated that we remember a small amount of unrelated items in our immediate memory and the succession of our eye movements is quite rapid. Thus, an observer will make more fixations during the inspection of one picture than he can hold in his immediate memory (Gombrich, 1960). Some part of this perception of the picture must draw upon encoded memories from earlier glimpses. Because our eyes register fine detail within a very small foveal region of the visual field, we must learn about the visual world by a succession of glances in different directions. Therefore, the content of each glance is always, in a sense, an answer to a question about what will be seen if some specific part of the peripherally viewed scene is brought to the fovea (Mackworth, 1972).

Further investigations by Mackworth (1972) indicate that while people read pictures sequentially, the sequence is not fixed. From some sort of quick scan we determine what we are looking at, then concentrate our attention on those regions that are of maximal use for interpretation (Gibson, 1969).

Mackworth and Bruner (1970) studied the eye fixations of six year olds as they observed blurred and sharply focused pictures. The children lacked a systematic approach for visual search for both types of pictures and concentrated mainly on details. They seemed to display inadequate eye movement patterns in an attempt to process the entire content of each picture and exhibited difficulty in examining fine features while testing peripheral items for relevancy. Haber (1973) indicated that pictures are searched in a non-random manner, the eyes fixate on areas of high information and ignore redundancies and invariant details. Picture perception is dependent on the ability of the individual to construct the image into a meaningful organization.

#### Simple Line Drawings

For some time the use of pictorial illustrations in instruction has been a source of confusion.

From this developed a controversy concerning the role of realism in visualized instructional materials (Parkhurst, 1975). Researchers in the 40's demonstrated that visualized instructional materials could be effectively measured by their realistic attributes. These researchers felt that realism in illustration accounted for maximum learning (Parkhurst, 1975). Dwyer (1967) grouped Carpenter's (1953) sign



similarity theory, Dale's (1946, 1969) iconocity theory and Gibson's (1954) pictorial perception theory and referred to them as "realism theories" (Thomas, 1976).

In contrast to this group of researchers, Travers, McCormick, VanMondrans and Williams (1964) and Dwyer (1967, 1972) indicated that realistic illustrations represent too many irrelevant cues which interfere with learning. Specifically, Travers (1964) maintained that simple line drawings could be more effective as information transmitters than detailed shaded drawings or realistic photographs. It was felt that the full realism in photographs flooded the viewer with too much visual information.

Miller and Allen (1957) believed that an abundance of irrelevant cues competed for the attention of the student.

Broadbent (1958, 1965) and Travers et al. (1964) represented the human storage system as a single channel, limited capacity system and noted that irrelevant cues had to be filtered out before pertinent data could be stored. Miller and Allen (1957) stated that it would be a mistake to assume that one cue added to another would increase learning by a linear increment. Additional cues or excessively realistic cues may be distracting or possibly evoke competitive responses in opposition to the desired effect. Consequently, Bruner et al. (1956) and Travers et al. (1964) have suggested that children do not need a wealth of stimulation in order to recognize the characteristics of an object or situation.

Dwyer (1972) found that the most realistic illustrations did not make for the most effective instruction. Wicker (1970) investigated

paired associated learning, and Paivio, Rogers and Smythe (1968) in free recall, discovered that detailed pictures did not significantly improve learning when compared with line drawings.

Attneave (1954) conducted research guided by the hypothesis that one function of the perceptual mechanism was to reduce redundant stimulation and encode incoming information so that only essentials travel through the nervous system to the brain. In support of this hypothesis he suggested that the lines bordering objects provide the essence of the information to be conveyed. This he felt accounted for the success of cartoons and stick figures as vehicles of information.

Travers et al. (1964) have stated that visual data are stored in the nervous system in some form similar to line drawings, permitting the student to remember and reproduce some information with greater facility than information with realistic details. This would seem to indicate that those visuals closely representing line drawings and containing the essence of the information to be conveyed would be more effective in facilitating instruction than would detailed illustrations, which would have to be decoded first by the nervous system before being forwarded.

Although simple line drawings have been designated a positive picture accompaniment to learning (Bloomer, 1960; Dwyer, 1967, 1972; Travers & Alvarado, 1970), little statistical information is available. Related research in the area of picture preferences is readily accessible.

A study by French (1952) showed that children consistently preferred simple line drawings up to the fifth grade. Beyond this age complex illustrations were preferred. However, this does not mean that more was learned from the complex display, only that the complex display was viewed for a longer period of time. It was theorized from this research that children select the most complex illustrations that they are able to perceptually organize.

In his extensive research testing picture types, Dwyer (1967, 1972) presented eight classifications of pictures to accompany science lessons for students in ninth grade through college. Pictures included simple line drawings (black and white, colored and shaded) and realistic photographs and models (black and white and colored). Dwyer determined that the simple line drawings were the most effective, as a result of final tests measuring all levels of comprehension. These tests indicated that the simple line drawings best accompanied an oral presentation.

A 1960 study by Bloomer using middle grade elementary students pointed out that children preferred colored pictures, although the color distracted them from the main idea. Although the color stimulated fantasy in the students, when given writing tasks, the students most frequently wrote about the simple line drawings. The results from these writing tasks demonstrated that simple line drawings induced creativity in the children.

Although studies favor simple line drawings, Holliday (1973) feels that this is another area that needs further investigation before experimental results can be directly used by instructional designers.

### The Relationship Between Pictures and Reading Comprehension

The bulk of the research regarding pictures and reading comprehension focuses on the use of pictures with regard to text.

Goodykoontz (1936) studied children in the sixth grade through the eighth grade. In this study children read an illustrated story and were asked to answer thirteen questions related to the text and thirteen questions related to the pictures. The results demonstrated that the average score on questions related to the text were higher than those related to the pictures. Questions then arose concerning the beneficial contributions pictures make to text comprehension.

In 1938, Miller tested children and found there was no significant difference in reading comprehension between those who used pictures and those who did not. It was determined that the children in these studies had to be shown the important items in the picture if they were to be of any value.

Dwyer (1972), Samuels (1967, 1970) and Weintraub (1960) found that pictures, when used as adjuncts to printed text, do not facilitate learning. Weintraub indicated that reading comprehension was greatest when pictures were not used with the text. This effect held true only with a group of children identified as poor readers. For good readers, pictures did not seem to add or detract from the comprehensibility of the story. Samuels (1970) confirmed these findings and concluded that, "There was almost unanimous agreement that pictures, when used as adjuncts to the printed text, do not facilitate comprehension" (p. 405). Samuels also felt that pictures had no effect on the better readers, but among the poorer readers, the presence of pictures interfered with

learning. Vernon (1953, 1954) and Burdick (1960) supported this position in their studies of science materials. Although there was no general facilitation of learning of the text attributable to either pictures or graphs, it was found that certain key points were remembered if illustrated.

Koenke (1968) presented third and sixth grade students with a passage that dealt with many nesting sites of birds. He used pictures that depicted specific types of birds building their nests in species-specific locations. Koenke found no difference in the ability to state the main idea between children reading illustrated versions and children reading non-illustrated versions of the same story.

In a study testing children reading one to two years below their grade level, Pederson (1971) found that pictures neither facilitated nor hindered comprehension skills. Bluth (1972) found no significant difference in comprehension scores for poor readers, but did find that use of pictures aided the comprehension of good readers.

Koenke and Otto (1969) found that sixth grade subjects who read passages accompanied by pictures responded with main ideas which received higher scores than the responses of subjects who did not see the pictures. Weisburg (1970) found that a graph or map facilitated the learning of earth science concepts better than verbal expository.

Holliday (1975) could not support the case for or against pictures. However, he pointed out that the results of his study ". . . demonstrate that a certain kind of picture, simple line drawings, can significantly facilitate a form of verbal comprehension" (p. 79).

Recent research has challenged the findings of Samuels and other researchers. Denburg (1976-77) has concluded that carefully designed illustrations that do not give irrelevant extra information can help beginning readers use their limited knowledge of print.

A study by Read and Barnsley (1977) provides evidence that even the pictures of basal readers can have a significant positive effect if long-term memory is tested. They concluded that a person's processing and storage of early reading materials is dependent on and affected by the interaction of both verbal and pictorial components.

Rohwer and Harris (1975) studied various methods of presenting instructional information. Results indicated that an oral-plus-picture condition performed marginally better than an oral-plus-print condition. These studies replicated the findings of an earlier study by Rohwer and Matz (1975). In addition, subjects in the picture-only condition performed significantly poorer than students in all the print conditions. The information content of the pictures was not sufficient to eliminate the need for the text. In other words, there was some pertinent information present in the text that was not represented in the pictures.

Hypothetically, in regard to pictures and text, pictures can facilitate comprehension if they depict information that is central to the text and that is touched upon in the comprehension measures. The pictures have a greater effect when they provide a different route to the content rather than merely repeating the existing information (Schallert, 1976).

Lesgold, DeGood, and Levin (1977) found strong evidence that a picture aided the retention of information when it correctly and

specifically represented the information. A study by Peeck (1974) provides further testimony that pictures facilitate the learning of specific information in a text. Children received an adapted version of a strip cartoon and were asked to read it. Some children received the story with pictures, some without pictures. On an immediate test, Peeck found that the group that received illustrated material remembered more information than the no-picture group. Test results a week later indicated that the picture group again correctly answered more picture questions and more corresponding picture and text questions than the no-picture group.

In the preceding studies, pictures were used to illustrate the printed word. Pictures can, however, be the sole vehicle to understanding. During instruction pictures can present problems. Although students look at illustrations, they usually do not study them unless prompted to do so. Research has indicated that mature readers notice only the global aspects of pictures. They fail to attend to and encode most of the detailed features (Friedman, 1979). Jahoda et al. (1976) found that although pictures facilitated the learning of illustrated text information (indicating that the students looked at the pictures), a second study testing the learning of picture-only information revealed that little information was gained from pictures when not accompanied by the text. Research in other areas indicated that when people are given cues about what to look for in a picture, they will notice only those aspects of the picture (Carr, Bacharach, & Mehner, 1977; Yarbus, 1967).

Lindseth (1969) studied the ability of first, second, and third grade children to answer comprehension questions on a developmental series that accompanied the stories upon which the stories were based. She found that the children were not able to answer comprehension questions solely by looking at pictures.

When comparing research, the design of the various studies becomes important. For example, in some studies, comprehension was tested using cued recall (Levin, Bender, & Lesgold, 1976) or multiple choice (Weintraub, 1960), or statement of the main idea (Koenke, 1968; Koenke & Otto, 1969). In still others, free recall (Rohwer & Harris, 1975) or sentence verification tasks are used (Rohwer & Harris, 1975). Also noted was the wide range of age levels, flowing from first grade (Bluth, 1972) to sixth grade (Koenke, 1968; Koenke & Otto, 1969). Methods of presentation differed among the studies and no distinction was made between narrative and expository prose. Discrepancies such as these may have accounted for the varying results among the investigations.

#### Summary

Research seemed to indicate a strong relationship between the child's level of cognitive development and his ability to perceive pictures effectively.

Simple line drawings have been designated the most effective picture type for conveying meaning to children.

Conflicting conclusions have been drawn regarding the relationship between reading comprehension and picture usage. Studies undertaken



thus far have generally concentrated on pictures as adjuncts to the text. Limited research is available concerning the use of pictures as a teaching instrument.

## Chapter III

### The Research Design

The purpose of this study was to examine the effectiveness of a visual-verbal literacy technique (picture comprehension) on certain targeted comprehension skills (inferential thinking) tested visually on seventh grade students.

The secondary purpose of this study was to determine if this technique of visual-verbal literacy (picture comprehension) transferred to the comprehension of written material.

#### Hypotheses

The hypotheses investigated in this study were as follows:

1. There was no significant difference between the mean posttest comprehension score of the seventh grade treatment group receiving instruction in a visual-verbal literacy technique and the mean posttest comprehension score of the seventh grade control group.
2. There was no significant difference in the mean comprehension score on the pretest and posttest for the seventh grade control group.
3. There was no significant difference in the mean comprehension score between the pretest and the posttest for the seventh grade treatment group (picture instruction).

## Methodology

### Subjects

All seventh grade students from a rural junior-senior high school were the source of subjects for this investigation.

Through placement testing in reading comprehension and a complete analysis of the results, 30 students were placed into a treatment program and 10 students acted as a control group. Those students who were absent for any portion of the testing or the treatment program, or who had any serious learning disability, were eliminated from the study.

The remaining students were divided into two groups: (1) the control group--no visual-verbal treatment and (2) the treatment group--instruction in picture comprehension.

### Instruments

The Barnell Loft Specific Skills Series, the Educational Insights Program, and The Webster New Practice Readers were the source of paragraphs included in the researcher-designed test of targeted reading comprehension skills. Readability levels of the paragraphs were checked using the Dale-Chall Formula (1948) and selections were chosen that were suitable for a low sixth grade reader.

The test consisted of two forms, counter-balanced for readability level and subject interest. A total of 16 questions tested equally the four targeted areas: (1) the main idea, (2) cause and effect, (3) comparing and contrasting, and (4) predicting outcomes. Particular interest was given to paragraphs with high interest for an average

seventh grade student. To best determine the student's comprehension of the text, a short answer format was utilized. All answers required no more than 25 words to answer.

Coinciding with the short answer format of the reading comprehension test was the test of picture comprehension. A total of 16 questions were asked, the content of which was based solely on the information in the illustration. Once again all four targeted areas were questioned equally, and a short answer was required of all students. Being designated the best conveyers of messages, simple line drawings were used in the picture treatment, as well as the test of picture comprehension.

#### Procedure

All students were administered the researcher-designed test of reading comprehension focusing on the targeted reading skills. Students who incorrectly answered seven or more out of the possible 16 questions were placed in the treatment program. Students missing three or less questions were placed in the control group. As a result of the placement criteria, 30 students were placed in the picture treatment group and 10 children comprised the control group.

Prior to the onset of the treatment program, the instructor received basic training in the technique. Materials were distributed that emphasized the visual-verbal interaction and the importance of student involvement. Also provided were leading questions and activities to introduce each picture unit and the skills to be emphasized.

The daily procedure, which lasted between 20-30 minutes was as follows:

The instructor would distribute one simple line drawing covering all four skill areas to the treatment group. The group would be given about three minutes to study the drawing. The instructor would then start a discussion covering all areas of the illustration that would create understanding of the pictorial message. Four drawings were discussed daily. This procedure was followed for ten consecutive school days. At the end of this period, a picture comprehension test was administered to determine if the students were able to derive meaning from the simple line drawings. Students were considered deficient if they incorrectly answered 50% of the picture-related questions in at least one of the four targeted skill areas. A posttest in reading comprehension was administered to determine the effect the treatment program had on the student's ability to derive meaning from text.

#### Analysis of Data

The mean comprehension scores of the students in the treatment group and the control group were calculated. Hypothesis One (which compared the posttest scores of the control group and the treatment group) was analyzed using a t-test. Similarly, a t-test was employed to test Hypotheses Two and Three (which compared the pretest and post-test scores in the treatment and the control groups).

#### Summary

All seventh graders from a rural school district were administered a test of reading comprehension focusing on four targeted skills. Students showing a deficiency in any skill area were placed in a picture

comprehension treatment program which stressed a visual-verbal approach. The effectiveness of this technique was later measured by the scores on a test of picture comprehension and the written test of reading comprehension. The resulting scores were compared and analyzed.

## Chapter IV

### Analysis of Data

#### Purpose

The purpose of this study was to examine the effectiveness of a visual-verbal literacy technique (picture comprehension) on certain targeted comprehension skills (inferential thinking) tested visually on seventh grade students.

The secondary purpose was to determine if this technique of visual-verbal literacy (picture comprehension) transferred to the comprehension of the written material.

#### Analysis of the Findings

Two certified reading teachers scored the written form of the comprehension test designed to measure inferential thinking skills. Means were then calculated for both the control group (no picture treatment) and the treatment group (picture treatment) (See Table 1).

Each of the three hypotheses proposed in this study was tested and analyzed using the data obtained from the written test scores.

Table 1

Mean Comprehension Scores for the Control Group  
and the Treatment Group

	Pretest	Posttest
Control Group	14.0	13.80
Treatment Group	5.3	8.53

The following is a restatement of hypothesis one:

1. There is no significant difference between the pretest mean comprehension scores and the posttest mean comprehension scores of the control group on a test measuring certain targeted comprehension skills.

A dependent t-test was used to compare the mean comprehension scores of the control group on the pretest and posttest. A calculated t score of 0.69 indicated there was no significant difference at the .05 level, demonstrating that the scores of the control group did not change significantly from one form of the test to the other. Therefore, hypothesis one was retained. These data established the reliability of this researcher designed test of written comprehension and indicated a lack of test or treatment contamination.

The following is a restatement of hypothesis two:

2. There is no significant difference between the pretest and posttest scores for the treatment group on a test measuring certain targeted comprehension skills.

A dependent t-test was used to compare the mean comprehension scores of the treatment group on the pretest and posttest. A calculated t score of -6.082 indicated a significant gain at the .001 level. Therefore, hypothesis two was rejected.

The data indicated a significant gain in the scores of the treatment group following the picture treatment. These data seemed to indicate that simple line drawings, when used as an instruction tool, in conjunction with a visual-verbal literacy technique, facilitate the learning of certain targeted comprehension skills.



The following is a restatement of hypothesis three:

3. There is no significant difference on the posttest scores between the control group and the treatment group on a test measuring certain targeted comprehension skills.

Using an independent, two-tailed t-test, a calculated t score of -4.99 was obtained. This score indicated a significant difference at the .001 level. Therefore the null hypothesis was rejected, indicating that although the treatment group made significant gains, it did not meet the scores of the control group.

Scores on the test of picture comprehension were calculated and a mean of 13.17 was obtained. Data from this test indicated that students exposed to the picture treatment program were able to derive meaning from simple line drawings when presented in a test form.

#### Interpretation of Data

Generally, pictures in the form of simple line drawings were effective in increasing the mean comprehension scores of students involved in a visual-verbal literacy program. Students in this same program were able to perform to mastery the four targeted skills of inferential thinking required on the picture comprehension test.

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

Table 2  
Mean Scores of Targeted Comprehension Skills

	Main Idea	Cause/ Effect	Comparing/ Contrasting	Predicting Outcomes
Pretest Treatment	1.03	1.1	.766	2.4
Posttest Treatment	1.96	2.0	1.46	3.1
Pretest Control	3.5	3.3	3.5	3.7
Posttest Control	3.5	3.2	3.5	3.7

On both forms of the written comprehension test the control group had the most difficulty answering questions related to cause and effect. High mean scores on predicting outcome questions indicated no difficulty in that skill area.

The treatment group had the most difficulty with questions asking them to make comparisons. However, as with the control group, the highest scores were in the area of predicting outcomes.

Although gains were shown in all four targeted skill areas for the treatment group, the greatest mean gains were in the comprehension of the main idea. These data may indicate that the visual-verbal technique was most successful in this area. The treatment group made its smallest gain in the areas of making comparisons and predicting outcomes, indicating perhaps that this technique was least successful in these areas.

After calculating the mean scores on the picture comprehension test, it was determined that a mean score of 13.17 indicated that 95% of the students taking this test mastered the task. A mean score of 2.86 on main idea questions demonstrated a deficiency in this area while a mean of 3.57 in the area of making comparisons indicated that students were able to derive the most meaning from pictures when questions were asked in this specific skill area.

#### Summary

From the data obtained in this study, it can be concluded that students exposed to a visual-verbal literacy technique perform significantly better on a researcher designed test of reading comprehension. These students are also able to master the same skills when tested on a picture comprehension task. Therefore, they were able to successfully transfer the material obtained from the pictures to the written material on the posttest. Although the scores of the treatment group increased significantly, these scores never approached the pretest scores of the control group. The length of the treatment program may have accounted for this factor, as well as the inherent characteristics of the students, and the design of the program.

## Chapter V

### Conclusions and Implications

#### Purpose

The purpose of this study was to examine the effectiveness of a visual-verbal literacy technique (picture comprehension) on certain targeted comprehension skills (inferential thinking) tested visually on seventh grade students.

The secondary purpose was to determine if this technique of visual-verbal literacy (picture comprehension) transferred to the comprehension of the written material.

#### Conclusions

Two of the three null hypotheses were rejected, leading to the following conclusions about the effectiveness of the visual-verbal literacy technique:

1. Simple line drawings, when used in conjunction with a visual-verbal literacy technique, do effectively increase the mean comprehension scores on a written test measuring certain targeted inferential skills.
2. Following a visual-verbal treatment program in picture comprehension, students were able to successfully master the questions on a test of picture comprehension focusing on the four targeted inferential skills.

Observations during the treatment program reflected varying abilities among students. The students who displayed the greatest

number of inferential thinking deficiencies on the pretest and posttest made the greatest number of verbal responses during discussion. These same students often initiated discussions and offered logical responses that were not part of the formal treatment program. Classes containing primarily students in the control group often needed assistance in initiating the discussion. These students seemed less likely to keep searching for implied meanings in pictures, relying only on the obvious in picture interpretation.

Specifically, students were able to discuss easily the cause and effect relationship and were successful in predicting outcomes and making comparisons. However, in all the discussion groups, students were unable to successfully draw together all the information in the drawings and select the main idea. Although these skills did not represent the lowest scores on the written test, the scores did indicate a general deficiency in this area.

Although students responded well verbally on the questions related to cause and effect, their written scores did not verify this. Both the control group and the treatment group showed a deficiency in this area on the written exam.

Simple line drawings have been designated the best conveyers of meaning. However, it was noted during the treatment program that these drawings, when depicting action, drew the most favorable responses from the control group. Students in the treatment program did not seem to need this element in the drawings to stimulate discussion. They responded equally to both still and action drawings.

### Implications for Research

Further investigations into the use of simple line drawings as instructional tools in reading are warranted. More comprehensive research in the following areas is necessary.

1. This visual-verbal literacy technique could be used at various age and achievement levels to determine at what point it is most successful.

2. Although simple line drawings were used in this experiment, further studies could experiment with other types of pictures to determine their effectiveness as an instructional tool.

3. The treatment program could be extended for a longer period of time in future studies, eliminating any results altered by the Hawthorne effect.

4. Future studies could develop better controls in research design. Efforts could be made to standardize the difficulty of the written passages on both the pretest and posttest. Attempts could also be made to measure the difficulty of the picture content, making it more appropriate for the age and ability level of the students involved.

5. Research in picture studies could incorporate students in many geographic areas, in an attempt to determine if visual instruction favors students in a particular environmental setting.

### Implications for Classroom Practice

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

1. Since full picture development does not occur until age 10, careful attention should be paid to the very young child who cannot fully perceive complex pictures or illustrations. All drawings for this age child must remain simple and meaningful.

2. Careful attention must also be directed toward the remedial reader. Since poor readers may develop more slowly the ability to select relevant information from pictures, individual differences must be accounted for in the classroom. Research from this study indicated that the poor reader rather than a good reader responds most favorably to the visual-verbal technique.

3. Instructors should not assume that children inherently derive meaning from pictures, especially from those pictures that are shaded or contain complex information. Often it is necessary to teach children how to read the information in pictures.

4. Since simple line drawings have been designated the best conveyers of meaning, teachers should use them in place of complex illustrations whenever possible. When instructing the child over age 10, teacher discretion concerning the child's developmental stage can determine the amount of complexity to add to the drawing.

5. Meaningfulness is the key to picture comprehension. When developing a program that incorporates pictures, either in conjunction with the text, or alone, the pictures must depict information that is central to the text. Pictures are most effective if they provide a different route to the content than merely repeating the information present.

6. Although pictures can have a positive effect on reading skills, students should have the opportunity to read both with and without pictures.

7. When pictures are a part of the text, both visual and verbal attention should be paid to them. When more than one sense is accounted for, picture perception and comprehension increases.



## References

## References

- Allen, W. H. Audio-visual communication. In C. W. Harris (Ed.), Encyclopedia of Educational Research (3rd ed.). New York: Macmillan Company, 1960.
- Ames, L. B., Learned, J., Metraux, R., & Walker, R. Development of perception in the young child as observed in responses to the Rorschach test blots. Journal of Genetic Psychology, 1953, 82, 183-204.
- Anderson, D. G., Grover, C. C., & Kinkead, E. B. New practice readers. New York: McGraw-Hill Inc., 1962.
- Asso, D., & Wyke, M. Visual discrimination and verbal comprehension of spatial relations by young children. British Journal of Psychology, 1970, 61, 99-107.
- Attneave, F. Some informational aspects of visual perception. Psychology Review, 1954, 61, 183-193.
- Bloomer, R. Children's preferences and responses as related to styles and themes of illustration. Elementary School Journal, 1960, 60, 334-340.
- Bluth, L. F. A comparison of the reading comprehension of good and poor readers in second grade with and without illustrations. Ed.D. Dissertation, University of Illinois at Urbana-Champaign, 1972. (ERIC Document Reproduction Service No. ED 082 175)
- Boning, R. A. Specific skills series. New York: Barnell Loft, 1967.

- Broadbent, D. E. Perception and communication. New York: Pergamon Press, 1958.
- Broadbent, D. E. Information processing in the nervous system. Science, 1965, 3695, 457-462.
- Brown, L. The 3-D reconstruction of a 2-D visual display. Journal of Genetic Psychology, 1969, 115, 257-262.
- Bruner, J. S., Goodnow, J. J., & Austin, G. A. A study of thinking. New York: John Wiley & Sons, 1956.
- Burdick, J. G. A study of cross-section drawings used as technical illustrations in high school science textbooks. (Doctoral dissertation, Syracuse University, 1959). Dissertation Abstracts, 1960, 20, 2707-2708.
- Carpenter, C. R. A theoretical orientation for instructional film research. A.V. Communication Review, 1953, 1, 38-52.
- Carr, T. H., Bacharach, V. R., & Mehner, D. S. Preparing children to look at pictures: Advance descriptions direct attention and facilitate active processing. Child Development, 1977, 48, 22-29.
- Dale, E. Audio-Visual methods in teaching. New York: Dryden Press, 1969. (Originally published, 1946).
- Dale, E., & Chall, J. A formula for predicting readability: Instructions. Educational Research Bulletin, 1948, 27, 37-54.
- Debes, J. L. Loom of visual literacy. Audio-Visual Instruction, 1969, 14, 26-27.
- Denburg, S. D. The interaction of picture and print in reading instruction. Reading Research Quarterly, 1976-77, 12, 176-189.

- Dilley, M. G., & Paivio, A. Pictures and words as stimulus and response items in paired-associate learning of young children. Journal of Experimental Child Psychology, 1968, 6, 231-240.
- Dwyer, F. M. Adapting visual illustrations for effective learning. Harvard Educational Review, 1967, 37, 250-263.
- Dwyer, F. M. A guide for improving visualized instruction. University Park: Learning Services, 1972.
- Elkind, D., Koegler, R., & Go, E. Studies in perceptual development: II Part-whole perception. Child Development, 1964, 35, 81-90.
- French, J. E. Children's preferences for pictures of varied complexity of pictorial patterns. Elementary School Journal, 1952, 53, 90-95.
- Friedman, A. Framing pictures: The role of knowledge in automatized encoding and memory for gist. Journal of Experimental Psychology: General, 1979, 108, 316-355.
- Gibson, J. J. A theory of pictorial perception. AV Communication Review, 1954, 1, 3-23.
- Gibson, E. J. Principles of perceptual learning and development. New York: Appleton-Century-Crofts, 1969.
- Gombrich, E. H. Art and illusion. New York: Pantheon Books, 1960.
- Goodykoontz, B. The relation of pictures to reading comprehension. Elementary English Review, 1936, 13, 125-130.
- Gregory, R. L. The intelligent eye. New York: McGraw Hill, 1970.
- Haber, R. The psychology of visual perception. New York: Holt Rinehart & Winston, 1973.
- Holliday, W. G. Critical analysis of pictorial research related to science education. Science Education, 1973, 5, 201-214.

- Holliday, W. G. The effects of verbal and adjunct pictorial verbal information in science instruction. Journal of Research in Science Teaching, 1975, 12, 77-83.
- Jahoda, G., Cheyne, W. M., Deregowski, J. B., Sinha, D., & Collingbourne, R. Utilization of pictorial information in classroom learning: A cross-cultural study. AV Communication Review, 1976, 24, 295-315.
- Koenke, K. The effects of a content-relevant picture on the comprehension of the main idea of a paragraph (Technical Report No. 86). Madison, Wisconsin: Wisconsin Research and Development Center for Cognitive Learning and the Laboratory for Research in Basic Skills, June, 1968. (ERIC Document Reproduction Service No. ED 024 540)
- Koenke, K., & Otto, W. Contribution of pictures to children's comprehension of the main idea in reading. Psychology in the Schools, 1969, 6, 298-302.
- Kolers, P. A. Some modes of representation. In P. Pliner, L. Krames, & T. Alloway (Eds.), Communication and affect: Language and thought. New York: Academic Press, 1973.
- Lesgold, A. M., DeGood, H., & Levin, J. R. Pictures and young children's prose learning: A supplementary report. Journal of Reading Behavior, 1977, 9, 353-360.
- Levin, J. R., Bender, B. G., & Lesgold, A. M. Pictures, repetition, and young children's oral prose learning. AV Communication Review, 1976, 24, 367-380.
- Lindseth, M. L. The use of pictures to answer comprehension questions in a selected developmental reading series. Unpublished master's thesis, University of Minnesota, 1969.

- Mackworth, N. Seven cognitive skills in reading. Reading Research Quarterly, 1972, 7, 68.
- Mackworth, N. H., & Bruner, J. S. How adults and children search and recognize pictures. Human Development, 1970, 13, 149-177.
- Mandler, J. M., & Robinson, C. A. Developmental changes in picture recognition. Journal of Experimental Child Psychology, 1978, 26, 122-136.
- Miller, W. Reading with and without pictures. Elementary School Journal, 1938, 38, 676-682.
- Miller, N. E., & Allen, W. A. Graphic communication and the crisis in education. AV Communication Review, 1957, 5, 1-120.
- Morris, C. W. Signs, language and behavior. New York: Prentice Hall, 1946.
- Paivio, A., Rogers, T. B., & Smythe, P. C. Why are pictures easier to recall than words? Psychonomic Science, 1968, 2, 137-138.
- Parkhurst, P. E. Generating meaningful hypothesis with aptitude-treatment interactions. AV Communication Review, 1975, 23, 171-183.
- Pederson, D. L. The effects of pictures on primary grade children's comprehension of basal readers. (Doctoral dissertation, University of Illinois at Urbana, 1971). Dissertation Abstracts, 1971, 32, 311-A.
- Peeck, J. Retention of pictorial and verbal content of a text with illustrations. Journal of Educational Psychology, 1974, 66, 880-888.
- Piaget, J. The language and thought of the child. New York: Harcourt, Brace, 1926.

- Read, J. D., & Barnsley, R. H. Remember Dick and Jane? Memory for elementary school readers. Canadian Journal of Behavioral Science, 1977, 9, 361-370.
- Rohwer, W. D., & Harris, W. J. Media effects on prose learning in two populations of children. Journal of Educational Psychology, 1975, 67, 651-657.
- Rohwer, W. D., & Matz, R. D. Improving aural comprehension in white and black children: Pictures versus print. Journal of Educational Child Psychology, 1975, 19, 23-36.
- Samuels, S. J. Attentional process in reading: The effect of pictures on the acquisition of reading responses. Journal of Educational Psychology, 1967, 58, 337-342.
- Samuels, S. J. Effects of pictures on learning to read, comprehension, and attitudes. Review of Educational Research, 1970, 40, 397-407.
- Santostefano, S., Rutledge, L., & Randall, D. Cognitive styles and reading disability. Psychology in the Schools, 1965, 2, 57-62.
- Schallert, D. L. Improving memory for prose: The relationship between depth of processing and context. Journal of Verbal Learning and Verbal Behavior, 1976, 15, 621-632.
- Sidley, E. Reading for comprehension series. Carson: Educational Insights, 1978.
- Thomas, J. L. The use of pictorial illustrations in instruction: Current findings and implications for further research, 1976.
- (ERIC Document Reproduction Service No. ED 160 108)

- Travers, R. M. A study of the advantages and disadvantages of using simplified visual presentation in instructional materials. Final Report on USOE Grant No. OEG-1-070144-5235, 1969.
- Travers, R. M., & Alvarado, V. The design of pictures for teaching children in the elementary school. AV Communication Review, 1970, 18, 47-64.
- Travers, R. M., McCormick, M., Van Mondfrans, A. P., & Williams, F. E. Research and theory related to audio-visual information transmission. Utah: Bureau of Educational Research, University of Utah, 1964.
- Vernon, M. D. The value of pictorial illustration. British Journal of Educational Psychology, 1953, 23, 171-179.
- Vernon, M. D. The instruction of children by pictorial illustration. British Journal of Educational Psychology, 1954, 24, 171-179.
- Vurpillot, E. The visual world of the child. London: Allen & Unwin, 1976.
- Weintraub, S. The effect of pictures on the comprehension of a second grade basal reader (Doctoral dissertation, University of Illinois at Urbana, 1960). Dissertation Abstracts, 1960, 20, 61-67.
- Weisburg, J. S. The use of visual advance organizers for learning earth science concepts. Journal of Research in Science Teaching, 1970, 7, 161-165.
- Wicker, F. W. On the locus of picture-word differences in paired-associate learning. Journal of Verbal Learning and Verbal Behavior, 1970, 9, 52-57.
- Yarbus, A. L. Eye movements and vision. New York: Plenum Press, 1967.