The Effect of a Neuro-Linguistic Programming Modeled-Reading Comprehension Strategy on Special Education Students

THESIS

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ABSTRACT

This study was designed to test the effectiveness of a Neuro-Linguistic Programming modeled-reading comprehension strategy. This lower order thinking strategy treatment was tested on seven special education students from three suburban middle schools in western New York.

This treatment was intended to develop the subject's ability to create images from written language. First, students drew pictures of sentences read to them by their teacher. Next, the teacher asked students questions about the visual, auditory and kinesthetic submodalities of their pictures; students were urged to add missing details. Once students could draw and sequence pictures adequately, they were instructed to make pictures in their mind of sentences read. When they were able to comprehend a paragraph at a time, they continued the strategy with silent reading.

Subjects were pre and post tested using the Ekwall Informal Reading Inventory (1986). A related t test indicated that there was a statistically significant difference between the pre and post test results.

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Chapter One

Statement of Problem

Purpose

The purpose of this study was to test the effectiveness of a Neuro-Linguistic Programming modeled-reading comprehension strategy. Specifically, this study tested the effectiveness of a visual imaging treatment among special education students.

Need for the Study

Reading comprehension is perhaps the single most important academic achievement that a student may obtain. The ability to understand written material affects a student's success potential with all academic subjects and later in life with income earning potential. Yet, 20% to 30% of the U.S. adult population is considered functionally illiterate (Kirsch, Jungeblut, Jenkins & Kalstad, 1993).

An extensive literature review of reading comprehension strategies reveals some interesting findings. Studies involved either higher order thinking skills or traditional skills training. Traditional skills involved skills such as word attack, phonics and vocabulary building. Higher order thinking skills involve such activities as summarizing, self-questioning and other metacognition skills. Baker and Brown (1984) indicate that reading involves metacognitive activities

including clarifying reading purposes, identifying important points, focusing attention on major content, monitoring comprehension, and taking corrective action when failures are detected.

There were no articles found classified under lower order thinking skills. However, many articles were found classified under basic skills and literacy training. Yet, upon review these articles were either about decoding skills such as word attack, phonics and vocabulary development or about higher order thinking skills such as self-generated questioning and summarizing.

Baker and Brown (1984) consider that metacognitive skill involves awareness and regulation of cognition. What about the creation of cognition? A reader must first create an internal sensory experience from printed words before attempting perceptual/discriminatory activities such as summarizing and monitoring.

Neuro-Linguistic Programming provides a model to explore sensory based/lower order thinking skills. However, there has been very little academic research to validate this model. This is a serious obstacle to widespread promotion of this model.

Reading comprehension research has contributed to the development of higher order thinking skills. However, there has been very little research on lower order thinking skills and reading comprehension This study was needed to provide data that Neuro-Linguistic Programming and lower order thinking skills are important

components of reading comprehension research and instruction programs.

Research Questions

1. Will teacher-directed students demonstrate significantly higher reading comprehension scores after the visual imagery treatment based on a pre and post informal reading inventory?
2. How do special education students benefit from the treatment?
3. Will teachers be able to gain competence with the techniques in the minimal training time allowed?

Null Hypothesis

There will be no statistically significant difference between the mean scores on an informal reading comprehension test taken before the treatment and the mean scores taken after the visual imagery treatment.

Definitions

The study considers it important for the reader to accept the following definitions for several terms:

READING COMPREHENSION: The ability to create internal pictures encoded with auditory and kinesthetic properties from written language.

LOWER ORDER THINKING SKILLS: The ability to make internal manipulations of visual, auditory and kinesthetic submodalities. Visual submodalities include color, size, shape brightness and movement. Auditory submodalities include volume, pitch, tonality and rhythm. Kinesthetic submodalities include texture, temperature, sensations, weight and emotions.

HIGHER ORDER THINKING SKILLS: The ability to perceive and discriminate among internal and external sensory experience. Examples in reading include summarizing, self-questioning and metacognitive skills.

Limitations

1. Three weeks may be too short of a treatment period.
2. Three hours may not be long enough to create competent trainers of the treatment.
3. Students are serving as their own controls.
4. Those students that are not able to adequately decode would not be expected to benefit much from the treatment so overall results will be different than if we could only treat phonics able students.

Chapter Two

Review of the Literature

Purpose

The purpose of this study was to test the effectiveness of a Neuro-Linguistic Programming modeled-reading comprehension strategy. Specifically, this study tested the effectiveness of a visual imaging treatment among special education students.

Overview

Topics covered in this review include reading comprehension, Neuro-Linguistic Programming, and visual imagery. Reading comprehension topics include metacognition, higher order thinking skills and lower order thinking skills.

Metacognition

Metacognitive skills involve awareness and regulation of cognition according to Baker and Brown (1984). Successful cognition training includes skills training, instruction in the overseeing and monitoring of the skills, and information regarding the significance and outcome of these activities. Baker and Brown indicate that reading involves metacognitive activities including clarifying reading

purposes, identifying important points, focusing attention on major content, monitoring comprehension, and taking corrective action when comprehension failures are detected.

Olshavsky (1977) demonstrates how a metacognition model relates to the reading process. The purpose of the study was to identify reading strategies used by a total sample of twenty-four good and poor readers selected from three heterogeneous tenth grade English classes in a small midwestern city high school. Students were taught to think aloud after reading each short story clause. The researcher recorded subject responses during the study and analyzed the responses to identify reading strategies.

Ten strategies were identified. Word-related strategies include use of context, synonym substitutions, and stated failure to understand a word. Clause-related strategies include rereading, inference, addition of information, personal identification, hypothesis, and stated failure to understand a clause. The story-related strategy involves use of story information to understand. For example, a subject would relate the clause information to the theme of the story.

These ten strategies were further categorized as problem identification and problem solving strategies. The problem identification strategies can be thought of as the evaluative part of comprehension monitoring, while the problem solving strategies relate to corrective action.

Comprehension Monitoring and Calibration

Comprehension monitoring is an active on-going activity that occurs during the reading process; it involves knowing about what is understood and what is not and knowing what to do to correct the situation (Garner, 1980). Comprehension calibration involves a reader's awareness of how well completed material was understood or not understood.

Pitts (1983) reported that good readers in grades 2, 4, 6, and 8 correct 53% of their errors, while poor readers correct 5 %. Garner (1983) reports that good readers and poor readers reflect four differences. Good readers use spontaneous lookback strategies to find unrecalled data, allocate cognitive effort by selecting intermediate level chunk size, summarize well, and have a clear focus on meaning and monitor for comprehension failures; poor readers do not use these skills. Garner (1980) found that poor readers manage reading as unrelated bits and pieces instead of as a whole text.

Garner and Reis (198l) conducted a study to determine how good and poor readers monitor comprehension and use spontaneous lookback strategy as corrective action. A lookback strategy involves realizing one doesn't understand something from written material and then referring back to the written material for resolution. Nineteen good and nineteen poor readers ranging from fourth to tenth grade were selected from two rural Maryland counties. Students were

provided with passages that had been interspersed with questions that required lookback and some that did not. Observers used verbal and nonverbal behavior as an indication that a subject had monitored his comprehension--that is, did not comprehend the answer to an inserted question. Interestingly, evidence of monitoring did not ensure that a subject would use the lookback strategy. Some subjects demonstrated both monitoring and lookback behaviors, while some subjects displayed neither.

The researchers found that poor readers tended to neither demonstrate monitoring, nor to use the lookback strategy. Good sixth and seventh grade readers used monitoring and lookback. The authors suggest that monitoring ability may precede a reader's ability to resolve a comprehension problem. Therefore, the authors conclude that identification of a comprehension failure is the first step to effective monitoring.

Glenberg and Epstein (1985) and Weaver (1990) conducted studies to determine how well readers calibrate their comprehension of written materials. Glenberg and Epstein (1985) found that subjects were very poor at calibrating their comprehension of reading material. In two experiments involving eighty-five college student, subjects read passages, predicted performance on an inference verification test and completed the test. The authors found that subjects could not differentiate between what was understood and what was not.

Weaver (1990) applied the materials and procedures of the Glenberg and Epstein study to a group of forty-five college students with a design modification. Weaver developed additional questions for each reading passage to improve what was considered an inaccurate measurement technique. Weaver found that subjects did not calibrate comprehension as poorly as previously reported.

Magliano, Little and Graesser (1993), Maki, Foley and Kajer (1990) and Glover (1990) tested treatments designed to improve comprehension calibration. Magliano, Little and Graesser (1993) tested the effect of a cognitive skills training on subjects' comprehension calibration. Sixty-three university students were randomly assigned between two conditions. The deep level strategies condition involved instructional strategies including clarifying, making predictions, forming questions, summarizing, using context, identifying trouble spots, and drawing inferences. The superficial level strategies condition involved analyzing letters in a word, sounding the syllables, consolidating phrases into chunks, grouping words correctly, integrating words in a sentence, establishing confidence in one's reading ability and motivating oneself to achieve excellence. Instruction was provided by a tape recorder. Then, students read passages, judged their comprehension level, and completed two comprehension tests. A comprehension calibration score was created by relating the students' comprehension judgments to test results.

The researchers found that the subjects in the deep level condition calibrated their comprehension better than those in the superficial condition. Further, data suggest that superficial level strategies may interfere with the ability to calibrate.

Maki, Foley and Kajer (1990) were interested in the impact of increased processing on comprehension calibration. Processing requirements were manipulated by providing text with and without deleted letters for the eighty college student subjects. The authors found that subjects were better able to calibrate comprehension when they read passages with deleted letters. The authors concluded that increased processing improved comprehension calibration.

Monitoring requires feedback. Many researchers believe that inserted questions will increase feedback to readers and improve comprehension calibration (Glover, 1989; Pressley, Snyder, Levin, Murray, & Ghatala, 1987). In the study by Pressley et al. (1987), students who answered knowledge/lower-ordered questions did significantly better than a control group in estimating how well they had understood written material.

Glover (1989) tested the hypothesis that subjects with inserted analysis level questions will do better at estimating test performance on read material than subjects with inserted knowledge level questions. The author explained that analysis of written material requires a subject to break information into its parts and to establish a

relationship among them. Knowledge level questions involve the ability to remember pieces of information. Sixty college freshman were randomly assigned to the conditions. The researcher found that the condition with the analysis level questions did significantly better in estimating test performance than the condition with the knowledge level questions, who in turn did much better than the control condition. The author concluded that comprehension calibration is aided by inserted questions. Therefore, he recommended teaching students a self-questioning strategy.

Self-Questioning

Self-questioning requires readers to set a purpose, generate questions that require comprehension, determine whether comprehension has occurred, and take corrective action. Studies by Frase and Schwartz (1975) and Andre and Anderson (1979) examined the impact of self-questioning on reading comprehension.

Frase and Schwartz (1979) had a group of sixty-four college freshman read two separate sections of a text. Students were instructed to read the first sections and to construct recall questions while they were to read and study the second section to determine if self-questioning would result in improved performance compared to the read and study condition. The authors found that the self-questioning condition resulted in significantly better performance on a post-test

than the read and study condition. However, questions tested knowledge recall rather than higher-ordered thinking.

Andre and Anderson (1979) tested whether students could identify and ask questions about main points and whether creating these questions would improve learning of the material. Twenty-nine seniors from a rural Illinois high school were classified as either higher or lower verbal ability and provided with a self-questioning training program. Students were provided with two passages and were asked to identify the main idea of each paragraph as the basis for the self-generated questions. Then, subjects completed a post-test consisting of ten recognition questions and ten application questions. The recognition questions required the subjects to recognize an example of a process copied from the text. The application questions presented new examples of a process and asked subjects to identify the process demonstrated by the example. The high and low ability control groups read and reread the passages as a studying technique before taking the post-test.

The authors found that the low ability questioning group performed significantly better than the low ability reread group. However, the high ability students performed about the same regardless of treatment. Student-generated questions were analyzed based on criteria from the self-questioning program. Seventy-four percent of the 118 questions generated during the post-test were classified as good comprehension

questions. Further, the relationship between study question and test performance was considered. The authors found that the probability of a correct post-test answer given that a good question was asked was .78 . However, the probability of a correct answer was only .39 if a poor study question was asked.

In a second experiment, eighty-one juniors and seniors were assigned to three treatments--questioning with training, questioning, and rereading. Students were classified as high, medium, and low verbal ability. Again, subjects read selected passages, applied their treatments, and took a post-test. The authors report that the questioning with training group performed significantly better than the question group, who in turn performed significantly higher than the reread group. Further, the self-questioning instruction significantly improved the performance of the low and middle ability subjects, but not the high ability group. The authors concluded that students may be taught to create good main point questions.

Nolan (1991) conducted a study to determine whether teaching students the two metacognitive strategies of self-questioning and prediction is more effective in improving reading comprehension than teaching students a single metacognitive strategy or a traditional vocabulary intervention strategy. The study involved forty-two students from grades six through eight who were selected based on poor reading comprehension as measured by the Gates-McGinitie

Reading Test. Students were randomly assigned to one of three treatments which are named self-questioning with prediction (SQWP), self-questioning (SQ), and control vocabulary intervention (CVI). The examiner instructed, modeled, explained, and applied metacognitive techniques for the SQWP and SQ groups. Both of these groups received instruction in self-questioning while the SQWP group received instruction in predicting. The examiner instructed and applied vocabulary development for the CVI group.

The study found that the combined strategy was significantly more effective than both other treatments and that the SQ strategy is more effective than the CVI strategy. Further, the poorest readers had the most dramatic increase in reading comprehension scores.

Summarization

Summarization involves several higher order thinking skills. First, it increases processing which has been shown to improve calibration (Maki et al., 1990). Second, it is an extension and improvement of self-generated questions. Summarization requires that a student organize questions around important and main ideas. To summarize, a student must comprehend material, evaluate it according to summary rules and write something. A failed attempt provides immediate feedback because nothing is written. The student is sent back on a search for meaning.

Several summarization studies delineate summarization rules, demonstrate a positive impact on comprehension, and involve comprehension monitoring. Doctorow, Wittrock and Marks (1978) conducted two experiments with 488 sixth graders to determine how the insertion of paragraph headings and student generation of sentences about story paragraphs would affect reading comprehension. The authors found that comprehension and recall were almost twice as great with paragraph headings and generated sentences than without.

The next highest test results occurred when instructions were to generate sentences followed by the insertion of paragraph headings condition. The group which read material without subheadings and did not create sentences had the lowest comprehension and recall scores. The authors found that the lower ability students benefited the most from the sentence generation activity.

Brown and Day (1983) identified six rules of summarization which are: deletion of trivial and redundant material, superordination of lists of items and actions, selection of a topic sentence, and invention of a topic sentence. Sixty-seven subjects performed summarization instructions on expository material so that the authors could evaluate the development of the ability to use the above rules. Subjects ranged from fifth grade to college. The authors found that the younger students relied primarily on deletion strategies, while the older students also used the more complex rules. The authors report a

developmental pattern. Deletion rules were observed first, followed by superordination, selection of a topical sentence, and finally, sentence invention.

Brown, Day and Jones (1983) found that subjects who planned their summaries by preparing rough drafts were able to condense more ideas into fewer words than with unplanned summaries. Subjects were selected from the fifth, seventh, and eleventh grades and college. Although few of the younger students used planning, those that did performed as well as the college students. The authors conclude that planning was the best predictor of efficiency.

Neuro-Linguistic Programming and Visual Imagery

Neuro-Linguistic Programming (NLP) is the study of the structure of human subjective experience. NLP provides a sensory based modeling capability of behavior. The visual, auditory and kinesthetic representational systems are the building blocks of behavior according to Dilts, Grinder, Bandler, and DeLozier (1980).

The reading comprehension treatment tested in this study was elicited from a group of excellent readers using NLP (Jackson, J. & Brownell, M.J. as cited in Cleveland, 1986). Competent readers transform printed language into meaningful, interesting pictures in their heads which also may encode auditory and kinesthetic components. There have been few academic studies of NLP practices

and none involving reading comprehension. However, there has been research on visual imagery.

Levin and Pressley (1978) conducted a study to determine the contribution of age and educational experience on a student's ability to benefit from an induced imagery strategy. Two samples of sixty rural kindergarten children were selected. Individual testing of the first sample of sixty occurred in the Fall, while the second sample of sixty-five was tested the following Spring. Participants were randomly assigned to either an imagery or a control experimental group.

The experiment involved presenting each subject with twelve pairs of unrelated pictured objects. The pictures were shown at twelve-second intervals and at a different random order for each subject. A test was administered immediately after presentation of the twelve picture pairs. Subjects were given a picture of each of the twelve stimulus objects and asked to point to the response picture. The response pictures were arranged in a three by four array. Subjects were given fifteen seconds to respond to each item.

The treatment for the experimental groups differed. The imagery subjects were instructed to make a picture in their heads of the two objects doing something together so that they could remember that they go together. The control subjects were instructed to remember the object pairings but were not given any learning strategy.

Summary data by experimental condition and time of testing revealed that imagery subjects performed significantly better than the control subjects. Further, the authors found that age predicted the imagery subjects performance independently of amount of schooling.

Lesgold, McCormick and Golinkoff (1975) conducted a study to determine if imagery skills related to reading comprehension can be taught to third and fourth graders. Specifically, they were interested in the effect that imagery training would have on the students' ability to learn whole passages of prose material. Subjects included ten third graders and twenty-two fourth graders from a multiracial urban setting. Following a pretest, subjects were placed into experimental and control groups to create two equal ability groups.

The experiment involved a twenty-seven day period in which twelve training sessions were held. The cartoon instruction treatment involved learning how to read stories and then to create physical pictures of the content. Over the period of training the subjects were told to draw stick figure cartoons for the passages, sequence the sketches, and select main story points and to say how each sketch related to a story starting on day two. The subjects were told to include something in a picture from each story sentence starting on day three. Then, the subjects were told to use their sketches to recall main points and details on day four. Next, subjects were told to imagine the cartoons rather than drawing them and to use these images as a recall

cue on the last day. The control groups read the same passages as the cartoon group, but they answered multiple choice questions. The treatments differed only in the procedures involving the drawing, imaging and recall. The authors found that the cartooning instructions resulted in significantly improved prose learning ability compared to the control group.

Anderson and Hidde (1971) conducted a study to determine if imagery instructions improve sentence learning. Subjects included twenty-four college students randomly distributed between two groups. Thirty sentences were prepared based on the formal $Noun_1$ the Verb Noun 2. Some examples include: "The lady examined the robin; The butcher kicked the stranger; The queen greeted the professor."

Although subjects thought that they were helping to norm a future test, one group of subjects received pronunciability instructions while the other received imagery instructions. Imagery group members were told to create an image of the sentence event and then to rate the vividness of the image. Pronunciability group members were to say the sentence out loud three times and to rate its pronunciability. Each sentence was shown on a three by five inch file card for seven seconds. The subjects then had three seconds to do the rating. After one presentation of the sentences a surprise recall test was administered. A list of subject nouns was given to each subject. Subjects were asked to

write as much as they could remember of the sentence that contained each subject noun.

The authors found that imagery subjects recalled more than three times the words than the pronunciability subjects on the surprise test. The imagery subjects recalled a mean of 10.6 verbs, while the pronunciability subjects averaged only 3.3 verbs ($t = 5.16$, $df = 22$, p less than .01). The recall means for objects for the imagery and pronunciability groups were, respectively, 10.4 and 3.0 ($t = 5.20$, $df = 22$, p less than .01). The authors examined the vividness ratings of the imagery group and found that vividness only had a slight impact on memory. Subjects recalled about 32% of the sentences when vividness was low and up to 40% when vividness was high.

Summary

Topics covered in this review include reading comprehension, Neuro-Linguistic Programming, and visual imagery. Reading comprehension research studies center around metacognitive intervention strategies. Reading comprehension studies tend to focus almost exclusively on higher order thinking skills. Higher order thinking skills involve comprehension monitoring and calibration, self-questioning and summarization. Neuro-Linguistic Programming provides a model for developing sensory based or lower order thinking skills; however, there have been few academic studies to validate this

model. Yet, visual imagery research does suggest the importance of lower order thinking skills in the reading process.

Chapter Three

Design

Purpose

The purpose of this study was to test the effectiveness of a Neuro-Linguistic Programming modeled-reading comprehension strategy. Specifically, this study tested the effectiveness of a visual imaging treatment among special education students.

Null Hypothesis

There will be no statistically significant difference between the mean scores on an informal reading inventory comprehension test taken before treatment and the mean scores taken after the visual imagery treatment.

Methodology

Subjects

Subjects in this study included three emotionally disturbed sixth graders, two hearing-impaired ninth graders, and two educable mentally-retarded ninth graders from public suburban schools in Western New York.

Procedures

Procedures were developed for teachers and students. Teachers received three hours of training to enable them to provide the reading comprehension treatment and to administer the reading comprehension test from the Ekwall Informal Reading Inventory (1986). All students were tested prior to and after the treatment as a measure of reading comprehension growth. Subjects received five hours of instruction over a period of three weeks.

This procedure was intended to develop the subjects' ability to create images from written language. First, students divided their paper into comic book panel sections. The teacher read two sentences and had the subjects draw what the words meant. Next, the teacher asked students questions about the submodalities of their pictures. Visual submodalities include size, shape, color, and movement. Auditory submodalities include volume, pitch, and tone. Kinesthetic submodalities include texture, temperature, movement and weight. Students were urged to add missing details to their pictures.

Students struggling with comprehension often make no picture or pictures poor in detail and quality. Therefore, students were required to use at least three colors and the entire panel section for each picture.

Once students were able to draw and sequence pictures adequately, they were instructed to make pictures in their mind of sentences read.

When they were able to comprehend a paragraph at a time, they continued the strategy with silent reading. The amount they read was increased as proficiency was demonstrated through verbal and written responses.

Analysis of Data

Comprehension scores were calculated for the pre and post tests for all subjects. The comprehension scores were used to develop mean grade equivalencies for the pre and post tests. A related *t* test was performed on the pre and post test mean scores to determine statistical significance.

Chapter Four

Analysis of the Data

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Analysis of the Data

Comprehension scores were calculated for the pre and post tests for all subjects. The comprehension scores were used to develop mean grade equivalencies for the pre and post tests. A related t test was performed on the pre and post test mean scores to determine statistical significance. The t score was calculated to be 2.5 The critical value of t for 6 degrees of freedom at the 95% confidence is $\pm$ 2.447. Therefore, the null hypothesis is rejected.

Table 1.

t Test of Difference between the Two Mean Scores

Subject	Pretest Grade Equivalent	Post test Grade Equivalent
1	4.00	6.00
2	5.00	6.00
3	2.00	3.00
4	5.00	5.00
5	5.00	5.00
6	7.00	7.00
7	6.00	7.00
MEAN	4.86	5.57
STANDARD DEVIATION	1.57	1.40
{degrees of freedom	6 }	
{t score	2.5}	

Critical $t = \pm 2.447$; $p<.05$

The null hypothesis is rejected because there is a statistically significant difference between the mean scores of the pre and post tests.

Chapter Five

Conclusions and Implications

Purpose

The purpose of this study was to test the effectiveness of a Neuro-Linguistic Programming modeled-reading comprehension strategy. Specifically, this study tested the effectiveness of a visual imaging treatment among special education students.

Conclusions

This study provides data that Neuro-Linguistic Programming and lower order thinking skills are important components of reading comprehension research and instruction programs. The teacher directed students demonstrated significantly higher reading comprehension scores after the treatment based on a pre and post informal reading inventory. Thus, it appears that the treatment helped to develop the students' ability to create images from written language. Further, the study indicates that teachers were able to gain competence with the techniques in the minimal training time allowed.

A follow-up interview was conducted with the three teachers six months after the completion of the treatment period. An unexpected finding was that each of the teachers continued to use some of the

visual imagery treatment to varying degrees for class instruction. The teachers use visual imagery questions to monitor their students' comprehension and to help students monitor their own comprehension during instruction.

Implications for the Classroom

Previous research has shown the importance of comprehension calibration (Glenberg and Epstein, 1985), comprehension monitoring (Garner & Reis, 1981), self-questioning (Frase & Schwartz, 1975), and summarization (Doctorow, Wittrock, & Marks, 1978). However, a reader must first create an internal sensory experience from printed language before attempting perceptual/discriminatory activities. Results of this study suggest the importance of direct instruction involving the development of visual imagery from language. Only when a student has a picture in his head, does he have something to monitor, calibrate, ask questions about, and summarize. Therefore, visual imagery instruction should precede these higher order comprehension strategies.

This study suggests that teachers may use visual imagery questions as a means for monitoring student comprehension of verbal and written material. No pictures or pictures poor in detail indicate poor comprehension and suggest the need for additional instruction. Conversely, pictures complete and rich in sensory based detail suggest

adequate comprehension. Thus, the teacher may continue instruction with assurance that students are learning.

Implications for Research

This study provided some data that the visual imagery treatment was effective among the special education subjects. However, further research of this treatment is needed as it relates to the following:

-student use of the skill after the treatment period

-memory

-cooperative learning

-types and numbers of students treated.

This study tested seven special education students. Further research is needed to test the effectiveness among students of different ages and of high, medium and low academic ability. Further, greater numbers of students need to be treated.

Lesgold, McCormick & Golinkiff (1975) found that students receiving visual imagery treatment only performed better on a recall test than the control group when they were reminded to use imagery. A question for further research involving the NLP imagery treatment is: Once trained, will students use the visual imagery ability regularly and on their own? If not, what additional treatment is necessary to get students to use visual imagery regularly?

Anderson and Hidde (1971) found that the students receiving a visual imagery treatment remembered over 50% more than the control

group based on a post test. However, this difference dropped to 20% in a matter of minutes. Perhaps, there would be no significant difference if the tests were administered after a couple of hours. A question for further research is: What long term memory improvements result from the NLP visual imagery treatment?

Traditional teacher directed instruction limits a teacher's ability to provide special help to struggling students on a regular basis due to limited resources and large class size. However, cooperative learning models free up the teacher for small group/individual instruction. Students of all abilities have been found to benefit from cooperative learning (Slavin, 1984, and Slavin, Stevens, & Madden, 1988). Therefore, it could prove useful to demonstrate the effectiveness of the visual imagery reading comprehension treatment in a cooperative learning setting. Questions for further research include the following:

-Will cooperative learning trained students demonstrate significantly higher reading comprehension scores after the treatment based on a pre and post informal reading inventory?

-Will there be a significant difference in reading comprehension gains between students trained in a teacher-directed or cooperative learning environment?

-How do high, medium and low ability students benefit from the visual imagery treatment and by learning situations (teacher-directed versus cooperative learning)?

Reading comprehension is perhaps the single most important academic achievement that a student may obtain. Yet, most reading comprehension research and instruction has focused on higher order thinking skills such as self-questioning and summarization. Students that have not mastered lower order thinking skills necessary for reading comprehension may benefit little from higher order thinking remediation activities.

This study tested the effectiveness of a Neuro-Linguistic Programming modeled-reading comprehension strategy. This lower order/visual imagery treatment resulted in a statistically significant reading comprehension improvement for the special education subjects. The results suggest the need for further research and for direct classroom instruction in lower order thinking skills such as visual imaging.

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