READING ACHIEVEMENT IN GRADES THREE, FOUR, AND FIVE WHEN INSTRUCTION IN GRADES ONE AND TWO WAS DETERMINED BY METHOD PREFERENCE

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INTRODUCTION

Is it important to provide reading instruction through learner's perceptual strengths for effective learning? If initial reading instruction is focused on the reader's information processing strengths, will there be a resulting difference in reading achievement attributable to any one method of instruction? Is automaticity as reflected by reading rate adversely affected by an initial phonetic approach to instruction with the emphasis on parts to whole when compared with individuals receiving initial reading instruction in a sight-word approach emphasizing recognition of whole words? These questions relate concerns involved in the recognition of individuals' characteristic ways of perceiving, organizing and retaining information as factors in making decisions about instruction in the complex process of reading.

It is generally recognized that individuals absorb and retain information in different ways. Furthermore, individuals exhibit behaviors indicating a preference for and/or abilities in differing methods of perceiving information that result in effective learning. Frequently, observed methods of instruction do not reflect knowledge of

differing individual learning characteristics but are based upon a teacher's preferred method of instruction or the decisions made by others in relation to curriculum development and materials chosen on the basis of content believed to contain the best method of instruction (Brooks, Fusco, & Grennan, 1983; Keefe, 1979). Classroom procedures need to reflect current accepted knowledge about individual differences in characteristic ways of learning (Dunn, Dunn, & Price, 1978; Joyce & Weil, 1973; Hunt, 1977-1978).

In Becoming a Nation of Readers (1984), Glaser states that research on the reading process has provided a greater understanding about how children are able to learn letter-sound associations in an alphabetic language such as English, the importance of fluency in word recognition, and how a text's structure and organization influence comprehension. Research often supports and verifies effective practices and identifies less useful methods of instruction. Research has provided us with knowledge of the reading process so that we now know it is necessary to learn efficient word recognition and comprehension skills as companion processes beginning with the child's initial reading experiences. The contribution of knowledge that children bring to school with them and the realization of individual differences in language experiences as important influences in the acquisition of reading proficiency are also more fully appreciated.

Research increasingly points to the importance of recognizing individual differences in learning style. Although numerous efforts have been made to individualize instruction, it appears that what resulted was a tendency to look for and apply a single instructional approach to all students (Kiernan, 1979). A more viable approach would be to identify the particular learning strengths of an individual and match these strengths with a compatible method of instruction. It would appear that matching learning style with instructional techniques would result in the optimum achievement of the learner.

Research has indicated that a child's preferred learning style based on demonstrated strengths can be predicted (Treadway, 1975; Young, 1975). A battery of tests administered to children at the end of kindergarten was used to place children in an instructional program most suited to those demonstrated existing strengths. The reading instructional methods and materials in the classroom were modified to accommodate the strengths of the learner. Those children who exhibited auditory-visual strengths were placed in classrooms utilizing phonic methods and materials which largely rely on auditory processing ability. For children demonstrating visual-auditory strengths, reading instruction was based on sight or whole-word approaches that emphasize visual methods of presentation. The methods and materials indicated by the learner's methods preference were used for instruction in reading during the first and second grade.

Utilizing methods preference as a basis for reading instructional methods and materials should result in successful reading achievement regardless of whether the instruction employed visual-auditory or auditory-visual approaches. Research is needed to determine if reading achievement in the third, fourth, and fifth grades was comparable for these two groups whose initial first and second grade instruction was based on method preference.

Statement of the Problem

The purpose of this study is to examine reading achievement and reading rate in the third, fourth, and fifth grades of two groups of readers whose initial reading instruction was based on predicted method preference. The reading achievement and reading rate of these readers will be compared to determine if a significant interaction of initial method of instruction, reading achievement, and reading rate exists.

Educators recognize that individuals exhibit different characteristic ways of learning. It is possible to take advantage of existing perceptual strengths by diagnosing learning preferences and placing learners in instruction that is based upon these demonstrated strengths. Appropriate reading instruction based on perceptual strengths of individual learners should provide the most effective learning situations for resulting reading achievement. Cognitive style as a mediating or process

variable has its greatest impact during initial learning (Stone, 1976). Wepman and Morency (1975) concluded the optimal influence on reading ability of matching a child's learning style with a compatible teaching method would probably be first grade, although it might also be of value later. Basing the first two years of reading instruction on an individual's method preference should result in comparable reading achievement and reading rate in the following grades, regardless of whether the initial method of instruction was a phonics approach or a sight-word approach.

Hypotheses

This study was designed to test the following null hypotheses:

1) There will be no significant difference between readers whose initial method of instruction based on method preference was auditory-visual and those readers whose initial method of instruction based on method preference was visual-auditory as evidenced by word recognition.
2) There will be no significant difference between readers whose initial method of instruction based on method preference was auditory-visual and those readers whose initial method of instruction based on method preference was visual-auditory as evidenced by reading comprehension.

3) There will be no significant difference between readers whose initial method of instruction based on method preference was auditory-visual and those readers whose initial method of instruction based on method preference was visual-auditory as evidenced by reading rate.

These hypotheses will be tested at the third, fourth, and fifth grade levels at the .05 level of confidence.

Assumptions

For the purpose of this study, it was assumed that the subject sample was representative of a larger group of students in grade levels three, four, and five whose initial reading instruction was based on a predicted method preference. It was also assumed that the modifications of reading instructional materials and techniques was appropriate for the predicted method preference.

Limitations

This study was limited by the sample size which was due to the need to procure parental permission for the subjects to participate in the study (Appendix A) and by the mobility of the population. The study was also limited to a specific geographic location with the majority of the subjects in the sample being middle class and Caucasian.

Definition of the Terms

Method Preference

Method preference is a demonstrated preference in the selection of recognition cues based on visual or auditory learning strengths. It is the method of instruction in which the child learns most successfully. The methods preferences to which this study refers are visual-auditory method and auditory-visual method.

Auditory-Visual Method

The auditory-visual method of reading instruction has the letter as the basic unit of instruction. Initially, the learner must accumulate a number of sound-symbol associations and use these in synthesizing, and thus decoding words. Skill transfer is accomplished through the use of known sound-symbol associations applied to unknown words (Ray, 1970).

Visual-Auditory Method

The visual-auditory method of reading instruction has the word as the basic unit of instruction. In the initial stages of learning the configuration of a total word with pictures and verbal context clues provides the vehicle of instruction. The skill development program is dependent upon an accumulation of sight words from controlled

vocabulary reading material to be utilized later in an analytical approach to decoding (Ray, 1970).

Word Recognition

Word recognition refers to the reader's ability to identify the meaning of stimulus words presented in a variety of contexts. In this study, it refers to the scores attained on a word meaning subtest of a standardized test of reading, The Nelson Reading Skills Test.

Reading Comprehension

Reading comprehension refers to the reader's ability to understand printed material that has been read silently. This skill requires a variety of mental processes, ranging from literal recall to drawing inferences and other higher level tasks concerning the material read. In this study, it refers to the scores attained on a subtest of The Nelson Reading Skills Test.

Reading Rate

Reading rate refers to a reader's speed of reading. In this study, it refers to the scores attained on a subtest of The Nelson Reading Skills Test. This subtest also includes questions which provides a check that indicates at least a rudimentary level of comprehension has been attained.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

A review of literature reveals there has been a great deal of reading research done in pursuit of finding the one best method of instruction for learners, including recurring studies of different approaches to teaching reading and various factors involved in reading achievement. This research has included identifying individual learning styles and instructional techniques that could be matched to produce optimal achievement (Barbe & Swassing, 1979). Although modality-based instruction has a long history and includes visual, auditory, tactile and kinesthetic methods of teaching reading, it has not been consistently pursued.

Historically, modality-based education carries a connotation of remediation which may be one reason this concept has not had a more prominent position in reading instruction. Fernald (1943) used modality-based instruction for remediation with the belief that almost all children could be taught to read to a level close to their expectancy, regardless of whether they had a partial or an extreme disability. Based on her study she concluded that children who were unable to learn visual symbols through

auditory and visual modalities were able to learn successfully by also involving tactual and kinesthetic experience in the learning process. She described a four-stage kinesthetic-sensory method based on having children learn to write words correctly, motivating them to want to do so, reading the printed copy of what they wrote and reading of other materials. Fernald's writing and tracing technique initially involved the auditory, visual, kinesthetic and tactile modality senses as a means of focusing on word forms. The child then progressed through stages of development to the point of being able to generalize word knowledge and recognize unknown words.

There are also some major concerns expressed by researchers and reviewers of the literature on matching modality preference and teaching methods. Some of these concerns involve arbitrary decisions of criteria for establishing modality preferences, a questioning of an established relationship between auditory preference and phonics instruction and visual preference and whole-word instruction, lack of recognition for the developmental and variable characteristics of modal preference, and a basic question of research designs that involve alternative treatments that do not require differing abilities as the variables of modality characteristics are correlated.

Silverston and Deichman (1975) note a lack of instrument standardization in the studies using the variable of reading achievement and in the tests and programs

represented as measuring specific sense modality skills. They conclude that auditory and visual discriminations follow developmental patterns to correspond to certain reading skills and auditory discriminations tend to precede visual discriminations in correlating with the initial stages of reading skills acquisition.

Carbo (1983) states research indicates reading performance is strongly associated with perceptual abilities and good readers prefer to learn through visual and auditory modalities while poor readers prefer learning tactually and kinesthetically. She cautions that if a young child tends not to have auditory learning skills then phonics instruction should be delayed until these abilities are developed. Second graders preferred structure with fewer choices of reading materials and careful exact directions from teachers. Conversely, older learners tend not to be teacher motivated, need less structure but more choices of reading materials, and they demonstrated greater visual and auditory strengths than primary children in this study.

Devensky (1977) sees a need for the development and standardization of instruments designed to assess sensory information processing skills in terms of modal preferences and strengths. He concludes method preference strengths may be related more to intersensory integration than directly to the reading process.

Barbe, Swassing, Malone, and Kampwirth (1981) note the criteria for determining modality has not been established

and also modality is not a fixed characteristic but integrates with age. It is suggested that failures to find significant interaction between modality strengths and method of instruction may be due to inadequacies of research design with the personal variables of modality characteristics being correlated.

Studies of teaching methods and reading achievement involving auditory-visual presentations and visual-auditory presentation are also of relevance to the present study. It would appear that instruction emphasizing existing abilities within the learner would result in comparable reading achievement unless there are inherent advantages within auditory-visual instructional approaches or within visual-auditory instructional approaches. There also exists the possibility that a child possessing auditory or visual perceptual strengths has an inherent advantage in the acquisition of reading skill over a child who does not have that specific perceptual strength.

Resnick (1979) states that finding clear evidence of one method of instruction's superiority over another is difficult but consistent patterns of findings concerning programs' effects can be determined. The code-emphasis method is better for word recognition tasks that are reflected on tests at the primary levels. Instruction that is direct and involves a well-structured curricula shows an advantage especially with low achieving groups. Due to the shift in emphasis of the characteristics of reading tests

over grade levels with increasing text complexity, code-oriented programs are neither better nor worse than child-centered, language-oriented programs as evidenced by test results.

Chall (1989) cites current research evidence on phonics between 1983 and 1988. She refers to several researchers who conclude that accurate word recognition is necessary for the acquisition of reading comprehension and other higher-level reading processes. She also cites evidence supporting the theory that phonological awareness measures that are administered in kindergarten are the most superior predictors of future reading achievement. She concludes that research indicates direct instruction in phonics improves reading achievement significantly and suggests that combining this research knowledge with other research findings such as the benefits of early exposure to print, reading to children, using appropriate difficulty of material for instruction, and providing instruction in vocabulary and comprehension as reading skill develops, will significantly improve students' reading achievement.

The remaining area of interest in the present study concerns rate as a component of reading achievement. It is suggested that utilizing phonics instruction as an approach to beginning reading could have a detrimental effect on reading rate because of the emphasis on the letter as the unit of instruction. One of the goals of efficient reading

is to assimilate the greatest amount of information in the shortest amount of time possible.

Research Relating Methods Preference and Method of Reading Instruction

Various criteria and means of identifying student method preference are available, ranging from purely observational techniques to formal measurements that have been validated as reliable in assessment procedures. Batteries of tests have been administered to determine the best predictors of learning preference. Researchers have also been successful using trial lessons as a method of determining the best predictors of method preference.

In a study by Mills (1955) to determine the most effective teaching method or combination of methods in teaching word recognition to individuals, he notes that most researchers have looked at complex measures of general reading achievement rather than measures of the particular skill of word recognition in attempting to determine appropriate methods of teaching word recognition. Generalized developmental reading programs have become confused with the phonic, visual, kinesthetic, and combination of methods used to teach word recognition. As these elements are all involved in the processing of printed symbols, any reference to a particular instructional method for word recognition is simply an indication of what is being stressed in that method.

Fifty-eight subjects in grades two, three, and four participated in this study. Mills devised a test instrument, the Learning Methods Test, that is a series of teaching lessons with accompanying tests to determine the most effective method for teaching word recognition to individual students. The test consists of four sets of picture-word cards, a manual with specific instructions for the four fifteen-minute teaching sessions, each of which stresses either the visual, phonic, kinesthetic, or a combination of these instructional methods, and record forms. The picture-word cards were used as a pretest to determine forty unknown words that were later used in the four learning-methods sessions. A process of individualized lessons and testing at twenty-four hour intervals was utilized until all four teaching methods had been presented.

The study showed that different children successfully learn to recognize words from different teaching methods with no one method that is best for all children. Mills concludes there is a need for identifying which method of instruction is best for which individual child.

Ray (1970) states that the most appropriate means of determining the selection of material suitable as a method of instruction is to evaluate the child in the process of learning to read. The child will exhibit a preference for visual or auditory recognition cues based on his learning strengths. The Ray Reading Methods Test was designed to measure the child's performance in response to teaching-

learning situations utilizing Visual-Auditory, Auditory-Visual, Linguistic-Word Structure, and Linguistic-Language Experience methods of reading instruction. The learning method test may be administered to individuals or small groups of six or fewer individuals and involves trial lessons in the different methods. The procedure consisted of a series of trial teaching-learning lessons followed by testing. The child was taught ten words in two instructional sessions for each of the methods. The teaching-learning sessions were followed by a series of post-tests designed to measure the retention of words taught and were given in intervals of twenty minutes, sixty minutes, and twenty-four hours. The teacher can evaluate the child's performance in each of the methods and use the information obtained to place the child in the most appropriate materials for reading instruction.

Companion studies conducted by Young (1975) and Treadway (1975) sought to determine if there existed demonstratable pre-reading behavior patterns that could predict success with reading when preference for Visual-Auditory, Auditory-Visual, Language Experience, or Linguistic methods of initial instruction were indicated. Sixty-six kindergarten children were administered a battery of tests from which subtest scores were used as independent variables. The companion studies included subtests of the Illinois Test of Psycholinguistic Abilities, Wechsler Preschool and Primary Scale of Intelligence, Peabody Picture

Vocabulary Test, and Durrell Analysis of Reading Difficulty. Treadway's study also included subtests from the Metropolitan Reading Readiness Test. The criterion variables used were scores from the four subtests of the Ray Reading Methods Test (1970). The data obtained identified significant predictors of word recognition success using the four methods of beginning reading instruction. The results indicated that scores from the significant subtests for each method could be utilized as predictors of success with that particular method of beginning reading instruction.

One of the problems encountered in identification of modality preference has been that the predictive test batteries used could not be administered by classroom teachers but required outside help from specialists. Also, tests utilizing sample lessons to identify student's learning preferences were extremely time consuming to administer.

Ames (1982) did a study to identify a battery of subtests that will predict learning preference without requiring individual administration or specially trained administrators. Twenty one subtests were administered to a population of sixty-five kindergarten children. The Visual-Auditory and Auditory-Visual subtests of the Ray Reading Methods Test (Ray, 1970) were the criterion variables and the subtests of the Murphy-Durrell Reading Readiness Analysis, Metropolitan Readiness Test Level I, and the

Metropolitan Readiness Test Level II were used as the independent variables.

The subjects were placed in groups of six and administered the subtests of the Ray Reading Methods Tests according to the directions given in the manual. Word knowledge in isolation was individually tested at the end of twenty minutes, sixty minutes, and twenty-four hours. The battery of subtests for the independent variables were administered in small groups in a classroom setting. A stepwise multiple correlation technique revealed that Letter/Sound Correspondence and Learning Rate made significant contributions to both the auditory-visual and visual-auditory method preference. Because these two independent variables did not differentiate between methods, they were prevented from entering the equation to enable other predictors to emerge. The subtests of Letter Names II, Rhyming, and Phonics II were revealed as measures predicting success with the auditory-visual method of teaching reading while Letter Names I, Visual Matching, and Quantitative Language emerged as predictive behaviors for measuring success in the visual auditory method.

The results of this study indicate it is possible to have a battery of group administered subtests given by the classroom teacher to predict success in method preference of auditory-visual or visual-auditory methods of instruction. It is recommended that a two level predictive battery be given with level one of the battery to predict overall

readiness to read by administering the Letter/Sound Correspondence and Learning Rate subtests, and level two to predict method preference by administering the six subtests which differentiated between method preference.

Once the modality preference has been identified, the learner can be placed in initial reading instruction based on this modality preference. It is believed a child who has been identified as having auditory-visual strengths will have the most success with a phonics or code-emphasis method of instruction which relies on auditory processing ability. A child who has demonstrated strengths in visual-auditory perception is believed to be best suited to instruction utilizing a sight or whole-word approach which relies on visual processing skills.

Carbo (1980) investigated the effect of three reading instruction treatments on the immediate and delayed recall of kindergarten children whose method preference had been identified as visual preference, auditory preference, or non-preference. Modality preference was determined by scores on the visual and auditory subtests of the Metropolitan Reading Tests, the Visual-Memory subtest of the Slingerland Pre-Reading Screening Procedures and the Memory for Sentences subtest of the Woodcock-Johnson Psycho-Educational Battery. The subjects were classified as either high or low in visual perception ability and/or auditory perception ability to form three modality preference groups: visual preference with high visual, low auditory

scores; auditory preference, with low visual, high auditory scores; and, non-preference, with low visual, low auditory scores.

Samples of twelve subjects were selected from each of these subgroups to participate in all three word stimulus methods comprising the reading treatments to be investigated: visual, visual-auditory, and visual-tactual. The words were cvc nouns not known by the subjects.

Following each teaching method immediate and twenty-four hour recall scores were obtained. The statistical analyses for the study involved a split-plot factoral 3.3 ANOVA for the dependent variables of immediate and delayed recall. The major findings of the study indicated a significant interactive effect between modality preference and method of instruction on both immediate and delayed recall. Auditory preference learners tended to recall more words when taught with a visual-auditory method than following the visual or visual-tactual method and visual preference learners tended to recall more words following the visual method than following the visual-auditory or visual-tactual methods. There were also significant overall differences among the three modality preference groups with non-preference subjects recalling significantly fewer words than either of the other groups on immediate and delayed recall. There was no significant evidence indicated by the

immediate or delayed recall scores revealing different levels of success of the three methods.

Meyers (1980) conducted a study of modality preference and method of instruction with the additional variable of verbal feedback that was designed to investigate modality preference in learning disabled children. It was believed the reinforcement provided by praise and knowledge of response accuracy might override any differences resulting from matching modality preference and teaching style. Seventy-two elementary age children were identified on the Illinois Test of Psycholinguistic Abilities as visual, auditory, or multisensory learners and were randomly assigned to visual, auditory, or multisensory instruction involving praise or no praise treatments. Subjects, placed in groups of six, were taught ten new words for ten minutes utilizing methods of instruction determined by group assignment. Groups were informed of the accuracy of their responses and half of the groups also received comments of praise. After completion of the tasks students were tested for immediate recall and one day later for delayed recall.

Although Meyers expected effects to be evidenced for the verbal feedback variable, the analysis of variance testing the independent variables of verbal feedback, mode of instruction, and learning modality preference along with the dependent variable of cognitive recall indicated a lack of significant interaction effects of any of the variables. Meyers concluded the practice of matching

modality preference with method of instruction was not statistically confirmed in this study. It is noted the auditory learners were statistically superior to the visual learners on the delayed recall measure. It is also necessary to consider it is possible a battery of tests would serve as a better indicator of modality preference than the ITPA.

Kampwirth (1981) designed a study involving preferred modalities which he states used an approach to modality measurement and to teaching which was comprehensive, brief, and tightly controlled. The purpose was to see if children who are taught unfamiliar words according to their measured auditory or visual preferred modality learn these words more easily than words they are taught according to their non-preferred modality. He also examined the possibility of an interaction between sex and method preference.

The subjects were one hundred end-of-first grade children. Each child was administered the following battery of tests: The Illinois Test of Psycholinguistic Abilities subtests of Auditory Sequential Memory, Visual Sequential Memory, Auditory Closure and Visual Closure, the Wepman Auditory Discrimination Test, and the Kagan Matching Familiar Figures Test. The children were taught a list of nonsense words using first either an auditory or visual approach and then through the other approach.

The data does not indicate an interaction between modality preference and reading method. The visual method

of teaching resulted in higher achievement regardless of modality preference, especially for the girls. The auditory modality preference children obtained higher achievement scores than did those with a visual modality preference, regardless of the teaching method used. Kampwirth suggests several possibilities for failure to confirm the modality-methods hypotheses: 1) measurement methods of preferred modalities are inadequate; 2) methods for teaching require a cross-modal rather than visual or auditory approach; and 3) subjects utilize a cross-modal strategy to assist themselves.

Williams (1987) investigated the relationships among the reading achievement performances of students who received one of three methods of reading instruction as determined by method preference throughout grade levels one through five. There were twenty-seven children who remained in the study at fifth grade level. These subjects had been administered a battery of tests described by Young (1975) and Treadway (1975) to establish a method preference for placement in instruction. The tests used for method preference prediction included subtests of the Illinois Test of Psycholinguistic Abilities, the Wechsler Preschool and Primary Scale of Intelligence, the Murphy-Durrell Reading Readiness Analysis, and the Metropolitan Reading Readiness Test. Based on these test results students were identified as having an auditory-visual method preference or visual-auditory method preference. Those students whose scores

were too low on all tests to indicate a preference were placed in a pre-preference method of instruction and received extended reading readiness experiences with more time to develop the skills needed in learning to read. Students exhibiting a method preference were placed in an initial reading program based on their method preference and instruction in this method continued through fifth grade.

Reading achievement at each grade level was measured by the corresponding Gates-MacGinities Reading Test for that level. A repeated measures analysis of variance (ANOVA) using a 3 x 5 factorial analysis with repeated measures on the grade level factor was utilized to analyze the data. The results indicated that the effect due to method of reading instruction as determined by method preference was significant, and the auditory-visual method of reading instruction differs significantly from the visual-auditory and the pre-preference method of reading instruction. The auditory-visual method of reading instruction had the highest level of reading achievement performance scores across grade levels one through five and the visual-auditory method had the second highest level of reading achievement performance. The analysis also indicated significant effects due to grade levels. The achievement scores between each grade level increased significantly except between reading achievement scores during grade level two and grade level three, but the interaction between method of reading instruction was not significant

Miller (1979) examined theories and research studies concerned with modality preference. She states that the concept of modality preference is based on premises and assumptions that may be faulty: 1) students have one preferred mode of perception; 2) it is assumed reading methods make demands on different receptors; and, 3) beginning reading is mainly a perceptual process. Miller warns that the concept of modality preference fails to recognize the different performances that are observable during varied tasks in some of the studies. Often the identification of a modal preference is an arbitrary decision based on the definition being used. Furthermore, evidence does not support the premise that auditory abilities are more related to phonics instruction than to the whole-word approach or that visual abilities are more related to the whole-word approach than to the phonics approach. Visual and auditory skills are necessary for success in learning to read with either instructional method, it is argued. Miller concludes that teachers need to continue to teach reading using a variety of methods to allow for individual differences.

Strength in auditory memory is frequently believed to be one of the predictors of auditory-visual method preference and successful performance in reading instruction based on a phonics approach. Jacomides (1986) did a study to investigate the assumptions that: 1) auditory memory has a greater effect on phonic analysis and literal

comprehension than does visual memory; 2) visual memory has a greater effect on immediate recognition, structural analysis, and written spelling than does auditory memory; and, 3) language facility has a greater effect than memory on inferential comprehension.

Four hundred students in grades one through six were selected for the study. Test scores were obtained from their records for the following variables: verbal intelligence, written spelling, sight recognition, structural analysis, phonic analysis, literal comprehension, inferential comprehension, auditory memory for words and sentences, and visual memory for objects and letters. Analysis of variance was used to examine the significance of the mean differences by grades and setwise multiple regression was conducted to determine the effects of the independent on the dependent variables.

The analysis of mean scores indicated the subjects had average scores in I.Q., inferential comprehension, and visual memory, but below average scores in literal comprehension and auditory memory. Scores on tests of memory correlated significantly with all tests of academic skills with significant differences of scores by grade level for all the variables. The results indicated that visual memory is significantly more related than auditory memory to sight recognition, structural analysis, and written spelling. Language facility is significantly related to inferential comprehension. Auditory memory was not found to

be significantly more related than visual memory to phonics analysis and literal comprehension. One major conclusion based on this study was that visual memory was significantly more related to specific reading and spelling skills examined than was auditory memory.

Research relating to means of identifying students' method preference and the relation of method preference to method of reading instruction have been presented. These studies are summarized in Table I.

Research Relating Method of Instruction and Reading Skill Acquisition

Chall (1967) conducted an extensive study of old and new methods of teaching reading from 1910 to 1965. The hypothesis she proposed was that the effects of learning phonics would vary by grade level and by the reading components of comprehension and word recognition. The researchers theorized that over time, phonics aided both word recognition and comprehension because phonics instruction in initial reading experiences facilitates word recognition and fluency which would have the effect of facilitating comprehension.

This study included an analysis of available research that compared various approaches to beginning reading, an analysis and synthesis of correlational studies of reading achievement, and an analysis of the clinical research on the effectiveness of phonics instruction for readers having

TABLE I

SUMMARY OF THE RESEARCH RELATING METHODS
PREFERENCE AND METHOD OF READING INSTRUCTION

Study	Number of Subjects	Predictors	Research Results
Mills (1955)	58 grade II-IV students	Trial teaching/ learning sessions	Different methods of instruction effective with different children.
Ray (1970)	Unknown	Trial teaching/ learning sessions	Teacher can evaluate performance and place in appropriate instruction.
Young & Treadway (1975) companion studies	66 kindergarten children	Subtests of Illinois Test of Psycholinguistic Abilities, Wechsler Preschool and Primary Scale of Intelligence, Peabody Picture Vocabulary Test, Durrell Analysis of Reading Activity, Metropolitan Reading Readiness Test.	Identified significant predictors of word recognition using particular methods of beginning reading instruction.

TABLE I (Continued)

Study	Number of Subjects	Predictors	Research Results
Ames (1982)	65 kindergarten children	Subtests of Murphy-Durrell Reading Readiness Analysis, Metropolitan Readiness Test Level I, Metropolitan Readiness Test Level II.	Identified a battery of group administered subtests that can predict success of auditory/visual and visual/auditory method preference.
Carbo (1980)	36 kindergarten children	Visual & Auditory subtest of Metropolitan Reading Tests, Visual-Memory Subtest of Slingerland Pre-Reading Screening Procedures, Memory for Sentences Subtest of Woodcock-Johnson Psycho-Educational Battery.	Significant interactive effect between modality preference and method of instruction on immediate and delayed recall of words.
Meyers (1980)	72 elementary age children	Illinois Test of Psycholinguistic abilities	Lack of significant interaction effects of verbal feedback, mode of instruction, and learning modality preference on word recognition.

TABLE I (Continued)

Study	Number of Subjects	Predictors	Research Results
Kampwirth (1981)	100 end-of-first grade children	Illinois Test of Psycholinguistic Abilities subtests of Auditory Sequential Memory, Visual Sequential Memory, Auditory Closure and Visual Closure, Wepman Auditory Discrimination Test, Kagan Matching Familiar Figures Test	Lack of interaction between modality preference and reading method; children with auditory method preference had higher scores regardless of teaching method; visual method of teaching resulted in higher performance regardless of modality preference.
Miller (1979)	N/A	Examined theories and research studies concerned with modality preference.	Concludes teachers need to teach using a variety of methods.
Jacomides (1986)	400 students grades 1-6, who received educational evaluations at the University of Houston Diagnostic Learning Center	Obtained measures of verbal intelligence, written spelling, sight recognition, structural and phonic analysis, literal and inferential comprehension, auditory	Scores indicated visual memory significantly more related than auditory memory to sight recognition, structural analysis, and written spelling; auditory memory not more related

TABLE I (Continued)

Study	Number of Subjects	Predictors	Research Results
		memory for words and sentences, visual memory for objects and letters.	than visual memory to phonics analysis and literal comprehension.

difficulties. Methods of instruction that were studied were classified according to the treatments involved, as: 1) look-say in which no phonics were taught; 2) systematic phonics in which phonics were taught early and systematically; and, 3) intrinsic phonics in which sight or reading for meaning was stressed and phonics were introduced later in moderate amounts. The researchers concluded that an early and systematic emphasis on phonics in reading instruction was superior to other approaches to beginning reading instruction.

In 1983, Chall prepared an updated edition of The Great Debate, covering the years from 1966 to 1982. The research question with which this study was concerned examined what kind of phonics instruction was more effective: direct-synthetic phonics in which instruction is given in blending separate letter sounds; or, indirect-analytic phonics in which phonic elements are analyzed from larger units. Both approaches could be classified as systematic phonics methods with the difference in approaches being letter-sound relationships are taught directly in the one approach and are inferred from words in the other approach. Many studies were reported that continued to find high correlations between alphabet knowledge prior to reading instruction with reading achievement at the end of grade one. Chall concludes that direct instruction of decoding skills is preferred if children are to learn these principles.

Over the years since the first edition of this study was published, there has been considerable controversy concerning the recommendations and conclusions of the researchers and the empirical base of the research studies themselves that were analyzed. Regardless of the basis for these expressed concerns, this research study has had a tremendous impact on initial reading instructional methods during the past twenty years.

Turner (1989) reviewed the research literature on phonics instruction cited in The Great Debate with the intent of focusing on research articles that reported carefully designed research that did not show bias, that spoke directly to the research question, and that provided the best evidence for confidence in the results. Research designs that were program evaluations rather than actually experimental were not selected for this study. The selection criteria also required that research studies be randomized field experiements with a randomization on unbiased assignments of pupils and treatment groups, controlled handling of the groups to insure equal learning opportunities, specified differences in the treatment of the variables with the experimental and control groups, and the use of assessment measures that represented the variables of interest in the experiences.

Turner found only nine studies that met his criteria of randomized field experiments which he states is the best evidence available from the research literature cited in

Chall's studies. Based on a review of the randomized field studies, he concluded that systematic phonics appeared to have a slight and early advantage over a whole-word approach as a method for beginning reading instruction. He did not find any significant differences in the method of beginning reading instruction that influenced the development of literacy in the middle grades and beyond.

Lesgold, Resnick, and Hammond (1985) report a study of word skill development in two different instructional programs. This study examined the development of word recognition automaticity and its relation to the acquisition of comprehension skill. The purpose was to find if word recognition precedes comprehension, indicating a need for code-emphasis instruction, or if word recognition was a by-product of overall achievement, tracking comprehension but not preceding it, which would favor a more global approach to instruction.

Approximately eighty children remained in this study through third grade. One group of children was instructed with a global method using the Houghton Mifflin Basal Reading program. Although not individualized, the children progressed at differing rates in small groups based on the teacher's assessment of overall reading performance. The second group was taught with a code method using the New Reading System, emphasizing word decoding skills along with comprehension skills. Progress in this individualized program was based on the word recognition of the child but

without reading speed (the child could take as long as necessary to decode the word) or assessment of comprehension evidenced. To examine each individual's development, the researchers divided the reading curriculum into a series of landmark levels at which points each child was tested for word recognition, comprehension, and automation of oral reading of individual words and word meanings.

Each sample of children was divided into high, medium, and low reading skill groups for data analysis, based on second and third grade reading comprehension scores. Progress through the curricula varied considerably for both cohorts with a spread between the high and low ability groups of 1.4 years in the code-emphasis approach and about 1.2 years in the groups using the global approach. About 15% of the children in each cohort passed through the reading program without developing word processing facility as evidenced later in standardized test results. Automaticity evaluation indicated high ability children were more accurate than lower ability children and global subjects in general became both faster and more accurate, whereas the code subjects increased in speed but dropped in accuracy. Initial differences in oral reading speed, with the code subjects beginning more slowly, disappeared by the end of third grade.

For interpretation, path weights using multiple regression techniques were established and then commonality analyses were performed. Speed and accuracy measures were

found to be better predictors of later reading comprehension performance than vice versa. It appears that progress in the code cohort was driven by progress in word processing speed whereas progress in the global cohort was related to word processing accuracy.

Lesgold et al concluded there is a clear relationship between word recognition efficiency early in reading and later reading comprehension performance but that early comprehension skill was not associated with later word recognition skill. Interpretation of the commonality analysis results indicate development occurred globally in the one cohort and componentially in the other, evidencing that instructional programs influence developmental patterns. No basis for choosing between global and code approaches was indicated, although it was noted that neither approach observed was providing the strongest support for developing word recognition efficiency.

Research indicates a causal relationship between phonological awareness and learning to read. Instruction designed to facilitate phonological awareness would benefit children in the early stages of reading. The purpose of a study by Tunmer and Nesdale (1985) was to more precisely determine the nature of the relation between phonological awareness and learning to read. Sixty-three first grade children were administered tests of verbal intelligence, phonemic segmentation ability, and reading achievement. Reading instruction in the classrooms involved employed

either a psycholinguistic approach or an eclectic approach that reflected a combination of different methodologies.

The phonemic segmentation test included twelve high-frequency real words and twelve pronounceable pseudowords, with half of the words in each group containing digraphs. The list of items also included four single-phoneme vowel sounds. The test was administered as a game with the examiner pronouncing the words and pseudowords and the child tapping out the number of phonemes he heard.

An analysis of the results indicates a weak correlation between verbal intelligence and each of the subtests of reading achievement. Nondigraph word segmentation was more strongly related to reading achievement subtests than words containing digraphs. A high correlation existed between real word and pseudoword decoding, both of which also correlated with reading comprehension and all three correlated with method of instruction. These results support other studies suggesting a strong correlation between word recognition accuracy and comprehension, with programs emphasizing decoding skills producing better results than those which do not.

The resulting data also suggests phonological awareness is a necessary but not sufficient condition for decoding skill as there were no students who performed poorly on phonemic segmentation and performed well on decoding. Although the correlation between measures of reading achievement and method of instruction were highly

significant, the correlation between method of instruction and phonemic segmentation did not reach significance, suggesting reading instruction does not greatly affect phonemic awareness per se. Students who were phonetically aware but lacking in decoding skill were equally distributed between the two teaching methods which seems to suggest a developmental delay in phonemic segmentation ability of some children. The researchers suggest a need for identification of effective training of skill in phonemic segmentation.

Although Freebody and Byrne (1988) did not investigate the relationship between reading achievement and teaching methods per se, their study examined students' decoding versus sight-word recognition strategies. The two major purposes of this study were to document the prevalence of elementary-school children's dependence on decoding versus sight-word strategies in word reading and to examine the relation of any such strategic dependencies to other reading-related measures. Word recognition strategies derive their significance from their relation to phonemic awareness as a necessity for decoding skills.

The sample of students in this study was composed of ninety children in second grade and eighty-nine in third grade. The teaching instruction at the schools these students attended reported using both skill and meaning techniques.

The children were given a battery of tests consisting of a number of word and story-reading exercises, phonemic

awareness tasks, and reading and listening comprehension questions. The word-reading tasks included a list of thirty regular words (letters represented their most common sound with no silent letters or single phonemic digraphs), thirty irregular words, and thirty nonsense words for each grade level of the population. There were two phonemic awareness tasks: given a word, the child was asked to say the word without its beginning consonant; and, given a word, they selected a word that ended with the same sound. The comprehension tasks were designed to assess reading and listening literal and inferential comprehension. Children were also assessed on oral reading speed at appropriate readability levels. Because the critical contrast being examined was the performance on irregular words and performance on nonsense words, these measures were used in a cluster analysis which revealed identifiable subgroups at each grade level evidencing a dependence on one word-reading strategy at the comparative expense of the other.

Based on the word-reading strategy data, the student's performance was analyzed for the other reading and comprehension related measures. A multivariate analyses for variance (MANOVAS) conducted for each grade separately tested for cluster group differences on total reading comprehension, total listening comprehension, reading time, and the phonemic awareness measures. Using the data on performance on irregular words and performance on nonsense words criteria, groups of high-on-both, low-on-both,

decoding strategy readers, and sight-word strategy readers were identified. At grade two, significant differences were found on measures of comprehension, reading time, and phonemic awareness in favor of the high group. The sight-word strategy readers performed better on comprehension measures and were faster readers than the decoding strategy group. Analyses on the grade three students again revealed listening comprehension as the only univariates on which no significant difference between the four groups was found. Contrasting the decoding strategy readers and sight-word readers resulted in a significant multivariate effect. The sight-word group read faster than the decoding group but tended to perform at a lower level in reading comprehension measures. Combining second and third grade data for interactions between grade level and strategy groups revealed on comprehension, grade two decoding group students performed at lower levels than the sight-word group but their counterparts at grade three performed more strongly on reading comprehension.

The researchers concluded the data suggests that on comprehension of written text an overdependence on decoding strategy does not inhibit improvement in comprehension from grade two to three, whereas overdependence on sight-word strategy apparently obstructs general reading improvement. This may be due to the greater proportion of a more diverse vocabulary in third grade level materials.

Research concerning the relation of methods of instruction and acquisition of reading skill has been discussed. A compilation of these studies is found in Table II.

Research Relating Reading Achievement and Reading Rate

Much of the literature on reading ability, especially as the factors of word recognition, comprehension and fluency relate to this complex skill, make reference to and draw upon the model of information processing in reading that is described and explained in the LaBerge and Samuels (1974) theory of automaticity. One of the issues involved in this theory deals with the concept of the limited capacity of attention and the assumption we can attend to only one thing at a time but may be able to process many things at once so long as only one requires attention. It is suggested that in reading, visual information passes through a series of processing stages consisting of visual, phonological, and episodic memory systems that lead to comprehension.

With practice, perceptual processes are learned to the point of being automatic, at which time direct attention is no longer necessary. Fluent reading may be thought of as the reader's ability to attend to the meaning units of semantic memory while the decoding stages from visual to semantic systems proceed automatically. As the development

TABLE II

SUMMARY OF THE RESEARCH RELATING METHODS OF INSTRUCTION AND READING SKILL ACQUISITIONS

Researcher	Subjects	Hypothsis/Purpose	Conclusion
Chall (1967)	N/A; analysis of existing research on beginning reading instruction methods, correlational studies of reading achievement, and clinical cases.	Theorized that over time, phonics aided both word recognition and comprehension as early phonics instruction facilitates word recognition and fluency and thus facilitates comprehension.	Early and systematic emphasis in phonics instruction in reading is superior to other beginning reading instruction methods.
Chall (1983)	Unknown; analysis of existing studies	Examined research to determine what phonics instruction was best: 1) direct-synthetic phonics, or 2) indirect-analytic phonics.	Direct instruction of decoding skills is best means of children learning phonetic principles.
Turner (1989)	N/A; reviewed research on phonics introduction cited in The Great Debate	Examined only studies that were carefully designed experimental reserach of randomized field esperiments with controlled handling of the groups	Systematic phonics had a slight early advantages over the whole-word approach in beginning reading instruction but not significant differences

TABLE II (Continued)

Researcher	Subjects	Hypothsis/Purpose	Conclusion
			were revealed that influenced literacy beyond primary grades.
Lesgold, Resnick, and Hammond (1985)	Longitudinal study of 80 children, from first through third grades	Examined development of word recognition skills as it relates to acquisition of comprehension skills.	Clear relationship between early skill in word recogntion and later reading cognition proficiency.
Freebody and Byrne (1988)	90 second grade children; 89 third grade children	Examined students' decoding vs. sight-word recogntion strategies to determine if prevelence of dependence on one strategy exists and to examine relation of such dependence with other reading related measures.	Over dependence on decoding strategy does not inhibit growth in comprehension skills between second and third grade but over dependence on sight-word strategy obstructs general reading improvement.

TABLE II (Continued)

Researcher	Subjects	Hypothsis/Purpose	Conclusion
Tunmer and Nesdale (1985)	63 first grade children in classrooms employing a psycholinguistic approach or an eclectic approach	Examined results of tests measuring verbal intelligence, phonemic-segmentation ability, and reading achievement to determine relation between phonological awareness and learning to read.	Phonological awareness: 1) is a necessary but not sufficient condition for decoding skill; 2) affects reading comprehension indirectly; 3) is not greatly affected by method of instruction; 4) is not significantly related to reading achievement. There was a significant relation between reading achievement and method of instruction favoring emphasis of decoding skills.

of automaticity proceeds, the reader moves to a reorganization of the material into higher-order units. Repetition of the same vocabulary enables the reader to move from word-by-word reading to larger units of meaningful phrases which enables the reader to reach his potential reading speed. This reorganization into larger units requires attention, often at the expense of accuracy and also reading rate for a period of time. At this point demands for accuracy may discourage chunking and keep the reader at a word-by-word level.

Guttentag and Haith (1980) investigated the theory that the major developmental changes in word processing ability occurred by the middle of second grade and that much of this print processing was done automatically. The purpose of this study was to examine the development of word-processing skills during first grade and to examine the relationship between the ability to read words rapidly and to process letters automatically. The ability to process letters automatically would seem to precede reading words rapidly if letter processing requires allocation of attention that is needed for other procedures involved in word recognition.

The subjects were twelve first grade children that were taught reading in both phonics and sight-word approaches to instruction. They were tested three times during the school year. Word recognition ability was assessed by timing the students as they read word lists. Automatic processing involved using a picture naming interference task of naming

pictures while trying to ignore words or strings of letters printed inside the pictures.

Data from the word reading tests indicated a reliable decrease in time between each testing period. Automatic letter processing was marginally reliable at the first testing, and significant at the second and third sessions. Further analysis indicated the children were able to automatically extract meaning from words by the end of first grade. The pattern of results suggests automatic letter processing occurs during early stages of reading either before or along with the ability to read printed words rapidly. It is cautioned the measures of automatic letter processing might not be entirely valid and, assuming that they are, the findings that automatic letter processing occurs along with or before rapid word reading does not necessarily mean it is required for rapid word reading.

A study of the automaticity theory by Stanovich, Cunningham, and West (1981) involved testing twenty-four first grade children at the beginning, middle, and end of the year. This study was an attempt to obtain more precise data about the development of automatic processing of letters, high-frequency words, and low-frequency words, and the relationship of automaticity to end of the year reading ability. At the end of the school year the teacher ranked the children into a skilled group and a less skilled group. Testing verified highly significant differences in

the means of the two groups on both reading ability and reading rate.

The three automaticity testing sessions consisted of subjects naming the color of flashed stimuli (letter, high-frequency words, low-frequency words, and strings of x's) as rapidly as possible. The interference ratio for letters was significant in all conditions with high-frequency word conditions approaching significance in the first testing period and the low-and high-frequency word conditions significant in the second and third testing periods. The interference scores for the skilled and less-skilled readers did not differ significantly, but the skilled readers displayed larger interference scores. A group of twenty-four readers at the end of second grade was also tested and their interference scores were very similar to those of the skilled first grade group, further indicating that development in skill of automatic word recognition for these subjects occurs in first grade.

The results support predictions of developmental trends in automaticity skill but indicate a weak relationship to individual differences in reading skill with a lack of statistically significant difference in interference scores of the two ability groups. It is noted that speed of word reading has been shown to be strongly related to reading ability and should be distinguished from automaticity skill, with recognition speed increasing during the time

automaticity is developing and even after the word is automatized.

A second experiment used a string of letter-size rectangles in the place of the string of x's for the control condition and added a measure of how fast the subjects named the letters and words in isolation to examine the influence of interference caused by the stimuli. These twenty-four first grade subjects were tested twice during the school year. The developmental trends evidenced in the first experiment were replicated in the data for this experiment with automaticity increasing with time, letters more automatized than words, and high-frequency words more automatized than low-frequency words. Again, the difference between the interference scores of the two ability groups did not reach significance. Most of the correlations between the interference ratios and measures of reading ability were in the expected direction but few reached statistical significance. Letter naming did not correlate with reading ability but word naming times and errors showed strong relationships.

These experiments provide further data indicating the development of sharp increases in automaticity skill during first grade that appear to level off by the end of first grade, especially for skilled readers. Furthermore, this research indicates the importance in distinguishing between automaticity and speed, lending support to the theory of limited capacity that suggests short-term memory is strained

by slow word recognition, which impairs reading regardless of whether or not the word was recognized automatically.

The speed of information-processing study by Jackson and McClelland (1979) tested a number of reaction-time tasks to determine the speed of encoding visual information at several different levels. A combined measure of speed and comprehension was utilized as the index of efficient reading performance. The focus of the study was to isolate central processes rather than sensory processes (i.e. eye movements) that could contribute to both effective reading and the gathering of information from the content of a single fixation.

If reading depends on a hierarchial organization of sub-processes that involve analyses first for visual features and proceeds to letter-word, semantic-syntactic, and conceptual levels of analyses, it is possible faster readers form appropriate higher level representations more quickly. This study looked at speed of forming representations at differing levels using tasks that were to reflect processes of forming visual letter codes, letter identity codes, semantic word codes, and verbal word codes.

The sample population consisted of fifty-two freshman and sophomore college students who were tested to identify a group of fast readers and average readers based on reading speed and effective comprehension. The faster readers were both reading faster and comprehending better. The students were tested on a long passage reading test and a short

passage reading test. In addition to the two reading tests, the study consisted of speed of encoding visual information tasks and tests of sensory functions, verbal and quantitative reasoning ability, short-term auditory memory span, and ability to comprehend spoken text.

The results of the reaction time data reveal fast readers had an advantage over slow readers in every task and the difference increased in size with the average amount of decision time required. These sensory tasks showed no significant relation to reading ability. Faster readers were also more accurate in verbal and quantitative reasoning, short-term auditory memory, and speech comprehension. The correlation and regression analyses reveal listening comprehension is highly correlated with effective reading speed, indicating that for these subjects, differences in reading speed lie in some general, modality-independent, language comprehension skills. Additionally, it appeared knowledge of sounds of printed words is a correlate of reading ability and a second experiment compared fast and average readers on a homophone task using pseudowords as stimuli rather than homonyms. Results on this task do not provide support for the view that individual reading ability differences are dependent upon phonological encoding processes but rather are dependent upon letter-code access ability as a preliminary step to phonological encoding.

The researchers conclude these analyses indicate three independent correlates of individual differences in reading speed: the ability to comprehend language, accessing letter-identification information, and knowledge either of pronunciation of unusual words or ability in using complex spelling-to-sound correspondences.

Breznitz (1987) cites research involving constraints that limit the capacity of short-term memory and proposes that by requiring beginning readers to read aloud at their maximum reading rate the quality of decoding and their degree of comprehension will be increased. By increasing the reading rate there will be an increase in the similarity of the words to known words in oral language and an increase in contextual memory from the increased size of informational units available. The study involved 161 Israeli first graders and 61 American first graders reading English as a cross-cultural replication.

The subjects orally read and answered items at their own normal reading rate to provide a base reading rate. The manipulated-rate condition involved reading and answering items using a computer screen at a goal rate based on the fastest and slowest rate at which a subject had read and correctly answered an item in the self-paced condition. The control group also read passages from a computer screen but without manipulation of the rate. One part of the study introduced deliberate letter-substitution errors with the belief subjects would be more likely to normalize these

errors in the fast-paced condition than in the slow-paced condition.

When the subjects read at their fast-paced rate they significantly improved both their reading accuracy and their comprehension with the poorer readers evidencing the greatest benefit. Reading in a slow-paced condition, word accuracy increased but comprehension significantly decreased. Using deliberately altered text, the fast-paced condition again significantly improved both oral reading accuracy and comprehension with the poorer readers showing the most significant improvement. It was concluded that prompting first graders to read faster than their normal pace increases both reading comprehension and accuracy. Breznitz states the increased reading accuracy in the fast-paced condition may have resulted from the increase in comprehension whereas fewer word recognition errors evidenced in the slow-paced condition may have resulted from the benefit of having time for rehearsal and self-correction before oral production. The study reveals a marked discrepancy between potential reading rate and performance with students able to read faster when required to do so. Teachers may encourage students to read more slowly to increase word accuracy but the results of this study indicate it will be at the expense of comprehension.

Juel and Holmes' (1981) study concerns some of the theoretical controversies of the relationship between oral and silent reading. This study examined whether oral and

silent sentence reading represent the same cognitive processes and if good and poor readers differ in their approaches to the two modes of reading. The forty-eight subjects in the sample were second and fifth grade students of high and low reading ability that initially were screened to include only those able to identify all the words in the sentences to be used for testing except the nouns. These sentences were used to compare oral and silent reading rate and comprehension and, for the purposes of this study, varied in decodability, word frequency, syllables in words, and semantic difficulty. If oral and silent reading represent a single fundamental process, then the reader should exhibit equal ability in forming relationships between word meanings utilizing both modes and there should be similar effects of word and sentence factors on reading rate in the two modes.

Sixty-four sentences were constructed in a noun-verb-noun sequence with the two nouns being of equivalent levels of frequency, decodability, concreteness, and number of syllables. The individual sentences were typed on cards and, for the comprehension task, matched with a row of four pictures from a set of three rows of pictures in which only one row illustrated the correct relationship between the nouns and verb. Reading of the sentences was timed with half of the sentences read orally and half read silently.

A repeated measures analysis of variance for a mixed factorial design was used with the data. Interactions

between reading mode and grade, ability level, and the five word and sentence factors were measured by a separate repeated measures ANOVA, which included mode as a factor. All the word and sentence factors significantly affected reading times in both modes. Syllables, decodability, frequency, and concreteness interacted significantly with reading mode. There appears to be a tendency for all readers, but especially poorer readers, to decrease processing time on difficult words in silent as compared to oral reading. An analysis of comprehension errors revealed an insignificant difference between the two modes with twenty-six percent of the errors in oral reading and twenty-nine percent of the errors in silent reading with no significant interactions between mode and any factor.

These results support similar reading models involving mediated processes prior to lexical access for elementary children's oral and silent reading of sentences. Mediation may occur as a result of emphasis on phonics and oral reading rather than due to its efficiency. It appears good readers successfully use mediated processing in both modes but poor readers decrease such processing in silent reading as compared to oral reading. Mode did not seem to affect comprehension.

Research concerning the relation of reading rate and reading achievement has been presented. A summary of these studies is found in Table III.

TABLE III

SUMMARY OF THE RESEARCH RELATING READING ACHIEVEMENT AND READING RATE

Researcher	Subject	Theory/Purpose	Conclusion
LaBerge and Samuels (1974)	Unknown	There is a limited capacity of attention with ability to process many things at once if only one requires attention. In reading, visual information passes through series of processing stages of visual, phonological and episodic memory systems leading to comprehension.	In reading, perceptual processes become automatic enabling readers to attend to meaning of written material.
Guttentag and Haith (1980)	12 first grade children	Examine development of word-processing skills and the ability to read words rapidly and process letters automatically.	Automatic letter processing occurs during early stages of reading, either before or along with ability to read words rapidly.
Stanovich, Cunningham, and West (1981)	24 first grade children	Examine development of automaticity with letters and high-and-low-frequency words and how this development relates to reading ability.	Results support theory of developmental trend of automaticity occurring during first grade. Did not find significant relationship

TABLE III (Continued)

Researcher	Subject	Theory/Purpose	Conclusion
			between automaticity and reading ability which indicates need to distinguish between automaticity and reading speed.
Jackson and McClelland (1979)	52 freshman and sophomore college students	Study of speed of information processing. Measures of speed and comprehension were used to identify central processes contributing to effective reading.	Identified three factors: 1) language comprehension; 2) access letter code information; 3) skill in pronouncing unusual words or in using complex spellings.
Breznitz (1987)	161 Israeli first graders; 61 American first graders	Examine effect on word recognition and comprehension when subjects are encouraged to increase reading rate.	Increased reading rate improved accuracy and comprehension with poorer readers showing most improvement, possibly due to increased similarity of words to oral language and increased contextual memory with additional size of informational units available.

TABLE III (Continued)

Researcher	Subject	Theory/Purpose	Conclusion
Juel and Holmes (1981)	48 second and fifth grade students of high and low reading ability.	Examine whether oral and silent reading represent a single fundamental process as evidenced by ability to form word relationships in both modes and reflect similar effects from sentence factors on rate in both modes.	Word and sentence factors significantly affected reading times in both modes with all readers but especially poorer readers decreasing processing time on difficult words in silent reading. Comprehension errors unaffected by mode.

Summary

The review of the literature has focused on studies relevant to reading achievement of third, fourth, and fifth graders whose initial reading instruction was based on method preference. Studies of the relationships between method preference and method of reading instruction, methods of instruction and reading skill acquisition, and reading rate and reading achievement pertained to this study.

The results of method preference studies are inconsistent, with some studies indicating an interaction between matching instruction with perceptual strengths (Carbo, 1980; Williams, 1987) and some studies indicating no significant relationship between method preference and method of instruction (Meyers, 1980; Kampwirth, 1981). Young (1975), Treadway (1975), and Ames (1982) identified batteries of subtests that predict success with particular methods of beginning reading instruction, while Mills (1955) and Ray (1970) suggest trial teaching/learning sessions to identify the most appropriate method of instruction for an individual child. Concerns with the lack of standardization of measures used to assess modality strengths, and inadequacies of research techniques used to study the interaction of instruction and perceptual strengths were expressed (Silverston & Deichman, 1975; Devensky, 1977; Barbe, Swassing, Malone, and Kampwirth, 1981). Miller (1979) questioned the basis for matching auditory strengths with phonics instruction and visual strengths with whole-

word methods of instruction. The study by Jacomides (1986) indicated that auditory memory is not significantly more related than visual memory to phonics analysis and literal comprehension. Studies by Meyers (1980), Kampwirth (1981), and Williams (1987) revealed superior performance scores for auditory learners as compared to visual learners.

Although this study is concerned with reading achievement as it relates to a phonics emphasis or sight-word emphasis in instruction based on a learner's method preference, it is recognized the methods of instruction may themselves produce differences in levels of reading achievement. Chall (1967, 1983) concludes that word recognition skill is necessary for reading comprehension and phonics is a superior method for the acquisition of decoding skills. Lesgold, Resnick, and Hammond (1985) found a relationship between early word recognition skill and later reading comprehension but they did not find an association between early comprehension skill and later word recognition skill. These researchers did not offer a basis for choosing between code emphasis and sight-word emphasis methods of instruction. Freebody and Byrne (1988) concluded that an overdependence on decoding strategy did not inhibit improvement in comprehension between grades two and three, but an overdependence on sight-word strategy obstructs general improvement in reading at this level. Although the study by Tunmer and Nesdale (1985) revealed a significant relation between method of instruction and reading

achievement indicating superior performance with programs emphasizing decoding skills, they did not find a significant relation between method of instruction and phonemic awareness which appeared to be a necessary but not sufficient condition for decoding ability.

Literature on reading achievement indicates the concept of automaticity in the reading process is related to factors involved in reading rate. Automatic word recognition, which would appear to interact with reading speed, frees a reader's direct focus of attention and enables attending to the meaning of print. Guttentag and Haith (1980) found the ability to process letters automatically occurs in the early stages of reading, either before or along with the ability to process printed words rapidly. The study by Stanovich, Cunningham, and West (1981) supports evidence of a developmental trend in automaticity skill during first grade but did not find a significant relation between automaticity skill and reading achievement. These researchers note the need to distinguish between automaticity and speed, which has been shown to relate to reading proficiency and continues to increase after automaticity of word recognition has developed. The study by Jackson and McClelland (1979) reveals listening comprehension is highly correlated with effective reading speed indicating that differences in reading speed lie in some general language comprehension skills. Breznitz's (1987) study indicated that by prompting first graders to read faster, there was an increase in both

comprehension and word accuracy. Juel and Holmes (1981) concluded all readers, but especially poorer readers, decrease print processing time on difficult words in silent reading as compared to oral reading. Comprehension did not show effects due to mode of silent or oral reading. These studies appear to indicate that reading speed is related to reading effectiveness with a faster speed possibly facilitating reading comprehension.

CHAPTER III

METHODOLOGY

The purpose of this study was to examine reading achievement and reading rate in the third, fourth, and fifth grades of students whose instruction in the first and second grades was based on a predicted method preference. The reading achievement and reading rate were compared to determine if a significant interaction exists in their initial instruction, reading achievement, and reading rate. The results were analyzed using a t test for two independent samples.

Description of the Sample

The subjects for this study consisted of third, fourth, and fifth grade students currently enrolled in one public elementary school located in North Central Oklahoma. The community and the school are characterized as a predominately white, middle-class, highly mobile population. The population is comprised of ninety percent Caucasions, with the rest of the population being American Indians, African Americans, and persons from various other countries and races. There are approximately 39,000 people including 21,000 university students living in the

community. Major employers include the university, manufacturing, and associated mercantile, commercial and professional services. (J. Wesley, personal communication, January 10, 1990)

The sample of students in this study is limited to those children for whom parental permission was procured for their inclusion in the study. It is also limited to those children who have been enrolled in this one school for three, four, or five consecutive years and were not retained during grade levels one through five. All subjects were screened prior to entering first grade with a battery of tests to identify their method preference. During the first and second grades they were instructed with materials and methods that corresponded to their established method preference. Students who scored consistently lower in all the subtest areas and did not demonstrate a method preference were not included in this study.

Methodology and Design

The students were administered a battery of tests prior to first grade to establish a method preference for a method of instruction. This battery of tests is based on the research by Young (1975) and Treadway (1975) and included subtests from the Murphy-Durrell Reading Readiness Test (1965), the Wechsler Preschool and Primary Scale of Intelligence (1967), and the Illinois Test of Psycholinguistic Abilities (1968 Revision). (See Appendix B

for a description of the subtests and a bibliography of the instruments.) Results from the tests were recorded on a Revised Method Preference Worksheet (Figure 1) based on a Method Preference Worksheet adapted by Ray (1985) (Figure 2), and students were identified as having a visual-auditory method preference or an auditory-visual method preference.

These children whose performance indicated a method preference were placed in instruction based on their predicted method preference for grades one and two. Materials used and methods of instruction were modified by the classroom teachers to reflect the appropriate methods designated for their particular students.

Students who demonstrated an auditory-visual method preference that are currently in the third grade received instruction with the Keys to Reading Series (Economy, 1980) in the first and second grades. Students that are now in the fourth grade whose method preference indicated strength in auditory-visual skills were placed in the Reading 720 Rainbow Edition (Ginn and Company, 1980) for instruction in the first and second grades. For those students whose performance indicated an established auditory-visual method preference that are presently in the fifth grade, instruction in the first grade utilized the Keys to Reading Series and in the second grade they were placed in instruction with the Reading 720 Rainbow Edition. Using these materials the student must accumulate a number of sound-symbol associations and use these in synthesizing and

METHOD PREFERENCE WORKSHEET

Name _____ Sex _____ Date Tested: Year _____ Month _____ Day _____

Date of Birth: Year _____ Month _____ Day _____

Age: Year _____ Month _____ Day _____

All Values Raw Score

		Student Score	-½ SD						+½ SD	+1 SD	Items
VISUAL-AUDITORY											
Murphy-Durrell	Letter Names II (Y-58)	_____	17	18	19	20	21	22	23	25	(26)
WPPSI	Geometric Design (Y-14)	_____	12		13	14	15		16	17	(28)
Murphy-Durrell	Learning Rate (Y-5)	_____	8		9	10	11		12	15	(18)
AUDITORY-VISUAL											
Murphy-Durrell	Learning Rate (Y-52)	_____	14		15	16	17		17	18	(18)
ITPA	Grammatic Closure (T-43)	_____	21	22	23	24	25	26	27	28	(33)
WPPSI	Vocabulary (T-14)	_____	24		25	26	27		28	31	(41)
ITPA	Sound Blending (Y-6)	_____	22		23	24	25		26	28	(32)

SCALED SCORES ADJUSTED ACCORDING TO AGE

		Student Score
VISUAL-AUDITORY		
Murphy-Durrell	Letter Names II (Y-58)	_____
WPPSI	Geometric Design (Y-14)	_____
Murphy-Durrell	Learning Rate (Y-5)	_____
AUDITORY-VISUAL		
Murphy-Durrell	Learning Rate (Y-52)	_____
ITPA	Grammatic Closure (T-43)	_____
WPPSI	Vocabulary (T-14)	_____
ITPA	Sound Blending (Y-6)	_____

Figure 1. Revised Method Preference Worksheet

Method Preference Worksheet

Name_____ Sex____ Date Tested: Year____ Month____ Day____

Address_____ Date of Birth: Year____ Month____ Day____

Parent's Name_____ Age: Year____ Month____ Day____

All Values Raw Score

		Student Score	-½ SD			M			+½ SD	+1 SD	Item
VISUAL-AUDITORY											
Murphy-Durrell	Letter Names II (Y-58)	____	17	18	19	20	21	22	23	25.	(26)
Metropolitan	Alphabet (T-55)	____	11		12	13		14	15	16	(16)
WPPSI	Geometric Design (Y-14)	____	12		13	14		15	16	17	(28)
Metropolitan	Word Meaning (T-9)	____	8			9			10	12	(16)
Murphy-Durrell	Learning Rate (Y-5)	____	8		9	10		11	12	15	(18)
AUDITORY-VISUAL											
Murphy-Durrell	Learning Rate (Y-52)	____	12		14	16		18	PS*	18	(18)
ITPA	Grammatic Closure (T-43)	____	21	22	23	24	25	26	27	28	(33)
WPPSI	Vocabulary (T-14)	____	24		25	26		27	28	31	(41)
ITPA	Visual Association (T-9)	____	18		19	20		21	22	24	(42)
ITPA	Sound Blending (Y-6)	____	22		23	24		25	26	28	(32)
LINGUISTIC-WORD STRUCTURE											
Murphy-Durrell	Letter Names II (Y-70)	____	17	18	19	20	21	22	23	25	(26)
Metropolitan	Alphabet (T-64)	____	11		12	13		14	15	16	(16)
Murphy-Durrell	Learning Rate (Y-10)	____	8		9	10		11	12	15	(18)
WPPSI	Picture Completion (Y-4)	____	12		13	14		15	16	18	(23)
WPPSI	Animal House (Y-3)	____	41	42	43	44	45	46	47	48	49	50	51	56	(70)
LANGUAGE EXPERIENCE											
Murphy-Durrell	Learning Rate (Y-63)	____	12		14	16		18	PS*	18	(18)
Metropolitan	Numbers (T-64)	____	11		12	13		14	15	16	(26)
ITPA	Sound Blending (T-17)	____	22		23	24		25	26	28	(32)
WPPSI	Animal House (Y-3)	____	41	42	43	44	45	46	47	48	49	50	51	56	(70)
Metropolitan	Alphabet (T-6)	____	11		12	13		14	15	16	(16)

*PS=Perfect Score

RAY READING METHODS TEST		REMARKS AND RECOMMENDATIONS
Auditory-Visual (7)	_____	_____
Visual-Auditory (7)	_____	_____
Linguistic Word St. (7)	_____	_____
Language Experience (7)	_____	_____
Intervention (<6)	_____	_____

Figure 2. Method Preference Worksheet

decoding words. Skill transfer is accomplished through the use of known sound-symbol associations that are applied to unknown words.

Students that are currently in the third, fourth, and fifth grades who demonstrated a visual-auditory method preference that indicated a strong visual and acceptable auditory ability were instructed with the Reading 720 Rainbow Edition (Ginn and Company, 1980). Those students whose method preference was visual with low auditory ability were instructed with the Bookmark Reading Program (Harcourt, Brace, and Jovanovich, 1983). Skill development is dependent upon an accumulation of sight words from controlled vocabulary reading material that is utilized later in an analytical approach to reading. (See Appendix C for bibliographic information on the materials used.)

Due to the need for parental permission for students to be included in the study as well as attrition throughout the grades, all of the children who were initially tested for instructional placement are not included in this study. Of the children who were initially identified for differentiation of instruction based on a predicted method preference for initial reading instruction, twenty-three subjects in the third grade, twenty-seven subjects in the fourth grade, and twenty-two subjects in the fifth grade were included in this study.

Instrumentation

The Nelson Reading Skills Test

The Nelson Reading Skills Test, Levels A & B (1977), measures Word Meaning, Reading Comprehension, and Reading Rate. The words in the Word Meaning subtest are presented in three contexts: words in isolation, context of a phrase, and context of a paragraph. Reading Comprehension requires the student to read a brief passage of various subject matters normally encountered in school reading. Both expository and narrative writing styles are used. The Reading Rate passage is approximately six hundred words long. Students read for one minute and then mark their answer sheets to indicate the number of words read. There is a comprehension check included.

The Nelson Reading Skills Test, Level A, is primarily for grade three and the first half of grade four and does not include testing with the reading rate passage. Using the Spache (1974) revised readability formula, it was determined Level B, Form 4, had a readability level of 3.1. This passage was utilized for determining the reading rate of the grade three subjects in this study. Reading rate was reported in words per minute.

The Nelson Reading Skills Test, Teacher's Manual (1977) reports on standardization information as well as on reliability and validity data. The Nelson Reading Skills Test was standardized in a spring phase and a fall phase

using 57 school districts that included public, private, and parochial schools with a norming sample of approximately 3,800 students per grade. Criteria used to select the standardization population included four community socioeconomic characteristics, five representative geographic locations, and enrollment of school districts with respect to size. Data collected on racial and ethnic identity of the sample is comparable to the population of the nation.

Reliability estimates of the test forms and test levels were secured by means of a split-halves method and then adjusted for full length using the Spearman-Brown formula. Reliability coefficients in the Word Meaning and Comprehension subtests range from .81 to .93. With the exception of the Reading Rate portion, the data on the subtests reveals the subtests are primarily power tests. The information on the validity of the Nelson Reading Skills Test reveals that test content was tried out and standardized, item content was analyzed for grade placement and frequency suitability, readability information was examined, and item content developed in view of experiences and interests of students for whom the test was primarily intended.

Data Collection

The Nelson Reading Skills Test was administered to the subjects in this study during the last two weeks of

February, 1990. The tests were administered either by the investigator or by the classroom teachers in a group setting that was relatively free of distractions. The self-marking answer sheets were all scored by the investigator.

Statistical Treatment of the Data

A repeated measures design utilizing a t test for two independent samples was used to statistically test for significance between the measures of reading achievement for students who received auditory-visual methods of instruction and those who received visual-auditory methods of instruction. The t test values for independent samples and equal variances were calculated using the following formula:

$$t = \frac{\bar{Y}_1 - \bar{Y}_2 - (M_1 - M_2)}{S_{\bar{y}_1 - \bar{y}_2}}$$

$$S_{\bar{y}_1 - \bar{y}_2} = \sqrt{S^2 \, (1/n_1 + 1/n_2)}$$

where $S^2 = \frac{(n_1 - 1) \, S_1^2 + (n_2 - 1) \, S_2^2}{n_1 + n_2 - 2}$

The t-test values for independent samples and unequal variances

were calculated using the following formula:

$$S_{\bar{y}_1 - \bar{y}_2} = \sqrt{S_1^2/n_1 + S_2^2/n_2}$$

$$t^1 = \frac{\bar{Y}_1 - \bar{Y}_2 - (M_1 - M_2)}{S_{\bar{y}_1 - \bar{y}_2}}$$

and the affective $df = \frac{S_1^2/n_1 + S_2^2/n_2)^2}{[(S_1^2/n_1)^2/(n_1-1)] + [(S_2^2/n_2)^2/(n_2-1)]}$

where $\bar{Y}_1$ = mean of the scores for group 1 (visual-auditory)

$\bar{Y}_2$ = mean of the scores for groups 2 (auditory-visual)

$S_{\bar{y}_1-\bar{y}_2}$ = the standard error of the differences

S^2 = the pooled sample variance in figuring standard error

n_1 = number of subjects in group 1 (visual-auditory)

n_2 = number of subjects in group 2 (auditory-visual)

S_1^2 = sample variance for group 1 (visual-auditory)

S_2^2 - sample variance for group 2 (auditory-visual)

With equal variances, the critical t values used for determining significance for the third grade sample are:

$t_{21}, .01 = 2.831$

$t_{21}, .02 = 2.518$

$t_{21}, .05 = 2.080$

$t_{21}, .10 = 1.721$

for the fourth grade sample:

$t_{25}, .01 = 2.787$

$t_{25}, .02 = 2.485$

$t_{25}, .05 = 2.060$

$t_{25}, .10 = 1.708$

and for the fifth grade sample:

$t_{20}, .01 = 2.845$

$t_{20}, .02 = 2.528$

$t_{20}, .05 = 2.086$

$t_{20}, .10 = 1.725$

For unequal variances, degrees of freedom are not whole numbers. Therefore, interpolation of a regular t table must be made to determine critical values.

CHAPTER IV

ANALYSIS OF THE DATA

Introduction

The major purpose of this study was to investigate reading achievement as evidenced by word recognition, comprehension, and reading rate in the third, fourth, and fifth grades of students whose instruction in the first and second grades was based on a predicted method preference. Hypotheses were formulated to test the significance of the relationships between initial instruction, reading achievement, and reading rate.

Analysis of the data was completed for a determination of the extent of relationship between initial method of reading instruction based on method preference, reading achievement, and reading rate. The hypotheses related to the examination of these relationships at the third, fourth, and fifth grade levels will be discussed.

Results Related to Hypothesis I

There will be no significant difference between readers whose initial method of instruction based on method preference was auditory-visual and those readers whose

initial method of instruction based on method preference was visual-auditory as evidenced by word recognition.

To determine the significance of the differences between readers in the third, fourth, and fifth grades whose initial instruction based on method preference was auditory-visual and those readers whose initial instruction based on method preference was visual-auditory as evidenced by word recognition, a t test for independent samples at each of the grade levels was computed using a .05 level of confidence. A summary of the data obtained is presented in Table IV. Mean word recognition performance scores for students in grades three, four, and five who received instruction based on method preference are converted to grade equivalents and reported in Figure 3.

The results shown in Table IV are not consistent across the grade levels reported. Based on this data it was determined the null hypothesis can be rejected for grades three and five. There was no significant interaction between method of initial instruction based on method preference and reading achievement as evidenced by word recognition for the sample of fourth grade students in this study and, thus, the null hypothesis can not be rejected for those students.

For the grade three and grade five level students, the results of the statistical analysis of word recognition achievement when initial instruction was determined by method preference indicate the auditory-visual method of

TABLE IV

SUMMARY OF DATA ON WORD RECOGNITION FROM THE T TEST PROCEDURE

Grade	Mean	SD	Diff.	Concl.	OSL
Third Grade					
Group 1	17.667	5.34	4.71	M1 ≠ M2	.0311
Group 2	22.375	2.825			
Fourth Grade					
Group 1	23.619	5.258	2.88	M1 = M2	.2224
Group 2	26.5	3.619			
Fifth Grade					
Group 1	25.625	3.384	3.54	M1 ≠ M2	.009
Group 2	29.167	.753			

Group 1: Visual-Auditory Method of Instruction Based on Method Preference

Group 2: Auditory-Visual Method of Instruction Based on Method Preference

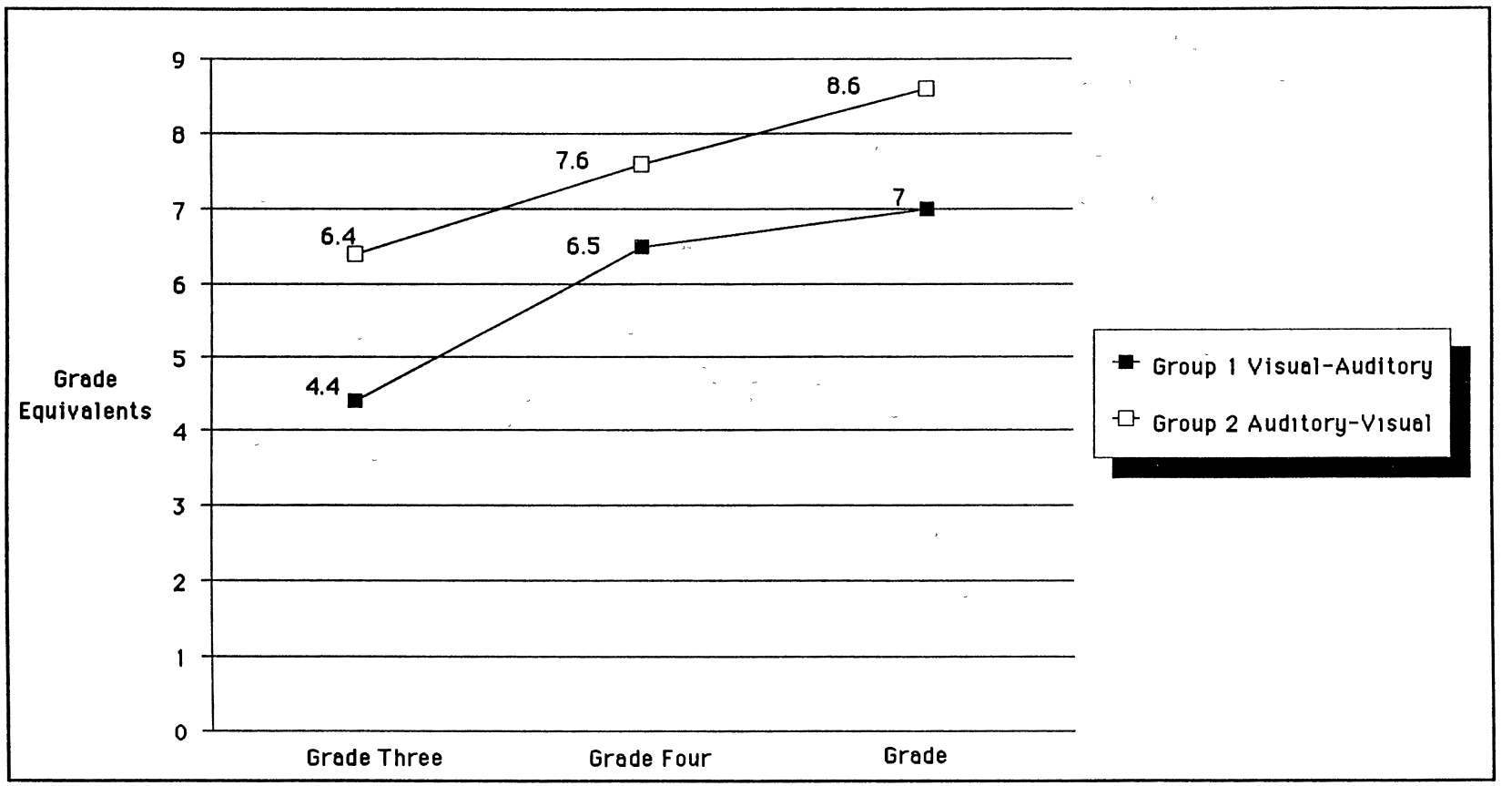

Figure 3. Mean Word Recognition Grade Equivalent Scores of Students in Grade Levels Three, Four, and Five Whose Method of Reading Instruction in Grades One and Two was Determined by Method Preference

instruction differs significantly from the visual-auditory method of instruction. The students whose method preference indicated an auditory-visual method preference performed significantly better than did those students whose performance indicated a visual-auditory method preference. Figure 3 shows a fairly consistent developmental growth pattern in word recognition between grade levels for the independent samples of subjects in both of the methods of instruction.

Results Related to Hypothesis II

There will be no significant difference between readers whose initial method of instruction based on method preference was auditory-visual and those readers whose initial method of instruction based on method preference was visual-auditory as evidenced by reading comprehension.

A t test of independent samples at the third, fourth, and fifth grade levels was computed at the .05 level of confidence to determine the significance of any differences in reading achievement as evidenced by comprehension between students whose initial instruction based on method preference was auditory-visual and those whose initial instruction based on method preference was visual-auditory. The results of the statistical analysis are reported in Table V. The data is converted to mean comprehension grade equivalents for the third, fourth, and fifth grade subjects and is shown in Figure 4.

TABLE V

SUMMARY OF DATA ON COMPREHENSION FROM THE T TEST PROCEDURE

Grade	Mean	SD	Diff.	Concl.	OSL
Third Grade					
Group 1	17.867	6.749	6.383	M1 ≠ M2	.005
Group 2	24.25	2.964			
Fourth Grade					
Group 1	25.524	5.036	1.143	M1 = M2	.6440
Group 2	26.667	6.153			
Fifth Grade					
Group 1	26.625	3.594	3.542	M1 ≠ M2	.0391
Group 2	30.167	2.483			

Group 1: Visual-Auditory Method of Instruction Based on Method of Preference

Group 2: Auditory-Bisual Method of Instruction Based on Method of Preference

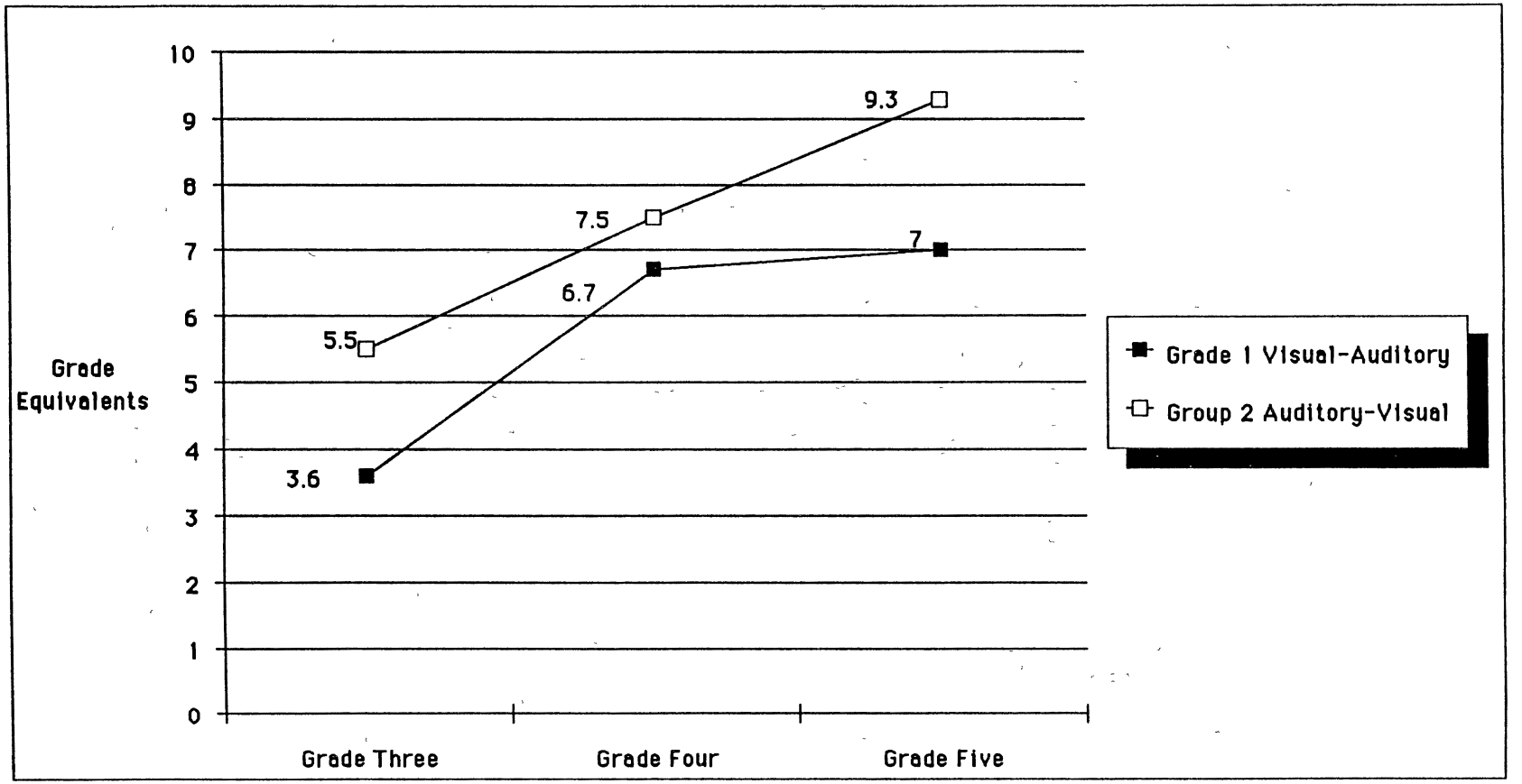

Figure 4. Mean Comprehension Grade Equivalent Scores of Students in Grade Levels Three, Four, and Five Whose Method of Reading Instruction in Grades One and Two was Determined by Method Preference

The data reveals Hypothesis II can be rejected for the subjects in grade three and in grade five. There is no significant difference between the reading achievement as evidenced by comprehension of those fourth grade students for whom instruction was provided utilizing visual-auditory methods and those fourth grade students for whom instruction was provided utilizing auditory-visual methods based on their predicted method preference.

The statistical analysis presented in Table V shows that for the sample of third grade students and the sample of fifth grade students in this study there is a significant difference between students whose initial reading instruction based on method preference was auditory-visual and those students whose initial instruction based on method preference was visual-auditory as evidenced by reading comprehension. The students in both these grade levels who received auditory-visual methods of instruction performed at a significantly higher level of achievement.

An examination of Figure 4 demonstrates a consistent pattern of reading comprehension development between the grade levels of the independent samples of students currently in the third, fourth, and fifth grades whose initial instruction based on method preference was auditory-visual. The independent samples of students that are currently in the third, fourth, and fifth grades whose instruction based on method preference was visual-auditory does not show a consistent pattern of development between

the grade levels as the independent sample of fourth grade students' level of reading comprehension achievement is very similar to the reading comprehension achievement of the independent sample of fifth grade students as expressed in mean comprehension grade equivalent scores.

Results Related to Hypothesis III

There will be no significant difference between readers whose initial method of instruction based on method preference was auditory-visual and those readers whose initial method of instruction based on method preference was visual-auditory as evidenced by reading rate.

A comparison was made using a t test for independent samples at the .05 level of confidence to determine the significance of difference between the reading performance as evidenced by reading rate of students presently in the third, fourth, and fifth grades whose initial instruction was auditory-visual or whose initial instruction was visual-auditory based on method preference. Table VI presents a summary of the results of the statistical analysis. Figure 5 demonstrates the mean reading rate expressed in words per minute for the subjects in grade levels three, four, and five.

Based on the evidence reported in Table VI, the null hypothesis for grade level three and grade level five can not be rejected. There is no significant difference in the reading rate of students presently in the third grade and

TABLE VI

SUMMARY OF DATA ON READING RATE FROM THE T TEST PROCEDURE

Grade	Mean	SD	Diff.	Concl.	OSL
Third Grade					
Group 1	188.667	100.108	-22.417	M1 = M2	.56913
Group 2	166.25	59.07			
Fourth Grade					
Group 1	193.714	65.312	75.953	M1 ≠ M2	.0373
Group 2	269.67	103.685			
Fifth Grade					
Group 1	229.938	82.408	21.395	M1 = M2	.663
Group 2	251.333	116.629			

Group 1: Visual-Auditory Method of Instruction Based on Method Preference

Group 2: Auditory-visual Method of Instruction Based on Method Preference

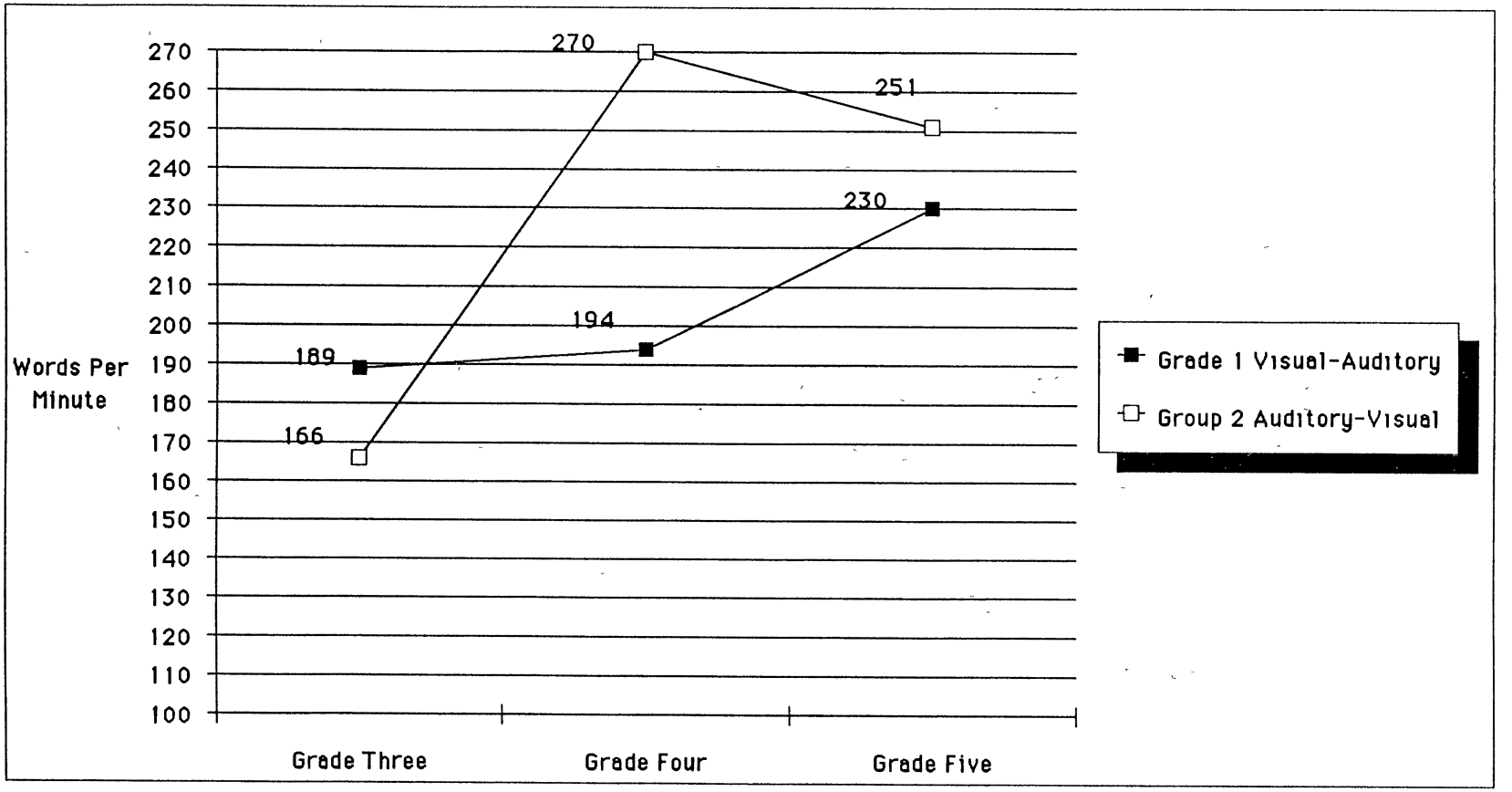

Figure 5. Mean Reading Rate in Words Per Minute of Students in Grade Levels Three, Four, and Five When Method of Reading Instructions in Grades One and Two Was Determined by Method Preference

students in the fifth grade whose initial instruction based on method preference was auditory-visual and those students presently in the third and fifth grades whose initial instruction based on method preference was visual-auditory.

The data in Table VI reveals a significant difference in the two groups of fourth grade readers whose initial instruction was based on method preference and the null hypothesis is rejected for this sample of students. At the fourth grade level the students for whom initial instruction based on method preference was auditory-visual read significantly faster than did those students for whom initial instruction based on method preference was visual-auditory.

Figure 5 demonstrates there is a reading rate growth pattern between the grade levels for the independent samples of students currently in the third, fourth, and fifth grades whose initial instruction had been visual-auditory but this pattern is not consistent as there is very little difference between the third grade readers and the fourth grade readers. Students whose initial instruction based on method preference was auditory-visual that are presently in the third, fourth, and fifth grades do not reveal a developmental reading rate growth pattern across the grade levels as the fourth grade sample of readers are reading faster than the fifth grade sample of subjects in this study.

Summary

A t test for independent samples was used to determine whether or not to reject the three hypotheses presented at the third, fourth, and fifth grade levels. The statistical analysis of the data was not consistent across the grade levels for any of the three hypotheses.

Reading achievement as evidenced by word recognition and reading comprehension when initial instruction had been based on method preference was significantly better for those students in the third and fifth grades whose instruction had been auditory-visual than for those whose instruction had been visual-auditory. There was no significant difference in reading performance indicated by word recognition and reading comprehension for students in the fourth grade whose initial instruction based on method preference had been auditory-visual and those for whom initial instruction based on method preference had been visual-auditory. There was no evidence to support the rejection of the hypothesis at the third and fifth grade levels concerning reading rate as a measure of reading achievement when reading instruction has been based on method preference. At the fourth grade level the data revealed a significant difference between the reading rate of students whose initial instruction was auditory-visual and those students whose initial instruction was visual-auditory based on method preference.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

General Summary of the Investigation

This study examined the reading performance of students whose initial reading instruction was based on a method preference as indicated by a battery of tests that was administered prior to entering first grade. Students whose performance indicated an auditory-visual method preference received instruction with materials and methods that had the letter as the basic unit of instruction with an accumulation of sound-symbol relationships to use in synthesizing and decoding words. Those students whose performance demonstrated a visual-auditory method preference were placed in instruction that had the word as the basic unit of instruction with the configuration of a total word along with pictures and verbal context clues providing the means of accumulating a sight vocabulary from controlled vocabulary reading material. These words were later used in an analytical approach to decoding.

The sample of students included in this study consisted of those students at one elementary school who are presently in the third, fourth, and fifth grades and whose instruction in the first and second grades was based on a predicted

method preference. The level of reading achievement as evidenced by word recognition, comprehension, and reading rate was measured using The Nelson Reading Skills Test. A statistical analysis using a t test for independent samples was performed to determine if a significant relationship was apparent between method of initial instruction based on method preference and the current level of reading achievement evidenced by word recognition, comprehension, and reading rate.

Conclusions

The data obtained from the statistical analysis was not consistent across the grade levels and the null hypotheses were rejected at some grade levels and were not rejected at other grade levels. Data from the independent t tests computed on the three hypotheses at the third, fourth, and fifth grade levels at the .05 level of confidence is presented in Table VII. An examination of the data for grade levels three and five reveals consistent information indicating significant differences in the performance on word recognition and comprehension of readers placed in instruction based on method preference favoring students with an auditory-visual preference. There was no significant relationship found in this study between the reading rate of students in the third grade and the fifth grade and their method of instruction. Data on those students in the fourth grade for whom instruction was based

TABLE VII

INDEPENDENT T TEST OF HYPOTHESES AT THIRD, FOURTH, AND FIFTH GRADES

Variable	Grade Level	Critical T Values	Significance
Word Recognition	3	-2.3099	p<.05
	4	-1.2513	NS
	5	-3.9350	p<.01
Comprehension	3	-3.1391	p<.01
	4	-0.4677	NS
	5	-2.2078	p<.05
Reading Rate	3	0.5781	NS
	4	-2.1999	p<.05
	5	-0.4850	NS

on method preference did not reveal significant differences related to method of instruction as evidenced by word recognition and comprehension but there was a significant difference in reading rate that favored the readers identified as having an auditory-visual method preference.

The performance of the third grade and fifth grade readers in this study concur with previous research that evidences a significant relationship between initial instruction based on method preference and level of reading achievement (Wepman & Morency, 1975; Stone, 1976; Carbo, 1980; Williams, 1987) and a demonstrated superior performance for auditory learners as compared to visual learners (Meyers, 1980; Kampwirth, 1981; Williams, 1987). The superior performance of the third grade and fifth grade students whose initial auditory-visual method of instruction emphasized decoding strategies is also in agreement with previous research (Chall, 1967, 1983; Tunmer & Nesdale, 1985). Studies by Lesgold, Resnick, and Hammond (1985) and by Freebody and Byrne (1988) found a relationship between early word recognition skill and later comprehension. Both the third grade students and the fifth grade students whose initial instruction emphasized decoding skills indicate superior performance not only in word recognition but also in comprehension at their present grade levels.

Concerns that reading rate may be adversely affected by instruction that employs the letter as the basic unit of instruction are not substantiated in this study. The data

on the third and fifth grade levels reveals there is no significant interaction between initial instruction based on method preference and reading rate at these grade levels. This is consistent with the results of studies indicating that although students who receive initial instruction with a letter sound relation emphasis generally have a slower rate as beginning readers than do readers taught with a whole-word emphasis, these differecnes disappear fairly quickly (Lesgold, Resnick & Hammond, 1985).

The statistical analysis for the sample of fourth grade students in this study was not in agreement with the other grade levels on any of the variables in the hypotheses. It is recognized that these grade levels are composed of independent samples of subjects and any differences that are revealed may very likely be differences in the subjects themselves. As the results at the fourth grade level differ so completely from the data on the other grade levels in this study it seems necessary to examine any available information that might indicate additional causes for differences in the observed reading achievement of these students.

A review of the materials utilized for instruction with the visual-auditory and auditory-visual method preference subjects reveals differences in the materials chosen for initial instruction for each grade level in this study. For the fourth grade subjects, it appears there was a lack of differentiation of materials used with the visual-auditory

and auditory-visual method preference groups. The materials from Ginn and Company (1980) were used with both of these groups of students. It is possible that the modifications in materials and techniques to accommodate the differing method preference learners did not influence the instruction received by the learner as much as did the choice of materials used.

Recommendations

1. It is recommended that a study should be done in which the investigator has control over the materials and techniques utilized for initial instruction based on method preference. This type study would have to be a longitudinal study.
2. It is recommended that a study be done of reading achievement levels at the middle school with sixth graders. This sample would be comprised of students for whom first and second grade instruction was based in method preference, students for whom all preceeding five years of reading instruction was based on method preference, and students for whom method preference was not a consideration in their earlier reading instruction. The data obtained could be examined for information that emerged indicating existing relationships between instruction and resulting reading achievement.

3. A study that compares students for whom reading instruction is based on method preference with students for whom method preference is not a consideration is recommended. This should be a longitudinal study so that the investigator is able to maintain controlled conditions for an experimental study.

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APPENDICES

APPENDIX A

LETTER TO PARENTS

OSU

Oklahoma State University

DEPARTMENT OF CURRICULUM AND INSTRUCTION
COLLEGE OF EDUCATION

STILLWATER, OKLAHOMA 74078-0146
GUNDERSEN HALL 302
(405) 744-7125

February 1, 1990

Dear Parents,

I am working on an advanced degree in reading instruction and have received permission from the Stillwater Public Schools to do a research study that will involve some Stillwater elementary grade students. To complete my research, I need your permission for your child to participate in my study

The purpose of this study is to examine the reading achievement of students in the third, fourth, and fifth grades whose initial placement in reading instruction was based on tests that were given before entering first grade. These test results are believed to indicate the method of instruction in which individual children will learn most successfully.

Those children for whom permission is given to participate in this study will take a standardized reading test, The Nelson Reading Skills Test. This test, which will require 40 minutes to take, will be given at your child's school and the individual results will remain confidential. Information concerning the reading achievement of groups of students rather than of individual students is needed for this particular study. The results of your child's performance will be made available to you upon request and I will be happy to answer any questions you might have about his/her performance.

In order for your child to participate in this study, please sign the form at the bottom of this page and return it to your child's teacher as soon as possible as we will begin testing the week of February 12. Specific times for testing will be arranged with your child's teacher If you have any questions, please feel free to call me at the Oklahoma State University Reading Center, 744-7119. I appreciate your cooperation.

Sincerely,

Beverley M Tully

My child,_____, who is in the _____ grade, has permission to participate in the research study conducted by Beverley Tully. I understand the results of my child's testing will remain confidential but will be released to me upon my request.

Parent's signature:_____

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APPENDIX B

BIBLIOGRAPHY OF INSTRUMENTS USED TO ESTABLISH METHOD PREFERENCE

BIBLIOGRAPHY OF INSTRUMENTS USED TO ESTABLISH METHOD PREFERENCE

Kirk, S., McCarthy, J., & Kirk, W. (1968 Revision). Illinois Test of Psycholinguistic Abilities. Champaign, IL: University of Illinois Press.

Grammatic Closure subtest to assess the child's ability with syntax and grammatic inflections. This subtest is comprised of a demonstration item and thirty-three test items in which a child is shown two side-by-side line drawings. The administer first points to the drawing on the left and makes a statement about the object. The administer then points to the drawing on the right and makes an incomplete statement in which the child is required to provide the missing word.

Sound Blending measures the child's ability to blend single sounds into an integrated whole word. Sounds are spoken singly at one-half second intervals. Items include real and nonsense words that increase in difficulty. This is a supplementary subtest and is comprised of demonstration items and 32 test items of which the first seven items utilize pictures. The last eight items are nonsense words with a demonstration utilizing nonsense words that precedes these items. Testing on real words is discontinued with three consecutive failed items unless the third error occurs

after item 18 in which case the testing continues using the nonsense word items until three consecutive nonsense items have been failed.

Murphy, H. & Durrell, D. (1965). Murphy-Durrell Reading Readiness Analysis. New York: Psychological Corporation.

Learning Rate Test is used to assess the child's ability to learn and recognize nine sight words including nouns, verbs, and adjectives that are readily meaningful to the child and easily illustrated. The words are presented on a chalkboard, flash cards, and in the text booklet with meaning as well as word recognition emphasized. One hour after the teaching session, the children are asked to identify the words in two multiple choice situations, one requiring the discrimination of a word from other words taught and the other requiring discrimination of words similar in form but not taught. The purpose of this subtest is a determination of the number of words a child is able to learn in one teaching session when words are presented using a standard systematic approach.

Letter Names II Test measures the child's knowledge of letter names. The child identifies letters named by the teacher.

Wechsler, D. (1967). Wechsler Preschool and Primary Scale of Intelligence. New York: Psychological Corporation.

Geometric Design. When presented with a stimulus picture of a geometric design the child is asked to

reproduce the design. This test which measures the childs ability to reproduce geometric figures assesses visual-motor organization and reveals behavioral logs of the child.

Vocabulary. Given an oral stimulus the child responds orally with word definitions. This subtest is designed to suggest a level of the child's auditory comprehension.

APPENDIX C

BIBLIOGRAPHY OF MATERIALS USED FOR INSTRUCTION IN FIRST AND SECOND GRADE

BIBLIOGRAPHY OF MATERIALS USED FOR INSTRUCTION IN FIRST AND SECOND GRADE

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VITA

Beverley Marsden Tully

Candidate for the Degree of

Doctor of Education

Dissertation: READING ACHIEVEMENT IN GRADES THREE, FOUR AND FIVE WHEN INSTRUCTION IN GRADES ONE AND TWO WAS DETERMINED BY METHOD PREFERENCE

Major Field: Curriculum and Instruction

Biographical:

Personal Data: Born in Tulsa, Oklahoma, January 20, 1942, the daughter of Ware Marsden and Virginia Lewis Marsden.

Education: Graduated from Stillwater High School, Stillwater, Oklahoma, May, 1959; received Bachelor of Science in Education degree from Oklahoma State University in 1962; received Master of Science in Education degree from Oklahoma State University in 1972; completed requirements for Doctor of Education degree at Oklahoma State University in July, 1990.

Professional Experience: Taught kindergarten, Stillwater, Oklahoma, 1962-63; taught third, fourth, and first grades in Schleicher County Schools, Eldorado, Texas, 1964-67; served as librarian in Tulsa Public Schools, Tulsa, Oklahoma, 1968-69; taught second grade, Campbell County Schools, Gillette, Wyoming, 1969-72; kindergarten teacher, Crane County Schools, Crane, Texas 1972-75; Title I Reading Teacher, Jefferson County Schools, Denver, Colorado, 1975-1979; graduate teaching assistant, Oklahoma State University, 1988-89; Faculty Teaching Associate, Oklahoma State University, 1989-1990.