PREDICTING KINDERGARTEN CHILDREN'S SUCCESS WITH SPECIFIC READING METHODS USING GROUP READINESS TESTS

By

Jimmy R. Ames

Bachelor of Science
in Education
Southeastern Oklahoma State University
Durant, Oklahoma
1972

Master of Behavioral Studies
in Reading
Southeastern Oklahoma State University
Durant, Oklahoma
1977

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF EDUCATION
December, 1982

PREDICTING KINDERGARTEN CHILDREN'S SUCCESS WITH SPECIFIC READING METHODS USING GROUP READINESS TESTS

Thesis Approved:

Darrel D. Rue
Thesis Adviser

David Yellin

Nona Jo Campbell

Bernard J. Belcher

Norman N. Durham
Dean of the Graduate College

ACKNOWLEDGEMENTS

I wish to express my appreciation and gratitude to my major adviser, Dr. Darrel Ray, who was always available and willing to give his time throughout this study. His guidance, encouragement, and assistance were invaluable to me.

My other committee members, Dr. Bernard Belden, Dr. Noma J. Campbell, Dr. Bruce Petty, and Dr. David Yellin, also made significant and invaluable contributions to the completion of this study. Each one contributed in their own unique way to the preparation of the final manuscript.

Many people aided in the collection of data and all of them played an important role in this study. Thanks are extended to Carol Williams, principal of the cooperating school, and the two kindergarten teachers, Fran Lathrop and Ann Queen, who unselfishly gave of their class time and also administered some of the tests. A not of thanks also to the graduate students from Oklahoma State University who helped with the individual tests and especially Brenda Goodrich who aided in the administration of some of the small group tests. In addition, appreciation is extended appreciation is extended to Wanda Morgan for assistance in typing and revising the many drafts of this manuscript.

Special gratitude and love is expressed to my wife, Annita, for her understanding and encouragement. She made many sacrifices in both time and material things to help make this dream a reality. Many thanks also to our girls, Michell, Trista, and Jenny, who kept me smiling through it all.

TABLE OF CONTENTS

Chapter Page

LIST OF TABLES

CHAPTER I

PRESENTATION OF THE PROBLEM

Introduction

Starting at the beginning of this century and continuing even until now, there has been much research and debate about the methods and materials for initial reading instruction. No magic solution has appeared as evidenced by the fact that children in the public schools still experience failure while trying to learn to read.

More recent studies have pointed out that while specific methods do not make a difference with a class of 30, each child does have a learning style preference that can be predicted (Young, 1975; Treadway, 1975). If these learning preferences are determined and taken into account in that child's educational program, it can greatly reduce the percentage of failure in beginning reading instruction.

Ray (1970) developed a means of identifying these learning preferences. He used the four most prevalent methods of reading instruction, Visual-Auditory, Auditory-Visual, Linguistic-Word Structure, and Language Experience, and designed a test "to evaluate the performance of children by measuring the response to teaching-learning experiences utilizing each of the four methods"(Ray, 1970, p.1).

The Ray Reading Methods Test then allows the teacher to place the child in a method of initial instruction that is best suited to that child's style of learning, thus reducing the percentage of failure due to inappropriate instruction.

Treadway (1975) and Young (1975) in companion studies developed a battery of tests that also predict learning preferences using subtests from 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. This battery is being used in many public schools to place children in the method of instruction most appropriate for them. However, some of the subtests used in the battery require specially trained administrators and must be given individually which makes it almost impossible for classroom teachers to differentiate instruction according to student needs and some small school systems do not have enough specially trained test administrators to complete the testing within a reasonable time. Identification of a group administered predictive battery will allow any teacher to differentiate instruction within their own classroom and will make it possible for any school district to use this program no matter how limited their resources.

Purpose of the Study

The purpose of the study was to identify a battery of subtests that would predict learning preference but does not

require individual administration or specially trained administrators. A need exists for a predictive battery that can be given by a classroom teacher to his/her entire class or to small groups of children. This would allow any classroom teacher to differentiate instruction based on the learning styles of each child in his/her room without outside help from specialists and without spending two to three weeks of class time to accumulate the necessary information.

Statement of the Problem

This study was designed to identify a battery of tests that could be given as group tests by classroom teachers for the purpose of predicting success with differentiated methods of instruction.

Hypotheses

This study was designed to test the following hypotheses:

Hypothesis I: There is no significant relationship between the scores on the pre-reading readiness variables and reading achievement when using the Auditory-Visual method of teaching reading.

Hypothesis II: There is no significant relationship between the scores on the pre-reading readiness variables and reading achievement when using the Visual-

Auditory method of teaching reading.

All hypotheses were tested at the .05 level of significance.

Questions

The following questions were formulated in order to determine which independent variables contributed significantly to the multiple correlation.

I. In regard to reading achievement when using the Auditory-Visual approach, will there be a significant contribution to the multiple correlation when the predictor variables are employed?

II. In regard to reading achievement when using the Visual-Auditory approach, will there be a significant contribution to the multiple correlation when the predictor variables are employed?

Definition of Terms

The following are definitions of terms as they were used in this study:

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 utilize these in synthesizing, and thus decoding, words. Skill transfer is accomplished through use of known sound-symbol associations applied to unknown words. This transfer is effected

> early in learning to read and particularly early in words where consistent sound-symbol patterns exist. The pace of decoding development is rapid (Ray, 1970, p.1).

Visual-Auditory Method

> The Visual-Auditory Method of reading instruction is currently the most widely used method. In the initial stage of learning, the configuration of a total word is used for instruction with pictures and verbal context clues providing the vehicle of instruction. No sound-symbol associations are developed. The skill development program is dependent upon an accumulation of sight words controlled vocabulary reading material to be utilized later in an analytical approach to decoding. The transfer of decoding skills is delayed in general application, with the pace of skill development being slow (Ray, 1970, p.1).

Formal Reading Instruction

> Instruction which would teach a child to read words at a pre-primer level.

Limitations of the Study

This study was limited in application by the fact that the sample was drawn from a single school in a rural school district. The sample was predominantly middle-class, from a limited geographical region.

Children who were already reading were not included in this study, but no attempt was made to control prior knowledge of skills related to reading that had been learned at school or at home.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

Many studies have searched for a solution to the problems of initial reading instruction. They have addressed such issues as when, how, and with what instructional method to begin the teaching of reading [Miller (1979); Kempwirth and Bates (1980)]. The early emphasis of this search was to find a single solution to the problems of initial reading instruction that would be best for everyone. More recently, the researchers have looked for ways to match methods of instruction to the abilities of the individual children rather than the class as a whole. This chapter reviews three areas that have received research attention: (1) the usefulness of readiness measures as predictive instruments, (2) the effort to match modality preference to initial methods of reading instruction, and (3) the use of predictive batteries and methods tests to match methods of initial reading instruction to learner preference.

Readiness Tests as Predictors of Reading Achievement

In the effort to eliminate first grade reading failures, researchers have searched for effective predictors of initial success in reading with the idea that early identification of possible failures would allow the teacher to use an intervention program to help those identified avoid being a failure. Readiness tests have been developed as a part of this effort to identify as early as possible these potential failures.

Collins (1979) used a criterion-referenced test, Prereading Skills Test, in a comparison study to see if it would predict first grade readiness and achievement as well as the norm referenced Metropolitan Readiness Test. She used 233 first graders from the Fort Worth, Texas School District. In September, 1975 the Prereading Skills Test and the Metropolitan Readiness Test were administered to all subjects. During March, 1976 the Gates-MacGintie Reading Test was administered to the same group. The scores of the Prereading Skills Test and Metropolitan Readiness Test were then correlated with the Gates-MacGintie Reading Test. The resulting correlation coefficients were .7489 for the Prereading Skills Test and .7482 for the Metropolitan Readiness Test. Collins concluded that the Prereading Skills Test scores are as useful as the Metropolitan Readiness Test scores for predicting end-of-first grade scores on the Gates-MacGintie Reading Achievement Test.

Hopkins and Sitkei (1969) administered the Lee-Clark Reading Readiness Test and the California Test of Mental Maturity during the first three weeks of school to all pupils entering first grade in two elementary schools. In all, 157 first graders participated in the study. Their scores on the predictor variables were correlated with scores on the Lee-Clark Reading Test: Primer, which was given near the end of first grade. The readiness test had a slightly higher correlation with end-of-year reading achievement scores than the intelligence test did. They concluded that it would be better to use readiness tests since they are easier to administer.

Using the Pinter-Cunningham Intelligence Test, the Murphy-Durrell Reading Readiness Analysis, and the Metropolitan Reading Readiness Test as measures of readiness, Pikulski (1973) made comparisons with achievement at the end of first and sixth grade using the Metropolitan Achievement Test as the dependent variable. Comparisons were made to determine whether the predictability of these readiness measures was related to methods for teaching reading. After sixth grade, scores were available for 159 children in the Language Arts group and 175 children in the Basal Reader group. Correlations between readiness scores and achievement scores were significantly higher for the Language Arts group. However, there were significant correlations between the independent variables and reading achievement even at the sixth grade level. Pikulski concluded that it was better to

use readiness measures for prediction because they yield correlations with achievement similar to those of intelligence tests, readiness tests are easier to administer, and they avoid dealing with the concept of intelligence.

Rude (1973) conducted a review of these five readiness tests: Metropolitan Readiness Tests, Murphy-Durrell Reading Readiness Analysis, Clymer-Barrett Prereading Battery, Gates-MacGintie Reading Tests-Readiness Skills, and Harrison-Stroud Reading Readiness Profiles. He concluded that they should be considered predictive in nature rather than diagnostic.

Perry (1979) developed her own reading readiness test, the Reading Readiness Inventory. She used 117 first graders in a comparative study of her test and the Metropolitan Readiness Test. The two readiness tests were administered at the beginning of first grade. She used the California Achievement Test as a measure of end-of-first grade reading achievement. The Reading Readiness Inventory had an R^2 of .646 with end-of-first grade reading achievement and the Metropolitan Readiness Test had an R^2 with end-of-first grade reading achievement of .539. The best battery of predictors was Visual Matching, Finding Patterns, and Beginning Consonants.

Ashmore (1973) used the Revised Auditory Test and the Metropolitan Readiness Test in a comparative study using 33 kindergarten children and 35 first grade children. He wanted to determine which test would best predict first grade

achievement and whether it would be best to administer them in kindergarten or first grade.

The tests of auditory and visual perception were given to both groups during February and March of 1972. Both groups were given the Metropolitan Readiness Test during the first month of their first grade year. During the spring of 1973, both groups were given the Gray Oral Reading Paragraphs and the reading section of the Wide Range Achievement Test. The Revised Auditory Test did not add significantly to the prediction of reading achievement when given to kindergarten children, but it was the best single predictor of reading ability when given to first graders.

Modality Preference and Methods of Initial Reading Instruction

Another research approach to the problems of first grade failures has been the attempt to match children's preferred modalities to an instructional method best suited for the individual child. Meyers (1980) investigated the effects of modality preference, mode of instruction and verbal feedback on immediate and delayed recall of new words in 72 elementary-age learning disabled students. She used the Illinois Test of Psycholinguistic Abilities to assign children to auditory, visual, or multisensory groups. These groups were then randomly assigned to visual, auditory, or multisensory instructional groups. Each group was presented with words printed on flash cards until ten words were

identified which were unknown to all group members. Students in groups of six were taught the ten new words in a ten minute lesson. The students were tested individually for immediate recall and were retested the next day for delayed recall. There were no significant interactions between modality preference and mode of instruction. She pointed out that it is necessary to consider that the Illinois Test of Psycholinguistic Abilities may not be a valid instrument for measuring learning-modality preferences.

In a study of 20 elementary school children in central Pennsylvania, Foster, Reese, Schmidt, and Ohrtman (1976) checked modality preference in relation to methods of teaching reading. The ten students exhibiting the best auditory modality preference and the ten students exhibiting the best visual preference were selected from a total school population of 417. Their modality preference was determined on the basis of scores from the Test of Auditory Perception and the Multiple Choice Bender; the former was considered an auditory test and the latter a visual test. Students were taught ten words visually and ten words auditorily in two seven-minute sessions on two separate days. The auditory preference children did well no matter what method was used to teach them, but the visual preference children did well only on visually presented material. These researchers concluded that a relationship does exist between modality strength and the ability to remember sight words taught to that modality strength.

A study by Wepman and Morency (1975) using 297 primary grade children, examined the effects on reading ability of matching a child's preferred modality with a compatible teaching method. The first year of the study was spent training teachers and test administrators and determining the children's preferred modality using the Perceptual Test Battery. Students were randomly assigned to classes so that one-third of each class showed an auditory preference, one-third showed a visual preference, and one-third had no preference or a balanced preference. Classes were instructed using either an auditory approach, a visual approach, or a balanced approach -- using a combination of auditory and visual methods. Results for grade one indicated that children who showed an auditory preference achieved significantly higher when an auditory teaching approach was used and children with a visual preference achieved significantly higher when a visual approach was used. Results could not be validated for grades two and three because of attrition.

In another study using the Perceptual Test Battery to establish preferred modalities, Peck (1977) used 53 subjects, ages seven to nine, from a private school. She divided them into five groups based on their Perceptual Test Battery scores. The groups were high visual-high auditory, high visual-low auditory, low visual-low auditory, and low visual-high auditory, and no preference. The Gates-MacGintie Reading Test was used as a measure of reading achievement at

the end of the instructional program. Each of the subtests of the Perceptual Test Battery showed significant but small relationships to reading achievement. When the subtests scores were combined to reflect a visual and an auditory score, there was no significant relationship. Peck concluded that modality as measured by the Perceptual Test Battery should not be used for identifying a teaching method for disabled readers.

The Illinois Test of Psycholinguistic Abilities was used to divide classes into modality preferences by Bateman (1968). In this study, 182 kindergarten children were identified as having a preferred visual modality or a preferred auditory modality on the basis of their visual and auditory scores on the Illinois Test of Psycholinguistic Abilities. Half of the students were then placed in a phonics (auditory) or whole word (visual) program of instruction based on their identified modality strength. The other four classes were used as a control group. Achievement scores in reading did not seem to be influenced when instruction was adjusted to modality strengths on the basis of scores from the Illinois Test of Psycholinguistic Abilities. The subjects identified as auditory learners achieved more than the visual learners but there was no significant interaction between modal preference and instructional method.

Using the Wepman Auditory Discrimination Test and three visual discrimination tests, Robinson (1968) grouped 488

first graders as high visual-high auditory, low-visual-low auditory, high visual-low auditory, and low visual-high auditory. Word recognition skills were taught using an auditory method or a visual method. The auditory method of instruction produced the highest achievement scores regardless of original modality to which the child was assigned. She found no significant relationships between modality preference and end-of-first grade achievement scores.

Outs (1979) used scores from the Preschool Language Scale to determine the modality preference of 96 first graders. He divided them inot four classes; two experimental and two control groups to determine the effects of modality grouping and instruction on reading achievement. The auditory experimental group was taught using an auditory method, the visual experimental group was taught using a visual method, and the control groups were not taught to their modality strengths. The auditory experimental was significantly higher in reading achievement and word recognition. The visual group's achievement did not differ significantly form the achievement of the control group. Outz concluded that it would be beneficial to group those students identified as auditory learners and instruct them using an auditory approach. However, he also concluded that there was no need to group visual learners because it did not matter which method of instruction was used for them.

Predictive Batteries and Methods Tests

Other researchers have attempted to determine a child's preferred learning style using batteries of tests in efforts

to determine the best predictors of achievement and learning preference. Bennett (1973) used the test data from the first grade studies to determine the predictive effectiveness of selected pre-reading measures. He used 5,440 subjects from the first grade studies data files. The tests examined were:

1. Murphy-Durrell Reading Readiness Analysis
2. Thurston Primary Perception Tests
3. Metropolitan Readiness Test
4. Pinter-Cunningham Primary Test
5. Stanford Achievement Test

From the first four tests he developed a battery of predictor variables, using the student's Stanford Achievement Test scores as the dependent variable. The best predictors were the three subtests of the Murphy-Durrell Reading Readiness Analysis, the Identical Forms subtest of the Thurstone Primary Perceptions Tests, the I.Q. score of the Pinter-Cunningham Primary Test, and the Word Meaning subtest of the Metropolitan Readiness Test.

Devoid (1976) screened 210 children at ages 3.5 to 5.5 with the following test battery to determine the relationship between scores obtained in a screening program and reading achievement at the end of first, second, and third grade:

1. Peabody Picture Vocabulary Test
2. ABC Inventory
3. Gross Motor Test

4. Fine Motor Screening
5. Vision
6. Hearing

The California Achievement Test was then administered at the end of first, second, and third grade. He concluded that a multi-test battery provided a better prediction of achievement than did any single test.

Austin and Donovan (1978) used 107 subjects in a study of predictive batteries. As kindergarteners, the students were given the following tests:

1. Peabody Picture Vocabulary Test
2. Goodenough Draw-A-Man Test
3. Developmental Test of Motor Integration
4. Wepman Auditory Discrimination Test
5. Illinois Test of Psycholinguistic Abilities
   a. Auditory Sequential Memory
   b. Visual Sequential Memory
6. Keystone Visual Survey Test
7. Informal Inventory of Letters and Numbers
8. Gates-MacGintie Readiness Skills Test

Austin and Donovan identified three groups of learners; preferred visual, preferred auditory, and no preference. The experimental groups were taught to their preferred modality; the control groups were not taught to their preferred modality. At the end-of-first grade, reading achievement was measured by the Woodcock Reading Mastery Test and the Gates-MacGintie Readiness Skills Test. The experimental

group achieved significantly higher than the control group. The difference was significant at the .10 level. Based on their research findings they recommended a predictive battery consisting of the following tests:

1. Gates-MacGintie Readiness Skills Test
2. Informal Inventory of Letters and Numbers
3. Goodenough Draw-A-Man Test
4. Illinois Test of Psycholinguistic Abilities
   a. Auditory Sequential Memory
   b. Visual Sequential Memory

Miller (1974) assigned student to preferred modalities on the basis of visual acuity as measured by the Keystone Telebinocular, auditory acuity as measured by a sweep check test with a Maico audiometer, visual closure as measured by the Higgins-Wertman Test, and auditory closure as measured by the auditory closure subtest of the Illinois Test of Psycholinguistic Abilities. They randomly divided 62 first grade students into two classrooms, one class visual and one class auditory. The students were not grouped by modality strengths. The Gates-MacGintie Reading Test was used to check achievement at the end of one year. Miller reported no significant difference between those taught to modality strength and those not taught to modality strength.

Carbo (1980) investigated the effect of selected word stimulus methods on immediate and delayed recall of kindergarten students identified as visual, auditory, or no preference learners. Subjects were drawn from the entire

population of kindergarten children within a suburban school district in Nassau County, New York. Of 97 students in five classes, 36 were selected for participation in this study, 12 from each modality group. All students were administered the Metropolitan Readiness Tests Level II, Visual Memory of the Slingerland Pre-Reading Screening Procedures, and the Memory for Sentences subtest of the Woodcock-Johnson Psycho-Educational Battery. Each stubtest used in the study was classified before the study began as being a test of visual or auditory abilities. Modalilty preference was then determined on the basis of scores from the visual and auditory subtest established previously by Carbo. Each child was then taught seven words over a period of eight school days using each of the three methods of instruction: visual, auditory, and a combination of both. Children were tested for immediate recall and delayed recall after 24 hours. The children's recall scores were much better when the teaching method was matched to modality preference.

Vandever and Neville (1974) used 282 second graders to see if teaching word recognition to students on the basis of their modality strengths would be better than teaching word recognition to the students on the basis of their modality weaknesses. Modality preference was determined on the basis of trial lessons taught visually or auditorily. At the end of six weeks of instruction, analysis of covariance revealed that children taught to strength did no better than those taught to weakness.

Bryant (1974) used a battery of ten tests to determine preferred learning styles for 99 third grade disabled readers who scored 2.0 or below in reading achievement. The tests she used were:

1. Bond-Balow-Hoyt Silent Diagnostic Test
2. Durrell-Sullivan Reading Capacity Primary Test
3. Gates-MacGintie Reading Test
4. Goodenough-Harris Drawing Test
5. Kinesthetic Test (Bryant)
6. Frostig Developmental Test of Visual Perception
7. Wisconsin Design for Reading Skill Development
8. Slossen Drawing Coordination Test for Children and Adults
9. Wepman Auditory Discrimination Test
10. Wide Range Achievement Test

The students were randomly assigned to one of three modality groups, visual, auditory, or kinesthetic. The students were taught for 12 weeks in the modality group to which they were randomly assigned. Prediction equations, using stepwise regression analysis, were determined using the pre-test scores as independent variables and reading achievement as the dependent variable. Each student's scores were applied to the prediction equations by computer simulation to determine which of the three instructional methods would be best for that child. She concluded that group administered tests and computer simulation can be used as predictors for a student's best mode of instruction.

However, she used a .50 confidence level in her study.

Mills (1956) developed the Mills Learning Methods Test to help determine the best method of reading instruction for each child. He used 58 students, dividing them into nine classifications based on age and intelligence levels. Four methods of instruction were used to teach the words; visual, phonic, kinesthetic, and a combination of the three. Mills concluded that different children do learn better by different methods of instruction and no one method of instruction is best for all. Coleman (1962) agreed with Mills in a later study using Mills Learning Methods Test. He used 51 subjects to determine if the visual, auditory, kinesthetic, or a combination of methods was more efficient. He examined this question at a total group, subgroup, and individual level. Coleman decided that knowledge of a student's learning preference would aid in developing a successful program for the child.

Morgans (1971) used the Ray-McCoy Reading Prognosis Test to identify the best instructional methods to be used in tutoring sessions with 12 disabled readers in grades three through six. Each subject received 35 hours of small group tutoring. The achievement of these 12 subjects was then compared to the achievement of a control group which had not been taught to learning preference using the Gates-MacGintie Reading Tests as a measure of achievement. Morgans concluded that there was no significant difference between the two groups.

Manwarren (1972) used 163 first grade students, who scored below the 30th percentile on the Metropolitan Readiness Test, in a validity study of the Ray Reading Methods Test. She wanted to determine if the Ray Reading Methods Test would identify the best method of instruction for an individual child. The students in 12 of the classrooms were taught by their preferred method as indicated by the scores on the Ray Reading Methods Test. The students in the other ten classrooms were taught by the same method as everyone else in their class using school adopted basal readers. The Metropolitan Achievement Tests were administered at the end of the school year to assess individual achievement. Manwarren reported that students taught according to their learning preference as identified by the Ray Reading Methods Test did score significantly higher than those students who were not taught to their learning preference.

Young (1975) and Treadway (1975) in companion studies sought to determine if tests of pre-reading behavior could be used to predict a student's preference for one of the following methods of initial reading instruction: Visual-Auditory, Auditory-Visual, Language Experience, or Linguistic. They used subtest scores from the following tests as independent variables:

1. Illinois Test of Psycholinguistic Abilities
2. Wechsler Preschool and Primary Scale of Intelligence
3. Peabody Picture Vocabulary

4. Durrell Analysis of Reading Difficulty

   Visual Memory of Words - Primary, only

5. Wechsler Intelligence Scale for Children-Revised

   Diget Span, only

6. Murphy-Durrell Reading Readiness Analysis

7. Metropolitan Readiness Test

These subtests scores were used as predictor variables in a stepwise multiple regression equation with scores from the Ray Reading Methods Test as the dependent variables. There were significant predictor variable for each subtest in the Ray Reading Methods Test indicating that there are subtests which predict success with methods of reading instruction.

Summary

This chapter has examined selected research related to the predictive use of readiness tests, modality preference and methods of initial reading instruction. and the use of batteries of tests and learning methods tests for predicting reading achievement and learning preference.

The literature does support the idea that readiness tests are good predictors of reading achievement. In most of the predictive studies reviewed, readiness tests accounted for a significant part of the total variance explained (Foster, Reese, Schmidt, and Ohrtman, 1976). The Metropolitan Readiness Test was used in more of the reviewed studies than any other readiness test. However, when the

Murphy-Durrell Reading Readiness Analysis was included in a study, it always produced significant results.

There is mixed support in the literature for matching modalities and teaching methods. However, the negative results reported may not be because children do not have a preferred learning style. The Treadway (1975) and Young (1975) studies show that learning to read is not so easily broken into simply auditory and visual modalities as measured by such instruments as the Illinois Test of Psycholinguistic Abilities. In their studies some visual tests predicted to auditory methods of instruction and some auditory tests predicted to visual methods of instruction. Researchers cannot assume before their study begins that certain tests are valid for placing children in auditory or visual methods of instruction (Meyers, 1980;Bateman, 1968).

However, the studies reviewed in this chapter which used batteries of tests for prediction and employed statistical procedures to determine which subtests were significant predictors, usually had significant results. Direct measures of learning preference which employed trial lessons also usually produced significant statistical matches between a child's learning preference and initial methods of reading instruction.

CHAPTER III

METHOD AND PROCEDURE

Introduction

The subjects for this study were 65 kindergarten students attending a rural school in North Central Oklahoma during the 1981-1982 school year. The following criteria which were developed by Treadway (1975) were met by all the students included as subjects for the sample population of this study:

1. Attending kindergarten for the first time and at least five years of age at the time of testing.
2. Evaluated as a non-reader by the classroom teacher.
3. Categorized as functioning not below normal range of intelligence.
4. Evaluated as being free of gross visual, speech, and/or hearing disabilities.
5. Maintaining perfect attendance during administration of the Ray Reading Methods Test.
6. Parental permission granted to administer the below mentioned instruments.

Tests and Testing Procedure

The following tests were administered to the sample population by qualified examiners during April and May of 1982.

1. Metropolitan Readiness Tests Level I (Nurss and McGauvran, 1976a).
2. Metropolitan Readiness Tests Level II (Nurss and McGauvran, 1976b).
3. Murphy-Durrell Reading Readiness Analysis (Murphy and Durrell, 1965).
4. Ray Reading Methods Test, Experimental Form (Ray, 1970).

The Metropolitan Readiness Tests and the Murphy-Durrell Readiness Analysis were administered by qualified examiners in their entirety to groups of students following the directions in the respective manuals. This writer administered the Ray Reading Methods Test following the instructions in the manual.

Instrumentation

Metropolitan Readiness Tests Level I (Nurss and MacGauvran, 1976a)

The Metropolitan Readiness Tests Level I is designed for use from the beginning to the middle of kindergarten to check the development of certain skills and abilities which contribute to reading readiness. It includes six subtests

which are as follows:

Test 1, Auditory Memory -- a test of twelve items which requires the child to recall a series of words spoken by the examiner.

Test 2, Rhyming -- a test of the child's ability to hear and discriminate among medial and final sounds.

Test 3, Letter Recognition -- this test simply requires the child to choose the letter of the alphabet named by the examiner from a choice of four letters.

Test 4, Visual Matching -- a visual perception test which requires the child to match letter series, words, numerals, and letter-like forms.

Test 5, School Language and Listening -- this subtest is a measure of listening comprehension which requires the child to select the picture described by the examiner.

Test 6, Quantitative Language -- this test measures basic concepts such as size, shape, and number-quantity relationships.

Level I was normed in November 1974 and April 1975 using a nationwide sample based on the Bureau of Statistics' four geographic regions. Schools were randomly selected using data from the National Center for Educational Statistics. Thirty-six strata were used on school system enrollment and these included parochial schools and public schools. A total of 49,618 children were used. Level I has an alternate-form reliability of .85. The Metropolitan Achievement Tests were given to the same students to measure predictive validity.

These correlation coefficients range from .58 to .72.

Metropolitan Readiness Tests Level II
(Nurss and MacGauvran, 1976b)

Level II is designed for use with end-of-kindergarten and beginning of Grade 1. It tests skills that are important in beginning reading and math. The tests consist of eight subtests which are as follows:

Test 1, Beginning Consonants -- this test requires the child to find a picture which begins with the same sound as a word spoken by the instructor.

Test 2, Sound-Letter Correspondence -- the students are given a picture of an object and are required to find the letter or letters that make the initial sound heard in the name of the object picture.

Test 3, Visual Matching -- the student must match a given picture of letters, numerals, or letter-like forms to another identical picture. They are given four choices.

Test 4, Finding Patterns -- this test is an embedded figure test in which the child must find a pattern from the context in which it is placed.

Test 5, School Language -- students must identify the picture described verbally by the examiner.

Test 6, Listening -- a situation is described by the examiner and the student must reorganize the information to be able to select the appropriate response.

Test 7, Quantitative Concepts -- this test measures such

concepts as number-numeral relationships, part-whole spectral concepts, and quantitative reasoning.

Test 8, Quantitative Operations -- the student is required to count and do simple addition and subtraction.

School systems used in the normative process were randomly selected from 36 strata of a sampling matrix using data from the National Center for Educational Statistics. The represented all four geographic regions and included most populaton and socio-economic groups. The test was given to kindergarten students in April 1975 and beginning Grade 1 students in November 1974. Level II has an alternate-form reliability of .88 and when compared to later Metropolitan Achievement Tests scores, it has a predictive validity of .72.

Murphy-Durrell Reading Readiness Analysis (Murphy and Durrell, 1965)

The Murphy-Durrell Reading Readiness Analysis is a reading readiness test which examines a child's ability to distinguish phonemes, their ability to learn new words, and their knowledge of the alphabet, both lower and upper case.

Phonemes Test - a test of a child's ability to identify distinct sounds in words. It measure the ability to identify consonant sounds in the initial position as well as a few in the final position.

Letter Test - a test of knowledge of the alphabet which requires the child to choose the letter named by the examiner

from among other letters. There is a test of both upper and lower case.

Learning Rate Test - a test to determine the number of words a child is able to learn and recognize under standardized conditions.

The Murphy-Durrell Reading Readiness Analysis was normed as a part of a national investigation of first-grade reading instruction. It was given to 12,231 first grade children in September 1964. The Spearman-Brown formula was utilized to calculate an odd-even split-half correlation coefficient. The reliability coefficient is .98. Predictive validity coefficients were calculated using scores on the Stanford Achievement Test-Reading Tests. These range from .38 to .66.

Ray Reading Methods Test, Experimental Edition (Ray, 1970)

The Ray Reading Methods Test is designed to evaluate the performance of children by measuring the response of teaching-learning experiences utilizing each of the four methods" (Ray, 1970). These four methods identified by Ray as the predominant instructional methods used by teachers are Visual-Auditory, Auditory-Visual, Linguistic-Word Structure, and Language Experience. The test manual for the Ray Reading Methods Test provide the following definitions of these methods of initial instruction.

Test 1, Visual-Auditory -- In the initial stage of learning, the configuration of a total word is used for

instruction with pictures and verbal context clues providing the vehicle of instruction.

Test 2, Auditory-Visual -- Initially, the learner must accumulate a number of sound-symbol associations and utilize these in synthesizing, and thus decoding, words.

For this study, only visual-auditory and auditory-visual methods were used because of time limits placed on the study by the cooperating school and because previous studies (Young, 1975 and Treadway, 1975) have shown that the four methods dicotomize into two categories in terms of demands made on the student. Auditory-Visual and Language Experience both required the learner to have good attention/concentration, language, and sound synthesis in that order of importance; Visual-Auditory and Linguistic both required visual discrimination, attention/concentration and coding.

A random sample of 30 first graders was used by Manwarren (1972) in a split-half reliability study of the Ray Reading Methods Test. This study reported a coefficient of .969 for the Visual-Auditory and .970 for the Auditory-Visual subtests.

Testing Schedule

During actual administration of each test, care was taken to follow the directions of each test manual carefully. Testing was done during April and May of 1982 and took five weeks to complete.

The Metropolitan Readiness Tests Level I were administered by the kindergarten teachers of the school as part of the total school testing program. Thursday and

Friday of each week, this writer and another graduate student administered the remaining small group tests, the Metropolitan Readiness Tests Level II and the Phonemes and Letter Names subtests of the Murphy-Durrell Reading Readiness Analysis. One class was given the Metropolitan Readiness Tests first, the other class was given the Murphy-Durrell Reading Readiness Analysis first.

This writer administered all of the Ray Reading Methods Test. It was given Monday, Tuesday, and Wednesday for four consecutive weeks. Two weeks were spent in each classroom. There were three instructional groups each morning and three each afternoon: six groups per day. Methods were alternated to aid internal validity (see Table I). Special care was taken to follow the directions and time schedules outlined in the test manual.

Statistical Analysis

The statistical analysis was performed at the Oklahoma State University Computer Center using the New Multiple Regression program of SPSS Update 7-9. This technique revealed which predictor variables contributed significantly to the prediction of the dependent variables and showed their relationship to each other and their contribution to the regression equation. The formula for the multiple regression is as follows:

$$R = \sqrt{\beta_1 \, r_{1y} + \beta_2 \, r_{2y} + \ldots . \beta_n \, r_{ny}}$$

Where: R = Multiple correlation coefficient

TABLE I

TEST SCHEDULE FOR THE RAY READING METHODS TEST

Class A		
Morning	Week #1	Week #2
Group 1	visual-auditory	auditory-visual
Group 2	auditory-visual	visual-auditory
Group 3	visual-auditory	auditory-visual
Afternoon		
Group 4	auditory-visual	visual-auditory
Group 5	visual-auditory	auditory-visual
Group 6	auditory-visual	visual-auditory
Class B		
Morning	Week #3	Week #4
Group 1	visual-auditory	auditory-visual
Group 2	auditory-visual	visual-auditory
Group 3	visual-auditory	auditory-visual
Afternoon		
Group 4	auditory-visual	visual-auditory
Group 5	visual-auditory	auditory-visual
Group 6	auditory-visual	visual-auditory

β_1 = Beta weight for predictor 1

r_{1y} = Pearson product-moment between predictor 1 and dependent variable

The amount of variance that is accounted for by the predictor variables can be calculated by squaring the multiple correlation coefficient (R). The resulting R^2 value represents the variance in the dependent variable accounted for by the independent variables in the regression equation.

The stepwise procedure was used to enter variables into the regression equation. This allowed the predictor variables to enter the equation one at a time, starting with the independent variable which contributed the most to the variance of the dependent variable. This procedure continued until independent variables were encountered which did not contribute significantly to the equation or until all of the independent variables were in the equation. The significance of the contribution of the variables to the multiple R was determined by the following equation:

$$F = \frac{R^2/K}{(1-R^2)/(N-K-1)}$$

Where: K = included independent variables

R^2 = squared multiple correlation

N = number of subjects

The results were also examined in terms of the following multiple regression equation:

$$Y' = a + b_1 x_1 + b_2 x_2 + ... + b_N x_N$$

CHAPTER IV

ANALYSIS OF THE DATA

Introduction

The purpose of the study was to identify a battery of subtests that would predict learning preference but would not require individual administration by specially trained administrators. Data was analyzied to determine if relations existed between the students' scores on the predictor variables and their scores on the Ray Reading Methods Test (Ray, 1970).

Both the visual and the auditory subtests of the Ray Reading Methods Test yielded three scores for each child, total recall after 20 minutes, total recall after 60 minutes, and total recall after 24 hours. This made a total of six dependent variables, three visual and three auditory. The means and standard deviations of the 19 independent variables and six dependent variables are presented in Table II.

Results Related to Hypothesis I and Question I

Hypothesis I: There is no significant relationship between the scores on the pre-reading readiness variables and reading

TABLE II

MEANS AND STANDARD DEVIATIONS OF VARIABLES

Independent Variable	Mean	Standard Deviation
(Murphy-Durrell)		
Learning Rate	12.169	4.022
Phonemes I	18.462	3.072
Letter Names I	24.200	2.563
Letter Names II	21.092	4.733
Phonemes II	24.554	3.873
(MRT Level II)		
Beginning Consonants	9.708	3.315
Letter/Sound Correspondence	11.415	3.893
Visual Matching	7.185	2.200
Finding Patterns	10.169	4.307
School Language	7.615	1.114
Listening	6.631	1.728
Quantitative Concepts	6.138	1.609
Quantitative Operations	9.938	3.191
(MRT Level I)		
Auditory Memory	10.123	2.240
Rhyming	10.754	3.057
Letter Recognition	9.554	2.069
Visual Matching	11.708	2.163
School Language & Listening	12.969	1.895
Quantitative Language	9.154	2.272

Dependent Variables		Mean	Standard Deviation
Visual	(20 minutes)	6.477	2.159
	(60 minutes)	7.338	2.101
	(24 hours)	7.000	2.298
Auditory	(20 minutes)	4.908	3.449
	(60 minutes)	5.554	3.549
	(24 hours)	5.554	3.522

achievement when using the Auditory-Visual method of teaching reading.

Question I: In regard to reading achievement when using the Auditory-Visual approach, will there be a significant contribution to the multiple correlation when the predictor variables are employed?

The independent variables were entered in a stepwise regression procedure to determine which ones, if any, would contribute significantly to the prediction of each dependent variable. The independent variables were added to the regression equation beginning with the variable that accounted for the greatest amount of variance. A .05 level of significance was used. The results of the regression procedure are presented in Table III.

The most significant predictors of auditory-visual at a 20 minute time interval were Letter/Sound Correspondence and Learning Rate. The multiple R for Letter/Sound Correspondence, was .7023. The R^2, or percent of variance, accounted for by Letter/Sound Correspondence was .4932. When Learning Rate was added to the stepwise regression, there was a significant change in R^2 of .0537. The resulting multiple R was .7395. The combination of Letter/Sound Correspondence and Learning Rate accounted for a total of .5469 percent of the variance at the 20 minute time interval.

TABLE III

STEPWISE REGRESSION RESULTS FOR THE AUDITORY-VISUAL METHOD

20 Minutes

Readiness Variable	Multiple R	R^2	R^2 Change	Significance Level
Letter/Sound Correspondence	.7023	.4932	.4932	.0000
Learning Rate	.7395	.5469	.0537	.0087

60 Minutes

Readiness Variable	Multiple R	R^2	R^2 Change	Significance Level
Letter/Sound Correspondence	.6990	.4887	.4887	.0000
Learning Rate	.7604	.5782	.0896	.0000
Letter Names II	.7854	.6169	.0387	.0000

24 Hours

Readiness Variable	Multiple R	R^2	R^2 Change	Significance Level
Letter/Sound Correspondence	.7419	.5504	.5504	.0000
Learning Rate	.7859	.6177	.0673	.0059
Rhyming	.8029	.6446	.0269	.0356

At the 60 minute time interval Letter/Sound Correspondence and Learning Rate were again significant predictors, but at this time interval Letter Names II also contributed significantly to the prediction of the dependent variable. Letter/Sound Correspondence accounted for most of the variance with an R^2 of .4887. Learning Rate added significantly to the prediction with an R^2 change of .0897. The total R^2 for 60 minutes is much higher than the total R^2 at 20 minutes.

When students were retested after 24 hours, the significant predictors were Letter/Sound Correspondence, Learning Rate, and Rhyming. The dependent variable, auditory-visual at the 24 hour time period, had the highest multiple R, .8029, of the three auditory-visual time periods. Letter/Sound Correspondence was again the most significant predictor with an R^2 of .5504. Learning Rate contributed significantly to the multiple R with an R^2 change of .0673 and Rhyming had an R^2 change of .0269. The total amount of variance accounted for by these three predictor variables was .6446.

Letter/Sound Correspondence was the most significant predictor of the auditory-visual dependent variable no matter which time interval score was used. Learning Rate was the second predictor to enter the equation each time, although it's contribution was greatest at 60 minutes. Letter Names II added significantly to the prediction at 60 minutes while Rhyming was a significant predictor after 24 hours.

Correlations of the independent variables and the dependent variables, auditory-visual, are presented in Table IV. All of the variables except Listening are significant at the .01 level of confidence. The amount of variance accounted for varied from .1163 by School Language and Listening to .5405 by Letter/Sound Correspondence. However, caution should be used in interpreting these correlations because of the high number of independent variables used.

Based on the results of the stepwise regression and the correlation figures presented in Table IV, Hypothesis I was rejected. These are group administered readiness variables which do have a significant relationship with reading achievement when using the auditory-visual method of teaching reading.

Results Related to Hypothesis II and Question II

Hypothesis II: There is no significant relationship between the scores on the pre-reading readiness variables and reading achievement when using the Visual-Auditory method of teaching reading.

Question II: In regard to reading achievement when using the Visual-Auditory approach, will there be a significant contribution to the multiple correlation when the predictor variables are employed?

TABLE IV

SIMPLE CORRELATIONS BETWEEN READINESS VARIABLES AND THE AUDITORY-VISUAL METHOD

Independent Variable	20 Minutes	60 Minutes	24 Hours
Learning Rate	.624	.674	.671
Phonemes I	.438	.445	.463
Letter Names I	.493	.549	.533
Letter Names II	.604	.622	.586
Phonemes II	.557	.617	.582
Beginning Consonants	.470	.528	.508
Letter/Sound Correspondence	.702	.699	.742
Visual Matching	.361	.385	.428
Finding Patterns	.347	.389	.436
School Language	.373	.454	.422
Listening	.309	.230	.191
Quantitative Concepts	.374	.347	.391
Quantitative Operations	.425	.425	.394
Auditory Memory	.552	.544	.564
Rhyming	.469	.436	.518
Letter Recognition	.506	.549	.532
Visual Matching	.453	.494	.506
School Language & Listening	.341	.356	.375
Quantitative Language	.397	.456	.460

.325 Indicates critical value at .01 level of confidence.

.250 Indicates critical value at .05 level of confidence.

The independent variables were entered in a stepwise regression procedure to determine which ones, if any, would contribute significantly to the prediction of the visual-auditory dependent variable. The independent variables were added to the regression equation beginning with the variable that accounted for the greatest amount of variance. A .05 level of significance was used. The results of the regression procedure are presented in Table V.

Three variables added significantly to the prediction of visual-auditory at 20 minutes. Letter/Sound Correspondence entered the equation first with a multiple R of .7254. It accounts for .5263 percent of variance of the dependent variable when measured at the 20 minute time interval. Learning Rate entered second, resulting in an R^2 change of .0602. Beginning Consonants with an R^2 change of .0268 was the third independent variable to enter the equation at the 20 minute time interval. The three independent variables combined to yield a multiple R of .7831 and an R^2 of .6133.

Only two independent variables contributed significantly to the prediction of visual-auditory at a time interval of 60 minutes. They were Letter/Sound Correspondence and Learning Rate. R^2 change for Letter/Sound Correspondence was .4832 and for Learning Rate, R^2 change was .0681. The total multiple R at the 60 minute time interval was .7425 and the R^2 was .5513.

At the 24 hour time interval, Learning Rate was the first to enter the equation with a multiple R of .6002 and an

TABLE V

STEPWISE REGRESSION RESULTS FOR THE VISUAL-AUDITORY METHOD

20 Minutes

Readiness Variable	Multiple R	R^2	R^2 Change	Significance Level
Letter/Sound Correspondence	.7254	.5263	.5263	.0000
Learning Rate	.7658	.5865	.0602	.0006
Beginning Consonants	.7831	.6133	.0268	.0440

60 Minutes

Readiness Variable	Multiple R	R^2	R^2 Change	Significance Level
Letter/Sound Correspondence	.6951	.4832	.4832	.0000
Learning Rate	.7425	.5513	.0681	.0032

24 Hours

Readiness Variable	Multiple R	R^2	Change	Significance Level
Learning Rate	.6002	.3602	.3602	.0000
Letter Recognition	.6542	.4280	.0678	.0087

R^2 of .3602. Letter Recognition was the second predictor with an R^2 change of .0678. These two predictors combined for a multiple R of .6542 and accounted for .4280 percent of the variance in visual-auditory at the 24 hour time interval.

Learning Rate was the only independent variable which was significant at all three time intervals. It entered the equation second at the 20 minute and 60 minute time intervals and at the 24 hour time interval, it entered the equation first.

Letter/Sound Correspondence was the most important predictor at the 20 and 60 minute time intervals, but it did not enter the equation at the 24 hour time interval. At the 20 minute time interval, Beginning Consonants contributed significantly to the prediction with an R^2 change of .0268 and at the 24 hour time interval Letter Recognition entered the equation second with an R^2 change of .0678.

Correlations of the independent variables and the dependent variables, visual-auditory, are presented in Table VI. The following variables were not significant at the .01 level of confidence: Phonemes I at 24 hours, Beginning Consonants at 20 minutes, Visual Matching at all time intervals, Listening at all time intervals, Auditory Memory at 24 hours, Rhyming at 20 minutes and 24 hours, and School Language and Listening at 20 minutes and 24 hours. The amount of variance accounted for varied from .1136 by Rhyming at 60 minutes to .5255 by Letter/Sound Correspondence at 20 minutes. However, caution should be used in interpreting

TABLE VI

CORRELATIONS BETWEEN READINESS VARIABLES AND THE VISUAL-AUDITORY METHOD

Independent Variable	20 Minutes	60 Minutes	24 Hours
Learning Rate	.649	.642	.600
Phonemes I	.353	.399	.263
Letter Names I	.570	.568	.475
Letter Names II	.549	.544	.447
Phonemes II	.415	.485	.388
Beginning Consonants	.301	.355	.338
Letter/Sound Correspondence	.725	.695	.559
Visual Matching	.228	.277	.229
Finding Patterns	.374	.410	.407
School Language	.409	.410	.366
Listening	.270	.272	.287
Quantitative Concepts	.377	.383	.346
Quantitative Operations	.292	.315	.281
Auditory Memory	.411	.433	.310
Rhyming	.314	.337	.285
Letter Recognition	.559	.520	.467
Visual Matching	.552	.514	.471
School Language Listening	.313	.352	.280
Quantitative Language	.399	.483	.425

.325 Indicates critical value at .01 level of confidence.

.250 Indicates critical value at .05 level of confidence.

these correlations because of the high number of independent variables used.

Based on the results of the stepwise regression presented above and the correlation figures presented in Table VI, Hypothesis II was rejected. These are group administered readiness variables which do have a significant relationship with reading achievement when using the visual-auditory method of teaching reading.

Other Significant Predictors for the Auditory-Visual Method

Even though Hypothesis I and Hypothesis II can be rejected on the basis of the data already presented, the data at this point does not provide different predictor variables for the Auditory-Visual and Visual-Auditory dependent variables. The Letter/Sound Correspondence and Learning Rate subtests predict to both methods of reading instruction and because they are highly correlated with most of the other predictor variables (see Table VII), the other variables are not allowed to enter the regression equation at the .05 level of significance.

Because of colinearity, a stepwise regression procedure was done without allowing Letter/Sound Correspondence and Learning Rate to enter the equation to determine if other independent variables would make a significant contribution to the regression equation using the auditory scores of the Ray Reading Methods Test (Ray, 1970) as dependent variables.

TABLE VII

CORRELATION OF LEARNING RATE AND LETTER/SOUND CORRESPONDENCE WITH OTHER INDEPENDENT VARIABLES

	Learning Rate	Letter/Sound Correspondence
Murphy-Durrell		
Phonemes I	.373	.586
Letter Names I	.483	.748
Letter Names II	.407	.727
Phonemes II	.607	.602
Metropolitan, Level II		
Beginning Consonants	.562	.488
Visual Matching	.254	.520
Finding Patterns	.338	.481
School Language	.353	.419
Listening	.178	.302
Quantitative Concepts	.325	.499
Quantitative Operations	.389	.510
Metropolitan, Level I		
Auditory Memory	.445	.569
Rhyming	.427	.435
Letter Recognition	.375	.667
Visual Matching	.510	.588
School Language & Listening	.304	.400
Quantitative Language	.337	.514

.325 Indicates critical value at .01 level of confidence.
.250 Indicates critical value at .05 level of confidence.

The results are displayed in Table VIII.

At the 20 minute time interval, two new predictors entered the equation in place of Letter/Sound Correspondence and Learning Rate. Letter Names II entered the equation first with a multiple R of .6035. It accounted for .3643 percent of the variance in the dependent variable. Rhyming entered second, causing an R^2 change of .0664. Together, these two independent variables had a multiple R of .6562 and they accounted for .4306 percent of the variance in the auditory-visual method measured at the 20 minute time interval.

Letter Names II also entered the equation first at the 60 minute time interval with an R^2 of .3870. This time, Phonemes II made a significant contribution to the prediction with an R^2 change of .0898. The total multiple R at the 60 minute time interval was .6905 with an R^2 of .4768.

Letter Names II and Rhyming were again the significant perdictors at the 24 hour time interval. The total multiple R was .6663 with an R^2 of .4439. Letter Names II entered the equation first with an R^2 of .3482. The addition of Rhyming resulted in an R^2 change of .1011.

There were three independent variables that contributed significantly to the prediction of the auditory-visual method on at least one of the time intervals. Letter Names II predicted significantly in all three analyses. Rhyming was significant at the 20 minute time interval and again at the 24 hour time interval, while Phonemes II made a significant

TABLE VIII

STEPWISE REGRESSION USING THE AUDITORY-VISUAL METHOD WITH LETTER/SOUND CORRESPONDENCE AND LEARNING RATE EXCLUDED

20 Minutes

Readiness Variable	Multiple R	R^2	R^2 Change	Significance Level
Letter Names II	.6035	.3643	.3643	.0000
Rhyming	.6562	.4306	.0664	.0092

60 Minutes

Readiness Variable	Multiple R	R^2	R^2 Change	Significance Level
Letter Names II	.6221	.3870	.3870	.0013
Phonemes II	.6905	.4768	.0898	.0018

24 Hours

Readiness Variable	Multiple R	R^2	R^2 Change	Significance Level
Letter Names II	.5855	.3428	.3428	.0000
Rhyming	.6663	.4439	.1011	.0014

contribution to the regression equation at the 60 minute time interval.

Other Significant Predictors for the Visual-Auditory Method

To see if there were other significant predictors besides Letter/Sound Correspondence and Learning Rate for the visual-auditory method, the remaining 17 independent variables were again used in a stepwise regression equation with the visual-auditory method as the dependent variable. The results are displayed in Table IX.

Letter Names I and Visual Matching were the new predictor variables at the 20 minute time interval. The total multiple R was .6255 with an R^2 of .3913. Letter Names I had a multiple R of .5699 and an R^2 change of .3248.

At the 60 minute time interval, Letter Names I again entered the equation first with a multiple R of .5675 and an R^2 of .3221, almost identical to it's contribution at the 20 minute time interval. This time, Quantitative Language entered the equation second with an R^2 change of .0570. The total multiple R at the 60 minute time interval was .6157

The first independent variable to enter the equation at the 24 hour time interval was again Letter Names I. This time it had a multiple R of .4749 and an R^2 of .2255. Visual Matching was also significant at the 24 hour time interval with an R^2 change of .0525. At the 24 hour time interval the total multiple R was .5272 and the total R^2 was .2780.

TABLE IX

STEPWISE REGRESSION USING THE VISUAL-AUDITORY METHOD WITH LETTER/SOUND CORRESPONDENCE AND LEARNING RATE EXCLUDED

20 Minutes				
Readiness Variable	Multiple R	R^2	R^2 Changed	Significance Level of T
Letter Names I	.5699	.3248	.3248	.0043
Visual Matching	.6255	.3913	.0665	.0116

60 Minutes				
Readiness Variable	Multiple R	R^2	R^2 Changed	Significance Level of T
Letter Names I	.5675	.3221	.3221	.0003
Quantitative Language	.6157	.3791	.0570	.0201

24 Hours				
Readiness Variable	Multiple R	R^2	R^2 Changed	Significance Level of T
Letter Names I	.4749	.2255	.2255	.0326
Visual Matching	.5272	.2780	.0525	.0378

Letter Names I is a significant predictor for each of the visual dependent variables. At the 20 minute and 24 hour time intervals, Visual Matching enters the equation second with R^2 changes of .0665 and .0525 respectively. Quantitative Language enters the equation after Letter Names I at the 60 minute time interval with an R^2 change of .0570.

Summary

The results of the stepwise multiple regression were presented and examined in this chapter. Each of the hypotheses was tested with this statistical procedure for each independent variable used in this study.

There were two predictor variables that were significantly related to scores on the Ray Reading Methods Test regardless of whether the child learned best with a visual method or an auditory method and regardless of the time interval used for measuring recall except at the 24 hour time interval of the visual-auditory method. Those two variables were Letter/Sound Correspondence and Learning Rate. Letter/Sound Correspondence entered the equation first at five of the six time intervals. It entered the equation first at all three time intervals of the auditory-visual dependent variable and first on the 20 minute and 60 minute time intervals of the visual-auditory dependent variable. Learning Rate entered the equation at all six time intervals, entering the equation second at all three auditory-visual time intervals and the 20 minute and 60 minute time intervals

of the visual-auditory. At the 24 hour time interval of the visual-auditory, when Letter/Sound Correspondence did not enter the equation at all, Learning Rate entered the equation first.

When these two variables were eliminated from the regression equation, the variables that were then significantly related to the auditory-visual method of teaching reading were Letter Names II, Rhyming, and Phonemes II. Letter Names II entered the prediction equation first at all three time intervals. Rhyming entered the regression equation second at the 20 minute and 24 hour time intervals, while Phonemes II contributed significantly to the prediction at the 60 minute time interval.

When Letter/Sound Correspondence and Learning Rate were eliminated from the regression equation for the visual-auditory method, Letter Names I, Visual Matching, and Quantitative Language were significant predictors. Letter Names I entered the regression equation first at all three time intervals. Visual Matching contributed significantly to the prediction at both the 20 minute and 24 hour time intervals. At the 60 minute time interval, Quantitative Language entered the equation second after Letter Names I.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary and Conclusions

The purpose of this study was to identify a battery of subtests that will predict learning preference but does not require individual administration or specially trained administrators. Such a group administered predictive battery would allow any classroom teacher to differentiate reading instruction based on the learning styles of each child in the classroom without outside help from specialists and without spending two to three weeks of class time to accumulate the necessary information.

A total of 21 subtests were administered to a sample population of 65 kindergarten students. The criterion variables were the Visual-Auditory and the Auditory-Visual subtests of the Ray Reading Methods Test (Ray, 1970). The subtests of the Murphy-Durrell Reading Readiness Analysis (Durrell and Murphy, 1964), Metropolitan Readiness Test Level I (Nurss and McGauvran, 1976a), and the Metropolitan Readiness Tests Level II (Nurss and McGauvran, 1976b) were used as the independent variables.

Two null hypotheses were presented in Chapter I pertaining to the significant relationship between the scores

on the independent variables and reading achievement with either a visual method or an auditory method. The hypotheses were tested using a stepwise multiple correlation technique. Since there were significant predictors each time, both null hypotheses were rejected.

Hypothesis I: There is no significant relationship between the scores on the pre-reading readiness variables and reading achievement when using the Auditory-Visual method of teaching reading.

Hypothesis I was rejected because Letter/Sound Correspondence and Learning Rate made significant contributions to the prediction of the auditory-visual learning preference. However, these two independent variables also predicted to the visual-auditory method. Because these two independent variables did not differentiate between methods they were prevented from entering the equation to see if other predictors would emerge that would differentiate between the auditory-visual and visual-auditory methods. It was expected that there would be other significant predictors that were excluded in the first statistical analysis because of their colinearity with Learning Rate and Letter/Sound Correspondence.

When these two predictors were kept from entering the equation for auditory-visual, three more significant predictors emerged. Recall for the lessons taught was tested at three time intervals; 20 minutes, 60 minutes, and 24

hours. One of the new predictors, Letter Names II, was significant at all three time intervals. Rhyming was significant at 20 minutes and 24 hours and Phoenmes II was significant at 60 minutes. Even without Letter/Sound Correspondence and Learning Rate, Hypothesis I would still be rejected.

Hypothesis II: There is no significant relationship between the scores on the pre-reading readiness variables and reading achievement when using the Visual-Auditory method of teaching reading.

Hypothesis II was rejected because Letter/Sound Correspondence and Learning Rate made significant contributions to the prediction of the visual-auditory method. Letter/Sound Correspondence was the most important predictor at the 20 and 60 minute time intervals. Learning Rate entered the equation second at both of these time intervals and was first at the 24 hour time interval.

Again, these two predictors were excluded from the equation to see if there were other significant predictors for the visual-auditory learning preference. Letter Names I entered the equation first at all three time intervals. Visual Matching was the second independent variable to enter the equation at the 20 minute and 24 hour time intervals and Quantitative Language was second at the 60 minute time interval.

Based on the above hypotheses, questions were asked to allow for the identification of predictor variables and the order of their entrance into the multiple regression equation.

Question I: In regard to the dependent variable, reading achievement with the auditory-visual method, will there be a significant contribution to the multiple correlation when the predictor variables are employed?

For the auditory-visual method, Letter/Sound Correspondence entered first in the stepwise regression equation at all three time periods measured. Learning Rate entered the equation second each time with Letter Names II entering third at the 60 minute time interval, and Rhyming entering third at the 24 hour time interval. Letter/Sound Correspondence and Learning Rate were prevented from entering the regression equation to see if other independent variables were significant in the prediction of the dependent variable. This time, Letter Names II entered the equation first every time with Rhyming entering second at the 20 minute time interval and the 24 hour time interval, and Phonemes II entering second at the 60 minute time interval. None of the other readiness measures were significant predictors of reading achievement at the .05 level of significance.

Question II: In regard to the dependent variable, reading achievement with the visual-auditory method, will there be a significant contribution to the multiple correlation when the predictor variables are employed?

For the visual-auditory method, Letter/Sound Correspondence entered the equation first at the 20 minute and 60 minute time intervals. Learning Rate was a significant predictor at all three time intervals, entering the equation second at the 20 minute and the 60 minute time intervals and first at the 24 hour time interval. Letter/Sound Correspondence and Learning Rate were then excluded from the equation to see if there were other independent variables which would make significant contributions to the multiple regression equation. Letter Names I entered first at all three time intervals, with Visual Matching entering second at the 20 minute and the 24 hour time intervals and Quantitative Language entering second at the 60 minute time interval. None of the other readiness variables were significant predictors of reading achievement at the .05 level of significance.

It was not intentional that only two or three variables enter the equation each time. However, because of the colinearity of the independent variables, the first two or three variables that entered the equation accounted for most of the variance that would have been accounted for by the

other variables. For example, when Letter Names II entered the equation for the dependent variable Auditory-Visual, it accounted for most of the other alphabet tests, such as Letter Names I and Letter Recognition.

Recommendations

On the basis of these research findings, it seems that it is possible to have a battery of subtests which predict success with either visual or auditory methods of teaching reading and that can be administered by the classroom teacher as small group tests. This should be a two level battery, level one to predict over-all readiness to read and level two to predict which method would be best for the individual child.

Letter/Sound Correspondence and Learning Rate predicted success in both visual and auditory methods and should be administered as level one of the predictive battery. These two subtests measure a part of readiness that is necessary for success no matter which method is used to learn to read.

Level two of the predictive battery should consist of the six subtests which differentiated between the Visual and Auditory methods. The patterns of behavior which are predictive of success with the auditory-visual method are measured by Letter Names II, Rhyming, and Phonemes II.

Letter Names I, Visual Matching, and Quantitative Language measure the patterns of behavior which are predictive of success with the visual-auditory method. This

group administered predictive battery is presented in Table X.

This battery requires no special training to administer it and all of the subtests can be given by any kindergarten or first grade teacher without help from specially trained personnel. The information learned from administration of the battery can then be used to place children in the method of initial reading instruction that is most appropriate for the individual child. This makes it possible for a first grade teacher to differentiate methods of initial reading instruction within her own classroom.

However, this predictive battery is not a direct measure of a child's learning preference like the Ray Reading Methods Test. In situations where there is sufficient time and personnel to work one-on-one with a child, it would be much more reliable to use a direct measure of the child's learning preference.

Implications and Suggestions for Further Research

Other reseach should be done with the group administered predictive battery using other group administered tests as independent variables. This study was limited to three readiness tests but the inclusion of other independent variables may produce a combination of subtests that would have higher multiple R's and R^2's. Also these future studies should not limit themselves to reading readiness tests but

TABLE X

SUMMARY OF SIGNIFICANT PREDICTORS FOR GROUP ADMINISTERED BATTERY

Level One
General Readiness

Test	Predictor Variable (Subtest)
Metropolitan Readiness Tests Level II	Letter/Sound Correspondence
Murphy-Durrell Reading Readiness Analysis	Learning Rate

Level Two

Visual-Auditory

Test	Predictor Variable (Subtest)
Murphy-Durrell Reading Readiness Analysis	Letter Names I
Metropolitan Readiness Tests Level I	Visual Matching Quantitative Language

Auditory-Visual

Test	Predictor Variable (Subtest)
Murphy-Durrell Reading Readiness Analysis	Letter Names II Phonemes II
Metropolitan Readiness Tests Level I	Rhyming

should explore the use of any kind of developmental tests that can be administered in small groups to end-of-kindergarten or begining-first-grade students.

Since application of this study is also limited to kindergarten or beginning first grade, research should be done to extend the ability to predict methodology to other grade levels. There are two directions such research can take. One is development of a methodology test, such as the Ray Reading Methods Test, that can be used at any grade level. Such a test should be a combination of the current concept of methodology tests and informal reading inventories.

Another approach to this problem would be a battery of tests similar to the one developed in this study. However, clinical experience at the Oklahoma State University Reading Center has shown that readiness tests are not useful for prediction after the child has received formal reading instruction. A predictive battery for children having received formal reading instruction must include tests that measure skills necessary for learning to read but the battery should not include readiness tests or actual reading tasks.

Further refinement of direct measures of learning preference is another area needing further research. A study should be done to determine which recall time interval is the best predictor of learner preference. If the 20 minute time interval or the 60 minute time interval on the Ray Reading Methods Test were as effective at predicting a student's

learning preference as the 24 hour time interval, then it might be possible to adapt the Ray Reading Methods Test so that classroom teachers could use it effectively while reducing the administration time in half.

A SELECTED BIBLIOGRAPHY

Ashmore, Robert J. "The Employment of An Auditory Perceptual Technique to Increase Ability to Predict Reading Success in Young Children." (Unpublished doctoral dissertation, University of Maryland, 1973.)

Austin, Mary C. and Margaret Donovan. "Does Modality Preference Made a Difference? The Results of a Three-Year Study-Literature Review and Empirical Data." Paper presented at the annual meeting of the International Reading Association, Houston, Texas, May 1-5, 1978.

Bateman, Barbara. "The Efficacy of an Auditory and an Visual Method on First Grade Reading Instruction with Auditory and Visual Learning." In H. K. Smith (Ed.), Perception and Reading. Newark, Delaware: International Reading Association, 1968, 124-132.

Bennett, Dale E. "The Differential Predictive Effectiveness of Selected Pre-Reading Measures on Success in Reading at the End of Grade One Under Each of Six Major Approaches to First Grade Reading Instruction." (Unpublished doctoral dissertation, University of Minnesota, 1973.)

Bryant, Pauline. "Defining Low-Achieving, Inner-City Third-Grade Students' Preferred Reading Modality Through Prediction Equations and Computer Simulation." (Unpublished doctoral dissertation, University of Kentucky, 1974.)

Carbo, Marie. "An Analysis of the Relationships Between the Modality Preferences of Kindergarteners and Selected Reading Treatments as They Affect the Learning of a Basic Sight Word Vocabulary." Doctoral dissertation, St. John's University, University Microfilms International, 1980.

Coleman, James C. "Learning Methods as Relevant Subject Variables in Learning Disorders." Perceptual and Motor Skills, 14 (1962), 263-269.

Collins, Cathy. "Criterion-Referenced Prereading Skills Test to Predict First Grade Reading Readiness and Achievement." Reading Improvement, 16 (1979), 182-189.

Devoid, Robert R. "The Predictive Validity of a Multi-Model Screening Program." (Unpublished doctoral dissertation, University of North Carolina at Chapel Hill, 1976.)

Durrell, Donald D. and Helen A. Murphy. Murphy-Durrell Reading Readiness Analysis. New York: Harcourt, Brace, and Jovonavich, Inc., 1964.

Durrell, Donald D. and Helen A. Murphy. "A Prereading Phonics Inventory." The Reading Teacher, 31 (1978), 385-390.

Foster, G. G., James H. Reese, Carl R. Schmidt, and William F. Ohrtman. "Modality Preference and the Learning of Sight Words." Journal of Special Education, 10 (1976), 253-258.

Hopkins, Keneth D. and E. George Sitkei. "Predicting Grade One Reading Performance: Intelligence vs. Reading Readiness Tests." The Journal of Experimental Education, 37 (1969), 31-32.

Kempwirth, Thomas J. and Marion Bates. "Modality Preference and Teaching Method: A Review of the Research." Academic Therapy, 15 (1980), 597-605.

Manwarren, Mildred I. "A Validity Study of the Ray Reading Methods Test." (Unpublished doctoral dissertation, Oklahoma State University, 1972.)

Meyers, Marcee. "The Significance of Learning Modalities, Modes of Instruction, and Verbal Feedback for Learning to Recognize Written Words." Learning Disability Quarterly, 3 (1980), 62-69.

Miller, Etta. "Modality Preference, Instructional Method, and Reading Achievement with First Graders - Final Report." State University of New York at Albany, Office of Education, Washington, D. C. Regional Research Program, 1974.

Miller, Etta. "First Grade Reading Instruction and Modality Preference." The Elementary School Journal, 80 (1979), 98-104.

Mills, Robert E. "An Evaluation of Techniques for Teaching Word Recognition." Elementary School Journal, 56 (1956), 221-225.

Morgans, Betty K. "Measuring Reading Growth Based on Method Preference." (Unpublished doctoral dissertation, Oklahoma State University, 1971.)

Nurss, Joanne R. "Research on the Assessment of Prereading Skills - An American Perspective." Reading, 13 (1979), 21-29.

Nurss, Joanne R. and Mary E. McGauvran. Metropolitan Readiness Tests Level I. New York: Harcourt, Brace, Jovonavich, Inc., 1976a.

Nurss, Joanne R. and Mary E. McGauvran. Metropolitan Readiness Tests Level II. New York: Harcourt, Brace, Jovonavich, Inc., 1976b.

Outz, Danny T. "The Effects of Learning, Modality Grouping, and Instruction on Total Reading Achievement and Word Recognition for First Grade Students." (Unpublished doctoral dissertation, University of South Carolina, 1979.)

Peck, Nancy L. "The Relationship of Visual and Auditory Perception and Modality Patterns to Reading Achievement and Intelligence." (Unpublished doctoral dissertation, University of Miami, 1977.)

Perry, Leslie Anne. "A Comparative Study of the Predictive Validity of Two Reading Readiness Tests." (Unpublished doctoral dissertation, University of Mississippi, 1979.)

Pikulski, John. "Predicting Sixth Grade Achievement by First Grade Scores." The Reading Teacher, 27 (1973), 284-287.

Pikulski, John. "Assessment of Pre-Reading Skills: A Review of Frequently Employed Methods." Reading World, 13 (1974), 171-197.

Ray, Darrel. Ray Reading Methods Test, (Unpublished paper, Oklahoma State University, 1970.)

Robinson, H. M. "Visual and Auditory Modalities Related to Two Methods of Beginning Reading." AREA Paper Abstracts. 1968, 74-75.

Rude, Robert T. "Readiness Tests: Implications for Early Childhood Education." The Reading Teacher, 23 (1973), 572-580.

Treadway, K. S. "The Relationship Between Pre-Reading Behavior Patterns and Success of Specific Reading Methods with Kindergarten Children." (Unpublished doctoral dissertation, Oklahoma State University, 1975.)

Vandever, Thomas R. and Donald D. Neville. "Modality Aptitude and Word Recognition." Journal of Reading Behavior, 6 (1974), 195-201.

Wepman, Joesph M. and Anne S. Morency. Perceptual Development and Learning: An Experiemental Study on Modality. Section II. Chicago: Chicago University, Final Report, 1975.

Young, D. J. "The Relationship Between Pre-Reading Behavior Patterns and Success of Specific Reading Methods with Kindergarten Children." (Unpublished doctoral dissertation, Oklahoma State University, 1975.)

VITA 2

Jimmy R. Ames

Candidate for the Degree of

Doctor of Education

Thesis: PREDICTING KINDERGARTEN CHILDREN'S SUCCESS WITH SPECIFIC READING METHODS USING GROUP READINESS TESTS

Major Field: Curriculum and Instruction

Biographical:

Personal Data: Born in Oklahoma City, Oklahoma, February 19, 1951, the son of Lester Ames and Joyce Cox Ames.

Education: Graduated from Durant High School, Durant, Oklahoma, May, 1969; received Bachelor of Science in Education degree from Southeastern Oklahoma State University in 1972; earned Master of Behavioral Studies in Reading from Southeastern Oklahoma State University in 1977; enrolled in doctoral program at Oklahoma State University, 1977-1982; completed requirements for the Doctor of Education degree at Oklahoma State University in December, 1982.

Professional Experience: Classroom teacher, Tishomingo Public Schools, Tishomingo, Oklahoma, 1973-1979; graduate teaching and research assistant, Oklahoma State University, 1979-1982.