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USE OF A PRE-READING PREDICTIVE INDEX  
TO DETERMINE POTENTIAL FAILURE  
IN FIRST GRADE READING

By

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## CHAPTER I

### PRESENTATION OF THE PROBLEM

#### Introduction

Students, parents, taxpayers, educators, and legislators are becoming increasingly aware that our present elementary school systems are not meeting the needs of many of our youngest citizens. Getting off to a good, smooth start in the early stages of reading instruction is a vital step in the forward progress of the young student. Reading serves as a foundation for all other learning in our present school system. Is it possible to predict if the child will fail in the early stages of reading? Is there wide variation within the individual child's abilities that may cause him to fail in our presently structured school? Is it possible to determine where this variation lies while the child is in kindergarten? This study is an attempt to identify potential reading failures at kindergarten level.

#### Need for the Study

Children are entering elementary school doomed to failure even before they begin formal education. Children are failing in reading (De Hirsch, 1966), in school (Glasser, 1969), and in life (Allen, 1969), at an alarming and increasing rate. These children are failing, not through any fault of their own, but through a failure of the schools

(Holt, 1964) to provide for adjustment for the way individuals learn when instruction is presented (Rosell, Natchez, 1964). Teachers of young children need to be convinced that most children have the ability to learn. They need to determine how these children learn best and what early communication skills need further development.

At the present time most school systems are developing one reading program and presenting it to all of the children enrolled in the system (Chall, 1967). Children failing to read by the third or fourth year are judged to be remedial (Smith, 1969) and placed in special classes. These special classes are expensive and inconvenient. Irreparable damage is done to children who spend their elementary school years as failures in reading (De Hirsch, 1966; Gates, 1937; Natchez, 1964).

Children learn to read in different ways. Some have a highly developed auditory sense while others may be unable to distinguish sounds to a fine enough degree to succeed in a method placing emphasis on phonics. Some children have poor visual perception and may be exposed to reading that emphasizes only a sight, or whole word, method of teaching reading. Some children may need to have a background of language skills (Loban, 1963; Strickland, 1962) developed before beginning a reading program of any kind. Ray and Rodenborn (1969) suggest training of specific abilities in the young child after identification of the areas of deficiency.

Many writers in the field of reading have called for early identification of children who may fail. Emmett Betts (1936) said that most reading difficulties can be prevented by good first-teaching and that a program of prevention requires identification of the prospective "non-readers." Theodore Harris (1963) stated, "We need to understand more

clearly the genesis and possible prevention of reading disability." Eve Malmquist (1963) suggests, "The ideal conditions would naturally be, however, to forestall and prevent the occurrence of special reading disabilities." Malmquist goes on to suggest that if we are to do this we must "diagnose the child's qualifications for learning the elementary reading functions before he starts to school." Lamphard (1965) says: "Accumulatory evidence suggests that the syndrome of reading disability is observable in the early school years."

Reading readiness tests administered to groups of children are useful tools for the teacher, however, some do present a global picture and many are only used for placement in groups. Barrett (1965) suggests caution in the use of readiness tests as the only means of evaluating the pre-reader. Binkley (1967) and Akers (1969) call for more study of readiness tests results when working with children from different socio-economic levels.

It is with the preceding concerns and comments in mind that the present investigator began this study. The diagnostic and identification procedures developed in this study are within the capability range of kindergarten and first grade teachers. Future identification of potential failures in reading can take place within the framework of the public schools prior to formal reading instruction.

#### Definitions of Terms

The following definitions are given to clarify terms that are used in this study.

#### Gates-MacGinitie Readiness Skills Test, Kindergarten and Grade 1.

This test consists of eight subtests: Listening Comprehension,

Auditory Discrimination, Visual Discrimination, Following Directions, Letter Recognition, Visual-Motor Coordination, Auditory Blending, and Word Recognition. It is designed to determine a child's degree of readiness for initial reading instruction. The test is published by Teachers College Press (1968).

Pre-Reading Predictive Index is a battery of six subtests combined to form a diagnostic instrument to identify strengths and weaknesses in kindergarten children. The subtests are:

- (1) Learning Rate Test. Five nouns familiar to most five-year-olds are presented and 30 minutes later checked for retention. This test is the first task presented each time a subject is tested because a period of time between initial presentation of the words and later determination of results is needed.
- (2) Categories Test. In this test the subject is asked to give the class name for three groups of words. The accomplishment of this task shows the beginning of a child's ability to generalize. The Categories Test was used by De Hirsch, Jansky, and Langford and reported in Predicting Reading Failure (1966).
- (3) Peabody Picture Vocabulary Test. This is designed to provide an estimate of a subject's verbal intelligence. The subject attends to a series of pictures and responds to the examiner's stimulus word. The response need not be oral and no reading is required. The test was authored by Lloyd M. Dunn and published by American Guidance Service, Inc. (1965).
- (4) Sentences. A subtest on the Wechsler Preschool and Primary Scale of Intelligence published by the Psychological

Corporation (1963). This test is made up of ten sentences. A sentence is read to the subject and he is asked to repeat the sentence. Each successive sentence is progressively more difficult and the test is discontinued when the subject fails three consecutive sentences. A score is compiled showing the number of successfully repeated sentences. This test is used to determine the child's ability to sequence auditorily.

- (5) Mazes. A subtest on the Wechsler Preschool and Primary Scale of Intelligence published by the Psychological Corporation (1963). This test is designed to determine the child's degree of visual-motor coordination. The subject is asked to perform the task of drawing a line from one object to another and to refrain from touching the lines or detouring into blind alleys. He earns a score on his ability to perform this task. Each maze becomes progressively more difficult and when there is failure on two mazes the testing is discontinued.
- (6) Oral Language Development Test. The subject is presented three stimulus pictures and is asked to tell about the pictures. The number of words used to describe what he sees in the picture gives him an oral language score. Responses are taped and evaluated on the basis of total words. This test was devised by the investigator conducting the study.

Potential Reading Failure in this study refers to a child who can be identified as one who will not achieve normal progress in reading, that is, one grade level in reading for one year spent in school if his intelligence is in the normal range. In this study the criterion

measure was one month progress in reading for each month spent in school.

Early Communication Skills refers to the child's ability to listen and understand the speech of others and to speak in sentences that will convey his meaning to another individual.

Failure refers in this study to the child in first grade who does not achieve a raw score of 25 (grade score 1.5) on the Gates-MacGinitie Primary A, Form I, test on the vocabulary section or a raw score of 14 (grade score 1.5) on comprehension portion of the test by February of the first grade.

North-Hatt Scale (N.O.R.C.) is a social ranking scale of ninety occupations covering the range from U. S. Supreme Court Justice to shoe shiner. The scale was developed under the direction of Cecil North and Paul Hatt in the National Opinion Research Center at Ohio State University. It will be used in this study to determine social class ranking of the children when judged by their father's occupation.

Number of Parents refers in this study to the homes of the children in the sample in which both parents reside.

#### Statement of the Problem

The purpose of this study is to devise an instrument that will identify potential reading failures in kindergarten. The instrument will be known as the Pre-Reading Predictive Index and will be comprised of a series of tests especially selected to identify children's specific strengths and weaknesses at the pre-reading stage. Statistical analysis will be applied to the data to test the predictive efficiency of each test and to test the hypothesis that some subtests on the

Pre-Reading Predictive Index may be more valuable than others in this attempt to predict failure.

The present investigation is undertaken to draw attention to earlier diagnosis of pre-reading development. No studies were located in the literature in which all children in a public school system of the size used in this study were screened at such an early time. No studies were located in which the number of parents in the home of the subjects served as a predictor of reading failure. No studies were located in which a learning rate test administered in kindergarten was used as a predictor of failure in reading. It is hoped that this investigation will draw additional attention to early diagnosis, aid teachers in understanding young children, and help to prevent failure in reading for more children.

#### Hypotheses

The hypotheses are presented in this section. They are grouped as they relate to each subtest of the instrument under investigation and as they relate to groupings of the subtests and presented as follows:

- (1) Group A - hypotheses related to the Learning Rate Test performance,
- (2) Group B - hypotheses related to the Categories Test performance,
- (3) Group C - hypotheses related to the scores on the Peabody Picture Vocabulary Test,
- (4) Group D - hypotheses related to the Sentences Test performance,
- (5) Group E - hypotheses related to the Maze Test performance,

- (6) Group F - hypotheses related to the Oral Language Development Test performance, and
- (7) Group G - hypotheses related to grouping of the subtests of the Pre-Reading Predictive Index.

Hypotheses Related to Learning Rate Test Performance

The hypotheses tested in this area are stated in the null form as:

- A-1 There is no significant correlation between the score an individual kindergarten child obtains on the Learning Rate Test and his reading vocabulary score in the first grade.
- A-2 There is no significant correlation between the score an individual kindergarten child obtains on the Learning Rate Test and his reading comprehension score in the first grade.
- A-3 There is no significant correlation between the score obtained on the Learning Rate Test and the social class ranking of the child achieving that score.
- A-4 There is no significant correlation between the score obtained on the Learning Rate Test and the race of the child achieving that score.
- A-5 There is no significant correlation between the score obtained on the Learning Rate Test and the sex of the child obtaining that score.
- A-6 There is no significant correlation between the score obtained on the Learning Rate Test and the number of parents in the home of the child achieving that score.

Hypotheses Related to Categories Test Performance

The hypotheses tested in this area are stated in the null form as:

- B-1 There is no significant correlation between the score an individual kindergarten child obtains on the Categories Test and his reading vocabulary score in the first grade.
- B-2 There is no significant correlation between the score an individual kindergarten child obtains on the Categories



Test and his reading comprehension score in the first grade.

- B-3 There is no significant correlation between the score obtained on the Categories Test and the social class of the child achieving that score.
- B-4 There is no significant correlation between the score obtained on the Categories Test and the race of the child achieving that score.
- B-5 There is no significant correlation between the score obtained on the Categories Test and the sex of the child achieving that score.
- B-6 There is no significant correlation between the score obtained on the Categories Test and the number of parents in the home of the child achieving that score.

Hypotheses Related to Peabody Picture  
Vocabulary Test Performance

The hypotheses tested in this area are stated in the null form as:

- C-1 There is no significant correlation between the score an individual kindergarten child obtains on the Peabody Picture Vocabulary Test and his reading vocabulary score in the first grade.
- C-2 There is no significant correlation between the score an individual kindergarten child obtains on the Peabody Picture Vocabulary Test and his reading comprehension score in the first grade.
- C-3 There is no significant correlation between the score obtained on the Peabody Picture Vocabulary Test and the social class ranking of the child achieving that score.
- C-4 There is no significant correlation between the score obtained on the Peabody Picture Vocabulary Test and the race of the child achieving that score.
- C-5 There is no significant correlation between the score obtained on the Peabody Picture Vocabulary Test and the sex of the child achieving that score.
- C-6 There is no significant correlation between the score obtained on the Peabody Picture Vocabulary Test and the number of parents in the home of the child achieving that score.

Hypotheses Related to Sentences  
Test Performance

The hypotheses tested in this area are stated in the null form as:

- D-1 There is no significant correlation between the score an individual kindergarten child obtains on the Sentences Test and his reading vocabulary score in the first grade.
- D-2 There is no significant correlation between the score an individual kindergarten child obtains on the Sentences Test and his reading comprehension score in the first grade.
- D-3 There is no significant correlation between the score an individual kindergarten child obtains on the Sentences Test and the social class ranking of the child achieving that score.
- D-4 There is no significant correlation between the score an individual kindergarten child obtains on the Sentences Test and the race of the child achieving that score.
- D-5 There is no significant correlation between the score an individual kindergarten child obtains on the Sentences Test and the sex of the child achieving that score.
- D-6 There is no significant correlation between the score an individual kindergarten child obtains on the Sentences Test and the number of parents of the child achieving that score.

Hypotheses Related to Mazes  
Test Performance

The hypotheses tested in this area are stated in the null form as:

- E-1 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and his reading vocabulary score in the first grade.
- E-2 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and his reading comprehension score in the first grade.
- E-3 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and the social class ranking of the child achieving that score.

- E-4 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and the race of the child achieving that score.
- E-5 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and the sex of the child achieving that score.
- E-6 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and the number of parents in the home.

Hypotheses Related to Oral Language  
Development Test Performance

The hypotheses tested in this area are stated in the null form as:

- F-1 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and his reading vocabulary score in the first grade.
- F-2 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and his reading comprehension score in the first grade.
- F-3 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and the social class ranking of the child achieving that score.
- F-4 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and the race of the child achieving that score.
- F-5 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and the sex of the child achieving that score.
- F-6 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and the number of parents in the home of the child achieving that score.

Hypotheses Related to Grouping of the  
Pre-Reading Predictive Index Subtests

The hypotheses tested in this area are stated in the null form as:

- G-1 There is no significant correlation between the independent variables (combined Learning Rate Test score and Oral Language Development Test score) and the dependent variable vocabulary test score.
- G-2 There is no significant correlation between the independent variables (combined Learning Rate Test score, Oral Language Development Test score, and Peabody Picture Vocabulary Test) and the dependent variable vocabulary test score.
- G-3 There is no significant correlation between the independent variables (social class and number of parents in the home when grouped) and the dependent variable vocabulary test score.
- G-4 There is no significant correlation between the independent variables (social class ranking, number of parents in the home, and race when grouped) and dependent variable vocabulary test score.
- G-5 There is no significant correlation between the independent variables (combined social class ranking, number of parents in the home, race, and sex of the child) and the dependent variable vocabulary score.
- G-6 There is no significant correlation between the independent variables (combined Learning Rate Test score and Sentences Test score) and the dependent variable comprehension score.
- G-7 There is no significant correlation between the independent variables (combined Learning Rate Test score and Oral Language Development Test score) and the dependent variable comprehension score.
- G-8 There is no significant correlation between the independent variables (combined Learning Rate Test score, Sentences Test score, Oral Language Development Test score, and Mazes Test score) and the dependent variable comprehension score.
- G-9 There is no significant correlation between the independent variables (combined social class ranking and number of parents in the home) and the dependent variable comprehension score.

G-10 There is no significant correlation between the independent variables (combined social class ranking, number of parents in the home, and race) and the dependent variable comprehension score.

### Delimitations

#### Scope of the Study

This study presents an analysis of the Pre-Reading Predictive Index subtests and four areas of biographical data. The Gates-MacGinitie Readiness Skills test was administered in February, 1970, to seventeen classes of kindergarten children. This test served as a screening instrument for selection of the subjects to be studied. One hundred forty-one students were selected and given individually the six subtests of the Pre-Reading Predictive Index. Biographical data pertaining to race, sex, social class, and home stability were gathered from school records. One year later, one hundred of the selected subjects were present to complete the criterion instrument, the Gates-MacGinitie Reading Primary A, Form I. Step-wise multiple regression was applied to the scores on the subtests of the Pre-Reading Predictive Index and social class ranking and the scores in vocabulary and comprehension made approximately one year later. This was an attempt to determine if a significant relationship existed between the scores. Point biserial correlations were obtained to determine if a significant relationship existed between race, sex, and number of parents in the home and the scores made on the tests.

### Assumptions

1. The administration of the tests was made in a uniform manner.
2. The method used to teach reading in the first grade was approximately the same for all classes.
3. The materials furnished for the teacher's use in reading was approximately the same for all classes.
4. The normal child may vary widely in his readiness skills with strengths and weaknesses in different areas.

### Limitations

1. The community from which the sample was drawn is a university community and the subjects' background may differ somewhat from that of the wider population.
2. The study did not control for teacher effectiveness in the presentation of initial reading instruction.
3. No control was attempted over use of the screening test results when they were made known to the kindergarten teachers.

### Significance of the Study

The major effort in this investigation is to develop and test an instrument that can be used with young children at the pre-reading stage of their academic life. This instrument is simple enough to be used by a competent kindergarten or first grade teacher and should make available a diagnostic tool that could help locate high risk children.

Reading is widely recognized in education as having a very important part in the learning process. It has even been called a fundamental right of every citizen. With this in mind it becomes very

important for the educational system to provide for successful reading for every child. Drawing attention to the special needs of children from different races, different social classes, and with one parent absent from the home should help educators plan a program to fit their special reading needs within the school.

Prevention of failure in reading protects the self image of the young child during the important primary years. Individual diagnosis in kindergarten of children's strengths and weaknesses should help educators plan a program that would focus attention on helping the young pre-reader before he has failed.

#### Organization of the Study

Chapter I introduced the problem and gave background for the study. It has defined terms, stated the problem, given the assumptions and limitations, stated the hypotheses, and given the significance of the study.

Chapter II will review the literature pertinent to this study.

Chapter III will give the design of the study and the method by which it was carried out. The population and selection of the sample will be described. The instruments used in the study will be discussed and their application explained. The statistical analysis of the data and its application to the hypotheses will be discussed.

Chapter IV will present the statistical analysis of the data. Each hypothesis will be presented and the degree of significance given.

Chapter V will present a discussion of the results of this study, conclusions that may be drawn, and recommendations for future studies in this area.

## CHAPTER II

### REVIEW OF THE LITERATURE

#### Introduction

The literature concerning the prediction of reading failure does not constitute a large body of research. Only a few early studies are reported dealing with the identification of the high risk child and predicting that he will fail when reading instruction is begun. Three studies were conducted in the decade of the thirties and no more were reported until the early fifties. Many writers mentioned the need for early identification of the problem reader, but the decade of the sixties seemed to be the time when emphasis began to shift to the pre-school child. It may be important to note here also it was during this same decade that federal funds could be used for research in education and in reading. Researchers have explored different ways to predict possible failure at this early stage, but they do share a common concern in attempting to locate these children before reading failure prediction can develop into reading failure reality.

This chapter will be presented chronologically with the earliest studies reported first. Attention will be given only to those studies dealing with early identification of high risk or failing readers at the kindergarten or first grade entrance level. The emphasis here is to be on identification before reading instruction has begun in the classroom. The studies will be divided into two sections with the



first dealing with studies reported prior to 1960. The second section will review those studies reported in the literature since 1960.

#### Early Attempts to Predict Failure

Castner (1935) in the Yale Clinic of Child Development studied 13 cases in which reading disability had been predicted prior to first grade entrance. In his indepth study of these children, he noticed a group of traits which occurred in various degrees and combinations. Castner described these predictive traits as follows: (1) scattering and inconsistency of the individual developmental examination; (2) inconsistency of results on successive examinations; (3) specific weakness on drawing tests; (4) sinistrad or other atypical directional tendency in drawing, or tendency to reversal in making letters and numbers; (5) the presence or history of sinistrality, total or partial, in the child or in the immediate family; (6) a history of reading disability in siblings or parents; (7) atypical factors in speech development; and (8) unstable or excitable personality.

The 13 children had not made normal progress in reading even though they were normal as to age, intelligence, and school opportunity. Two cases had achieved 50 percent of normal progress. The average achievement of the group was 25 percent of normal. The Gray Reading Achievement was used as a criterion measure. Castner analyzed the thirteen cases individually on the basis of the eight traits he had selected as being predictive and concluded that only one child showed all applicable traits to be present. Other children showed or had present some or most of the described traits. Castner concluded that it was possible through pre-school examination and follow-up procedures

to identify potential reading disability cases before the child started classwork.

Monroe (1935) and her associates attempted to discover children who would be likely to fail in reading before they had actually failed. They administered aptitude tests to 434 children in the primary grades. The tests were grouped into six major divisions: (1) visual; (2) auditory; (3) motor; (4) articulation; (5) language; and (6) laterality. The visual tests were Recognition of Orientation, Ocular-Motor Control and Attention, and Visual Memory for Forms. Auditory tests were Word Discrimination, Sound-Blending, and Auditory Memory. The motor tests were to test the subject's speed in completing a task, his steadiness when using a pencil on a line, and his proficiency in writing his name. In the articulation tests the subjects were asked to repeat words and phrases and were scored on speed and accuracy. In the language tests the subjects were asked to classify common nouns, respond to pictures, and name pictures shown to them. The laterality tests were to determine hand and eye preference. Parts of the tests were given to small groups of ten or twelve children by their teacher, and then individual children were administered the individual tests by an examiner. Percentile curves were plotted for each half-year age group from 5½ to 8½ years for each type of test. An aptitude graph was charted for each child, indicating the high and low points of his abilities by his percentile scores in each of the five types of tests. A total percentile score was calculated and all scores were correlated with the reading achievement at the end of the year. Quartile tables were drawn to point out where children failing in the different quartiles on the aptitude tests later fell on the reading tests.

Monroe concluded from this study that children who scored 60th percentile or above made average or above progress in reading. Children in the 40th to 60th percentile were in the most critical range and could achieve or fail to achieve depending on personality, emotional, or teaching factors that were not measured. Children below the 30th percentile on the aptitude tests could be predicted to fall in the lowest quartile of reading achievement. Monroe recommended that careful diagnostic study be made of individual children who deviate in any area on the aptitude tests so that teachers may meet the child's difficulties at an early stage.

The characteristics of pupils when they entered school and their achievement in reading during the year were reported in 1936 by Gates and Bond. One aspect of their study was the effect of mental age of the child upon his success or failure in reading. The ten pupils who came nearest to failure are scattered from a point just above the lowest mental age to a point just below the highest mental age. The paper and pencil readiness tests were not successful in indicating the best or the poorest readers. The group of failing children were studied as a whole, and further analysis was made of all data on individual children. Records of four of the children revealed nothing that could account for failure. The other six cases showed defects or deficiencies in one or more areas. Gates and Bond concluded that their study emphasized the importance of recognizing and adjusting to individual limitations and needs before and after the beginning of reading rather than changing the time of beginning.

Meyer (1953) reported a three-year study of 51 children from kindergarten through the third grade. He was attempting to discover if a

study of Rorschach records made during the kindergarten year would reveal evidence that might be useful in telling which children would later be retarded readers and which ones would be achieving readers. The subjects were 26 boys and 25 girls used in an earlier normative study of the Rorschach at the kindergarten level. The test was administered during the last two months of the year when the children's mean age was 5 years and 10 months. During the fall term of the first grade each child was given a Stanford-Binet (Form L). At the beginning of the fall term of the third grade each child was given the Chicago Reading Test (Test B, Form 2) to determine his reading grade placement. Achieving readers were those who placed 2.9 and retarded readers placed 2.0 or below. Scores were classified on the Rorschach responses and compared statistically with the later reading scores. The mean number of signs used by the achieving groups was greater than that used by the retarded group. The level of significance of the difference was greater than .001. In the discussion Meyer states, "Rorschach records may be used as prognostic tests of reading achievement." He found that the retarded readers irrespective of intellectual levels showed the following differences: use a large number of responses with poorer quality; use a lesser number of whole responses of good quality; a greater proportion of retarded readers use a lesser percentage of detailed responses and are unable to differentiate beyond inaccurate, vague, and mediocre global perceptions.

Meyer observed a smaller proportion of retarded readers are able to use color and gave credit to the Rorschach for identifying children with "emotional timidity" that later will be associated with a lowered reading achievement.

The objectives of an investigation by Gjessing (1958) in Norway between 1951 and 1956 included these questions: (1) Is it possible to insure a greater degree of accuracy in making predictions if, in addition to test scores, other traits and qualities in school beginners and their background are included? (2) What tests could be included in a permanent program of reading readiness investigations?

Before entry into first grade 300 children took part in a reading readiness investigation which lasted six days (two hours each day) for each child. Several test batteries were given including mental age, verbal comprehension, auditory memory and discrimination, visual memory and discrimination, sound-blending and numerical comprehension. The subjects were observed in the sandbox, dramatics, copying and free-hand drawing, needlework and various social contacts.

The data were analyzed by correlations, multiple correlations, and factor analysis. The predicted value of the test material used had a correlation of .57 between prediction tests and reading development after one year in school. Gjessing found the degree of precision of prediction can be increased if other traits and qualities are included in the assessment. A clear connection was established between poor reading readiness and delayed language development. No connection was shown between different degrees of reading readiness and socio-economic background. He found it possible to eliminate the large time-consuming test battery by selection based on multiple correlation. Five of the seventeen test variables were selected, and there was no increase in accuracy of prediction with the addition of more of the other variables. Gjessing recommends construction of an adequate test battery where the emphasis is on definite functions and early diagnosis so schools could

plan preventative and therapeutic measures in a variety of areas.

#### Prediction Studies From 1960

Based on the assumption that intelligence quotient was the best single predictor of school achievement, Morgan (1960) wanted to determine if the Pintner-Cunningham Primary Test (Form A) and the Full-Range Picture Vocabulary Test (Form B) have predictive value at the late kindergarten and early first grade levels. Morgan was trying to determine if trained kindergarten teachers could make valid potential achievement level placements and if the two tests would be of value in making the decisions. The criterion measure was to be the grouping done by the first grade teachers. Subjects completing all tests were 76 children from a rural consolidated school. The kindergarten teachers made their recommendations for individual placement of the children without knowing the results of the testing. The first grade teachers ranked the children into high, medium, and low achievement groups and used test results that were available. They were asked to determine which children were placed too high or too low by the kindergarten teachers.

Significance beyond the .02 level of confidence was obtained between the Pintner-Cunningham Primary Test and the Full-Range Picture Vocabulary Test and the high and low achievement groups. The means and standard deviations for the slow, average, and high groups were 92.68 and 9.06; 107.36 and 10.36; and 113.59 and 10.66. Teacher rankings of relative brightness was confirmed with rho's of .644, .710, and .655 for the slow, average, and high groups. The tests were significant at less than the .05 level.

Morgan concluded that well trained kindergarten teachers can make competent achievement placements; the two tests make an improved prediction possible; and both tests correlate significantly with first grade teacher observations. He says that from this study it is possible to determine the potentially low and high first grade achievers at the kindergarten level.

Cohen (1963) and the Frankford Friends' Study Group consisting of a principal, kindergarten teacher, first grade teacher, psychologist, and child psychiatrist studied 25 girls and 31 boys, beginning at age 5, for a period of four years. The study was undertaken to predict which of these 56 children would have difficulty learning in the first grade. The individual members studied the children independently giving special attention to excessive inhibition or excessive anxiety. Psychological tests, teacher observations, and play therapy sessions were analyzed independently and independent predictions concerning the child's learning achievement were made. Metropolitan Achievement Tests scores were compared to I. Q. scores to arrive at a prediction for each child as compared to his own potential. This was used to divide the 56 children into underachievers, achievers, and overachievers. Analysis of variance, Chi Square and t tests were used in comparing predicted achievement to actual achievement in first grade and second grade. Cohen concluded from this study that excessive anxiety seems to be the pathogenic factor in underachievement. The kindergarten teacher, psychologist, and child psychiatrist were all able to predict with statistical significance which kindergarten children would learn according to their potential in the first grade.

A pilot study of 40 kindergarten children by Weiner and Feldman (1963) led them into a larger investigation. They were trying to determine whether a Reading Prognosis Test could be constructed to measure future reading ability. The initial study with the small sample found a correlation of .87 with the Gates Primary Word Reading Test (1958). The Reading Prognosis Test was administered individually. Improvements were made in the format as a result of the pilot study.

A second study using 138 pupils from six New York City schools was conducted. Subjects were selected on the basis of socio-economic status, race, sex, and grade. One of the purposes of this study was to see if the test could be constructed to measure future reading ability of children from different socio-economic levels. Equal numbers of subjects from lower and middle socio-economic levels were drawn and equal numbers from Caucasian and Negro races. The battery consisted of eight subtests grouped to measure three areas: (1) language, (2) perceptual discrimination, and (3) beginning reading skills. A total of 126 children were present and completed the Gates Primary Reading Tests: Sentence Reading and Paragraph Reading (1958) the criterion measures. Step-wise multiple linear regression was used for analysis of the data. The analysis included grouping the data for the total, the middle, and lower socio-economic levels. The total group achieved an  $r$  of .854 on Capital Letters, Small Letters, and Sight Vocabulary and .557 on the language subtests, Meaning, Vocabulary, and Storytelling. The perceptual discrimination subtests Auditory Discrimination, Visual Discrimination, and Visual Similarities  $r$  was .755 for the total group. The middle class achieved an  $r$  of .812 on Capital Letters, Small Letters, and Sight Vocabulary and .407 on Meaning



Vocabulary and Storytelling. The middle class had an  $r$  of .712 on the perceptual discrimination subtests Auditory Discrimination, Visual Discrimination, and Visual Similarities. The lower class group achieved an  $r$  of .774 on Capital Letters, Small Letters, and Sight Vocabulary. The lower class achieved an  $r$  of .423 on Meaning Vocabulary and Storytelling and an  $r$  of .781 on the perceptual discrimination subtests Auditory Discrimination, Visual Discrimination, and Visual Similarities. Weiner and Feldman concluded that poor readers from any socio-economic status group can be identified before formal reading takes place and their skill deficiencies determined.

Craig (1965) felt that the usual reading readiness identification procedures give limited diagnostic information. Craig conducted a study in 1963 and 1964 with first grade children. A test battery was constructed consisting of twenty-two tasks chosen from reported research and considered to be most promising in identifying specific areas of poor development in children with normal intelligence and adequate language but who failed in initial reading instruction. Fifty-six children were matched on sex, age, classroom, and the scaled score on the Wechsler Intelligence Scale for Children vocabulary subtest. The X child of each pair was judged by the teacher to be making good progress in reading and had made no score lower than 15 on Wide Range Achievement test. The Y child of each pair was judged by the teacher to be making poor progress in reading and had scored less than 13 on the reading subtest of the Wide Range Achievement test.

The twenty-two tasks included in the experimental battery sampled performance in the areas of visual perception, auditory perception, visual motor coordination, spatial orientation, tactile memory, and

general information such as time concepts. Of the twenty-two tasks administered in the spring of 1963 the scores earned by the X and Y groups on fifteen of the tasks were found to be statistically different. One year later, in the spring of 1964, the fifteen tasks were re-administered to forty-six of the fifty-six subjects. The forty-six children had not received any special training. A significant difference on six of the fifteen tasks between X and Y groups was found in the follow-up study.

Craig concluded from the results of this study that the construction and use of a diagnostic test battery can give precise information concerning the areas of poor development in children who are not making expected progress in reading in first grade.

Beginning in the early 1960's with a study of groups of intelligent four and five-year-olds De Hirsch, Jansky, and Langford (1966) predicted reading, writing, and spelling difficulties. The study was limited to the child's perceptuo-motor and linguistic functioning. The subjects were children referred to the Pediatric Language Disorder Clinic, Babies Hospital, Columbia Presbyterian Medical Center, New York because of oral-language deficits. Results from this limited study led De Hirsch and associates to ask if these tests would predict failure when administered to a general population and would they still be effective predictors when unsupported by clinical judgments.

The second study growing out of the results obtained from the initial study was reported in 1966 and was to predict reading, writing, and spelling achievement two and one-half years later at the end of the second grade. Another purpose was to combine the best predictors into an instrument that could be used to identify high risk children. The

general population for the De Hirsch, Jansky, and Langford follow-up study was from a pool of children born between September 1, 1955, and June 30, 1956, who weighed over 2.500 grams at birth. From this pool were drawn 53 children from English-speaking homes; rated I. Q.'s within one standard deviation above and below 100 on the Form L of the Stanford-Binet Intelligence Scale (1937); presented no significant sensory deficits and showed no evidence of psychopathology as judged clinically. The median age of the 53 children at the time of the initial testing was 5 years, 10 months. Thirty boys and twenty-three girls participated in the study; four percent of the children were Negro and eighty-five percent attended kindergarten. Parents' education and occupations identified the children as representing a lower middle stratum of an urban society. Information was obtained from the families as to speech, reading, writing, and spelling difficulties of the parents and siblings. De Hirsch assumed that a child's perceptuo-motor and language level at kindergarten age forecasts his later performance in reading, writing, and spelling.

A series of four evaluations were made in the investigation. The first testing session was used to assess vision, hearing, and intelligence of the subjects. Thirty-seven tests were administered to the fifty-three children in the second of the four series of test administration times. Reading and writing tests were given at the end of the first grade making up the third session. Final testing came at the end of the second grade and included writing, reading, spelling, and four items from the kindergarten test battery were re-administered.

In an attempt to identify those kindergarten tests that would serve as predictors of second grade performance, coefficients were

computed measuring the correlation between each kindergarten test and a summary measure of silent and oral end-of-second-grade reading achievement. Coefficients were computed for spelling and writing scores. Those kindergarten tests that yielded significant correlation coefficients were retained as potential predictors. De Hirsch reports that over one hundred combinations were tried experimentally. The ten chosen as best predictors after analysis of correlations were Pencil Use, six of the nine designs on the Bender Visuo-Motor Gestalt Test, Wepman Auditory Discrimination Test, Number of Words Used in a Story, Categories, Horst Reversals Test, Gates Word Matching Test, Word Recognition I, Word Recognition II and Word Reproduction.

Tauber (1966) conducted an investigation to identify tests suitable for administration in kindergarten which would locate children who would have difficulty in writing, reading, speaking, and spelling. Tauber felt that a battery of tests with high individual correlations with achievement and low intercorrelations with each other would measure independent skills related to achievement. The subjects selected for study were 15 boys and 15 girls from ages 5.3 to 6.2. These were kindergarten children and all were enrolled in the same school. The team used to conduct the study was made up of a consulting psychiatrist, psychologist, social worker, and remedial reading instructor. The following tests were used: Peabody Picture Vocabulary (Form B), Wepman Auditory Discrimination (Form II), Verbal Language Development Scale, Knox Cube Test, Marianne Frostig Developmental Test of Visual Perception, Bender Gestalt Test, and Goodenough Draw-A-Man. The criterion measure was the Metropolitan Achievement Test, Primary I Battery, Form A. Scores on each of the first five of the measures were ranked and

rank order correlation coefficients were computed.

Three tests met the criteria of high correlation with achievement and low intercorrelations with each other. These tests were Knox Cube Test, Verbal Language Development Scale, and the dissimilar word pair items of the Wepman Auditory Discrimination Test. The Knox Cube Test was dropped because it was more difficult to give and score. The Verbal Language Development Scale and the Wepman Auditory Discrimination Test yielded an  $r$  of .92. Classification of performance on the Bender-Gestalt, Goodenough Draw-A-Man, and the Metropolitan Achievement Test indicated no useful agreement. Tauber recommended that classroom teachers use the Verbal Language Development Scale and the dissimilar word pair items of the Wepman Auditory Discrimination Test as a battery to identify potential learning disabilities.

Three hundred kindergarten children were studied by Hirst (1969) to determine predictor variables of future failure or success in reading and arithmetic. Hirst measured the following variables: psychological, socio-emotional, socio-economic, readiness, physical, perceptual-motor, developmental, sociometric, and creativity. Data were analyzed using multiple regression analysis for males and females on three socio-economic levels. The study attempted to identify predictor variables of academic success and failure for all children. Results of this three-year study indicate that age and intelligence test scores are not good predictors of first and second grade reading achievement. The Digit Span subtest of the Wechsler Intelligence Scale for Children was found to be the most consistent in selecting failures in second grade reading. Hirst found also that teachers' predictions were amazingly accurate for the lower socio-economic group who fail.

Binkley (1968) conducted a study in Nashville, Tennessee, with 1,110 pupils from 39 schools in culturally deprived neighborhoods. He was attempting to assess the relative importance of the measured readiness level at first grade entrance upon fourth grade achievement and personality adjustment of the culturally deprived children. Variables at school entrance included chronological age, readiness level, sex, and race. Readiness was divided into three levels: below average, average, and above average. Factor analysis was used to test the effects of each variable upon achievement in the fourth grade. Significant findings showed in this study that children who scored low on readiness tests also scored low on achievement and personality tests four years later. Binkley recommends pre-school testing of culturally deprived children with more refined instruments to determine needs before the child enters formal school.

Murray (1970) tested 200 pre-first grade children to determine if the 25 percent scoring the lowest on visual-motor-perceptual development would also be clustered in the lowest third of first grade performance on word recognition skills at the end of the year. Tests used at entry time of first grade included: Peabody Picture Vocabulary, Walking Board Motor Ability Test, Winter Haven Form Copying Visuals I, and Ocular Motility. Tests given in May were the Winter Haven, Visuals III, Gates Primary Word Recognition, California Low Primary Reading, and Letter Matching Form. Thirty-two of the bottom forty-eight scores on the Winter Haven Form Copying test were among the lowest 65 scores on reading on the Gates Primary Word Recognition test. The highest single correlation found in the preliminary testing was an  $r$  of .4496 between the Winter Haven Form Copying Test and the Gates Primary Word

Recognition Test. When the Gates Primary Word Recognition and California Low Primary Reading criterion tests were combined, a correlation of .4511 was found. Murray suggests caution in drawing implications from this study because all children classified as retarded were removed from the sample.

Aftanas (1970) conducted a longitudinal study to determine if a set of measures could be used to predict specific reading problems and general school achievement. One hundred forty-two kindergarten children in one school were given a battery of psychometric instruments. An interview form was used to determine birth order, birth weight, and language(s) spoken in the home. The children were tested for reading skills and general school progress over a three year period. Results indicate: (1) the number of significant negative deviations from the mean on the predictor tests is a better predictor of reading retardation than a low score on any one; (2) the younger bright child showed slower progress on the first of the basic tests given by the teachers but was performing at the level of his intellectual peers after the first year; (3) although 35 children in the sample would have been considered reading retardates after the first year, only eight had reading quotients less than 100 at the end of the third year; and (4) as preschoolers there was a trend for boys to be less capable in visual and visual-perceptual skills, but at no time in the first three years were they less capable than the girls in reading.

The Stanford-Binet correlated .544 with total reading score. The Early Detection Inventory correlated .520 with the criterion reading measures. The groups were selected so that a wide range of social classes would be represented. Analysis of variance applied to each of

the measures revealed a significant difference between the lowest socio-economic sample and the subjects from other social classes. Aftanas suggests that socio-economic groups be analyzed separately to determine the best predicting measures for each group.

Rosenfield (1971) studied 30 first grade children selected from two mid-western urban schools using the Illinois Test of Psycholinguistic Abilities in an attempt to predict later reading ability and disability. The 30 subjects were considered to closely resemble the norming group of the Illinois Test of Psycholinguistic Abilities test. The complete test was administered to the randomly selected children in November. Mental ability was determined through the use of the B scale of the Kent Series of Emergency Scales. Five months later the Diagnostic Reading Scales were administered. A checklist was developed to indicate teacher judgment of each subject's psycholinguistic, intellectual, scholastic, and behavioral characteristics. Data were analyzed using stepwise multiple correlation. These data indicated the total score on the Illinois Test of Psycholinguistic Abilities was a very weak predictor of reading level. The best prediction came from the representational level of the Illinois Test of Psycholinguistic Abilities. A significant difference at the .05 level did occur in the number of strengths and weaknesses shown by the high and low groups. Teachers were better able to select the high and low groups than was the Illinois Test of Psycholinguistic Abilities. They were in relatively close agreement on strengths and weaknesses. In the discussion Rosenfield suggests caution in the use of Illinois Test of Psycholinguistic Abilities as a predictor of reading ability or disability.



### Summary

The studies presented in the review of the literature point out that it is possible to identify in the pre-reading stage those children who will encounter difficulty when presented formal reading instruction. Implied in the research is the idea that to draw attention early to these high risk children will help prevent failure at a later time in their school experience.

Researchers have taken different approaches to their various studies. Two early studies investigated individual subjects using the case study approach. Later ones used pairs of matched subjects and many used different sizes and number of groups for study. Some pilot studies led researchers on to larger groups of subjects and more complicated procedures. Instruments used in the studies vary from simple story telling analysis, observations of a subject in a sandbox or using a pencil, to highly complicated batteries including projective techniques that require clinical specialists for administration. Many different sensory perceptions and various abilities of the young child have been tapped for study. Interview sheets were used to determine what the family history might reveal. Teacher predictions were used both as independent and dependent variables in different studies. The time taken to carry out the research varied from as short a time as a few months up to five years. Statistical analysis of the various studies seems to have evolved from simple checking in columns of the plus and minus signs to the present use of highly complicated techniques using electronic computers. One common idea seems to run through all available literature in this area. This is a concern to identify potential reading failures early.

## CHAPTER III

### METHODOLOGY AND DESIGN

This chapter presents a discussion of the procedures and instruments used in the study. The sample is described and the method of selection of the subjects is given. Descriptions of the instruments used in the selection of subjects, each subtest of the Pre-Reading Predictive Index, and the criterion measure are given. The method used to analyze the data is described.

#### Design of the Study

The basic purpose of this study was to design and evaluate an instrument that would identify children in kindergarten who would fail in a beginning reading program presented from a basal reader. An additional purpose was to point up variability within each child's readiness to read and to try and determine if sex, race, social class, or number of parents in the home were related to the failure to learn to read. The subjects were 100 high risk kindergarten children. This selected group took the criterion measure after an eleven and one-half months lapse of time from the administration of the selection instrument.

A kindergarten population of three hundred and sixty-five kindergarten students were administered the screening instrument, the 1968 Gates-MacGinitie Readiness Skills Test, during the second week of

February, 1970. One hundred forty-one students who scored one (1.0) standard deviation below the mean on one or more of the subtests of the Gates-MacGinitie Readiness Skills test or who fell on or below the 24th percentile on the total weighted score were designated as high risk children and selected for further study. This additional study consisted of administering the Pre-Reading Predictive Index to these 141 subjects. Additional information concerning sex, race, social class, and number of parents in the home was gathered from school records.

Following the administration of the individual Pre-Reading Predictive Index, the results were not made known to the kindergarten teachers. The children proceeded in the public school program for eleven and one-half months. During this eleven and one-half month period the classroom instruction emphasized reading readiness in the last three months of the kindergarten term. Reading readiness was presented for approximately four to six weeks of the following first grade year.

The seventeen first grades in which the 100 high risk children received instruction used the basal reader approach to reading instruction. All of the children used readiness material published by the basal reader company. Following this readiness they were grouped and placed in the pre-primers for instruction in reading.

The criterion measure was administered during the last week of January, 1971. Subjects attaining a raw score of 25 (grade score 1.5) or less on vocabulary or 14 (grade score 1.5) or less on comprehension on the Gates-MacGinitie Reading Test, Primary A, Form I were considered to have failed in reading.

Step-wise multiple regression was used to determine if a relationship exists between the raw scores made on the Pre-Reading Predictive

Index and the Gates-MacGinitie Reading Test, Primary A, Form I vocabulary and comprehension tests. Point biserial  $r$  was determined for sex, race, and home stability to ascertain if biographical information could add to predictive efficiency.

#### Selection of the Subjects

Three hundred and sixty-five kindergarten students of a southwestern public school system served as the general population of this study. These students attended fourteen kindergarten classes taught in one-half day sessions by seven certified teachers. The classes were held in four locations and were a part of the public school system serving all eligible children in this southwestern town of 35,000 people.

A preliminary screening of the population from which the sample was taken occurred in February, 1970. At this time, the three hundred and sixty-five kindergarten students were given the 1968 Gates-MacGinitie Readiness Skills test by their teachers. The teachers met for a study of the directions for administration of the tests prior to the testing dates. The students took the test in four sessions with college teachers-in-training assisting in the classrooms. The classes were divided so that approximately one-half of the students were being tested at each time. The other one-half of the students were outside the classroom to provide optimum testing attention.

Individual students who scored one standard deviation below the mean on one or more subtests of the Gates-MacGinitie Readiness Skills test or who fell on or below the 24th percentile on the total weighted score were selected as subjects for this study. There were 141 children who received a score of one standard deviation below the mean on

one or more of the subtests or who fell on or below the 24th percentile on the total weighted score. Information as to race, sex, social class, and number of parents in the home was obtained from the school records and interviews. The Otis Dudley Duncan Index of the N.O.R.C. Scale was applied to the parent's occupation to place it on a ten-point scale for further analysis. Attrition accounted for the loss of forty of the high risk subjects and one subject was retained in kindergarten. A total of 100 students for which complete information was available finished the criterion measure and made up the sample for this study.

The schools from which the sample was selected were racially desegregated. The range in socioeconomic levels, as judged by parent's occupation, ran from hard core welfare to college professor. Verbal intelligence quotient range for the subjects was from 85 to 131. There were 37 females and 63 males in the study with 13 Negro and 87 Caucasian subjects. School records revealed that 21 of the 100 subjects were living with one parent.

#### Instruments Used and Their Application in This Study

##### Gates-MacGinitie Readiness Skills, Kindergarten and Grade 1 (1968)

This test was devised to measure the development of skills considered prerequisite to reading instruction. It is made up of eight subtests, the first seven of which are weighted to yield a total readiness score for the child. The eighth subtest is used to determine if the child is already reading. Primarily the test is designed to be administered at the end of the kindergarten year or the first month of the first grade year. The eight subtests which make up this test are:

- Test 1. Listening Comprehension, a 20-item test of ability to understand the total thought of a simple story. The examiner reads stories to the children and each child marks the one that best answers the question.
- Test 2. Auditory Discrimination, a 21-item test of ability to distinguish between two words of similar sound. The child marks one of two pictures after the examiner has named both pictures in a pair and then re-names one of the pictures.
- Test 3. Visual Discrimination, a 24-item test of ability to distinguish between the printed forms of two words. The child selects the one word that is different in a line of four words.
- Test 4. Following Directions, a 14-item test of ability in following increasingly more difficult directions. Each set of directions is read by the examiner while the child selects from a panel of four pictures.
- Test 5. Letter Recognition, an 18-item test of ability to recognize letters of the alphabet. The examiner names one letter out of four letters in each item. The child selects one and marks.
- Test 6. Visual-Motor Coordination, a 7-item test of ability to complete the forms of printed letters. The child is given seven model letters and he is to complete a part of each letter printed adjacent to the model.
- Test 7. Auditory Blending, a 14-item test of ability to join parts of a word into a whole word. The examiner pronounces the name of one of the pictures, in a set of three, saying it in two or three parts; the child marks the corresponding picture.
- Test 8. Word Recognition, a 24-item test of ability to recognize words presented in isolation. The examiner reads one word in each set of three and the child marks that word.

The normative population of the Gates-MacGinitie Readiness Skills test included a nation-wide sample of approximately 40,000 pupils in 38 communities. The communities were selected on the basis of size, geographic location, average educational level, and average family income.

The Gates-MacGinitie Readiness Skills test administered to the 365 kindergarten students the second week of February, 1970, was used as a screening instrument to select those students for further study. Those subjects whose score might be one standard deviation below the mean on one or more of the eight subtests or on or below the 24th percentile in the total readiness score were placed in the sample for further testing and study.

#### National Opinion Research Center Scale

Cecil North and Paul Hatt, in 1947, developed a method of occupational classification. The N.O.R.C. measure of relative prestige for each occupation is a rank based on ordering the average scores derived from the weighted proportions of excellent, good, average, somewhat below average, or poor ratings for each occupation. The lowest occupation on this prestige scale is shoe shiner with a score of 33 while the highest score is 96 for a United States Supreme Court Justice. Hodge, Siegal, and Rossi in 1963 replicated the 1947 North-Hatt study and found a correlation of .99 between the two studies. There had been little change in occupational prestige in the sixteen years between the two studies. Otis Dudley Duncan constructed a socio-economic index from census information on detailed occupational characteristics. This index related the N.O.R.C. Scale to the 1950 Bureau of Census Report and allows a researcher to classify more varied occupations. The Otis Dudley Duncan Socio-economic Index for Occupations based on the N.O.R.C. Scale was used in this study because it provides a system of classification that allowed the investigator to classify all occupations of the subjects' parents. Hard core welfare subjects were

arbitrarily assigned a score one numeral below the 3 given to shoe shiner on the N.O.R.C. Scale. Following stratification of the sample of population used in this study only the first numeral was retained as suggested by Reiss (1961). This places the occupations of the families on a ten-point interval scale and simplified handling of the statistical analysis.

### Pre-Reading Predictive Index

This test was developed to individually diagnose the skills and abilities considered to be prerequisite to formal reading instruction. It is made up of six subtests and is designed to be administered when the child is in kindergarten or chronologically between 5 years and 6 years and 7 months. The test is administered individually and takes approximately 30 minutes. The six subtests which make up this test are:

- Test 1. Learning Rate, a 15-item test of ability to learn new sight words and remember them for a thirty minute period. The examiner gives the child a word while the child focuses his attention on the word card. The child is asked to respond to the word three times, telling something about the word and using it while he attends to the word in its printed form. This is repeated for the five words used. He is reviewed on the words and told that he will work with these words a little later in the period.
- Test 2. Categories, a 3-item test of ability to listen to three clusters of words and form a mental generalization drawing the words into a classification. The child responds orally to the examiner. He may earn a score from 0 - 3.
- Test 3. Peabody Picture Vocabulary Test (Form A) is a test of ability to understand and respond to a word given by the examiner. The child is presented a plate of four pictures and is to select the one best example of the spoken word. This test yields a percentile score, a mental age, and a verbal intelligence quotient.



- Test 4. Sentences, a subtest from the Wechsler Preschool and Primary Scale of Intelligence, is a test of auditory memory. The examiner reads ten sentences to the child and he repeats verbatim what he remembers. The sentences become increasingly more complex and are scored from 0 - 34. The subject is given credit for partial recall.
- Test 5. Mazes, a subtest from the Wechsler Preschool and Primary Scale of Intelligence, is a test of visual-motor ability. The examiner presents an increasingly more complex series of tasks one at a time. The child responds by making a line between two points without going out of given lines or into blind alleys. He is scored from 0 - 26 as the tasks become increasingly more difficult.
- Test 6. Oral Language Development is a test of ability to respond orally to a series of three pictures. A sample picture is presented to make sure the subject understands what is expected of him. The child's responses are taped and credit is given for each word spoken.

The Pre-Reading Predictive Index was administered individually to 141 children in March, 1970 by graduate students trained in the procedures of individual testing. The test administrators met for instructions and procedures to insure uniformity of administration of the individual tests. Practice tests were given by the examiners and follow-up sessions were conducted to insure that there were no changes in procedure. The first task presented to each child was the presentation of the five words for the Learning Rate test. Following this, other subtests were given in random order. The Oral Language Development test was taped for each child so that an accurate count could be obtained. The last item presented on each test administered was the Learning Rate test response sheet. It was necessary for a period of approximately thirty minutes to lapse in order to determine how many of the five words presented earlier were still retained.

Tests were scored by the test administrators at the time of the testing. A complete re-evaluation was made of every subtest to ensure uniformity of scoring by the investigator.

Gates-MacGinitie Reading Tests,  
Primary A, Form I (1965)

This test is administered to groups and is intended for use in the first grade to give a measure of the child's reading achievement. It consists of two parts:

- Part 1. Vocabulary is a 48-item test that measures ability to recognize or analyze isolated words. Each item contains four printed words and a picture illustrating the meaning of one of the words. The child selects and circles the word that best corresponds to the picture. The words are presented in an increasingly difficult manner.
- Part 2. Comprehension is a 34-item test that measures the child's ability to read and understand whole sentences and paragraphs. Each passage is accompanied by a panel of four pictures and the child's task is to mark the picture that best illustrates the meaning of the passage. The passages are of increasing length and difficulty.

The Gates-MacGinitie Reading Test, Primary A, Form I was used as a criterion to measure reading achievement of the 100 students in this study. Vocabulary and comprehension raw scores were the dependent variables used to measure the independent predictor variables of: race, social class, sex, home stability, Learning Rate, Categories, Peabody Picture Vocabulary Test, Sentences, Mazes, and Oral Language Development Test used in this study. Step-wise multiple regression was used to measure the relationship between each independent variable and the criterion measures of vocabulary and comprehension referred to as the dependent variables in this study.

### Statistical Design

The statistical model used for predicting reading failure in vocabulary and comprehension scores (dependent variables) was multiple correlation and regression. The computer program used was a step-wise multiple regression program from the biomed cans. This program allowed the investigator to examine 10 independent variables and 1 dependent variable or any combination of the independent variables on each run of the computer. This step-wise multiple regression program first computed the Pearson product moment correlation coefficients between all predictors and between each predictor and the criterion variable. These coefficients were then printed out in a correlation matrix. The program also computed and printed the mean and standard deviation for each variable.

To determine the effect of each predictor's power when compared with the other independent variables, a beta weight was computed. The next step computed a regression coefficient for each predictor. Since the dependent variable may have a different mean than the predictors, such was the case in this study, the "a" coefficient was computed. This "a" coefficient made the adjustment for the difference in the means and was called the dependent variable intercept. The computer then printed out both the regression coefficients and the "a" coefficients.

The regression equation is:

$$y_1 = a + b_1 x_1 + b_2 x_2 + b_3 x_3$$

Where:  $y_1$  = predicted score on dependent variable  
 $a$  = intercept or "a" coefficient  
 $b_1$  = regression coefficient for predictor #1  
 $x_1$  = score on predictor #1  
 $b_2$  = regression coefficient for predictor #2  
 $x_2$  = score on predictor #2

The equation for the multiple correlation coefficient is:

$$R = B_1 r_1 + B_2 r_2 + B_3 r_3$$

Where: R = Multiple correlation coefficient  
 $B_1$  = Beta weight for predictor #1  
 $r_1$  = Pearson product moment between predictor #1 and dependent variable

This program is a step-wise regression and the computer started with the predictor that had the largest correlation with the dependent variable. Each remaining predictor was added to the regression equation one at a time. The computer performed an analysis of variance to determine if each added predictor added anything to the total efficiency of the regression equation. If a statistically significant contribution is made by each added predictor the computer accepted the independent variable (predictor) as a part of the multiple correlation. If nothing significant was added the computer rejected that independent variable from the multiple correlation. Each independent variable contribution to the multiple correlation was printed out.

In the present study three of the independent variables--sex, race, and number of parents in the home--represented dichotomies. Since point biserial correlation coefficient correlates a continuous variable with a dichotomy and is a product moment, it is used in the multiple correlation and regression equations as if it were a Pearson's  $r$ . The biomed step-wise regression program was used as described on the preceding page. The computer performed the steps and printed out means, standard deviations, regression coefficients, and "a" coefficients.

## Summary

This chapter presented information related to the design of the study. Three hundred sixty-five kindergarten students from a southwestern school took the screening instrument from which a sample of 100 subjects met the criteria. Criteria for selection of the subjects were presented. Descriptions of the instruments used for screening, testing, and criterion measures were given in detail, including a description of the Gates-MacGinitie Readiness Skills Test, descriptions of each test making up the Pre-Reading Predictive Index, and a description of the criterion measure and its use. Method-of-collection of the biographical data and a description of the North-Hatt Scale and its use is described.

The statistical procedures used in the study were presented. This involved a description of the contribution made by the computer and an explanation of step-wise multiple regression as it applies to this study.

## CHAPTER IV

### PRESENTATION AND TREATMENT OF THE DATA

The major purpose of the study is to devise an instrument that will identify potential reading failures in kindergarten before reading instruction has been initiated. The study is concerned also with determining if knowledge concerning race, social class, sex, and number of parents in the home would increase the accuracy of the prediction of failure in reading. Analysis of the data was based upon the degree of relationships obtained between a score that the child received in kindergarten on each of the subtests of the Pre-Reading Predictive Index and each of the scores that the same child received eleven and one-half months later on the Vocabulary section and the Comprehension section of the Gates-MacGinitie Reading Tests, Primary A, Form I.

The data will be discussed under the following headings: (1) an analysis of the relationships between each of the subtests on the Pre-Reading Predictive Index and reading vocabulary score, reading comprehension score, social class, race, sex, and number of parents; (2) an analysis of multiple regression correlation rankings of each subtest on the Pre-Reading Predictive Index and biographical information and their predictive efficiency to vocabulary score and reading comprehension score for this select population.

Analysis of Relationships Between Each Subtest  
on the Pre-Reading Predictive Index, and  
Biographical Data and Criterion Measures

Pearson r correlation coefficients were computed to determine if there was a significant relationship between the raw scores obtained on each subtest of the Pre-Reading Predictive Index administered in kindergarten and the raw scores achieved in reading vocabulary and reading comprehension in the first grade. Pearson r correlation coefficients were computed to determine the degree of relationship between social class ranking and each subtest of the Pre-Reading Predictive Index and social class ranking and reading vocabulary score and reading comprehension score.

Point biserial correlation coefficients were computed to determine the degree of relationship between the race, sex, and the number of parents in the home of each child and his score on subtest of the Pre-Reading Predictive Index and between race, sex, and number of parents and his reading vocabulary and reading comprehension scores in the first grade. The resulting correlation coefficients and their levels of significance between the Learning Rate Test raw scores and the other variables are presented in Table I.

Results Related to Learning Rate Test

A-1 There is no significant correlation between the score an individual kindergarten child obtains on the Learning Rate Test and his reading vocabulary score in the first grade.

The computed Pearson r was .361 between the Learning Rate Test score and the reading vocabulary score. Rejection of the null hypothesis at the  $<.001$  level of confidence with 90 degrees of freedom called

for an  $r$  at or greater than .3375. The result was a rejection of the null hypothesis beyond the .001 level of significance.

TABLE I  
ANALYSIS OF RESULTS RELATED  
TO LEARNING RATE TEST

Source	Mean	SD	df	Obtained Value	Critical Value	p
				Pearson r		
Vocabulary	21.39	9.49	90	.361	.337	<.001*
Comprehension	11.99	4.90	90	.300	.267	<.01*
Social Class	5.66	1.55	90	.182	.205	>.05
				Point biserial r		
Race			90	-.247	.242	<.02*
Sex			90	.046	.205	>.05
Number of Parents			90	.000	.205	>.05

N = 100

\*Indicates significance.

A-2 There is no significant correlation between the score an individual kindergarten child obtains on the Learning Rate Test and his reading comprehension score in the first grade.

The computed Pearson  $r$  was .300 between the Learning Rate Test score and the reading comprehension score. Rejection of the null hypothesis at the .01 level of confidence with 90 degrees of freedom



called for an  $r$  greater than .267. The result was a rejection of the null hypothesis at the .01 level of significance.

A-3 There is no significant correlation between the score obtained on the Learning Rate Test and the social class of the child achieving that score.

The Pearson  $r$  was .182 between the Learning Rate Test score and the social class ranking of the child. Rejection of the null hypothesis at .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis. The  $r$  of .182 is  $< .10$  level of confidence but  $> .05$ .

A-4 There is no significant correlation between the score obtained on the Learning Rate Test and the race of the child achieving that score.

The computed Point biserial  $r$  was -.247 between the Learning Rate Test score and the race of the child taking the test. Rejection of the null hypothesis at the .02 level of confidence with 90 degrees of freedom called for an  $r$  greater than .242. The result was a rejection of the null hypothesis at the .02 level of significance. The Negro subjects did not score as high as the Caucasian subjects.

A-5 There is no significant correlation between the score obtained on the Learning Rate Test and the sex of the child obtaining that score.

The computed Point biserial  $r$  was .046 between the Learning Rate Test score and the sex of the child taking the test. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

A-6 There is no significant correlation between the score obtained on the Learning Rate Test and the number of parents of the child achieving that score.

The computed Point biserial  $r$  was .000 between the Learning Rate Test score and the number of parents of the child taking the test. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

Correlation coefficients and their levels of significance between the Categories Test raw scores and the other variables are presented in Table II.

TABLE II  
ANALYSIS OF RESULTS RELATED  
TO CATEGORIES TEST

Source	Mean	SD	df	Obtained Value	Critical Value	p
				Pearson $r$		
Vocabulary	21.39	9.49	90	-.011	.205	>.05
Comprehension	11.99	4.90	90	-.008	.205	>.05
Social Class	5.66	1.55	90	.125	.205	>.05
				Point biserial $r$		
Race			90	.062	.205	>.05
Sex			90	.075	.205	>.05
Number of Parents			90	-.020	.205	>.05

### Results Related to Categories Test

B-1 There is no significant correlation between the score an individual kindergarten child obtains on the Categories Test and his reading vocabulary score in the first grade.

The computed Pearson  $r$  was  $-.011$  between the Categories Test score and the reading vocabulary score. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  of  $.205$ . The result was a failure to reject the null hypothesis at the .05 level of significance.

B-2 There is no significant correlation between the score an individual kindergarten child obtains on the Categories Test and his reading comprehension score in the first grade.

The computed Pearson  $r$  was  $-.008$  between the Categories Test score and the reading comprehension score. Rejection of the null at the .05 level of confidence with 90 degrees of freedom called for an  $r$  of  $.205$ . The result was a failure to reject the null hypothesis at the .05 level of significance.

B-3 There is no significant correlation between the score obtained on the Categories Test and the social class ranking of the child achieving that score.

The computed Pearson  $r$  was  $.125$  between the Categories Test score and the social class ranking of the child. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  of  $.205$  or greater. The result was a failure to reject the null hypothesis at the .05 level of significance.

B-4 There is no significant correlation between the score obtained on the Categories Test and the race of the child achieving that score.

The computed Point biserial  $r$  was  $.062$  between the Categories Test score and the race of the child achieving that score. Rejection of the

null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

B-5 There is no significant correlation between the score obtained on the Categories Test and the sex of the child achieving that score.

The computed Point biserial  $r$  was .075 between the Categories Test score and the sex of the child achieving that score. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

B-6 There is no significant correlation between the score obtained on the Categories Test and the number of parents in the home of the child achieving that score.

The computed Point biserial  $r$  was .020 between the Categories Test score and the number of parents in the home of the child achieving that score. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

Correlation coefficients and their levels of significance between the Peabody Picture Vocabulary Test scores and the other variables are given in Table III.

#### Results Related to the Peabody Picture Vocabulary Test

C-1 There is no significant correlation between the score an individual kindergarten child obtains on the Peabody Picture Vocabulary Test and his reading vocabulary score in the first grade.

TABLE III  
ANALYSIS OF RESULTS RELATED TO PEABODY  
PICTURE VOCABULARY TEST

Source	Mean	SD	df	Obtained Value	Critical Value	p
				Pearson r		
Vocabulary	21.39	9.49	90	.271	.267	<.01*
Comprehension	11.99	4.90	90	.210	.205	>.05
Social Class	5.66	1.55	90	.240	.205	>.05
				Point biserial r		
Race			90	-.084	.205	>.05
Sex			90	-.242	.242	<.02*
Number of Parents			0-	-.064	.205	>.05

\*Indicates significance.

The computed Pearson r was .271 between the Peabody Picture Vocabulary Test score and the reading vocabulary score. Rejection of the null hypothesis at the .01 level of confidence with 90 degrees of freedom called for an r greater than .267. The result was a rejection of the null hypothesis at the .01 level of significance.

C-2 There is no significant correlation between the score an individual kindergarten child obtains on the Peabody Picture Vocabulary Test and his reading comprehension score in the first grade.

The computed Pearson r was .210 between the Peabody Picture Vocabulary Test score and the reading comprehension score. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an r greater than .205. The result was a rejection of

the null hypothesis at the .05 level of significance.

- C-3 There is no significant correlation between the score obtained on the Peabody Picture Vocabulary Test and the social class ranking of the child obtaining that score.

The computed Pearson  $r$  was .240 between the Peabody Picture Vocabulary Test score and the social class ranking of the child. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  of .205 or greater. The result was a rejection of the null hypothesis at the .05 level of significance.

- C-4 There is no significant correlation between the score obtained on the Peabody Picture Vocabulary Test and the race of the child obtaining that score.

The computed Point biserial  $r$  was -.084 between the score obtained on the Peabody Picture Vocabulary Test and the race of the child achieving that score. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

- C-5 There is no significant correlation between the score obtained on the Peabody Picture Vocabulary Test and the sex of the child obtaining that score.

The computed Point biserial  $r$  was -.242 between the score obtained on the Peabody Picture Vocabulary Test and the sex of the child achieving that score. Rejection of the null at the .02 level of confidence with 90 degrees of freedom called for an  $r$  greater than .242. The result was a rejection of the null hypothesis at the .02 level of significance. The male subjects did not score as high as the female subjects on the Peabody Picture Vocabulary Test.

- C-6 There is no significant correlation between the score obtained on the Peabody Picture Vocabulary Test and the number of parents in the home of the child obtaining that score.

The computed Point biserial  $r$  was  $-.064$  between the score obtained on the Peabody Picture Vocabulary Test and the number of parents in the home of the child achieving that score. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

The correlation coefficients and their levels of significance for the Sentences Test raw scores and the other variables are presented in Table IV.

TABLE IV  
ANALYSIS OF RESULTS RELATED  
TO SENTENCES TEST

Source	Mean	SD	df	Obtained Value	Critical Value	p
				Pearson $r$		
Vocabulary	21.39	9.49	90	.197	.205	>.05
Comprehension	11.99	4.90	90	.244	.242	<.02*
Social Class	5.66	1.55	90	.072	.205	>.05
				Point biserial $r$		
Race			90	-.086	.205	>.05
Sex			90	.062	.205	>.05
Number of Parents			90	-.026	.205	>.05

\*Indicates significance.

### Results Related to the Sentences Test

D-1 There is significant correlation between the score an individual kindergarten child obtains on the Sentences Test and his reading vocabulary score in the first grade.

The computed Pearson r was .197 between the score obtained on the Sentences Test and the reading vocabulary score. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an r of .205 or greater. The result was a failure to reject the null hypothesis at the .05 level of significance ( $p < .10$  but  $> .05$ ).

D-2 There is no significant correlation between the score an individual kindergarten child obtains on the Sentences Test and his reading comprehension score in the first grade.

The computed Pearson r was .244 between the score obtained on the Sentences Test and the reading comprehension score. Rejection of the null hypothesis at the .02 level of confidence with 90 degrees of freedom called for an r of .242 or greater. The result was a rejection of the null hypothesis at the .02 level of significance.

D-3 There is no significant correlation between the score an individual kindergarten child obtains on the Sentences Test and the social class ranking of the child achieving that score.

The computed Pearson r was .072 between the score obtained on the Sentences Test and the social class ranking of the child. Rejection of the null hypotheses at the .05 level of confidence with 90 degrees of freedom called for an r of .205 or greater. The result was a failure to reject the null hypothesis at the .05 level of significance.

D-4 There is no significant correlation between the score an individual kindergarten child obtains on the Sentences Test and the race of the child achieving that score.



The computed Point biserial  $r$  was  $-.086$  between the score obtained on the Sentences Test and the race of the child achieving that score. Rejection of the null hypothesis at the .05 confidence level with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

D-5 There is no significant correlation between the score an individual kindergarten child obtains on the Sentences Test and the sex of the child achieving that score.

The computed Point biserial  $r$  was  $.062$  between the score obtained on the Sentences Test and the sex of the child achieving that score. Rejection of the null hypothesis at the .05 confidence level with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

D-6 There is no significant correlation between the score an individual kindergarten child obtains on the Sentences Test and the number of parents in the home of the child achieving that score.

The computed Point biserial  $r$  was  $-.026$  between the score obtained on the Sentences Test and the number of parents in the home of the child achieving that score. Rejection of the null hypothesis at the .05 confidence level with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

The correlation coefficients and their levels of significance for the Mazes Test raw scores and the other variables are presented in Table V.

TABLE V  
ANALYSIS OF RESULTS RELATED  
TO MAZES TEST

Source	Mean	SD	df	Obtained Value	Critical Value	p
				Pearson r		
Vocabulary	21.39	9.49	90	.124	.205	>.05
Comprehension	11.99	4.90	90	.177	.205	>.05
Social Class	5.66	1.55	90	.029	.205	>.05
				Point biserial r		
Race			90	-.153	.205	>.05
Sex			90	-.318	.267	<.01*
Number of Parents			90	.000	.205	>.05

\* Indicates significance.

#### Results Related to the Mazes Test

E-1 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and his reading vocabulary score in the first grade.

The computed Pearson r was .124 between the score obtained on the Mazes Test and the reading vocabulary score. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an r of .205 or greater. The result was a failure to reject the null hypothesis at the .05 level of significance.

E-2 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and his reading comprehension score in the first grade.

The computed Pearson  $r$  was .177 between the score obtained on the Mazes Test and the reading comprehension score. Rejection of the null hypothesis at the .05 confidence level with 90 degrees of freedom called for an  $r$  of .205 or greater. The result was a failure to reject the null hypothesis at the .05 level of significance ( $p < .10$  but  $> .05$ ).

E-3 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and the social class ranking of the child achieving that score.

The computed Pearson  $r$  was .029 between the score obtained on the Mazes Test and the social class ranking of the child. Rejection of the null hypothesis at the .05 confidence level with 90 degrees of freedom called for an  $r$  equal to or greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

E-4 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and the race of the child achieving that score.

The computed Point biserial  $r$  was  $-.153$  between the score obtained on the Mazes Test and the race of the child achieving that score. Rejection of the null hypothesis at the .05 confidence level with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

E-5 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and the sex of the child achieving that score.

The computed Point biserial  $r$  was  $-.318$  between the score obtained on the Mazes Test and the sex of the child achieving that score. Rejection of the null hypothesis at the .01 confidence level with 90 degrees of freedom called for an  $r$  equal to or greater than .267. The

result was a rejection of the null hypothesis at the .01 level of significance. The male subjects did not score as high as the female subjects on the Mazes Test.

- E-6 There is no significant correlation between the score an individual kindergarten child obtains on the Mazes Test and the number of parents in the home of the child achieving that score.

The computed Point biserial  $r$  was .00053 between the score obtained on the Mazes Test and the number of parents in the home of the child achieving that score. Rejection of null hypothesis at the .05 confidence level with 90 degrees of freedom called for an  $r$  equal to or greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

The correlation coefficients and their levels of significance for the Oral Language Development Test raw scores and the other variables are presented in Table VI.

#### Results Related to the Oral Language Development Test

- F-1 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and his reading vocabulary score in the first grade.

The computed Pearson  $r$  was .274 between the Oral Language Development Test score and the reading vocabulary score. Rejection of the null hypothesis at the .01 level of confidence with 90 degrees of freedom called for an  $r$  at or greater than .267. The result was a rejection of the null hypothesis at the .01 level of significance.

TABLE VI  
ANALYSIS OF RESULTS RELATED TO ORAL  
LANGUAGE DEVELOPMENT TEST

Source	Mean	SD	df	Obtained Value	Critical Value	p
Pearson r						
Vocabulary	21.39	9.49	90	.274	.267	<.01*
Comprehension	11.99	4.90	90	.191	.205	>.05
Social Class	5.66	1.55	90	.086	.205	>.05
Point biserial r						
Race			90	.059*	.205	>.05
Sex			90	.156*	.205	>.05
Number of Parents			90	.103*	.205	>.05

\*Indicates significance.

F-2 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and his reading comprehension score in the first grade.

The computed Pearson r was .191 between the Oral Language Development Test score and the reading comprehension score. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an r at or greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance ( $p < .10$  but  $> .05$ ).

F-3 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and the social class ranking of the child achieving that score.

The computed Pearson  $r$  was .086 between the Oral Language Development Test score and the social class ranking of the child. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

F-4 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and the race of the child achieving that score.

The computed Point biserial  $r$  was .059 between the score obtained on the Oral Language Development Test and the race of the child achieving that score. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

F-5 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and the sex of the child achieving that score.

The computed Point biserial  $r$  was .156 between the score obtained on the Oral Language Development Test and the sex of the child achieving that score. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

F-6 There is no significant correlation between the score an individual kindergarten child obtains on the Oral Language Development Test and the number of parents in the home of the child achieving that score.

The computed Point biserial  $r$  was .103 between the score obtained on the Oral Language Development Test and the number of parents in the home of the child achieving that score. Rejection of the null

hypothesis at the .05 level of confidence with 90 degrees of freedom called for an  $r$  greater than .205. The result was a failure to reject the null hypothesis at the .05 level of significance.

#### Analysis Applied to Groupings of the Independent Variables

The independent variables were grouped to determine which ones were accounting for the greatest degree of variance in the computed correlations. Table VII presents the groupings of the independent variables with the dependent variable vocabulary score. The contributions made to the groupings are presented in rank order, the grouped computed correlation coefficient, the adjusted correlation coefficient, and the degree of significance is given.

- G-1 There is no significant correlation between the independent variables (combined Learning Rate Test score and Oral Language Development Test score) and the dependent variable vocabulary test score.

The computed multiple correlation coefficient was .461 between the combined scores on Learning Rate and Oral Language Development and vocabulary score. When adjusted for degrees of freedom it was .452. Rejection of the null hypothesis at the .001 confidence level with 90 degrees of freedom called for an  $r$  greater than .227. The result was a rejection of the null hypothesis at the .001 level of significance.

- G-2 There is no significant correlation between the independent variables (combined Learning Rate Test score, Oral Language Development Test score, and Peabody Picture Vocabulary Test) and the dependent variable vocabulary test score.

The computed multiple correlation coefficient was .495 between the combined scores on Learning Rate, Oral Language Development, and Peabody Picture Vocabulary Test and vocabulary score. When adjusted

TABLE VII  
 GROUPED INDEPENDENT VARIABLE INTERCORRELATIONS  
 WITH VOCABULARY

Groupings	Variable Contributions To Grouped Correlation	Grouped Computed Correla- tion	df	Adjusted Vocabulary Correlation	p
<u>H<sub>o</sub> G-1</u>					
Learning Rate	.361	.461	90	.452	<.001*
Oral Language Development	.100				
<u>H<sub>o</sub> G-2</u>					
Learning Rate	.361	.495	90	.479	<.001*
Oral Language Development	.100				
Peabody Picture	.034				
<u>H<sub>o</sub> G-3</u>					
Social Class	.349	.397	90	.386	<.001*
Number of Parents in the Home	.048				
<u>H<sub>o</sub> G-4</u>					
Social Class	.349	.414	90	.393	<.001*
Number of Parents in the Home	.048				
Race	.017				
<u>H<sub>o</sub> G-5</u>					
Social Class	.349	.430	90	.399	<.001*
Number of Parents in the Home	.048				
Race	.017				
Sex	.016				

\* Indicates significance.



for df the correlation coefficient was .479. Rejection of the null hypothesis at the .001 confidence level with 90 degrees of freedom called for an r greater than .337. The result was a rejection of the null hypothesis at the .001 level of significance.

G-3 There is no significant correlation between the independent variables (social class and number of parents in the home when grouped) and the dependent variable vocabulary test score.

The computed multiple correlation coefficient was .397 between social class and home stability when considered together and vocabulary. When adjusted for df it was .386. Rejection of the null hypothesis at the .001 confidence level with 90 degrees of freedom called for an r greater than .337. The result was a rejection of the null hypothesis at the .001 level of significance.

G-4 There is no significant correlation between the independent variables (social class, ranking, number of parents in the home, and race when grouped) and dependent variable vocabulary test score.

The computed multiple correlation coefficient was .414 between social class, home stability, and race when grouped and vocabulary score. When adjusted for df it was .393. Rejection of the null hypothesis at the .001 confidence level with 90 degrees of freedom called for an r greater than .337. The result was a rejection of the null hypothesis at the .001 level of significance.

G-5 There is no significant correlation between the independent variables (combined social class ranking, number of parents in the home, race, and sex of the child) and the dependent variable vocabulary score.

The computed multiple correlation coefficient was .430 between social class, home stability, race, and sex and vocabulary score. When adjusted for df it was .399. Rejection of the null hypothesis at the .001 confidence level with 90 degrees of freedom called for an r

greater than .337. The result was a rejection of the null hypothesis at the .001 level of significance.

The groupings of the independent variables with the dependent variable comprehension score are presented in Table VIII. The contributions made to the groupings are presented in rank order. The grouped computed correlation coefficients, the adjusted correlation coefficients, and the degrees of significance are given.

- G-6 There is no significant correlation between the independent variables (combined Learning Rate Test score and Sentences Test score) and the dependent variable comprehension score.

The computed multiple correlation coefficient was .374 between Learning Rate and Sentences and the comprehension score. When adjusted for df the correlation coefficient was .362. Rejection of the null hypothesis at the .001 confidence level with 90 degrees of freedom called for an r greater than .337. The result was a rejection of the null hypothesis at the .001 level of significance.

- G-7 There is no significant correlation between the independent variables (combined Learning Rate Test score and Sentences Test score and Oral Language Development Test Score) and the dependent variable comprehension score.

The computed multiple correlation coefficient was .412 between Learning Rate, Sentences, and Oral Language Development and the comprehension score. When adjusted for df it was .391. Rejection of the null hypothesis at the .001 confidence level with 90 degrees of freedom called for an r greater than .337. The result was a rejection of the null hypothesis at the .001 level of significance.

- G-8 There is no significant correlation between the independent variables (combined Learning Rate Test score, Sentences Test score, Oral Language Development Test score, and Mazes Test score) and the dependent variable comprehension score.

TABLE VIII  
 GROUPED INDEPENDENT VARIABLE INTERCORRELATIONS  
 WITH COMPREHENSION

Groupings	Variable Contributions To Grouped Correlation	Grouped Computed Correlation	df	Adjusted Vocabulary Correlation	p
<u>H<sub>o</sub> G-6</u>					
Learning Rate	.300	.374	90	.362	<.001*
Sentences	.074				
<u>H<sub>o</sub> G-7</u>					
Learning Rate	.300	.412	90	.391	<.001*
Sentences	.074				
Oral Language Development	.038				
<u>H<sub>o</sub> G-8</u>					
Learning Rate	.300	.430	90	.399	<.001*
Sentences	.074				
Oral Language Development	.038				
Mazes	.018				
<u>H<sub>o</sub> G-9</u>					
Social Class	.219	.254	90	.234	<.05*
Number of Parents in the Home	.035				
<u>H<sub>o</sub> G-10</u>					
Social Class	.219	.293	90	.259	<.02*
Number of Parents in the Home	.035				
Race	.039				

\* Indicates significance.

The computed multiple correlation coefficient was .430 between Learning Rate, Sentences, Oral Language Development, and Mazes and the comprehension score. When adjusted for df it was .399. Rejection of the null hypothesis at the .001 confidence level with 90 degrees of freedom called for an r greater than .337. The result was a rejection of the null hypothesis at the .001 level of significance.

G-9 There is no significant correlation between the independent variables (combined social class ranking and number of parents in the home) and the dependent variable comprehension score.

The computed multiple correlation coefficient was .254 between social class and home stability and the comprehension score. When adjusted for df it was .234. Rejection of the null hypothesis at the .05 level of confidence with 90 degrees of freedom called for an r greater than .205. The result was a rejection of the null hypothesis at the .05 level of significance.

G-10 There is no significant correlation between the independent variables (combined social class ranking, number of parents in the home, and race) and the dependent variable comprehension score.

The computed multiple correlation coefficient was .293 between social class, home stability, and race and comprehension score. When adjusted for df it was .259. Rejection of the null hypothesis at the .02 level of confidence with 90 degrees of freedom called for an r greater than .242. The result was a rejection of the null hypothesis at the .02 level of significance.

#### Summary

The results of the statistical treatment of the data were presented in this chapter. Step-wise multiple regression was used to test

the hypothesis regarding each predictor variable being studied. Independent variables were tested when grouped and these correlations were reported.

The Pre-Reading Predictive Index subtests found to have the highest single correlation coefficients with vocabulary scores were Learning Rate Test, Peabody Picture Vocabulary Test, and Oral Language Development Test scores. Significance at the .01 level was found between the social class ranking of the child and the vocabulary scores. A significant relationship was not found to exist between race, sex, or number of parents in the home and the vocabulary score when tested singularly. Significant correlations were obtained between the Pre-Reading Predictive Index subtests scores of Learning Rate, Peabody Picture Vocabulary Test, and Sentences Test and scores on the comprehension test. Significance at the .05 level was obtained between social class ranking and the comprehension scores. There was no significant correlation between race, sex, and number of parents in the home and the comprehension scores when tested singularly.

Grouping of the independent variables that had the most significant correlation coefficients allowed the reader to observe the contributions being made by each independent variable. Predicting to the dependent variable of vocabulary score, significance did not increase when grouping the biographical data of four variables over the obtained level when two variables were used. Grouping independent variables to determine relationships for comprehension score revealed that Learning Rate Test and the Sentences Test made the most contribution to the .001 level of significance. Significance was not increased by adding more variables. Grouping social class ranking and the number of parents in

the home and with the comprehension raw score gave a computed correlation coefficient of .05. By adding race to this grouping the level of significance was increased to .02.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

#### General Summary of the Investigation

The purpose of this study was to test an instrument designed to assist in the identification of high risk children at the pre-reading stage. These children were described as those likely to fail in reading when the reading program was largely presented from basal readers. Biographical data were collected and analyzed to determine degree of relationship between race, social class, sex, and the number of parents in the home and vocabulary and comprehension scores in reading in the first grade.

Three hundred and sixty-five kindergarten students took the 1968 Gates-MacGinitie Readiness Skills Test during the second week of February, 1970. There were 141 students out of the 365 who scored one (1.0) standard deviation below the mean on one or more of the subtests of the Gates-MacGinitie Readiness Skills Test or who fell on or below the 24th percentile on the total score.

The Pre-Reading Predictive Index consisting of six subtests was administered individually by trained personnel. Approximately thirty minutes was needed to give each subject the six subtests. The Pre-Reading Predictive Index was scored by the testers and re-evaluated by the investigator. The subjects of this study participated in the

regular kindergarten program and all except one of the 141 were advanced into first grade. There the children received further readiness and reading instruction using the basal reader approach.

The criterion measure was administered during the last week in January, 1971. There were 100 of the 141 subjects present to complete the Gates-MacGinitie Reading Test, Primary A, Form I at that time. Subjects attaining a raw score of 25 (grade score 1.5) or less on vocabulary or 14 (grade score 1.5) or less on comprehension were considered to have failed in reading. These raw score criterion levels represent one month's progress in reading for each month spent in school.

Step-wise multiple regression was used to determine the relationship between the raw scores made on each subtest of the Pre-Reading Predictive Index and social class ranking and the raw scores made on vocabulary and comprehension subtests of the Gates-MacGinitie Reading Test, Primary A, Form I. Point biserial  $r$  was computed for race, sex, and number of parents in the home to see if biographical information would add to the degree of relationship. Computed correlation coefficients may be read in Table IX. The computer selected and grouped the independent variables to find each contribution to the correlation coefficient. The significant groups are presented. Those independent variables not making a contribution to significance were rejected by the computer.



TABLE IX  
INTERCORRELATIONS AMONG TWELVE VARIABLES

Variables	1	2	3	4	5	6	7	8	9	10	11	12
<u>Predictors</u>												
1. Race		-.298*	.011	.384 <sup>#</sup>	-.247**	.062	-.084	-.086	-.153	.059	-.151	-.157
2. Social Class			.021	-.298*	.182	.125	.240*	.072	.029	.086	.349 <sup>#</sup>	.218*
3. Sex				-.090	.046	.075	-.242**	.062	-.318 <sup>#</sup>	.156	.099	.048
4. Number of Parents in the Home					.000	-.020	-.064	-.026	.000	.103	.082	.061
5. Learning Rate						.037	.165	.076	.248**	-.034	.361 <sup>#</sup>	.300 <sup>#</sup>
6. Categories							.107	.128	.039	.079	-.011	-.008
7. Peabody Picture Vocabulary								.314 <sup>#</sup>	.233*	.120	.271 <sup>#</sup>	.210*
8. Sentences									-.084	.127	.197	.244**
9. Mazes										.030	.124	.177
10. Oral Language											.247**	.191
<u>Criterion</u>												
11. Vocabulary												.629 <sup>#</sup>
12. Comprehension												

\*  
p = .05  
\*\*  
p = .02  
#  
p = .01  
##  
p = .001

### Results Related to the Learning Rate Test

Step-wise multiple regression was applied to the raw scores of the Learning Rate test, the independent variable, and the raw scores of dependent variables vocabulary and comprehension. Intercorrelations were computed between Learning Rate Test scores and race, social class, sex, and number of parents in the home.

The results of the analysis indicated that significant relationships exist between the scores on the Learning Rate Test and vocabulary, comprehension, and race. The greatest significance ( $<.001$ ) was found to be between the Learning Rate Test score and the vocabulary score. The other dependent variable, comprehension, correlated  $<.01$  confidence level with the Learning Rate Test score. The only biographical data showing a significant correlation coefficient was race. It was significant at  $<.02$  level of confidence. Social class, sex, and number of parents in the home did not show a significant correlation coefficient with the Learning Rate Test scores.

The results of this study indicate that the Learning Rate Test administration and evaluation would be a worthwhile activity for kindergarten teachers to undertake. Children in kindergarten who learn words easily and retain them over a period of time do not need a long period of readiness instruction before beginning to read. Those children in kindergarten who do not retain known words over a period of time need to have specific instruction in visual and auditory discrimination, in letter recognition, practice exercises in listening and in visual-motor coordination, and instruction to further develop their oral language concepts. The results of this study indicate that more attention needs to be given to Negro children before expecting them to

learn and retain words.

#### Results Related to the Categories Test

Step-wise multiple regression was applied to the raw scores of the Categories Test, the independent variable, and the raw scores of the dependent variables, vocabulary and comprehension. Intercorrelations were computed between Categories Test scores and race, social class, sex, and number of parents in the home to test the hypotheses.

Analysis of the results of the Categories test did not reveal significance in any of the correlations. It would seem that the Categories Test does not add information concerning prediction of failure in reading with this population sample. Therefore, given a population similar to the one used in this study it would not add information concerning the identification of children who may fail in reading to administer this subtest of the Pre-Reading Predictive Index.

#### Results Related to the Peabody Picture Vocabulary Test

Step-wise multiple regression was applied to the scores of the Peabody Picture Vocabulary Test, the independent variable, and the scores of dependent variables vocabulary and comprehension. Intercorrelations were computed between the Peabody Picture Vocabulary Test scores and race, social class, sex, and number of parents in the home.

Analysis of the results indicated that a significant correlation exists between the Peabody Picture Vocabulary Test and the dependent variable vocabulary scores. The significance was  $< .01$  level of confidence. Significance was  $< .05$  between social class ranking and the Peabody Picture Vocabulary Test. An inverse relationship at the .02

confidence level was found to exist between sex and the Peabody Picture Vocabulary Test. The male subjects in this study did not score as high as the female subjects on the Peabody Picture Vocabulary Test. No significant relationships were found between the Peabody Picture Vocabulary Test and number of parents in the home, race, or the comprehension score in reading in the first grade.

Results of this study seem to indicate that the Peabody Picture Vocabulary Test is an instrument that would be helpful to the kindergarten and the first grade teachers. The Peabody Picture Vocabulary Test could help the teachers locate the children who might have difficulty in learning words presented in isolation or those who needed help with concept development. The test could help the teachers locate the boys from the lower social class who might need additional instruction in order to prevent failure in reading in the first grade.

#### Results Related to the Sentences Test

Step-wise multiple regression was applied to the raw scores of the Sentences Test, the independent variable, and the raw scores of dependent variables vocabulary and comprehension. Intercorrelations were computed between Sentences Test scores and race, social class, sex, and number of parents in the home. Results of the analysis indicated a relationship at  $<.02$  confidence level between the Sentences Test and the score in comprehension. No significant correlation coefficient was found for vocabulary, social class, race, sex, and number of parents in the home when related to the Sentences Test score for this selected sample of 100 children.

The degree of significance obtained between the comprehension scores in reading in the first grade and the Sentences Test would seem to warrant inclusion of this test for diagnostic use in kindergarten. The Sentences Test is an auditory memory test and a low score would help locate children who need help in developing their auditory skills to prevent possible failure in reading.

#### Results Related to the Mazes Test

Step-wise multiple regression was applied to the raw scores of the Mazes Test, the independent variable, and the raw scores of dependent variables vocabulary and comprehension. Intercorrelations were computed between the Mazes Test scores and race, social class, sex, and number of parents in the home. The results of the analysis indicated a probability  $>.05$  confidence level relationship between the Mazes Test scores and vocabulary and comprehension scores in reading in the first grade. There was no significant relationship between the Mazes Test scores and social class, race, or number of parents in the home. An inverse relationship was found to exist between the sex of the subject and the score on the Mazes Test at  $<.01$  confidence level. The male subjects scored lower on the Mazes Test than did the female subjects. Since there was no relationship shown between the Mazes Test score and reading vocabulary or comprehension scores it seems that this test does not serve to predict reading failure and should be eliminated from the Pre-Reading Predictive Index.

Results Related to the Oral Language  
Development Test

Step-wise multiple regression was applied to the raw scores of the Oral Language Development Test, the independent variable, and the raw scores of dependent variables vocabulary and comprehension. Intercorrelations were computed between Oral Language Development Test scores and race, social class, sex, and number of parents in the home.

One significant correlation coefficient at the .01 level of confidence was found in the analysis. This relationship was between the Oral Language Development Test score and the vocabulary score in reading in the first grade. No significant correlation was found between Oral Language Development Test scores and comprehension scores, social class, race, sex, and number of parents in the home. A relationship exists  $< .10$  between comprehension scores and the Oral Language Development Test score, but this is not to be considered at the critical level.

It would seem from this investigation that there is enough evidence of existing relationships between vocabulary scores and Oral Language Development Test scores to warrant including this test for use with kindergarten children. These results indicate that the more words the children use in describing pictures the more words they learn in reading. With the failing readers it would seem to say the fewer words used in kindergarten the fewer words they learn in reading. This test could help identify those children who need additional help in developing oral language skills.

### Results Related to Groupings of the Independent Variables

Step-wise multiple regression was applied to all of the scores of the independent variables. The computer selected and grouped together those independent variables making a contribution to a multiple correlation coefficient. Intercorrelations were computed between this grouped data and each dependent variable. The analysis of the groupings of the independent variables was to determine which ones were making the most contribution to the multiple  $r$ . Only those groupings that were significant were held by the computer in its analysis. All reported results were significant at the .001 level of confidence and may be read from Table VII, page 64.

The first multiple correlation held by the computer was between the vocabulary scores and Learning Rate Test scores and Oral Language Development Test scores. Learning Rate Test information contributed .361 to the .452 correlation coefficient with Oral Language Development Test adding another .100. This additional contribution strengthens the other finding. The addition of the Peabody Picture Vocabulary Test score added further strength to the multiple  $r$  and raised it to .479. Although the significance level of .001 was not raised, still, this stronger degree of relationship should give the reader more confidence in the results.

It would seem from examining Table VII that Learning Rate and social class ranking made the most contribution to the correlation coefficient with regard to vocabulary score. Social class ranking contributed .349 while number of parents in the home added .048, race added .017, and sex added .016 to the multiple  $r$  to raise it to .399.

In the analysis of the results when studying groupings of the independent variables as related to comprehension score the reader is referred to Table VIII, page 67. The Sentences Test added .074 to the Learning Rate Test .300 correlation coefficient and Oral Language Development Test another .038. The Mazes Test added another .018 and raised the multiple r to .399 which was significant at the .001 level of confidence. The computer rejected the Categories and Peabody Picture Vocabulary Test as not making contributions to the multiple correlations with this selected sample. The computer also grouped the biographical data to determine which independent variable made the greatest contribution to the multiple r. Social class ranking made the most contribution with .219 and number of parents in the home added .035 to produce an adjusted correlation of .234 for  $<.05$  confidence level. The addition of race information added .039 and raised the adjusted correlation to .259 and also, raised the significance to  $<.02$  level of confidence.

From the results of this multiple correlation coefficient, teachers of kindergarten children can administer the Learning Rate Test, the Oral Language Development Test, and the Peabody Picture Vocabulary Test in the middle of the year and obtain scores that will predict to first grade reading vocabulary scores. With the addition of the Sentences Test a reliable prediction can be made to reading comprehension scores. The results of this study indicate that teachers in kindergarten and first grade need to be aware of the number of parents in the child's home and the occupation of the parents. Diagnostic information obtained by use of the selected subtests on the Pre-Reading Predictive Index and significant biographical information can predict which children will



fail in reading. With this specific diagnostic information measures can be taken before reading instruction has begun to prevent failure in reading from occurring.

#### Summary of Conclusions

Thirty-five years ago attention was called to the need for early identification of the young child who might have difficulties in learning to read. Many writers and a few researchers have repeated this concern since that time. This study was undertaken to draw attention to earlier diagnosis of the beginning reader and to determine if reading failure could be predicted at the kindergarten level. In order to accomplish the early diagnosis, a battery of simple tests (Pre-Reading Predictive Index) was selected and devised with the kindergarten child's developmental stage in mind. This study was then conducted by selecting and testing a group of children at the pre-reading stage who might be considered as high risks for formal reading instruction, administering the Pre-Reading Predictive Index and evaluating the subjects' reading progress one year later. The following conclusions are presented as a result of this study:

1. Early screening in kindergarten can be carried out by the teachers. This can be done early enough in the kindergarten for the teachers to plan a program of instruction aimed specifically at the reading readiness needs of the children.
2. It is important for the teacher to give attention to the biographical data such as social class ranking, race, and number of parents in the home when evaluating reading

vocabulary and comprehension scores in the first grade.

3. When the Pre-Reading Predictive Index was evaluated by this study some subtests were found to be more effective as predictors than others. Categories should be eliminated from the battery because of its lack of significance with any other variable. Categories did not add to the multiple correlation coefficient when grouped.
4. The results of this investigation point out that grouping of the subtests of the Pre-Reading Predictive Index will give a higher correlation coefficient than will using the tests alone.
5. Learning Rate, Oral Language Development, and Peabody Picture Vocabulary Test grouped will serve as efficient predictors for vocabulary scores and by adding Sentences a combination can be pulled together for prediction of comprehension scores.
6. Early screening in kindergarten and administration of Learning Rate, Oral Language Development, Peabody Picture Vocabulary Test, and Sentences added to the biographical data; social class ranking, race and number of parents in the home would serve to identify children similar to the 100 used in the sample who can be predicted to fail in reading in the first grade.

### Recommendations

The investigator in planning, carrying out, and evaluating the present study came to several conclusions pertaining to further research needed in this area:

1. A two year follow-up study using the same selected subjects when they reach the middle of the second grade and testing again when they reach the middle of the third grade (or year in school), to determine if the kindergarten prediction holds for vocabulary and comprehension in reading at the later dates.
2. Using the same selected sample, an Oral Language Development Test re-evaluation to determine which subjects had made growth in use of language.
3. A study conducted on a sample of bi-lingual children to determine if the predictive efficiency would hold for a different population.
4. A study with screening taking place early in the kindergarten and all subjects receiving the Pre-Reading Predictive Index, dividing the selected subjects into control and experimental groups, the control group would receive the regular readiness program, the experimental group would receive instruction designed especially for their strengths and weaknesses as revealed by the testing. Criterion measures could be reading achievement tests at the end of first, second, and third grades.

#### A SELECTED BIBLIOGRAPHY

- Aftanas, M. S. "A Study of the Psychological and Social Factors Related to Preschool Prediction of Reading Retardation." Paper presented at National Convention of the Canadian Psychological Association, Winnipeg, Manitoba, May 28, 1970.
- Akers, James C. "A Predictive Validity Study of the Metropolitan Readiness Tests." (unpublished Doctor's dissertation, Oklahoma State University, 1969).
- Allen, James E. "The Right to Read--Target For the 70's." Speech before National Association of State Boards of Education, September 23, 1969.
- Barrett, Thomas C. "Predicting Reading Achievement Through Readiness Tests." Reading and Inquiry. Ed. J. Allen Figurel. Proceedings of the Annual Convention, Vol. 10, 1965, International Reading Association, Newark, Delaware.
- Bentz, Darrell D. "A Study of the Effect of Perceptual and Language Training Upon Kindergarten Children's Reading Readiness Performance." (unpublished Doctor's dissertation, Oklahoma State University, 1970).
- Betts, Emmett A. The Prevention and Correction of Reading Difficulties. Evanston, Illinois: Row Peterson and Company, 1936.
- Binkley, M. Edward. "School Entrance Variables and Later Achievement and Personality." Reading and Realism. Ed. J. Allen Figurel. Proceedings of the Thirteenth Annual Convention, Vol. 13, Part I, 1971, International Reading Association, Newark, Delaware.
- Bloom, Benjamin S. Stability and Change in Human Characteristics. New York: John Wiley and Sons, Inc., 1964.
- Bruning, James L., and B. L. Kintz. Computational Handbook of Statistics. Glenview, Illinois: Scott, Foresman and Company, 1968.
- Buros, O. K. (Ed.) Reading Tests and Reviews. Highland Park, New Jersey: The Bryphon Press.
- Castner, B. M. "Prediction of Reading Disability Prior to First Grade Entrance." The American Journal of Orthopsychiatry, 5 (1935), 375-387.

- Chall, Jeanne S. Learning to Read: The Great Debate. New York, N. Y.: McGraw-Hill Publishing Company, 1967.
- Cohen, Theodore. "Prediction of Underachievement in Kindergarten Children." Archives of General Psychiatry, 9 (November, 1963), 42-48.
- Craig, Isabel. "Developmental Tasks in Reading." Reading and Inquiry, Vol. 10. Newark, Delaware: International Reading Association, 1965.
- DeHirsch, Katrina. "Tests Designed to Discover Potential Reading Difficulties at the Six-Year-Old Level." American Journal of Orthopsychiatry, 27 (1957), 566-576.
- DeHirsch, Katrina, Jeannette J. Jansky, and William S. Langford. Predicting Reading Failure. New York, N. Y.: Harper and Row, Publishers, 1966.
- Dunn, Lloyd M. Expanded Manual for the Peabody Picture Vocabulary Test. Circle Pines, Minnesota: American Guidance Service, Inc., 1965.
- Ferguson, George A. Statistical Analysis in Psychology and Education, 2nd ed. New York, N. Y.: McGraw-Hill Book Company, 1966.
- Gates, Arthur I. The Improvement of Reading, A Program of Diagnostic Remedial Methods, 3rd ed. New York: The Macmillan Company, 1947.
- Gates, Arthur I., and Guy L. Bond. "Reading Readiness: A Study of Factors Determining Success and Failure in Beginning Reading." Teachers College Record, 37 (1936), 679-685.
- Gates, Arthur I., and Walter H. MacGinitie. Gates-MacGinitie Reading Tests, Readiness Skills Kindergarten and Grade 1, Teacher's Manual. New York, N. Y.: Teachers College, Columbia University, 1968.
- Gjessing, Hans-Jorgen. "The Concept of Reading Readiness in Norway." Reading Instruction: An International Forum. Ed. Marion D. Jenkinson. Newark, Delaware: International Reading Association, 1966.
- Harris, Albert J., and Florence G. Roswell. "Clinical Diagnosis of Reading Disability." Children With Reading Problems. Ed. Gladys Natchez. Basic Books, Inc. Pub., 1968.
- Harris, Theodore L. "What Questions Does Reading Research Ask?" Reading as an Intellectual Activity. Ed. J. Allen Figurel. International Conference Proceedings, 1963, International Reading Association, Newark, Delaware.
- Hatt, Paul K. "Occupation and Social Stratification." American Journal of Sociology, LV (May, 1950), 533-543.

- Hirst, Wilma E. "Identification in the Kindergarten of Factors that Make for Future Success in Reading and Identification and Diagnosis in the Kindergarten of Potential Reading Disability Cases." Washington, D. C.: U. S. Department of Health, Education, and Welfare, Office of Education, Bureau of Research, 1969. EP 029710
- Hodge, Robert W., Paul M. Siegal, and Peter H. Rossi. "Occupational Prestige in the United States, 1925-63." American Journal of Sociology, 70 (1964-65), 286-302.
- Holt, John C. How Children Fail. New York, N. Y.: Pitman Publishing Company, 1964.
- Lampard, Dorothy M. "Early Diagnosis of Reading Disability." Reading and Inquiry. Ed. J. Allen Figurel. Proceedings of the Annual Convention, Vol. 10, 1965, International Reading Association, Newark, Delaware.
- Loban, Walter. The Language of Elementary School Children. Research Report, No. 1, National Council of Teachers of English, 1963.
- Malmquist, Eve. "Organizing Instruction to Prevent Reading Disabilities." Reading as an Intellectual Activity. Ed. J. Allen Figurel. International Conference Proceedings 1963, International Reading Association, Newark, Delaware.
- McCullough, Celeste, and Loche Van Atta. Introduction to Descriptive Statistics and Correlation. New York: McGraw-Hill Book Company, 1965.
- Means, Robert S., and Don Ely. "Prediction of Graduate Success at Oklahoma State University." (unpublished paper, Oklahoma State University, 1970).
- Meyer, George. "Some Relationships Between Rorschach Scores in Kindergarten and Reading in the Primary Grades." Journal of Projective Techniques, 17 (1953), 414-425.
- Monroe, Marion. "Reading Aptitude Tests for the Prediction of Success and Failure in Beginning Reading." Education, September, 1935, pp. 7-14.
- Morgan, Elmer F. "Efficacy of Two Tests in Differentiating Potentially Low From Average and High First Grade Achievers." Journal of Educational Research, Vol. 53, No. 8 (April, 1960), 300-303.
- Murray, Beulah B. "A Suggested Method for Pre-School Identification of Reading Disability." Tennessee University Psychological Clinic, Knoxville, Spons. Agency, (Washington, D.C.: Office of Education, Department of Health, Education, and Welfare.
- Oklahoma State University. Thesis Writing Manual. Stillwater, Oklahoma, 1967.

- Popham, W. James. Educational Statistics Use and Interpretation. New York, N. Y.: Harper and Row, Publishers, 1967.
- Ray, Darrel D., and Leo V. Rodenborn. Manual for the Readiness Record File. Stillwater, Oklahoma: Diagnostic Publishing Company, 1969.
- Reiss, Albert J., Jr., and Otis Dudley Duncan. Occupations and Social Status. The Free Press of Glencoe, Inc., A Division of Crowell-Collier Publishing Company, 1961. Appendix B, pp. 263-275, Table B-1.
- Rosenfield, Abby G. "Psycholinguistic Abilities as Predictors of Reading Ability and Disability." Chicago, Illinois: Northeastern Illinois State College, February, 1971.
- Smith, Nila B. Reading Instruction for Today's Children. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1963.
- Strickland, Ruth G. The Language of Elementary School Children: Its Relationship to the Language of Reading Textbooks and the Quality of Reading of Selected Children. Bulletin of the School of Education, Indiana University, XXXVIII, July, 1962.
- Tauber, Rosalyn. "Identification of Potential Learning Disabilities." Academic Therapy Quarterly, 2 (Fall 1966-67), 116-121.
- Wechsler, David. Manual for the Wechsler Preschool and Primary Scale of Intelligence. New York, N. Y.: The Psychological Corporation, 304 East 45th Street, 1963.
- Weiner, Max, and Shirley Feldman. "Validation Studies of a Reading Prognosis Test for Children of Lower and Middle Socio-Economic Status." Educational and Psychological Measurement, Vol. XXIII, No. 4, 1963.

VITA <sup>2</sup>

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Thesis: USE OF A PRE-READING PREDICTIVE INDEX TO DETERMINE POTENTIAL FAILURE IN FIRST GRADE READING

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