A PREDICTIVE VALIDITY STUDY OF THE

METROPOLITAN READINESS TESTS

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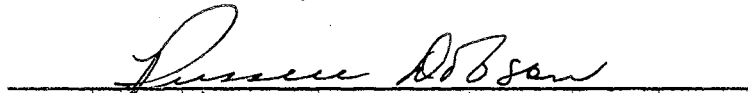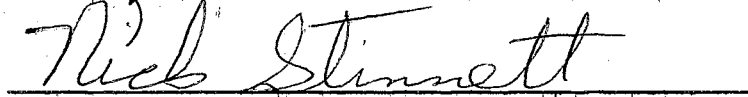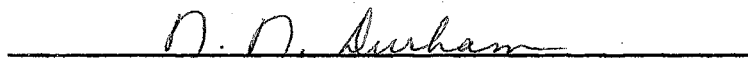Thesis Approved:

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CHAPTER I

PRESENTATION OF THE PROBLEM

Introduction

Can a group administered test give meaningful informa-
tion to a first grade teacher? Will a standardized test,
such as The Metropolitan Readiness Test Form A, provide
sufficient information to help the teacher to identify those
students which will have success or failure in first grade
reading? Is it correct to mark a child as a future success
or failure in reading according to measures such as the
Metropolitan Readiness Tests? These and other questions
are ones which are constantly being asked by those who are
interested in first grade reading achievement. Tests such
as this are administered widely in many school systems
throughout the nation. The tests are sometimes given undue
importance in designating certain pupils to achieve or not
achieve within a certain range. This study is concerned
with investigating the predictive validity of one of these
measures in an effort to determine if such a test has the
"power of prediction."

Weintraub (1967) states that readiness tests tend to
correlate somewhere between .60 and .40 with later measures
of reading achievement and that readiness tests do an

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acceptable job of identifying the extremes of the normal curve, i.e., those who will probably succeed and those who will probably fail. He points out, however, that a large group of children near the middle of the curve could go either direction when placed in what could be called a normal reading program. Simpson (1960) found the 1947 edition of the Metropolitan Readiness Tests to have a correlation of .62 with first grade reading achievement. Hegenson (1967) found the 1965 edition of the Metropolitan Readiness Tests to have a correlation with reading achievement of .66.

These studies indicate that while there is good correlation between readiness tests and reading achievement, the relationship is not absolute and should not be interpreted in such a manner. Classification of a child as being a potential reading problem or success is a very big decision and calls for restraint on the part of teachers and others who have access to test scores.

Statement of the Problem

The purpose of this study is to establish a measure of predictive validity for the 1965 edition of the Metropolitan Readiness Tests and its individual subtests using first grade students' test results. These test results will be grouped according to the sex and socio-economic level of the students. To expedite consideration of this problem, the areas of concern are defined by the following questions:

A. Can significant differences in performance
on the Metroplitan Readiness Tests and the
Gates-MacGinitie Reading Test be found when
students are categorized by sex? The
hypotheses to be tested in this area are
stated in the null form as:

1. There is no significant difference
in performance on the Metropolitan
Readiness Tests when students are
categorized by sex.

2. There is no significant difference
in performance on the Gates-MacGinitie
Reading Test when students are cate-
gorized by sex.

B. Do students of different socio-economic levels
differ significantly in their performance on
the Metropolitan Readiness Tests and the Gates-
MacGinitie Readiness Test? The hypotheses to
be tested in this area are stated in the null
form as:

1. There is no significant difference
in performance on the Metropolitan
Readiness Tests when students are
categorized by socio-economic level.

2. There is no significant difference
in performance on the Gates-MacGinitie
Reading Test when students are

categorized by socio-economic level.

C. Are there significant differences in performance
on the <u>Metropolitan</u> <u>Readiness</u> <u>Test</u> and the
<u>Gates-MacGinitie</u> <u>Reading</u> <u>Test</u> when students
are categorized by sex and socio-economic
level. The hypotheses to be tested in this
area are stated in the null form as:

    1. There is no significant difference
in performance on the <u>Metropolitan</u>
<u>Readiness</u> <u>Test</u> when students are
categorized by sex and socio-
economic level.

    2. There is no significant difference
in performance on the <u>Gates-</u>
<u>MacGinitie</u> <u>Reading</u> <u>Test</u> when students
are categorized by sex and socio-
economic level.

D. Do the perceptual subtests, language subtests,
or the total test of the Metropolitan signif-
icantly predict reading achievement for the
total sample? The hypotheses to be tested in
this area are stated in null form as:

    1. There is no perceptual subtest
which will significantly predict
reading achievement for the total
sample.

    2. There is no language subtest which

will significantly predict reading
achievement for the total sample.

    3. The total test will not significant-
ly predict reading achievement for
the total sample.

E. Do the perceptual subtests, language subtests
or the total test significantly predict read-
ing achievement when students are categorized
by sex. The hypotheses to be tested in this
area are stated in the null form as:

    1. There is no perceptual subtest
which will significantly predict
reading achievement when students
are categorized by sex.

    2. There is no language subtest which
will significantly predict reading
achievement when students are
categorized by sex.

    3. The total test will not significantly
predict reading achievement when stu-
dents are categorized by sex.

F. At what socio-economic levels are the perceptual
and language subtests, and the total test sig-
nificant in predicting reading achievement?
The hypotheses to be tested in this area are
stated in the null form as:

    1. There is no perceptual subtest

which will significantly predict

reading achievement when students

are categorized by socio-economic

level.

    2. There is no language subtest which

will significantly predict reading

achievement when students are

categorized by socio-economic level.

    3. The total test will not significantly

predict reading achievement when stu-

dents are categorized by socio-

economic level.

G. Do the perceptual subtests, language subtests

or the total test significantly predict read-

ing achievement when groups are categorized

by sex or socio-economic level? The

hypotheses to be tested in this area are

stated in the null form as:

    1. There is no perceptual subtest

which will significantly predict

reading achievement when students

are categorized by sex and socio-

economic level.

    2. There is no language subtest which

will significantly predict reading

achievement when students are

categorized by sex and socio-

economic level.

3. The total test will not signifi-

cantly predict reading achievement

when students are categorized by

sex and socio-economic level.

Need for the Study

First grade teachers are individuals with a large

amount of responsibility in the form of twenty to thirty

young minds. It is in this grade that a teacher is given

the task of orienting young children to a school routine,

establishing a somewhat sustained attention span and teach-

ing them to read among other things. With so much to be

done, there is not as much time as would be desirable to

determine a child's readiness for reading instruction.

Concern about this problem is not new. In the 1920's,

Reed (1927) noted that there was a great deal of concern

about the large number of failures in first grade. The

conclusion reached concerning this matter was that not all

children were ready for reading at six years. Smith (1961)

observed that from 1920 to 1940 there was great interest in

regard to the area of reading readiness. Less and others

(1934) found the readiness measures used in their study to

have a .49 correlation with first grade achievement.

Henig (1949) reported that teacher forecasts seem to have

as accurate a predictiveness as the readiness tests common

at that time. Karlin (1957) found this to be essentially
true in his study. Karlin (1959) warned that the almost
exclusive use of readiness tests to measure readiness should
be re-examined. Simpson (1960) found the readiness tests
used in her study to have good correlation with reading
success but not highly significant success in the predicting
of success or failure in reading. These studies indicate
that limited dependence should be placed on readiness tests
in the determination of reading readiness.

It should be pointed out at this time that while group
administered readiness tests have limitations they are
usually better than not attempting to measure readiness.
Recognition of the limitations of such tests, associated
with attempts to improve them warrants their continued use
as general guidelines rather than absolute predictors of
reading achievement.

Another major criticism of the readiness tests is that
they do vary according to socio-economic groups. Sullivan
(1965) found that a high positive relationship does exist
between socio-economic levels and levels of reading readi-
ness of first grade students. Johnson (1967) reported
similar findings in his study considering the socio-economic
factor and its relationship to reading readiness. Coker
(1966), however, found no significant relationship between
socio-economic level and readiness scores. Vilscek (1964)
indicated that there was no statistically significant dif-
ference in readiness between those first grade pupils in the

lower socio-economic groups and those in the above groups.
All-in-all, results of studies considering the socio-
economic factor in relation to performance on reading readi-
ness measures are inconclusive.

It is the purpose of this investigation to make a pre-
dictive validity study of one of the most widely used readi-
ness tests considering the factors of sex and socio-economic
level. The instrument to be studied is the 1965 edition of
the <u>Metropolitan Readiness Tests</u>, Form A.

There are six subtests included in the <u>Metropolitan
Readiness Tests</u>. They are as follows:

Test 1. Word meaning, a 16-item picture vocabu-
lary test. The pupil selects from three
pictures the one that illustrates the
word the examiner names.

Test 2. Listening, a 16-item test of ability to
comprehend phrases and sentences instead
of individual words. The pupil selects
from three pictures the one which
portrays a situation or event the
examiner describes briefly.

Test 3. Matching, a 14-item test of visual
perception involving the recognition of
similarities. The pupil marks one of
three pictures which matches a given
picture.

Test 4. Alphabet, 16-item test of ability to
recognize lower-case letters of the
alphabet. The pupil chooses a letter
named from among four alternatives.

Test 5. Numbers, a 26-item test of number
knowledge.

Test 6. Copying, a 14-item test which measures
a combination of visual perception and
motor control. (Harcourt, Brace & World,
1965, p. 3)

This test is one of the most widely used readiness

tests on the market today judging by its wide use as re-
ported in research studied today. Buros (1953) reviewed
this test and reported its wide use as a readiness measure.
Sullivan (1967), Wortenberg (1967), Nash (1963) Mayans
(1966), and several others have made studies using it as a
predictive instrument.

This study will seek to answer questions which are
pertinent to those concerned about first grade reading
readiness. These areas of questions were stated in the
Statement of the Problem and they generally deal with the
predictiveness of the test. Briefly, they covered the areas
of the predictiveness of the subtests, the predictiveness of
various groupings of the subtests, the predictiveness of the
test as a whole and all of the three areas just stated as
they apply to the factors of socio-economic level and sex.

<div align="center">Definition of Terms</div>

The following are definitions and clarification of
terms as they are applied throughout this study.

Metropolitan Readiness Tests, Form A (1965) published
by Harcourt, Brace and World, Inc. This test consists of
six subtests measuring a range of areas. These areas are
word meaning, listening, matching, alphabet, numbers, and
copying. In the remainder of this paper this test will be
called the Metropolitan.

Gates-MacGinitie Reading Test, Primary A, Form 1 (1965)
published by Teachers College Press, Teachers College,

Columbia University. This test is designed for use in the first grade. Two equivalent forms of Primary A are available (Form 1 and 2). Each test is composed of two parts: vocabulary and comprehension. In the remainder of this paper this test will be called the Gates-MacGinitie.

National Opinion Research Center Scale. This scale was developed by the National Opinion Research Center which is located at Ohio State University. It presents the social rankings of ninety occupations. The occupations covered by the scale range from U. S. Supreme Court Justice to a shoe shiner. The scale was developed under the direction of Cecil North and Paul Hatt and is sometimes referred to as the North-Hatt Measure. In the remainder of this paper this scale will be called the NORC scale.

Predictive Validity. This is the extent to which an instrument is efficient in forecasting and differentiating behavior in a specified area. Simply stated as used in this study, it is the ability of an instrument to predict reading achievement in the first grade. It will be measured by the success of the Metropolitan in predicting performance on the Gates MacGinitie.

Reading Readiness. This term refers to those skills, knowledge or experience for reading as they are measured by the Metropolitan. These components are those deemed necessary in certain quantities to insure success in reading. Identified individually with the subtest of the Metropolitan which measures them, they are as follows: 1. Verbal

concepts by word meaning; 2. ability to comprehend phrases and sentences by listening; 3. visual perception by matching; 4. recognition of letters of the alphabet by alphabet; 5. number concepts and knowledge by numbers; 6. motor control by copying.

Reading Achievement. This will be achievement as it is measured on the Gates-MacGinitie.

Perceptual Subtests. This is the Alphabet, Numbers, Matching, and Copying subtests of the 1965 edition of the Metropolitan Reading Readiness Test. These subtests are both measures of visual perception which is considered to be one of the major abilities needed for successful reading development.

Language Subtests. This is the Word Meaning and Listening subtests of the 1965 edition of the Metropolitan Reading Readiness Test. These subtests are both measures to a certain degree of language background and experience. Language experience is considered fundamental to reading development.

Socio-economic Level. This is a level assigned to subjects of the sample by the NORC Scale. The level will be indicated by one of the following adjectives: low, middle, or high.

Delimitations

Scope of the Study

This study presents an analysis of the test scores of

630 subjects who were enrolled in a metropolitan school system. The test scores were categorized according to sex and socio-economic level to arrive at six groups of 105. The socio-economic level was designated by the NORC scale. Each of the subjects had taken the Metropolitan in 1968 and took the Gates-MacGinitie approximately one year later in 1969. Analysis of variance and multiple linear regression were applied to the test results grouped according to sex and socio-economic level to determine if significant difference in performance existed and if any of the subtests, grouping of subtests or the total test could significantly predict reading achievement.

This study is not concerned with methods of teaching reading, the various theories of reading or the efficiency of the school system from which the subjects were selected.

Controls

The term "controls" as here applied is defined as referring to restraints on experimental conditions.

1. The same textbooks were used by all subjects. The series used was published by Harper and Row, Inc. This provided a common textbook and reading methodology for all subjects in this study.

2. All subjects had teachers who hold college degrees and are certified by the state. This provides the minimum level of education of

each teacher.

3. The subjects within each socio-economic level were randomly chosen.

Assumptions

Through random sampling, a uniformity in several areas is assumed. Specifically:

1. It was assumed that test administrations by teachers were not detrimental to the study.

2. It was assumed that relatively uniform quantity of school furnished reading materials were available for all subjects in this study.

3. It was assumed that the I.Q. distribution of the subjects was normal.

Limitations of the Study

1. Due to the nature of the study, it was not feasible to control instruction beyond the criteria of minimum teacher education and that all subjects in the study used the same textbook series, therefore reading materials other than the regular textbook could not be controlled.

2. Due to the nature of the NORC Scale, it was not feasible to compensate or consider the

variable of "working mothers". The effect of
this upon the socio-economic placement of the
pupil is not known.

Due to the fact that this study is in the area of
social sciences, it was impossible to control all existing
variables.

Organization of the Study

Chapter I has introduced the problem to be studied.
This has included the statement of the problem, the need
for the study, the definition of terms as used in the study
and the delimitations of the study.

Chaper II will review the literature concerning the
hypotheses to be tested.

Chapter III will describe design of the study, the
population, the selection of the sample and the instruments
used to select the sample. It will also describe the test
used to measure reading achievement and the statistical
methods used to test the predictive validity of the instru-
ment under study.

Chapter IV will contain a statistical analysis of the
data. This chapter will indicate the degree to which the
hypotheses are found to be correct within recognized
limitations.

Chapter V will present a discussion of the results of
this study and recommendations regarding future studies in
this area.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The literature concerning the prediction of reading
success by various tests constitutes a formidable body of
research. The studies range from testing a single predictor
of reading success to multiple predictors of reading
success. Reviewed for this study was the literature con-
cerning studies of the prediction of reading success by
various instruments. In keeping with this central theme the
literature will be discussed and divided into the following
areas of interest: (1) Studies which report on a single
predictive variable of reading success, (2) studies which
report on multiple predictive variables of reading success,
and (3) studies which report on the Metropolitan Readiness
Tests as a predictor of reading success. Those studies
which deal with the factors of socio-economic level or sex
will be grouped together within each section.

Single Predictive Variables of Reading Success

Several studies have been conducted using a single fac-
tor or element necessary to learn how to read as a predictor
of future reading performance. These studies cover such

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areas as auditory discrimination, visual discrimination, auditory-visual integration, recognition of letters and various others. The attempts to isolate different readiness factors and their predictive power have met with varying degrees of success.

In the area of auditory discrimination, Gates, Bond, and Russell (1939) conducted a study using first grade classes of four public schools in a large eastern city. They administered several tests, including a test of auditory discrimination. Correlations between each of the auditory discrimination tests and each of the reading achievement tests were computed for test results obtained midway through the first grade, at the end of the first grade and midway through the second grade. The average correlations with reading achievement were (1) giving words with the same rhyming final sounds, .43, (2) giving words with stated initial sounds, .41, (3) blending, .38, (4) reproduction of nonsense words, .23, (5) giving letters for sounds, .21, and (6) discriminating word pairs, .20.

Steinbach (1940) conducted a study which used a sample of three hundred entering first grade pupils who were given a battery of readiness tests. Included in the battery was a word-pairs discrimination test as the only measure of auditory discrimination. Results showed this test to rank second in reference to its relationship with reading achievement at the end of the first grade. The correlation of this factor with future reading achievement was .51.

Nila (1953) conducted a study to discover the factors that enter into the process of learning to read in grade one. The subjects for this study were 300 first grade entrants of eleven classes in nine schools. There were approximately 25% of the pupils in each quartile. In this study a consistently high correlation between auditory discrimination and reading achievement was found.

Thompson (1963) engaged in a study to determine the relation of auditory discrimination and intelligence test scores to success in primary reading. The sample used in the study was 105 first grade children who entered two elementary schools. Tests that measured auditory discrimination, intelligence, reading achievement and auditory accuity were administered. An arbitrary scaling method was used to determine the adequacy of the auditory discriminative ability of each individual. A statistical analysis of the data of this study indicates that auditory discrimination and intelligence are highly correlated with success in primary reading. In fact, the status of the first grade entrants' auditory discriminative ability is highly prognostic in determining who will become a good reader. Thompson recommended that first grade entrants be tested using a reliable test of auditory discrimination and that those children who score on the lower end of such a distribution be given an extended readiness period in which exercises to develop this ability are presented.

Robert Dykstra (1966) reports that relationships do

exist between pre-reading measures of auditory discrimination and reading achievement at the end of the first grade. In this study seven measures of auditory discrimination in a group intelligence test were administered at the beginning of first grade. Two measures of reading achievement were given at the completion of the first grade. Complete data was gathered on 632 pupils. A study of this data showed intercorrelations among the auditory discrimination measures and between each measure and subsequent reading achievement to be uniformly low with few reaching .40. Dykstra observed that five of the seven auditory discrimination measures made a significant statistical contribution to a multiple regression equation which was designed to predict reading achievement. The study mentioned that other findings included significant sex differences in performance on three of the auditory discrimination tests and on both of the reading tests. These differences favored the girls in all cases.

In the area of visual discrimination, Smith (1928) conducted one of the earliest studies to consider the visual discrimination of letters as an avenue to predicting later reading success. In this study, letter matching ability was measured by an individual test during the first week of the first grade. This was correlated with the results of the Detroit Word Recognition Test which was administered twelve weeks later. A statistical analysis of the data on the 200 children of the study revealed a correlation coefficient of .87 which prompted Smith to conclude that letter

matching could be used as a measure of reading readiness.

Wilson and Flemming (1940) provided further informa-
tion related to the importance of visual discrimination of
letters as an index of reading readiness. They studied the
naming and writing of letters rather than the simple letter
matching. They based their findings on three to six first
grade classrooms of children who took one or all of the
visual discrimination tests and the Gates Primary Reading
Test. A statistical review of this information revealed
that reading achievement was found to correlate .63 with
naming small letters, .62 with naming capital letters,
.62 with writing capital letters and .48 with writing small
letters. It was the conclusion of these investigators that
the beginning stages of mastering the mechanics of reading
primarily concentrated on the forms, names and sounds of
letters.

Shea (1964) reports concerning a study designed to
develop a test of visual discrimination of words and to
determine which of the following tests – the Metropolitan
Readiness Tests, Form A, the Lorge-Thorndike Intelligence
Test or the Test of Visual Discrimination of Words was the
best predictor of reading achievement at mid-year. Pupils
in the study took the battery of tests in September and a
word recognition test after five months of formal first
grade instruction. This study confirmed the theory that
the ability to visually discriminate words was an indicator
of readiness to start formal instruction when the visual

approach of instruction is employed.

Another study in the area of visual discrimination by Meyers (1966) sought to determine the relative effects of the selective ordering of letter names, sounds, and sight words upon achievement in word knowledge or discrimination and comprehension. The sample for this study consisted of 208 first grade children. All of the children in the study had attended kindergarten and all came from English speaking homes. Tests of word knowledge, word discrimination and comprehension of sentences and paragraphs were used as criterion measurements. One of the conclusions reached was that initial instruction in letter names and sounds produces higher achievement in word perception, but not in comprehension, than does instruction in sight words for children with intelligent quotients from 98 to 119.

Barrett (1965) reviewed the literature dealing with the relationship between measures of pre-reading visual discrimination and first grade reading achievement. Upon completion of this review, he noted that visual discrimination of letters and words had a somewhat higher predictive relationship with first grade reading achievement than did visual discrimination of geometric designs and pictures. He felt the need existed for investigations that employ statistical designs which utilize multivariant analysis.

A higher level of visual discrimination is found in having a pupil copy a pattern or design. This involves the integration of the motor coordination of the child and the

visual discrimination of the child to discriminate as to the symbol he is drawing and its likeness to that which he is copying.

Easley (1964) undertook a study for the purpose of developing a scale for scoring the Draw a Man Test to be used in the evaluation of reading readiness. Drawings of kindergarten children were selected as representative of the various levels of performance on the Draw a Man Test. These samples of drawing were judged according to levels of quality by sixty-two primary school teachers and college faculty members. A scale was developed using twenty-one drawings which included fourteen steps. The picture quality forming the final scale ranged from a scribble to a very well defined drawing of the figure. Through statistical analysis a predictive correlation of .64 was found between the scale scored Draw a Man Test and reading achievement.

Keogh (1963) considered the relationship between outline form copying ability as measured by the Bender-Gestalt Visual Motor Test and reading ability in the primary grades. The specific purpose of the study was to evaluate the use of the Bender-Gestalt at the kindergarten level as a predictive measure of later reading achievement. The data were collected in a longitudinal design utilizing scores on the same children at kindergarten and third grade. The sample consisted of 127 children for whom data were available at all grade levels. The Bender was

administered by individual and group methods and scored with a Keogh-Smith Rating Scale in the Koppitz Revised Scoring System. A statistical analysis of the results revealed significant improvement in the Bender-Gestalt performance from kindergarten to grade three with no significant difference between the performance of boys and girls. The Bender-Gestalt in this study was found to be of limited value as a predictive tool of reading difficulty, but was found to be useful as a test for identification of potentially good readers.

From the literature, it appears that visual and auditory discrimination are factors which can predict future reading achievement, although there seems to be somewhat varying reports of the ability of these factors to predict reading achievement. Since most standardized readiness measures are composed of each of these factors plus other assorted factors, it is important that the relative effectiveness of these predictors is known.

<center>Multiple Predictive Variables of

Reading Success</center>

Interest in a standardized reading readiness test is not something that is recent. Researchers have been interested for some period of time in an instrument that could at the group level predict success or failure among first grade students. In an early study by Deputy (1930) first grade children were pre-tested with an intelligence test

and various measures of reading readiness. The correlation
between these tests and later reading achievement were as
follows: Comprehension and recall, .37, visual and audi-
tory association, .39, word recognition, .49, visual readi-
ness, .52, and Pintner-Cunningham Primary Mental Test, .70.

Lee, Clark and Lee (1934) reported testing 164 first
grade children. They found a correlation of .49 between
scores on the Lee-Clark Readiness Test and the Lee-Clark
Primary Reading Test. They also found a correlation of .54
between the former and the Gates Silent Reading Test. In
the same study, a group of teachers predicted the reading
achievement of the pupils in their respective classes. It
was noted that the correlation between individual teacher's
predictions and actual achievement ranged from .10 to .88.
A summary of this part of the study would be that one-half
of the teachers were as effective in predicting pupil
achievement as was the readiness test.

Bremer (1959) using the Metropolitan Readiness Tests
and the Gates Primary Reading Test, tested readiness in
grade one and reading achievement at the beginning of grade
two for 514 subjects. He found a correlation of .40 between
the two tests. At the same time, he noticed that 31% of the
subjects who scored in the lowest one-third on the readiness
test scored in the highest quartile in reading. Another 31%
who were in the lowest one-third on the readiness test
scored above the mean in reading achievement. He concluded

that the test might be used for diagnosis but not
prediction.

Nash (1963) investigated the effectiveness of certain
predictors of reading success and determine which of these
predictors was the most reliable in predicting reading suc-
cess in the first grade. The sample consisted of 132 first
grade children who were enrolled in a public school. They
were given the Metropolitan Readiness Tests, selected items
on the Stanford-Binet Intelligence Scale, Form LM, Associa-
tional Metric Technique, Draw a Man Test, Learning Rate of
Words Inventory, New Bender-Gestalt Test and Maturity Level
for Reading Readiness Scale. The post test which was used
for a criterion was the Gates Primary Reading Test. A sta-
tistical review of the data reveals that the positive rela-
tionships between the predictor tests and the criterion test
indicate that there are many factors that influence the
reading process and that these factors are complex and
interrelated. It was noted that predictor tests which
measured the specific aspects of the reading process best
predict reading success. It was also noted that the battery
of predictors increased the reliability of prediction over
that prediction obtained using any one of the measures.

Kerfoot (1964) endeavored to determine the relation-
ship between selective measures of auditory and visual
reading readiness measures and reading achievement in the
first grade and spelling and reading achievement in the
second grade. Six differences were investigated for all of

the measures included. The population consisted of a stratified random sample of eight schools. It was comprised of 462 children which were broken down into 239 boys and 223 girls. A statistical treatment of the data by the use of multiple regression equations indicated that measures of visual discrimination were better predictors of reading and spelling achievement than were measures of auditory discrimination. The study went on to point out that the best visual predictors of first grade reading achievement were naming letters and numbers, copying and word matching. The researchers also indicated that performance for boys can be predicted with greater accuracy than performance for girls on the basis of the variables included in this study.

Several studies using multiple predictors of reading success have dealt with the problem of socio-economic level and its effect upon reading achievement. One thing is certain. Not all studies agree upon the relative importance that should be given to the socio-economic factor.

Alshan (1964) used a population of seven first grade classes which included 159 children in a public school affiliated with a city college. The location of the school was in a relatively impoverished area of the city where most of the children were Negro and a smaller percentage were of Puerto Rican origin. The study had as its major purposes the development of minimal set of diagnostic measures that might be used by first grade teachers for predicting success in beginning reading and a study of the relationships

among the predictive measures with first grade reading

achievement. This study included eighty-two subjects for

whom complete data on all twenty-eight measures were avail-

able. All tests and reading scales were intercorrelated to

determine what factors were being measured and which of

these were the most predictive at the end of the first

grade as defined by the Gates Primary Word Recognition Test.

The ranking of the factors as measured by the Gates Primary

Word Recognition Test found that auditory blending and con-

sonant combinations ranked first. This was followed by

teachers ratings, visual discrimination, other names and

consonant sounds and oral language proficiency. It was

reported that the low predictive value of the visual dis-

crimination measures may have very well been a function of

the late administration of the test. The ranking of the

oral language factor as having the lowest predictive value

raised questions regarding the recent concern about the

importance of oral language for success in beginning reading

of all children, and particularly for the culturally dis-

advantage. Alshan observed that language, while important

for success in reading, does not begin to function until

the later grades when reading matter takes on a higher

order of conceptional and structural complexity.

Silvaroli (1964) sought to determine if any combina-

tion of readiness factors, mental age, auditory discrimina-

tion, visual discrimination, letter identification, social

class status and maternal need achievement could be used
prior to a formal program of reading instruction to predict
possible success in reading. The technique of random selec-
tion was used and a sample population of eight-seven first
grade children was obtained from 475 children who were
entering first grade. Each child in the study was given the
Durell Test of Upper and Lower Case Letter Identification,
Otis Character Scoring Mental Ability Test, the short form,
and the Warner Index of Status Characteristics was used to
obtain a quantitative measure of social class status for
each child in the sample group. The Gates Primary Reading
Test, Form III, was given to the sample population of
children in March, 1963. This measure was used as a
dependent or criterion variable on which the six independent
reading readiness factors were intercorrelated.

The data was treated by multiple correlation in which
the coefficients of multicorrelation were determined for
each of the six readiness factors for both boys and girls.
The results of the study indicated that a measure of letter
identification of upper and lower case letters can be used
to predict probable success in first grade reading. An
additional observation was that the ability to identify
letters appears to be a reflection of certain verbal ex-
periences which the child may have had prior to his en-
trance into first grade.

Vilscek (1964) investigated whether or not mental ages
and socio-economic levels are powerful variables effecting

first grade pupils' reading achievement when initial dif-
ferences in reading readiness scores are statistically
controlled. The study was conducted for approximately
eight months during which 402 pupils from twenty-four
classes received basal reading instruction. These students
were administered standardized tests of inventories to
evaluate pupil intelligence, reading readiness, psychologi-
cal, social and emotional maturity, family index of social
position and final achievement in reading. Upon review of
the data the pupils were assigned to six experimental groups
on the basis of family socio-economic status and pupil
mental age range. The study revealed that there were sig-
nificant differences of achievement on each of the five
criterion variables between pupils from the upper socio-
economic level and the lower socio-economic level. It was
also reported that there were no significant interrelations
between mental age levels and socio-economic levels on any
of the five criterion variables.

Another study considering the socio-economic factor
was conducted by Andres (1965). In this study, six measures
of reading readiness were administered in September,
November, January, and March. These measures were <u>Pattern
Copying</u>, <u>Identical Forms</u>, <u>Auditory Discrimination</u>,
<u>Phonemes</u>, <u>Word Meaning</u> and <u>Listening</u>. Then the data were
analyzed on the basis of race, sex and age groups. At the
end of the year reading achievement was analyzed in terms
of main and interraction effects of race, treatment, sex,

and age. The factor pattern changes in reading readiness were investigated and relationships between reading readiness and achievement were studied. A review of the data revealed that phonemes was the best single predictor among the readiness tests. The best multiple predictors in five instances were phonemes and identical forms with correlations of .42 to .66. It was also pointed out that all expectancy tables demonstrated poor discrimination and slight improvement throughout the year. Indications were that they seemed to be of greater predictive value for a Negro than for white subjects.

Serwer (1966) headed a study to investigate in urban disadvantaged Negro first grade children. The relationship between five measures of reading readiness and a simultaneous measure of the initial task in the reading process as it is currently taught in most of the schools of the nation, i.e., sight word acquisition. Comprehension of oral language, auditory discrimination, visual discrimination, knowledge of letter names and visual motor coordination were selected as independent variables of reading readiness. The sample for the study consisted of 147 children in two special service schools in a Negro ghetto. A statistical analysis of the data reveals that there is a significantly positive correlations between the criterion measure of acquisition of sight words and the five selected reading readiness measures used in this study.

Serwer observed that the contribution of reading

readiness measures in the seeming order of magnitude to the combined correlation for the whole sample was knowledge of letter names, visual motor coordination, comprehension of oral language, visual discrimination, and auditory discrimination. For boys the descending order of correlation to the criterion measure was knowledge of letter names, visual motor coordination, visual discrimination, auditory discrimination, and comprehension of oral language. For girls, the descending order of correlation for the criterion measure was oral language comprehension of sentence units, knowledge of letter names, visual motor coordination, visual discrimination, and auditory discrimination.

DeHirsch, Jansky, and Langford (1966) conducted a study to identify those kindergarten tests which might be potential predictors of end-of-second grade reading achievement. Coefficients were computed which measured the correlation between each predictor test and a summary measure of silent and oral second grade reading achievement. Those kindergarten tests which yielded significant correlation coefficients were retained as potential predictors. The remainder of the tests were removed from further consideration. It was discovered that nineteen of the thirty-seven kindergarten tests were significantly related to the Over-all Reading Performance Index, sixteen to writing performance and twenty to spelling.

> Kindergarten tests significantly related to end-of-second-grade reading achievement were Behavioral Control, Pencil Use, Human-figure Drawing, Bender Visuo-Motor Gestalt Test, Tapped-out Patterns,

Wepman Auditory Discrimination Test, Story Organ-
ization, Number of Words Used, Categories, Name
Writing, Letter Naming, Horst Reversals Test,
Word Matching, Word Rhyming, Word Recognition I
and II, Word Reproduction, Ego Strength, and
Work Attitude. (Dehirsch, Jansky and Langford,
1966, p. 31)

These kindergarten tests were then screened and re-
duced to a Predictive Index containing just ten of those
mentioned above. The ten chosen were Pencil Use, 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.

An objective view of the literature considering the
use of multiple predictors is clouded somewhat by the
variation in reports of the effects of sex and socio-
economic status upon the results of the tests. The amount
of research done in this area is by no means exhaustive.
There is considerable room for further investigation of
these two variables. This is especially true when they are
considered together as in the study by Serwer (1966).

Studies Which Used the Metropolitan Readiness

Tests as a Predictor of Future

Reading Achievement

The Metropolitan Readiness Tests have been widely used
for many years. The organization of the test lends itself
to group administration. This is a factor which many
teachers like. Most teachers seem to place more confidence

in measures they have administered. In 1965 Harcourt,
Brace and World, Inc. published a new form of the
Metropolitan Readiness Tests. The 1965 edition was stream-
lined to six subtests instead of eight. Several studies
have been done using the Metropolitan Readiness Tests and
the following are representative of such studies.

Karlin (1957) studied more than 100 first grade
children, all of whom had an I.Q. of 90 or above, had at-
tended kindergarten and had no serious visual, hearing or
emotional problem. Through statistical analysis he found
a correlation of .36 between scores on the Metropolitan
Readiness Tests administered in September and achievement
on the Gates Primary Reading Test administered at the end
of the school year. He noted that prediction of reading
achievement based on readiness test scores was only about
4% better than that of teacher prediction which was made
in the absence of any readiness data. Based upon this out-
come, Karlin concluded that the confidence that teachers
place in the concept of reading readiness is justifiable
but the advisability of using existing readiness tests
almost exclusively to measure extent of readiness is a
thought that should be re-examined.

Simpson (1960) endeavored to determine the importance
of perceptual ability as measured by the Metropolitan
Readiness Tests and the Primary Mental Abilities Test and
first grade success in reading achievement. Simpson also
sought to assess the effectiveness of certain perceptual

training activities in improving reading achievement. The
subjects for the study were 360 first grade pupils randomly
drawn from eleven public elementary schools of a typical
midwestern type of population. The test scores for these
subjects from the Metropolitan Readiness Tests and the
Primary Mental Abilities Test were correlated with Metro-
politan Reading Test scores. After a statistical treatment
of the data, Simpson reported the following correlations:
Word meaning, .39, sentence meaning, .34, information, .32,
matching, .49, numbers, .62, copying, .42, and the total
readiness items, i.e., items (1) through (8), .62. The
study also reported that the effect of the perceptual
training program yielded evidence statistically signifi-
cant between the 2% and 5% level, and that the reading
achievement of the perceptual training group was greater
than that of the controlled group.

Ross (1962) followed up on Simpson's study and com-
pared the relationship between the subtest scores of the
Metropolitan Readiness Tests administered at the beginning
of the first grade and reading achievement at the second
and third grade level. A statistical analysis revealed
that the results of this study were substantially the same
as those in the earlier study. It was noted that the per-
ceptually orientated subtests correlated more highly with
reading achievement scores at these grade levels than the
language orientated subtests. Word meaning was the only
exception which in the latter study showed a correlation

equal to that of the perceptually orientated tests. It
would, thus, appear that the importance of perceptual
aspects of reading as they are apparent at the beginning of
school experience do continue to influence reading perform-
ance for two to three years later.

Sullivan (1965) conducted a study to determine the
effectiveness of predicting reading readiness achievement by
use of a home reading material availability scale and the
relationships to the subject's socio-economic data, and,
secondly, to analyze the predictiveness of selected reading
readiness in achievement instruments between matched groups
of Negro and Caucasian subjects. The subjects for this
study were 189 students from two elementary schools for
Negroes and 323 students from five elementary schools for
Caucasians from a city of approximately 58,000 population.
The schools were selected with regard to their geographical
locations and their socio-economic homogeneity. A scale was
constructed to qualify the reading material that was avail-
able in each home. The scale was formulated with the aid
of a jury of contemporary authors in the field of elementary
reading readiness and achievement. A questionnaire was
developed and sent to the home of each subject in order to
obtain information for the above scale and also for the
application of Hollingshead-Redlich Index of Social Position
Socio-Economic Scale. During the pre-school clinic the sub-
jects received the Metropolitan Readiness Tests. The sub-
jects in the study received Metropolitan Reading Achievement

Tests in March of that same school year. After a study of
the data, Sullivan concluded that the home reading avail-
ability scale did not seem to possess predictive properties
at a level significant to be useful as a single predictor.
It was allowed, however, that a relationship does seem to
exist between socio-economic levels and the evidence of
reading readiness of first grade pupils.

Coker (1966) carried out a study to establish the re-
lationship between readiness test scores and selected
socio-economic factors of families qualified for participa-
tion in Operation Headstart. The comparison of readiness
test scores of pupils who were qualified and attended Head-
start with those pupils who were qualified but did not
attend was the second aspect of this investigation. The
subjects that were used in the study consisted of all public
school students in a single city who were qualified for par-
ticipation in the Operation Headstart program conducted in
the summer of 1965. The availability of a Metropolitan
Readiness Tests score was also a requirement for participa-
tion in this study. Scores on the Metropolitan Readiness
Tests administered in September, 1965 were collected for
each of the eighty pupils. Information was also collected
to complete the index of status characteristics through a
personal interview of the family of each student. As a
result of this study, Coker noted that there was a differ-
ence significant at the .05 level in readiness as measured
by the Metropolitan Readiness Tests at the beginning of the

first school year between children who were qualified and attended Headstart and children who were qualified but did not attend Headstart. It was also noted that children participating in Headstart seemed to have a significantly higher score at the .05% level of significance. It was also noted that the correlation between a family's economic position measured by total yearly income and the child's score on the Metropolitan Readiness Tests was .40.

Mayans (1966) explored the idea that reading levels for culturally advantaged, culturally mixed and culturally disadvantaged children in the first grade can be predicted from psychological test scores secured early in the kindergarten year. The subjects for this study were 245 Caucasian children from a predominately suburban school district. The children were divided into two groups according to the father's educational and occupational level. Predictive variables used in this study were the Metropolitan Readiness Tests, Peabody Picture Vocabulary Test, Stanford-Binet Vocabulary Test and the Teacher Questionnaire. The Gates Primary Reading Test was the criterion instrument given two years later in May. It was noted from a review of the data that the mean performance of the Metropolitan, Binet, Peabody, Teacher Questionnaire, and the Gates tests each showed a clear progression. The culturally advantaged had the highest mean scores, the culturally mixed the next highest mean scores, and the culturally disadvantaged the lowest mean scores. The study also pointed out that the

Metropolitan Test yielded the highest correlation to the
Gates Test and was also the highest predictor in all the
groups. Generally, the Teacher Questionnaire was second to
the Metropolitan in the degree of correlation to the Gates
Test. It seemed to also contribute significantly to the
prediction of performance on the Gates Test in all groups
except the culturally mixed and culturally disadvantaged.
Mayan recommended

> Since early identification of culturally disadvan-
> taged children has been demonstrated to be prac-
> tical, readiness tests such as the Metropolitan
> should become standard operational procedure dur-
> ing the first weeks of kindergarten in order that
> appropriate compensatory programs may be planned
> and developed for these children.

Another study using the Metropolitan Readiness Tests
as a predictor was carried on by Wortenberg (1967). This
study investigated the relationship between standardized
group readiness scores, intelligence, mental age, auditory
discrimination, letter identification, visual discrimina-
tion, memory span and associated learning as predictors of
success in beginning reading. The study sought to determine
whether any one of the predictors or any combination of pre-
dictors would show a high relationship to reading in the
first grade. The population of this study consisted of
ninety-eight first grade students from a suburban Philadel-
phia school. These students were given the Metropolitan
Readiness Tests at the end of kindergarten. At the begin-
ning of first grade, the students were given the Lorge-
Thorndike Intelligence Test and subtests from the Detroit

Test of Learning Aptitude, Memory Span Test from Measured
Intelligence, the Wepman Auditory Discrimination Test and
Visual Discrimination Test and other identification tests
from Vetch Ready to Read Test. The broad measures comprised
the predictive measures. Each student was given the
Stanford Achievement Test, individual word recognition test,
and the Informal Reading Inventory as measures of success
in reading achievement at the end of the first grade. The
findings of the study revealed that letter identification
was the highest predictive variable when the criterion for
reading achievement was the word reading subtest of a stand-
ardized achievement test, a spelling subtest of standardized
achievement test and an untimed word recognition test. It
was also noted that the ability to identify letters, intel-
ligence, visual discrimination abilities, the total raw
score of a standardized reading readiness test and memory
span were the most frequent combination of predictive meas-
ures. Wortenberg concluded that there appears to be a rela-
tionship between the ability to identify letters and the
success in beginning reading. He points out, however, that
letter identification was not always the highest single
factor and its predictive value was based upon what measure
was being used to determine success in beginning reading.

Hagensen (1967) sought to determine the relationship
of scores on the 1965 edition of the Metropolitan Readiness
Tests to Metropolitan Primary I Achievement Test scores for
first grade children on the basis of sex, race, and age.

The purposes given for the study were to provide correla-
tions pertaining to a recently revised readiness test, to
provide figures to aid in evaluating the choice of tests
for a school system and, to provide general information
helpful to teachers in planning a more individualized
reading readiness program. Population for this sample was
421 first grade children in six white schools and one Negro
school in a county school district. The subjects were
present for readiness testing in the fall of 1964 and for
achievement testing in May of 1965. The researchers sepa-
rated the 421 sets of test scores by sex, race, and into
five four-months age groups ranging from 5:8 to 6:0.

Upon completion of a correlation study of the data
selected in this study, it was noted that the 1965 edition
of the Metropolitan Readiness Tests is sufficiently related
to the Metropolitan Primary I Achievement Test to be con-
sidered a reliable predictor of reading success. An addi-
tional observation from the study was that, of the readiness
subtest, those of numbers and alphabet were consistently the
best predictors of academic achievement for groups of
children. Sex and age differences in relationship to
numerous aspects of tested readiness and achievement, while
revealing varying patterns were not of sufficient statisti-
cal significance to be of educational importance.

McClellan (1968) used the 1965 edition of the Metro-
politan Readiness Tests, Form A, the Peabody Picture
Vocabulary Test, A, The Goodenough-Harris Draw-A-Man Test,

and the Metropolitan Readiness Test, Form R as predictors
of reading achievement. The sample of the study consisted
of 230 first grade students who had completed the cope pro-
gram available in their school system and 275 children who
had not participated in the cope program. Scores from an
administration of the Metropolitan Achievement Test,
Primary Battery I, Form A, were used as the dependent
variables. This study attempted to establish those factors
which would successfully predict first grade reading
achievement for lower socio-economic students. McClellan
reported that predictions for boys can be made best from the
total score on the 1947 edition of the Metropolitan Readi-
ness Tests, Form R, the total score on the Metropolitan
Readiness Test, Form A and the score on the Draw-A-Woman
Test. For girls, the best predictors were the total scores
on the 1947 edition of the Metropolitan Readiness Tests,
Form R and the 1965 edition of the Metropolitan Readiness
Tests, Form A.

The studies using the Metropolitan Readiness Tests as
a predictor seem at a surface glance to present a cloudy
picture. The variables of sex and socio-economic status
are significant factors influencing this result. All of
the studies point to the predictive value of the Metropoli-
tan Readiness Tests but indicate that its level of cor-
relation with future reading success is not such to permit
absolute predictions. Screening for readiness training

seems to be one of the things that the Metropolitan does best.

On the whole, there is not a great number of studies using the 1965 edition of the Metropolitan Readiness Tests. This particular instrument is in the process of becoming established in the public classroom. Therefore, a need exists for a large study which will control the two variables of sex and socio-economic level as much as possible.

CHAPTER III

METHODOLOGY AND DESIGN

A discussion of the procedures and instruments used in this study are presented in this chapter. The design of the study and methods of selection of the subjects are given. A description of the instruments used in selection of the subjects and the instruments used to measure and predict future reading achievement progress are presented. Attention is drawn to the methods that were used to analyze the data.

Design of the Study

All students in this study were administered the 1965 revision of the <u>Metropolitan Readiness Tests</u> at the end of kindergarten in 1968. The students then received instruction in the developmental strand of the Harper Row series of first grade Readers being used in all first grade classes for reading instruction. In the first part of April, 1969, each student was given the <u>Gates-MacGinitie Reading Test</u>, Primary A, Form 1. A statistical analysis included the use of a multiple-regression equation and multiple analysis of variance was used to examine the data. These statistical tools were used to establish the existence or non-existence of significant differences due to the sex and socio-economic

level of the subjects and to determine the predictive
validity of the Metropolitan, and various subtests of the
Metropolitan.

The Population

Six hundred thirty first grade students of a large
metropolitan school system participated in this study.
These students were selected on a random basis from each of
the three socio-economic levels defined by this study. An
equal number of boys and girls were randomly selected to
represent each socio-economic level. Thus, the population's
scores were organized into six sub-groups on the basis of
socio-economic level and sex.

Each child used in the study was grouped socio-
economically by their father's occupation as given on the
permanent record folder. No attempt was made to compute the
level of the mother in those cases where she worked, except
when she was the sole support of the family.

Selection of the Subjects

A preliminary screening of the population from which
the sample was taken was completed in accordance with the
following criteria: (1) Student must have attended kinder-
garten in the school system from which the sample was drawn,
(2) students must have taken the 1965 edition of the
Metropolitan Readiness Test, Form A, during April, 1968 in
the school system from which the sample was taken, (3)

students must have been enrolled in the school system from which the sample was taken during all of the 1968-69 school year.

The portion of the population which remained after this preliminary screening was then subject to being chosen to participate in the study on a random basis. A sub-group size of 105 of each sex at each socio-economic level made the size of the sample 630 students. The socio-economic levels were determined by the NORC Scale.

The actual selection of students for the study was done in the following manner:

1. All first grade students' permanent folders were obtained from the first grade teachers.

2. The preliminary screening criteria were applied to each folder.

3. If the screening criteria were met, a further check was made to make sure there was a definite occupation listed for each student's parent.

4. Identification data such as school, room, and an identification number were entered on a data sheet.

5. The socio-economic status of the student was determined by the NORC Scale and entered on the data sheet.

6. The results of the 1965 edition of the <u>Metro-politan Readiness Test</u> were then recorded on

the data sheet.

7. A table of random numbers was used to reduce

the size of those groups exceeding 105.

Instruments Used and Their Application

in This Study

NORC Scale

This is a scale of occupational prestige. It presents

prestige rankings of ninety occupations. The range of oc-

cupations is wide and goes from a U. S. Supreme Court

Justice with a prestige of ninety-six to a shoe shiner with

a prestige score of thirty-three. Broken down into major

occupational groupings, the order ran:

> (1) professional and semi-professional workers
> (2) proprietors, managers and officials, (3)
> clerical, sales and kindred workers, (4) crafts-
> men, foremen, and kindred workers, (5) farmers
> and farm managers, (6) farm laborers, (7)
> service workers, and (8) laborers. (Hodges,
> 1964, p. 124)

The NORC study which produced the NORC Scales in 1947

was replicated by Hodge, Siegel, and Rossi in 1963. A cor-

relation of .99 between prestige scores derived from the

1947 NORC study and the replication in 1963 indicates that

very few changes in occupational prestige ratings have oc-

curred in the sixteen-year period (Hodge, Siegel and Rossi,

1963).

Duncan's Socio-economic Index for Occupations in the

Detailed Classification of the Bureau of Census (Reiss,

1965) was used to place occupations on the NORC Scale. This

index has over five hundred occupations and give the NORC

score for each occupation. The greater number of jobs list-

ed removed much of the subjectivity in placing occupations

on the NORC Scale. Greater accuracy in placement was possi-

ble using this index.

Kahl (1957) in studying the NORC Scale suggests that

the public had in mind certain broad occupational categories

when they ranked specific titles. These broad categories

are as follows:

1. Professional and administrative positions.
   This level had NORC scores of 84 to 96.
2. Semiprofessional and medium-level adminis-
   trative positions. This level had NORC
   scores of 83 to 78.
3. Highly skilled manual workers; owners of
   small businesses (five often employees),
   and higher level white collar workers, like
   bookkeepers. This level had NORC scores of
   63 to 77.
4. Semiskilled manual workers, owner-operators
   of petty businesses, and the routine white
   collar workers. This level had NORC scores
   of 48 to 62.
5. Unskilled laborers. This level had NORC
   scores of 33 to 47. (Kahl, 1957, pp. 76 and
   77).

Kahl (1957) pointed out that these cutting points are

arbitrary but do allow researchers to compare highly dis-

parate occupations.

For use in this study, the NORC scale was divided into

three levels which correspond closely to those levels dis-

cussed by Kahl (1957). The high socio-economic level was

composed of those occupations whose prestige score was from

74 through 93. The middle socio-economic level was composed

of those occupations whose prestige score was from 63

through 73. The low socio-economic level was composed of those occupations whose prestige score was from 34 through 62.

This division of the NORC scale differs from Kahl's in that his two upper and lower levels are grouped into broader levels titled high and low. The dividing point between the high and middle socio-economic levels was lowered to make the group boundaries fit the particular population of this study. This population contained a large number of highly skilled manual workers which compose the middle socio-economic level on the NORC scale. These occupations start with the NORC rank of 73 and are electricians and trained machinists.

It should be pointed out that the descriptive adjectives high, middle, and low which are used to describe the three socio-economic levels on the NORC scale merely indicate placement on that scale. These terms are not meant to designate classes of people, but rather indicate the occupational socio-economic level according to NORC scale.

1965 Edition of the Metropolitan
Readiness Tests, Form A

These tests were devised to measure the extent to which school beginners have developed in the skills and abilities which contribute to readiness for first grade instruction. It was designed to test pupils at the end of

kindergarten or the beginning of first grade. The purpose of the test is not to measure the effectiveness of kindergarten, but rather serve as a quick and convenient basis for classification of students. The tests are contained in a sixteen page booklet. The six subtests which make up this test are: (1) word meaning, (2) listening, (3) matching, (4) alphabet, (5) numbers, and (6) copying. Each test consists of pictures which the pupil is to mark or copy according to instructions given to him orally by the examiner.

The normative population of the 1965 edition of the Metropolitan Readiness Tests included a total of 12,231 students in 299 schools. Reliability testing using an alternate form (Form B) for retest produced a correlation of .91 in study consisting of 546 kindergarten pupils.

The Metropolitan Readiness Test, Form A, was the instrument being tested in this study. The testing centered around the predictive validity of the test in relationship to the factors of sex and socio-economic status. This study was also concerned with the predictive validity of the individual subtests and designated groupings of them.

The Gates-MacGinitie Reading Test, Primary A, Form 1 is intended for use in the first grade as a reading achievement test. It consists of two parts: vocabulary and comprehension. The vocabulary test samples the child's ability to recognize or analyze isolated words. It is made up of forty-eight exercises which contains four printed words and a picture illustrating the meaning of one of the words,

Each child is to circle the word that best corresponds to the picture. The comprehension test measures the child's ability to read and understand whole sentences and paragraphs. The child must grasp the total thought if he is to answer correctly. The child is required to mark the picture which best illustrates the meaning of the passage or that answers the question in the passage.

This test was used as a criterion to measure reading achievement of the students in this study. A correlation between this test and the Metropolitan Readiness Test was made to determine the predictive validity of the Metropolitan.

Statistical Design

A primary hypothesis of this study is that there is a significant difference in the performance of students on the Metropolitan according to the factors of socio-economic level and sex. The statistical tool used to test for this significance was one-way classification analysis of variance.

All computations were done on the 360, Model 50 IBM. The program used in this treatment of the data was the BMDOIV. Analysis of Variance For One-Way Design-Version of June 15, 1966 from the Health Sciences Computing Facility, UCLA.

This treatment of the data by single classification analysis of variance was used to identify the relationship

between one dependent variable (reading achievement as meas-
ured by the Gates-MacGinitie) and two independent variables
(sex and socio-economic level as defined by the NORC Scale).
In testing for this significance, the Metropolitan scores
served as the predictor variables while the scores from the
Gates-MacGinitie served as the criterion variable. The
basic equation from which all analysis of variance computa-
tions are derived is reported in Popham (1967, p. 85).

$$F = \frac{\text{Between groups mean square}}{\text{Within groups mean square}}.$$

In the remaining treatment of the data, the two parts
of the criterion measure were converted to a single score
to represent reading achievement. Computations were then
done considering the six subtests of the Metropolitan and
the whole test score as seven predictive variables in their
relationships with the factors of socio-economic level and
sex.

The statistical methods used in considering the above
relationships were multiple regression analysis as outlined
by Wert (1954). The program used in this treatment of the
data was the Multiple Linear Regression program from the
Oklahoma State University. This program is a version of the
regression program contained in IBM's System 360 Scientific
Subroutine Package. This method allows simultaneous solu-
tions of the regressions equations, and the coefficient of
multiple correlation can readily be determined from this
analysis of the data. The data can then be treated by

multiple regression to arrive at the loss in prediction of the criterion that happens when various of the prediction variables are removed. This method leads directly to computing coefficients of correlation between each predictive variable and the criterion, between combinations of the predictive variables and the criterion and between the predictive variables themselves.

The multiple linear regression program used on these data also gives a computed t value for each regression coefficient. The t value indicates the relative efficiency of the factor as a predictor in the regression equation and it also indicates the level of significance of the factor when interpreted by a t table.

The basic multiple regression equation that computations were derived from is reported in Popham (1967, p. 110).

$$\widetilde{Y} = a + b_1 X_1 + b_2 X_2 + b_n X_n.$$

The basic equation for the t of a regression coefficient is reported in Edwards (1967, p. 252).

$$t = \frac{b_Y}{S_{b_Y}}.$$

CHAPTER IV

PRESENTATION AND TREATMENT OF THE DATA

The purpose of this chapter is to present a detailed
description of the statistical treatment of the data and a
statement of the results.

This study has two main areas of concern. The first
part of the study was concerned with determining if there
were significant differences in performance attributable
to the factors of sex, socio-economic level or both on the
Metropolitan Readiness Tests and the Gates-MacGinitie
Reading Test. The second part of the study investigated the
predictive validity of Metropolitan-Readiness Test when the
factors of sex, socio-economic level or a combination of
both are considered.

The data will be discussed under the following head-
ings: (1) An analysis of the performance of students on
the Metropolitan and Gates-MacGinitie tests when the stu-
dents are categorized by sex and socio-economic level or
both and (2) An analysis of the predictive validity of the
Metropolitan perceptual subtests, language subtests, and
the total test when the students scores are categorized into
total sample, sex, socio-economic level and a combination of
sex and socio-economic level.

Analysis of the Performance of Students on the

Metropolitan and Gates-MacGinitie

Analysis by Sex

A one-way analysis of variance was applied to the scores of the subjects on the Metropolitan Readiness Tests and the Gates-MacGinitie Reading Test to determine if there was a significant difference in performance when students were categorized due to the factor of sex. The resulting F values along with their level of significance are given in Table I.

An inspection of Table I indicates that Word Meaning and Matching were significant at the .05 level while Alphabet, vocabulary raw score and comprehension raw score were significant at the .01 level. Five of the subtests reached the .05 level of significance which indicates that the majority of the tests show a significant difference in performance at this level according to sex.

A further breakdown of the table points out that less than one-half (three of seven) of the Metropolitan tests are significant at the .05 level. Therefore, hypothesis A-1 (there is no significant difference in performance on the Metropolitan Readiness Tests when students are categorized by sex) is rejected because at least one of the subtests reached a level of significance.

Table I also indicates that both the Gates-MacGinitie subtests were significant at the .01 level. Therefore,

TABLE I

RESULTS OF A ONE-WAY ANALYSIS OF VARIANCE BY SEX

Test	Source of Variation	df	Sum of Squares	Mean Square	F ratio
Metropolitan					
Word Meaning	Between	1	47.6372	47.6372	6.3733*
	Within	626	4679.0664	7.4745	
	Total	627	4726.7031		
Listening	Between	1	0.8068	0.8068	0.1484
	Within	626	3404.3582	5.4383	
	Total	627	3405.1648		
Matching	Between	1	37.5480	37.5480	4.0662*
	Within	626	5780.6133	9.2342	
	Total	627	5818.1602		
Alphabet	Between	1	371.1057	371.1057	21.7478*
	Within	626	10682.0781	17.0640	
	Total	627	11053.1836		
Numbers	Between	1	59.2126	59.2126	3.1560
	Within	626	11745.0234	18.7620	
	Total	627	11804.2344		
Copying	Between	1	1.1834	1.1834	0.1003
	Within	626	7387.0352	11.8004	
	Total	627	7388.2148		
Total Test	Between	1	746.8792	746.8792	3.5184
	Within	626	132885.5000	212.2771	
	Total	627	133632.3250		
Gates-MacGinitie					
Vocabulary	Between	1	1169.8379	1169.8379	10.7650**
	Within	626	68027.8750	108.6707	
	Total	627	69197.6875		
Comprehension	Between	1	1191.9309	1191.9309	19.2698**
	Within	626	38721.1250	61.8548	
	Total	627	39913.0547		

*P $<$ .05   **P $<$ .01

hypothesis A-2 (there is no significant difference in per-
formance on the Gates-MacGinitie Reading Tests when students
are categorized by sex) is rejected.

A review of the subtest and total test mean scores for
boys and girls found in Table IX (Appendix B) indicate that
girls surpassed the boys in seven out of the nine tests.

Analysis by Socio-Economic Level

A one-way analysis of variance was applied to the
scores of the subjects on the Metropolitan Readiness Tests
and the Gates-MacGinitie Reading Test to determine if there
was a significant difference in performance due when stu-
dents were categorized by the factor of socio-economic
level. The resulting F values along with their level of
significance are given in Table II.

The F values found in Table II are all significant at
the .01 level and indicate that there is a significant dif-
ference in performance to the factor when students are
identified by socio-economic level. Specifically, Table II
indicates that hypothesis B-1 (there is no significant dif-
ference in performance on the Metropolitan Readiness Tests
when students are categorized by socio-economic level) is
rejected. Hypothesis B-2 (there is no significant differ-
ence in performance on the Gates-MacGinitie Reading Test
when students are categorized by socio-economic level) is
also rejected.

A review of the subtest and total test mean scores

TABLE II

RESULTS OF A ONE-WAY ANALYSIS OF VARIANCE BY SOCIO-ECONOMIC LEVEL

Test	Source of Variation	df	Sum of Squares	Mean Square	F ratio
Metropolitan					
Word Meaning	Between	2	166.5547	83.2773	11.4137**
	Within	625	4560.1562	7.2962	
	Total	627	4726.7109		
Listening	Between	2	93.6238	46.8119	8.8350**
	Within	625	3311.5537	5.2985	
	Total	627	3405.1775		
Matching	Between	2	186.8000	93.4000	10.3660**
	Within	625	5631.3633	9.0102	
	Total	627	5818.1602		
Alphabet	Between	2	839.7036	419.8518	25.6915**
	Within	625	10213.7734	16.3420	
	Total	627	11053.4766		
Numbers	Between	2	1003.7502	501.8750	29.0414**
	Within	625	10800.8672	17.2814	
	Total	627			
Copying	Between	2	325.2012	162.6006	14.3884**
	Within	625	7063.0234	11.3008	
	Total	627	7388.2227		
Total Test	Between	2	12958.3789	6479.1875	33.5572**
	Within	625	120674.3125	193.0789	
	Total	627	133632.6875		
Gates-MacGinitie					
Vocabulary	Between	2	5080.9258	2540.4629	24.7638**
	Within	625	64117.2148	102.5875	
	Total	627	69198.1250		
Comprehension	Between	2	3064.7852	1532.3926	25.9913**
	Within	625	36848.6992	58.9579	
	Total	627	39913.4844		

**P < .01

found in Table X (Appendix B) indicates that the high socio-
economic level always had the highest mean score, the
middle socio-economic level always had the second highest
mean score while the low socio-economic level always had the
lowest mean score.

Analysis by Sex and Socio-Economic Level

The combination of the factors of sex and socio-
economic level were tested by a one-way analysis of vari-
ance. The F values from this analysis of the subjects
scores are found in Table III.

The F values found in Table III are all significant at
the .01 level and indicate that there is a significant dif-
ference in the test performance of students when they are
identified by sex and socio-economic level. Specifically,
Table III indicates that hypothesis C-1 (there is no sig-
nificant difference in performance on the Metropolitan
Readiness Tests when students are categorized by sex and
socio-economic level) is rejected. Hypothesis C-2 (there is
no significant difference in performance on the Gates-
MacGinitie Reading Test when students are categorized by
sex and socio-economic level) is also rejected.

A review of the subtest and total test mean scores
found in Table XI (Appendix B) indicate in the majority of
cases the differences in performance favored girls from the
standpoint of sex and favored the high socio-economic level
from the standpoint of socio-economic level. These results

TABLE III

RESULTS OF A ONE-WAY ANALYSIS OF VARIANCE BY SEX AND SOCIO-ECONOMIC LEVEL

Test	Source of Variation	df	Sum of Squares	Mean Square	F ratio
Metropolitan					
Word Meaning	Between	5	217.4482	43.4896	5.9989**
	Within	622	4509.2695	7.2496	
	Total	627	4726.7148		
Listening	Between	5	112.0090	22.4018	4.2311**
	Within	622	3293.1873	5.2945	
	Total	627	3405.1960		
Matching	Between	5	267.7334	53.5467	6.0006**
	Within	622	5550.4375	8.9235	
	Total	627	5818.1680		
Alphabet	Between	5	1212.7422	242.5484	15.3307**
	Within	622	9840.7422	15.8211	
	Total	627	11053.4844		
Numbers	Between	5	1164.5544	232.9109	13.6156**
	Within	622	10640.0625	17.1062	
	Total	627	11804.6133		
Copying	Between	5	381.1047	76.2209	6.7659**
	Within	622	7007.1172	11.2655	
	Total	627	7388.2187		
Total Test	Between	5	14395.0156	2879.0029	15.0182**
	Within	622	119237.9375	191.7009	
	Total	627	133632.9375		
Gates-MacGinitie					
Vocabulary	Between	5	6249.1094	1249.8218	12.3495**
	Within	622	62948.9336	101.2041	
	Total	627	69198.0000		
Comprehension	Between	5	4316.3281	863.2656	15.0841**
	Within	622	35597.2500	57.2303	
	Total	627	39913.5781		

**P <.01

support the prior findings in this study concerning sex and socio-economic level.

An Analysis of the Predictive Validity

of the Metropolitan

Analysis Using the Total Sample

Multiple linear regression was applied to the data to determine if any of the Metropolitan perceptual or language subtests or the total test would significantly predict reading achievement for the total sample. The resulting t values which indicate the relative efficiency of a subtest as a predictor in the regression equation and the level of significance of that subtest when interpreted by a t table are presented in Table IV.

TABLE IV

RESULTS OF MULTIPLE LINEAR REGRESSION
ON THE TOTAL SAMPLE

Equation	Inter-cept		Independ-ent	Reg. Coef.	t	p
Total Sample on Subtests	12.87	Lang	Wd. Meaning	0.038	0.17	N.S.
			Listening	0.640	2.59	<.01
			Matching	0.696	3.34	<.001
		Percept.	Alphabet	1.171	10.79	<.001
			Numbers	0.766	4.32	<.01
			Copying	0.436	2.40	<.05
Total Sample on Total Score	7.61		Total	0.801	22.04	.001

The computed t values found in Table IV indicate that for the total sample the perceptual subtests, the total test and some of the language subtests will significantly predict reading achievement. Specifically, Table IV indicates that hypothesis D-1 (there is no perceptual subtest which will significantly predict reading achievement for the total sample) is rejected. This hypothesis is rejected because among the perceptual subtests Copying was significant at the .05 level, Listening and Numbers at the .01 level and Matching and Alphabet at the .001 level.

Hypothesis D-2 (there is no language subtests which will significantly predict reading achievement for the total sample) is rejected because the language subtest Listening was significant at the .01 level.

Hypothesis D-3 (the total test will not significantly predict reading achievement for the total sample) is rejected because the total test score was significant at the .001 level.

Analysis by Sex

Multiple linear regression was applied to the data to determine if any of the Metropolitan perceptual or language subtests or the total test would significantly predict reading achievement when the students are categorized by sex. The resulting t values for the regression coefficients of the predictive variables are found in Table V.

The computed t values found in Table V indicate that

TABLE V

RESULTS OF MULTIPLE LINEAR REGRESSION WHEN THE SAMPLE IS
DIVIDED ACCORDING TO THE SEX OF THE STUDENTS

Equation	Intercept		Independent Variables	Regression Coefficient	t	p
Boys Subtests	14.67	Lang	Word Meaning	0.055	0.16	N.S.
			Listening	0.190	0.49	N.S.
			Matching	0.633	2.08	<.05
		Percept.	Alphabet	1.666	7.04	<.001
			Numbers	0.859	3.41	<.001
			Copying	0.618	2.37	<.05
Boys Total Test	6.43		Total	0.789	14.83	<.001
Girls Subtests	11.56	Lang	Word Meaning	0.138	0.46	N.S.
			Listening	1.028	3.27	<.01
			Matching	0.727	2.54	<.05
		Percept.	Alphabet	1.611	7.27	<.001
			Numbers	0.689	2.73	<.01
			Copying	0.300	1.18	N.S.
Girls Total Test	9.91		Total	0.794	16.28	<.001

when students are categorized by sex some of the perceptual
and language subtests and the total test do significantly
predict reading achievement. Specifically, Table V indi-
cates that hypothesis E-1 (there is no perceptual subtest
which will significantly predict reading achievement when
students are categorized by sex) is rejected because:

1. For boys, Copying and Matching were signifi-
   cant at the .05 level while Alphabet and
   Numbers were significant at the .001 level.

2. For girls Matching was significant at the
   .05 level, Numbers at the .01 level and
   Alphabet at the .001 level.

Hypothesis E-2 (there is no language subtest which will
significantly predict reading achievement when students are
categorized by sex) is rejected because for girls Listening
was significant at the .01 level.

Hypothesis E-3 (the total test will not significantly
predict reading achievement when students are categorized by
sex) is rejected because the total test was a significant
predictor at the .001 level for both boys and girls.

Analysis by Socio-Economic Level

Multiple linear regression was applied to the data to
determine if any of the Metropolitan perceptual or language
subtests or the total test would significantly predict
reading achievement when students are categorized by socio-
economic level. The resulting t values for the regression

coefficients of the predictive variables are found in
Table VI.

The computed t values found in Table VI indicate that
when students are categorized by socio-economic level some
of the perceptual and language subtests and the total test
do significantly predict reading achievement. Specifically,
Table VI indicates that hypothesis F-1 (there is no per-
ceptual subtest which will significantly predict reading
achievement when students are categorized by socio-economic
level) is rejected because:

1. For the high socio-economic level Matching
   is significant at the .05 level, Numbers at
   the .01 level, and Alphabet at the .001
   level.

2. For the middle socio-economic level Numbers
   is significant at the .05 level and Alphabet
   at the .001 level.

3. For the low socio-economic level Matching,
   Numbers, and Copying are significant at the
   .05 level and Alphabet at the .001 level.

Hypothesis F-2 (there is no language subtest which
will significantly predict reading achievement when stu-
dents are categorized by socio-economic level) is rejected
because:

1. For the high socio-economic level Listening
   is significant at the .01 level.

2. For the middle socio-economic level,

TABLE VI

RESULTS OF MULTIPLE LINEAR REGRESSION WHEN THE SAMPLE IS DIVIDED ACCORDING
TO THE SOCIO-ECONOMIC LEVEL OF THE STUDENTS

Equation	Intercept		Independent Variables	Regression Coefficient	t	p
High Subtests	11.14	Lang	Word Meaning	0.162	0.50	N.S.
			Listening	1.118	2.97	< .01
			Matching	0.741	2.16	< .05
		Percept.	Alphabet	1.545	6.26	< .001
			Numbers	0.765	2.84	< .01
			Copying	0.505	1.70	N.S.
High Total Test	8.30		Total	0.818	14.48	< .001
Middle Subtests	14.08	Lang	Word Meaning	0.014	0.03	N.S.
			Listening	0.968	2.22	< .05
			Matching	0.413	1.19	N.S.
			Alphabet	1.844	6.54	< .001
		Percept.	Numbers	0.747	2.32	< .05
			Copying	0.080	0.24	N.S.
Middle Total Test	11.15		Total	0.739	10.75	< .001
Low Subtests	19.08	Lang	Word Meaning	0.064	0.14	N.S.
			Listening	0.259	0.54	N.S.
			Matching	1.017	2.54	< .05
		Percept.	Alphabet	1.501	4.92	< .001
			Numbers	0.702	2.09	< .05
			Copying	0.603	1.89	< .05
Low Total Test	8.97		Total	0.745	10.35	< .001

Listening is significant at the .05 level.

Hypothesis F-3 (the total test will not significantly predict reading achievement when students are categorized by sex) is rejected because it was a significant predictor at the .001 level for all three socio-economic levels.

Analysis by Sex and Socio-Economic Level

Multiple linear regression was applied to the data to determine if any of the Metropolitan perceptual or language subtests or the total test would significantly predict reading achievement when students are categorized by sex and socio-economic level. The resulting t values for the regression coefficients of the predictive variables are found in Table VII.

The computed t values found in Table VII indicate that when students are categorized by sex and socio-economic level some of the Metropolitan perceptual and language subtests and the total test do significantly predict reading achievement. Specifically, hypothesis G-1 (there is no perceptual subtest which will significantly predict reading achievement) is rejected because:

1. For high socio-economic boys, Alphabet is significant at the .001 level.

2. For high socio-economic girls, Alphabet and Numbers are significant at the .001 level.

3. For middle socio-economic boys, Numbers is significant at the .05 level while Alphabet

TABLE VII

RESULTS OF MULTIPLE LINEAR REGRESSION WHEN THE SAMPLE IS DIVIDED ACCORDING TO THE
SEX AND SOCIO-ECONOMIC LEVEL OF THE STUDENTS

Equation	Intercept		Independent Variables	Regression Coefficient	t	p
High Boys Subtests	10.39	Lang	Word Meaning	0.319	0.56	N.S.
			Listening	0.764	1.19	N.S.
			Matching	1.094	1.95	N.S.
		Percept.	Alphabet	1.521	4.29	<.001
			Numbers	0.445	1.05	N.S.
			Copying	0.582	1.25	N.S.
High Boys Total	6.00		Total	0.824	10.12	<.001
High Girls Subtests	11.53	Lang	Word Meaning	0.404	1.04	N.S.
			Listening	1.455	3.23	<.01
			Matching	0.339	0.81	N.S.
		Percept.	Alphabet	1.353	3.61	<.001
			Numbers	1.226	3.40	<.001
			Copying	0.339	0.89	N.S.
High Girls Total	11.65		Total	0.796	10.44	<.001
Middle Boys Subtests	16.04	Lang	Word Meaning	0.392	0.62	N.S.
			Listening	0.132	0.18	N.S.
			Matching	0.033	0.06	N.S.
		Percept.	Alphabet	1.502	3.36	<.01
			Numbers	1.006	2.20	<.05
			Copying	0.603	1.131	N.S.
Middle Boys Total	11.97		Total	0.700	10.71	<.001
Middle Girls Subtests	13.86	Lang	Word Meaning	0.089	0.16	N.S.
			Listening	1.552	2.94	<.01
			Matching	0.888	1.80	N.S.
		Percept.	Alphabet	2.046	5.71	<.001
			Numbers	0.384	0.80	N.S.
			Copying	0.492	0.98	N.S.
Middle Girls Total	12.06		Total	0.747	7.35	<.001
Low Boys Subtests	19.82	Lang.	Word Meaning	0.710	1.17	N.S.
			Listening	0.163	0.22	N.S.
			Matching	0.994	1.66	N.S.
			Alphabet	1.83	3.74	<.001
			Numbers	0.75	1.54	N.S.
		Percept.	Copying	0.55	1.21	N.S.
Low Boys Total	7.23		Total	0.73	6.43	<.001
Low Girls Subtests	16.08	Lang	Word Meaning	1.131	1.72	N.S.
			Listening	0.164	0.24	N.S.
			Matching	0.961	1.75	N.S.
			Alphabet	0.925	2.19	<.05
			Numbers	0.637	1.36	N.S.
			Copying	0.667	1.49	N.S.
Low Girls Total	11.01		Total	0.752	8.47	<.001

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is significant at the .01 level.

4. For middle socio-economic girls, Alphabet
    is significant at the .001 level.

5. For low socio-economic boys, Alphabet is
    significant at the .05 level.

Hypothesis G-2 (there is no language subtest which will significantly predict reading achievement) is rejected because:

1. For high socio-economic girls, Listening
    is significant at the .01 level.

2. For middle socio-economic girls, Listen-
    ing is significant at the .01 level.

Hypothesis G-3 (the total test will not significantly predict reading achievement when the students are categorized by sex and socio-economic level) is rejected because the total test was significant predictor on all sex and socio-economic level categories at the .001 level.

Summary of Hypothesis Testing

1. The hypotheses dealing with differences in
    performance on the Metropolitan Readiness
    Tests attributable to the factors of socio-
    economic level or a combination of sex and
    socio-economic level were rejected. The
    hypothesis dealing with differences in per-
    formance according to sex was rejected.

2. All hypotheses dealing with differences in

performance on the <u>Gates-MacGinitie</u> <u>Read-</u><u>ing</u> <u>Test</u> attributable to the factors of sex and socio-economic level or both were rejected.

3. All hypotheses dealing with the predictive validity of the perceptual subtests when the sample was whole, divided according to sex, socio-economic level or sex and socio-economic level were rejected.

4. All hypotheses dealing with the predictive validity of the language subtests when the sample was, whole divided by sex, socio-economic level or sex and socio-economic level were rejected.

5. All hypotheses dealing with the predictive validity of the total test when the sample was whole, divided by sex, socio-economic level or sex and socio-economic level were rejected.

CHAPTER V

SUMMARY AND CONCLUSIONS

General Summary of the Investigation

This investigation examined the predictive validity of
the 1965 revision of the Metropolitan Readiness Tests when
students are categorized by sex and socio-economic level.
Two major areas of concern were investigated: (1) The
possible differences attributable to the factors of sex and
socio-economic level or a combination of both in performance
on the Metropolitan and Gates-MacGinitie tests, (2) an anal-
ysis of the predictive validity of the Metropolitan percep-
tual and language subtests and the total test when the
sample was whole, divided by sex, socio-economic level and a
combination of sex and socio-economic level.

All the students in this study were from a large
metropolitan school system. These students were administer-
ed the 1965 revision of the Metropolitan Readiness Tests at
the end of kindergarten in 1968 and were administered the
Gates-MacGinitie Reading Test in April 1969 as a post test.
The students scores were arranged by socio-economic levels
using the prestige rating given their father's occupation on
the NORC scale and their sex. The total sample of the study
was 627 students on whom complete data was collected. The

data derived from these groups in various combinations were examined through the techniques of analysis of variance and multiple linear regression.

Summary of Results

The results of the first portion of the study which sought to identify differences in performance according to the factors of sex and socio-economic level indicate that differences do exist. It should be noted that it was considered basic to this study that differences according to sex and socio-economic level did exist in order to justify a further treatment of the data. This justification was needed because if there was no significant difference in performance when students are categorized by sex and socio-economic level, then it would be unnecessary to search for predictive measures based on these identified student differences.

The students' scores were categorized by sex and treated by an analysis of variance to determine if there was a significant difference in performance according to the sex of the students. The obtained F values on the Metropolitan revealed that only on Word Meaning, Matching, and Alphabet was there a significant difference ($<.05$) in performance according to sex. On the Gates-MacGinitie both F values were significant at the .01 level and indicated that there was a significant difference in performance on this test according to sex. In Table IX (Appendix B), the differences

in performance indicated that the girls surpassed the boys in performance five out of seven times on the Metropolitan and in both tests of the Gates-MacGinitie.

The students scores were also categorized by socio-economic level and treated by an analysis of variance to determine if there was a significant difference in performance according to the socio-economic level of the students. The obtained F values indicated that for all possible scores there was a significant (<.01) difference in the performance on the Metropolitan and Gates-MacGinitie tests when students are categorized by socio-economic level. It was observed in Table X (Appendix B) that the high socio-economic level always had the highest mean score, the middle socio-economic level always the second highest and the low socio-economic level always had the lowest.

When the students scores were categorized by sex and socio-economic level, an analysis of variance was applied to the data to determine if there was a significant difference in performance according to the sex and socio-economic level of the student. The obtained F values indicated that there was a significant (<.01) difference in performance on the Metropolitan and Gates-MacGinitie tests when the students were categorized by sex and socio-economic level. In Table XI (Appendix B), it was observed that except in scattered cases the differences in performance on the Metropolitan and Gates-MacGinitie tests indicated that the girls surpassed the boys in performance and that the high socio-economic

level surpassed the middle and low socio-economic levels in performance. These results supported the findings that were mentioned earlier in this chapter.

It can be concluded from the results of these three analysis of variance applied to the data categorized according to sex, socio-economic level or both that significant differences in performance do exist. These differences indicate that the sex and the socio-economic level of the students are factors to be recognized and accounted for when testing students of approximately first grade level using the instruments cited in this study.

Multiple linear regression was applied to the data when it was grouped totally together, according to sex, according to socio-economic level and according to sex and socio-economic level. This statistical technique was used to determine if any of the Metropolitan perceptual or language subtests or the total test would significantly predict reading achievement when the data was grouped in the above mentioned ways. This statistical technique yields for each predictive factor a computed t value which indicates the relative efficiency of that factor as a predictor in the regression equation and the level of significance of that factor when the t value is interpreted by a t table. The resulting t values obtained from multiple linear regression on the whole sample, the sample divided by sex, divided by socio-economic level, and divided by sex and socio-economic level are presented in Table VIII.

TABLE VIII

A SUMMARY OF THE COMPUTED t VALUES RESULTING FROM
MULTIPLE LINEAR REGRESSION ON THE SAMPLE

Group	Computed Value	LANGUAGE		PERCEPTUAL				Total	Number of Significant Predictors
		Word Meaning	Listening	Matching	Alphabet	Numbers	Copying		
Total Sample	t	0.175	2.598**	3.341***	10.80***	4.321***	2.403*	22.05***	6
Boys	t	0.163	0.491	2.078*	7.041***	3.411***	2.373*	14.837***	5
Girls	t	0.460	3.273**	2.541*	7.272***	2.732**	1.183	16.284***	5
High Level	t	0.501	2.974**	2.163*	6.266***	2.838**	1.701	14.488***	5
Middle Level	t	0.036	2.229*	1.119	6.545***	2.320*	0.241	10.759***	4
Low Level	t	0.150	0.543	2.542*	4.926***	2.090*	1.897	10.356***	4
High Boys	t	0.569	1.194	1.955	4.296***	1.059	1.252	10.126***	2
High Girls	t	1.044	3.238**	0.813	3.613***	3.405***	0.894	10.443***	4
Middle Boys	t	-0.620	0.180	0.068	3.360***	2.203*	1.315	7.258***	3
Middle Girls	t	0.162	2.949**	1.807	5.719***	0.805	0.983	7.353***	3
Low Boys	t	1.176	0.229	1.666	3.748***	1.548	1.214	6.432***	2
Low Girls	t	1.721	0.249	1.755	2.193*	1.363	1.493	8.479***	2

* <.05   ** <.01   *** <.001

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An inspection of Table VIII indicates that for the total sample only word meaning was not a significant predictor of reading achievement. The perceptual and language subtests and the total test were significant predictors of reading achievement. It is observed that Matching, Alphabet, and Numbers which are perceptual subtests, reach the .001 level of significance. This seems to indicate that for the total sample the perceptual subtests are a relatively efficient predictor of reading achievement.

When the sample was divided according to sex five out of the seven predictors were significant for each sex. For boys, it was observed that the perceptual subtests seemed to have higher efficiency as predictors than the language subtests. This is supported by the observation that all of the perceptual subtests reached a level of significance while none of the language subtests reached a level of significance.

When the sample was divided according to socio-economic level, it was observed that there were five significant predictors at the high socio-economic level, four at the middle socio-economic level and four for the low socio-economic level. No observable pattern favoring the perceptual or language subtests could be located.

An inspection of Table VIII indicates that when the sample was divided according to sex and socio-economic level that the language subtests were significant on only two of the six possible socio-economic levels. It was also noted

that one or more of the perceptual subtests were significant
at each of the six socio-economic levels. A conclusion
based on these two observed results is that the perceptual
subtests are efficient predictors of reading achievement
more consistently than the language subtests.

When all possible categorizations of the sample were
considered, Word Meaning was the least efficient predictor
in that it never in any of the twelve regression equations
was a significant predictor. At the other extreme,
Alphabet was the most consistent predictor among the sub-
tests because it was significant in twelve out of twelve
possible times with eleven of those significances being at
the .001 level.

A close inspection of Table VIII indicates that the
total test was the most consistent predictor of reading
achievement. The total test score reached the .001 level
of significance twelve out of twelve possible times. It
was observed to be the most efficient predictor no matter
what the sex or socio-economic level of the student.

A review of the last column of Table VIII, which gives
the number of significant predictors for a category offers
an interesting observation. The number of subtests which
significantly predict reading achievement decreases as the
sample is divided into more specifically identified cate-
gories. This would seem to indicate that as the sample is
more specifically identified, fewer subtests are signifi-
cant predictors. This observation coupled to the fact that

significant differences in performance do exist attributable
to the identifying factors of sex and socio-economic level
indicates that the Metropolitan subtests do not consistently
predict for specifically identified samples. Therefore,
when working with a highly identified sample, the total
score is the most consistent, efficient predictor of reading
success.

Recommendations

The 1965 revision of the <u>Metropolitan Readiness Tests</u>
is an instrument which will be subject to wide use in coming
years. It is with this in mind that the following sugges-
tions are given:

A. Suggestions for use of the Metropolitan.

    1. Persons administering this test should
be made aware that performance on this
test will vary according to the sex
and socio-economic level of the stu-
dent and that, when possible, allowances
should be made.

    2. The total test score should be used in
predicting reading achievement for
specifically identified students.

    3. The Alphabet subtest should be recog-
ized as the single subtest which will
consistently predict reading achieve-
ment for all students.

B. Suggestions for future research.

　　　　1. Studies designed to predict read-
　　　　　　ing failure using the
　　　　　　Metropolitan.

　　　　2. Studies designed to establish
　　　　　　criteria for using the Metropolitan
　　　　　　as a predictor of reading readiness.

　　　　3. A study following the design of this
　　　　　　study but using multiple analysis of
　　　　　　variance to determine differences in
　　　　　　performance according to sex and
　　　　　　socio-economic level.

　　　　4. A study following the design of this
　　　　　　study, but using stepwise multiple
　　　　　　linear regression to determine the
　　　　　　predictive validity of the subtests.

Concluding Statement

The results of this study are offered as an attempt to
aid in the understanding of an instrument which is currently
being used in public schools.

It is hoped that the results of this study will serve
a useful purpose by benefiting those interested in this area
of reading and aiding in future studies on the relationship
of sex and socio-economic level to reading.

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APPENDIX A

NORC SCALE OF OCCUPATIONS

NORC Scale of Occupations

Occupation	Score
High Socio-Economic Level	
U. S. Supreme Court justice	96
Physician	93
State governor	93
Cabinet member in the federal government	92
Diplomat in the U.S. Foreign Service	92
Mayor of a large city	90
College professor	89
Scientist	89
United States representative in Congress	89
Banker	88
Government scientist	88
County judge	87
Head of a department in a state government	87
Minister	87
Architect	86
Chemist	86
Dentist	86
Lawyer	86
Member of board of directors of large corporation	86
Nuclear physicist	86
Priest	86
Psychologist	85
Civil engineer	84
Airline pilot	83
Artist who paints pictures that are exhibited in galleries	83
Owner of factory that employs about 100 people	82
Sociologist	82
Accountant for large business	81
Biologist	81
Musician in a symphony orchestra	81
Author of novels	80
Captain in the regular army	80
Building contractor	79
Economist	79
Instructor in public schools	79
Public-school teacher	78
County agricultural agent	77
Railroad engineer	77
Farm-owner and operator	76
Official of an international labor union	75
Radio announcer	75
Newspaper columnist	75
Owner-operator of a printing shop	74

Occupation	Score

Middle Socio-Economic Level

Electrician	73
Trained machinist	73
Welfare worker for a city government	73
Undertaker	72
Reporter on daily newspaper	71
Manager of small store in a city	69
Bookkeeper	68
Insurance agent	68
Tenant farmer - one who owns livestock and machinery and manages the farm	68
Traveling salesman for a wholesale concern	68
Playground director	67
Policeman	67
Railroad conductor	67
Mail-carrier	66
Carpenter	65
Automobile repairman	63
Plumber	63

Low Socio-Economic Level

Garage mechanic	62
Local official of labor union	62
Owner-operator of lunch stand	62
Corporal in the regular army	60
Machine operator in factory	60
Barber	59
Clerk in a store	58
Fisherman who owns own boat	58
Streetcar motorman	58
Milk-route man	54
Restaurant cook	54
Truck-driver	54
Lumberjack	53
Filling-station attendant	52
Singer in a night club	52
Farm hand	50
Coal miner	49
Taxi-driver	49
Railroad section hand	48
Restaurant waiter	48
Dockworker	47
Night watchman	47
Clothes-presser in a laundry	46
Soda-fountain clerk	45
Bartender	44
Janitor	44

Occupation	Score

Low Socio-Economic Level (Continued)

Share-cropper – one who owns no livestock or equipment and does not manage farm	40
Garbage collector	35
Street-sweeper	34
Shoe-shiner	33

APPENDIX B

MEAN SCORES FOR STUDENTS WHEN THEY ARE

CATEGORIZED BY SEX, SOCIO-ECONOMIC

LEVEL OR BOTH

TABLE IX

CATEGORIZATION BY SEX

Test	Boys	Girls
Metropolitan		
Word Meaning	8.75	8.20
Listening	10.29	10.21
Matching	8.47	8.96
Alphabet	8.35	9.88
Numbers	13.27	13.88
Copying	9.32	9.41
Total	58.47	60.65
Gates		
Vocabulary	33.57	36.30
Comprehension	19.02	21.78

TABLE X

CATEGORIZATION BY SOCIO-ECONOMIC LEVEL

Test	High	Middle	Low
Metropolitan			
Word Meaning	9.14	8.41	7.88
Listening	10.78	10.09	9.88
Matching	9.26	8.91	7.97
Alphabet	10.50	9.19	7.66
Numbers	15.19	13.46	12.09
Copying	10.21	9.44	8.45
Total	65.15	59.56	54.09
Gates			
Vocabulary	38.37	35.06	31.39
Comprehension	23.25	20.15	17.84

TABLE XI

CATEGORIZATION BY SEX AND SOCIO-ECONOMIC LEVEL

Test	High Boys	High Girls	Mid. Boys	Mid. Girls	Low Boys	Low Girls
Metropolitan						
Word Meaning	9.43	8.85	8.60	8.23	8.23	7.52
Listening	10.81	10.75	9.93	10.26	10.12	9.63
Matching	9.04	9.49	8.33	9.48	8.04	7.90
Alphabet	9.81	11.19	8.46	9.91	6.79	8.55
Numbers	15.26	15.11	12.59	14.31	11.97	12.22
Copying	10.11	10.31	9.06	9.80	8.80	8.10
Total	64.52	65.78	57.00	62.06	53.94	54.07
Gates						
Vocabulary	37.18	39.56	33.57	36.51	29.99	32.81
Comprehension	22.02	24.47	18.30	21.94	16.77	18.93

VITA

3

James Chester Akers

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Doctor of Education

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