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MANNING, Emma Jean, 1937-
INTELLIGENCE AND READING ACHIEVEMENT OF BLACK DISADVANTAGED TENTH GRADE STUDENTS.

The University of Oklahoma, Ed.D., 1977
Education, secondary

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THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

# INTELLIGENCE AND READING ACHIEVEMENT OF BLACK DISADVANTAGED TENTH GRADE STUDENTS

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

DOCTOR OF EDUCATION

BY

EMMA JEAN MANNING

Norman, Oklahoma

1977

INTELLIGENCE AND READING ACHIEVEMENT

OF BLACK DISADVANTAGED TENTH GRADE STUDENTS

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ACKNOWLEDGEMENTS

The writer wishes to express profound gratitude to Dr. Robert L. Curry, chairman of the committee, for his sympathetic awareness, wise counsel, and unceasing encouragement. His inspirational leadership provided me with the fortitude to meet the demands of the situation through difficult times.

Sincere appreciation is extended to Dr. Gene Shepherd and to Dr. Mary Clare Petty whose constructive suggestions and moral support have been invaluable during the completion of this study. The writer is indebted to Dr. Omer J. Rupiper for assistance in the statistical design of the study.

Special acknowledgement is extended to the Richmond County Board of Education, who granted permission to conduct the study, thus making this research a reality. Appreciation is also extended to the staffs of the participating schools for their assistance in the collection of the data.

To my parents, Mr. and Mrs. Mack H. Thomas, the writer is deeply indebted for their devotion, sacrifices and encouragement throughout the years and the doctoral program.

To my husband, Willie James Manning, deep appreciation is expressed for his understanding, patience and assistance during the doctoral program.

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# INTELLIGENCE AND READING ACHIEVEMENT OF BLACK DISADVANTAGED TENTH GRADE STUDENTS

## CHAPTER I

## INTRODUCTION

### Need for the Study

Reading as a subject and as a tool for learning has assumed an eminent position in the school curriculum. The influences that it exerts upon the individual in his environment are often wide-spread.

Bond and Tinker assert that the ineffective reader is often handicapped in practically all walks of life. The competent reader can function more effectively in daily activities, achieve more satisfactorily in school learnings, satisfy emotional and intellectual needs, maintain better personal and social adjustment, appreciate better his cultural heritage, and be a better citizen.[1]

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[1]Guy L. Bond and Miles A. Tinker, Reading Difficulties: Their Diagnosis and Correction. (New York: Appleton, Century-Crofts, 1967), pp. 8-9.

While reading is a complex activity, involving the total organism, it is summarized as follows:

> The recognition of printed or written symbols which serve as stimuli for the recall of meanings build up through the reader's past experience, and new meanings derived through manipulation of concepts already in his possession.[2]

Dallman, Deboer and others contend that reading is the means by which every age is linked to every other, and makes possible man's capacity for "Time Binding," the ability to perceive himself and the fluid universe around him in the historic process. If all the inventions of a hundred years were destroyed and only books were left, man could still be man, in the sense intended by the idealists, the poets, and the great creators.[3]

At present, our educational system is comprised of a large proportion of youth known as the "culturally disadvantaged." These youth, to a large extent, have experienced deprivation in recreational, personal, social political and academic arenas. Victims of impoverished environments, of stereotyped attitudes among various segments of society, of an educational system whose curriculum is primarily structured upon the needs of students

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[2]Ibid., p. 22.

[3]Martha Dallman, Robert L. Rouch, Lynette Y. Chang, John J. Deboer, The Teaching of Reading, (New York: Holt, Rinehart and Winston, Inc., 1974), p. 4.

characterized by a higher socio-economic background, the disadvantaged youth often finds himself assigned to the category of an underachiever and particularly with respect to reading skills. Moreover, statistics reveal that the high school drop-out rate is higher for the youth of the lower socio-economic level in comparison with his more fortunate counter-part.

In a description of the culturally disadvantaged, Bloom makes the following observation:

> They are so called because the roots of their problems may in large be traced to experiences in homes which do not transmit the cultural patterns necessary for the types of learning characteristics of the schools and the larger society. A large proportion of these youth come from homes in which adults have a minimal level of education. Many of them come from homes where poverty, large family size, broken homes, discriminations and slum conditions further complicate the picture.[4]

According to Figurel, the ultimate reading goal for the disadvantaged reader is no different from that of other boys and girls. It was indicated, however, that the short-term and day-by-day reading goals for disadvantaged boys and girls will have to assume a somewhat different approach if the ultimate objective is to be reached upon the completion of school.[5]

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[4]Benjamin Bloom, Compensatory Education for cultural Deprivation, (New York: Holt, Rinehart and Winston, Inc., 1965), pp. 4-5.

[5]J. Allen Figurel, "Are The Reading Goals For The

The degree of success achieved in developing competent readers, will require various adjustments. These adjustments must be in terms of approaches, practices, techniques and sequential learning tasks designed to meet the needs of disadvantaged students.[6]

The above conclusion illustrates the need for further exploration of factors which may yield valuable insight into the reading process. In the last thirty years or so, recognition has been given to the variable of "intelligence" as it relates to achievement. However, the correlation literature indicates that additional research is needed in the assessment of the contribution of intelligence to reading achievement among culturally disadvantaged students.

Bruininks reports that the correlations between measures of verbal intelligence in unselected populations have consistently varied between .40 and .75, with evidence suggesting an increase in these attributes with chronological age. He further reveals that (1) the measures employed in past investigations have primarily consisted of group intelligence tests, and (2) few previous

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Disadvantaged Attainable?" Reading Goals for the Disadvantaged, The International Reading Association, 1969, p. 1.

[6]Ibid., p. 1.

studies have included language and creative thinking abilities in assessing relationship to reading.[7]

Among those expressing interest in the relationship of intelligence to reading ability, are educators. Questions have been formulated as to how it might be determined if a student's reading is comparable to his intelligence, or if a student is reading below his intellectual level. Authorities acknowledge that a disparity between reading achievement and intelligence sometimes exists. It has been determined that underachievers in reading possess the capability to perform on a higher level as evidenced by intelligence quotients.

Marksheffel contends that educators, psychologists, medical doctors and reading specialists are in general agreement that a valid test of intelligence is one of the best indicators of one's reading ability. The fact that a student possesses a high intelligence quotient does not guarantee that he will function on a high level of reading as many factors, in addition to intelligence, influence this quality and the extent of a student's reading achievement. He emphasizes, however, that the student with a high

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[7]Robert H. Bruininks, "Measures of Intelligence, Language, Creativity, Reading, and Written Language Achievement of Disadvantaged Children." Reading Goals for The Disadvantaged, International Reading Association, 1969.

intelligence quotient has the potential to become an efficient reader, but the student who is limited in intelligence can never read beyond a certain point.[8]

The conclusions above emphasize the importance of intellectual functioning in its tendency to exert a limit on learning within the environment. There are broad implications relative to the curriculum and to individual differences in reading instruction.

In further support of the relationship of intelligence to reading ability, certain specific mental abilities have been suggested as necessary for success in reading. Among these are: (1) the ability to see likenesses and differences, (2) the ability to remember word forms with freedom from aphasia and word blindness, (3) memory span of ideas, (4) ability to do abstract thinking, and (5) the ability to correlate abstractions with definite modes of response as this ability is related to the reading process.[9] A lack of research related to intellectual ability and reading achievement of black disadvantaged youth provides a basis for this study.

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[8]Ned D. Markshеffel, Better Reading in the Secondary School, (New York: The Ronald Press Company, 1966), pp. 101-102.

[9]Lucille M. Harrison, "Intellectual Readiness" In Henry P. Smith and Emerald V. Dechant, Psychology in Teaching Reading, (New Jersey: Prentice-Hall, Inc., 1961), p. 87.

## Statement of the Problem

The problem was to determine if significant differences and correlations exist among scores on tests of intelligence and reading achievement of black tenth-grade students from the lower socio-economic status.

## Purpose of the Study

The purpose of this study was to determine whether intelligence was related to the reading ability of tenth grade youth from the lower socio-economic status. The knowledge gained from this investigation should be of value in more effective educational and vocational guidance of disadvantaged students.

## Hypotheses

The following null hypotheses were tested in this study:

1. There is no statistically significant correlation between the intelligence quotients obtained on the Stanford-Binet Intelligence Scale (Form L-M) and the Henmon-Nelson Test of Mental Ability (Form A).

2. There are no statistically significant differences between mean standard scores on the subtests of the Gates-MacGinitie Reading Test (Survey F) by sex.

3. There are no statistically significant correlations between the intelligence quotients obtained on the Stanford-Binet Intelligence Scale (Form L-M) and the

standard scores on the subtests of the Gates-MacGinitie Reading Test (Survey F).

## Operational Definitions

1. Intelligence: The ability to understand, think abstractly, and solve problems as measured by the Stanford-Binet Intelligence Scale (Form L-M) and the Henmon-Nelson Test of Mental Ability (Form A).

2. Intelligence Quotient: The ratio between chronological age and mental age as measured by the Stanford-Binet Intelligence Scale (Form L-M).

3. Reading Achievement: The reading comprehension scores of the participants as yielded by the Gates-MacGinitie Reading Test (Survey F).

4. Socio-economic Status: A class of student participants relative to social and economic factors as indicated by the Two Factor Index of Social Position.[10]

5. Culturally Disadvantaged: A category ascribed to student participants of the lower socio-economic level based upon individual and environmental characteristics measured by the Two Factor Index of Social Position.

## Limitations of the Study

The limitations of this study were as follows:

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[10]August B. Hollingshead, Two Factor Index of Social Position, (New Haven, Connecticut: Yale Station, 1965).

1. The study was limited to black tenth-grade students of the lower socio-economic level enrolled in the Richmond County Public School System.

2. The study was limited to a sample of 50 black students.

3. The measuring instruments were limited to the Stanford-Binet Intelligence Scale (Form L-M), the Henmon-Nelson Test of Mental Ability (Form A), the Gates-MacGinitie Reading Test (Survey F), and the Two Factor Index of Social Position for determining the socio-economic status of the participants.

## Assumptions

1. The concept of intelligence can be isolated and measured by a standardized testing instrument.

2. The Stanford-Binet Intelligence Scale (Form L-M) and the Henmon-Nelson Test of Mental Ability (Form A) are valid and reliable instruments for the measurement of intelligence.

3. The Gates-MacGinitie Reading Test (Survey F) is a valid and reliable measure of reading achievement of black tenth-grade high school students.

4. A sample of 50 black tenth-grade students may be considered an adequate sample size from which to generalize.

## Selection of Instruments

Four instruments were utilized in collecting data for this study: (1) The Two Factor Index of Social Position, (2) The Stanford-Binet Intelligence Scale (Form L-M), (3) the Henmon-Nelson Test of Mental Ability (Form A), and (4) the Gates-MacGinitie Reading Test (Survey F).

The Two Factor Index of Social Position. The Two Factor Index of Social Position was used as a measurement of socio-economic status. This index places individuals and families in classes and is premised upon three assumptions:

1. That social stratification exists in the community.
2. That status positions are determined mainly by a few commonly accepted characteristics.
3. That items symbolic of status may be scaled and combined by the use of statistical procedures.[11]

The two indicators of status utilized by the Index of Social Position to determine class positions are occupation and education. The items are evaluated by a scale and combined and weighted by a statistical procedure into a "class status" score. The statistical analysis for determining the class score utilizes the multiple correlation

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[11] Ibid., p. 387.

and regression equations. This procedure allows for a quick, reliable and meaningful stratification of the population.[12]

The validity and reliability of the Two Factor Index of Social Position are considered satisfactory for the measurement of socio-economic status. The correlation of social classes with education is .78, with occupation .88, and combined .93.[13]

The Stanford-Binet Intelligence Scale (Form L-M). The Binet scale is an individual test of intelligence which measures verbal and non-verbal abilities from the preschool years to adulthood. The intelligence level is expressed in terms of I. Q. a ratio of mental age over chronological age. At the adult level, the scale is weighted with problem-solving and memory items. The mental abilities sampled by the Stanford-Binet at the upper levels are: (1) vocabulary, (2) Induction, (3) Reasoning, (4) Ingenuity, (5) Abstract Words, (6) Sentence Building, (7) Memory for Sentences, (8) Essential Differences, (9) Opposite Analogies (10) Orientation, (11) Repetition of Digits, and (12) Proverbs.

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[12]August G. Hollingshead and Frederick C. Redlich, Social Class and Mental Illness, (New York: John Wiley Sons, Inc., 1958), pp. 394-395.

[13]Ibid., p. 394.

Validity was checked by computing the biserial correlation of each subtest with the total scores on the test. Evidence that the Stanford-Binet has high validity and reliability is afforded by the fact that for both Form L and Form M, the biserial correlations remain high.[14]

The mean correlation for the 1960 scale is .66 as compared with a mean of .61 for all tests in both forms in the 1937 revision. For year levels 6-0 through 14-0, the 1960 mean is .67, the 1937 mean .60. The adult levels, Average Adult through Superior Adult III, have the highest correlations, the 1960 mean is .73 and the 1937 mean is .61.[15]

The Henmon-Nelson Test of Mental Ability (Form A). The Henmon-Nelson Test is a group intelligence test designed to measure the level of intelligence from grades three through twelve. The mental abilities assessed by the Henmon-Nelson Test are: (1) Vocabulary, (2) Sentence Completion, (3) Word Classification, (4) Logical Selection, (5) Disarranged Sentences, (6) Interpretation of Proverbs, (7) Verbal Analogies, (8) Mixed Spelling, (9) Series Completion, (10) Design Analogies, and

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[14]Lewis M. Terman and Maud A. Merrill, Stanford Binet-Intelligence Scale, (Boston: Houghton Mifflin Company, 1972), p. 24.

[15]Ibid., p. 33.

(11) Arithmetic Reasoning.

The level of validity and reliability of the Henmon-Nelson Test of Mental Ability is reported satisfactory for the measurement of intelligence. Evidence for congruent validity is presented in the form of correlations with several well known tests of intelligence. The median coefficient for all levels is .76, with the range of .50 to .84. Concurrent validity is well established by correlations between Henmon-Nelson I. Q.'s and achievement test scores and between I. Q.'s and teacher's grades. The median coefficient for total achievement battery scores versus I. Q. is .79, with the range .64 to .85. Average grades and I. Q. produced a median of "r" of .60, with a range of .90 to .74.[16]

Reliability is reported in terms of odd-even correlations for each grade level and form. Correlations between the median of the 24 odd-even reliability coefficients reported is .94, and the range of values is .90 to .97. The six interform correlations range from .87 to .94 with a median of .91.[17]

The Gates-MacGinitie Reading Test (Survey F). A satisfactory level of validity and reliability has been

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[16]Oscar Krisen Buros, The Fifth Measurement Year Book, (New Jersey: The Gryphon Press, 1959), p. 342.

[17]Ibid.

obtained for the Gates-MacGinitie Reading Test (Survey F) as reported in Buros Sixth Year-Book of Mental Measurement. The comprehension test has high alternate form reliability (.88). The comprehension and vocabulary scores are extremely high (.85), and corrections made for the unreliability of both tests yield a correlation of .95. The comprehension test also correlates highly (.79) with Lorge Thorndike Verbal I. Q. scores.[18]

Analysis of the Data

The Pearson Product Moment Correlation Coefficient was calculated to analyze the relationship between the scores yielded from the Henmon-Nelson Test of Mental Ability (Survey F) and the Stanford-Binet Intelligence Scale (Form L-M). The scores obtained by the students on the Henmon Nelson Test and the Binet Scale were reported as I. Q. scores.

Standard scores were presented for each of the subtests of the Gates-MacGinitie Reading Test (Survey F). A multiple correlation analysis was computed to assess the relationship of each subtest score of the Gates-MacGinitie Reading Test to the I. Q. score yielded from the Stanford-Binet Intelligence Scale (Form L-M).

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[18]Oscar Krisen Buros, "Reading Tests and Reviews," Sixth Mental Measurement Year Book, (New Jersey: The Gryphon Press, 1968), p. 91.

Four One-Way Analyses of Variance (ANOVA) were used to determine the relationship of scores obtained by males and females on the subtests of the Gates-MacGinitie Reading Test (Survey F). Means and standard deviations were also computed.

# CHAPTER II

# REVIEW OF THE LITERATURE

## Introduction

Chapter II of this study presents the pertinent literature with respect to the relationship existing between intelligence and reading achievement, and as reported by various authorities in the field. Specifically, the areas explored deal with the variables of intelligence, reading, and socio-economic-status and their application to the disadvantaged youth. The review of the relevant literature has been instrumental in providing an understanding of the factors which influence the reading process, particularly as investigated in this study.

## Intelligence and Reading Achievement

The ability to read has been widely used as a measure of mentality. With the exception of a few non-language scales, intelligence tests generally include reading skills. Since learning to read has its limits set by inherent patterns of mental development, the close

relationship existing between reading ability and intelligence may warrant the general practice of testing reading ability as one of the factors in measuring intelligence. Wheeler, however, concludes that reading ability and intelligence are not one and the same thing and makes the following caution:

> "While certain degrees of mental maturity are necessary to the development of reading proficiency, there are many individuals of normal and superior mentality who have reading difficulties. Any individual with a reading retardation level commensurate with mental level, is handicapped when given an aptitude test requiring reading beyond his reading achievement level."[1]

Curry and Hughes agree that differences in achievement and performance are not necessarily related to the single factor of intellectual ability, but indicate that it is a highly important factor. In addition to the relationship between mental age and reading age, emphasis is placed upon the determination of how well a child is achieving in reading as compared to the level he should be achieving in reading as when such factors as age, grade, and mental ability are combined. They conducted a study with sophomores in the Waco Public School System to determine the relationship between (1) reading grade placement scores and mental grade placement scores, (2) between measured achievement and anticipated achievement in reading

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[1]Lester R. Wheeler, "The Relation of Reading to Intelligence," School and Society, Volume 70, 1949, p. 225.

vocabulary, and (3) between measured achievement and anticipated achievement in reading comprehension of three intellectual ability groups: above average, average, and below average. Correlation coefficients were computed for the various factors and for all of the subjects combined.[2]

Results indicated that the correlations for mental grade placement scores and reading grade placement scores for the intellectual ability groups and for the sub-groups within were between .30 and .43, and .63 for all subjects combined; measured achievement and anticipated achievement in Reading Vocabulary ranged from .15 to .36, and .56 for subjects combined. In Reading Comprehension, the correlations were low for most of the groups with the exception: the above-average and average ability groups yielded a coefficient of .63 for the entire group in the average ability group. A substantial coefficient of .72 was yielded for the entire group of sophomores.[3]

Barbe and Grigg determined the correlation between various factors in reading ability and the I. Q. of fifty-two tenth grade students using the Henmon-Nelson Tests and the Iowa Silent Reading Tests. A low positive correlation

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[2]Robert L. Curry and Hughie Hughes, "Relationships Between Measured and Anticipated Achievement in Reading," Junior College Journal, Volume 32, 1961-62, p. 91.

[3]Ibid., p. 91-92.

was found between reading rate and I. Q., but was not statistically significant.

The correlation between intelligence and reading comprehension and paragraph comprehension was .55 and .64, with both correlations being significant. Word meaning and sentence meaning were found to have correlations of .69 and .64 with the I. Q., respectively. An analysis of the various skills yielded the following results:

Directed reading was found to have a correlation of .65 with the I. Q. Poetry comprehension and I. Q. was .57; the use of the index and selection of key words were found to have correlations of .57 and .65 respectively; and the total reading yielded a correlation of .72.[4]

Anderson, Hughes, and Dixon assessed the rate of reading development and its relation to age of learning to read, sex, and intelligence. The subjects consisted of 107 boys and 102 girls with continuous achievement records from the first to the sixth grade of the University Elementary School at the University of Michigan. Three I. Q. groups were established: pupils with scores of 130 and above, pupils with scores of 100 or lower, and pupils placed in a residual group. The relationship between rate of

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[4]Walter Barbe, "Correlations Between Reading Factors and I. Q." School and Society, (New York: The Society for the Advancement of Education, Inc.), Volume 75, (January-June 1941), pp. 134-136

reading development and intelligence indicated that no significant differences were found between the sexes in the number of individuals placed in each of the groups.[5]

## Intelligence and Curriculum Areas

The correlation of intelligence with proficiency in the various academic fields with reading as an influential factor has been investigated by a number of authorities.

Numerous studies have been conducted to determine the relationship between the variables of intelligence and gain in reading achievement with curriculum areas.

Scott, in a two-fold purpose, investigated (1) the relationship between intelligence scores and gains in reading, arithmetic reasoning, social studies, and science achievement, and (2) whether a gain in reading achievement is related to a gain in arithmetic reasoning, social studies and science achievement. The study included 670 pupils in the Bend Public Schools with available intelligence test scores, and with scores from the Stanford Achievement Test administered at the beginning of grade five and at the end of grade six. The subjects were divided into three

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[5]Irving H. Anderson, Byron Hughes, and W. Robert Dixon. "The Rate of Reading Development and Its Relation to Age of Learning to Read, Sex, and Intelligence." Journal of Educational Research. Volume L, Number 7, (March, 1957), pp. 482-494.

capacity groups: low, average and high. Results indicated that the correlation between reading achievement and social studies achievement was high with the low capacity group, otherwise, the correlations were low, but positive in every case. The correlations between intelligence quotients and gain in reading and gain in social studies were lowest with the higher capacity group.[6]

Scott, in a related study, utilizing 193 fifth and sixth grade pupils in the Bend Public Schools, assessed the relationship between intelligence scores and gains in the sub-tests of the Stanford Achievement Test Battery. The sub-tests consisted of Paragraph Meaning, Word Meaning, Spelling, Language, Arithmetic Reasoning, Arithmetic Computation, Social Studies, Science and Study Skills. All the correlations were low with the highest correlation obtained between intelligence and gain in paragraph meaning. Intelligence and gain in reading proficiency were found to be related to gains in the other curriculum areas as measured by achievement tests.[7]

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[6]Carrie M. Scott, "The Relationship Between Intelligence Quotient and Gain in Reading Achievement with Arithmetic Reasoning Social Studies, and Science." The Journal of Educational Research, Volume 56, Number 6, (February, 1963), pp. 322-326.

[7]Carrie M. Scott, "Intelligence and Gain in Reading as Related to Gains in the Sub-tests of the Stanford Achievement Test," The Journal of Educational Research, Volume 56, Number 9, (May-June, 1963), pp. 494-496.

Fay[8] believed that the reading skills significant for success in one subject may differ for success in another, and to study general reading ability as it relates to other curriculum areas is inadequate. Artley[9] felt that reading skills are both general and specific, but that the social studies are most adapted to general reading ability. The obtained correlation of .80 between gain in reading and gain in social studies with the low capacity group confirms this premise. Coffin,[10] found positive correlations between reading ability and improvement in arithmetic. Hinkleman[11] believed that reading had an important relationship to elementary school achievement,

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[8]Leo C. Fay, "The Relationship Between Specific Reading Skills and Selected Area of Sixth Grade Achievement," Journal of Educational Research, XLIII (February, 1944), pp. 464-473.

[9]Sterl Artley, "A Study of Certain Relationships Existing Between General Comprehension and Reading Comprehension in a Specific Subject Matter Area," Journal of Educational Research, XXXVII (February, 1944), pp. 464-373.

[10]Esther A. Coffin, "The Relationship Between Silent Reading Ability and Arithmetic Ability," School Science and Mathematics XLI, (January, 1941).

[11]Emmet A. Hinkleman "Relationship of Reading Ability to Elementary School Achievement," Educational Administration and Supervision, XLII (February, 1956), pp. 65-67.

but that intelligence must also be considered. Tilton[12] in making intercorrelations between measures of school learning, found the correlations between reading and arithmetic fundamentals, social studies, and science to range from .217 to .323. He found that reading gains were less closely associated with progress during the fourth and fifth grades than in the lower grades, and believed that progress in the informational areas during the fourth and fifth grades resulted from functioning of the ability to read already present at the beginning of the period.

The obvious conclusion from the investigations of the relationship of reading to subject matter areas, with intelligence as an influential factor, is that intelligence has a causal relationship to school learning and that one must learn to read in order to succeed with informational materials. Scott[13] asserts that since the relationships were present when intelligence scores were held constant, both intelligence and reading proficiency influence academic progress.

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[12]James Warren Tilton, "The Intercorrelations Between Measures of School Learning," The Journal of Psychology, LXXXV (April 1953), pp. 169-179.

[13]Carrie M. Scott, "Intelligence and Gain in Reading as Related to Gains in the Sub-tests of the Stanford Achievement Test," The Journal of Educational Research. Volume 56, Number 9, (May-June, 1963), pp. 494-496.

Verbal and Non-Verbal Tests

Research has established that verbal materials tend to yield a higher correlation with mental age than do non-verbal materials. Gates, in a comprehensive study, investigated the prediction of achievement in the fundamental school subjects with a select group of 117 pupils ranging from grades 1 to 8 in the Scarborough School, at Scarborough New York. The mean Stanford-Binet Intelligence Quotients were approximately 117 with 20 pupils to each grade. All coefficients of correlation were computed by the Pearson-Moment Formula. The following results are reported by grades:

1. In grades I and II, the Non-verbal Tests, gave low correlations with achievement (0.30 and 0.23) respectively compared to 0.36 and 0.44 respectively, between the Stanford-Binet and Achievement, which is more verbal. For these grades, the mean correlation between length of test and magnitude of the mean correlations with all criteria was 0.69.

2. For Grade III, a group of Non-verbal Tests gave a mean correlation of 0.22 with achievement as compared to 0.65, the mean correlation of a group of verbal tests with achievement.

3. In Grades IV, V, and VI, taking mean results, the Stanford-Binet gives a correlation with achievement of

0.54. Adding the independent elements of the mean verbal group test, the multiple r becomes 0.605.[14]

Results also indicate that the Stanford-Binet yields higher correlations in the upper grades than in the lower grades. This is attributed to two factors: (1) increasing verbalness of material in upper levels, and (2) an increase in testing time.[15]

Gates conducted a study of the role of visual perception, intelligence, and associative processes in reading and spelling of 310 school children in grades I to VI, administering a series of tests designed singly or in combination to measure the mental capacities of perception and association. These measurements included auditory-visual association, visual-visual association, general linguistics and abstract learning, reading abilities, and spelling ability. The obtained correlations suggest that the perception tests utilizing digits and various printed figures activate reactions that exert little influence on reading and spelling, whereas those perception tests which utilize words depend on reactions thought to

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[14]Arthur I. Gates, "The Correlations of Achievement in School Subjects with Intelligence Tests and Other Variables," The Journal of Educational Psychology Volume XII, (March, 1922), pp. 129-285.

[15]Ibid., p. 284.

be important factors in reading and spelling.[16]

Mental age was shown to be correlated most highly with reading, spelling, and the word perception tests, and other verbal tests as indicated by the Stanford-Binet Intelligence Scale. The correlations tended to be low with the non-verbal tests.[17]

Wheeler compared the ACE Psychological Ratings and reading scores of 1881 university freshmen according to various curricula and as a total group. A high degree of relationship (r=.70) was found between reading skill and the linguistic scores of the ACE Psychological Examination, while a low degree of relationship (r=.30) occurred between reading ability and quantitative psychological scores. Reading ability tended to correlate high (r=.71) with the total or gross psychological scores of the ACE. Wheeler concluded that the high relationship found between reading ability is a good index of linguistic intelligence.[18]

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[16]Arthur I. Gates, "A Study of the Role of Visual Perception Intelligence, and Certain Associative Processes in Reading and Spelling," The Journal of Educational Psychology, Volume XVII, (October, 1926), Number 7, pp. 433-445.

[17]Ibid.

[18]Lester R. Wheeler, "The Relation of Reading to Intelligence." School and Society, Volume 70, (October 8, 1949), pp. 227.

## Group and Individual Tests

Reference has been made to the fact that intelligence tests are heavily influenced by the reading ability of the examinees. What is the relationship between scores of group and individual intelligence tests? To what extent do differences exist with respect to readers of various ability levels?

Bleismer[19] reported that poor readers exhibited significantly higher mean I. Q.'s on the Stanford-Binet than on various group intelligence tests. He cautions, however, that the conclusions are not clear since similar data for average or above average readers were not reported. Blair and Kaman,[20] stated that intelligence tests requiring reading ability do not discriminate against poor readers at the college freshmen level, but that these tests may discriminate at lower age levels.

Stroud[21] posed a related question; assuming that poor reading does negatively influence group intelligence

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[19]Emery P. Bliesmer, "A Comparison of Results of Various Capacity Tests Used with Retarded Readers," Elementary School Journal, Volume 56, (May, 1956), pp. 400-402.

[20]Glen M. Blair and James F. Kamman, "Do Intelligence Tests Requiring Reading Ability Give Spuriously Low Scores to Poor Readers at the College Freshmen Level?" Journal of Educational Research, 36, 1942, 280-283.

[21]James B. Stroud, "A note on the Relationship Between Reading and Intelligence Scores," In Oscar S. Causey and Emery P. Bliesmer (Editors), Research and Evaluation in College Reading. Ninth Year Book, National Reading Confer-

test scores, how much reading deficiency is necessary to lower significantly the I. Q.'s derived from group tests?

In reply to the question posed by Stroud, Neville[22] contends that lack of reading ability does tend to negatively influence scores on verbally oriented group intelligence tests for pupils in grade five. He found that poor readers obtained I. Q.'s on individual tests that were significantly higher than their scores on the group test. However, the average readers tended to obtain comparable I. Q.'s on both group and individual tests, while the good readers tended to obtain higher I. Q.'s on the group test. Good readers obtained higher scores than the poor readers on all measures while the average readers were higher on only three measures all of which were verbally oriented individual tests.

## Reading and Socio-economic Factors

The relationship between socio-economic status and pupil achievement extends back a little more than thirty years. Investigations of these variables have indicated that a definite relationship exists between socio-economic

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Conference for College and Adults, 1960.

[22]Donald Neville, "The Relationship Between Reading Skills and Intelligence Test Scores," The Reading Teacher, Volume 18, Number 4, (January, 1965), pp. 257-262.

status and scholastic achievement.

Garrison made a comparison of the relative influence of intelligence and socio-economic status upon the information possessed by a group of first grade pupils, as indicated by the Sangren Information Test. The results on the information test were treated by comparing the scores made by the upper and lower halves in intelligence test performance, holding socio-cultural status constant. There was a difference in favor of the high mental ages, but the differences were not so great as that between the upper halves in socio-economic status, with the mental ages held constant.[23]

Engle studied the relation between home environment and school marks. In that investigation, three groups of high school pupils of differing socio-economic status were compared upon the basis of marks earned. The privileged group was made up of pupils from homes subjectively rated as well to do. A second group was randomly selected from pupils not included in the privileged and unprivileged groups. The latter was made up of pupils whose families had received public assistance. The results by percent

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[23]K. V. Garrison, "The Relative Influence of Intelligence and Socio-cultural Status Upon the Information Possessed by First Grade Children," Journal of Social Psychology, 1932. pp. 3, 362-367.

of the three groups earning the various letter grades are presented in Table 1.

TABLE 1

Distribution of Grades by Groups

| | A | B | C | D | E |
|---|---|---|---|---|---|
| Privileged | 19 | 31 | 28 | 17 | 5 |
| Randomly Selected | 12 | 20 | 30 | 30 | 7 |
| Unprivileged | 5 | 18 | 33 | 32 | 12 |

SOURCE: Engle, T. L. "Home Environments and School Records," School Review, Volume 42, 1934, pp. 590-598.

Hilliard and Traxell investigated the relation between information background, reading readiness, and the reading progress of primary grade children. The subjects were divided into a "rich" background group and a "meager-background" group. The rich background had a significant advantage in reading readiness, and in the second grade averaged six months above the standard in reading. The meager background group averaged one month below the standard.[24]

[24]G. Hilliard and E. Traxell, "Informational Background as A Factor in Reading Readiness and Reading Progress." Elementary School Teacher, 1910-11, pp. 11, 119-135.

Coleman reported the study of approximately 4,000 cases in the 7th, 8th and 9th grades, representing all of the geographic regions of 43 states. The total group was divided into four nearly equal groups representing high, normal, and low socio-economic states and a fourth group whose parents had received "relief." Differences between Q1, the median, and Q3 were found to favor the higher groups for every grade in chronological age, in test intelligence scores, reading scores, history scores, and problem solving scores.[25]

Although Coleman's study indicated a definite relationship between socio-economic status and achievement in school subjects, he is cautious in concluding that superior achievement is a result of socio-economic status. This is revealed in the following statement:

> "It is impossible to say whether superior achievement is a result of socio-economic status or of intelligence. One generally expects a high correlation between intelligence and achievement. It is also impossible to say whether intelligence determines socio-economic status or that socio-economic status determines intelligence.[26]

Curry determined whether the differences in scholastic achievement were significant between groups of sixth-

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[25]S. Coleman, "The Relationship of Socio-economic Status to the Performance of Junior High School Students," Journal of Experimental Education, 9 (1940), pp. 61-63.

[26]Ibid.

grade children of comparable intellectual ability, but different in socio-economic status randomly selected from 2,623 subjects of thirty-three elementary schools in a large city in the Southwest United States. The California Test of Mental Maturity and the California Achievement Test were used as a measure of intellectual ability and scholastic achievement, respectively. The subjects were assigned to high, medium, and low intellectual ability groups. In the medium-intellectual ability group, differences in language achievement were found to be statistically significant between the upper and lower, and the middle and lower socio-economic group.[27]

Curry concludes that socio-economic status appears to have no effect upon the scholastic achievement of sixth grade students of high intellectual ability. High-intellectual ability tends to offset any deficiency which may be created by lower social and economic conditions.[28]

Similarities between Curry's and Coleman's conclusions, based on research findings, appear to indicate that the causality relationship between socio-economic

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[27]Robert L. Curry, "The Effect of Socio-Economic Status on the Scholastic Achievement of Sixth Grade Children," British Journal of Educational Psychology, Volume 32, 1962, pp. 46-49.

[28]Ibid.

status and intelligence is difficult to determine.

Chauncey studied a group of 113 eighth grade and 130 ninth grade pupils. Scores made on the Sims Scores Card for Socio-Economic Status correlated with those earned on the Stanford Achievement Test to the extent of r=.30 8th grade and r=.35 9th grade. When intelligence scores were partialed out, the coefficients were .23 and .30 respectively.[29]

Bryan correlated Sims Scores with school marks and with Metropolitan Achievement Test scores. A coefficient of .56 was obtained between school marks and with Metropolitan Achievement Test scores. She obtained a coefficient of .56 between marks (averaged for six semesters) and Sims Scores, and of .59 between Metropolitan Scores and Sims Scores; and a partial correlation coefficient of .35 between Sims Scores and marks with Otis I. Q. held constant.[30]

Shaw investigated the relationship between socio-economic status and educational achievement in grades four to eight of 280 pupils in the public schools of Sheldon,

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[29]M. R. Chauncey, "The Relation of the Home Factor to Achievement and Intelligence Test Scores," Journal of Educational Research, 1929, pp. 20, 88-89.

[30]R. A. Bryan, "A Study of the Relationship Between Socio-economic Status and Scholastic Achievement," Unpublished Master's Thesis, University of Iowa, 1941.

Iowa. Socio-economic status was measured by the Sims Scores Card. Educational achievement was measured by the Stanford Achievement Test, Form D, and by an average of school marks. Intelligence test scores were obtained by the use of the Otis Self-Administering Test of Mental Ability. A fairly substantial relationship was found between socio-economic status and academic achievement. A coefficient of .41 was obtained between the scores on the Sims Scores Card and Standard Achievement E.Q.'s: a weighted average coefficient for the five grades of .39 between Standard Achievement raw scores and Sims Scores; and a coefficient of .38 between average marks and Sims Scores. With intelligence partialed out, a coefficient of .27 was obtained between Standard Achievement E.Q.'s and Sims Scores.[31]

## Mental Ability and Social Status

According to Neff, the precise character of the relationship between certain socio-economic variables and intelligence test scores comprises one of the most persistent and perplexing problems in the entire field of mental testing. Wherever large groups of children have

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[31]Duane C. Shaw, "The Relation of Socio-Economic Status to Educational Achievement in Grades Four and Eight," Journal of Educational Research, Volume 37, pp. 197-201, 1943-1944.

been measured by use of the standard tests of intelligence, it can be shown that socio-economic status is one of the variables that enter into the determination of intelligence test scores.[32]

Eells sums up the relationship of socio-economic status to mental ability in the following statement:

> "Almost since the advent of intelligence testing, educators and psychologists have debated and investigated the relationship of the I. Q. to environmental factors. The fact that there is a definite and measurable relationship between the scores which pupils obtain on intelligence tests and the social status or cultural background of their parents, has been known since the time of Binet."[33]

While the majority of general investigations has shown that the background factors for persons at the top of the I. Q. scale are superior to the ones exhibited by those at the bottom of the scale, a few investigations have shown a surprisingly small superiority for those in the better environment.[34]

A comparison was made over four years between relief and non-relief children in the schools of Wichita, Kansas.

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[32]Walter S. Neff, "Socio-economic Status and Intelligence: A Critical Survey," The Psychological Bulletin, Vol. 35, No. 10, (December, 1938), pp. 727.

[33]Kenneth Eells, Intelligence and Cultural Differences (The University of Chicago Press, 1951), p. 3.

[34]Walter S. Neff, "Socio-economic Status and Intelligence: A Critical Survey," p. 727.

It was discovered that 30 percent of the relief and 34.5 percent of the non-relief children were above average in intelligence. While the relief children were inferior on the average, there was a tremendous amount of overlapping.[35]

Saltzman, interested in analyzing the differing effects of social status on success in the individual tests of the Stanford-Binet Scale, compared the performance of two groups of children of different socio-economic backgrounds on the Stanford-Binet Examination. In addition, a Goodenough Drawing Test was administered to each individually. Results revealed that the group of children from a poor social economic environment showed relative superiority on tests involving counting, handling of money and sensory discrimination. A group from a good social and economic environment showed relative superiority on tests involving vocabulary and verbal comprehension, rote memory involving sentences and digits, rhymes, motor control and essential similarities between concrete objects. Considerably less difference was found between the two groups when measured by a non-verbal test of developmental level such as the Goodenough Drawing Test than when measured by means of the Stanford-Binet.[36]

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[35]Albert E. Croft, "The Ability of Relief Children," American Sociological Review, Vol. V, 1940, pp. 185-192.

[36]Sara Saltzman, "The Influence of Social and Eco-

Cuff reports the study in which he analyzed the socio-economic status of 738 college freshmen. He found the correlations between the socio-economic status of freshmen and intelligence, between freshman achievement and socio-economic status, and between freshman grades and intelligence. Measuring instruments consisted of the Thurstone and Thurstone Psychological examination the Sims Socio-Economic Score Card, and the Edgerton's Table for finding point-hour ratios and standard scholastic rates. The findings indicated that there was a tendency for those in the higher socio-economic centiles to score higher on intelligence tests and to make better grades.[37]

Havinghurst and Jankes assessed the relationship of mental ability and social status of all ten year old boys and girls, with a mean I. Q. of 110, residing in an urban and a rural middle western community. The tests administered were: Stanford-Binet, Cornell Coxe, Iowa-Silent Reading, Minnesota Paper Form Board, Minnesota Mechanical Assembly, Chicago Assembly Test for Girls, Porteus Maze and Goodenough Draw-A-Man. Test results were compared for social class

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nomic Background and Stanford-Binet Performance," The Journal of Social Psychology, Volume 12, 1940, pp. 71-80.

[37]Noel B. Cuff, "Relationship of Socio-economic Status to Intelligence and Achievement," Peabody Journal of Education, XI (1933), 106-10.

groups, urban-rural and sex groups. Product-moment correlations were calculated for the various pairs of tests.[38]

The reported results indicated that children of higher family social status, tended to do better in all of the tests than children of lower social position who were definitely lower in all the abilities measured. Urban children tended to do better than rural children except on mechanical assembly test for boys, in which the rural boys were superior. In spite of group differences, there was overlapping of scores indicating superior ability in some of the lower-class children and some of the rural children. Correlations coefficients between the tests were high, and correlations between mechanical ability tests and intelligence tests were higher than in previous studies.[39]

A second study was conducted by Havinghurst and Jankes, wherein tests were given to all available sixteen-year old boys and girls, residing in a typical mid-western community with a mean I. Q. of 108. Test instruments in-

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[38]Robert J. Havinghurst and Leota Long Janke, "Relations Between Ability and Social Status in A Mid-western Community. I: Ten-Year-Old Children, The Journal of Educational Psychology, XXXV, 1944, pp. 357-68.

[39]Ibid.

cluded Stanford-Binet, Wechsler-Bellevue, Iowa Silent Reading, Minnesota Paper Form Board, Minnesota Mechanical Assembly, and Chicago Assembly Test for Girls. Test results were compared for social class groups, urban-rural, and sex groups. Product-moment correlations were calculated for the various pairs of tests. Results revealed that boys and girls from families of higher social status tended to do better than rural boys and girls, but not significantly so. No significant sex differences were obtained.[40]

In a final study by Havighurst and Breeze, in the assessment of mental ability and social status, the Thurstone Primary Mental Abilities Tests, were given to all thirteen year old children residing in a typical middle-western community of six-thousand inhabitants. The test results were compared for social class groups and for sex groups. Product-moment correlation coefficients were calculated for the various tests in relation to an index of socio-economic status.[41]

It was found that girls excelled boys in the Number,

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[40]Leota Long Janke and Robert J. Havighurst, "Relations Between Ability and Social Status in a Midwestern Community. II. Sixteen Year-Old Boys and Girls," The Journal of Educational Psychology, XXXV, 1944, pp. 499-509.

[41]Robert J. Havighurst and Fay Breeze. "Relation Between Ability and Social Status In A Midwestern Community. III Primary Abilities," The Journal of Educational Psychology, XXXV, 1944, p. 241.

Word Fluency Reasoning and Memory Tests, while boys excelled girls in the Space Test with no reliable differences in the Verbal Comprehension test. Children of higher family-social-status tended to do better in all of the tests than children of lower social positions. Coefficients of correlation of scores in the various tests with socio-economic status fell into the range, .2 to .4.[42]

The review of the research investigating the variables of intelligence and achievement relative to socio-economic factors indicated the following:

1. Intelligence is positively correlated with reading achievement, and while the two are not synonymous, intelligence exerts an influential role upon the reading performance of the individual. The rate of reading with intelligence tends to yield low positive or negative correlations, indicating that reading rate is not as important a factor in mental ability as paragraph comprehension and reading comprehension with their higher correlations.

2. Gains in reading achievement are positively related to gains in other curriculum areas such as arithmetic, social studies and science achievement with social studies showing the highest correlation, and with both

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[42]Ibid.

intelligence and reading proficiency as influential factors in academic progress.

3. Verbal material tends to yield higher correlations with achievement than non-verbal material at all grade levels, with the magnitude of the relationship showing an increase, attributed to greater verbalness of the material.

4. In general, higher I. Q. scores are obtained on individual measures of intelligence in comparison with group measures of intelligence. While scores on group intelligence tests are negatively influenced by poor reading ability, proficient readers tend to achieve higher scores on both group and individual measures of mental ability.

5. Socio-economic status is an important aspect of reading achievement and intelligence with positive correlations being evidenced between the variables. Although the positive relationship is indisputable, the causality factor is not easily determined.

6. A definite positive relationship exists between social status and mental ability as indicated by research, although a few studies have revealed an overlapping of intellectual functioning between socio-economic groups in both rural and urban areas. While there was a difference in items passed on tests of mental functioning between boys and girls, no appreciable sex difference was evident in most investigations.

## CHAPTER III

## PROCEDURES AND RESULTS OF THE DATA

This study was conducted to determine whether intelligence was related to the reading ability of tenth grade youth from the lower socio-economic status. The scores yielded from the Henmon-Nelson Test (Form A) and the Stanford-Binet Intelligence Scale (Form L-M) were correlated with factors of the Gates-MacGinitie Reading Test. (Survey F).

Although the investigation of the variables of intelligence and reading extends back a little more than thirty years, the review of the literature indicated a lack of research relative to intellectual ability and reading achievement of black disadvantaged youth.

### PROCEDURE

The participants in this study were selected from a large urban school system in the southeast region of the United States, classified as lower socio-economic level by The Two Factor Index of Social Position by August B.

Hollingshead.[1] The school district in which this study took place enrolled a total of 31,493 students with a total enrollment of 2,801 tenth-grade students in the school year, 1976. A proportionate number of males (N=25) and females (N=25) were randomly selected from 515 black students in the participating school system which had a predominately black population.

Three major hypotheses were tested from the data collected in this study. Standardized tests were selected and administered to the participants to determine the relationship between intelligence and reading achievement scores.

The administration of intelligence and reading tests in the public school system requires parental permission. A letter was distributed to the guardians of the tenth-grade students of the two participating high schools explaining the nature of the investigation and requesting that the students be granted permission to participate in the study.

The second requirement for the study involved obtaining information necessary to the determination of the socio-economic level of the participants. A questionnaire premised upon the Two-Factor Index of Social Position

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[1]August B. Hollingshead, Two Factor Index of Social Position, (New Haven, Connecticut: Yale Station, 1965).

was therefore distributed to the parents. The two items essential for determining the social position of an individual or of a household are: (1) the precise occupational role of the household head and (2) the amount of education acquired by the household head.

The factors of occupation and education are then combined by weighting the individual scores obtained from the scale positions. The weights for each factor were determined by multiple correlation techniques as follows:

| Factor | Factor Weight |
|---|---|
| Occupation | 7 |
| Education | 4 |

To calculate the score for an individual, the scale value for occupation is multiplied by the factor weight for occupation and the scale value for education is multiplied by the factor weight for education. The scores are then arranged on a continuum or divided into groups of scores to determine the social position of an individual and assigns him to a high, low, or middle social class. This investigation involved only disadvantaged students, therefore the researcher selected those individuals within the range of scores which identified this particular socio-economic group.

The Henmon-Nelson Test of Mental Ability (Form A)

and the Gates-MacGinitie Reading Test (Survey F) were administered by the researcher to the participants in small group sessions at the beginning of the school day. The Stanford-Binet Intelligence Scale (Form L-M) was administered individually by the researcher during regular school hours and on weekend days in designated areas, isolated from normal activity and the possibility of interruption. A schedule for the administration of the Binet Scale was devised in order that test administration proceed with maximum efficiency. The testing and scoring procedures of the Henmon-Nelson Test of Mental Ability (Form F), the Stanford-Binet Intelligence Scale (Form L-M) and the Gates-MacGinitie Reading Test (Survey F) were strictly adhered to, as presented in the respective manuals so that an accurate picture of the relationship between the variables of intelligence and reading achievement might emerge.

## Results of Data Analysis

Using the data compiled by the procedures as described in this chapter, the scores of black disadvantaged tenth-grade students on the Henmon-Nelson Test of Mental Ability, the Stanford-Binet Intelligence Scale, and the Gates-MacGinitie Reading Test were tabulated. Mean scores and standard deviations for scores on each variable are presented in table 2.

TABLE 2

MEANS AND STANDARD DEVIATIONS OF SCORES FOR EACH VARIABLE

| Variable Number | Variable Name | Mean Score | Standard Deviation |
|---|---|---|---|
| 1 | Speed | 47.40 | 8.44 |
| 2 | Accuracy | 41.74 | 9.41 |
| 3 | Vocabulary | 38.12 | 7.50 |
| 4 | Comprehension | 38.70 | 8.16 |
| 5 | Henmon-Nelson IQ | 89.16 | 11.07 |
| 6 | Stanford-Binet IQ | 91.52 | 14.69 |

In order to facilitate the interpretation of the scores on the Gates-MacGinitie Reading Test, grade level scores are reported in Appendix B. Standard scores (see Appendix A) were used for purposes of analysis.

### Hypothesis $Ho_1$

Hypothesis $Ho_1$ was concerned with the correlation between the scores obtained by students on the Henmon-Nelson Test of Mental Ability and the Stanford-Binet Intelligence Scale. A pearson product moment correlation was used to assess this relationship.

The first hypothesis tested in the study was stated in the null form as follows:

$Ho_1$ There is no statistically significant correlation between the intelligence quotients obtained on the Stanford-Binet Intelligence Scale (Form L-M) and the Henmon-Nelson Test of Mental Ability (Form A)

The results of the statistical analysis (table 3) indicated that a significant relationship existed between the scores of students on the Henmon-Nelson Test of Mental Ability and the Stanford-Binet Intelligence Scale: therefore, the hypothesis related to these tests was rejected.

TABLE 3

COMPARISON OF HENMON-NELSON AND STANFORD-BINET TESTS

| TEST | MEAN IQ | STD. DEV. | CORRELATION |
|---|---|---|---|
| Henmon-Nelson | 89.16 | 11.07 | |
| Stanford-Binet | 91.52 | 14.69 | .842* |

* $p < .01$

Hypothesis $Ho_2$

Hypothesis $Ho_2$ was concerned with the differences between the scores of males and females on the subtests of the Gates-MacGinitie Reading Test. Four one-way analyses

of variance were used to test for differences between the sexes.

The second hypothesis tested in the study was stated in the null form as follows:

$Ho_2$ There are no statistically significant differences between mean standard scores on the subtests of the Gates-MacGinitie Reading Test (Survey F) by sex.

The results of the statistical analysis (table 4) indicated there were no statistically significant differences between the scores of tenth grade males and females on the subtests of the Gates-MacGinitie Reading Test. The raw scores of speed, accuracy, vocabulary and comprehension did not reveal a degree of variability necessary for the rejection of the hypothesis; therefore the hypothesis related to these four subtests was accepted.

TABLE 4

SCORES OF MALES AND FEMALES ON SUBTESTS OF GATES-MAC GINITIE

| SUBTEST | MALES | FEMALES | F-Value |
|---|---|---|---|
| Speed | 45.88 | 48.92 | 1.65 |
| Accuracy | 40.60 | 42.88 | .71 |
| Vocabulary | 36.48 | 39.76 | 2.40 |
| Comprehension | 37.32 | 40.80 | 1.44 |

* P> .05

The translation of the subtest scores on the Gates-MacGinitie Reading Test into grade equivalent scores are reported in table 5.

TABLE 5

GRADE LEVEL MEANS

| VARIABLE | MALES | FEMALES | TOTAL |
|---|---|---|---|
| Speed | 10.0 | 10.7 | 10.3 |
| Accuracy | 9.3 | 9.7 | 9.5 |
| Vocabulary | 7.3 | 8.5 | 7.9 |
| Comprehension | 7.2 | 8.9 | 8.1 |

Both male and female students scored within their normal grade level range on the subtests of speed and accuracy. However, the scores obtained by male and female students on the subtests of vocabulary and comprehension, revealed a range of 1.5 to 2.0+ grade levels below the norm.

Hypothesis $Ho_3$

Hypothesis $Ho_3$ was concerned with the relationship between the scores obtained by students on the subtests of the Gates-MacGinitie Reading Test and the Stanford-Binet Intelligence Scale. A multiple correlation analysis was

used to test the relationship between the scores on the Stanford-Binet Intelligence Scale and the Gates-MacGinitie Reading Test with the Stanford-Binet Test as the dependent variable.

The third hypothesis tested in the study was stated in the null form as follows:

$Ho_3$ There are no statistically significant correlations between the intelligence quotients obtained on the Stanford-Binet Intelligence Scale (Form L-M) and the standard scores on the subtests of the Gates-MacGinitie Reading Test (Survey F).

The results of the statistical analysis (table 6) indicated there were statistically significant relationship between the scores obtained by tenth grade students on the subtests of the Gates-MacGinitie Reading Test and the Stanford-Binet Intelligence Scale; therefore, the hypothesis related to these tests was rejected.

The relationship between the subtest scores on the Gates-MacGinitie Reading Test and the Stanford-Binet I. Q. scores, is further clarified by an analysis of the specific tests. This information is presented below:

(1) Speed on the Gates-MacGinitie is correlated with Accuracy at a significant level (r=0.528). However, Vocabulary, Comprehension, and the Stanford-Binet scores were not significantly correlated with Speed.

TABLE 6

CORRELATION OF SCORES ON GATES-MACGINITIE AND STANFORD-BINET

| VARIABLE | SPEED | ACCURACY | VOCABULARY | COMPREHENSION | S-B |
|---|---|---|---|---|---|
| Speed | 1.000 | 0.528* | 0.267 | 0.303 | 0.319 |
| Accuracy | | 1.000 | 0.650* | 0.713* | 0.782* |
| Vocabulary | | | 1.000 | 0.768* | 0.738* |
| Comprehension | | | | 1.000 | 0.770* |
| S-B | | | | | 1.000 |

* $p < .01$

(2) Accuracy is correlated to a significant degree with Speed ($r = 0.528$), Vocabulary ($r = 0.650$), Comprehension ($r = 0.713$), and the Stanford-Binet ($r = 0.782$).

(3) Vocabulary is correlated to a significant degree with Comprehension ($r = 0.768$) and the Stanford-Binet Scale ($r = 0.738$).

(4) Comprehension is correlated to a significant degree with Accuracy ($r = 0.713$), Vocabulary ($r = 0.768$), and the Stanford-Binet Scale ($r = 0.770$).

(5) The Stanford-Binet Scale was correlated to a significant degree with Accuracy ($r = 0.782$), Vocabulary ($r = 0.738$), and Comprehension ($r = 0.770$). Speed was the

only factor that was not significantly related to the Stanford-Binet Scale. (The Stanford-Binet Scale does not adhere to a rigid time schedule).

All tests were related to all other tests with a level of significance surpassing the .01 level with the exception of speed. Speed, however, was related to accuracy at a significant level.

# CHAPTER IV

# SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## Summary

The purpose of this study was to investigate the relationship between intelligence and reading achievement scores of black disadvantaged tenth grade students. The relationship between the variables of intelligence and reading achievement was determined by the Henmon-Nelson Test of Mental Ability (Form A), the Stanford-Binet Intelligence Scale (Form L-M), and the Gates-MacGinitie Reading Test (Survey F).

The problem of this study was to determine if significant differences and correlations exist among scores of intelligence and reading achievement of black tenth grade students from the lower socio-economic status.

Three hypotheses were developed to implement the investigation of the problem. These hypotheses are as follows:

1. There is no statistically significant correlation between the intelligence quotients obtained on the

Stanford-Binet Intelligence Scale (Form L-M) and the Henmon-Nelson Test of Mental Ability (Form A).

2. There are no statistically significant differences between mean standard scores on the subtests of the Gates-MacGinitie Reading Test (Survey F) by sex.

3. There are no statistically significant correlations between the intelligence quotients obtained on the Stanford-Binet Intelligence Scale (Form L-M) and the standard scores on the subtests of the Gates-MacGinitie Reading Test (Survey F).

In this investigation, 50 black tenth grade subjects with a proportionate number of males (N=25) and females (N=25), were randomly selected from a total enrollment of 515 black students from two high schools and classified as lower socio-economic status by the Hollingshead Index of Social Position. The data collected on each of the participants consisted of intelligence quotients yielded from the Henmon-Nelson Test of Mental Ability (Form A) and the Stanford-Binet Intelligence Scale (Form L-M), and reading comprehension scores on the Gates-MacGinitie Reading Test (Survey F).

A pearson product moment correlation coefficient, a multiple correlation analysis and analyses of variance were used to test the hypotheses of the study.

## Conclusions and Findings

The following conclusions have been drawn from the data:

1. Both male and female students obtained comparable scores on the subtests of speed, accuracy, vocabulary and comprehension of the Gates-MacGinitie Reading Test.

2. The students obtained scores on the Stanford-Binet Intelligence Scale comparable to scores on the Henmon-Nelson Test of Mental Ability although the differences were not significant.

3. The mean intelligence score of the total student population was within normal range on the Stanford-Binet Intelligence Scale and the Henmon-Nelson Test of Mental Ability. However, the mean score was slightly below the mean score for the general population, consistent with research findings for the lower socio-economic level as a group.

4. Both male and female students obtained scores within grade level on the subtests of speed and accuracy, but obtained scores below actual grade placement on the subtests of vocabulary and comprehension of the Gates-MacGinitie Reading Test.

5. The female students performed on a higher level in comparison with the male students on the subtests of the Gates-MacGinitie Reading Test although the differences were not statistically significant.

6. The performance of the tenth grade students on the subtests of the Gates-MacGinitie Reading Test

was comparable to performance on the Stanford-Binet Intelligence Scale and the Henmon-Nelson Test of Mental Ability.

7. The tenth grade students obtained scores on the subtests of "Speed" comparable to obtained scores on the subtest of accuracy, but not to vocabulary, comprehension and the Stanford-Binet I. Q. scores.

8. The tenth grade students obtained scores on the subtest of "Accuracy" comparable to the obtained scores on the subtests of speed, vocabulary and the Stanford-Binet I. Q. scores.

9. The tenth grade students obtained scores on the subtests of "Comprehension" comparable to obtained scores on the subtests of accuracy and vocabulary and the Stanford-Binet I. Q. scores.

10. The tenth grade students obtained scores on the subtest of "Vocabulary" comparable to obtained scores on the subtests of Comprehension and the Stanford-Binet I. Q. scores.

## Recommendations

The results of this study indicated that a positive relationship exists between the variables of intelligence and reading achievement among black tenth grade students of the lower socio-economic level. Based upon this finding, the following recommendations are therefore offered:

1. Further studies should be conducted to determine the relationship between intelligence and reading achievement with the inclusion of subjects from the middle and upper socio-economic levels. Performance may then be compared among subjects of the lower, middle and upper socio-economic levels.

2. A correlation study should be conducted between intelligence tests designed specifically for disadvantaged students and the traditional intelligence tests with reading comprehension. A comparison can be made between the different measures to assess the role of experience in reading performance and in intellectual development.

3. The Henmon-Nelson Test of Mental Ability may be administered by classroom teachers in lieu of an individual test in the assessment of mental ability and in the educational and vocational guidance of black disadvantaged students.

4. Caution is to be exercised in "labeling" or "categorizing" students based on a single test, as supporting data may be necessary for an accurate evaluation of a student's capacity. Interpretation attached to individual scores must also be made in light of existing physical, psychological, and social factors.

5. A replication of the present study should be conducted in both urban and rural environments. A

comparison can then be made between the performance of students in the different settings.

6. Research should be conducted within school systems to determine their particular characteristics, as significance attached to test results by a school system must be made in terms of its specific curricular requirements. Results may be used to develop adequate reading programs or to correct deficiencies in the curriculum.

# APPENDIX A

TABLE 7

DATA OBTAINED FOR TENTH GRADE STUDENTS ON GATES-MAC GINITIE READING TEST

| STANDARD SCORES--GATES MAC GINITIE READING TEST | | | | INTELLIGENCE QUOTIENTS | | |
|---|---|---|---|---|---|---|
| Speed | Accuracy | Vocabulary | Comp. | Henmon-Nelson | Stanford-Binet | Sex |
| 51 | 48 | 44 | 45 | 93 | 103 | Male |
| 33 | 30 | 35 | 29 | 72 | 72 | Male |
| 48 | 32 | 31 | 29 | 76 | 78 | Male |
| 30 | 32 | 29 | 29 | 80 | 88 | Male |
| 46 | 30 | 31 | 37 | 86 | 77 | Male |
| 30 | 30 | 33 | 35 | 83 | 77 | Male |
| 48 | 41 | 29 | 29 | 81 | 73 | Male |
| 48 | 49 | 44 | 38 | 87 | 86 | Male |
| 36 | 30 | 29 | 29 | 73 | 57 | Male |
| 48 | 46 | 47 | 46 | 95 | 96 | Male |
| 56 | 30 | 29 | 29 | 70 | 64 | Male |
| 44 | 41 | 47 | 45 | 90 | 94 | Male |
| 57 | 35 | 29 | 29 | 76 | 83 | Male |
| 30 | 30 | 33 | 32 | 75 | 87 | Male |
| 40 | 30 | 33 | 31 | 80 | 68 | Male |
| 64 | 53 | 38 | 32 | 86 | 92 | Male |
| 54 | 30 | 31 | 35 | 77 | 65 | Male |
| 62 | 60 | 29 | 40 | 95 | 102 | Male |
| 48 | 45 | 32 | 38 | 91 | 101 | Male |
| 51 | 51 | 47 | 45 | 98 | 114 | Male |
| 51 | 46 | 36 | 42 | 101 | 105 | Male |
| 30 | 62 | 45 | 45 | 98 | 109 | Male |
| 48 | 43 | 35 | 39 | 83 | 91 | Male |
| 56 | 58 | 55 | 65 | 121 | 127 | Male |
| 38 | 33 | 41 | 40 | 91 | 103 | Male |
| 59 | 62 | 62 | 63 | 120 | 120 | Female |
| 53 | 41 | 42 | 34 | 100 | 93 | Female |
| 41 | 30 | 29 | 39 | 88 | 76 | Female |
| 53 | 48 | 44 | 43 | 94 | 105 | Female |
| 44 | 35 | 29 | 32 | 84 | 77 | Female |
| 51 | 49 | 44 | 38 | 100 | 102 | Female |
| 49 | 35 | 46 | 29 | 80 | 86 | Female |
| 56 | 55 | 47 | 49 | 97 | 104 | Female |
| 54 | 46 | 36 | 40 | 100 | 96 | Female |
| 46 | 39 | 33 | 39 | 87 | 85 | Female |
| 46 | 41 | 43 | 37 | 89 | 89 | Female |
| 51 | 53 | 45 | 45 | 96 | 107 | Female |
| 51 | 33 | 36 | 29 | 86 | 93 | Female |

TABLE 7--Continued

| Speed | Accuracy | Vocabulary | Comp. | Henmon-Nelson | Stanford-Binet | Sex |
|---|---|---|---|---|---|---|
| 56 | 39 | 33 | 32 | 81 | 93 | Female |
| 49 | 48 | 41 | 49 | 103 | 103 | Female |
| 41 | 30 | 38 | 43 | 82 | 80 | Female |
| 48 | 45 | 41 | 43 | 87 | 90 | Female |
| 51 | 48 | 43 | 45 | 101 | 101 | Female |
| 51 | 49 | 38 | 50 | 103 | 106 | Female |
| 30 | 30 | 29 | 29 | 84 | 85 | Female |
| 51 | 45 | 32 | 34 | 78 | 84 | Female |
| 54 | 45 | 41 | 41 | 89 | 93 | Female |
| 51 | 45 | 35 | 38 | 89 | 85 | Female |
| 46 | 46 | 49 | 42 | 103 | 108 | Female |
| 41 | 35 | 38 | 39 | 79 | 103 | Female |

# APPENDIX B

TABLE 8

GRADE EQUIVALENT SCORES ON GATES-MAC GINITIE READING TEST

| Speed | Accuracy | Vocabulary | Comprehension | Sex |
|---|---|---|---|---|
| 11.4 | 10.5 | 9.4 | 9.9 | Male |
| 5.4 | 5.0 | 6.9 | 4.6 | Male |
| 10.3 | 5.0 | 5.8 | 4.6 | Male |
| 5.4 | 5.0 | 4.6 | 4.6 | Male |
| 10.0 | 5.0 | 5.8 | 7.2 | Male |
| 5.4 | 5.0 | 6.5 | 6.5 | Male |
| 10.3 | 9.3 | 4.6 | 4.6 | Male |
| 10.3 | 10.9 | 9.4 | 7.7 | Male |
| 6.3 | 5.0 | 5.0 | 4.6 | Male |
| 10.3 | 10.2 | 10.1 | 10.1 | Male |
| 12.9 | 5.0 | 4.6 | 4.6 | Male |
| 9.6 | 9.3 | 10.1 | 9.9 | Male |
| 12.9 | 7.1 | 5.0 | 4.6 | Male |
| 5.4 | 5.0 | 6.5 | 5.3 | Male |
| 7.9 | 5.0 | 6.5 | 4.6 | Male |
| 12.9+ | 12.6 | 7.9 | 5.3 | Male |
| 12.9+ | 5.0 | 5.8 | 6.5 | Male |
| 12.9+ | 12.9+ | 5.4 | 8.5 | Male |
| 10.3 | 10.0 | 6.2 | 7.7 | Male |
| 11.4 | 11.6 | 10.0 | 9.9 | Male |
| 11.4 | 10.2 | 7.3 | 9.3 | Male |
| 12.9 | 12.9 | 9.6 | 9.9 | Male |
| 10.3 | 9.7 | 6.9 | 8.1 | Male |
| 12.9 | 12.9 | 12.4 | 12.9+ | Male |
| 7.2 | 7.8 | 8.5 | 8.5 | Male |
| 12.9+ | 12.9+ | 12.9+ | 12.9+ | Female |
| 12.4 | 9.3 | 8.8 | 5.9 | Female |
| 8.8 | 5.0 | 4.6 | 8.1 | Female |
| 12.4 | 10.5 | 9.4 | 9.5 | Female |
| 9.6 | 7.1 | 4.6 | 5.3 | Female |
| 11.4 | 7.1 | 9.4 | 7.7 | Female |
| 10.7 | 7.1 | 9.9 | 4.6 | Female |
| 12.9+ | 12.9+ | 10.1 | 10.6 | Female |
| 12.9+ | 10.2 | 7.3 | 8.5 | Female |
| 10.0 | 8.7 | 6.5 | 8.1 | Female |
| 11.4 | 12.6 | 9.6 | 9.9 | Female |
| 11.4 | 6.4 | 7.3 | 4.6 | Female |
| 12.9+ | 8.7 | 6.5 | 5.3 | Female |
| 10.7 | 10.5 | 8.5 | 10.5 | Female |
| 8.8 | 5.0 | 7.9 | 9.5 | Female |
| 10.3 | 10.0 | 8.5 | 9.5 | Female |
| 11.4 | 10.5 | 9.1 | 9.9 | Female |
| 11.4 | 10.9 | 7.9 | 10.8 | Female |

TABLE 8--Continued

| Speed | Accuracy | Vocabulary | Comprehension | Sex |
|---|---|---|---|---|
| 5.4 | 5.0 | 4.6 | 4.6 | Female |
| 11.4 | 10.0 | 6.2 | 5.9 | Female |
| 12.9+ | 10.0 | 8.5 | 8.9 | Female |
| 11.4 | 10.0 | 6.9 | 7.7 | Female |
| 10.0 | 10.2 | 10.6 | 9.3 | Female |
| 8.8 | 7.1 | 7.9 | 8.1 | Female |

# APPENDIX C

REQUEST FOR PARENTAL PERMISSION FOR THE ADMINISTRATION OF INTELLIGENCE AND READING TESTS

Dear Parent:

I am a candidate for the doctoral degree in the field of Reading Education and am presently engaged in the writing of the dissertation, a study to be conducted on a topic of interest chosen by the candidate to whom the degree is to be rewarded, and which is necessary for the receiving of the degree. As my chosen topic involves reading on the high school level, I must conduct research which necessitates administering tests to a number of tenth grade students in the secondary school.

I am requesting your permission for your son or daughter to participate in this study, which requires that the student be administered tests of reading and intelligence: the Henmon-Nelson Test of Mental Ability, the Stanford Binet Intelligence Scale, and the Gates-MacGinitie Reading Test. If your child can participate in this investigation, please sign your name on the line below.

Your cooperation is sincerely appreciated.

Jean Manning, candidate

Student's Name _____

Parent's Signature _____

# APPENDIX D

# QUESTIONNAIRE FOR DETERMINING SOCIO-ECONOMIC STATUS

(1) Student's Name: _____ (2) Sex: M_____ F_____

(3) Date of Birth: _____ (4) Age: _____
(Mo.) (Day) (Year) (Years)(Months)

(5) Place of Birth: City_____ State_____

(6) What is the mother's occupation?

Write the title, like watchman, foreman, clerk, manager, president, etc. _____

(7) What is father's occupation?

Write the title, like watchman, fireman, clerk, manager, president, etc. _____

(8) Grade or year of school completed by the student's father.

Circle One:

| Grade School | High School | College |
|---|---|---|
| 1 2 3 4 5 6 7 8 | 1 2 3 4 | 1 2 3 4 5 6 7 8 |

(9) Grade or year of school completed by the student's mother.

Circle One:

| Grade School | High School | College |
|---|---|---|
| 1 2 3 4 5 6 7 8 | 1 2 3 4 | 1 2 3 4 5 6 7 8 |

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