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ABSTRACT

This study sought to test by the validation process the finding that there is a different relationship between associative learning ability and IQ in middle- and low-socioeconomic groups as reported by Jensen and others. The study was conducted to ascertain need for revision of testing programs and curricular materials used with disadvantaged students. Criterion used in validation was reading achievement in the Sullivan Programmed Readers which, because of rote type of learning involved, was taken as a measure of an associative learning ability task. A test of general IQ, the California Test of Mental Maturity (CTMM), and three tests of associative learning ability were used to predict achievement in the program for three different populations of second-grade children: middle-SES-White (N = 22), Low-SES-White (N = 25) and low-SES-Negro (N = 25). Groups were equated on means of CTMM, age, sex ratio, and pretest of reading placement. Results from multiple regression analysis found the middle-SES-White variable unable to make a significant contribution to the regression equation using IQ to predict reading achievement. Direct correlations made between IQ and the tests of associative learning ability also support the conclusion that differences of consequence are not present between SES or racial groups on this relationship. (Author)

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Final Report

Project No. 2F015
Grant No. OEC-6-72-0721-(509)

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A COMPARISON OF GENERAL IQ AND ASSOCIATIVE LEARNING ABILITY AS PREDICTORS OF ACHIEVEMENT IN PROGRAMMED READERS

September 1972

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Education

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This study sought to test by the validation process the finding that there is a different relationship between associative learning ability and IQ in middle- and low-socioeconomic groups as reported by Jensen and others. The study was conducted to ascertain need for revision of testing programs and curricular materials used with disadvantaged students.

Criterion used in validation was reading achievement in the Sullivan Programmed Readers which, because of rote type of learning involved, was taken as a measure of an associative learning ability task. A test of general IQ, the California Test of Mental Maturity (CTMM), and three tests of associative learning ability were used to predict achievement in the program for three different populations of second-grade children: middle-SES-White (N = 22), low-SES-White (N = 25) and low-SES-Negro (N = 25). Groups were equated on means of CTMM, age, sex ratio, and pretest of reading placement.

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by

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Houston, Texas

September 1972

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U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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National Center for Educational Research and Development

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CHAPTER I

INTRODUCTION

IQ Deficit of the Disadvantaged and Hypothesized Causes

The past decade has witnessed much concern over the low scores made on IQ tests by disadvantaged children. These scores have been found to generally fall fifteen or twenty points below the national norms established for middle-class groups.[1] Concern over this IQ deficit in a sizeable segment of the American population is understandable when one is aware of the major uses to which these tests are put (1) to predict school success or failure, and (2) to predict job success or failure.

Several theories and concomitant experimental research have resulted from efforts of psychologists, educators and others to ascertain cause and remedy of the deficit. To date, there have been three major

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[1] For reviews of research on this point see: (1) Audrey M. Shuey, The Testing of Negro Intelligence (2d ed.; New York: Social Science Press. 1966). (2) Joan M. Karp and I. Siegel, "Psycho-educational Appraisal of Disadvantaged Children," Review Educational Research, XXXV (1965), 401-12. (3) E. W. Gordon, "Characteristics of Socially Disadvantaged Children," Review Educational Research, XXXV (1965), 377-88. (4) Susan S. Stodolsky and Gerald Lesser, "Learning Patterns in the Disadvantaged," Harvard Educational Review, XXXVII (Fall, 1967), 546-93.

hypotheses advanced which attempt to explain the IQ discrepancy found between disadvantaged and middle-class groups. They are the environmental deprivation explanation, the culturally biased test explanation, and a genetically based explanation.

The environmental deprivation explanation holds that intelligence is distributed equally among socio-economic levels but is stunted in children raised in meager environments. Project Head Start, the Higher Horizons Project, and the Durham Education Improvement Project are some of the compensatory education programs which derived direction from this theory: and which, in general, have been ineffective in raising the level of low-socioeconomic groups on the IQ variable.[1] Supporters of this hypothesis, Martin Deutsch and associates at New York University's Institute of Developmental Studies, feel this was due to ineffective matching of stimulating experiences with developmental needs of the children. In 1967, Deutsch announced that researchers at IDS will look for specific experiences that will stimulate specific cognitive process development at specific "later ages."[2] In addition,

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[1]U. S. Commission on Civil Rights, Racial Isolation in the Public Schools, I (Washington, D. C.: U. S. Government Printing Office, 1967).

[2]Martin Deutsch, ed. The Disadvantaged Child: Selected Papers of Martin Deutsch and Associates (New York: Basic Books, Inc., 1967).

supporters of the deprivation theory are testing the effect of earlier intervention programs involving cognitive process development at infant ages, changes in child-rearing patterns of the mother, better prenatal care, and better infant nutrition.

The culturally biased test explanation was brought into prominence by Eells and Davis. Their book, Intelligence and Cultural Differences, spurred much research on factors which might influence test results.[1] It was felt that if cultural contamination was removed from intelligence tests, members of low-socioeconomic groups would be placed on equal footing with middle-socioeconomic groups and there would be no difference between them on mean IQ scores. However, scores made by low-socioeconomic groups on culture-fair tests such as Raven's Progressive Matrices are found to be significantly lower than those of middle-socioeconomic groups.[2] In some cases low-socioeconomic groups performed worse on the culture-fair variety.[3] This

[1]K. W. Eells, et al.. Intelligence and Cultural Differences (Chicago: University Chicago Press, 1951).

[2]E. A. Haggard, "Social Status and Intelligence," Genetic Psychological Monographs, XLIX (1954) 141-86; H. G. Ludlow, "Some Recent Research on the Davis-Eells Games," School and Society, LXXXIV (1956), 146-210.

[3]C. Higgins and C. Sivers, "A Comparison of Stanford-Binet and Colored Raven Progressive Matrices IQs for Children with Low Socioeconomic Status," Journal of Consulting Psychology, XXII (1958), 465-568.

reported research indicates that differences between socioeconomic levels on IQ do not arise solely as a result of invalid measuring instruments.

The genetically based explanation for IQ discrepancies found between socioeconomic levels was presented by Arthur R. Jensen in the winter edition of 1969 Harvard Educational Review. He produced data obtained from over 30,000 kinsman correlations from which he concluded that 80 per cent of the variation on IQ test scores is accounted for by genetic or inherited factors, and that only 20 per cent may be attributed to environmental causes. He stated that IQ discrepancies between socioeconomic levels are the result of intelligence and education acting as screening devices sorting those with higher ability and achievement to higher strata of society.

Of the three hypotheses advanced to explain the IQ deficit found in disadvantaged groups, only the environmental deprivation explanation offers hope that removal of the deficit may be effected. Programs involving intervention at infant stages of life may be able to raise IQ levels for large numbers of children.[1] At present, however, there are large numbers of children from low-socioeconomic groups already in the schools making IQ test

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[1] H. B. Robinson and N. M. Robinson, The Mentally Retarded Child (New York: McGraw-Hill Book Co., 1965).

scores that predict failure for them.

IQ as Predictor of Scholastic Achievement

Benjamin S. Bloom states that IQ, after the second grade, approaches unity as it predicts scholastic achievement until the secondary level of school at which time it tapers to .50 and past achievement becomes a better predictor.[1] This high correlation between IQ and school achievement is due in part to the close association between required school behavior and the IQ test tasks. The first intelligence test was constructed for the purpose of identifying children likely to fail in school. Simon and Binet, commissioned in 1905 by the Minister of Public Instruction in Paris to construct the instrument, determined what skills distinguished successful from unsuccessful students as they endeavored to learn in school and built the test to measure these distinguishing characteristics. The high correlations between IQ tests and achievement tests declare the success of this operational definition of intelligence in predicting achievement.

Although IQ tests today differ in format, kind and number of subtests, and in use of numerical, figural, or verbal tasks; it is found that they intercorrelate to

[1] Benjamin S. Bloom, "Testing Cognitive Ability and Achievement," Handbook of Research on Teaching (Chicago: American Ed. Research Association, Rand McNally & Co., 1963).

a significant degree and to that degree are taken as measures of the same construct. Spearman defines raw intelligence as this commonality between intelligence tests ("g" factor). Subtests of the Wechsler Intelligence Scale for Children (WISC): information, comprehension, arithmetic, vocabulary, digit span, picture completion, block design, and object assembly are all considered measures of general intelligence ("g" factor) because of the intercorrelation factor. In a review of research assessing digit span subtest's loading on "g", Durning reports correlations found between .63 and .80 between measures of the ability and full scale WISC.[1] Recently, however, it has been found that scores on certain subtests involving associative learning ability such as digit span do not correlate significantly with general intelligence scores for disadvantaged groups. Another finding is that low-socioeconomic groups exhibiting a deficit in general IQ show no deficit in associative learning ability.[2]

Relationship Between General IQ and Associative Learning Ability

Associative learning ability is measured by tests

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[1] Kathleen Durning, "Preliminary Assessment of the Navy Memory for Numbers Test" (unpublished Master's thesis, San Diego State College, 1968).

[2] A review of research reporting these findings is presented in chap. ii.

involving simple recall, serial learning, and paired-associate learning. Scores on such tests correlate with general IQ measures and have been taken as measures of "g" for that reason. An exception has been reported by Jensen and others who found tests of associative learning ability and general IQ do not correlate significantly in low-socioeconomic groups. In addition, these researchers find middle-class and disadvantaged populations equal in associative learning ability. These findings indicate that IQ may be a poor predictor of achievement on many school tasks for low-socioeconomic groups and that teaching procedures and curric ... materials for the disadvantaged should require associative learning ability.

Statement of the Problem

The purpose of this study was to test by the validation process the finding that a significant correlation exists between IQ and associative learning ability in middle-socioeconomic groups but does not in low-socioeconomic groups. External criterion will be achievement in the Sullivan Programmed Readers which, because of rote type of learning involved, is taken as a measure of mastery of an associative learning task (see chapter iii for rationale). It was hypothesized that:

1. A test of associative learning ability would be an equal predictor in both low- and

middle-socioeconomic groups of achievement in the programmed readers.

2. IQ would be a significantly greater predictor of achievement variance in the programmed readers for the middle-socioeconomic group.

This research was conducted to ascertain need for revision of testing programs and curriculum materials used with disadvantaged students.

Summary

A fifteen or twenty point difference is found between the means of low-socioeconomic and middle-socioeconomic groups of children on intelligence tests. Efforts to raise the level of low-socioeconomic scores by providing compensatory education programs have been unsuccessful and the differences remain between socioeconomic levels on IQ despite administration of culture-fair tests.

The concern over an IQ deficit in a sizeable segment of the American population is understandable when one is aware of the major uses to which these tests are put: (1) to predict school success or failure, and (2) to predict job success or failure.

The research of Jensen and others indicate that it may be advantageous to explore measures of learning ability other than general IQ in predicting achievement for disadvantaged groups. Jensen finds disadvantaged populations are equal to middle-class groups on associative learning ability. In addition, he finds that general IQ and associative learning ability do not correlate significantly in low-socioeconomic as they do in middle-socioeconomic groups. This indicates IQ will be a poor predictor of achievement on many school tasks for them; and, also indicates a need for teaching procedures and curriculum materials for the disadvantaged to utilize associative learning ability.

It was the purpose of this study to test Jensen's finding by the validation process using achievement in the Sullivan Programmed Readers as external criterion.

CHAPTER II

REVIEW OF LITERATURE

The review consists of studies which focus on the correlation pattern found between general IQ and associative learning ability in different socioeconomic groups and on the level of associative learning ability found in disadvantaged groups. Studies conducted by Jensen are presented first. These are followed by reports from other investigators.

Data Reported by Jensen

Samples from low- and middle-socioeconomic (SES) groups of preschool children, aged four through six years, showed correlations between mental age and paired-associate learning (with chronological age partialed out) of .10 in the low-SES group, N = 100, and .51 in the middle-SES group, N = 100. The low-SES children were Negro; the middle-SES children were White. Despite the fact that there was a difference of 18 IQ points between the groups, they did not differ significantly in paired-associate learning, serial learning, and digit span (WISC).[1]

[1] Arthur R. Jensen, "Jensen's Theory of Intelligence: A Reply," Journal of Educational Psychology, LX (December, 1969), 427-33.

Jensen compared the 30 lowest scoring children in fourth, fifth, and sixth grades on digit span in a White middle-SES school with the 30 highest scoring children on digit span in a Negro, low-SES school in fourth, fifth, and sixth grades. The mean digit span test score for the low-SES group was 65.3 and for the middle-SES group was 38.7. The corresponding mean Progressive Matrices scores (measure of general IQ) were 64.7 for the low-SES group and 72.6 for the middle-SES group. Also, the regression of Progressive Matrices on digit span was different. For the low-SES group b equaled .35. For the middle-SES group b equaled .50.[1]

Jensen compared performance of retarded junior high students (Stanford-Binet IQs from 50 to 75) on a selective learning task with average children (IQs 90 to 110) and gifted children (IQs above 135). All subjects attended the same school. The task consisted of learning to associate five or six colored geometric forms with five or six different pushbuttons (a form of paired-associate learning). There were highly significant differences between the groups, and the learning rate correlated with IQ even within the retarded group. However, some of the retarded subjects learned as fast as the gifted on these tasks.[2]

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[1] _Ibid._, p. 429.

[2] Arthur R. Jensen, "Learning Ability in Retarded,

Data From Other Investigators Which Support Jensen's Findings

Guinagh tested low-SES Negro (N = 105), low-SES White (N = 84), and middle-SES White (N = 79) third graders on Raven's Progressive Matrices and a digit span test. Correlations between Progressive Matrices and digit span were .29 for low-SES Negro, .13 for low-SES White, and .43 for middle-class White.[1] Correlations were corrected for attenuation.[2]

Durning, in a study assessing the ability of digit span to predict success in military service, investigated hypotheses concerning the distribution of ability on digit span as compared to the distribution of general intelligence. The Armed Forces Qualifying Test (AFQT) was the measure of general intelligence. She found that men scoring in the fourth category of the AFQT (10th to 30th percentile) made digit span scores which correlated .13 with general intelligence. These men were predominantly low-SES. The difference between this correlation and that

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Average, and Gifted Children," Merrill-Palmer Quarterly Journal of Behavior and Development, IX (1963), 123-40.

[1]B. J. Guinagh, "An Experimental Study of Basic Learning Ability and Intelligence in Low Socioeconomic Populations" (unpublished Ph.D. dissertation, Michigan State University, 1969).

[2]Attenuation is a procedure for correcting unreliability of variables being correlated. It is obtained by dividing the coefficient by the square root of the product of the reliabilities of the two measures being correlated.

obtained between digit span and AFQT scores for men scoring above the fourth category was significant at the .01 level of confidence. Correcting these for restriction of range raised the correlations to .21 and .40 for category-fours and non-category-fours respectively.[1]

Rapier compared the associative learning ability of normal and retarded school children from high- and low-SES backgrounds on a series of paired-associate and serial learning tasks. All the children were White. She found learning ability of the retardates from low-SES to be greater than that of the retardates from the high-SES groups. She also found that IQ scores were more highly correlated with associative learning for high-SES groups (.43) than for the low-SES group (.22). Rapier states:

> On Day 1 tasks, normal IQ Ss learned faster than retardates in both SES groups. Over the rest of the tasks, there continued to be IQ differences in learning ability among high-SES Ss, but not among low-SES Ss where differences in learning ability gradually disappeared. Why should IQ be a better predictor of learning ability in the high-SES than in the low-SES group?[2]

Deutsch and Katz performed correlations between digit span (both aural and visual) and IQ (Lorge Thorndike) at the first, third and fifth grade levels. The only

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[1] Durning, "Numbers Test."

[2] Jacqueline L. Rapier, "Learning Abilities of Normal and Retarded Children as a Function of Social Class," Journal of Educational Psychology, LIX (1968), 102-10.

significant correlation, (r = .48) was found between visual digit span and IQ on the third grade level. Subjects were low-SES children attending schools in the Harlem area of New York. These results are in contrast with correlations found between digit span and IQ when subjects represent the average population.[1] Durning, in a review of research assessing digit span's loading on "g" reports correlations found between .63 and .80 between measures of the ability and full scale WISC.[2] The Deutsch and Katz correlations agree with Jensen's finding regarding the relationship between digit span and IQ in low-SES groups.

Semler and Iscoe compared the performance of White and Negro children on four tasks involving paired-associate learning. They also administered the WISC to children who ranged in age from five to nine years. Although significant differences were present favoring the White children on the WISC they were not present in the paired-associate learning. The study found the correlation between IQ and learning-task scores low for both groups (.09 for Whites, .19 for Negroes). The Negro group was described in the report as being low-SES. The White group

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[1] Phyllis A. Katz and Martin Deutsch, "Visual and Auditory Efficiency and Its Relationship to Reading in Children," Cooperative Research Project No. 1099 of the Office of Education, U. S. Department of Health, Education and Welfare (1963).

[2] Durning, "Numbers Test," p. 5.

was intended to be a match in SES to the Negro group but it is stated that the White group's SES was significantly higher.[1]

In summary, the correlations found between measures of general IQ and various measures of associative learning ability range from .40 to .73 in the middle-SES groups and from .13 to .33 in low-SES groups. It has been the general finding that low-SES groups are equal to middle-SES groups on associative learning ability. In the case of retarded children, the low-SES retardates are found superior to middle-SES retardates in associative learning ability.

Needs Revealed by Review of Literature Taken Into Account in Planning Design of Present Investigation

1. Three studies reviewed (Jensen, 1968, 1969, and Durning, 1968) confounded race and socioeconomic status. Jensen used Negro subjects for the low-SES group and White subjects for the middle-SES group. Guinagh avoided this confusion by using both a group of White and a group of Negro subjects for the low-SES category as did the present study.
2. The studies which involved assessment of

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[1] Ira J. Semler and Ira Iscoe, "Comparative and Developmental Study of Learning Abilities of Negro and White Children Under Four Conditions," Journal of Educational Psychology, LIV, No. 1 (1963), 38-44.

children from more than one race used subjects attending separate schools. In the Jensen and Guinagh studies SES membership was determined by school membership. With extensive integration taking place, studies of this kind may now be conducted using subjects from the same schools.

3. Excepting Rapier's, the studies reviewed used SES groups in which mean IQs represented the customary level for the category. This resulted in significantly lower IQ levels in the disadvantaged groups; and, uncertainty as to whether results should be attributed to differences in SES or IQ levels. The present investigation equated SES groups on IQ.
4. There also appears a need to separate the SES dimension from possible effect associated with category of mental retardation. Studies comparing correlations between general IQ and associative learning ability using retarded children from low- and middle-SES groups may be finding differences caused by higher incidence of one type of retardate in a given SES category. In the present study, mean IQs were in the normal range.

The present study attempted to provide the control revealed needed. In addition, it attempted to provide a practical test of validity for relationships found by using achievement in programmed readers as external criterion for predictors IQ and associative learning ability.

CHAPTER III

DESIGN

Sample

Subjects in this study were 22 middle-SES-White, 25 low-SES-White, and 25 low-SES-Negro students attending second-grade classes in three southern United States communities. The three schools selected were chosen because they had approximately 50-50 Negro-White race ratios and offered greatest number of students in second grade. Each of the schools serves the total elementary school population of the small town in which it is located. The communities may be described as semi-rural.

An approximately equal number of subjects was selected from a school for each of the three SES-race categories during initial phase of the investigation. At termination of study, the distribution of 72 subjects remaining by school and SES-race category was as follows:

		No. Ss
School A	Middle-SES-White	14
	Low-SES-White	16
	Low-SES-Negro	15
School B	Middle-SES-White	5
	Low-SES-White	6

		No. Ss
	Low-SES-Negro	8
School C	Middle-SES-White	3
	Low-SES-White	3
	Low-SES-Negro	2

Subjects' SES was determined by the Parent Information Form (appendix iii) which assessed parents' level of education, income and employment. Items were scored according to level of answers. Student SES classification was determined by summing scores made on the five items. Low-SES subjects made scores of 15 or less. Middle-SES subjects made scores of 20 or more.

Selections were made for the three groups so that mean IQ of each would be approximately equal. Mean IQ for low-SES-Negro, low-SES-White, and middle-SES-White subjects remaining at termination of the study were 96, 97, and 99 respectively. The Hartley F-Max test applied to the variances obtained from IQ score distributions for each group showed no significant differences (F = 1.9232). Frequency distributions for the three SES-race categories are presented in Table 1.

Age ranges of the three categories were homogeneous. Frequency distributions on age are presented in Table 2.

In addition to being equated on these variables, groups were equated on average placement of subjects in the Sullivan Programmed Readers.

TABLE 1

IQ (CTMM) DISTRIBUTION FINAL SAMPLE

IQ (CTMM) Interval	Mid-SES-W Frequency	Low-SES-W Frequency	Low-SES-N Frequency
69- 78	1	0	0
79- 88	0	2	2
89- 98	9	13	14
99-108	10	8	8
109-118	2	2	1
119-128	0	0	0
Mean = SD =	99.5 8.5	97.2 7.9	95.6 6.3

TABLE 2

AGE DISTRIBUTION FINAL SAMPLE

Age (mos.) Interval	Mid-SES-W Frequency	Low-SES-W Frequency	Low-SES-N Frequency
69- 78	0	0	1
79- 88	6	4	4
89- 98	12	18	17
99-108	2	2	3
109-118	1	1	0
119-128	1	0	0
Mean = SD =	94.73 7.68	93.32 5.70	92.40 5.80

Instruments

1. The instrument used to assess general IQ was the California Short-Form Test of Mental Maturity devised by Elizabeth T. Sullivan, Willis W. Clark, and Ernest W. Tiegs (1963, Level I). The test measures logical reasoning through the use of pictured opposites, similarities, and analogies. Also measured by this instrument are numerical reasoning, verbal comprehension and delayed story comprehension.

2. The Test of Associative Learning Ability (TALA) was used which is similar to that devised by Jensen and used in his research.[1] It renders a composite score summing the standard scores made by students on the following subtests:

   Recall Test. It consists of two sets of objects--sixteen familiar and eight abstract shapes in plastic. The set of familiar objects consists of a candle, comb, toy horse, toy car, toy airplane, sucker, diaper pin, crayon, toy watch, plastic flower, paper umbrella, spoon, small doll, toy cow, baby doll bottle, and toy watch. The set of abstract objects consists

[1] Arthur R. Jensen, "Learning Abilities in Mexican-American and Anglo-American Children," California Journal of Educational Research, XII (1961), 149-51.

of a blue square, a yellow triangle. green circle, red triangle, yellow, square, green triangle, red circle, and red square.

Subjects name each object presented in a set. Objects are removed from sight and subjects are asked to name as many as they can recall. Subject's score in the present investigation was total number of unrecalled items on four trials.

Serial Learning Test. Eight familiar objects used in the recall test are placed under inverted white cardboard boxes in a row. Subjects attempt to name what is under each box in sequence from left to right, looking to see if they name the object correctly after each guess. Subject's score was total number of errors made in four trials. The test is repeated using the eight abstract objects.

Paired-Associate Learning Test. Each of eight familiar objects used in the recall and serial learning tests are attached to an inverted cardboard box with another eight familiar objects placed under the boxes. The The subject's task is to learn what is under each box--his only clue is the object on top of the box, as the order of the boxes is rearranged after each trial to rule out serial learning. Subject's score was the total number of errors made in four trials.

TALA subtests are administered to subjects in the order presented above.

3. The instrument which measured reading achievement at post-test time was a series of Progress Tests devised by M. W. Sullivan and published by Behavioral Research Laboratories. They were selected for the study because they measure direct learning of material utilizing associative learning ability. The Progress Tests accompany the Sullivan Programmed Readers. Each book in the program contains ninety-six pages of content and is accompanied by a Progress Test containing forty items covering this material. The equality found between texts in the amount of material covered plus the equality found in the number of test items covering each assure student scores that are interval in nature.

Rationale Concerning the Link Between Associative Learning and the Sullivan Programmed Readers

The Sullivan Programmed Readers attempt to teach primarily the decoding skills. These materials were selected for the study because students appear to learn in them through the associative learning process as illustrated below.

The program begins by establishing basic sound-symbol associations for a few letters. A word is then spelled with these letters and presented with a picture to establish a word-meaning association. The student is asked to identify each separate letter-sound association in the word (one per frame). He is then asked to write missing letters of the word and finally, write the entire word from memory. After the letters and sounds are firmly linked in this manner to the whole word, the word is presented in contrast to one different by only one letter and sound. In contrasting a thoroughly learned association with other material, the student is led to make associations regarding linguistic spelling patterns.

Examples taken from the Sullivan program which illustrate this procedure may be found in appendix ii. It may be seen by examining these materials that: (1) much rote practice is given on elements to be learned, (2) both sound-symbol and word-picture associations are taught, and (3) the program utilizes past associations to build new learning (not only in the synthesis of letter sounds into words but also in contrasting new elements with old to facilitate associations).

Procedure

Selection of Sample

On January 3, 1972 the Parent Information Form assessing socioeconomic status (SES) was sent to the schools to be completed by teachers of the 266 students in second-grade. Schools and their respective populations were as follows:

	Subjects
School A	Negro 74
	White 70
School B	Negro 29
	White 29
School C	Negro 38
	White 26

At this time teachers also reported student age, sex, and placement in the Sullivan Programmed Readers.

On January 5, 6, and 7 the California Short-Form Test of Mental Maturity was administered to all subjects. The principal researcher gave these tests to total classes ranging from 24 to 30 in number of students. In each of the nine administrations both teacher and classroom aide acted as monitors in order to meet standardization requirements set forth in the test manual.

SES data obtained from the Parent Information Form, scores on the California intelligence measure, sex, and placement in the Sullivan reading program were recorded for the purpose of selecting subjects. This involved equating three SES-race groups on IQ, sex ratio, and placement in reading.

Before selection, the following number of subjects was found available for each SES-race category:

Low-SES-Negro	91 subjects
Low-SES-White	49 subjects
Middle-SES-White	47 subjects

In the hope that a random selection might be made from each of the categories, tests of significance were applied to the IQ scores between groups. The differences noted were significant beyond .01 level of confidence, so a random selection was not made.

The final selection of subjects was made by matching the lower distribution of both categories of White subjects with the higher distribution of scores for Low-SES-Negro subjects. Matching was made within schools to assure approximately equal presence in each category of any school effect.[1] Data on distribution of IQ are presented in Table 1.

[1] All schools in the study are participating in a project using the Sullivan readers. Administration of the program including the training of teachers and aides was done centrally by project personnel.

Administration of Associative Learning Ability Tests

During the period January 31 to February 11, the Test of Associative Learning Ability was administered to the selected groups by examiners judged to be professionally competent on the basis of training and experience. Tests were administered to subjects individually. Examiners ere without knowledge of subjects' IQ scores or SES classification. Frequency tables on standard score distributions for each SES-race category may be found in appendix i. Polarity of z was reversed in deriving standard scores to avoid working with negative correlations. Means and standard deviations for TALA subtests' standard scores are presented for each group in Table 3.

TABLE 3

TESTS OF ASSOCIATIVE LEARNING ABILITY

Group	Recall		Serial		Paired Asso.	
	Mean	SD	Mean	SD	Mean	SD
Mid-SES-W	48.9	10.5	46.9	11.3	50.3	7.5
Low-SES-W	49.5	8.6	51.8	8.5	51.1	11.0
Low-SES-N	51.1	11.0	49.6	8.9	49.7	10.0

Administration of Post-test in Reading Achievement

During the period March 24 to March 30 the Sullivan Reading Program's Progress Tests were administered to the

72 students in the study. Progress Tests for Series I, Series II, and Series III were administered to each child, regardless of placement at termination of the study, at three different testing sessions. Trained examiners gave these tests with assistance from classroom aides assigned to the Sullivan program's Project Read. Means and standard deviations of the three reading tests for each SES-race category are presented in Table 4.

TABLE 4

TESTS OF READING ACHIEVEMENT

Group	Series I Mean	Series I SD	Series II Mean	Series II SD	Series III Mean	Series III SD
Mid-SES-W	147.1	15.4	121.7	26.9	92.6	37.6
Low-SES-W	142.4	20.1	106.2	34.3	73.5	33.7
Low-SES-N	140.1	17.2	105.5	32.0	79.92	34.6

Statistical Analysis

The analysis of the data involved calculation of correlation coefficients and multiple regression equations which tested the hypotheses. Hypothesis 1 stated that there would be no difference in the ability of TALA to predict achievement in reading for the three SES-race groups. Hypothesis 2 was translated into the appropriate null which stated that there would be no difference in the ability of IQ to predict achievement for the three SES-race groups.

In testing these hypotheses the .05 level of significance was used.

The variables employed in the study were given X and Y designations and are listed in Tables 5 and 6 in the next chapter. SES-race groups, intelligence, and subtests on the associative learning ability tests were designated X variables and are also referred to as independent variables. The three reading achievement measures have been designated the Y variables (criterion) and are also referred to as dependent variables. It will be noted that a different set of variables was used in testing each of the hypotheses. SES-race category, and the three TALA tests were placed in multiple regression equations predicting reading achievement to test hypothesis 1. SES-race category and IQ scores were placed in multiple regression equations to test hypothesis 2.

The calculation of these equations was performed in accordinace with Stepregression 1 Program, University of Wisconsin. The program first selects and computes the necessary statistics for the single best independent variable. It then selects the best of the remaining variables, from which the first has been partialed out. This process continues until the program has ordered the variables according to their value in contributing to the power of the multiple regression equations. At each step of the program, information is available pertaining to (1) the value of the multiple correlation coefficient, (2) the test of significance for the multiple correlation coefficient, (3) the value of the partial regression coefficients for each independent variable, and (4) the tests of significance for these coefficients. The partial regression coefficient for each independent variable expresses the average change in the dependent variable while partialing out the effect of all other independent variables. A test was made to determine whether or not each partial regression coefficient represented a relationship significantly different from zero. In testing both hypothesis 1 and 2, significance or non-significance of SES-race variables was examined.

CHAPTER IV

RESULTS

Two hypotheses were formulated for the purpose of testing a reported differential relationship between associative learning ability and IQ in middle- and low-SES groups. Both hypotheses involved predicting achievement in the Sullivan Programmed Readers which was taken as a measure of mastery of an associative learning ability task. In accordance with reported relationships, TALA subtests would be expected to predict achievement in the Sullivan program equally for the three SES-race categories, while IQ would be expected to predict more achievement variance for the middle-SES group. The latter would be expected due to reported higher correlation between IQ and associative learning ability in that population.

The two hypotheses which were tested in this study are examined in the order presented.

Hypothesis 1. The tests of associative learning ability will predict reading achievement in the Sullivan Programmed Readers equally for middle-SES-White, low-SES-White, and low-SES-Negro groups.

Hypothesis 2. The CTMM will predict a significantly greater proportion of achievement variance in the Sullivan

Programmed Readers for the middle-SES-White group.

In testing hypothesis 1, three multiple regression equations were calculated to predict achievement on the three reading tests. Each equation contained SES-race group membership and the three associative learning ability tests as independent variables. In calculating a multiple regression equation, the computer program first performed correlations between all variables (Table 5) and then selected the best independent variable. It then selected the best of the remaining variables from which the first had been partialed out. This process was repeated until all independent variables were ordered according to the change which they effected in the dependent variable. The change associated with each is described by the coefficient of determination. Examination of coefficients of determination associated with group variables formed the basis for accepting or rejecting this hypothesis. The multiple regression equations calculated to predict achievement on the three reading tests yielded little contribution made by SES-race category. Greatest coefficients of determination associated with SES-race variables were .04, .05, and .04 for the three equations. Consequently hypothesis 1 is accepted. Statistical data on regression analysis are presented in appendix i.

In testing hypothesis 2, three multiple regression equations were again calculated to predict achievement on

TABLE 5

CORRELATION MATRICES FOR VARIABLES
USED IN TESTING HYPOTHESIS 1

Equation 1

Variable	X1	X2	X3	X4	X5	
X1 (Mid-SES-W)	1.000					
X2 (Low-SES-W)	-.484	1.000				
X3 (Recall Test)	-.062	-.026	1.000			
X4 (Serial Test)	-.181	.169	.371	1.000		
X5 (Paired Asso.)	-.005	.053	.146	.374	1.000	
Y1 (Read. Ser. I)	.149	-.027	-.092	.196	.118	1.000

Equation 2

Variable	X1	X2	X3	X4	X5	
X1 (Mid-SES-W)	1.000					
X2 (Low-SES-W)	-.484	1.000				
X3 (Recall Test)	-.062	-.026	1.000			
X4 (Serial Test)	-.181	.169	.371	1.000		
X5 (Paired Asso.)	-.005	.053	.146	.374	1.000	
Y2 (Read. Ser. II)	.227[a]	-.103	.070	.195	.229[a]	1.000

Equation 3

Variable	X1	X2	X3	X4	X5	
X1 (Mid-SES-W)	1.000					
X2 (Low-SES-W)	-.484	1.000				
X3 (Recall Test)	-.062	-.026	1.000			
X4 (Serial Test)	-.181	.169	.371	1.000		
X5 (Paired Asso.)	-.005	.053	.146	.374	1.000	
Y3 (Read.Ser.III)	.203	-.162	.181	.077	.159	1.000

[a]Statistically significant at .05 level.

the three reading tests. In these equations, groups and the CTMM became the independent variables. Correlation matrices on variables used in the three equations are presented in Table 6. For hypothesis 2 to be accepted it would be necessary for the middle-SES-White group variable to make significant contributions to the multiple regression equations. An examination of the coefficients of determination yielded no significant contribution made by this variable. Consequently hypothesis 2 is rejected.

Although the paired associate test was a significant predictor of reading achievement (test II) at the .05 level of significance, and the serial and recall tests reached .10 level of significance in two equations, correlations between associative learning ability tests and criterion were generally low. The maximum coefficient of determination obtained by using the tests was .08. Valid testing of hypothesis 2 requires that the criterion be a measure of an associative learning ability task. It was decided, therefore, to make direct correlations between CTMM and the recall, serial, and paired associate tests to see if they supported rejection of hypothesis 2. It may be seen by examining Table 7 that no pattern of the correlations can support statements concerning SES or race differences; therefore, rejection of hypothesis 2 is indicated. The test of serial learning which is analogous to digit span used by most researchers on this question rendered

TABLE 6

CORRELATION MATRICES FOR VARIABLES USED IN TESTING HYPOTHESIS 2

Equation 1

Variable	X1	X2	X3	Y1
X1 (Mid-SES-W)	1.000			
X2 (Low-SES-W)	-.484	1.000		
X3 (CTMM)	.156	-.043	1.000	
Y1 (Read. Ser. I)	.149	-.027	.323[a]	1.000

Equation 2

Variable	X1	X2	X3	Y2
X1 (Mid-SES-W)	1.000			
X2 (Low-SES-W)	-.484	1.000		
X3 (CTMM)	.156	-.043	1.000	
Y2 (Read. Ser. II)	.227[b]	-.103	.270[b]	1.000

Equation 3

Variable	X1	X2	X3	Y3
X1 (Mid-SES-W)	1.000			
X2 (Low-SES-W)	-.484	1.000		
X3 (CTMM)	.156	-.043	1.000	
Y3 (Read. Ser. III)	.203	.162	.191	1.000

[a]Statistically signi. .cant at .01.

[b]Statistically significant at .05

correlations with IQ of .27, .32, and .17 for the middle-SES-White, low-SES-White, and low-SES-Negro groups respectively. Both the middle-SES-White and low-SES-Negro correlations were insignificant, while the low-SES-White correlation was significant at .05 level of confidence.

TABLE 7

CORRELATION COEFFICIENTS OBTAINED BETWEEN IQ AND TALA SUBTESTS FOR THREE SES-RACE GROUPS

Group	Recall-IQ	Serial-IQ	Paired Asso.-IQ
Mid-SES-W N = 22	.060	.272	.246
Low-SES-W N = 25	.195	.326	.024
Low-SES-N N = 25	.087	.172	.217

As was stated, the maximum coefficient of determination which TALA scores reached was .08. It is noted also that the maximum coefficient of determination for IQ was .10. The correlation coefficient was .32. This represents a much weaker relationship than is customarily found between IQ and measures of reading achievement on standardized tests.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

This study sought to test by the validation process the finding that there is a different relationship between associative learning ability and IQ in middle- and low-SES groups. Criterion used in validation was reading achievement in the Sullivan Programmed readers. Both IQ and tests of associative learning ability were used as predictors of achievement for middle-SES-White, low-SES-White, and low-SES-Negro subjects.

Conclusions

Results from multiple regression analysis and from direct correlations support the conclusion that differences of consequence are not present between SES or racial groups on relationship between associative learning ability and IQ.

Some significance was attained by TALA tests in predicting achievement in the Sullivan program, but it is concluded that they will be of little value without addition of other uncorrelated independent variables.

Due to the unusually low correlation found between IQ and achievement as measured by the Progress Tests, it is concluded that students may be less handicapped by low IQ on tests which measure direct learning than has traditionally been assumed.

Discussion

The present study obtained results which are inconsistent with results reported from other investigations regarding the relationship between IQ and associative learning ability in middle- and low-SES groups. Possible reason for the differences may lie in the fact that in this study groups were equated on IQ. In addition, IQ levels were within the normal range. Most studies on this question used groups in which IQ was at customary levels associated with the categories resulting in uncertainty as to whether differences should be attributed to SES or IQ levels (Jensen 1968, 1969; Guinagh, 1969; Durning 1968). Two studies involved retarded subjects without differentiation as to organic or cultural-familial classification (Rapier 1968; Jensen 1963). One of the purposes of the present study was to separate the SES dimension from others.

The finding that IQ is a less powerful predictor of achievement in the Sullivan Programmed Readers as measured by the Progress Tests may be compared to findings regarding IQ as a predictor of achievement in reading programs as measured by standardized tests. Table 8 presents correlations obtained in the Cooperative Research Program between IQ and Stanford subtests in reading.[1] It will be noted that these are greater than that obtained in the present study.

TABLE 8

SUMMARY OF CORRELATIONS BETWEEN PINTNER-CUNNINGHAM INTELLIGENCE TEST AND STANFORD PARAGRAPH MEANING, VOCABULARY, AND WORD READING TESTS FOR EACH OF SIX READING PROGRAMS

Treatment	Stanford Paragraph Meaning	Stanford Vocabulary	Stanford Word Reading
Basal	.42	.50	.44
i.t.a.	.52	.58	.52
Basal-Phonics	.56	.54	.57
Language Experience	.43	.43	.42
Linguistic	.48	.47	.47
Phonic-Linguistic	.52	.54	.56

Implications and Recommendations

The fact that reported relationships between IQ and associative learning ability were not substantiated by this study indicates need for replication of past research in which race, IQ or category of mental retardation was

[1] Guy L. Bond and Robert Dykstra, "The Cooperative Research Program in First-Grade Reading," Reading Research Quarterly, II (1967), 35-42.

confounded with SES.

Further attempts should be made to find a way around the IQ deficit present in disadvantaged groups by exploration of both learning abilities and diverse mental abilities. The finding that disadvantaged students were equal to middle-SES groups on associative learning ability and that tests of this ability can predict to some extent in curricular materials is encouraging and suggests that a comprehensive approach be taken in which a variety of tests of specific abilities are used which encompass a model such as Guilford's.[1] Theoretically, once the general learning and ability profile of disadvantaged children is illuminated, curricular materials and teaching strategies may be designed which specifically use their strengths. It may be feasible, in fact, with the aid of computers to provide individual prescriptions for students based on the requirements of curricular tasks and student's exhibited readiness. Little research has been conducted which explores differences in ability by SES or ethnic group. One exception is the work of Lesser, Fifer, and Clark who found verbal labeling ability superior to concept formation in Negro

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[1] J. P. Guilford, N. W. Kettner, and P. R. Christensen, "A Factor-analytic Study Across the Domains of Reasoning, Creativity, and Evaluation, I. Hypotheses and Description of Tests," Rep. Psychol. Lab., No. 11 (1954), Los Angeles: University of Southern California.

subjects.[1] Considering the great number of abilities as yet unassessed, it is likely that there are specific strengths to be revealed for any given group which might be utilized in mastery of curricular materials specifically constructed to require them.

After the ability profile of disadvantaged children is revealed it is recommended that a materials match for it be derived statistically. Teacher constructed or commercially prepared materials purported to utilize learning strengths which the children exhibit should be put to empirical test. This may be accomplished by analyzing the power of ability tests used in assessing the profile as they predict achievement in the materials. Once an ability-materials match is made, the extent to which it effects improvement in student achievement should also be assessed by appropriate research methodology. Needless to say, this total process would require tremendous effort from school personnel.

A simpler approach to curriculum development and testing programs for the disadvantaged child and one supported by the comparatively weak ability of IQ to predict on tests of direct learning as was found in this study would involve writing behavioral descriptions of what

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[1]Stodolsky and Lesser, "Learning Patterns in the Disadvantaged," pp. 546-93.

students are expected to learn and translating these into examinations. Teachers do this to some extent, but the process should be formalized.

Summary

The present research pointed out that different results may be obtained from those reported concerning the relationship between associative learning ability and IQ when SES-racial groups are equated on IQ and within normal levels. The study also pointed out that IQ can be less powerful in predicting achievement when tests measure direct learning. The finding that tests of associative learning ability can predict to some extent in curricular materials and that SES-racial groups are equal on this ability is encouraging and suggests that many other learning abilities and mental abilities be assessed for predictive purposes.

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APPENDIX I

Middle-SES-White Test Scores

		Associative Learning Tests (#1 Recall #2 Serial #3 Paired Asso.)									Reading Post-Test		
		#1		#2		#3		#1	#2	#3			
Sub.	IQ	RAW	Z	RAW	Z	RAW	Z	Stand. Scores			I	II	III
1	92	31	.11	30	.26	23	.43	48.9	47.4	40.7	149	123	79
2	103	38	.70	31	.40	17	-.03	43	46	50.3	158	155	158
3	94	27	-.37	29	.11	8	-1.48	53.7	48.9	64.8	159	156	126
4	96	35	.41	13	-1.47	19	.29	45.9	64.7	47.1	152	100	51
5	104	26	.47	30	.26	19	.29	45.3	47.4	47.1	156	122	103
6	96	56	2.47	29	.11	20	.45	25.3	48.9	45.5	132	71	48
7	95	65	3.35	57	4.17	19	.29	16.5	8.3	47.1	154	122	107
8	110	40	.90	19	-1.33	4	-2.12	41	63.3	71.2	155	139	103
9	97	34	.31	23	-.75	20	.45	46.9	57.5	45.5	153	123	110
10	98	32	.11	28	-.02	16	-.19	48.9	50.2	51.9	154	136	103
11	96	25	-.56	29	.11	17	-.03	55.6	48.9	50.3	152	128	59
12	70	28	-.27	40	1.71	21	.61	52.7	32.9	43.9	155	138	113
13	95	24	-.66	27	-.17	18	.12	56.6	51.7	48.8	143	141	127
14	103	23	-.76	26	-.31	16	-.19	57.6	53.1	51.9	159	155	149
15	100	27	-.37	37	1.27	8	-1.48	53.7	37.3	64.8	131	101	49
16	115	33	.21	33	.69	21	.61	47.9	43.1	43.9	157	101	100
17	102	23	-.76	35	.98	21	.61	57.6	40.2	43.9	89	51	43
18	105	27	-.37	29	.11	21	.61	53.7	48.9	43.9	138	88	53
19	104	17	-1.35	22	-.99	18	.12	63.5	59.9	48.8	149	121	63
20	108	25	-.56	31	.40	13	-.67	55.6	46	56.7	149	135	108
21	101	20	-1.05	29	.11	17	-.03	60.5	48.9	50.3	158	155	146
22	105	34	.31	35	.98	18	.12	46.9	40.2	48.8	130	117	89

Low-SES-White Test Socres

		Associative Learning Tests (#1 Recall #2 Serial #3 Paired Asso.)									Reading Post-Test		
		#1		#2		#3		#1	#2	#3			
Sub.	IQ	RAW	Z	RAW	Z	RAW	Z	Stand.	Scores		I	II	III
1	93	43	1.53	35	.95	21	.61	33.2	40.2	43.9	151	89	46
2	98	25	-.56	27	-.17	16	-.19	55.6	51.7	51.9	156	153	109
3	91	43	1.19	19	-1.33	20	.45	38.1	63.3	44.5	152	133	70
4	107	45	1.39	15	-1.91	0	-2.71	36.1	69.1	77.7	158	132	72
5	103	43	1.19	22	.89	20	.45	38.1	58.9	45.5	153	108	45
6	90	39	.80	39	1.56	19	.29	42	34.4	47.1	151	131	107
7	100	39	.80	20	-1.18	5	-1.96	42	61.8	69.6	157	155	115
8	90	42	1.09	35	1.42	24	1.09	39.1	32.9	39.1	122	48	29
9	83	25	-.56	24	-.60	7	-1.64	55.6	56	66.4	121	82	55
10	99	21	-.96	21	-1.04	5	-1.96	59.6	60.4	69.6	153	109	67
11	95	28	-.27	24	-.60	22	.77	52.7	56	42.3	154	97	69
12	96	24	-.66	17	-1.62	14	-.51	56.6	56.2	55.1	153	147	115
13	97	30	-.07	25	-.46	24	1.09	50.7	54.6	39.1	147	87	61
14	91	37	.60	32	.55	20	.45	44	44.5	45.5	153	104	86
15	95	29	-.17	29	.11	18	.12	51.7	48.9	48.8	107	60	48
16	102	25	-.56	24	-.60	7	-1.64	55.6	56	66.4	153	146	101
17	104	18	-1.25	27	-.17	25	1.25	62.5	51.7	47.5	151	139	128
18	93	29	-.17	28	-.02	24	1.09	51.7	50.2	39.1	132	69	47
19	94	23	-.76	30	.26	20	.45	57.6	47.4	45.5	107	67	44
20	111	29	-.17	28	-.02	24	1.09	57.6	50.2	39.1	159	155	152
21	107	18	-1.25	27	-.17	17	-.03	62.5	51.7	50.3	156	88	24
22	111	21	-.96	21	-1.04	13	-.67	59.6	60.4	56.7	153	140	109
23	102	36	.50	34	.84	26	1.41	45	41.5	35.9	138	71	50
24	79	33	.21	27	-.17	12	-.83	47.9	51.7	53.3	76	46	33
25	95	37	.60	30	.26	16	-.19	44	47.4	52	147	98	56

Low-SES-Negro Test Scores

Associative Learning Tests
(#1 Recall #2 Serial #3 Paired Asso.)

		#1		#2		#3		#1	#2	#3	Reading Post-Test		
Sub.	IQ	RAW	Z	RAW	Z	RAW	Z	Stand.	Scores		I	II	III
1	96	36	.50	20	-1.18	19	.29	45	61.8	47.1	130	131	64
2	108	53	2.17	39	1.56	24	1.09	28.3	34.4	39.1	152	147	97
3	95	23	-.27	27	.17	17	-.03	52.7	51.7	50.3	151	92	56
4	102	30	-.07	15	-1.19	11	-1.00	50.7	61.9	60	155	152	152
5	99	36	.50	31	.40	23	.93	45	46	40.7	153	121	87
6	97	24	-.66	18	-1.47	18	.12	56.6	64.7	48.8	156	149	131
7	94	47	1.58	44	2.28	26	1.41	34.2	27.2	35.4	143	115	78
8	100	41	1.00	34	.84	1	-2.61	40	41.6	76.1	145	117	63
9	81	17	-1.35	34	.84	20	.45	63.5	41.6	45.5	115	86	103
10	99	20	-1.05	28	-.02	14	-.51	60.5	50.2	55.1	151	131	120
11	95	16	-1.45	24	-.60	11	-1.00	64.5	56	60	157	145	148
12	98	23	-.16	28	-.02	23	.43	57.6	50.2	40.7	158	147	131
13	93	32	.11	28	-.02	21	.61	48.9	50.2	43.9	141	125	89
14	95	24	-.66	31	.40	17	-.03	56.6	46	50.3	101	58	33
15	95	30	-.07	27	-.11	24	1.09	50.7	51.7	39.1	120	78	53
16	101	25	-.56	22	-.89	19	.29	55.6	53.9	47.1	130	61	39
17	114	16	-1.45	20	-1.18	8	-1.48	64.5	61.8	64.8	156	123	93
18	101	30	-.07	33	.69	26	1.41	50.7	43.1	35.9	97	61	22
19	100	20	-1.05	27	-.17	9	-1.32	60.5	51.7	63.2	115	52	55
20	93	20	-1.05	25	-.46	13	-.67	60.5	54.6	56.7	142	70	56
21	89	31	.11	32	.55	10	-1.16	48.9	44.5	61.6	130	87	63
22	88	24	-.66	24	-.60	24	1.09	56.6	56	39.1	146	124	68
23	93	17	-1.35	31	.40	17	-.03	63.5	46	50.3	144	115	71
24	93	59	2.76	26	-.31	18	.12	22.4	53.1	48.8	145	78	50
25	95	41	1.00	37	1.27	21	.61	40	37.3	43.9	151	79	56

HYPOTHESIS 1 GROUPS TALA TESTS READING SERIES I

BASIC REGRESSION STATISTICS

FINAL EQUATION	
STANDARD ERROR OF ESTIMATE	17.8236
COEFFICIENT OF DETERMINATION	.1071
MULTIPLE CORRELATION COEFF.	.3273

V A R I A B L E S I N T H E E Q U A T I O N

VAR	REGRESSION COEFFICIENT	STD. ERROR OF REGRESSION COEFFICIENT	STANDARDIZED REGRESSION COEFFICIENT	PARTIAL CORRELATION COEFFICIENT	T-VALUE WITH 66 DEG. FREEDOM	PARTIAL F VALUE WITH 1 AND 66 DEG. FREEDOM	SIG. LEVEL
	127.82174	15.19296		.719	8.41322	70.78227	.0000
X1	7.64678	5.26369	.1950	.176	1.45269	2.11030	.1510
X2	.45570	5.09470	.0120	.011	.08945	.00800	.9290
X3	-.34032	.22382	-.1915	-.184	-1.52049	2.31189	.1332
X4	.52573	.25157	.2857	.243	2.08978	4.36719	.0405
X5	.07260	.23263	.0392	.038	.31182	.09723	.7562

A N A L Y S I S O F V A R I A N C E S U M M A R Y T A B L E

SOURCE OF VARIATION	SUM OF SQUARES	DEG. FREEDOM	MEAN SQUARE
LINEAR REGRESSION	2515.80817	5	503.16163
RESIDUALS FROM REGRESSION	20966.84461	66	317.67946
CORRECTED TOTAL	23482.65278	71	

F-RATIO = 1.58 WITH 5 AND 66 DEG. FREEDOM
SIGNIFICANCE LEVEL OF F-RATIO = .1769

CORRECTION FOR MEAN	1473758.34722	1
UNCORRECTED TOTAL	1497241.00000	72

SUMMARY OF STEPS

STEP NO.	VAR	STANDARD ERROR OF ESTIMATE	COEFFICIENT OF MULT. CORRELATION	COEFFICIENT OF DETERMINATION	CHANGE IN COEFFICIENT OF DETERMINATION	SIGNIFICANCE LEVEL	NUMBER OF VARIABLES IN THE EQUATION
1	X4	17.9601	.1961	.0385	.0385	.099	2
2	X1	17.7546	.2716	.0733	.0353	.109	3
3	X3	17.5737	.3251	.1057	.0319	.124	4
4	X5	17.6911	.3271	.1070	.0013	.753	5
5	X2	17.8236	.3273	.1071	.0001	.929	6

HYPOTHESIS 1 GROUPS TALA TESTS READING SERIES II

BASIC REGRESSION STATISTICS

FINAL EQUATION

STANDARD ERROR OF ESTIMATE	31.3880
COEFFICIENT OF DETERMINATION	.1322
MULTIPLE CORRELATION COEFF.	.3635

V A R I A B L E S I N T H E E Q U A T I O N

VAR	REGRESSION COEFFICIENT	STD. ERROR OF REGRESSION COEFFICIENT	STANDARDIZED REGRESSION COEFFICIENT	PARTIAL CORRELATION COEFFICIENT	T-VALUE WITH 66 DEG. FREEDOM	PARTIAL F VALUE WITH 1 AND 66 DEG. FREEDOM	SIG. LEVEL
	49.60228	26.75543		.222	1.85391	3.43700	.0682
X1	17.52556	9.26992	.2503	.227	1.89058	3.57430	.0631
X2	-1.47733	8.97197	-.0218	-.020	-.16466	.02711	.8697
X3	-.02625	.39416	-.0083	-.008	-.06660	.00444	.9471
X4	.61263	.44303	.1864	.168	1.38283	1.91221	.1714
X5	.53897	.41003	.1629	.160	1.31447	1.72782	.1932

A N A L Y S I S O F V A R I A N C E S U M M A R Y T A B L E

SOURCE OF VARIATION	SUM OF SQUARES	DEG. FREEDOM	MEAN SQUARE
LINEAR REGRESSION	9901.54103	5	1980.30821
RESIDUALS FROM REGRESSION	65023.73675	66	985.20813
CORRECTED TOTAL	74925.27778	71	

F-RATIO = 2.01 WITH 5 AND 66 DEG. FREEDOM
SIGNIFICANCE LEVEL OF F-RATIO = .0886

CORRECTION FOR MEAN	882234.72222	1
UNCORRECTED TOTAL	957160.00000	72

S U M M A R Y   O F   S T E P S

STEP NO.	VAR	STANDARD ERROR OF ESTIMATE	COEFFICIENT OF MULT. CORRELATION	COEFFICIENT OF DETERMINATION	CHANGE IN COEFFICIENT OF DETERMINATION	SIGNIFICANCE LEVEL	NUMBER OF VARIABLES IN THE EQUATION
1	X5	31.8471	.2290	.0524	.0524	.053	2
2	X1	31.1848	.3231	.1044	.0520	.049	3
3	X4	30.9299	.3630	.1318	.0273	.148	4
4	X2	31.1540	.3634	.1321	.0003	.874	5
5	X3	31.3880	.3635	.1322	.0001	.947	6

HYPOTHESIS 1 GROUPS TALA TESTS READING SERIES III

BASIC REGRESSION STATISTICS

FINAL EQUATION
STANDARD ERROR OF ESTIMATE 35.7653
COEFFICIENT OF DETERMINATION .1014
MULTIPLE CORRELATION COEFF. .3184

V A R I A B L E S I N T H E E Q U A T I O N

VAR	REGRESSION COEFFICIENT	STD. ERROR OF REGRESSION COEFFICIENT	STANDARDIZED REGRESSION COEFFICIENT	PARTIAL CORRELATION COEFFICIENT	T-VALUE WITH 66 DEG. FREEDOM	PARTIAL F VALUE WITH 1 AND 66 DEG. FREEDOM	SIG. LEVEL
	22.78327	30.48666		.092	.74732	.55849	.4575
X1	13.80984	10.56268	.1761	.159	1.30742	1.70934	.1956
X2	-6.20716	10.22318	-.0818	-.075	-.60717	.36865	.5458
X3	.59056	.44912	.1662	.160	1.31492	1.72900	.1931
X4	.03989	.50481	.0108	.010	.07902	.00624	.9373
X5	.50171	.46721	.1354	.131	1.07385	1.15314	.2868

A N A L Y S I S O F V A R I A N C E S U M M A R Y T A B L E

SOURCE OF VARIATION	SUM OF SQUARES	DEG. FREEDOM	MEAN SQUARE
LINEAR REGRESSION	9524.94696	5	1904.98939
RESIDUALS FROM REGRESSION	84424.37249	66	1279.15716
CORRECTED TOTAL	93949.31944	71	

F-RATIO = 1.49 WITH 5 AND 66 DEG. FREEDOM
SIGNIFICANCE LEVEL OF F-RATIO = .2053

CORRECTION FOR MEAN	479383.68056	1	
UNCORRECTED TOTAL	573333.00000	72	

SUMMARY OF STEPS

STEP NO.	VAR	STANDARD ERROR OF ESTIMATE	COEFFICIENT OF MULT. CORRELATION	COEFFICIENT OF DETERMINATION	CHANGE IN COEFFICIENT OF DETERMINATION	SIGNIFICANCE LEVEL	NUMBER OF VARIABLES IN THE EQUATION
1	X1	35.8745	.2027	.0411	.0411	.088	2
2	X3	35.4166	.2807	.0798	.0377	.098	3
3	X5	35.3337	.3104	.0964	.0176	.254	4
4	X2	35.4991	.3183	.1013	.0049	.546	5
5	X4	35.7653	.3184	.1014	.0001	.937	6

HYPOTHESIS 2 GROUPS IQ READING SERIES I

BASIC REGRESSION STATISTICS

FINAL EQUATION

STANDARD ERROR OF ESTIMATE	17.4740
COEFFICIENT OF DETERMINATION	.1158
MULTIPLE CORRELATION COEFF.	.3403

VARIABLES IN THE EQUATION

VAR	REGRESSION COEFFICIENT	STD. ERROR OF REGRESSION COEFFICIENT	STANDARDIZED REGRESSION COEFFICIENT	PARTIAL CORRELATION COEFFICIENT	T-VALUE WITH 68 DEG. FREEDOM	PARTIAL F VALUE WITH 1 AND 68 DEG. FREEDOM	SIG. LEVEL
	70.95629	26.41701		.310	2.68601	7.21464	.0091
X1	4.86929	5.16995	.1242	.113	.94184	.88707	.3496
X2	1.75265	4.94583	.0462	.043	.35437	.12558	.7242
X3	.71669	.27118	.3053	.305	2.64289	6.98489	.0102

ANALYSIS OF VARIANCE SUMMARY TABLE

SOURCE OF VARIATION	SUM OF SQUARES	DEG. FREEDOM	MEAN SQUARE
LINEAR REGRESSION	2719.47488	3	906.49163
RESIDUALS FROM REGRESSION	20763.17790	68	305.34085
CORRECTED TOTAL	23482.65278	71	

F-RATIO = 2.97 WITH 3 AND 68 DEG. FREEDOM
SIGNIFICANCE LEVEL OF F-RATIO = .0379

CORRECTION FOR MEAN	1473758.34722	1
UNCORRECTED TOTAL	1497241.00000	72

SUMMARY OF STEPS

STEP NO.	VAR	STANDARD ERROR OF ESTIMATE	COEFFICIENT OF MULT. CORRELATION	COEFFICIENT OF DETERMINATION	CHANGE IN COEFFICIENT OF DETERMINATION	SIGNIFICANCE LEVEL	NUMBER OF VARIABLES IN THE EQUATION
1	X3	17.3362	.3226	.1041	.1041	.006	2
2	X1	17.3629	.3379	.1142	.0101	.379	3
3	X2	17.4740	.3403	.1158	.0016	.724	4

HYPOTHESIS 2 GROUPS IQ READING SERIES II

BASIC REGRESSION STATISTICS

FINAL EQUATION

STANDARD ERROR OF ESTIMATE	31.3553
COEFFICIENT OF DETERMINATION	.1077
MULTIPLE CORRELATION COEFF.	.3282

V A R I A B L E S   I N   T H E   E Q U A T I O N

VAR	REGRESSION COEFFICIENT	STD. ERROR OF REGRESSION COEFFICIENT	STANDARDIZED REGRESSION COEFFICIENT	PARTIAL CORRELATION COEFFICIENT	T-VALUE WITH 68 DEG. FREEDOM	PARTIAL F VALUE WITH 1 AND 68 DEG. FREEDOM	SIG. LEVEL
	8.29630	47.40257		.021	.17502	.03063	.8616
X1	13.24706	9.27654	.1892	.171	1.42796	2.03906	.1579
X2	-.04467	8.87478	-.0007	-.001	-.00503	.00003	.9960
X3	1.00687	.46660	.2401	.243	2.06921	4.28162	.0423

A N A L Y S I S   O F   V A R I A N C E   S U M M A R Y   T A B L E

SOURCE OF VARIATION	SUM OF SQUARES	DEG. FREEDOM	MEAN SQUARE
LINEAR REGRESSION	9070.81031	3	2690.27010
RESIDUALS FROM REGRESSION	65854.46747	68	983.15393
CORRECTED TOTAL	74925.27778	71	

F-RATIO = 2.74 WITH 3 AND 68 DEG. FREEDOM
SIGNIFICANCE LEVEL OF F-RATIO = .0502

CORRECTION FOR MEAN	882234.72222	1
UNCORRECTED TOTAL	957160.00000	72

S U M M A R Y O F S T E P S

STEP NO.	VAR	STANDARD ERROR OF ESTIMATE	COEFFICIENT OF MULT. CORRELATION	COEFFICIENT OF DETERMINATION	CHANGE IN COEFFICIENT OF DETERMINATION	SIGNIFICANCE LEVEL	NUMBER OF VARIABLES IN THE EQUATION
1	X3	31.5050	.2696	.0727	.0727	.022	2
2	X1	31.1272	.3282	.1077	.0350	.104	3
3	X0	31.3553	.3282	.1077	.0000	.996	4

HYPOTHESIS 2 GROUPS IQ READING SERIES III

BASIC REGRESSION STATISTICS

FINAL EQUATION	
STANDARD ERROR OF ESTIMATE	35.7764
COEFFICIENT OF DETERMINATION	.0736
MULTIPLE CORRELATION COEFF.	.2713

V A R I A B L E S I N T H E E Q U A T I O N

VAR	REGRESSION COEFFICIENT	STD. ERROR OF REGRESSION COEFFICIENT	STANDARDIZED REGRESSION COEFFICIENT	PARTIAL CORRELATION COEFFICIENT	T-VALUE WITH 68 DEG. FREEDOM	PARTIAL F VALUE WITH 1 AND 68 DEG. FREEDOM	SIG. LEVEL
	4.30022	54.08632					
X1	10.41394	10.58498	.1328	.010	.07951	.00632	.9369
X2	-6.89253	10.12613	-.0908	.118	.98384	.96794	.3287
X3	.78314	.55521	.1668	-.082	-.68067	.46331	.4984
				.169	1.41053	1.98959	.1629

A N A L Y S I S O F V A R I A N C E S U M M A R Y T A B L E

SOURCE OF VARIATION	SUM OF SQUARES	DEG. FREEDOM	MEAN SQUARE
LINEAR REGRESSION	6912.80437	3	2304.26812
RESIDUALS FROM REGRESSION	87036.51508	68	1279.94875
CORRECTED TOTAL	93949.31944	71	

F-RATIO = 1.80 WITH 3 AND 68 DEG. FREEDOM
SIGNIFICANCE LEVEL OF F-RATIO = .1554

CORRECTION FOR MEAN	479383.68056	1
UNCORRECTED TOTAL	573333.00000	72

SUMMARY OF STEPS

STEP NO.	VAR	STANDARD ERROR OF ESTIMATE	COEFFICIENT OF MULT. CORRELATION	COEFFICIENT OF DETERMINATION	CHANGE IN COEFFICIENT OF DETERMINATION	SIGNIFICANCE LEVEL	NUMBER OF VARIABLES IN THE EQUATION
1	X1	35.8745	.2027	.0411	.0411	.088	2
2	X2	35.6370	.2594	.0673	.0262	.169	3
3	X3	35.7764	.2713	.0736	.0063	.498	4

MIDDLE-SES
WHITE

FREQUENCY ANALYSIS

NUMBER 22

INTERVALS	RECALL 3 FREQ.	RECALL 3 PCT	SERIAL 4 FREQ.	SERIAL 4 PCT	PAIRED ASSO. 5 FREQ.	PAIRED ASSO. 5 PCT
19-28	0	.0	0	.0	0	.0
29-38	0	.0	0	.0	0	.0
39-48	0	.0	0	.0	0	.0
49-58	0	.0	0	.0	0	.0
58-68	0	.0	0	.0	0	.0
69-78	0	.0	0	.0	0	.0
79-88	0	.0	1	4.5	0	.0
89-98	0	.0	0	.0	0	.0
99-**	0	.0	0	.0	0	.0
109-**	0	.0	0	.0	0	.0
119-**	0	.0	0	.0	0	.0
129-**	0	.0	0	.0	0	.0
139-**	0	.0	0	.0	0	.0
149-**	0	.0	0	.0	0	.0
159-**	1	4.5	0	.0	0	.0
169-**	0	.0	0	.0	0	.0
179-**	0	.0	0	.0	0	.0
189-**	0	.0	0	.0	0	.0
199-**	0	.0	0	.0	0	.0
209-**	0	.0	0	.0	0	.0
219-**	0	.0	0	.0	0	.0
229-**	0	.0	0	.0	0	.0
239-**	0	.0	0	.0	0	.0
249-**	1	4.5	0	.0	0	.0
259-**	0	.0	0	.0	0	.0
269-**	0	.0	0	.0	0	.0
278-**	0	.0	0	.0	0	.0
289-**	0	.0	0	.0	0	.0
299-**	0	.0	0	.0	0	.0
309-**	0	.0	0	.0	0	.0
3 3-**	0	.0	0	.0	0	.0
329-**	0	.0	1	4.5	0	.0
339-**	0	.0	0	.0	0	.0
349-**	0	.0	0	.0	0	.0
359-**	0	.0	0	.0	0	.0
369-**	0	.0	1	4.5	0	.0
378-**	0	.0	0	.0	0	.0
389-**	0	.0	0	.0	0	.0
399-**	0	.0	2	9.1	1	4.5
409-**	1	4.5	0	.0	0	.0
419-**	0	.0	0	.0	0	.0
429-**	1	4.5	1	4.5	0	.0
439-**	0	.0	0	.0	4	18.2
449-**	1	4.5	0	.0	2	9.1
458-**	1	4.5	2	9.1	0	.0
469-**	2	9.1	2	9.1	3	13.6
479-**	1	4.5	0	.0	3	13.6
489-**	2	9.1	5	22.7	0	.0
499-**	0	.0	1	4.5	3	13.6
509-**	0	.0	1	4.5	0	.0
518-**	1	4.5	0	.0	2	9.1
529-**	3	13.6	1	4.5	0	.0
538-**	0	.0	0	.0	0	.0

549-**	2	9.1	0	.0	0	.0
559-**	1	4.5	0	.0	1	4.5
568-**	2	9.1	1	4.5	0	.0
579-**	0	.0	0	.0	0	.0
588-**	0	.0	1	4.5	0	.0
599-**	1	4.5	0	.0	0	.0
608-**	0	.0	0	.0	0	.0
619-**	0	.0	0	.0	0	.0
629-**	1	4.5	1	4.5	0	.0
639-**	0	.0	1	4.5	2	9.1
649-**	0	.0	0	.0	0	.0
659-**	0	.0	0	.0	0	.0
669-**	0	.0	0	.0	0	.0
679-**	0	.0	0	.0	0	.0
689-**	0	.0	0	.0	0	.0
699-**	0	.0	0	.0	0	.0
709-**	0	.0	0	.0	1	4.5
719-**	0	.0	0	.0	0	.0
729-**	0	.0	0	.0	0	.0
739-**	0	.0	0	.0	0	.0
749-**	0	.0	0	.0	0	.0
759-**	0	.0	0	.0	0	.0
769-**	0	.0	0	.0	0	.0
OMITTED	0	.0	0	.0	0	.0
RESPONDING	22		22		22	

LOW-SES
WHITE

FREQUENCY ANALYSIS

	RECALL 3		SERIAL 4		PAIRED ASSO. 5	
INTERVALS	FREQ.	PCT	FREQ.	PCT	FREQ.	PCT
19-28	0	.0	0	.0	0	.0
29-33	0	.0	0	.0	0	.0
39-48	0	.0	0	.0	0	.0
49-53	0	.0	0	.0	0	.0
59-68	0	.0	0	.0	0	.0
69-78	0	.0	0	.0	0	.0
79-88	0	.0	0	.0	0	.0
89-93	0	.0	0	.0	0	.0
99-**	0	.0	0	.0	0	.0
109-**	0	.0	0	.0	0	.0
119-**	0	.0	0	.0	0	.0
129-**	0	.0	0	.0	0	.0
139-**	0	.0	0	.0	0	.0
149-**	0	.0	0	.0	0	.0
159-**	0	.0	0	.0	0	.0
169-**	0	.0	0	.0	0	.0
179-**	0	.0	0	.0	0	.0
189-**	0	.0	0	.0	0	.0
199-**	0	.0	0	.0	0	.0
209-**	0	.0	0	.0	0	.0
219-**	0	.0	0	.0	0	.0
229-**	0	.0	0	.0	0	.0
239-**	0	.0	0	.0	0	.0
249-**	0	.0	0	.0	0	.0
259-**	0	.0	0	.0	0	.0
269-**	0	.0	0	.0	0	.0
279-**	0	.0	0	.0	0	.0
289-**	0	.0	0	.0	0	.0
299-**	0	.0	0	.0	0	.0
309-**	0	.0	0	.0	0	.0
319-**	0	.0	0	.0	0	.0
329-**	1	4.0	1	4.0	0	.0
339-**	0	.0	1	4.0	0	.0
349-**	0	.0	0	.0	0	.0
359-**	1	4.0	0	.0	1	4.0
369-**	0	.0	0	.0	0	.0
379-**	2	8.0	0	.0	0	.0
389-**	1	4.0	0	.0	4	16.0
399-**	0	.0	1	4.0	0	.0
409-**	0	.0	1	4.0	0	.0
419-**	2	8.0	0	.0	1	4.0
429-**	0	.0	0	.0	0	.0
439-**	2	8.0	1	4.0	1	4.0
449-**	1	4.0	0	.0	4	16.0
459-**	0	.0	0	.0	0	.0
469-**	0	.0	2	8.0	2	8.0
479-**	1	4.0	0	.0	1	4.0
489-**	0	.0	1	4.0	0	.0
499-**	1	4.0	2	8.0	1	4.0
509-**	2	8.0	4	16.0	0	.0
519-**	1	4.0	0	.0	2	8.0
529-**	0	.0	0	.0	0	.0
539-**	0	.0	1	4.0	0	.0

549-**	3	12.0	0	.0	1	4.0
559-**	1	4.0	4	16.0	1	4.0
569-**	2	8.0	0	.0	0	.0
579-**	0	.0	0	.0	1	4.0
589-**	2	8.0	1	4.0	0	.0
599-**	0	.0	2	8.0	0	.0
609-**	0	.0	1	4.0	0	.0
619-**	2	8.0	0	.0	0	.0
629-**	0	.0	1	4.0	0	.0
639-**	0	.0	0	.0	0	.0
649-**	0	.0	0	.0	0	.0
659-**	0	.0	0	.0	2	8.0
669-**	0	.0	0	.0	0	.0
679-**	0	.0	0	.0	0	.0
689-**	0	.0	1	4.0	2	8.0
699-**	0	.0	0	.0	0	.0
709-**	0	.0	0	.0	0	.0
719-**	0	.0	0	.0	0	.0
729-**	0	.0	0	.0	0	.0
739-**	0	.0	0	.0	0	.0
749-**	0	.0	0	.0	0	.0
759-**	0	.0	0	.0	0	.0
769-**	0	.0	0	.0	1	4.0
OMITTED	0	.0	0	.0	0	.0
NUMBER RESPONDING	25		25		25	

LOW-SES
NEGRO

FREQUENCY ANALYSIS NUMBER 25

	RECALL 3		SERIAL 4		PAIRED ASSO. 5	
INTERVALS	FREQ.	PCT	FREQ.	PCT	FREQ.	PCT
19-28	0	.0	0	.0	0	.0
29-38	0	.0	0	.0	0	.0
39-48	0	.0	0	.0	0	.0
49-58	0	.0	0	.0	0	.0
59-68	0	.0	0	.0	0	.0
69-78	0	.0	0	.0	0	.0
79-88	0	.0	0	.0	0	.0
89-98	0	.0	0	.0	0	.0
99-**	0	.0	0	.0	0	.0
109-**	0	.0	0	.0	0	.0
119-**	0	.0	0	.0	0	.0
129-**	0	.0	0	.0	0	.0
139-**	0	.0	0	.0	0	.0
149-**	0	.0	0	.0	0	.0
159-**	0	.0	0	.0	0	.0
169-**	0	.0	0	.0	0	.0
179-**	0	.0	0	.0	0	.0
189-**	0	.0	0	.0	0	.0
199-**	0	.0	0	.0	0	.0
209-**	0	.0	0	.0	0	.0
219-**	1	4.0	0	.0	0	.0
229-**	0	.0	0	.0	0	.0
239-**	0	.0	0	.0	0	.0
249-**	0	.0	0	.0	0	.0
259-**	0	.0	0	.0	0	.0
269-**	0	.0	1	4.0	0	.0
279-**	1	4.0	0	.0	0	.0
289-**	0	.0	0	.0	0	.0
299-**	0	.0	0	.0	0	.0
309-**	0	.0	0	.0	0	.0
319-**	0	.0	0	.0	0	.0
329-**	0	.0	0	.0	0	.0
339-**	1	4.0	1	4.0	0	.0
349-**	0	.0	0	.0	0	.0
359-**	0	.0	0	.0	2	8.0
369-**	0	.0	1	4.0	0	.0
379-**	0	.0	0	.0	0	.0
389-**	0	.0	0	.0	3	12.0
399-**	2	8.0	0	.0	2	8.0
409-**	0	.0	2	8.0	0	.0
419-**	0	.0	0	.0	0	.0
429-**	0	.0	1	4.0	0	.0
439-**	0	.0	1	4.0	2	8.0
449-**	2	8.0	0	.0	1	4.0
459-**	0	.0	3	12.0	0	.0
469-**	0	.0	0	.0	2	8.0
479-**	0	.0	0	.0	2	8.0
489-**	2	8.0	0	.0	0	.0
499-**	3	12.0	3	12.0	3	12.0
509-**	0	.0	3	12.0	0	.0
519-**	1	4.0	0	.0	0	.0
529-**	0	.0	1	4.0	0	.0
539-**	0	.0	1	4.0	0	.0

549-**	1	4.0	0	.0	1	4.0
559-**	3	12.0	2	8.0	1	4.0
569-**	1	4.0	0	.0	0	.0
579-**	0	.0	0	.0	0	.0
589-**	0	.0	1	4.0	0	.0
599-**	3	12.0	0	.0	2	8.0
609-**	0	.0	2	8.0	1	4.0
619-**	0	.0	1	4.0	0	.0
629-**	2	8.0	0	.0	1	4.0
639-**	2	8.0	1	4.0	1	4.0
649-**	0	.0	0	.0	0	.0
659-**	0	.0	0	.0	0	.0
669-**	0	.0	0	.0	0	.0
679-**	0	.0	0	.0	0	.0
689-**	0	.0	0	.0	0	.0
699-**	0	.0	0	.0	0	.0
709-**	0	.0	0	.0	0	.0
719-**	0	.0	0	.0	0	.0
729-**	0	.0	0	.0	0	.0
739-**	0	.0	0	.0	0	.0
749-**	0	.0	0	.0	0	.0
759-**	0	.0	0	.0	1	4.0
769-**	0	.0	0	.0	0	.0
OMITTED	0	.0	0	.0	0	.0
RESPONDING	25		25		25	

MIDDLE-SES
WHITE

FREQUENCY ANALYSIS NUMBER 22

INTERVALS	ACHIEV READING SERIES I (6) FREQ.	PCT	ACHIEV READING SERIES II (7) FREQ.	PCT	ACHIEV READING SERIES III (8) FREQ.	PCT
19-28	0	.0	0	.0	1	4.5
29-38	0	.0	0	.0	0	.0
39-48	0	.0	0	.0	2	9.1
49-58	0	.0	1	4.5	3	13.6
59-68	0	.0	0	.0	2	9.1
69-78	0	.0	1	4.5	0	.0
79-88	0	.0	1	4.5	0	.0
89-98	1	4.5	0	.0	1	4.5
99-**	0	.0	3	13.6	6	27.3
109-**	0	.0	1	4.5	1	4.5
119-**	0	.0	6	27.3	3	13.6
129-**	4	18.2	3	13.6	0	.0
139-**	1	4.5	2	9.1	1	4.5
149-**	14	63.6	4	18.2	2	9.1
159-**	2	9.1	0	.0	0	.0
169-**	0	.0	0	.0	0	.0
179-**	0	.0	0	.0	0	.0
189-**	0	.0	0	.0	0	.0
199-**	0	.0	0	.0	0	.0
209-**	0	.0	0	.0	0	.0
219-**	0	.0	0	.0	0	.0
229-**	0	.0	0	.0	0	.0
239-**	0	.0	0	.0	0	.0
249-**	0	.0	0	.0	0	.0
259-**	0	.0	0	.0	0	.0
269-**	0	.0	0	.0	0	.0
279-**	0	.0	0	.0	0	.0
289-**	0	.0	0	.0	0	.0
299-**	0	.0	0	.0	0	.0
309-**	0	.0	0	.0	0	.0
319-**	0	.0	0	.0	0	.0
329-**	0	.0	0	.0	0	.0
339-**	0	.0	0	.0	0	.0
349-**	0	.0	0	.0	0	.0
359-**	0	.0	0	.0	0	.0
369-**	0	.0	0	.0	0	.0
379-**	0	.0	0	.0	0	.0
389-**	0	.0	0	.0	0	.0
399-**	0	.0	0	.0	0	.0

LOW-SES
WHITE

FREQUENCY ANALYSIS NUMBER 25

INTERVALS	ACHIEV READING SERIES I (6) FREQ.	PCT	ACHIEV READING SERIES II (7) FREQ.	PCT	ACHIEV READING SERIES III (8) FREQ.	PCT
19-28	0	.0	0	.0	1	4.0
29-33	0	.0	0	.0	2	8.0
39-48	0	.0	2	8.0	5	20.0
49-53	0	.0	0	.0	3	12.0
59-68	0	.0	2	8.0	2	8.0
69-73	1	4.0	2	8.0	3	12.0
79-88	0	.0	3	12.0	1	4.0
89-93	0	.0	3	12.0	0	.0
99-**	2	8.0	2	8.0	2	8.0
109-**	0	.0	1	4.0	4	16.0
119-**	2	8.0	0	.0	1	4.0
129-**	2	8.0	3	12.0	0	.0
139-**	2	8.0	4	16.0	0	.0
149-**	15	60.0	3	12.0	1	4.0
159-**	1	4.0	0	.0	0	.0
169-**	0	.0	0	.0	0	.0
179-**	0	.0	0	.0	0	.0
189-**	0	.0	0	.0	0	.0
199-**	0	.0	0	.0	0	.0
209-**	0	.0	0	.0	0	.0
219-**	0	.0	0	.0	0	.0
229-**	0	.0	0	.0	0	.0
239-**	0	.0	0	.0	0	.0
249-**	0	.0	0	.0	0	.0
259-**	0	.0	0	.0	0	.0
269-**	0	.0	0	.0	0	.0
279-**	0	.0	0	.0	0	.0
289-**	0	.0	0	.0	0	.0
299-**	0	.0	0	.0	0	.0
309-**	0	.0	0	.0	0	.0
319-**	0	.0	0	.0	0	.0
329-**	0	.0	0	.0	0	.0
339-**	0	.0	0	.0	0	.0
349-**	0	.0	0	.0	0	.0
359-**	0	.0	0	.0	0	.0
369-**	0	.0	0	.0	0	.0
379-**	0	.0	0	.0	0	.0
389-**	0	.0	0	.0	0	.0

LOW-SES
NEGRO

FREQUENCY ANALYSIS NUMBER 25

INTERVALS	ACHIEV READING SERIES I (6) FREQ.	PCT	ACHIEV READING SERIES II (7) FREQ.	PCT	ACHIEV READING SERIES III (8) FREQ.	PCT
19-23	0	.0	0	.0	1	4.0
29-38	0	.0	0	.0	1	4.0
39-43	0	.0	0	.0	1	4.0
49-58	0	.0	2	8.0	6	24.0
59-63	0	.0	2	8.0	3	12.0
69-78	0	.0	3	12.0	2	8.0
79-83	0	.0	3	12.0	2	8.0
89-98	1	4.0	1	4.0	3	12.0
99-**	1	4.0	0	.0	1	4.0
109-**	2	8.0	3	12.0	0	.0
119-**	1	4.0	4	16.0	1	4.0
129-**	2	8.0	2	8.0	2	8.0
139-**	7	28.0	3	12.0	1	4.0
149-**	11	44.0	2	8.0	1	4.0
159-**	0	.0	0	.0	0	.0
169-**	0	.0	0	.0	0	.0
179-**	0	.0	0	.0	0	.0
189-**	0	.0	0	.0	0	.0
199-**	0	.0	0	.0	0	.0
209-**	0	.0	0	.0	0	.0
219-**	0	.0	0	.0	0	.0
229-**	0	.0	0	.0	0	.0
239-**	0	.0	0	.0	0	.0
249-**	0	.0	0	.0	0	.0
259-**	0	.0	0	.0	0	.0
269-**	0	.0	0	.0	0	.0
279-**	0	.0	0	.0	0	.0
289-**	0	.0	0	.0	0	.0
99-**	0	.0	0	.0	0	.0
309-**	0	.0	0	.0	0	.0
319-**	0	.0	0	.0	0	.0
329-**	0	.0	0	.0	0	.0
339-**	0	.0	0	.0	0	.0
349-**	0	.0	0	.0	0	.0
359-**	0	.0	0	.0	0	.0
369-**	0	.0	0	.0	0	.0
379-**	0	.0	0	.0	0	.0
389-**	0	.0	0	.0	0	.0
399-**	0	.0	0	.0	[illegible]	.0

APPENDIX II

page 3

Look at the page on the right. In box 1 you see the letter that has the sound /i/. (This is the first sound of the word in. Be careful to give the sound of each letter -- not its name.) This letter is made up of a dot and a line. Draw a circle around the dot. Then pull the slider down to check your answer.

Look at box 2. We have left out part of the letter that has the sound /i/. Which part have we left out -- the dot or the line? (Answer: the dot)

That's right. Finish the letter by putting a dot in above the line. Then pull the slider down to check your answer. Did you all get it right?

Look at box 3. Finish the letter that has the sound /i/ by drawing a line over the dots. Then pull the slider down to check your answer.

Look at box 4. What part of /i/ has been left out -- the dot or the line? (Answer: the line)

Finish the letter that has the sound /i/ by putting in the line. Then pull the slider down to check your answer.

Look at box 5. Whenever you see a line like this, you will write a letter on it. Write the letter that has the sound /i/ on the line. Then pull the slider down to check your answer.

In box 6, you see three lines. Write the letter that has the sound /i/ on each of the three lines. Then pull the slider down to check your answer.

Look at box 7. In it, you see the letter that has the sound /i/ and another letter that has the sound /n/. (Remember to give the sound of the letter -- not its name.) Circle the top letter, the one that has the sound /i/. Then pull the slider down to check your answer.

Look at box 8. The top letter in the box has the sound /i/. The bottom letter has the sound /n/. Circle the bottom letter -- the one that has the sound /n/. Then pull the slider down to check your answer.

Look at box 9. Which letter has the sound /n/ -- the top letter or the bottom letter? (Answer: the bottom letter)

Circle the letter that has the sound /n/. Then pull the slider down to check your answer.

Look at box 10. Who can tell me the sound of the top letter? (Answer: /i/)

Who can tell me the sound of the bottom letter? (Answer: /n/)

Circle the letter that has the sound /i/. Then pull the slider down to check your answer.

We are ready to turn the page. Pick up your slider and slip it over the answer column on the next page like this. (Demonstrate.)

PAGE FROM TEACHER'S MANUAL

1. i

2. i

3. i

4.

5.

6.

7. i n

8. i n

9. i n

10. i n

PAGE FROM STUDENT WORKTEXT

page 45

In box 1, you see a picture of a man. Under the picture, you see the word man. Circle the letter that has the sound /m/.

In box 2, you again see the word man. Circle the letter that has the sound /æ/.

Who can read the word in box 3? (Answer: man)

Circle the letter that has the sound /n/.

In box 4, finish the word man by writing the letter that has the sound /n/.

In box 5, finish the word man by writing the last two letters.

In box 6, write the word man.

Who can read the word in box 7? (Answer: man)

Circle the picture that goes with the word man.

Who can read the word in box 8? (Answer: pan)

Circle the picture that goes with the word pan.

In box 9, who can read the top word? (Answer: pan)

Who can read the bottom word? (Answer: man)

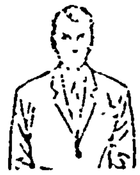
Circle the word that goes with the picture.

In box 10, circle the word that goes with the picture.

Turn the page.

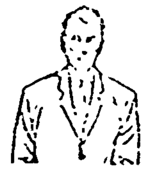
PAGE FROM TEACHER'S MANUAL

1



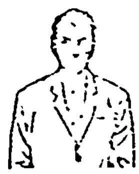
man

2



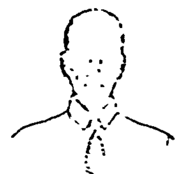
man

3



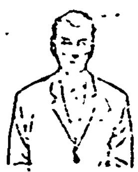
man

4.



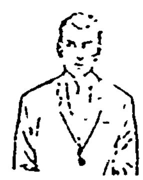
ma__

5



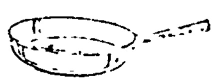
m____

6

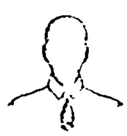


______

7



man



8

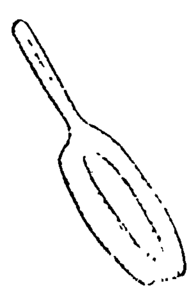
pan

9

pan

man

10



pan

man

PAGE FROM STUDENTS WORKTEXT

APPENDIX III

PARENT INFORMATION FORM

Student____________________ Teacher________________

Address____________________ School________________

A. Check the following category which comes closest to the occupation of student's father. If father is retired, deceased, or unemployed indicate his former or customary occupation. (Mark only one)

1.___Unskilled worker, laborer, farm worker
2.___Semiskilled worker (e. g., machine operator)
3.___Service worker (policeman, fireman, barber, military non-commissioned officer, etc.)
4.___Skilled worker or craftsman (carpenter, electrician, plumber, etc.)
5.___Salesman, bookkeeper, secretary, officer worker, etc.
6.___Owner, manager, partner; of a small business; lower level governmental official; military commissioned officer
7.___Profession requiring a bachelor's degree (engineer, elementary or secondary teacher, etc.)
8.___Owner, high-level executive- large business or high-level government agency
9.___Professional requiring an advanced college degree (doctor, lawyer, college professor, etc.)

B. On the line below write number of category above which comes closest to mother's occupation (or former occupation).

____

C. Check one of the following which best estimates parents" total income for last year.

1.___Less than $4,000
2.___$4,000 to $5,999
3.___$6,000 to $7,999
4.___$8,000 to $9,999
5.___$10,000 to $13,999
6.___$14,000 to $19,999
7.___$20,000 to $25,999
8.___$26,000 to $31,999
9.___$32,000 or more

D. Check the highest level of father's education. (Mark only one)

1.___No formal schooling or some grade school
2.___Finished grade school
3.___Some high school
4.___Finished high school
5.___Business or trade school
6.___Some college
7.___Finished college (four years)
8.___Attended graduate or professional school (e. g., law or medical school) but did not attain a graduate or professional degree
9.___Attained a graduate or professional degree (e. g., MA, PHD, MD)

E. From above alternatives indicate mother's highest level of educ[illegible]on.

____

Does the student have Title I status? ______

APPENDIX IV

ASSOCIATIVE LEARNING ABILITY TEST

STUDENT ____________________ TEACHER ____________

RECALL TEST

Directions: a. Ask child to name each of 16 familiar objects and 8 abstract objects placed before him, one at a time.

b. Ask child to recall as many items as he can.

Repeat above process 3 times
Record number of objects not recalled on each trial.

Score:

Trial 1	Trial 2	Trial 3	Trial 4
Number Unrecalled___	Number Unrecalled___	Number Unrecalled___	Number Unrecalled___

SERIAL LEARNING TEST

Directions: a. Place the following 8 objects under boxes in view of the child: doll, horse, flower, candle, gum, crayon, airplane, and watch.

b. Beginning on your right (child's left) point to the first box and ask subject to name what is under it. Let him look under the box to see if he is correct. Continue down the row of boxes.

Repeat above process 3 more times maintaining same left to right sequencing.
Record number of wrong guesses.

Score:

Trial 1	Trial 2	Trial 3	Trial 4
Number Unrecalled___	Number Unrecalled___	Number Unrecalled___	Number Unrecalled___

Repeat using the 8 abstract objects under the boxes.

Score:

Trial 1	Trial 2	Trial 3	Trial 4
Number Unrecalled___	Number Unrecalled___	Number Unrecalled___	Number Unrecalled___

PAIRED ASSOCIATE LEARNING TEST

Directions: a. Place 8 familiar objects on top of the boxes and 8 familiar objects under the boxes in view of the child.

b. Beginning on your right (child's left) point to the first box and ask him to name what is under it. Let him look to see if he is right. Repeat going down the row.

Repeat 3 times changing order of boxes.

Score:

Trial 1	Trial 2	Trial 3	Trial 4
Number Unrecalled___	Number Unrecalled___	Number Unrecalled___	Number Unrecalled___