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AUTHOR	Hollingshead, Maybelle Clayton; Clayton, Charles
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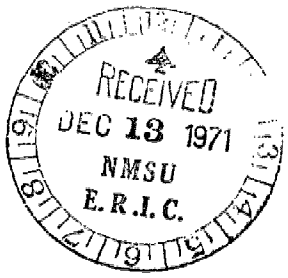
ABSTRACT

The investigation examined the "Wide Range Achievement Test" (WRAT) and its subtests (spelling, reading, and arithmetic), as well as possible differences attributable to the factors of sex, with the "Chicago Non-Verbal" (CNV) as a criterion variable. The 1970 study encompassed 72 Indian students (with a mean chronological age of 13.2 for boys and 13.4 for girls) attending the Riverside Summer Institute at Anadarko, Oklahoma. Test data obtained were examined through mean, standard deviation, standard error, and the Pearson Product Moment. The low correlation between the WRAT and the CNV indicates significant differences; WRAT results show greater retardation than CNV results; WRAT results show a greater variation below the standard mean than is indicated by CNV results; both tests indicate that females are above the mean, and the variation in difference from the mean of the 2 tests is about the same; WRAT scores show the greatest retardation on the arithmetic subtest for both males and females; males show greater deviation below the mean on the reading subtest; and girls show the greatest retardation below the mean on the arithmetic subtest. Cultural factors and tribal differences are cited as limitations to this study. Included with a description of the study and findings are a literature review, a 12-item bibliography, and tables showing mean, standard deviation, and standard error of test scores. (MJB)

STUDY OF THE RELATIONSHIP BETWEEN THE PERFORMANCE OF INDIAN YOUTH ON THE CHICAGO NON-VERBAL AND THE WIDE RANGE ACHIEVEMENT TEST



A Research Project

by

Maybelle Clayton Hollingshead, Ed. D.
Professor at Oklahoma College of Liberal Arts
Chickasha, Oklahoma

and

Charles Clayton
Superintendent of Schools
Wagoner, Oklahoma

Submitted to S. Gabe Paxton
Bureau of Indian Affairs
Anadarko Area Office
Anadarko, Oklahoma
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STUDY OF THE RELATIONSHIP BETWEEN THE PERFORMANCE OF INDIAN YOUTH ON THE CHICAGO NON-VERBAL AND THE WIDE RANGE ACHIEVEMENT TEST

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INTRODUCTION

An increased emphasis has been placed on the importance of a well-planned and properly functioning testing program. The value of highly valid and reliable instruments for measuring intelligence and achievement has been a primary concern of educators, counselors, and psychologists as testing programs have been evaluated.

The selection of an appropriate instrument has a great deal of significance in the evaluation of youth. Appropriate testing instruments for use with Indian students is a pertinent problem that needs study and analysis. Since Gabe Paxton in his study found that the Chicago Non-Verbal gives promise as a valid tool in measuring intelligence of Indian students, this group test was selected. The Wide Range Achievement Test was chosen to measure academic achievement because of its ability to assess achievement of students from kindergarten through high school and because of its short administration time.

Statement of the Problem

This study was designed to investigate the performance of Indian youth on the Chicago Non-Verbal and on the Wide Range Achievement Test.

The areas of concern are defined by the following hypotheses:

A. Do the reading scale, spelling scale, or the arithmetic scale of the Wide Range Achievement Test significantly correlate with the intelligence achieved on the Chicago Non-Verbal for the total sample?

B. Are there significant differences in performance on the Wide Range Achievement Test for Children and the Chicago Non-Verbal when students are categorized by sex?

Definition of Terms

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

Chicago Non-Verbal, published by The Psychological Corporation. A group intelligence test designed specifically for those children who are handicapped in the use of the English language, and includes those who come from an environment where there is meager use of the English language and those who have difficulty in learning to read.

Wide Range Achievement Test (1965), published by Guidance Associates. The WRAT is a tool for the study of the basic school subjects of reading (word recognition and pronounciation), written spelling, and arithmetic computation. It was designed as an adjunt to tests of intelligence and behavior adjustment.

WRAT Reading: At the upper levels, this subtest involves pronouncing words.

WRAT Spelling. This subtest involves writing the name and writing single words to dictation.

WRAT Arithmetic. This subtest involves performing written computations.

Indian Youth. This term refers to Indian young people who ranged in age from eleven years and one month to fifteen years and four months. The mean chronological age for girls was 13.4 while the mean chronological age for boys was 13.2.

Delimitations

Scope of this Study

This study was the analysis of the test scores of 104 Indian youth who ranged in age from 11-1 to 15-4 with a mean chronological age of 13.2 for boys and 13.4 for girls. The Chicago Non-Verbal and the Wide Range Achievement Test were administered to each of the subjects during the Riverside Summer Institute at Anadarko, Oklahoma, in 1970. Statistical treatment was given raw data to obtain the means and standard deviations. Pearson Product Moment was applied to the test data to determine if significant difference in performance existed.

Limitations of the Study

This study was limited to the 72 Indian students attending the Riverside Summer Institute at Anadarko, Oklahoma, on whom complete data were collected. Cultural factors and tribal differences of the Indian youths were also considered limitations.

Significance of the Study

The value of this study lies in the continuous search for valid and reliable tools for the measurement and appraisal of the various aspects of the Indian youth. Cultural and bilingual environments often make many tests untrustworthy.

REVIEW OF THE LITERATURE

Very little attention in the literature has been given to intelligence as a possible factor in the educational disadvantage of Indian Americans. One of the reasons for this may be that most tests of mental ability are agreed to be culture-bound. MacArthur (1962) sought intelligence tests which would minimize cultural bias. MacArthur (1967) also concluded that the Progressive Matrices and the Safran Culture Reduced Intelligence Test were best, and that Canadian native pupils at early school age have the general intellectual ability which semms necessary to participate fully in the larger Canadian community.

Gabe Paxton (1965) in studying the intelligence of Indian adolescents using the Chicago Non-Verbal Examination obtained a correlation of .60 when comparison was made to achievement on the California Reading Test. He concluded that this was a substantial indication of the predictive validity of the Chicago Non-Verbal.

Miller (1968) measured the intelligence of Indian and white students in the Dakotas along with achievement, alienation, attitude toward school, and vocational maturity. He found large differences in favor of the white students on all variables.

Bryde (1966) studied the Sioux students. He found no intelligence defecit among the Sioux.

McGrath (1960) investigated mental retardation in relation to bilingual and subcultural factors. He found that cases that had been identified as mental retardation were in many instances really pseudo-mental retardation caused by sociocultural factors.

No aspect of Indian education has been more fully researched than the school learning of Indian children as measured by standardized tests. Berry (1968), Edington (1969), Coombs (1958), and Bryde (Bernardoni, 1962), all found that Indian students achieved well below white students and that they fell further behind as the higher grades were reached. Martin (1962) conducted such testing with Navajo pupils in Arizona, and Zintz (1960) studied Indian students in New Mexico. Their findings also agreed with the above mentioned researchers.

Coombs' study included 14,000 Indian students and nearly 10,000 white pupils in eleven states. He found that while Indian pupils did not compare too unfavorably with white children at the fourth-grade level, they progressively declined from that point on through the twelfth grade. Bryde, in testing more than 400 Sioux pupils and more than 200 white pupils in South Dakota, reported that the Indian pupils actually did better on the tests than the white pupils in the fourth, fifth, and sixth trades, then fell behind in the seventh grade and declined from that point on.

The Coleman Report (1966) confirmed that Indian children achieved at a lower level than white children at all grade levels and at an increasing rate of retardation. This report also revealed that all

minority ethnic groups achieved below the white children, and that of the disadvantaged ethnic minorities, the Indian Americans achieved highest.

Methodology and Design

Population of the Study

The population for this study included all the 104 students attending the Riverside Summer Institute, Anadarko, Oklahoma, in 1970. Out of the 104 students, complete data were collected for 67 students for spelling and arithmetic achievement and for 72 students for reading achievement. The Indian youth ranged in age from eleven years one month to fifteen years four months with a mean chronological age of 13.2 for the boys and 13.4 for the girls.

Testing Procedures

The Chicago Non-Verbal Examination was administered to the 104 students in small groups with the instructions being given simultaneously to all students by one individual over a television hook-up. Trained monitors were stationed in each classroom. The arithmetic and spelling subtests of the Wide Range Achievement were also administered in like manner. The reading subtest of the Wide Range Achievement Test was administered individually by classroom teachers and trained personnel.

RESULTS OF THE STUDY

The areas of investigation are defined by the following hypotheses, and the results of each hypothesis are stated.

Analysis Using the Total Sample

Hypothesis A. Do the reading scale, spelling scale, or the arithmetic scale of the Wide Range Achievement Test significantly correlate with the intelligence achieved on the Chicago Non-Verbal for the total sample? The hypotheses to be tested in this area are stated in the null form as:

1. The reading scale will not significantly correlate with intelligence achieved on the Chicago Non-Verbal for the total sample.

   This hypothesis was rejected ($r = .12826$ with $p < .05$).

   In order to test hypothesis A.1, scores were obtained on 72 subjects from the reading subtest and correlated with scores on the Chicago Non-Verbal. The reading subtest scores were used as the independent variable, and the Chicago Non-Verbal scores were the dependent variable. The correlational technique employed was the Pearson Product Moment technique (Guilford, p. 91-112).

(See Table I, p. 8)

TABLE I

MEAN, STANDARD DEVIATION, AND STANDARD ERROR ON THE WIDE RANGE ACHIEVEMENT READING SCALE AND CHICAGO NON-VERBAL USING THE TOTAL SAMPLE

	Standard Mean	Obtained Mean	Standard Deviation	Standard Error
WRAT Reading Scale	46.40	45.1108	13.4684	1.5984
Chicago Non-Verbal	100.00	98.366	15.070	1.7518

2. The spelling scale will not significantly correlate with intelligence achieved on the Chicago Non-Verbal for the total sample.

This hypothesis was rejected ($r = .17185$ with $p < .05$).

In order to test hypothesis A.2, scores were obtained on all 67 subjects from the Wide Range Achievement spelling subtest and correlated with scores on the Chicago Non-Verbal. The spelling subtest scores were used as the independent variable, and the Chicago Non-Verbal scores were the dependent variable. The correlational technique employed was the Pearson Product Moment.

TABLE II

MEAN, STANDARD DEVIATION, AND STANDARD ERROR ON THE WIDE RANGE ACHIEVEMENT SPELLING SCALE AND CHICAGO NON-VERBAL USING THE TOTAL SAMPLE

	Standard Mean	Obtained Mean	Standard Deviation	Standard Error
WRAT Spelling Scale	27.08	22.2685	8.2071	1.0102
Chicago Non-Verbal	100.00	98.366	15.070	1.7518

3. The arithmetic scale will not significantly correlate with intelligence achieved on the Chicago Non-Verbal for the total sample.

This hypothesis was rejected ($r = .23572$ with $p .05$).

In order to test hypothesis A.3, scores were obtained on 67 subjects from the arithmetic subtest and correlated with scores on the Chicago Non-Verbal. The arithmetic subtest scores were used as the independent variable, and the Chicago Non-Verbal scores were the dependent variable. The correlational technique employed was the Pearson Product Moment.

TABLE III

MEAN, STANDARD DEVIATION, AND STANDARD ERROR ON THE WIDE RANGE ACHIEVEMENT ARITHMETIC SCALE AND CHICAGO NON-VERBAL USING THE TOTAL SAMPLE

	Standard Mean	Obtained Mean	Standard Deviation	Standard Error
WRAT Arithmetic Scale	26.31	19.2682	6.1470	1.7566
Chicago Non-Verbal	100.00	98.366	15.070	1.7518

Analysis by Sex

Hypotheses B

Are there significant differences in performance on the Wide Range Achievement Test for Children and the Chicago Non-Verbal when students are categorized by sex? The hypotheses to be tested in this area are stated in the null form as:

1. There is no significant difference in performance on the Wide

Range Achievement Test read scale when children are categorized by sex.

This hypothesis was rejected (r = .0220 with p .05 for males, and r = .0996 with p .05 for females).

In order to test hypothesis B.1, students were categorized by sex into two groups. Thirty-six males were in one group and 36 females were in the other group. The reading scale scores of the 36 males were correlated with scores on the Chicago Non-Verbal, and the reading scale scores of the 36 females were correlated with scores on the Chicago Non-Verbal. The reading scale scores were used as the independent variable and the Chicago Non-Verbal scores were the dependent variables.

TABLE IV

MEAN, STANDARD DEVIATION, AND STANDARD ERROR BY SEX ON THE WIDE RANGE ACHIEVEMENT READING SCALE AND CHICAGO NON-VERBAL

	Standard Mean	Obtained Mean	Standard Deviation	Standard Error
MALES				
WRAT Reading Scale	46.40	39.0552	9.8312	1.6617
Chicago Non-Verbal	100.00	95.289	15.283	2.5108
FEMALES				
WRAT Reading Scale	48.73	51.1556	13.9656	2.3606
Chicago Non-Verbal	100.00	101.527	14.966	2.4943

2. There is no significant difference in performance on the Wide

Range Achievement Test spelling scale when children are categorized by sex.

This hypothesis was rejected (r = .07244 for males and .12016 for females with p .05).

In order to test hypothesis B.2, students were categorized by sex into two groups. The results were 33 males and 34 females. The spelling scale scores of the 33 males were correlated with scores on the Chicago Non-Verbal, and the spelling scale scores of the 34 females were correlated with scores on the Chicago Non-Verbal. The reading scale scores were used as the independent variable and the Chicago Non-Verbal scores were the dependent variable.

TABLE V

MEAN, STANDARD DEVIATION, AND STANDARD ERROR BY SEX ON THE WIDE RANGE ACHIEVEMENT SPELLING SCALE AND CHICAGO NON-VERBAL

	Standard Mean	Obtained Mean	Standard Deviation	Standard Error
MALES				
WRAT Spelling Scale	27.08	17.908	6.2151	1.098
Chicago Non-Verbal	100.00	95.289	2.5108	15.283
FEMALES				
WRAT Spelling Scale	29.04	26.5	7.6743	1.3359
Chicago Non-Verbal	100.00	95.289	14.966	2.4943

3. There is no significant difference in performance on the Wide Range Achievement Test Arithmetic scale when children are categorized by sex.

This hypothesis was rejected (r = .18945 for males and .39865 for females with p .05).

In order to test hypothesis B.3, students were categorized by sex into two groups. Thirty-three males were in one group and 34 females were in the other group. The arithmetic scale scores of the 33 males were correlated with scores on the Chicago Non-Verbal, and the arithmetic scale scores of the 34 females were correlated with scores on the Chicago Non-Verbal. The arithmetic scale scores were used as the independent variable and the Chicago Non-Verbal scores were the dependent variable.

TABLE VI

MEAN, STANDARD DEVIATION, AND STANDARD ERROR BY SEX ON THE WIDE RANGE ACHIEVEMENT ARITHMETIC SCALE AND CHICAGO NON-VERBAL

	Standard Mean	Obtained Mean	Standard Deviation	Standard Error
MALES				
WRAT Arithmetic Scale	26.31	19.2727	8.0688	1.4263
Chicago Non-Verbal	100.00	95.289	15.283	2.5108
FEMALES				
WRAT Arithmetic Scale	27.63	19.2646	4.4769	.7793
Chicago Non-Verbal	100.00	95.289	14.966	2.4943

SUMMARY AND CONCLUSIONS

General Summary of the Investigation

This investigation examined the Wide Range Achievement Test and its subtests, as well as possible differences attributable to the factors of sex, with the Chicago Non-Verbal as a criterion variable. The study encompasses 104 Indian youth who ranged in age from 11-1 to 15-4. The tests were administered at Anadarko, Oklahoma, in 1970, during the Riverside summer Institute. The data from these groups in various combinations were examined through mean, standard deviation, standard error, and the Pearson Product Moment.

Summary of Results

The students were below the mean on the Chicago Non-Verbal with 98.366 Spelling, 98.360 Reading, and 98.366 for Arithmetic. The Wide Range Achievment test results deviate considerably from the standard means. The results: Spelling 22.2685 to a standard mean of 27.08; Reading 45.1108 to a standard mean of 46.40 ; Arithmetic 19.2682 to a standard mean of 26.31. The difference in means according to sex is Reading: Males 51.1556 to standard mean of 48.73 ; Females 39.0552 to 46.40; Spelling: Males 17.908 to standard mean of 27.08, Females 26.5 to standard mean of 29.04; Arithmetic: Males 17.908 to standard mean of 27.08, Females 19.2646 to standard mean of 27.63.

The results indicate that students were slightly below the standard

on the Chicago Non-Verbal. The results on the Wide Range Achievment Test show the student considerably below the mean on the Spelling subtest, slightly below the standard mean on the Reading sub test, and very much below the mean on the Arithmetic sub test.

The males were 95.289 on the Chicago Non-Verbal, and the Reading sub test of the Wide Range Achievement Test showed extra retardation (mean 46.40 to 39.055). On the other hand, the females were above the mean for the Wide Range Achievement Reading sub test and the Chicago Non-Verbal. The males and females were very much below the mean for the spelling subtest and the arithmetic subtest.

Concluding Statements

The low correlation existing between the Wide Range Achievement Test and the Chicago Non-Verbal indicate significant differences. The results indicate that Wide Range Achievement tests and subtests show a greater retardation than the Chicago Non-Verbal. The Wide Range Achievement Test and sub tests show a greater variation below the standard mean than is indicated by the results on the Chicago Non-Verbal. Both tests, however, indicate that the females are scoring above the mean and the variation in difference from the mean of the two tests is about the same. The Wide Range Achievement Test shows the greatest retardation on the arithmetic sub test for both males and females. The males show greater deviation below the mean on the Reading sub test, whereas the girls show the greatest retardation below the mean on the arithmetic sub test.

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APPENDIX A--EXHIBIT 1

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 67 INDIAN YOUTH ON THE WIDE RANGE ACHIEVEMENT ARITHMETIC TEST

Raw Score	Total Freq.	d	fd	fd^2
42-44	2	+8	+16	128
39-41	0	+7	0	0
36-38	1	+6	+6	36
33-35	0	+5	0	0
30-32	1	+4	+4	16
27-29	1	+3	+3	9
24-26	6	+2	+12	24
21-23	6	+1	+6	6
18-20	22	0	0	0
15-17	17	-1	-17	17
12-14	9	-2	-18	36
9-11	2	-3	-6	18
	N=67		Sum fd = +6	Sum fd^2 = 290

Standard Mean:	26.31
Obtained Mean:	19.2682
Standard Deviation:	6.1470
Standard Error:	.7566

APPENDIX A--EXHIBIT 2

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 72 INDIAN YOUTH ON THE WIDE RANGE ACHIEVEMENT READING TEST

Raw Score	Total Freq.	d	fd	fd^2
76-80	2	+9	+18	162
72-75	0	+8	0	0
68-71	2	+7	+14	98
64-67	4	+6	+24	144
60-63	4	+5	+20	100
56-59	7	+4	+28	112
52-55	6	+3	+18	54
48-51	3	+2	+6	12
44-47	6	+1	+6	6
40-43	7	0	0	0
36-39	8	-1	-8	8
32-35	13	-2	-26	52
28-31	6	-3	-18	54
24-27	3	-4	-12	48
20-23	1	-5	-5	25
	N=72		Sum fd = +65	Sum fd^2 = 875

Standard Mean:	46.40
Obtained Mean:	45.1108
Standard Deviation:	13.4684
Standard Error:	1.5984

APPENDIX A--EXHIBIT 3

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 67 INDIAN YOUTH ON THE WIDE RANGE ACHIEVEMENT SPELLING TEST

Raw Score	Total Freq.	d	fd	fd^2
39-41	1	+6	+6	36
36-38	3	+5	+15	75
33-35	3	+4	+12	48
30-32	7	+3	+21	63
27-29	11	+2	+22	44
24-26	7	+1	+7	7
21-23	2	0	0	0
18-20	11	-1	-11	11
15-17	8	-2	-16	32
12-14	8	-3	-24	72
9-11	4	-4	-16	64
6-8	2	-5	-10	50
	N=67		Sum fd = +6	Sum fd^2 = 502

Standard Mean:	27.08
Obtained Mean:	22.2685
Standard Deviation:	8.2071
Standard Error:	1.0102

APPENDIX A--EXHIBIT 4

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 34 INDIAN GIRLS ON THE WIDE RANGE ACHIEVEMENT ARITHMETIC TEST

Raw Score	Total Freq.	d	fd	fd^2
27-29	1	+3	+3	9
24-26	4	+2	+8	16
21-23	5	+1	+5	5
18-20	15	0	0	0
15-17	5	-1	-5	5
12-14	4	-2	-8	16
	N=34		Sum fd = +3	Sum fd^2 = 51

Standard Mean: 27.63
Obtained Mean: 19.2646
Standard Deviation: 4.4769
Standard Error: .7793

APPENDIX A--EXHIBIT 5

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 33 INDIAN BOYS ON THE WIDE RANGE ACHIEVEMENT ARITHMETIC TEST

Raw Score	Total Freq.	d	fd	fd^2
42-44	2	+8	+16	128
39-41	0	+7	+0	0
36-38	1	+6	+6	36
33-35	0	+5	0	0
30-32	1	+4	+4	16
27-29	0	+3	0	0
24-26	2	+2	+4	8
21-23	1	+1	+1	1
18-20	7	0	0	0
15-17	12	-1	-12	12
12-14	5	-2	-10	20
9-11	2	-3	-6	18
	N=33		Sum fd = +3	Sum fd^2 = 239

Standard Mean: 26.31
Obtained Mean: 19.2727
Standard Deviation: 8.0688
Standard Error: 1.4263

APPENDIX A--EXHIBIT 6

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 34 INDIAN GIRLS ON THE WIDE RANGE ACHIEVEMENT SPELLING TEST

Raw Score	Total Freq.	d	fd	fd^2
39-41	1	+5	+5	25
36-38	3	+4	+12	48
33-35	3	+3	+9	27
30-32	6	+2	+12	24
27-29	7	+1	+7	7
24-26	4	0	0	0
21-23	1	-1	-1	1
18-20	5	-2	-10	20
15-17	2	-3	-6	18
12-14	0	-4	0	0
9-11	1	-5	-5	25
6-8	1	-6	-6	36
	N=34		Sum fd = +17	Sum fd^2 = 231

Standard Mean: 29.04
Obtained Mean: 26.5
Standard Deviation: 7.6743
Standard Error 1.3359

APPENDIX A--EXHIBIT 7

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 33 INDIAN BOYS ON THE WIDE RANGE ACHIEVEMENT SPELLING TEST

Raw Score	Total Freq.	d	fd	fd^2
30-32	1	+5	+5	25
27-29	4	+4	+16	64
24-26	3	+3	+9	27
21-23	1	+2	+2	4
18-20	6	+1	+6	6
15-17	6	0	0	0
12-14	8	-1	-8	8
9-11	3	-2	-6	12
6-8	1	-3	-3	9
	N=33		Sum fd = +21	Sum fd^2 = 155

Standard Mean: 27.08
Obtained Mean: 17.908
Standard Deviation: 6.2151
Standard Error: 1.0980

APPENDIX A--EXHIBIT 8

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 36 INDIAN GIRLS ON THE WIDE RANGE ACHIEVEMENT READING TEST

Raw Score	Total Freq.	d	fd	fd^2
76-80	2	+7	+14	98
72-75		+6	0	
68-71	2	+5	+10	50
64-67	4	+4	+16	64
60-63	3	+3	+9	27
56-59	5	+2	+10	20
52-55	3	+1	+3	3
48-51	2	0	0	0
44-47	4	-1	-4	4
40-43	1	-2	-2	4
36-39	2	-3	-6	18
32-35	6	-4	-24	96
28-31	1	-5	-5	25
24-27	1	-6	-6	36
	N=36		Sum fd = +15	Sum fd^2 = 445

Standard Mean:	48.73
Obtained Mean:	51.1556
Standard Deviation:	13.9656
Standard Error:	2.3606

APPENDIX A--EXHIBIT 9

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 36 INDIAN BOYS ON THE WIDE RANGE ACHIEVEMENT READING TEST

Raw Score	Total Freq.	d	fd	fd^2
60-63	1	+6	+6	36
56-59	2	+5	+10	50
52-55	3	+4	+12	48
48-51	1	+3	+3	9
44-47	2	+2	+4	8
40-43	6	+1	+6	6
36-39	6	0	0	0
32-35	7	-1	-7	7
28-31	5	-2	-10	20
24-27	2	-3	-6	18
20-23	1	-4	-4	16
	N=36		Sum fd = +14	Sum fd^2 = 218

Standard Mean: 46.40
Obtained Mean: 39.0552
Standard Deviation: 9.8312
Standard Error: 1.6617

APPENDIX B--EXHIBIT 1

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 75 INDIAN YOUTH ON THE CHICAGO NON-VERBAL

IQ Interval	Total Freq.	d	fd	fd^2
130-139	2	+4	+8	32
120-129	4	+3	+12	36
110-119	10	+2	+20	40
100-109	17	+1	+17	17
90-99	23	0	0	0
80-89	12	-1	-12	12
70-79	5	-2	-10	20
60-69	2	-3	-6	18
	N=75		Sum fd = +29	Sum fd^2 = 175

Mean: 98.366
Standard Deviation: 15.070
Standard Error: 1.7518

APPENDIX B--EXHIBIT 2

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 38 INDIAN BOYS ON THE CHICAGO NON-VERBAL

IQ Interval	Total Freq.	d	fd	fd^2
130-139	1	+4	+4	16
120-129	1	+3	+3	9
110-119	4	+2	+8	16
100-109	9	+1	+9	9
90-99	9	0	0	0
80-89	9	-1	-9	9
70-79	3	-2	-6	12
60-69	2	-3	-6	18
	N=38		Sum fd = +3	Sum fd^2 = 89

Mean: 95.289
Standard Deviation: 15.283
Standard Error: 2.5108

APPENDIX B--EXHIBIT 3

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 37 INDIAN GIRLS ON THE CHICAGO NON-VERBAL

IQ Interval	Total Freq.	d	fd	fd^2
130-139	1	+4	+4	16
120-129	3	+3	+9	27
110-119	6	+2	+12	24
100-109	8	+1	+8	8
90-99	14	0	0	0
80-89	3	-1	-3	3
70-79	2	-2	-4	8
	N=37		Sum fd = +26	Sum fd^2 = 86

Mean:	101.527
Standard Deviation:	14.966
Standard Error:	2.4943