A COMPARATIVE STUDY OF VERBAL AND NON-VERBAL INTELLIGENCE OF NAVAJO JUNIOR HIGH SCHOOL STUDENTS

by

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INTRODUCTION

It is not the purpose of this report to solve any problems; but rather to make both the writer and the reader more clearly aware of one which has long existed.

Much research has been completed regarding many facets of intelligence. Psychologists and educators are becoming more and more cognizant of their inability to accurately "measure" mental ability. The professional educator is aware of the limitations of his measuring devices. However, it is quite well accepted that various types of tests do indicate degrees of mental ability. Educators are further aware of the many environmental aspects of an individual's life which can affect the results of testing. Distorted reflections of innate intelligence can be almost unbelievable because of environmental and cultural implications. In recent years, nurture, as it affects intelligence, has been the object of the thinking of many researchers. The University of Chicago has played a major role of leadership of this area.

While various testing instruments may claim to be relatively free of cultural influences, it is doubtful that any such device does exist. Culture is too deeply imbedded in our daily lives--in every child's and adult's life--to be discarded in the process of test construction or test taking. It is indeed fortunate that learned minds are aware of this and are sincerely attempting the task of "weeding out"

cultural reflections in test items.

It has been indicated that intelligence tests should span a far wider range of mental activities with fewer academic type questions and more objective methods of validation should be devised.

This report deals specifically with a tribe of North American Indians, the Navajo. The Navajo tribe has the greatest population, over eighty thousand, of any tribe of North American Indians. It also has the distinction of being the most primitive. Within recent years Navajo parents and tribal leaders have taken a gratifying attitude toward the education of their youth. They sincerely want their children to improve living standards and become worthy American citizens.

It seems imperative that a teacher or administrator working with these children be thoroughly aware of the handicaps suffered by a bilingual student attempting to achieve on a white man's level out of his native environmental and cultural patterns.

STATEMENT OF PROBLEM

It seems most curious to the writer that so little research has been done with Indian children. Of the vast array of studies to be found in the area of testing, it is indeed rare to find one on Indians and even more unusual to

find such research on individual tribes.

The purpose of this report was to answer the following questions:

1. Can relative academic success as indicated by the Stanford Achievement Test be predicted from the Terman-McNemar Test of Mental Ability or the Pintner Test of General Ability, Non-Language Series?

2. Can accurate prediction of success in the language arts sub-tests be made through the employment of either of these two tests of mental ability?

3. The Terman-McNemar Test of Mental Ability better correlates with which of the four Stanford Achievement subtests: paragraph meaning, word meaning, spelling, or language?

4. The Pintner Test of General Ability, Non-Language Series, better correlates with which of the four Stanford Achievement subtests: paragraph meaning, word meaning, spelling, or language?

5. How do these Navajo subjects compare with norms established for English-speaking mono-linguals?

6. Do the scores obtained on the Terman Test of Mental Ability correlate with the scores found on the Pintner non-language test?

7. How do the results of this research effort compare with the results of other studies previously completed and released to the professional field?

REVIEW OF LITERATURE

Beyond the slightest doubt research to date has repeatedly proven one thing about American Indians living in primitive environment--they do not rank as high on mental ability tests as do their non-Indian white fellow countrymen. However, it would be invalid to assume that Indians are not as intelligent as whites because of this.

In a study of the Osage Indians, Rohrer (38) concluded there were eight non-racial factors which affect intelligence test scores: (1) differences in social and economic status, (2) differences in cultural environment, (3) differences in language, (4) differences in schooling, (5) differences in motivation in testing situations, (6) differences in rapport in testing situations, (7) inaccuracy in determining chronological ages, and (8) differences in determining racial intermixture.

Because the lives of the Osage Indians so closely parallel to those of the whites living in Oklahoma, Rohrer felt all these factors for creating differences were eliminated. The Osages maintain average economic living standards, they speak only English, attend public schools (they are not eligible to attend government schools for Indians), and accurate birth records are kept. In his study of 235 subjects using the Goodenough Draw-A-Man Test and the Otis Self-Administering Test of Mental Ability, Rohrer reached the following con-

clusions: The mean I.Q. for white children on the Goodenough Draw-A-Man Test was 102.92 with a standard deviation of 19.9. The mean I.Q. for his Osage testees was 103.8 with a standard deviation of 21.2 on the Goodenough. The mean I.Q. for white children on the Otis was 98.05, standard deviation 17.68. The mean I.Q. for the Osages on the Otis was 100.05, standard deviation, 18.0.

While the foregoing conclusions are the converse of most research with Indian children, it must be kept in mind that the Osages could hardly be considered representative of the American Indian as was indicated previously.

Garth (Monroe, 32), studied a small group of Indians who had been reared in white foster homes and found an average intelligence quotient equal to whites. It was stated by Garth and Klineberg that, "It is safe to conclude that the belief in inborn racial or national differences is not supported by adequate experimental evidence."

Freeman and Schwesinger (Monroe, 32 pp.951-3) stated, in effect, the same theory--attempts to establish the natural intellectual inferiority of races has proven unsuccessful.

Although the average mental abilities of Negroes and North American Indians, as a group, are found generally to be lower, these results are maintained only under present environmental conditions. There is no correlation between race and I.Q. As the economic and cultural levels rise national levels of intelligence do likewise.

In a study of 547 whites and 268 Indian children, Rowe (39) found the " . . . Indians are relatively weaker in tests involving comprehension and definition than in tests of a more purely perceptual or memory nature." He further concluded that "the Indians are everywhere inferior to whites."

Norman and Midkiff (35) tested 96 Navajo children, aged six years six months to twelve years eight months, at the United States Indian Service School in Albuquerque, New Mexico, with the Raven Progressive Matrices and the Goodenough Draw-A-Man Tests and found the mean I.Q. on the Goodenough was 99.26 and on the Raven 64.94. "Poor performance of these children on the Raven is consistent with findings from other psychological studies of native populations."

Havinghurst, et al. (18) administered the Goodenough Draw-A-Man Test and the Grace Arthur Performance Test to 325 children representing six tribes of North American Indians: Hopi, Zuni, Zia, Papago, Navajo, and Sioux. Of the 47 Navajos tests in the group he found a mean I.Q. of 109.7 on the Goodenough and a mean of 94.4 on the Grace Arthur Performance. These scores were compared with a group of white children from the Midwest whose mean score was 101.2 on the Goodenough and 112.7 on the Cornell-Coxe. Havinghurst concluded the Goodenough is valid for Indian children for one aspect of general intelligence--the ability to form concepts based on observation.

Hunter's (Hirsch, 24) findings demonstrated that Indians are intellectually inferior to whites and that that inferiority has a tendency to decrease as the proportion of white blood increases.

Garth (12) in a study of Plains Indians varying from one-sixteenth to seven-eighths blood, eight to 21 years old, found that "degree of white blood is more influential in lower school grades than in higher ones, reaching its highest influence in the fifth grade. In the sixth, seventh, and eighth grades it tends to be a constant factor but not a very strong one." He further concluded that "while degree of white blood tends to improve the intelligence, being positively correlated with it (.42) it is no guarantee of intelligence for the correlation coefficient is not very high."

Pintner (Garth, 12) reported findings from testing Indians from both English speaking and non-English speaking homes. He employed the Binet-Simon Test and Pintner non-verbal test. It was found that children from non-English speaking homes were inferior to those from English-speaking homes; however, less difference was found on the non-verbal test.

A study reported by Telford (41), using 225 subjects, Negro, white, and Indian, demonstrated that the intelligence levels on four tests showed racial rank in this order: White, Indian, and Negro, respectively. On the Goodenough the means

were 100, 88, and 77-79, respectively. In one case, the Mare and Foal Test, the Indian students exceeded both the Negroes and Whites.

Garth, et al. (13) reported findings from a study of Indian children in grades four through nine. The Otis Classification Test was used in concluding that "The mental age of these full-blood Indians is for a grade much lower than the chronological age for that grade. The educational age is found to be higher for a grade than the mental age. The median I.Q. was 70. The accomplishment ratio for these full-blood Indians was higher than for whites.

From research on 1050 Indian children--Pueblo, Navajo, and Apache, in grades four through eight, Garth (14) concluded that there was a constant tendency for I.Q. to increase with education:

Grade	4	5	6	7	8
Mdn. I.Q.	50.0	66.1	70.2	75.6	80.0
Mdn. I.Q. (total)	approximately 69				

These conclusions were reached after employment of the National Intelligence Tests, Scale A, Form 1.

In a study of Southwestern Indians Haught (17) concluded after testing with the Pintner-Cunningham Primary Mental Test, the National Intelligence Test and the Terman Group Test in government schools in Santa Fe and Albuquerque, New Mexico that ---

1. From six to nine years the mental growth of subjects is approximately parallel with chronological age; but one year retarded. From nine to sixteen years the retardation of mental age increases from year to year and somewhat uniformly.

2. In mental age the Indian is from one to four and seventenths years below whites.

Haughts's study was in agreement with the thinking of a respected official in the United States Indian Service at Santa Fe, New Mexico. In a discussion with this individual he expressed the need for further investigation and research into this area in an effort to determine the reasons for this increase in retardation despite formal education.

Separate studies conducted by Wheeler (46) and Neff (34) showed that children from rural areas, i.e., East Tennessee mountain children and East Kentucky mountain children are generally lower than the population median intelligence scores. The theory of "effect of continual residence" was cited as possible explanation of regression by older children in this region. A similar study by Klineberg on Negro boys demonstrated parallel results. Asker stated, following such a study of Kentucky children, "tests constructed and standardized in one locality for and on particular groups should not be used in some other locality on some other group.

Many reports concluded or at least indicated that vocabulary played a major role in testing Indian children. Fitzgerald and Ludeman (11) tested 93 Indian children in South Dakota with the National Intelligence Test, Terman Group

Test, and the Otis. They found a median I.Q. of 87.5 with a range from 73 to 111. They discovered that Indian children did have trouble with vocabulary and that because of their cultural experiences the testees tended to answer questions as logical in their thinking but judged incorrect by the test key.

Durrell refers to the group intelligence test which involves a great number of reading items as a "reading test incorrectly labeled." He thinks such tests should not be used as a basis for intelligence or accomplishment quotient. A similar point of view is cited by Pintner, the "best known group tests at the present time depend largely if not entirely upon the knowledge and use of language." However, Hawthorne (20) found that in a study of students in grades five through twelve no corresponding improvement resulted in intelligence scores in a series of retests after intensive reading instruction. This leads the writer to believe Hawthorne's theory is not in agreement with Pintner and Durrell. Hawthorne's subjects were children in the St. Louis area; he made no mention of the cultural factors or patterns of his testees.

Hebb (21) reported that a recent report by Elwood gives a correlation of .978 between vocabulary and the Stanford-Binet mental age--"this finding might be used to show that vocabulary is the central factor of intelligence."

Similar studies by Millard (30) are consistent. He concluded that reading achievement correlates highly with measures

of intelligence. The range of correlation undoubtedly lies somewhere between the .489 found by Gates and the .720 as reported by Reed.

Barbe and Crilik (1) tested 52 tenth grade students with the Hemmon-Nelson Test and the Iowa Silent Reading Test and found that I.Q. and paragraph comprehension correlated at .64; I.Q. and total reading at .72. This agrees closely with the correlations by the authors of the Iowa Silent Reading Test who correlated reading with the Terman-McNemar. They found total reading correlated at .78 with one group and .72 with another. Barbe and Crilik stated that "vocabulary is considered the best single measure of intelligence."

Triggs, et al. (43) concluded, following a study of the correlation between reading ability and general intelligence on the elementary and junior high school levels, that reading skills are more closely related to verbal than to non-verbal intelligence; the positive correlation between reading ability and non-verbal intelligence is low.

Cattell (6) stated that tests measure "a good deal of obviously acquired knowledge and skills and that they are heavily weighted with scoring on special abilities distinct from intelligence." Eells and others (9 p.16) concluded that intelligence tests are not limited to common cultural experiences of all American children--test items appear to be drawn very largely from the cultural experiences of the middle-class group.

Green (16) pointed out that the low correlation he found to exist between intelligence and ability to learn indicates there is little relationship between ability to learn and intelligence as it is measured by intelligence tests.

An interesting and appropriate research conducted by Murphy (33) led her to conclude that the non-verbal intelligence test she used measured those traits which the mechanical aptitude tests measured rather than the traits measured by the verbal intelligence test.

Few studies were found which indicated that non-verbal tests may have a role in the prediction of academic achievement. One pioneer in this field, however, has been Bolton (3) who attempted to evaluate their use in this area. After administering both verbal and non-verbal tests to his subjects, he concluded that the Terman was the best predictor of teachers' marks; but that the non-verbal tests will facilitate educational guidance.

Bennett and Doppett (2) theorize that while non-verbal intelligence tests are usually considered useful cross-culturally because they eliminate reading and language items, verbal abilities are a factor in intelligence and are more effective predictors of the external criteria of intelligence.

The division of Test Research and Service of the World Book Company has recently completed a summary of over 400

achievement-intelligence correlations. Their findings for the eighth grade students in Lewiston, Maine are summarized in the following table.

Table 1. Correlations between Terman-McNemar and Stanford Achievement Test Subject Scores. Grade 8

Subject area	Public schools N = 239	Parochial schools N = 129
Paragraph meaning	.74	.66
Word meaning	.81	.81
Spelling	.60	.50
Language	.71	.65

The median of all 400 r's in their research was .65. This median correlation included intelligence scores from the Otis, Pintner, and Terman intelligence tests and many achievement tests.[1]

RESEARCH

Fort Wingate High School, a school operated by the United States Indian Service and located very near the Navajo Reservation, had an enrollment during the 1956-57 school year of approximately 500 students. Of the total enrollment, 154 students were enrolled in the junior high department, i.e.,

[1] Personal communication, World Book Co., July 1, 1957. This study will be published in Text Service No. 18, available Sept, 1957.

seventh and eighth grades. Of those enrolled on this level the writer tested 148. Six students were omitted from the study because of absence during one or both days of testing with their groups. Because of reluctance to cause those students to be absent from more regular classes, they were omitted. It was thought that the remaining 148 subjects constituted an adequate sampling.

Students in this research had been enrolled in school for from five to ten years. Some students had been accelerated, other retarded causing this wide range of years in school attendance as well as a wide range of chronological ages.

The greatest area of difficulty encountered was in determining the accurate birthdate of some students. Birth dates for children of the Navajo are sometimes arbitrarily assigned when they are enrolled in school for the first time, since vital statistical records are often lacking. Parents indicate as best they can the age of the child--this age is assigned at that time only to discover later it was not accurate. Instances occurred when the child himself indicated in writing as many as three different birth years. In those cases the writer checked official school records in an attempt to secure the proper age. In nearly all cases, however, the same birthdate was found in two places, or from two sources before it was assumed correct. In three cases it was impossible

ible to find the same two birthdates for the same child. In those cases birthdates on office records were used. Chronological ages for the subjects were found to range from twelve years six months to seventeen years eleven months.

The Navajo language was the language of the home in all cases except four, two of these homes were Pueblo and that native language was used. While parents spoke varying amounts of English in all cases except two it was used little if any by parents in communicating with their children.

Students tested were all full-blood Indians as was indicated by each child and varified with office records.

Subjects of this research, with one exception, a girl whose parents lived in Fresno, California, had homes all over the Reservation or in town nearby the Reservation. Because of this geographic scattering of subjects it was thought this group was representative of all degrees of Navajo culture, i.e., the most primitively reared to those who have convenient modern homes in towns where white cultural patterns have been more closely knit into their everyday lives while not attending the boarding school.

Selections of tests given were the result of recommendations by experts in the field. Whitman (Buros, 4) refers to the Pintner Non-Language Test as a "substitute for verbal tests in measuring the hard-of-hearing, deaf, and foreign language speaking." Pintner's test was selected on the basis

of Whitman's statement, "It appears to be the best test in its field, but like all group tests which cover a wide range it should prove most efficient in the middle of the age ranging for which it is intended."

The Pintner General Ability Test, Non-Language Series is divided into six sections: Figure Dividing, Reverse Drawing, Pattern Synthesis, Movement Sequence, Manikin, and Paper Folding. Pantomime directions were available for this device; however, they were not utilized in administration. The author of this test had written very simple verbal directions and it was thought that every child had sufficient knowledge of the English language to understand the instructions. Verbal directions as recommended in the testing manual were followed exactly.

Split-half reliability coefficient for Form K, the form utilized in this study, was .858 with a standard deviation of 16.0 (Pintner 37, p.4).

In selecting a verbal intelligence test it was desired to have a measuring device which depended entirely upon linguistic ability. It was thought such a test would place intelligence quotients at a much lower range; but would better correlate with achievement findings. Thorndike stated in Buro's Mental Measurements Yearbook (1940), "Restriction to verbal materials has had the effect of narrowing and purifying the function measured" (Cronbach, 7, p.174).

The Terman-McNemar Test is divided into seven subtests: Information, Synonyms, Logical Selection, Classification, Analogies, Opposites, and Best Answer. The split-half reliability coefficient for the Terman-McNemar Test of Mental Ability was .96, determined on 279 cases in grades seven through nine (Terman and McNemar, 42, p.2).

In administering the tests the recommended directions given by the authors were followed exactly.

TECHNIQUES IN RESEARCH

The junior high school was divided into six home-room groups, comprised of 25 to 32 students in each group. The writer made arrangements with each of the home-room sponsors to administer the tests in the students' home rooms.

In the first visit to each home-room information about the individual child was secured. The objective of collecting such information was carefully explained to each group; then they were informed they would be given two tests at a later date. All students appeared most cooperative and several asked when they could take the tests--indicating that good rapport had been established.

The Pintner General Ability Tests were administered to all groups first, beginning with the writer's seventh grade home room students. All groups were tested with this instrument before any received the Terman-McNemar Test. By

following such a schedule a period of four to seven days lapsed between the time a group took the Pintner and the time the Terman was administered.

While the actual testing time on the Pintner is relatively brief--fifty minutes--the directions are time-consuming. For this reason the test was administered in two sections. Sub-tests one through four were given in the first sitting and sub-tests five and six in the second sitting in all cases.

The Terman-McNemar Test of Mental Ability was administered second. This instrument is less time-consuming; both in actual testing time--forty minutes--and in time required for directions. Therefore, the test was given in one sitting. Separate answer sheets were employed in administering this testing device.

In both testing situations a stop watch was used to insure accurate timing. In nearly all cases, on both tests, students finished each section of the test before time was called.

All tests were hand scored by the writer, and raw scores converted to intelligence quotients from tables in the testing manuals. The authors of both tests employed the deviation method of finding intelligence quotients in constructing their tables to be used in converting raw scores.

Scores from the Stanford Achievement Test used in this report were those taken from the individual's cumulative

folder. Those tests were administered by classroom teachers; but not to their own home-room groups. Teachers traded classrooms to administer the Stanford Achievement Test. In this way no teacher gave tests to his own home-room students. These tests were given May 1, 1957.

The Stanford Achievement Test is one of the most highly recommended of achievement tests. The revised edition administered to this group was favorably anticipated by educational leaders. "With the appearance of the 1952 revision, it will undoubtedly retain its position as one of the finest achievement tests available" (Buros, 4).

FINDINGS OF RESEARCH

In comparing scores on the Pintner General Ability Test and the Terman-McNemar Test all sections of both seventh and eighth grades were treated as one group. It was felt the larger sampling would give more reliable results than to treat each grade separately.

The following graph, Fig. 1, indicates the intelligence quotient scores on each test.

The median on the Pintner was found to be 97.75 with a standard error of the median of .84. The Terman-McNemar median was 79.1, standard error of the median .66. The mean on the Pintner was 98.18; on the Terman 75.88. The range of scores on the Pintner was 56 to 129. The range on the

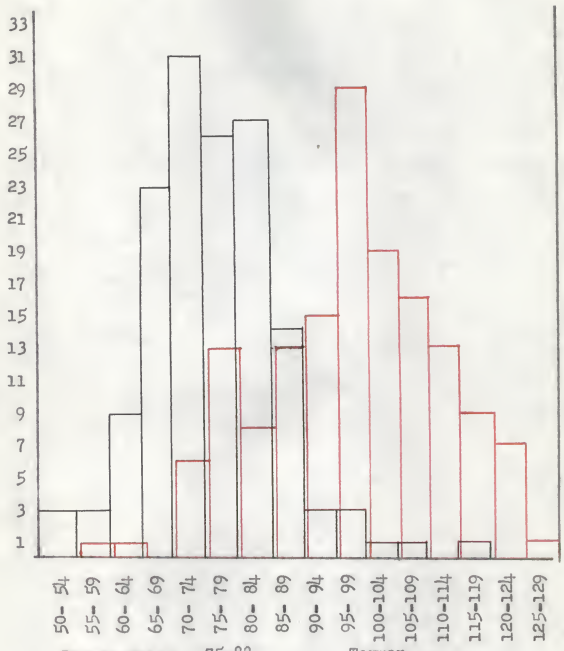

Fig. 1. I.Q.'s on the Pintner Non-Language and Terman-McNemar, Grades 7 and 8.

Terman was 50 to 115. Correlation between the two tests was .26.

Assuming the percentile norms established by the tests' authors for English speaking white children are valid, a further analysis of the scores obtained with these Navajo subjects led to the following conclusions:

1. No child ranked in the upper 25 per cent on the Terman.

2. Nine children ranked in the middle 50 per cent on the Terman. These nine scores were distributed on the Pintner percentile scale as follows:

A. Three children in the upper 25 per cent.

B. Five children in the middle 50 per cent.

C. One child in the lower 25 per cent.

3. One-hundred-thirty-nine children ranked in the lower 25 per cent on the Terman. Their distribution on the Pintner scale was:

A. Twenty-one in the upper 25 per cent.

B. Seventy-seven in the middle 50 per cent.

C. Forty-one in the lower 25 per cent.

As research had indicated the amount of formal education should affect a correlation between verbal intelligence and school achievement. If it is valid to assume that reading ability affects verbal intelligence, it should logically follow that a higher coefficient of correlation could be ob-

tained from scores by the eighth graders on the Terman-McNemar Test and language arts subtests on the Stanford than could be found by correlating results obtained from the seventh grade group.

With this thought in mind the writer divided the scores into the two grade levels and correlated findings. The following tables, (Tables 2 and 3) demonstrate the results.

Table 2. Correlations between the intelligence tests and the Stanford Achievement language arts subject tests and battery median.

Subject area	Grade 7 Terman	Pintner
Battery median	.41	.40
Paragraph meaning	.41	.32
Word meaning	.60	.13
Spelling	.18	.12
Language	.56	.10

N= 76 in all cases except language in which N= 67.

In the seventh grade N= 76 except in the language subject test in which case N equaled 67. In nine cases on this level students' scores were so low they could not be measured by the Stanford Achievement Test, Intermediate; therefore, they were omitted. The same occurred in the eighth grade in two cases on the same subtest leaving a remaining N of 70.

Table 3. Correlations between the intelligence tests and the Stanford Achievement language arts subject tests and battery median.

Subject area	Grade 8 Terman	Pintner
Battery median	.67	.49
Paragraph meaning	.59	.14
Word meaning	.76	.12
Spelling	.51	.45
Language	.46	.48

N= 72 in all cases except language in which N= 70.

CONCLUSIONS

Academic success could not accurately be predicted on the Stanford battery median on the seventh grade level by employing either the Terman McNemar or the Pintner Non-Verbal Intelligence Tests. A fairly high correlation was found between the Terman and the battery median in the eighth grade. It should be possible to predicate success on the eighth grade level with some confidence using the Terman-McNemar Test of Mental Ability.

Success could be predicted relatively accurately using the Terman Test of Mental Ability on both levels in the language arts subtests of the Stanford Achievement Test, except in paragraph meaning and spelling on the seventh grade level and

language on the eighth grade level.

The highest correlation between the Terman-McNemar Test of Mental Ability and the Stanford language arts subtests at the seventh grade level was in word meaning with a correlation of .60. The highest correlation between the Terman-McNemar Test of Mental Ability and the Stanford language arts subject tests on the eighth grade level was also in word meaning with a correlation of .76.

On both levels the highest correlation between the Pintner and the Stanford was the battery median. The Pintner, however, in no area could be used with confidence in the prediction of success on the Stanford Achievement Test.

Assuming the mean I.Q. on the Terman Test to be 100, Navajo students in this study were 24.12 I.Q. points below the white mean.

Assuming 100 to be the mean I.Q. on the Pintner Non-Language Test, the Navajo students were 1.82 I.Q. points below the white mean.

Four intelligence-achievement correlations showed the eighth grade groups' coefficients significantly higher than the seventh grade groups'--this may be an indication of the role education has in influencing verbal intelligence.

Finally, the writer concluded that this study, insofar as intelligence of North American Indians is concerned, is consistent with studies previously made. The testing devices

used apparently measure not only intelligence but many cultural and environmental factors as well.

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APPENDIX

Table 4. Raw scores of 148 Navajo Indian children on intelligence and achievement tests.

Individual	Grade 7						
	1	2	3	4	5	6	7
1	129	82	5.3	4.8	6.5	7.0	5.6
2	122	71	4.9	4.4	4.5	6.2	5.5
3	121	81	8.0	5.7	6.6	7.3	7.5
4	121	77	9.3	6.4	7.2	8.0	7.4
5	120	86	4.1	5.5	--	7.8	4.6
6	120	84	7.6	4.2	6.7	5.4	6.7
7	117	85	4.1	6.9	7.9	11.9	6.8
8	117	70	5.3	4.6	4.1	6.1	3.6
9	117	65	5.9	4.4	5.6	6.5	5.2
10	116	86	6.2	4.4	5.6	6.1	6.0
11	115	80	4.9	6.4	4.9	6.0	4.9
12	114	74	3.1	4.8	7.6	8.9	4.8
13	112	76	4.3	4.6	6.6	6.3	6.3
14	112	79	8.4	5.3	7.6	8.6	5.7
15	111	61	3.5	3.6	2.2	4.0	3.6
16	110	84	6.7	6.4	6.6	6.4	6.1
17	110	73	4.3	4.2	4.1	6.3	5.0
18	110	67	4.3	4.2	4.1	6.3	4.5
19	109	81	4.3	5.0	6.9	8.9	5.7
20	108	83	5.3	5.3	6.7	8.3	7.2
21	107	85	4.3	4.4	6.3	6.8	6.3
22	107	76	5.3	5.5	4.5	6.9	5.3
23	106	109	7.0	7.1	8.8	8.6	7.6
24	106	75	4.4	4.4	4.5	7.4	5.2
25	106	77	4.4	5.7	4.7	7.2	6.4
26	105	74	5.5	4.8	5.6	7.4	5.6
27	105	67	5.3	4.0	7.6	8.6	5.7
28	104	75	6.7	7.3	4.5	7.3	6.7
29	104	70	5.1	4.4	--	6.4	4.8
30	104	58	3.5	4.4	4.1	6.1	4.6
31	103	87	9.3	6.4	9.9	8.9	8.6
32	102	85	7.3	5.7	6.3	6.9	6.7
33	102	67	3.5	4.6	1.9	6.9	4.8
34	100	67	3.5	5.5	6.0	7.6	5.5
35	100	51	4.1	3.3	--	7.3	4.5
36	98	76	5.5	4.8	6.0	7.7	6.0
37	98	71	4.3	4.4	5.6	5.7	5.6
38	98	78	3.7	5.7	4.9	9.4	5.2
39	97	69	7.3	4.2	3.3	7.7	6.0
40	97	69	3.5	3.8	3.3	5.6	4.1
41	97	72	7.3	5.9	6.9	6.7	6.8
42	97	85	5.1	5.5	8.5	7.8	7.8

Table 4 (Cont').

Individual	1	2	3	4	5	6	7
			Grade 7				
43	96	88	7.0	6.7	8.2	10.2	7.3
44	96	72	4.1	3.8	2.2	7.1	4.6
45	96	71	2.8	4.6	2.8	4.1	4.1
46	96	63	4.9	5.0	3.3	7.7	4.7
47	95	84	3.0	5.0	--	7.8	5.2
48	95	75	3.0	4.2	6.6	7.4	4.5
49	95	87	6.2	6.4	6.6	11.5	6.6
50	94	74	4.1	4.4	7.6	7.4	4.8
51	94	71	4.4	4.2	3.3	6.4	4.8
52	94	69	4.6	4.2	4.1	5.5	4.6
53	93	64	4.0	4.6	6.0	6.3	4.7
54	93	64	3.7	4.6	6.3	5.6	4.9
55	91	84	5.7	4.6	6.6	7.6	4.6
56	90	78	5.9	5.0	7.4	7.5	5.9
57	90	74	4.9	3.8	7.6	7.5	5.3
58	88	80	4.1	5.3	5.6	7.3	5.6
59	88	68	4.1	4.6	--	5.5	4.8
60	88	66	4.1	5.5	4.1	7.1	4.8
61	88	70	2.6	4.0	--	5.6	4.4
62	87	66	5.3	5.7	5.2	6.3	5.3
63	86	77	6.2	6.2	6.3	7.1	6.3
64	86	68	3.9	4.6	6.0	5.7	4.6
65	86	68	3.9	5.0	3.3	5.7	4.9
66	85	73	5.9	4.2	7.9	6.7	5.8
67	84	86	4.1	5.7	7.4	7.5	5.6
68	84	80	7.6	5.3	5.6	9.4	6.1
69	83	79	4.4	6.2	7.2	6.9	6.0
70	82	75	4.6	5.5	--	5.9	4.6
71	80	79	4.1	4.2	8.0	7.8	5.0
72	80	63	4.4	4.2	4.5	7.6	4.5
73	79	66	3.5	4.2	2.2	4.2	4.0
74	75	62	3.9	3.8	--	5.5	4.3
75	72	70	3.9	4.6	4.1	6.3	4.8
76	61	67	3.5	4.2	--	7.4	3.6
			Grade 8				
77	120	83	6.7	5.7	7.9	8.3	7.3
78	118	78	4.9	4.2	6.3	7.7	6.3
79	118	92	10.1	7.5	11.7	10.5	10.4
80	118	74	6.7	5.5	4.9	7.9	6.6
81	116	84	7.0	6.2	6.9	10.5	8.9
82	113	87	9.7	6.4	9.9	10.5	9.9
83	112	92	6.7	6.7	7.5	8.9	7.5
84	112	75	4.1	5.9	4.5	7.7	5.9
85	112	80	5.9	5.0	6.9	9.4	7.9
86	111	84	7.0	5.9	5.6	9.8	7.1

Table 4 (Cont'.)

Individual	Grade 8						
	1	2	3	4	5	6	7
87	111	97	8.4	5.9	6.9	11.4	7.4
88	109	83	7.0	5.9	6.6	9.4	6.6
89	109	79	4.9	5.5	6.3	7.7	7.0
90	108	83	8.4	6.9	8.2	8.7	8.2
91	107	72	7.6	5.7	6.9	8.4	6.9
92	106	73	7.6	4.6	7.2	8.6	6.7
93	105	96	6.2	7.1	8.2	11.0	8.2
94	105	67	8.8	4.8	5.2	8.0	8.1
95	104	76	5.5	5.7	6.0	8.1	7.5
96	104	88	7.6	5.3	5.6	7.9	7.6
97	103	82	8.8	5.3	6.5	8.4	6.8
98	102	83	8.4	5.7	6.6	9.8	6.6
99	102	75	4.6	6.4	3.7	7.0	6.1
100	102	75	4.3	5.9	3.3	6.0	5.9
101	102	89	8.0	6.2	8.5	11.7	7.1
102	101	115	9.7	8.8	10.4	9.6	7.7
103	101	97	7.6	6.9	6.9	11.2	8.9
104	100	73	5.3	5.0	6.6	7.4	6.6
105	100	73	5.7	6.2	6.0	10.0	6.8
106	99	79	9.7	5.7	6.6	10.7	8.6
107	99	55	5.9	6.2	4.1	6.2	5.9
108	99	77	7.0	5.9	8.5	8.6	7.0
109	99	81	4.1	5.7	3.3	6.1	4.5
110	98	83	7.6	7.1	7.2	9.6	7.2
111	98	83	7.6	5.9	5.2	5.0	6.7
112	97	75	5.7	4.8	6.0	6.3	6.0
113	97	87	5.7	5.7	4.1	8.3	6.4
114	97	74	6.7	5.5	3.3	7.3	5.6
115	96	72	7.6	5.9	7.9	8.6	6.7
116	96	50	3.5	3.6	7.0	4.3	4.3
117	96	74	3.0	4.4	3.7	6.0	4.6
118	96	71	7.6	4.6	6.3	10.0	6.3
119	95	82	5.7	4.8	3.7	7.3	4.8
120	95	73	5.5	5.0	5.2	7.9	5.5
121	94	80	5.7	5.9	7.6	8.6	6.9
122	93	81	8.4	6.9	6.9	4.0	7.3
123	92	74	9.3	5.3	8.5	9.6	7.7
124	91	66	4.9	5.7	6.6	8.4	6.0
125	91	82	7.0	5.5	6.9	7.4	7.1
126	91	71	6.2	4.6	2.8	8.3	5.6
127	90	102	8.0	8.6	7.2	8.9	9.2
128	88	68	4.1	4.4	4.1	4.6	4.4
129	88	66	4.6	5.0	6.6	7.1	5.8
130	85	81	8.4	5.5	6.9	10.2	7.3
131	85	65	7.0	4.6	7.4	7.9	7.0

Table 4 (Concl.)

Individual	1	2	Grade 8				
			3	4	5	6	7
132	81	71	10.1	4.4	4.7	7.9	4.7
133	81	64	4.6	4.2	4.5	6.5	4.9
134	79	63	4.6	5.3	--	6.1	4.7
135	79	60	3.9	5.5	2.2	7.0	5.2
136	79	71	4.3	5.3	5.2	6.1	5.2
137	78	78	4.6	6.2	6.0	10.0	6.0
138	78	53	3.9	4.6	4.1	6.8	4.6
139	78	75	5.3	4.6	6.6	7.0	5.3
140	77	90	9.7	8.6	5.2	6.1	5.2
141	77	65	3.2	4.6	5.6	6.1	5.5
142	75	68	4.6	5.7	3.7	8.0	4.8
143	75	51	3.7	3.6	5.2	4.3	4.0
144	75	62	4.3	4.4	5.0	7.0	4.6
145	73	55	2.8	3.4	--	3.7	3.7
146	72	68	6.7	5.3	5.6	10.2	5.6
147	71	74	7.0	5.9	4.5	7.9	4.8
148	56	57	5.1	4.6	3.0	6.2	5.0

Column 1 - Pintner Non-Language Test
Column 2 - Terman-McNemar
Column 3 - Paragraph meaning
Column 4 - Word meaning
Column 5 - Language
Column 6 - Spelling
Column 7 - Battery median

A COMPARATIVE STUDY OF VERBAL AND NON-VERBAL INTELLIGENCE OF NAVAJO JUNIOR HIGH SCHOOL STUDENTS

by

AILEEN BARNETT HELMICK

A. B., Marymount College, 1951

AN ABSTRACT OF A MASTER'S REPORT

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Educators and psychologists have recognized for some time that cultural and environmental factors have a great affect on intelligence tests scores, particularly those of verbal testing devices. It seems to be the general concensus of opinion among such professional people that "intelligence" as such, cannot, at the present time, be accurately measured--rather the external manifestations, such as linguistic ability, perceptual abilities, and many others--indicate aspects of what is commonly referred to as intelligence.

The writer sought to determine which of two intelligence tests could be more effectively utilized in predicting success of Navajo Indian children on an academic achievement test standardized on white children attending public schools. Further, it was decided to investigate the correlations between the intelligence scales and the language arts subject subtests of the achievement battery.

To achieve these objectives the Terman-McNemar Test of Mental Ability, Form C and the Pintner General Ability Test, Non-Language Series, Intermediate Test, Form K, were administered to 148 seventh and eighth grade Navajo students at Ft. Wingate, New Mexico. Results from the Stanford Achievement Test, Advanced Battery, Form J, which had been administered two weeks earlier were obtained from individuals' cumulative folders.

Following the administration and scoring of the tests the two intelligence tests scores were correlated and a co-

efficient of .26 was found. Coefficients of correlation between the Terman-McNemar Test of Mental Ability and the Stanford Achievement battery were .41 on the seventh grade level and .67 on the eighth grade level. Correlations between the Terman-McNemar and Stanford language arts subtests were as follows on the seventh grade level: paragraph meaning, .41; word meaning, .60; spelling, .18; language, .56. Correlations between the Terman-McNemar and Stanford subtests on the eighth grade level were .59, .76, .51, and .46, respectively. Low correlations were found in all instances between the Pintner Non-Verbal and Stanford subtests. The mean on the Terman-McNemar was found to be 75.88; on the Pintner 99.18.

The findings in this study have led the writer to conclude that in this sampling, assumed to be representative of Navajo junior high school students, the mean I.Q. on the Terman-McNemar is 24.12 I.Q. points below that of the standardization sample population grades seven through nine. The Pintner mean I.Q. for these subjects was 1.82 I.Q. points below the population mean.

These findings would indicate that the Pintner cannot be used to predict Stanford Achievement success; however, the Terman could be utilized with some confidence in some areas. The possibility that formal education for bilingual primitive groups does affect verbal intelligence is indicated

by the higher correlations found between the Stanford subject tests and the Terman on the eighth grade level.

The results of this research effort are consistent with previous findings. Many researchers have determined that verbal intelligence tests scores for North American Indians are below those of the whites. The cultural and environmental bases of verbal test items are, without the slightest doubt, biased in favor of some culture other than that of the redman.