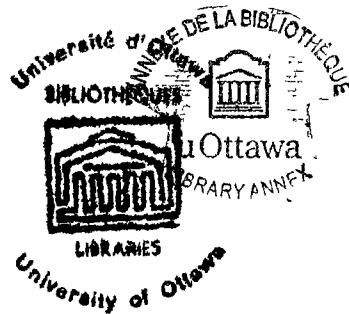


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READING ACHIEVEMENT AND INTELLIGENCE SCORES
OF INDIAN CHILDREN

by (Mary E. Whelan)

Thesis presented to the School of
Psychology and Education of the
University of Ottawa as partial
fulfillment of the requirements
for the degree of Master of Arts.



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CURRICULUM STUDIORUM

Mary Elizabeth Whelan was born at Haileybury, Ontario, on December 15, 1913. She received the degree of Bachelor of Education from the University of Ottawa, in June 1952.

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INTRODUCTION

The Indian holds a secure place in our country. His welfare is a subject of national interest in both Canada and the United States. Research on problems which affect the classroom procedure in Indian Schools is a necessary prelude to a real understanding of the situation; and educators have begun to use the tools of research to solve these educational problems.

The object of this survey was to find the relationship between the reading and the intelligence of Indian children when measured by tests which have been standardized on American children; more specifically to find the degree to which verbal and non-verbal tests of intelligence are influenced by skill in reading.

The method employed was to administer a Verbal Intelligence test, a Non-Verbal Intelligence test and a Reading test and to measure the relationship among them. These tests were administered in the Indian Residential Schools of the Oblate Province of Manitoba.

The material is presented in four chapters. Chapter I reviews the literature. In Chapter II the design of the survey is explained. The results of the tests are presented in Chapter III and these results are discussed in Chapter IV.

CHAPTER I

A REVIEW OF THE LITERATURE

The purpose of the present study is to ascertain the performance of Indian children on tests standardized for a white population and to find the relationship that exists between intelligence and reading as measured by these tests.

Indian intelligence and achievement have been investigated in some areas of Canada and the United States.

To Rowe¹ is attributed the first reported study of Indian intelligence. In 1914, he tested 268 Indian children in the state of Michigan with the Goddard Revision of the Binet Scale. On the basis of chronological age, he found that 94.2% of them were below the norm for whites.

In 1921, Hunter and Sommermeier² found a correlation of .41 between I.Q. and the degree of white blood

1 C.E. Row, "Five Hundred Forty-seven White and Two Hundred Sixty-eight Indian Children Tested by the Binet-Simon Tests", in Pedagogical Seminary, Vol. 21, 1914, p. 454-468, quoting Jamieson and Sandiford, "The Mental Capacity of Southern Ontario Indians", in The Journal of Educational Psychology, Vol. 19, No. 8, 1928, p. 313-328, and Havighurst and Hilkevitch, "The Intelligence of Indian Children as Measured by a Performance Scale", in The Journal of Abnormal and Social Psychology, Vol. 39, No. 4, 1944, p. 419-433.

2 W.S. Hunter and E. Sommermeier, "The Relation of Degree of Indian Blood to Score on the Otis Intelligence Test", in Journal of Comparative Psychology, Vol. 2, 1922, p. 257-277, quoted as in reference 1.

when they tested 715 mixed blood Indians, with the Otis Classification Test, at Haskell Institute, in Kansas. The quartiles for total score, the median score on each of the ten sub-tests and the percentage of individuals testing at and above the Otis age norms were found to decrease as the amount of Indian blood increased. Their findings were substantiated by Garth³.

Fitzgerald and Ludeman⁴ tried to discover a reason for the lower intelligence norms reported by investigators who tested the Indian with white men's tools. They gave the National Intelligence Test to forty-one children in grades ranging from four to eleven, and the Terman Group Test of Mental Ability to fifteen pupils of the same group, at Springfield, South Dakota. To forty-two high school students at Santee, Nebraska, they gave the Otis Group Intelligence Scale. For the eighty-three cases tested, they reported an average I.Q. of 87.5, with a range of seventy-three to 111. They believed that in some cases the Indian was hampered by language and that his environment was a factor in leading him to consider unacceptable answers as logical and correct.

³ T.R. Garth, Race Psychology: A Study of Racial Mental Differences, New York, McGraw-Hill, 1931, Chapters 4 and 5, cited by Havighurst and Hilkevitch, as in ref. 1.

⁴ J.A. Fitzgerald and W.W. Ludeman, "The Intelligence of Indian Children", in Journal of Comparative Psychology, Vol. 6, 1926, p. 319-328.

An attempt to measure the influence of nurture on intelligence was made by Garth, Smith, and Abell⁵ in the case of one thousand full-blood Indians in schools of Oklahoma and South Dakota. They gave the Otis Classification Test to pupils in grades four to nine and reported an I.Q. of 70.4, an A.R. of 107.4, and a correlation between intelligence and achievement of 0.67. They concluded that education was the factor that had the greatest influence on the intelligence score.

Jamieson and Sandiford⁶, in 1928, reported on a series of tests administered to Indian children in Southern Ontario. The subjects were in attendance at the eleven day schools of the Six Nations, the Mohawk Institute, and the Mount Elgin Residential School. On the National Intelligence Test, 275 pupils attained a median I.Q. of 79.8, with an S.D. of 15.0; on the Pintner Non-Language Mental Test 280 subjects reached a median I.Q. of 96.9, with an S.D. of 17.6; on the Pintner Patterson Scale of Performance the median I.Q. was 96.4, with an S.D. of 21.6 for 115 cases; while the

⁵ T.R. Garth, H.W. Smith, and W.A. Abell, "A Study of the Intelligence and Achievement of Full Blood Indians", in Journal of Applied Psychology, Vol. 12, 1928, p. 511-516.

⁶ Elmer Jamieson and Peter Sandiford, "The Mental Capacity of Southern Ontario Indians", in the Journal of Educational Psychology, Vol. 19, issue of November 1928, p. 313-328.

fifty-nine children tested with the Pintner-Cunningham Primary Mental Test had a median I.Q. of 77.9.

Telford⁷ used a battery of tests, some of which had been devised for the making of racial comparisons, at the United States Indian School of Wahpeton, North Dakota. A group of thirty-five Indian pupils gained scores below white norms on the Peterson Rational Learning Test and on the Healy Puzzle A Test but exceeded the white norm on the Mare and Foal Test. Two hundred twenty-five subjects from kindergarten to grade six earned an average I.Q. of 88 on the Goodenough Draw-a-Man-Test.

In his report on a survey of the system of education in the schools maintained for the native races of Alaska by the government of the United States, Eells⁸ discloses the fact that eighty-three Indian children tested with the Stanford-Binet Test procured an average I.Q. of 87.88, with a S.D. of 14.92 and a probable error of the mean of 1.11; while fifty-eight Indian children tested on the Goodenough Draw-a-Man-Test, reached a mean I.Q. of 91.55, with a S.D. of 13.74 and a probable error of the mean of 1.22.

7 G.W. Telford, "Test Performance of Full and Mixed Blood North Dakota Indians", in Journal of Comparative Psychology, Vol. 14, 1932, p. 123-145.

8 W.C. Eells, "Mental Ability of the Native Races of Alaska", in Journal of Applied Psychology, Vol. 17, No. 4, issue of August 1933, p. 417-438.

The weights that should be attributed to school placement and educational achievement in the case of mixed-blood Indians in the United States Schools in South Dakota and Oklahoma formed the basis of a research made by Garth⁹ when he administered the Otis Classification Test to sixty-five full-blood and 871 mixed-blood Indians, and a group of white companions in grades four to nine. He reported the following correlations: intelligence score and school grade .64; intelligence score and achievement score .82; school grade and achievement score .68; and school grade and age .54.

The rate of mental development of the Southwestern Indian, from six to sixteen years of age, was studied by Haught¹⁰. His 961 subjects were chosen from the Federal Indian Pueblo Schools in New Mexico and the United States Indian Schools at Albuquerque and Sante Fe. He used the Pintner-Cunningham Primary Mental Test, for the younger subjects, the National Intelligence Test for the intermediates, and the Terman Group Test of Mental Ability for the older group. The I.Q. range was from seventy-one to eighty-seven.

⁹ T.R. Garth, "The Intelligence and Achievement of Mixed Blood Indians", in Journal of Social Psychology, Vol. 4, 1933, p. 134-137.

¹⁰ B.F. Haught, "The Mental Growth of the Southwestern Indian", in The Journal of Applied Psychology, Vol. 18, No. 1, issue of February 1934, p. 137-142.

The quotients were highest at nine and lowest at sixteen. From ages six to nine the group was retarded about one year, but the retardation increased somewhat uniformly from year to year to reach its lowest point at sixteen years.

Hansen¹¹ found no clear-cut difference in achievement between public school and boarding school pupils of Indian blood in Oklahoma, when he administered the Oklahoma Edition of the Tracy Short Answer Test to 529 Indian children enrolled in public school, 516 Indian children enrolled in boarding school, and to 507 white children. He stated, however, that the white children in the public schools were superior to the Indian children in general achievement and in every subject except writing.

Garth and Smith¹² measured the intelligence of 808 full-blood Indians attending the United States Indian Schools at Sante Fe and Albuquerque with the Pintner Non-Language Mental Test and with the Otis Classification Test. The latter test has two parts, one of which measures mental ability, and the other educational achievement. Their

11 H.C. Hansen, "Scholastic Achievement of Indian Pupils", in Journal of Genetic Psychology, Vol. 50, 1937, p. 361-369.

12 T.R. Garth and O.O. Smith, "The Performance of Full-blood Indians on Language and Non-language Intelligence Tests", in Journal of Abnormal and Social Psychology, Vol. 32, Nos. 3-4, issue of October-December 1937, p. 376-381.

purpose was to compare the results obtained on the verbal test with those obtained on the non-verbal test and to gauge the influence of education on both tests. The subjects ranged from eight to twenty-one years of age and from grade four to grade nine. The investigators found that the median mental ages ranged from 1.2 to 2.5 years higher from the non-verbal than from the verbal tests. They also reported the following correlations: between verbal intelligence and achievement, a raw correlation of .75 and a net correlation of .57; between non-verbal intelligence and achievement, a raw correlation of .42 and a net correlation of .15; between the two mental tests, a raw correlation of .42 and a net correlation of .16.

Rohrer¹³ measured the general intelligence of a group of Osage Indians, in the elementary schools in Oklahoma, with the Goodenough and Otis scales. The Goodenough Draw-a-Man-Test was given to pupils of grades one to three inclusive. The Otis Self-Administering Test of Mental Ability for Intermediate Grades, Form A was used with grades four to eight inclusive. A control group of white children was also tested. The mean I.Q. for the 125 Osage children tested on the Goodenough scale was 103.8, with a S.D.

13 J.R. Rohrer, "Test Intelligence of Osage Indians", in Journal of Social Psychology, Vol. 16, issue of August 1942, p. 99-105.

of 21.2 and a standard error of the mean of 1.89. On the Otis test, 110 Osage children, in the senior grades, obtained a mean I.Q. of 100.05, with a S.D. of 18.0 and a standard error of the mean of 1.71. The author found no significant difference between the means of subjects with different degrees of Indian blood or between those of Indian and white children.

Sparling¹⁴ tested seventeen girls and fifteen boys, whose ages ranged from eight to seventeen years, at the Mount Elgin Residential School on the Muncey Reserve in Ontario, in order to demonstrate the difference in performance of Indians on the Stanford Revision of the Binet-Simon Test and the Vineland Revision of the Porteus Maze Series. The mean I.Q. on the former test was 75.0 with a S.D. of 13.5 and a range of fifty-four to 101; on the latter test, the I.Q. was 108.0 with a S.D. of 16.2 and a range of eighty-two to 142. The standard error of the difference between mean quotients was 5.2.

Arthur¹⁵, too, was dissatisfied with the results obtained by Indian children when tested with the ordinary

14 Margaret E. Sparling, "Intelligence of Indian Children - the Relationship between Binet and Porteus Scores", in American Journal of Mental Deficiency, Vol. 46, No. 1, issue of July 1941, p. 60-62.

15 Grace Arthur, "Experience in Testing Indian School Children", in Mental Hygiene, Vol. 25, issue of April 1941, p. 188-195.

tools. She omitted two tests from Form 1 of the Point Scale of Performance Tests and tried out the revised form at Haskell Institute, Ponemah, and Red Lake. Twenty-one high school students obtained Stanford-Binet quotients of 94, (Q_1 88, Q_3 96.5) and Revised Point Scale quotients of 126, (Q_1 112.5, Q_3 142). For thirty-one grade school subjects she reported Stanford-Binet and Revised Point Scale quotients as 83, (Q_1 71, Q_3 92) and 90, (Q_1 80, Q_3 100) respectively.

In December 1941, Dennis¹⁶ administered the Goodenough Draw-a-Man-Test in an attempt to gain an estimate of the intelligence of Hopi Indian school children in which they would not be under an environmental handicap. The quotients ranged from sixty-four to 185 for the group of seventy-five girls and seventy-seven boys; the average I.Q. was 108.3, with a S.D. of 23.3.

The University of Chicago, during 1942-1943, sponsored a committee on Human Development to investigate the mental, social, and physical development of Indian children. As part of this project Havighurst and Hilkevitch¹⁷ tested 670 children of ages six to fifteen in eleven communities

16 W. Dennis, "Performance of Hopi Children on the Goodenough Draw-a-Man-Test", in Journal of Comparative Psychology, Vol. 34, issue of December 1942, p. 341-348.

17 R.J. Havighurst and R.R. Hilkevitch, "Intelligence of Indian Children as Measured by a Performance Scale", in Journal of Abnormal and Social Psychology, Vol. 39, issue of October 1944, p. 419-433.

of Navaho, Hopi, Zuni, Zia, Pagago, and Sioux Indian tribes with a shortened form of the Arthur Point Performance Scale. Havighurst, Gunther, and Pratt¹⁸ used the Goodenough Draw-a-Man-Test with 325 children of the same tribes. On the Arthur Scale the mean I.Q.'s ranged from 84.3, with a S.D. of 19.0, with the Ramah group of the Navaho tribe to 115.0, with a S.D. of 21.6, for the Oraibi group of the Hopi tribe. The alternate group of the Hopi tribe, the First Mesa, led on the Goodenough Test with a mean I.Q. of 117.1 while the Pine Ridge subjects of the Sioux tribe obtained a mean I.Q. of 102. Other groups held intermediate positions.

Turner and Penfold¹⁹ compared Indian children from the Caradoc Reserve at Muncey, Ontario, with white children from the surrounding rural areas. One hundred thirty-two Indian children who took the Otis Quick-Scoring Mental Ability Test, Alpha Form A, grades 1-4, Non-Verbal Section obtained a mean I.Q. of 91.2, with a S.D. of 14.5. The Henmon Nelson Test of Mental Ability, Form A, grades 3-8 was administered to ninety-three Indian subjects; their mean I.Q. was 81.5, with a S.D. of 15.5. The Wechsler Intelligence

¹⁸ R.J. Havighurst, M.K. Gunther, and I.E. Pratt, "Environment and the Draw-a-Man-Test: The Performance of Indian Children", in Journal of Abnormal and Social Psychology, Vol. 41, No. 1, issue of January 1946, p. 50-63.

¹⁹ G.H. Turner and D.J. Penfold, "The Scholastic Aptitude of Indian Children of the Caradoc Reserve", in Canadian Journal of Psychology, Vol. 6, 1952, p. 31-44.

Scale for Children, with slight changes made for Canadians, was given to seven, ten, and fourteen year old groups; a total of eighty-two cases. The results for the Indian group were as follows: on the Performance Scale, I.Q. 96.7, S.D. 13.3; on the Verbal Scale, I.Q. 85.6, S.D. 14.1; t 5.1. Twenty-eight Indian children were given both the Henmon-Nelson and Wechsler. On the Henmon-Nelson their mean quotient was 90.3; on the Performance Scale of the Wechsler 100.6, and on the Verbal Scale of the Wechsler, 91.1. An unspeeeded power test, the Progressive Matrices, 1947, Sets A, AB, and B, was also given in an attempt to use a culture-free test with 205 Indian and 215 white pupils of ages six to thirteen. The white children obtained higher mean scores at each age level. The differences were significant at each level from nine to twelve inclusive.

In Retrospect.- Of the three Canadian research projects reviewed, all have been confined to a restricted area in Southern Ontario. Although the testing was spread over a period of some twenty years, no substantial difference in results was found. Indian children continued to receive higher scores on non-verbal than on verbal intelligence tests. A small sample was found to be above the average for white children on the Porteus Maze Test, which is non-verbal.

When Canadian results were compared with those of our American neighbours they were found to agree; intelligence quotients of Indian children on both sides of the border were higher when the measuring tool was of a non-verbal or performance type. Here too, a small sample exceeded the white norm on a non-verbal test; the Mare and Foal Test. While there was much over-lapping of scores and superior Indian quotients were above the average quotients for whites, only Rohrer²⁰ found no significant difference in performance either between Indian and white children or between the averages obtained by Indian children on verbal and non-verbal tests. He attributed his findings to the fact that the group tested was special one, in that its subjects came from homes of a higher socio-economic and cultural level as a result of royalties from mineral rights.

Only Haught²¹ considered the lower performance of Indians to be due to lower native ability. He defended his position on the grounds that (1) the older they became and the longer they remained in school, the farther they fell below the normal mental age for whites, and (2) the quotients of the Southwestern Indians decreased after ten years of age.

20 Rohrer, Op. cit., p. 99-105.

21 Haught, Op. cit., p. 137-142.

The factors given greatest prominence in the conclusions of the authors reviewed were degree of white blood, proximity to a white culture, schooling, familiarity with the English language, cultural characteristics, and socio-economic status. No attempt has been made to measure any one of these factors while holding all others constant.

Yet Peterson²² in his summary of the results of the three year testing programme carried on by the University of Chicago, at the request of the Education Division of the United States Indian Service, had this to say:

Dr. Thomas Garth, who devoted many years to a study of Indian intelligence, at one time reached the conclusion that Indian intelligence was directly correlated with degree of white blood -- the more white blood, the higher the intelligence. Before he died, Garth realized that the determining factor was not white blood but a familiarity with the English language and with white customs. Such familiarity resulted naturally when one or more of the parents was white. His final conclusion was that a full blood Indian child, raised in a white home and exposed only to the English language, will respond to linguistic tests much as whites do.²²

The effect of bilingualism on scores obtained on verbal tests of intelligence has been studied. Only two studies in which the effect was not adverse were noted by

²² Shailer Peterson, How Well Are Indian Children Educated? Lawrence, Kansas, Haskell Institute, United States Indian Service, 1948, p. 108.

Darcy²³. He suggested that further research was needed to measure the extent of the bilingual influence.

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Research projects on the educational problems of Indians in Canada have been limited in number and confined to a small geographical area. Hence there is a need for studies of other Indian groups in Canada on various phases of the many problems which face educators in these fields.

While it is generally agreed that the results yielded by verbal and non-verbal tests are different, no study of the influence of reading on each type of test has been done. The purpose of the present research is to study this influence.

The problems to be considered, then, are these:

- (1) What type of relationship, if any, exists between the scores obtained on intelligence tests of a verbal and non-verbal nature?
- (2) How do vocabulary and comprehension, as measured by a reading test, affect the scores on verbal and non-verbal tests and on each phase of the verbal test?

23 N.T. Darcy, "A Review of the Literature on the Effects of Bilingualism Upon the Measurement of Intelligence", in Journal of Genetic Psychology, Vol. 82, issue of March 1953, p. 21-57, quoted by Pinneau and Jones, "Mental Development in Infancy and Childhood and Mental Abilities in Adult Life", in Review of Educational Research, Vol. 25, No. 5, issue of December 1955, p. 415-437.

CHAPTER II

DESIGN OF THE SURVEY

The material for the survey was gathered in the Indian Residential Schools of the Oblate Province of Manitoba. Two intelligence tests, one verbal and one non-verbal, and one reading test formed the core of the research. The results of these tests were correlated and their relationships studied.

1. The Population Described.

The Oblate Province of Manitoba is an ecclesiastical division. Its boundaries are not synonymous with those of the geographical province. Hence the schools in which the tests were given were situated in three provinces of Canada. The Indian Residential Schools, under the direction of the Oblates of Mary Immaculate, in this area, were Fort Frances, Kenora, and McIntosh in Western Ontario; Fort Alexander, Guy, Sandy Bay, and Pine Creek in Manitoba; and Muscowequan, St. Philips, Qu'Appelle, and Cowesses in Southeastern Saskatchewan.

This sample included three of the great linguistic families of North American Indians; the Algonquian, the Siouan, and the Athapaskan. The Algonquins are found from

the Atlantic Ocean to the Rocky Mountains. The Ojibway, Blackfoot, Chippewa, and Cree testees in the sample belong to the Algonquian family. The Sioux, who formerly inhabited a large area between the Mississippi River and the Rocky Mountains, came to the Canadian prairies as refugees from the United States between 1862 and 1876. No treaty was signed between Canada and the Sioux but they were given small reserves and assistance in agriculture. The Athapaskans are located north of the Athabaska River, in the Mackenzie River basin, and in Northern British Columbia. The Chipewyan band members at Churchill, Manitoba, and in the Onion Lake and Ile à la Crosse districts in Saskatchewan are of Athapaskan stock. In all the schools where tests were given members of the Algonquian linguistic stock were found; Qu'Appelle and Cowesses housed members of both Algonquian and the Siouan linguistic stocks; Guy played host to members of both the Algonquian and Athapaskan linguistic families.

Agriculture, lumbering, and trapping are the basic industries which provide a livelihood for the Indians in these areas, although some are employed in the building trades, in transportation services and in the armed forces.

The children in the sample come from bilingual homes where in some cases different dialects are spoken by

the parents as a result of intermarriage between members of different tribes.

In order to obtain a sample of children familiar with the English language Grades 7 and 8 were chosen for the tests; it was felt that children enrolled in these grades would have been in school long enough to acquire a fair degree of facility in the English language and enough reading skills to attack pencil and paper tests more or less objectively. In an effort to have a minimum of twenty pupils from each school Grades 5 and 6 were included in some cases. Students enrolled in Grades 9 and 10 of the High School were also tested. Details of these matters are found in Table I and in Table II.

3. The Tools Used.

The Science Research Associates' tests of general intelligence, the SRA Verbal Form and the SRA Non-Verbal Form, and the Gates Reading Survey were chosen as the measuring instruments.

The SRA Verbal Form is a shortened form of the American Council on Education Psychological Examination and a revised edition of the Thurstone Test of Mental Alertness. It is a time limit test which gives a total score and two sub-scores. The two sub-scores, the L-score and the Q-score,

Table I.- Geographical and Academic Distribution of Testees
in the Indian Residential Schools of the Oblate
Province of Manitoba.

Provinces Schools	/Grades: /Totals:	V	VI	VII	VIII	IX	X	V-X
		32	55	95	67	46	27	322
Ontario								
Fort Frances				11	8			19
Kenora				9	1	3	4	17
McIntosh	16	7	4	3	2			32
Manitoba								
Fort Alexander				6	11	11	10	38
Guy					8	8		16
Sandy Bay		9		11	1			21
Pine Creek		13		8	2			23
Saskatchewan								
Muscowequan	16	8		11	4			39
St. Philips		18		5	6			29
Qu'Appelle				18	18	22	13	71
Cowesses				12	5			17

Table II.- Age-Grade Distribution of Testees.

Grades	Number	Average Age
V	32	13-2
VI	55	14-0
VII	95	14-7
VIII	67	15-6
IX	46	16-8
X	27	16-10
<u>V-X</u>	<u>322</u>	<u>15-1</u>

measure linguistic ability and quantitative thinking, respectively. The authors chose to measure the two skills which they considered the most representative of the abilities required for curriculums that are linguistic or technical to a large degree.

The total raw score, the L-score, and the Q-score can all be translated into intelligence quotients, percentile ranks, or stanine ranks. These quotients and ranks give measures of intellectual abilities. They do not measure achievement.

The SRA Verbal Form consisted of eighty-four questions, thirty-six of which were designed to give a quantity quotient and forty-eight a language quotient. The questions on quantity included choosing the correct number for a series, and problems involving money, weights, measures and time. The language questions were designed to test vocabulary rather than comprehension, since they stressed the choosing of the initial letter for a word that meant the same or opposite as the given word, or for a word that would satisfy the definition given.

Commins¹ on reviewing the test found a number of features to recommend it for survey purposes. Schaefer² considered it worthy of recommendation for general use where a short form of general intelligence measurement was desired. However, Commins³ thought the time limit of fifteen minutes inadequate for any test of intelligence and was unable to accept a practical distinction between "quantitative" and "linguistic" intelligence. Schaefer⁴ considered the fact that the word "intelligence" did not appear in the booklet a practical means of avoiding emotional attitudes on the part of some subjects. Both reviewers criticized the manual for its scanty information, particularly on standardization procedure. This weakness, however, may be a carry-over from the original tests.

1 W.D. Commins, Review entry 319, quoted by O.K. Buros, Ed., The Fourth Mental Measurements Yearbook, Highland Park, N.J., The Gryphon Press, 1953, p. 424.

2 Willis C. Schaefer, Review entry 319, quoted by O.K. Buros, Ed., The Fourth Mental Measurements Yearbook, Highland Park, N.J., The Gryphon Press, 1953, p. 424-425.

3 Commins, Ibid.

4 Schaefer, Ibid.

The SRA Verbal Form is a shortened form of the American Council on Education Psychological Examination. Howland⁵ considered that the yearly revision of this test made it difficult to prepare a satisfactory manual. Then too, the SRA Verbal Form is a revised edition of the Thurstone Test of Mental Alertness, and Anastasi⁶, in reviewing this latter test, found no reliability or validity coefficients given nor no correlations between scores on the short form and the long form. She judged the Thurstone Test of Mental Alertness to be more difficult than the American Council on Education Psychological Examination because of the scrambled arrangement of the items and suggested that this might lead to guessing on the part of the subject. While these weaknesses may be reflected in the SRA Verbal Form, Commins⁷ considered the SRA Verbal Form adequate for many group comparisons and Schaefer⁸ recommended it as an excellent test for estimating general intelligence and as a broadly useful test.

5 Carl I. Howland, Review entry 218, quoted by Oscar K. Buros, Ed., The Third Mental Measurements Yearbook, New Brunswick, N.J., Rutgers University Press, 1949, p. 298-299.

6 Anne Anastasi, Review entry 265, quoted by Oscar K. Buros, Ed., The Third Mental Measurements Yearbook, New Brunswick, N.J., Rutgers University Press, 1949, p. 344-345.

7 Commins, Op. cit.

8 Schaefer, Op. cit.

The SRA Non-Verbal Form also measures intelligence. It was designed primarily for those who are illiterate, for students with reading difficulties and for foreign-born students. The authors also suggested that it be used as a double-check on students who made poor scores on the verbal test. A series of sixty groups of five pictures each make up the test. No reading skill is necessary. The candidate is asked to mark the picture that is most different. Hence the test is based on recognition of differences, a skill that, according to the authors, research has shown basic to learning. The non-verbal form gives only the total score; there are no sub-scores. This score, too, can be translated into quotient, percentile and stanine. Commins⁹, who reviewed the test, doubted the value of non-verbal tests in general on the grounds that they do not differ essentially from verbal tests, and that they have been considered by some workers to be even more influenced by cultural factors than are verbal tests. The reviewer considered this particular test to be strongly academic because it is based upon the classification of pictured objects and figures. However, Commins¹⁰ stated that he believed that the SRA Non-Verbal test

⁹ W.D. Commins, Review entry 318, quoted by O.K. Buros, Ed., The Fourth Mental Measurements Yearbook, Highland Park, N.J., The Gryphon Press, 1953, p. 423-424.

¹⁰ -----, Personal Correspondence to the Author, dated April 20, 1956.

compared favourably with many other non-verbal tests of the same general kind.

The Gates Reading Survey measures vocabulary comprehension, speed and accuracy of reading in English. It is designed for grades three to ten inclusively but provides norms that are capable of classifying the abilities of the subjects from the grade two level through the grade twelve level. The vocabulary test measures a knowledge of word meanings. There are eighty-five words in the test selected entirely from the Thorndike list of 20,000 words most common in representative reading materials. The words chosen for the test range from easy words in the first thousand of the Thorndike list to difficult words in the twentieth thousand. The comprehension test is made up of thirty-five paragraphs which increase in difficulty from the beginning to the end, and measure the skill of the subject in abstracting word meanings from their context. In both the vocabulary and the comprehension tests, the subject is given all the time he needs to finish but is not allowed extra time to waste.

Holberg¹¹, who used the Gates Reading Survey for three years in Grades 3 through 6, considered it the best

¹¹ Dorothy E. Holberg, Review entry 487, quoted by O.K. Buros, Ed., The Third Mental Measurements Yearbook, New Brunswick, N.J., Rutgers University Press, 1949, p. 514.

reading survey test available at present, although she made many suggestions for improvements in the method of administration. She found that the test overestimated the reading ability of the child and placed him in a higher grouping than he should be for instructional purposes. Spitzer¹² assumed that the test had too great a range to be of practical value. He based his opinion on the experience of test users who have found that tests of a much smaller range tend to be too hard for the junior grade tested and too easy for the higher grade. Spitzer¹³, too, was of the opinion that the norms were set too low for practical purposes.

The present writer has had considerable experience in the testing of Indian school children. She has found that with the Gates Reading Survey these children, in general, show a large measure of retardation. A fact for which she can offer no explanation is that this retardation is not so evident at the Grade 3 level.

12 Herbert F. Spitzer, Review entry 487, quoted by O.K. Buros, Ed., The Third Mental Measurements Yearbook, New Brunswick, N.J., Rutgers University Press, 1949, p. 514-516.

13 -----, Personal Correspondence to the Author, dated April 17, 1956.

Eells¹⁴, who studied the educational achievement of the native races of Alaska reported in his remarks on their achievement in reading that the Eskimo children at the second grade level were up to normal but by the sixth grade were retarded two full grades. He found that the Indians and Aleuts were somewhat better but none of them above the third grade reached the American standard.

The present writer has found, too, that the Indian children do not show this marked retardation on the SRA Reading Record. Both Turnball¹⁵ and Triggs¹⁶ criticized the SRA Reading Record as being a highly speeded test. Yet Turnball¹⁷ believed it to have value as a measure of the level of general reading ability for a group, and Triggs¹⁸ recommended that the test be used with students who were known to have the essential reading skills but who were not applying them to particular purposes, but he did not think

14 Walter C. Eells, "Educational Achievement of the Native Races of Alaska", in Journal of Applied Psychology, Vol. 17, No. 6, issue of December 1933, p. 646-670.

15 Wm. W. Turnball, Review entry 550, quoted by O.K. Buros, Ed., The Fourth Mental Measurements Yearbook, Highland Park, N.J., The Gryphon Press, 1953, p. 587-588.

16 F.O. Triggs, Review entry 502, quoted by Oscar K. Buros, Ed., The Third Mental Measurements Yearbook, New Brunswick, N.J., Rutgers University Press, 1949, p. 531-534.

17 Turnball, Op. cit.

18 Triggs, Op. cit.

the test was suitable for diagnosing the deficiencies of retarded readers for remedial work.

3. The Procedure Followed.

The technique employed to study the relationships between the series of tests given was the finding of the coefficients of correlation. All results were obtained by working with raw scores instead of with quotients. This method reduced the chances of error, as it was then necessary to translate only the final mean of each test and sub-test into a quotient for each grade instead of doing so for each of the 322 individual cases on each test and sub-test taken. Since there were 322 subjects, each of whom received six raw scores, the use of norms to change individual raw scores into quotients would have entailed 1932 operations, but by changing only the final mean for each grade into a quotient the table of norms was required for only 36 operations, and because the use of tables made interpolation necessary in some cases the method used reduced to a minimum the chances of error.

Correlations were worked out between the following means: (1) total verbal and vocabulary, (2) total verbal and comprehension, (3) non-verbal and comprehension, (4) non-verbal and vocabulary, and (5) total verbal and non-verbal.

Since the Gates Reading Survey does not provide tables for translating a total raw score into a total reading score it was not possible to correlate total reading with either the intelligence tests or the reading sub-tests.

The verbal and non-verbal intelligence tests were correlated in order to evaluate each type of test as a measure of the true mental ability of the Indian child. Then each type of intelligence test was correlated, in turn with the Comprehension and the Vocabulary scores of the reading test to assess the influence that reading ability and a knowledge of vocabulary had on the scores obtained on the verbal and the non-verbal tests of intelligence, respectively.

CHAPTER III

INDIAN CHILDREN'S PERFORMANCE ON AMERICAN TESTS

The survey had two main objectives, first to study the performance of Indian children on tests that had been standardized on American children, and secondly to find what bearing reading skills might have had on non-verbal and verbal tests of intelligence respectively.

It has been noted that results were obtained by working with raw scores in order to reduce the chances of error. The mean raw score for each test and sub-test with its standard deviation was computed for each grade. In order to make these mean scores more meaningful they were changed into quotients.

Table III gives the results obtained on the SRA Non-Verbal Form, Table IV presents the findings on the SRA Verbal Form, and Table V depicts the standings made on the Gates Reading Survey.

A study of Table III showed a consistent increase in the mean raw scores obtained on the SRA Non-Verbal Form from Grade V to Grade X while the standard deviations for the mean scores were inclined to vary inversely as the grade. With the exception of Grade IX, which was only slightly irregular, the higher the grade the lower was the standard

Table III.- Measures of Indian Children's Performance on the SRA Non-Verbal Form.

Grades	N	Mean	Sigma
V	32	36.19	7.24
VI	55	36.76	5.02
VII	95	38.23	4.56
VIII	67	39.73	4.33
IX	46	40.19	4.71
X	27	43.63	3.52
V-X	322	38.20	5.27

deviation. This followed the usual trend in intelligence testing; the groups became more homogeneous as they advanced through the grades because of drop-outs as they progressed through school¹.

Table IV was used to illustrate the means and standard deviations obtained on the SRA Verbal Form. On the verbal test all the means, of the Total Score, the Language Score, and the Quantity Score, increased steadily with the grade, but the standard deviations, unlike those for the non-verbal test, had a tendency to be higher for the senior than for the junior grades. Since it is contrary to the general trend in intelligence testing for the sigma to vary directly as the grade, the verbal test of intelligence must have been affected by other factors besides intelligence. As the sigma for this test did not decrease for the higher grades the test might have lacked the sensitivity that it should have had. As a group of children progress through school it is normal for them to become a more select group². Less gifted children are inclined to discontinue school and hence the group that remains in school is usually more

¹ Irving Lorge, "Influence of Test Upon the Nature of Mental Decline", in the Journal of Educational Psychology, Vol. 27, No. 2, February 1936, p. 100-110.

² Idem.

Table IV.- Measures of Indian Children's Performance on the SRA Verbal Form.

Grade	N	Language		Quantity		Total Score	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
V	32	6.81	3.24	5.47	1.88	12.28	4.52
VI	55	7.62	3.12	7.16	2.68	14.83	2.68
VII	95	11.69	5.74	10.44	3.58	22.14	8.07
VIII	67	13.00	5.70	10.70	4.09	23.70	8.45
IX	46	16.19	6.85	13.24	5.49	29.41	11.55
X	27	20.30	6.80	16.70	5.59	37.00	11.42
V-X	322	12.16	6.64	10.37	4.94	22.52	10.69

uniform in abilities and achievement. This is particularly true of Indian children who are, as a general rule, older for their grade than are white children and as a result leave school before passing through all the grades. The enrollment of Indian pupils in all types of Indian schools in Canada³ for 1954-55 was as follows:

Grade I - 8,620	Grade VII - 1,432
Grade II - 4,478	Grade VIII - 872
Grade III - 4,194	Grade IX - 305
Grade IV - 3,327	Grade X - 170
Grade V - 2,745	Grade XI - 110
Grade VI - 2,155	Grade XII - 40

Hence, the Grade X could be expected to be a more homogeneous group than the Grade V.

In Table V one reads the steady increase of the means of both the vocabulary and comprehension sub-tests of the Gates Reading Survey, from the Grade V to the Grade X level. The means for all grades were below the norms for white children of comparable age, but the pattern of increase from grade to grade was very much the same as that shown on the tables of norms that were provided by the author of the test.

³ Queen's Printer, Canada Report of the Department of Citizenship and Immigration 1954-55, Ottawa, Edmond Cloutier, Queen's Printer and Controller of Stationery, 1955, p. 76-77.

Table V.- Measures of Indian Children's Performance on Two Sub-tests of the Gates Reading Survey.

Grades	N	Vocabulary		Comprehension	
		Mean	S.D.	Mean	S.D.
V	32	19.22	6.75	31.84	9.74
VI	55	24.95	6.73	36.07	10.64
VII	95	33.93	7.52	49.93	10.76
VIII	67	38.36	8.26	57.16	8.99
IX	46	46.91	9.35	61.80	10.39
X	27	53.04	7.59	67.63	6.24

To bring out the pattern of Vocabulary increase for Indian and white children respectively, Figure 1 was drawn; and to trace a comparison of the growth in Comprehension between Indian and white children respectively, another graph was prepared, Figure 2.

Tables III, IV, and V presented the means of the raw scores obtained on each test and sub-test by the different grades. To study the relationship among these series of measurements, correlations were then worked out. Because the numbers were too large to fit into the calculating machine, the usual "Pearson r" formula for dealing with raw scores on a calculating machine was not used, in its place, the formula

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{N}}{\sqrt{\sum x^2 - \frac{(\sum x)^2}{N}} \sqrt{\sum y^2 - \frac{(\sum y)^2}{N}}}$$

was employed.

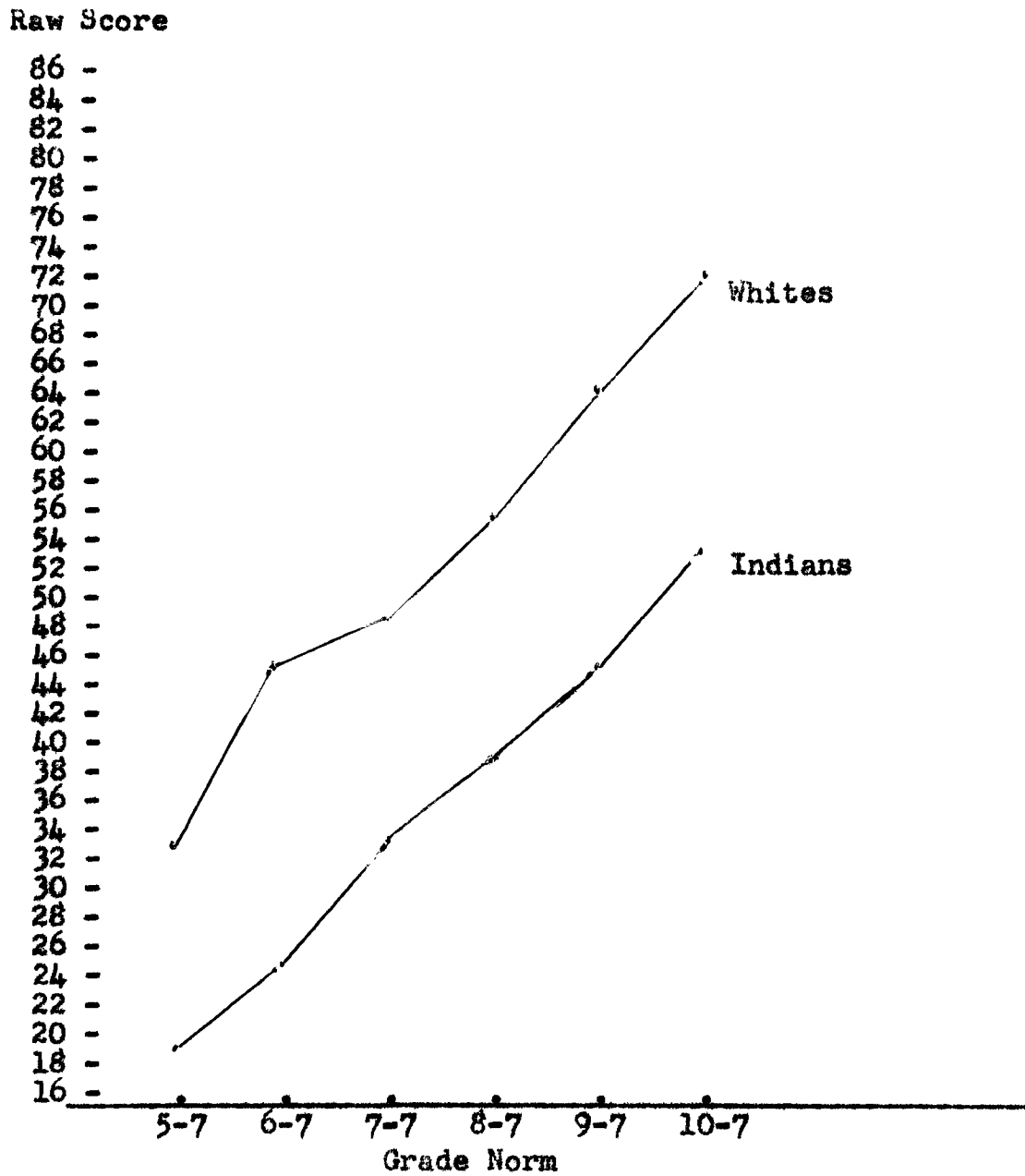


Figure 1.- Comparison of Vocabulary Growths as Measured on the Gates Reading Survey.

Raw Score

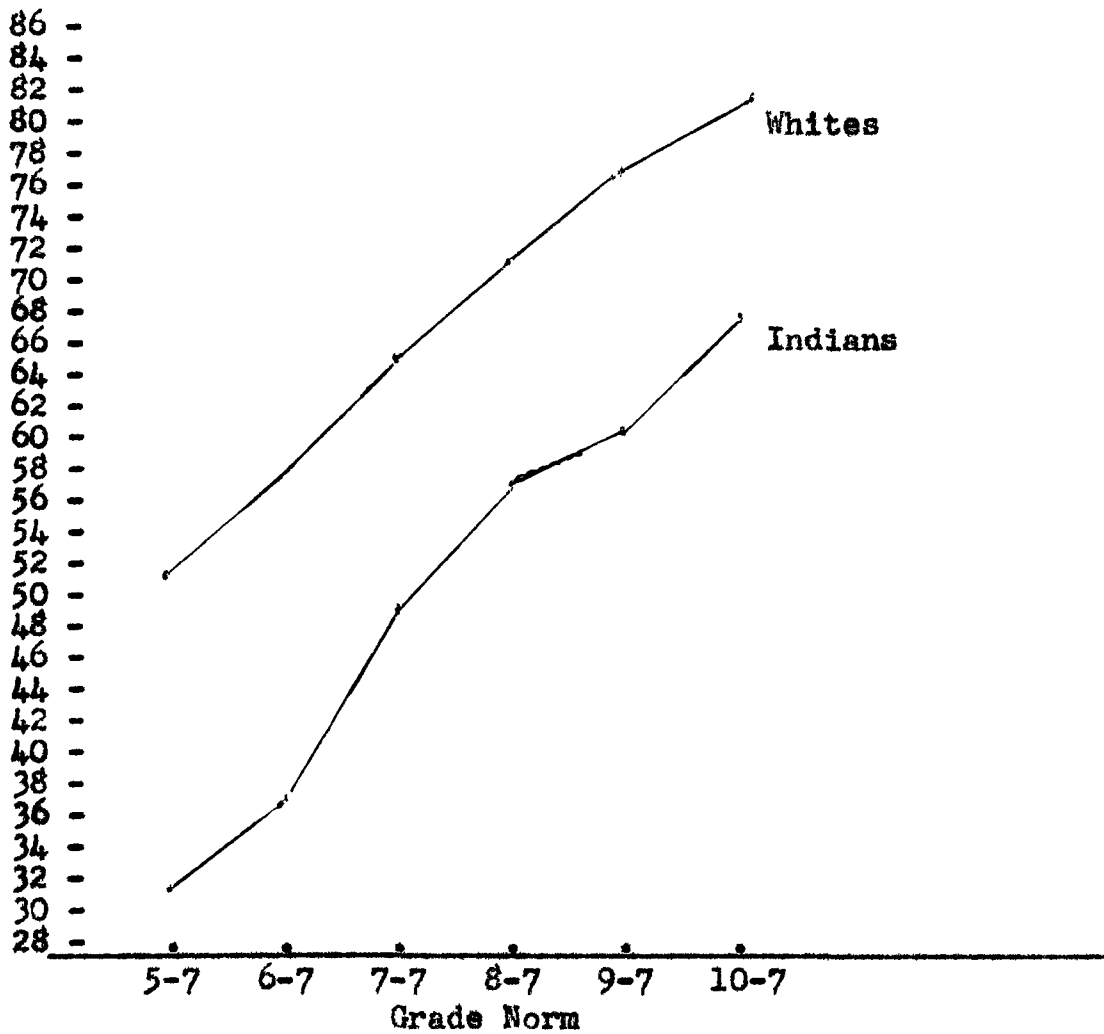


Figure 2.- Comparison of Comprehension Growths as Measured on the Gates Reading Survey.

Table VI was then made to show the correlations that were found to exist among these measures. Of the five relationships worked out, two, those between Verbal-Vocabulary and Non-Verbal-Vocabulary, and between Verbal-Comprehension and Verbal-Vocabulary, were found to be highly significant.

A study of Table VI led to the following conclusions:

1) There existed the same type of relationship between the Verbal test of intelligence and the Comprehension sub-test of the reading test as between the Non-Verbal test of intelligence and the Comprehension sub-test of the reading test.

2) There was a true difference, not an accidental difference, in the effect that Vocabulary had on the Non-Verbal and Verbal tests of intelligence, respectively.

3) There was a true difference, not an accidental difference, in the effects of Vocabulary and Comprehension respectively, on the score obtained on the Verbal test of intelligence. Hence it was possible for a child who had good comprehension to obtain a poor score because of poor vocabulary.

To test the significance of the differences among the correlations presented in Table VI, the following formula was used:

$$t = \frac{D}{\sqrt{r_1^2} + \sqrt{r_2^2}}$$

Table VI.- Correlations of the Results Obtained
by the Indian Children on the American Tests.

	Non-Verbal	Gates Comp.	Gates Vocab.
SRA Verbal	.36 \pm .04	.48 \pm .04	.72 \pm .02
SRA Non-Verbal		.44 \pm .04	.42 \pm .04

The significance of the correlation differences in terms of "t" were then shown in Table VII, and a study of this table revealed that there was a difference, significant at the 1% level, between (1) Non-Verbal-Vocabulary and Verbal-Comprehension, and (2) between Verbal-Vocabulary and Non-Verbal-Comprehension.

The final step in the presentation of results was the translation of all means into quotients. The use of quotients facilitated the comparison of intelligence and achievement scores obtained on the present survey and also facilitated the comparison of the results obtained on the present survey with those of the studies reviewed in Chapter I. Because the manual for the Gates Reading Survey does not provide centile ranks, it seemed more practical to find the reading quotients corresponding to the various Vocabulary and Comprehension mean scores and use the quotient as the basis of comparison between the reading and intelligence tests of this survey. Then too, the results of the majority of the surveys reviewed in the literature relating to the present survey had been presented as quotients and the use of quotients in this survey made comparisons easier.

Table VII.- The Significance of Correlation Differences in terms of t.

	Non-Verbal- Comprehension	Non-Verbal- Vocabulary	Verbal- Vocabulary
Verbal- Comprehension	.80		6.00 ¹
Verbal- Vocabulary		7.50 ¹	
Non-Verbal- Vocabulary	.40		

¹ Significant at the 1% level.

The reading and intelligence quotients for the present survey were shown in Table VIII. A study of Table VIII suggested the following inferences:

1) Only on the non-verbal test of intelligence did the quotients approach the norms for white children. As a group, the subjects tested had a quotient eighteen points higher on the non-verbal than on the verbal test of intelligence.

2) Reading quotients indicated retardation at all grade levels.

3) The reading quotients and the verbal intelligence quotients were very similar.

4) On the non-verbal test of intelligence the quotients were close to the norms for whites. This was probably due to the fact that a knowledge of vocabulary was needed less on the non-verbal test, since comprehension played a smaller part than vocabulary on the score obtained on the verbal test of intelligence.

5) The verbal test of intelligence probably measured achievement rather than intelligence.

6) The fact that on the verbal test of intelligence the quantity quotients were higher than the language quotients may have been due to the fact that quantity quotients were less influenced by a knowledge of vocabulary than were the language quotients.

Table VIII.- Comparison of Quotients Obtained on Intelligence and Reading Tests.

Grades	Non-Verbal I.Q.'s	Verbal I.Q.'s			Reading I.Q.'s	
		"L"	"Q"	Total	Vocab.	Comp.
V	97	73	75	70	72	74
VI	97	69	75	69	74	71
VII	101	81	87	82	79	78
VIII	100	81	86	81	78	79
IX	95	82	85	71	77	78
X	105	91	94	86	84	82
V-X	97	78	84	79	78	75

7) Verbal tests of intelligence do not validly measure the intelligence of Indian children because they are related to a knowledge of the English language; the average Indian child will score on a Verbal test of intelligence as he knows English.

How do these results compare with those of other workers? That will be seen in the next chapter.

CHAPTER IV

DISCUSSION OF RESULTS

When the results of this survey were compared with those of the workers reviewed in Chapter I, the following observations were made:

Fitzgerald and Ludeman¹, Jamieson and Sandiford², Garth and Smith³, Sparling⁴, Havighurst and Milkevitch⁵, and Turner and Penfold⁶ all found that on Non-Verbal tests

1 J.A. Fitzgerald and W.W. Ludeman, "The Intelligence of Indian Children", in Journal of Comparative Psychology, Vol. 6, 1926, p. 319-328.

2 Elmer Jamieson and Peter Sandiford, "The Mental Capacity of Southern Ontario Indians", in the Journal of Educational Psychology, Vol. 19, issue of November 1928, p. 313-328.

3 T.R. Garth and O.O. Smith, "The Performance of Full-blood Indians on Language and Non-Language Intelligence Tests", in Journal of Abnormal and Social Psychology, Vol. 32, Nos. 3-4, issue of October-December, 1937, p. 376-381.

4 Margaret E. Sparling, "Intelligence of Indian Children - the Relationship Between Binet and Porteus Scores", in American Journal of Mental Deficiency, Vol. 25, issue of April 1941, p. 188-195.

5 R.J. Havighurst and R.R. Milkevitch, "Intelligence of Indian Children as Measured by a Performance Scale", in Journal of Abnormal and Social Psychology, Vol. 39, issue of October 1944, p. 419-433.

6 G.H. Turner and D.J. Penfold, "The Scholastic Aptitude of Indian Children of the Caradoc Reserve", in Canadian Journal of Psychology, Vol. 6, 1952, p. 31-44.

of intelligence Indian children did significantly better than on Verbal tests of intelligence. In some cases they did as well or better than white children on performance tests. The findings of the present study are in agreement with these results.

Turner and Penfold⁷ found significantly lower intelligence quotients on the verbal scale of the Wechsler Intelligence Scale for Children than on the performance scale and also found that this inferior performance was more marked on the vocabulary test than on either the general information test or the general comprehension test. This, too, agrees with the conclusions reached after a study of Table VI where it was remarked that a poor vocabulary could lead to a poor score despite good comprehension.

Dennis⁸ criticized Eells⁹ because he used the Goodenough-Draw-a-Man-Test with children above ten years of

7 G.H. Turner and D.J. Penfold, "The Scholastic Aptitude of Indian Children of the Caradoc Reserve", in Canadian Journal of Psychology, Vol. 6, 1952, p. 31-44.

8 W. Dennis, "Performance of Hopi Children on the Goodenough-Draw-a-Man-Test", in Journal of Comparative Psychology, Vol. 34, issue of December 1942, p. 341-348.

9 W.C. Eells, "Mental Ability of the Native Races of Alaska", in Journal of Applied Psychology, Vol. 17, No. 4, issue of August 1933, p. 417-438.

age. Yet Havighurst, Gunther, and Pratt¹⁰ concluded that there was probably no change of Draw-a-Man I.Q. with age among Indian children and suggested that the Draw-a-Man-Test probably measured only one aspect of general intelligence, namely, the ability to form concepts.

Turner and Penfold¹¹ listed cultural characteristics as one of the environmental factors responsible for the lower scholastic aptitude ratings found in their survey. Yet, Commins¹² objected to non-verbal tests on the grounds that many studies had found them more influenced by cultural factors than were verbal tests. Now, it was only on the SRA Non-Verbal Form that the 322 Indian children, studied in this survey, achieved a standing comparable to white children. Hence, culture cannot be a determining factor for this particular group. In other words, the bringing together of the conclusions reached by other workers in the field seemed to eliminate culture as a factor contributing to low

10 R.J. Havighurst, M.K. Gunther, and I.E. Pratt, "Environment and the Draw-a-Man-Test: The Performance of Indian Children", in Journal of Abnormal and Social Psychology, Vol. 41, No. 1, issue of January 1946, p. 50-63.

11 G.H. Turner and D.J. Penfold, "The Scholastic Aptitude of Indian Children of the Caradoc Reserve", in Canadian Journal of Psychology, Vol. 6, 1952, p. 44.

12 W.D. Commins, Review entry 318, quoted by Oscar K. Buros, Ed., The Fourth Mental Measurements Yearbook, Highland Park, N.J., The Gryphon Press, 1953, p. 423-424.

test performance. This writer suggests that the difference in results may be due to a reading difficulty and not to a different culture.

Haught¹³ and Turner and Penfold¹⁴ noted that I.Q. decreased as age increased. Eells¹⁵ found that achievement in reading declined after the Grade II level. It would seem that more research is necessary in order to determine which is cause and which is effect in this relationship that exists between verbal intelligence and reading quotients.

Havighurst and Hilkevitch¹⁶ recommended that the Grace Arthur Performance Test in the shortened form be used with Indian children. They found that a performance test of intelligence was more valuable for educational placement and guidance than a test which required a greater use of

13 B.F. Haught, "The Mental Growth of the Southwestern Indian", in The Journal of Applied Psychology, Vol. 18, No. 1, issue of February 1934, p. 137-142.

14 G.H. Turner and D.J. Penfold, "The Scholastic Aptitude of Indian Children of the Caradoc Reserve", in Canadian Journal of Psychology, Vol. 6, 1952, p. 31-44.

15 Walter C. Eells, "Educational Achievement of the Native Races of Alaska", in Journal of Applied Psychology, Vol. 17, No. 6, issue of December 1933, p. 646-670.

16 R.J. Havighurst and R.R. Hilkevitch, "Intelligence of Indian Children as Measured by a Performance Scale", in Journal of Abnormal and Social Psychology, Vol. 39, issue of October 1944, p. 419-433.

the English language. Arthur¹⁷, herself, pointed out that her scale was probably more useful because it did not jump from task to task but allowed sufficient time for a change of mental set. Now, the SRA Verbal Form on which the Indian children in this sample obtained an I.Q. eighteen points lower than on the SRA Non-Verbal Form, is a revised edition of the Thurstone Test of Mental Alertness, and Anastasi¹⁸ criticized this latter test as being difficult because of the scrambled arrangement of its items. Hence, if we are to find the reason why Indian children do not succeed as well on verbal as on non-verbal tests of intelligence, it may be necessary to build tests in which both arrangement of the items and the vocabulary are carefully controlled.

¹⁷ Grace Arthur, "Experience in Testing Indian School Children", in Mental Hygiene, Vol. 25, issue of April 1941, p. 188-195.

¹⁸ Anne Anastasi, Review entry 265, quoted by Oscar K. Buros, Ed., The Third Mental Measurements Yearbook, New Brunswick, N.J., Rutgers University Press, 1949, p. 344-345.

The statements made by Anastasi and Foley:

Intelligence tests would be very different if they had been constructed among American Indians or Australian aborigines rather than in American cities.¹⁹

For example, an intelligence test standardized on white American urban school children is a valid measure of intelligence only for white American urban school children.²⁰

seemed to have been corroborated by the results of this survey.

¹⁹ Anne Anastasi and John P. Foley, Jr., Differential Psychology, New York, Macmillan, 1949, p. 740.

²⁰ Ibid., p. 746.

SUMMARY AND CONCLUSIONS

Three hundred twenty-two Indian pupils in attendance at the Indian Residential Schools of the Oblate Province of Manitoba were given the SRA Verbal Form, the SRA Non-Verbal Form, and the Gates Reading Survey. On the SRA Verbal Form the mean I.Q. was 79, while on the SRA Non-Verbal Form the mean I.Q. was 97, an increase of 18 points. On the Gates Reading Survey the reading quotients were as follows: on the Vocabulary sub-test 78, and on the Comprehension sub-test 75. The correlations between Verbal-Vocabulary and Non-Verbal-Vocabulary and between Verbal-Comprehension and Verbal-Vocabulary were significant at the 1% level: the former correlation was 7.50 and the latter correlation 6.00. It is suggested that in order to measure, adequately, the intelligence of Indian children, it may be necessary to build tests in which both vocabulary and the arrangement of the items are carefully controlled.

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Useful to the evaluation of the background of the SRA Verbal Form.

Anastasi, Anne, and John P. Foley, Jr., Differential Psychology, New York, Macmillan, 1949, xv-894 p.
Valuable for its references to studies on racial differences.

Arthur, G., "Experience in Testing Indian School Children", in Mental Hygiene, Vol. 25, issue of April 1941, p. 188-195.
Of interest because she adjusted a test to meet the needs of Indian children.

Commins, W.D., Review entry 319, quoted by Oscar K. Buros, Ed., The Fourth Mental Measurements Yearbook, Highland Park, N.J., The Gryphon Press, 1953, p. 424.
Useful in the evaluation of the SRA Verbal Test.

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Establishes, as generally accepted, the theory of the adverse influence of bilingualism on scores obtained on verbal tests of intelligence.

Dennis, W., "Performance of Hopi Children on the Goodenough Draw-a-Man-Test", in Journal of Comparative Psychology, Vol. 34, issue of December 1942, p. 341-348.
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-----, "Educational Achievement of the Native Races of Alaska", in Journal of Applied Psychology, Vol. 17, No. 6, issue of December 1933, p. 646-670.

Of interest for its report of the reading achievement of the native races of Alaska.

Fitzgerald, J.A. and W.W. Ludeman, "The Intelligence of Indian Children", in Journal of Comparative Psychology, Vol. 6, 1926, p. 319-328.

Valuable as an early attempt to find a reason for the lower intelligence norms reported for Indian children.

Garth, T.R., H.W. Smith, and W.A. Abell, "A Study of the Intelligence and Achievement of Full-Blood Indians", in Journal of Applied Psychology, Vol. 12, 1928, p. 511-516.

An early study on the factors that influenced the intelligence score of Indian subjects.

Garth, T.R., Race Psychology: A Study of Racial Mental Differences, New York, McGraw-Hill, 1931, chapters 4 and 5, cited by Havighurst and Milkevitch, "The Intelligence of Indian Children as Measured by a Performance Scale", in The Journal of Abnormal and Social Psychology, Vol. 39, No. 4, 1944.

Important as a link in the continuity of research on Indian education.

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Of interest as an early comparison between Indian intelligence and achievement.

Garth, T.R., and O.O. Smith, "The Performance of Full-blood Indians on Language and Non-language Intelligence Tests", in Journal of Abnormal and Social Psychology, Vol. 32, Nos. 3-4, issue of October-December 1937, p. 376-381.

Of value as a measure of educational influence on a verbal and a non-verbal test.

Hansen, H.C., "Scholastic Achievement of Indian Pupils", in Journal of Genetic Psychology, Vol. 50, 1937, p. 361-369.

Important as it established the fact that he found no difference in achievement between public school and boarding school pupils of Indian blood, but found them lower in achievement than white children.

Haught, B.F., "The Mental Growth of the Southwestern Indian", in The Journal of Applied Psychology, Vol. 18, No. 1, issue of February 1934, p. 137-142.

Related to the present study since it investigated the rate of mental development of an Indian group.

Havighurst, R.J. and R.R. Hilkevitch, "Intelligence of Indian Children as Measured by a Performance Scale", in Journal of Abnormal and Social Psychology, Vol. 39, issue of October 1944, p. 419-433.

Important as a widespread study with various Indian groups.

Havighurst, Gunther, and Pratt, "Environment and the Draw-a-Man-Test: The Performance of Indian Children", in Journal of Abnormal and Social Psychology, Vol. 41, issue of January 1946, No. 1, p. 50-63.

Important as a related study with a smaller number of the same group of Indians as were tested by Havighurst and Hilkevitch.

Holberg, Dorthy E., Review entry 487, quoted by O.K. Buros, Ed., The Third Mental Measurements Yearbook, New Brunswick, N.J., Rutgers University Press, 1949, p. 514.

Useful in the evaluation of the Gates Reading Survey.

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APPENDIX 1

ABSTRACT OF

Reading Achievement and Intelligence Scores
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Reading Achievement and Intelligence Scores of Indian Children

The extent to which the achievement in reading attained by an Indian child affects his score on each of a verbal and a non-verbal test of intelligence was the problem investigated in this study.

The literature on related research studies was reviewed. The Gates Reading Survey, the SRA Verbal Form, and the SRA Non-Verbal Form were administered to 322 Indian children enrolled in eleven Indian Residential Schools of the Oblate Province of Manitoba. An analysis of the results revealed that only on the non-verbal test of intelligence did the quotients approach the norms for white children. As a group, the subjects tested had a quotient eighteen points higher on the non-verbal than on the verbal test of intelligence. Reading quotients indicated retardation for all the grades tested, that is from Grade V through Grade X. The reading quotients and the verbal intelligence quotients were very similar.

It is suggested that a verbal test of intelligence measures the extent to which the Indian child understands

the English language, and is not, for him, a valid test of intelligence. It is also suggested that in order to measure adequately the intelligence of Indian children it may be necessary to build for them a test having a carefully selected vocabulary and the arrangement of its items carefully controlled.