



A comparative analysis of the performance of Indian and white children from North Central Montana on the Wechsler intelligence scale for children
by Raymond Lester Peck

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Abstract:

The purpose of this study was to determine whether the scores of Indian children from North Central Montana were significantly different from scores of white children from the same area of Montana on the Wechsler Intelligence Scale for children. The Information, Comprehension, Arithmetic, Similarities, Vocabulary, Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Coding subtests, and the Verbal I.Q., Performance I.Q., and Full Scale I.Q. means of the Indian sample and the white sample were tested by t-tests at the .01 level of confidence to determine if there was a significant difference in performance. The study was based on 105 Indian subjects and 105 white subjects attending the same schools in North Central Montana. The results were also examined to determine if the sex of the examiner had any significant difference on the results, and the results were also examined to determine on the basis of sex of the subjects, i.e., male performance versus female performance.

The total white sample (male and female) scored significantly higher than the total Indian sample beyond the .01 level of confidence on all five subtests and the Verbal I.Q. on the Verbal Section of the test. The mean scaled score was 6.562 on the Information subtest, 6.371 on the Comprehension subtest, 6.010 on the Arithmetic subtest, 7.629 on the Similarities subtest, and 6.962 on the Vocabulary subtest for the Indian sample.

The total white group was also higher on all subtests, except the Block Design and Object Assembly, on the Performance Section beyond the .01 level of confidence. The mean scaled score was 8.686 on the Picture Completion subtest, 7.819 on the Picture Arrangement subtest, 8.143 on the Block Design subtest, 8.771 on the Object Assembly subtest, and 7.667 on the Coding subtest. The Performance I.Q. was also higher for the white sample than the Indian sample beyond the .01 level of confidence.

The difference between the results obtained by male and female examiners testing Indian children failed to reach the .01 level of confidence on any of the thirteen variables tested, although the female examiners secured somewhat higher results on eight of the ten subtests, the Verbal I.Q., the Performance I.Q., and the Full-Scale I.Q. The Indian males were significantly higher than the Indian females at the .01 level of confidence on the Picture Completion and Picture Arrangement subtests. The Indian males were also higher than the Indian females on the Information, Comprehension, Arithmetic, Vocabulary, Block Design and Object Assembly subtests, but the differences were not significant at the .01 level of confidence. The white males exceeded the white females at the .01 level of confidence on only the Block Design subtest; however, they exceeded the females at a level below the .01 level of confidence on all of the other nine subtests except Coding.

A COMPARATIVE ANALYSIS OF THE PERFORMANCE OF INDIAN AND
WHITE CHILDREN FROM NORTH CENTRAL MONTANA ON THE
WECHSLER INTELLIGENCE SCALE FOR CHILDREN

by

RAYMOND LESTER PECK

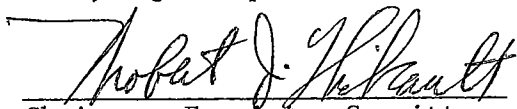
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R.L.P.

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ABSTRACT

The purpose of this study was to determine whether the scores of Indian children from North Central Montana were significantly different from scores of white children from the same area of Montana on the Wechsler Intelligence Scale for children. The Information, Comprehension, Arithmetic, Similarities, Vocabulary, Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Coding subtests, and the Verbal I.Q., Performance I.Q., and Full Scale I.Q. means of the Indian sample and the white sample were tested by t-tests at the .01 level of confidence to determine if there was a significant difference in performance. The study was based on 105 Indian subjects and 105 white subjects attending the same schools in North Central Montana. The results were also examined to determine if the sex of the examiner had any significant difference on the results, and the results were also examined to determine on the basis of sex of the subjects, i.e., male performance versus female performance.

The total white sample (male and female) scored significantly higher than the total Indian sample beyond the .01 level of confidence on all five subtests and the Verbal I.Q. on the Verbal Section of the test. The mean scaled score was 6.562 on the Information subtest, 6.371 on the Comprehension subtest, 6.010 on the Arithmetic subtest, 7.629 on the Similarities subtest, and 6.962 on the Vocabulary subtest for the Indian sample.

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The difference between the results obtained by male and female examiners testing Indian children failed to reach the .01 level of confidence on any of the thirteen variables tested, although the female examiners secured somewhat higher results on eight of the ten subtests, the Verbal I.Q., the Performance I.Q., and the Full Scale I.Q. The Indian males were significantly higher than the Indian females at the .01 level of confidence on the Picture Completion and Picture Arrangement subtests. The Indian males were also higher than the Indian females on the Information, Comprehension, Arithmetic, Vocabulary, Block Design and Object Assembly subtests, but the differences were not significant at the .01 level of confidence. The white males exceeded the white females at the .01 level of confidence on only the Block Design subtest; however, they exceeded the females at a level below the .01 level of confidence on all of the other nine subtests except Coding.

CHAPTER I

INTRODUCTION

As noted by Beatty (1953), Indian children have been some of the favorite subjects for those who develop and administer tests, and intelligence tests seem to be among the favorite kinds of tests that these people like to use. However, Coombs (1958) argues that physical location of Indians and cultural factors makes the application of most intelligence tests to Indian children highly questionable.

One of the better known and most highly developed individual intelligence tests is the Wechsler Intelligence Scale for Children (Cronbach, 1969). Burstein (1965) indicates that durability alone is adequate reason for considering the Wechsler Intelligence Scale for Children (WISC) among the better intelligence tests. He notes that "the WISC may have not displaced the older Stanford Binet, but it has certainly come to rival its predecessor as an intelligence test" (p. 843). However, the WISC was standardized on a totally white population (Wechsler, 1949), although it has been translated into a number of foreign languages. There seems little doubt that the WISC has been applied to nonwhite subjects in this country since it was published in 1949, although only one small study dealing with its application to Indian children could be found in the literature. A number of studies were found dealing with its application to Negro children.

During the period from 1967 to 1969 this writer was associated

with an ESEA Title III Project in ten counties in North Central Montana where numerous Indian children from three reservations were referred for psychological/educational evaluation. The appropriateness of the WISC as an individual intelligence test when evaluating these children was soon questioned by the examiners working in this project. The testing of Indian children from this area with the WISC was very likely the first time a large number of Indian children in that area had been tested by an individual intelligence test.

All examiners administering the WISC had been certified by the Montana State Department of Public Instruction under the certification standards in force at that time. Each examiner had received specific training and supervision in the administration of the WISC.

The concern expressed by the examiners employed in the project seemed to stem primarily from the fact that placement in special education classes was often determined by test scores secured on the WISC. White children from the same area of Montana were also being tested by these same examiners. An effort to find literature on the application of the WISC to Indian children proved to be fruitless.

STATEMENT OF THE PROBLEM

The purpose of this study was to compare in a statistical manner the performance on the Wechsler Intelligence Scale for Children the Indian and white children from a ten county area in North Central

Montana. The comparison was made on the ten subtests, the Verbal I.Q., the Performance I.Q., and the Full Scale I.Q. to determine if there was a significant difference at $\alpha = .01$ between Indian and white children tested. Piaget (1969) stated:

The interaction with this social environment in which the individual indulges varies widely according to his level of development, and consequently in its turn it modifies the individual's structure in an equally varied manner (p.47).

If the interaction with social environment is as important as Piaget indicated, a difference in subtest scores seems very likely. By analyzing the subtest scores of the Indian and white children tested, a profile of their intelligence can be determined, and the question of whether or not the patterning of subtest scores is different can be answered. The results were also examined in a non-statistical manner against Wechsler's mean of 10 scaled score points on each subtest to determine how much above or below the mean both the Indian and white samples were. A deviation of more than three scaled score points from the mean of 10 is considered significant on all subtest scores (Wechsler, 1949).

The question of whether or not female examiners might secure different results than male examiners was also tested by a t-test to see if a significant difference at $\alpha = .01$ existed. The total sample (Indian and white) was examined by the same method to determine if there were significant differences based on sex, i.e., Indian males, Indian females, white males and white females.

NEED OF THE STUDY

If the Indian child is to be placed in special education classes and remedial programs on the basis of the WISC test, examiners should be aware of any special considerations in the use of this test that may apply to Indian children. As stated earlier, only white children were used in the standardization of the WISC, and it seems quite apparent that culture, socioeconomic status and other factors may make the Indian child quite different in terms of cognitive development from the white child. McNickle (1962) stated that certain common psychological factors among Indians have been identified that make them different from the white race.

Glasser and Zimmerman (1968) claimed that the white children used to standardize the WISC were mainly from the middle-class in America. Kennedy (1971) concluded that Indians are more sober, more apprehensive, more humble, more suspicious, and more affected by their feelings than whites. Arthur (1941) found that testing Chippewa children with tests that have been standardized on white children was of little value when predicting performance or behavior. Some authorities (Bryde, 1966; Sommars, 1969; Greenberg and Greenberg, 1964) believe that Indians have emotional disorders which affect their behavior, their school adjustment, school productivity, and reactions to their environments. Greenberg and Greenberg pointed out that an Indian will remain silent and inactive

until he understands the situation, while the non-Indian child will become active and talk under the same circumstances. The point is made by Merrill (1947) that the Indian may develop a "turning in" and become shy and uncommunicative due to his cultural influence.

Barnette (1968) concluded that there are some significant value differences between Montana Indian children and Montana white children. Erickson (1963) and Bryde (1966) examined the value system of Sioux Indian children and concluded much the same as Barnett. Herrington and Douglas (1961) and Visscher (1970) also reported differences in the value system of Montana Indian children and their white counterparts. These authorities seem to be in agreement that bravery, individual freedom, generosity and sharing, and adjustment to nature are more common to the Montana Indian child than the Montana white child. Although most of these characteristics might be considered to be more in the affective domain than the cognitive domain, there is ample authority to indicate that the affective domain is so closely related to the cognitive domain that it is impossible to separate them.

Barnett (1968) concluded that wherever Indian reservations were found, there were common characteristics that tended to be mostly negative; he noted extensive poverty, poor housing, illness of all types, severe unemployment, isolation, and poor school attendance among the more common negative characteristics found on reservations. Coombs, Kron, Collister, and Anderson (1958) argued that physical location of the

Indians influence results of intelligence tests, and they point out that city or town-dwelling Indians tend to be mixed-bloods and most of the reservation Indians tend to be full-bloods.

Although population statistics are open to question due to the confused and changing definition of who is an Indian, it is believed that the total number of Indians in the United States is now well over 570,000 (Greenberg and Greenberg, 1964; Fey and D'Arch, 1959). There are over 130,000 Indian children of school age; about 40 per cent of this number are found in the states of Arizona and New Mexico. Fey and D'Arch (1959, p. 19) classify over 80 per cent of the Indians in this country as "societal", and define this term as "Indians who associate primarily with other Indians in tribal communities or reservations". Many people in Montana who work with Indians seem to agree that at least 90 per cent of the Indian population in Montana would be considered "societal" in terms of this definition by Fey and D'Arch. If Indians are increasing in numbers within our society and such a large percentage are "societal", it seems necessary that we recognize this group in a realistic manner. Piaget (1969, p. 46) pointed out the significance of environment as follows:

The human being is immersed right from birth in a social environment which affects him just as much as his physical environment. Society, even more, in a sense, than the physical environment, changes the very structure of the individual, because it compels him to recognize facts, but also provides him with a ready-made system of signs, which modify his thoughts; it presents him with new values and it imposes on him an infinite

series of obligations. It is therefore quite evident that social life affects intelligence through the three media of language (signs), the content of interaction (intellectual values), and rules imposed on thought (collective or per-logical norms).

If we can identify the differences common to the Indian child due to his social environment, which Piaget indicates are so important, we may be able to devise more effective instructional methods for the Indian child. As a result of test results reported in this study, schools may find curriculum changes that will make learning more efficient for Indian pupils.

After reviewing the changes in objectives and methods found in the history of Indian education in the United States, Trang (1969) concluded that inconsistency and confusion were its chief characteristics. Beatty (1953, p. 83) pointed out in his review of Indian education that the Indian had been excluded from white schools because they were considered to be "dirty, diseased and unfit". He also made the point that Indian education will remain as a problem because "statistics show that persons of large percentage Indian blood are marrying toward the full-blood group". One might expect that recent efforts to improve education of the Indians would be based on as much objective data as possible, but there is very little indication in the literature that efforts to develop a proper testing program for Indians has been among the many efforts directed toward improved Indian education. Certainly the importance of testing in the educational process can not be denied.

Hall (1968) examined the problems of Navajo Indian children at some length and concluded that language is a major problem for most Indian children when they enter school, yet tests written only in English and standardized on totally white populations are commonly applied to them. Greenberg and Greenberg (1964) stressed the point that Indian children are special students who require special treatment and skills through every grade. Indian children have difficulty in comprehending tenses since time does not represent the same thing to them as it does to the non-Indian. This fact alone may account for some of their difficulty in achieving average scores on various tests that are timed (Passoe, Goldberg, and Tannenbaum; 1967; Coldarci, 1960; Goodenough, 1926; Garth, 1929). These authors note that the Indian lives in the present and the past, and future simple does not have a great deal of significance for him. Keach, Fulton, and Gardner (1967) concluded that the Indian has a tendency to be in harmony with nature, while the white child is more interested in conquering nature; the Indian child is likely to be limited to an awareness of the present, but the white child is more likely to be concerned about the future; the Indian was reared in a culture that stresses respect for the aged, but white society has an emphasis on youth; the Indian child is taught cooperation and maintenance of the status quo; but the white child has been raised in an atmosphere of competition and scaling the ladder of success; the Indian child does not seek recognition and is taught submissiveness, while the

white culture tends to stress individuality and aggressiveness.

Obviously, personality traits will influence behavior in a testing situation. Kennedy (1971) concluded that there were some personality differences between Indians and whites when he applied the Sixteen Personality Factor Questionnaire to the two groups. Bryde (1966, p. 129) used the Minnesota Multiphasic Personality Inventory (MMPI) to test Indian children and concluded "the total Indian group revealed greater personality disruption and poorer adjustment". Leon (1960, p. 15) studied emotional problems of Indian students in federal boarding schools and related public schools and concluded that "learning difficulties may also be symptoms of emotional maladjustment".

The environment of the Indian child is also extremely significant in terms of the quality of responses that an examiner may expect to receive from the child in a testing situation. Many tests are based on the assumption of equal opportunity to experience things in the white, middle-class, modern world, and isolated life on the reservation often does not provide such experiences. Without these experiences the child does not have the background to provide an acceptable response.

Approximately three-fourths of the Indian population in the United States lives in rural areas, and there are very few reservation Indians who would be considered to be middle-class (Johnson, 1970). He pointed out that the amount of government welfare, educational level, average life span, and rate of tuberculosis are all indexes of the

deprivation of the American Indian. Based on these points, Johnson claims that the Indians are the least prepared to participate in American society, and the two enduring cultures - white and Indian - make assimilation into the dominant culture extremely difficult. Ryker, Rogers, and Beaujard (1971) concluded much the same as Johnson on this point. Friesen and Moseson (1971) made much the same observations and concluded that change is unlikely to come from within the Indian social structure due to the importance of the elders in the Indian community.

GENERAL QUESTIONS TO BE ANSWERED

This study attempted to answer the question whether or not there are significant differences between the subtest scores of Indian children and the scores of white children from the same area of North Central Montana on the Wechsler Intelligence Scale for Children (WISC). On those subtests where Indian children achieved significantly lower scores than those of the white children, possible contributing factors are presented based on information provided by Glasser and Zimmerman (1967), Lutey (1971), Wechsler (1949; 1958), Rapport, Gill and Schafer (1968), and Schafer (1948). This study was not concerned with isolating factors that may have depressed subtest scores other than suggesting possible causes presented by experts mentioned above. The identification of subtests on which the Indian children scored significantly lower than white children can be used by examiners of Indian children in the future

in the interpretation of WISC scores.

Wechsler' (1949) stated that less than five subtests on each of the two sections of the WISC (Verbal and Performance) can be used to determine the I.Q.; he suggests a minimum of four subtests be used on each of the two sections, but stated that three subtests might be used. The usual reason for using less than five tests would be that the examiner considers one of the subtests to be invalid for some reason, but time considerations might preclude administering all of the ten subtests. Since prorating is an acceptable procedure, it is possible, as a result of this study, to suggest a combination of subtest scores that are more satisfactory when testing an Indian child.

This study also examined the question of whether or not there is a significant difference between the results secured by a female examiner administering the WISC to Indian children as compared to male examiners using this test. McGuigan (1963) pointed out that, although we recognize that the characteristics of an examiner may influence behavior, there have been very few attempts to study the examiner as an independent variable. However, Binder, McConnell, and Sjöholm (1957) found that a female examiner secured higher test results than a male examiner, and they reasoned that the higher results by the female examiner were due to the fact that the female provided a less threatening environment for the subjects, which resulted in the subjects being less inhibited. Kennedy and Vega (1971) studied the question of how Negro students' test

scores would be influenced by the race (color) of the examiner, and they found that Negro students reacted in the same manner as white students when they were tested in a critical manner by a white examiner. Both Negro and white students suffered a decrement in performance when the examiner exhibited a critical manner; however, Negro students performed at a higher level when treated in a critical manner by a Negro examiner. Bryde (1965) expressed the opinion that an examiner who knew little or nothing about the Indian personality may influence the results of any individually administered test.

Monke (1971), commenting on the "principle of reciprocal effect", stated that in any interpersonal situation, the effect elicited in one person is in kind and proportion to the effect being transmitted by the other. Galfo (1971, p. 4) examined the question of whether or not culturally disadvantaged mothers manifest differences in their perception of male and female children, and concluded that they "perceive their boys and girls differently in a number of important ways"; girls were seen as either more valued or having better qualities than boys. Watson (1966) reviewed a large amount of research on the significance of the mother-child relationship and concluded that the mother is the principle agent of socialization and is the most important person of all those around the child. Driver (1961, p. 477) stated that "praise and ridicule are most commonly used means of discipline for Indian children".

If Driver is correct, an examiner who gives praise to a subject may secure higher scores than one who does not when working with Indian children.

Egeland (1967) examined the question of examiner anxiety on performance on the WISC. He determined anxiety level of the examiner by using the Taylor Manifest Anxiety Scale, and the anxiety level of the subjects was determined by the Children's Manifest Anxiety Scale; he concluded that the high-anxious examiners obtained higher mean scores than did the low-anxious examiners. High-anxious subjects performed equally well on the Verbal Scale when tested by either type of examiner, but the low-anxious subjects were superior to other groups when tested by high-anxious examiners. Egeland found no effect on the Performance Scale with any combination of examiners and subjects based on anxiety levels.

The norms on the WISC provided by Wechsler apply to both male and female subjects. This study provides data on the performance of both male and female subjects to determine if the WISC norms might be different for the two sexes.

GENERAL PROCEDURES

The test results of both white and Indian children were taken from the WISC record form used by the examiner at the time the subjects were tested. These record forms were carefully checked for scoring

errors for each of the 210 subjects included in this study, and only those results were used where the examiner indicated that the test was considered to be valid. Judgment of the individual examiners as to point value of answers was accepted, and corrections were made only where there were errors due to point values for time or mistakes in computation or reading of tables of scaled scores. This check of WISC Record Forms was limited to the five subtests on the two sections of the test that were used in this study. Neither the Digit Span nor the Mazes subtest was used in this study due to the fact that neither of them were commonly administered; they are normally used as alternates when other subtests are considered to be invalid. In the seventeen cases where the alternate tests had been administered to Indian subjects, the test results were not used because the subtests included in this study were not all considered to be valid by the examiners administering them. The same standards were used in selecting the white subjects for inclusion in the study.

Wechsler (1949) and Massey (1965) have both provided scoring criteria for the WISC and both were used by examiners in the scoring of the test results. Although some judgment is exercised by the examiner, guidelines for scoring the WISC are quite specific.

These test results were available to the writer as a result of his previous association with the Northern Montana ESEA Pupil Personnel Services Project as project director. The test results of all Indian children from the Blackfeet, Rocky Boy, and Fort Belknap Indian reservations tested by PPSP staff members were included in this study if they satisfied the above mentioned criteria; an equal number of white

subjects were selected on a random basis from students attending the same schools as the Indian subjects.

LIMITATIONS OF THE STUDY

This study was confined to those Indian children who were tested by qualified project staff examiners of the Pupil Personnel Services Project during the period from July 1, 1967 to July 1, 1970; the same time element and other criteria applied to Indian subjects were also applied to white subjects involved in this study. Only the test results on the WISC were used in this study, and Indian children from only the Blackfeet Reservation, the Fort Belknap Reservation, and the Rocky Boy Reservation are included in the Indian group.

As these tests were administered under an assurance of confidentiality, none of the subjects are identified in this thesis. Although comparisons might be of interest and value if they were based on reservation origin and school attended; no such comparisons have been made in this study. As noted elsewhere in this thesis, the culture of plains Indian tribes is considered to be very similar, so the assumption has been made that there would not be any significant differences among the Indian subjects from the three reservations involved. To publish results of this study based on the school attended by the subjects could be damaging in a number of different ways. As pointed out by Honigman (1961, p. 123), "a number of reports . . . suggest quite convincingly

that a high degree of psychological homogeneity characterizes the American Indian"; he also noted that there is still basically an Indian system of social structure and culture in spite of the pressure from the dominant culture. Lesser (1961, p. 3) supports Honigman as follows:

Studies among the Cherokees of North Carolina....and among the Navajos of the Southwest reveal the same inner Indian feelings about the world and man's place in nature, the same non-competitive attitudes, the same disinterest in the American drive for progress and change.

Lesser pointed out further that the completely acculturated Indians are probably not represented in reservation communities because they leave the reservation and are assimilated; he also stated that there are some "clearly discernable constellations of personality characteristics that identify the aboriginal culture" (p. 3). McNickle (1962) stated that Indian characteristics exist and remain after centuries of Indian white association.

Both the Indian and white subjects were attending schools similar in size at the time they were tested; however, previous educational experience was not taken into account. The Indian child who might have attended a Federal boarding school was not identified, however, all subjects were attending Montana public schools of similar size, organization and structure at the time they were referred to the Pupil Personnel Services Project. Schools involved including Browning, Havre, Rocky Boy, Box Elder, Harlem, Hays, Lodge Pole, Chinook, Cut Bank, Valier, Babb, East Glacier, and Dodson.

No attempt was made to equate or adjust results of this study on the basis of socioeconomic circumstances of the subjects involved. Jensen (1969, p. 75) stated that "half of all correlations between socioeconomic status (SES) and children's I.Q.'s reported in the literature fall between .25 and .50, with most falling in the region of .35 to .40". Obviously, the other half of the studies examined by Jensen fall above or below these limits, and a .35 is not considered to be a high correlation. Jensen, who stressed heredity over environment, admitted that the positive correlation between socioeconomic status and I.Q. is one of the least disputed facts in psychology and education. However, intelligence has been correlated with other factors such as occupational status of the father. Jensen discounts environmental factors somewhat by pointing out that Indians are lower than Negroes on nearly all of the environmental indexes, but they average one-half of a standard deviation above Negroes on both ability and achievement tests.

Stanley (1956, p. 265) raised the issue of socioeconomic status in relation to intelligence tests and claimed that the present tests "measure the cultural and economic opportunities which the child or adult has had". Kirkland (1971) claimed that anxious persons and those with a great need to avoid failure set either extremely high or extremely low levels of aspiration; she indicated that this fact may account for the sometimes absent and sometimes exaggerated achievement motives of the disadvantaged. A study by Cropley (1964) dealing specifically with the

WISC and socioeconomic status found a correlation on all tests on the Verbal Scale except the Comprehension subtest. On the Performance Scale a correlation between low scores and socioeconomic status was found only on the Object Assembly subtest for subjects who were 10 years old. Even lower scores were reported for children from low socioeconomic backgrounds at 12 years of age on the Verbal Scale, but there were no differences for this age group on the Performance Scale. Cropley concluded that verbal reasoning skills become increasingly specific with maturation.

Kushlick (1966) reported that severely subnormal children are evenly distributed among all social strata of industrial societies, while these mildly subnormal come predominantly from the lower socioeconomic class. Adams (1969) supported the statement that middle-class pupils consistently test higher on I.Q. tests than lower-class subjects; however, he reports distinctive profiles for four ethnic groups (Jewish, Chinese, Negro and Puerto Rican) that held for both middle-class and lower-class children. Jewish children were relatively high in verbal skills and relatively low in spatial perception, while Chinese children showed a reverse relationship on these two skills. Negroes and Puerto Ricans were relatively lower on both verbal and performance skills.

Hilgard (1962) reported that the American Indians have sometimes shown up as equal to the performance of whites on performance type intelligence tests. He indicated that in most studies the rank order of intelligence tests has been: White (Caucasian), Oriental (Mongoloid),

Negro (African), and American Indian; however, Jensen (1969) indicated that the Negro is commonly below the American Indian. Hilgard pointed out that these differences are significantly less in rural areas, which he credits to decreased socioeconomic differences. Kaestle and Montgomery (1969) indicated some support for Jensen's position that the most important environmental factors affecting intelligence occur prenatally and in the first year of life, and are associated mainly with the nourishment of the mother and the child.

Due to the total number of subjects involved and due to the difficulty of securing accurate information on the socioeconomic status of each subject, it was deemed impossible to consider socioeconomic status in detail in this study. However, it should be noted that all the schools where subjects for this study were in attendance are integrated schools; some schools had over ninety per cent Indian enrollments, and some had over ninety per cent white enrollments. All of the schools were accredited by the State of Montana, and there were no apparent major differences in facilities, funding, or staffing.

DEFINITION OF TERMS

Although most of the terms are defined within the body of this paper, the following terms are defined here for special emphasis:

1. Indian: any person enrolled on the official roll of an Indian reservation.

2. Blackfeet: any person enrolled on the Blackfeet Indian Reservation official roll.
3. Rocky Boy Indian: any person enrolled on the Rocky Boy Indian Reservation official roll.
4. Fort Belknap Indian: any person enrolled on the Fort Belknap Reservation roll.
5. WISC: the Wechsler Intelligence Scale for Children.
6. PPSP: The Pupil Personnel Services Project.
7. BIA: Bureau of Indian Affairs.
8. SDPI: State Department of Public Instruction.
9. Psychograph: a graphic representation of the subtest and I.Q. scores achieved on the WISC.

CHAPTER II

REVIEW OF RELATED RESEARCH

INTRODUCTION

David Wechsler appears to be one of the more prolific writers on the subject of intelligence; this fact and the fact that he was the author of the Wechsler Intelligence Scale for Children dictated that he would be one of the chief sources of information for this study. Wechsler's writings date back to 1926, and approximately twenty different publications by him were examined by this writer; the following three publications were found to be most helpful while doing this study:

Manual: Wechsler Intelligence Scale for Children (1949), The Measurement and Appraisal of Adult Intelligence (1958), and Range of Human Capacities (1952).

Although the primary source of material was the Montana State University Library, a number of other sources were used. After reading some of the work of L. Madison Coombs of the Bureau of Indian Affairs Research and Evaluation Office, this writer wrote to him requesting his comments on this study. Although Mr. Coombs had retired, he graciously wrote a three page reply that proved very helpful to this writer.

Senator Mike Mansfield secured a number of publications from various federal agencies, which were used by this writer. Personnel in the area office of the Bureau of Indian Affairs in Billings and the State

Department of Public Instruction in Helena also provided a good deal of assistance in this study. An outline of the proposed study was also submitted to The Psychological Corporation, publishers of the WISC, and Dr. Alan S. Kaufman, Senior Research Associate responded with some specific suggestions relative to the study. This correspondence may be found in Appendix A, page 157.

INTELLIGENCE TESTING AND RACE

Berry (1968, p. 44) pointed out that "the most fundamental question of all had to do with his (the Indian pupil) inherent capacity to acquire knowledge made available to him"; based on the number of studies that have been done on this basic question, it appeared that the question has been a favorite topic down through the years. According to Berry (1968), the development of Alfred Binet's intelligence scales caused scholars to feel that an instrument had finally been devised which would enable them to objectively study the relative ability of various races. Berry credits E. C. Rowe with being the first to apply the Binet-Simon Test to Indian and white children; this first testing of the two races took place in 1918, according to Berry.

The interest in administering intelligence tests to Indian children in the early years of the 20th Century may have stemmed from white attitudes toward Indians at that time. Beatty (1953) indicated that Indians were excluded from public schools during this period and

were generally considered to be unfit to associate with white children. Underhill (1953) expressed the opinion that there has always been those who doubted that the Indian had the necessary intelligence to profit from formal education; she also claimed that it appeared that many researchers set out to prove this point by administering tests to Indian students on a mass basis. She stated that "there is no such thing as inferiority of a whole people" (p. 92), and pointed out that inborn capacities are only potentials that will become actual under favorable conditions. Underhill charged that many educators came to question the ability of Indians on the basis of this testing. Hebb (1966, p. 198) supported many of Underhill's statements and claimed "that no valid comparison of native ability can be based on a comparison of IQ's obtained by persons brought up in different cultures".

Goodenough (1926) and Garth (1928) were two of the leaders among this early group who were interested in determining the intelligence of Indians. Goodenough, using her Draw-A-Man Test on Negroes and Indians in the South, arrived at a mean I.Q. of 78.7 for the Negroes and 85.6 for the Indians. However, Havighurst and Newgarten (1955) used the Draw-A-Man Test on Indian children in the Southwest and found that these children achieved somewhat higher scores than white children; two possible explanations were offered for the differences in these two studies: (1) Goodenough's results were influenced by the "mind set" of the earlier period, or (2) Indians of the Southwest had a

culture that emphasized art at an early age.

Garth (1928) used tests that had been standardized on white children to study the intelligence of Indian children and found consistently lower mean I.Q.'s for the Indians. He went so far as to show a positive correlation between the degree of white blood and I.Q. scores. Underhill (1953) agreed that Garth's figures were correct but claimed the difference was due to culture and not Indian blood. Brigham (1923) concluded that Nordic groups had an intelligence superior to the Alpine and Mediterranean groups at about the same time that Garth published his study; this conclusion was arrived at as a result of intelligence testing of immigrants to this country. Although this point has no direct, particular significance to this study of Indian children in Northern Montana, it indicates that there must have been quite an interest during this period in intelligence testing of various groups in society.

Klineberg (1928) appears to have been one of the first to challenge the conclusion of this early period that was prone to conclude that the Indian was inferior in native ability or intelligence. He raised the question of cultural factors on test scores of white and Indian children when intelligence was being measured. Garth (1931) published a summary of the research dealing with racial differences and concluded that I.Q. testing up to that time showed the Indian to be intellectually inferior to the white. He also dealt with the question of the relative intelligence of mixed-bloods and full-bloods, and

concluded that there was a positive correlation between the degree of white blood and test scores. Berry (1968) cites the Jonasson study of 1937, that was conducted at the Whapeton Boarding School in North Dakota, as one of the first that refuted the theory of the inferiority of the full-blooded Indians.

A trend developed during the late 1930's where investigators not only claimed the intelligence of Indians as equal to that of whites, but some claimed superiority in certain kinds of intelligence (Berry, 1968; Beatty, 1953; Underhill, 1953). Havighurst and Newgarten (1955) presented a comprehensive review of the literature dealing with this question in their study of the Navajo, Hopi, Papago, Sioux, Zia and Sumi tribes; their study considered emotional, intellectual and moral development of the Indian children in these six tribes. They concluded that there were many differences in terms of values and personality development but no real difference in native ability when proper or appropriate tests were used.

More recent research has dealt with the question of whether or not there is any real difference between the native ability of the Indian and the native ability of the white. Peters (1963) administered four different intelligence tests to Hopi Indian children and concluded that "apparent capacity" reaches peak performance at about ten or eleven years of age and suffers gradual decline from that point on. Hebb (1966) stated that intelligence of whites does not peak until fifteen years of

age and is relatively constant until twenty-five or thirty. Bryde (1965) supported Peter's conclusions and indicated it is due to personality factors of Indians.

Rohrer (1942) hypothesized that Indian children who were equal to whites in cultural opportunities, socioeconomic level, and comparable schooling would have I.Q. scores equal to those of white children. He used 235 Osage Indian children who met his qualifications, paired them with whites, and found no significant differences as a whole or within degrees of Indian blood. Coombs (1958) argued that physical location of Indians influenced the results on intelligence tests and showed a relationship between degree of Indian blood and location. The city or town-dwelling Indians tended to be mixed-bloods and those on the reservation full-bloods. Shuey (1958) presented this same point in favor of Negro children by pointing out that degree of Negro blood was correlated with residence in many of the studies that had been done, particularly in the earlier years of the studies of Negro intelligence in the South. Bryde (1965) also concluded that there were no significant differences among blood groups that could not be explained by physical location and cultural factors.

Munn (1965, p. 409) pointed out that speech "adds immeasurably to intelligence in human beings as compared with other organisms" and individual differences in human intelligence are most evident through oral and written expression (linguistic activities). He discussed the

many definitions of intelligence and indicates that some of these definitions stress capacity, such as the capacity to carry on abstract thinking, while some definitions simply define intelligence as what intelligence tests measure. Munn's basic point is that intelligence measured at an early age has questionable value because such tests are predominantly measures of symbolic (language) processes. Hess and Shipman (1965, p. 871) supported this contention by pointing out that language development among children from deprived backgrounds is relatively poor and "auditory and visual discrimination skills are not well developed". Wertheimer, Bjorkman, Lundberg and Magnusson (1968) reported a study of riverboat children in England and claimed that there is a continuous deterioration of I.Q.'s as compared to children raised in more adequate cultural environments. "Studies of blacks who moved to more stimulating environments had precisely the expected results; that is, their intellectual level rose" (Wertheimer, Bjorkman, Lundberg, and Magnusson, 1968, p. 194). Tuddenham (1948) claimed that there is some evidence of an increase in intelligence test performance in the general population between the two World Wars; he cited improved education, nutrition, health care and the standard of living as reasons for this improved performance.

Constancy of the I.Q. of the individual is also of major concern of those persons concerned with psychology and the educational process. As noted earlier, Peters (1963) claimed that peak performance of Hopi

Indian children on intelligence tests is apparently reached by age ten or eleven; Hebb (1966) stated that peak performance of white children is not reached until age fifteen, but Bloom (1964) stated that the relative standing of white children is highly consistent after eight years of age. However, Becker, Engleman and Thomas (1971, p. 439) reported that "Engleman raised the I.Q. of twelve disadvantaged children an average of 24 points with two years of instruction in reading, arithmetic, and language". This increase was measured by the Stanford-Binet Test, and this point seems to have been accepted by those who support early compensatory education programs.

One cannot examine recent writings in the area of intelligence and ignore the writings of Arthur R. Jensen. In the winter issue of 1969 the Harvard Educational Review published the Jensen article that created a major storm of subsequent articles and letters in many publications. Jensen argued that compensatory education had failed to produce a lasting effect on childrens' I.Q.'s and/or achievement; he suggested that the premise on which compensatory education was based is false, i.e., I.Q. differences are not due to environmental differences and cultural bias of I.Q. tests. He claimed that the premise is incorrect because intelligence is determined more by heredity than environment; he is of the belief that prenatal influences may well contribute the largest environmental influences on intelligence. He has contended that extreme environmental deprivation can keep a child from performing

up to his genetic potential, but an enriched educational program cannot push the child above his genetic potential.

Pointing to large compensatory education programs in St. Louis, New York, Syracuse, Seattle, Philadelphia and Berkley, that were developed to narrow the gap between minority and majority pupils, Jensen claimed that the chief goal has been utterly unrealized in any of the large compensatory education programs that have been evaluated so far. He has also claimed that culture free or culture fair I.Q. tests administered to Negroes actually showed slightly lower scores, on the average, than more conventional I.Q. tests. In answer to the frequent claim that language is the basis for a great deal of the apparent difference between I.Q.'s of blacks and whites, Jensen stated that the majority of studies show that Negroes perform relatively better on verbal than on nonverbal intelligence tests. He also claimed that the American Indian is below the American Negro on every environmental index, yet the Indian scores on ability and achievement average about a half a standard deviation higher than the scores of Negroes.

In a follow-up article in the summer issue of the same publication in 1969, Jensen stated that he simply proposed that the hypothesis of genetic racial differences in mental abilities is a reasonable one deserving of further scientific investigation. He also made the interesting observation that improved environment did not decrease

the difference among individuals but it may increase the differences. It is apparently his contention that environmental differences account for only about 20 per cent of the differences in intelligence among individuals.

Jensen has not had to stand alone in the position that he has taken. Cronbach (1969), Elkind (1969), Crow (1969), and Herrnstein (1971), who are recognized authorities in the field of intelligence testing, have supported a number of the statements made by Jensen. Herrnstein's position is that the United States already has a high I.Q. ruling class and a lower-class with I.Q.'s that are below average; he argues that good education will merely sharpen the existing differences. His point was that the more uniform the environment, the more important heredity will become. Among earlier writers who favored the importance of heredity over environment as determinants of I.Q. were Jones (1954) and Anderson (1949).

Jensen's conclusions have been challenged from many sources and positions. Light and Smith (1969) challenged nearly all points presented by Jensen; Stinchcombe (1969) claimed that Jensen had ignored the cumulative effect of poor environment; Deutsch (1969) challenged the quality of Jensen's writing and the statistics used; Fehr (1969) suggested different methods of calculating the effects of environment and heredity and arrived at different conclusions. Kagan (1969) charged Jensen with (1) inappropriate generalizations, (2) glossing over

environmental influences on tested I.Q., (3) cited new studies that indicated part of the perceived intellectual inadequacy of lower-class children may derive from a style of mother-child interaction that gives the lower-class child less intense exposure to maternal intervention, which influences performance on I.Q. tests, and (4) argued that compensatory education programs have not been adequately developed nor properly evaluated to date. Hunt (1969) stated that Jensen does not have satisfactory evidence to make his assertions about genetic differences and the basic question of high heridability of intelligence. Hunt has been credited with being one of the leaders in overturning the concept of "fixed intelligence".

In all of this discussion it is important that some of the basic assumptions associated with both intelligence and achievement testing not be forgotten. Commenting on intelligence testing in general, and the Stanford-Binet intelligence test specifically, Munn (1965, p. 414) has pointed out that the theory is that "if the child of a given age has average ability, he will have acquired the symbolic behavior possessed by average children of that age". He has stated very clearly that this theory presupposes that the child being tested has neither below average nor above average educational opportunity. Munn noted that intelligence tests emphasize flexibility in symbolic processes, like memory, concept formation and reasoning. He moves to a somewhat middle ground when he stated "it is environment which actualizes the hereditary potential"

(p. 435). However, his comments raised the issue of importance of personality types in the testing situation, and whether certain personality types are more common in certain ethnic and socioeconomic groups.

Cattell (1963, p. 5) has broken the definition of intelligence into what he terms "fluid" and "crystallized" intelligence. "Fluid" intelligence is defined as a "capacity for new conceptual learning and problem solving, a general brightness and adaptability, relatively independent of education and experience". "Crystallized" intelligence was defined as "precipitated out of experience, consisting of acquired knowledge and developed intellectual skills". Cattell's definition seems to be the most appropriate one for this study in that the WISC measures intelligence in a manner appropriate to this framework.

The question of values also becomes significant in relation to test performance. Cameron and Storm (1965), Risley (1965) and Cradler and Goodwin (1971) all concluded that lower-class children tend to prefer material reinforcement over social and/or symbolic reinforcement when compared to middle-class children. Coleman (1962) and Fitzgerald and Ausubel (1963) take the position that what is recalled tends to be shaped by previous language habits, misconceptions and attitudes. Osborn (1970) reports that approximately 55 per cent of the Indian children in the United States speak their native language at home, which he interprets as a six-year language deficiency when they enter English speaking schools.

The influence and/or importance that language may have when testing Indian children has been one of the more obvious criticisms made by some testing authorities. Greenberg and Greenberg (1964) discuss the significance of language in relation to educational problems of the American Indian child, and they point out that this problem calls for special treatment and special skills at every grade level. Bryde (1968) also raised the question of how much language ability might influence test results and noted that the examiner must be constantly aware of the fact that an examiner can influence test results in a number of different ways. In Bryde's case, he was concerned about the administration of the Minnesota Multiphasic Personality Inventory (MMPI) to Indian children who were aware that he was a Catholic priest, i.e, he was concerned that his position as a clergyman might influence some of the responses of the subjects. He also noted that an examiner who knows nothing about the Indian personality may influence the results of an individually administered test in other ways. Hall (1968, p. 28) has stated that the Navajo language is "so different from English that it forces the speaker into two different images of reality". Passoe, Goldberg and Tannenbaum (1967, p. 142) commented as follows:

The Indian has difficulty in comprehending the tenses since time does not represent the same meaning to him as it does to a non-Indian. The past, present, and future are problems he has not encountered previously.

PSYCHOLOGICAL CONSIDERATIONS

Although the more recent research seems to be in agreement that there is no real difference in native ability of the Indian and white children, some authorities in the field seem to believe that many white people with whom Indian children come in contact, including teachers, are not aware of what social scientists have concluded regarding the intelligence of racial groups. Underhill (1953) is quite strong on this point and takes the position that a great portion of the poor achievement of Indian children is due to the fact that the white group does not really give them a chance to achieve. She makes the point that there have been many cases where whites have been absorbed into Indian tribes so completely that they are not distinguishable from the Indians by the time they reach maturity; her point seems to be that such whites would have distinguished themselves from the Indians had they been of superior intelligence and sees this point as proof that the Indians can just as easily be absorbed into white society.

The criticism leveled by Underhill and others is based on the theory that if teachers and other members of the white dominant group see the Indian as innately inferior and incapable of learning, such attitudes or feelings will be conveyed to the Indian children, even though they may be very subtle and unintended. As Hodgkinson (1967) has pointed out, a child will come to think of himself in a negative

manner and set lower standards of effort, achievement, and ambition for himself under these conditions. Expectations of teachers that Indian pupils will do poorly in school thus become a major factor in guaranteeing the accuracy of the prediction or prophecy. Although the quality of the research has been questioned, Rosenthal and Jacobson (1968) conducted an experiment to test this theory in San Francisco schools and concluded that children from whom teachers expected greater intellectual gains actually showed greater gains. Kirkland (1971, p. 307) stated emphatically that "how a person thinks of himself influences his test behavior"; if he believes achievement to be important he will work longer, harder and with greater speed than if he does not believe achievement to be important. She has stated that "test performance may be affected by an individual's biases toward certain sets of responses" (p. 319), and the bold personality type will guess more frequently than those low in self-esteem. Adams (1969), discussing personality development of the adolescent, has stated that there is a correlation between pubescence self-esteem, and "coping ability" of the adult personality, i.e., early maturing adolescents are more apt to be high in self-esteem.

The question of different attitudes and values and the self-concept differences between the white/dominant group and minority groups has received a great deal of attention in recent literature. Brookover, Shailer and Peterson report a correlation of .51 between academic performance and self-concept, and claim that general self-concept is

related to the individual's perception of the opinions that significant others have of him, Brim, Glass, Neulinger, and Firestone (1969) found that many more Negroes than whites viewed intelligence tests as "very accurate", and they also pointed out that individuals may view and use test information much differently, depending on how they perceive the test. One who views a test as "very accurate" has to deal with the results in a different manner than one who does not feel the test is very accurate.

Adams (1969) noted that anxiety has been associated with low self-esteem, and anxiety causes one to become more concerned with one's self, which sets up a vicious circle in terms of personality development in the adolescent. Coleman (1966) found that those people who were high in self-esteem tended to believe they had control of their environment and achieved more in school. He examined the question of attitudes and values as they relate to self-concept differences between white and Indian children; the results are illustrated quite clearly in the following table.

TABLE I

PERCENT OF 12th GRADE PUPILS HAVING CERTAIN ATTITUDES

	<u>Indian</u>	<u>Negro</u>	<u>White</u>
<u>Sense of control of environment:</u>			
Luck more important than work	11%	11%	4%
When I try, something stops me	27%	22%	14%
People like me don't have much of a chance	14%	12%	6%
<u>Self-concept:</u>			
Believes self to be brighter than average	31%	40%	49%
I just can't learn	44%	27%	39%
I would do better if teacher didn't go so fast	26%	21%	24%

(Coleman, 1966, p. 24)

Throughout the literature on Indian children we find observations that their style of learning is more visual than verbal, i.e., more learning by looking than through language activities. Spelling is considered to be at least partly a matter of visual discrimination. Coleman (1966) has stated that Indians surpass whites in visual discrimination skills; Coombs, Kron, Collister and Anderson (1958) found that Indian children achieve lowest on reading vocabulary tests and best in spelling, and they concluded that these results reflect their higher ability in visual imagery and form perception. Havighurst and Newgarten (1946), using the Draw-A-Man test on a widely distributed Indian sample, concluded:

The children of Indian tribes which have kept close touch with the world of nature and with their indigenous cultures are especially stimulated to observe accurately, to organize their observations and express them aesthetically, and thus may be expected to do well on the DAM test. White children, and urban white children especially, may have much less chance to form concepts from firsthand observations, but must rely more upon books and words. p. 61

The Draw-A-Man test has been one of the favorite testing instruments applied to Indian children since its development in 1926; its favored position as a test for Indian children apparently stemmed from the claim that it is a culture fair test. However, Goodenough (1946, p. 399) concluded after her test had been in use nearly twenty years that "it is clear that cultural differences do appear to a greater or less extent in the drawings of children". She also stated that the search for a culture free test is illusory and the main assumption that mere freedom from verbal requirements renders a test equally suitable for all groups is no longer tenable. This conclusion apparently stemmed from the fact that the Draw-A-Man test had been consistently returning higher I.Q. scores on Indian children from tribes where art is highly important in their culture.

Pettit (1946) has claimed that education in the home of the Indian child is much more apt to be an imitation type than a verbal type, which is apparently a statement that would likely be accepted by most of those who have knowledge about Indian home life. Pettit has also stated that a greater share of the culture of more primitive

societies, i.e., the child can learn a greater percentage of the desired knowledge by observing and listening in the less complex societies. Adult activities are less understandable by observation alone in the complex society.

The question of the problem created for the Indian child by having to function in a two-language world has been mentioned in relation to testing in the preceding section of this chapter, but only those who have lived in an environment where a different or second language is used can fully appreciate the frustration that the Indian child must often face in this situation. If Hall (1968) is correct when he claims that the Indian child is forced into two different images of reality when he uses two different languages, it seems apparent that the world may well become a very confusing place for the Indian child. In applying the Minnesota Multiphasic Personality Inventory to Sioux Indian children, Bryde (1965, p. 129) stated:

....twenty-six significant differences out of a total of 28 personality variables (were found). On each of these measures, the total Indian group revealed greater personality disruption and poor adjustment. Notable among the more meaningful were: feelings of rejection, depression, anxiety, and tendencies to withdraw, plus social, self and emotional alienation.

Herrington and Douglas (1968) found many of these values and attitudes among Montana Indian children in their analysis of Indian assimilation. Adcock (1968) pointed out that attendance is frequently lowered where Indian children ride school buses, which forces them to

fit into the inflexibility of strict time schedules on which buses operate. He pointed out that time orientation is very different for the Indian child, and this time factor is also important when the teacher follows her prescribed teaching schedule. This point may be the source of frequent observations by white teachers that Indian children lack motivation and waste time. Obviously, time is important in many activities in school, including many tests. Time is also a part of the willingness to plan ahead and delay gratification, which is important in white culture but unimportant in Indian culture (Adams, 1966; Bryde, 1966).

Coldarci (1960, p. 25) has claimed that 75 per cent of the achievement variation in relation to I.Q. of Indian children in the Southwest can only be explained by factors "such as motivation, level of aspiration, and emotional blocking". In reference to certain cultures in the South Pacific, Spiro (1959, p. 170) commented as follows:

That culture and personality are interdependent variables is a proposition that today evokes almost universal assent... it is moreover widely assumed that some culture contact situations are more pathogenic than others.

Individuals whose life experiences were idiosyncratic developed mental illness either because extant cultural means for tension reduction were ineffective...or because these experiences gave rise to tension for which cultural means for reducing tension were nonexistent.

Leon (1960, p. 15) has asserted that "learning difficulties may also be symptoms of emotional maladjustment", which may be a point well taken.

He made this conclusion as a result of a study of emotional problems of

Indian students in federal boarding schools and related public schools. Piaget (1969, p. 46) has stated that "society, even more, in a sense, than the physical environment, changes the very structure of the individual", which is a pertinent consideration when examining the personality development of the Indian child. Wechsler (1958, p. viii) has stated that "intelligence is most usefully interpreted as an aspect of the total personality", which is a highly related consideration when one proposes to examine I.Q. scores attained by any subject on his intelligence test.

Anxiety is often considered an important personality factor in relation to performance (Kirkland, 1971; Goldman and Leslie, 1961; Ebel, 1965; K. T. Hill and S. P. Sarason, 1966). Kuhler (1968, p. 80) had indicated that a moderate amount of anxiety may spur one to greater effort, but "too high a level of anxiety may be disruptive, resulting in disorganized and avoidance behavior". He also made the point that since educators tend to come from the middle-class, it is not unlikely that both content and method in American schools are mainly oriented toward the middle-class and fail to take into account the greater variations in motivations and values from different backgrounds. All of us tend to experience an increase in anxiety when we are forced to operate in a different or strange environment.

Kirkland (1971, p. 317) has tended to generalize when she has stated that "negative correlation is found between anxiety and test

performance", but she becomes more specific when she narrows this conclusion down to correlations between achievement, I.Q. and reading tests. She has further concluded that anxiety correlates negatively only for the middle and low I.Q. groups on these three tests. She summarizes by stating that a high level of anxiety generally causes impaired performance, but the critical point is the importance of the test to the individual; although subjects react differently to anxiety, poorer students tend to be more anxious than the better students. Kirkland has claimed that high anxiety correlates positively with Negroes, rural children, children with emotional problems, unpopularity with peers, and low socioeconomic level; she also asserted that there is a negative correlation between anxiety and performance on complex tasks, and test anxiety increases with the grade level.

Keller and Rowley (1971, p. 206) conducted a study on anxiety levels and performance on the Stanford Achievement Test and concluded:

Although the correlation coefficients are modest, some support may be offered for the theoretical notion that anxiety interferes with performance on complex, cognitively demanding tasks such as those required by the Stanford Achievement Test.

In examining the question of how anxiety influences performance, Flynn (1971, p. 207) apparently agrees that anxiety is a common source of misbehavior when he commented that "if two students have equal mastery of subject matter, the student who is evidencing classroom adjustment problems is more likely to be retained". Flynn's major point

seemed to be that a child of this type is least able to stand the negative aspects of failure, so his problems are compounded when he is retained in the same grade. Rosenhan (1966) has provided additional food for thought on this issue when he pointed out that lower-class children are more responsive to approval and disapproval than middle-class children; he found no difference between Negro and white children on the basis of race, but he found a relationship based on socioeconomic status (class). However, Rosenhan is quick to point out that what is reinforcing for a particular child will depend upon his behavioral (reinforcement) history. The significance of anxiety in relation to performance is an important factor in test performance. Adams (1966) has noted that anxiety levels are more significant in the adjustment of female adolescents than male adolescents and credits aggressive male behavior with reducing anxiety levels in the males.

If the question of anxiety and self-concept is examined jointly, Wallace's (1971, p. 261) comments on the principle involved in the Rosenthal-Jacobson study may be of interest:

That expectations can be communicated to others and can importantly influence their behavior is one of the more exciting hypothesis to emerge from relative recent social psychological theorizing. The term "self-fulfilling prophecy" refers to the general case in which prediction about behavior can shade over into control over the behavior.

The question might be raised as to what effect an excessively high expectation on the part of the teacher might have on the anxiety level

of the pupil; assuming that the anxiety level might be raised to a high point, Hebb (1966) provides some basis for concluding that performance would be decreased when he states that chronic fear is called anxiety, which can not be escaped and tends to be performance reducing as far as test achievement is concerned.

Watson (1968, p. 553) also examined the question of self-concept and commented that "children with moderately high, but not the highest, self-concepts are most accepted". Children with low self-concepts are least accepted by their peers, according to Watson. Ribble (1943) has stated that "psychological mothering" is fundamental to a strong self-concept. Rosen (1968) has indicated there is a relationship between class and self-concept with the middle-class child more likely to develop a strong self-concept. Lehman (1962) has indicated that attitudes and values have their origin in the home, but has noted a lack of agreement as how or why certain values or attitudes are adopted while others are modified or altered, possibly even rejected, by a child. Lehman is in agreement with the statement that differences are found within and among cultural groups, races and religions.

Kuhler (1968) has pointed out that performance may be influenced by the pupil's perception of how his classmates and teachers are reacting to him. He stressed the point that "many social characteristics of individuals are learned or modified through intimacy or identifying with a model" (p. 345). However, Landis and Hayman (1971) raise serious

question to the idea that lower-class children are more prone to "negative self-images" in their study of ghetto children.

A consistency in the description of personality of Indians is apparent in the literature. McNickle (1962, p. 7) refers to them as "restrained and non-demonstrative; immediate concern in problem situations, rather than advance planning". Havighurst and Newgarten (1955) have characterized them as group-centered and more restrained than whites. Keach, Fulton and Gardiner (1967, p. 239) described Indians as having an "awareness of the present, a belief in mythology and in the supernatural, respect for the aged, and belief in giving". Lesser (1961, p. 3) has stated that the Navajos of the Southwest and the Cerokees of North Carolina have "the same inner Indian feelings about the world and man's place in nature". Behre (1968, p. 12) refers to Montana Indians as a group in stating "their culture places less emphasis than the white culture on achievement or competition". Honigman (1961, p. 123) makes an even broader statement when he indicated that there is "a high degree of psychological homogeneity (that) characterizes the American Indian". Bryde (1969), as a result of his study of the Sioux Indian children, has stated that Indian children should be educated first of all in their own value system. Bryde (1965, p. 16) has noted some "cultural variations" exist among different tribes, but "there seems to be almost universal psychological characteristics of Indians in general". Bryde's work with

the Minnesota Multiphasic Personality Inventory among the Sioux Indians at Pine Ridge, South Dakota, is one of the most interesting psychological studies found that deals with personality difference between the white and Indian youngsters. His study examined the hypotheses that among white and Indian adolescents a comparison of achievement and MMPI variables would reveal significant differences in an undesirable direction on the part of the Indian students, these differences would correlate in the undesirable direction with degree of Indian blood, and Indian drop-outs would reveal significantly greater personality disturbance than the Indian who stayed in school. Bryde (1966, p. 189) has stated simply and clearly that all hypotheses found support.

Although there are numerous psychological/personality studies in the literature that deal with the Indian, there does not appear to be any serious attempt to write a personality description other than pointing out differences between the whites and Indians as measured by various tests.

ACADEMIC ACHIEVEMENT

An unlimited number of studies have been done on school or academic achievement of Indian students. It seemed that most universities have attracted at least one graduate student who chose to write a thesis on this topic in fairly recent times. Many school administrators and/or counselors associated with schools in Montana that have an

Indian population have made local studies comparing the performance of Indian children with white children. The Bureau of Indian Affairs has accomplished a number of studies through their Research and Evaluation Office that deal with the question of achievement of Indian children.

Coombs, Kron, Collister and Anderson (1958) based a study on the California Achievement Test and ranked the pupils' achievement according to the type of school attended; their rank order was as follows: (1) white pupils in public schools, (2) Indian pupils in public schools, (3) Indian pupils in Federal schools, and (4) Indian pupils in mission schools. These writers pointed to what they termed an "amazingly consistent relationship between the degree of Indian blood and preschool language on the one hand and the level of achievement on the other"

(p. 6). Roessel (1962) asked teachers of Indian children in what classroom subjects Indian children have the greatest difficulty; the teacher indicated that "Oral English" presented the most problems to the Indian student with "Reading" and "Written English" as the second and third most frequent sources of difficulty. These same teachers indicated that "Arithmetic" presented the least amount of problems to the Indian student, and they ranked "Spelling" and "Physical Education" as second and third in terms of least difficulty. This study was confined to elementary school teachers.

Bryde (1965, p. 127) summarized a number of achievement studies on Indian children and concluded that the Indian students "achieve

satisfactorily for a while, then reverse themselves and show a steady decline". Bryde termed this reversal the "cross-over phenomenon" and stated that it appeared to occur at about the seventh grade level.

Coldarci (1960) concluded much the same as Bryde and suggested that this "cross-over" occurs two or three years earlier than the seventh grade; he suggested that it may be due to the fact that the school curriculum become increasingly dysfunctional for the Indian.

Mayeske (1971, p. 5) has challenged the reported higher results in achievement by white pupils in comparison to minority group children; he claims that 24 per cent difference in achievement dwindles to a mere 1.2 per cent "after a variety of social and economic conditions have been taken into account". Mayeske is only one of a few who attempt to explain away differences in test results between minority group children and white children, but his position is one of the more extreme in that he seemed to feel that explaining the differences somehow caused them to not really exist. Guthrie (1971) appears to be one among many who have tried various types of compensatory educational programs with minority group children; he attempted to follow Jensen's suggestion of using instructional methods appropriate to children of different socio-economic backgrounds, but he found no difference in performance based on the suggested instructional methods. However, Rosenthal and Jacobson (1966, p. 177) stated flatly that "experiments have shown that in behavioral research....E's (examiner's) expectancy can be significant

in determining S's (subject's) responses".

A number of other writers comment on the fact that what teachers regard as proper school objectives, rewards, and punishments are decreasingly shared by Indian students. Bryde's (1965) comments on this point are related, although he concerns himself only with attitudes and personality of the Sioux Indian pupils at different grade levels; he made the point that attitudes, values and personality of the Indian children are different from those of the white child, yet both usually have the same curriculum. Leon (1960, p. 15) has stated that "learning difficulties may also be symptoms of emotional maladjustment". Greenberg and Greenberg (1964) discussed the matter of language in relation to achievement and pointed out that cultural factors are also significant to achievement of the Indian pupil. However, the main point stressed by the Greenbergs was that the school becomes more and more a verbal world in the higher grades, which causes greater problems for the language deficient Indian pupil.

Trang (1969, p. 10) pointed out that Indian education "has been a confused, changing thing--depending on federal and state efforts, control and responsibility". She also pointed out that Indian children are more likely to suffer a number of school changes during their school history due to the more unstable home conditions they are apt to have. Sommars (1969) commented on the educational problems of Indian children at Fort Peck, Montana and the relationship between poor school

achievement and family derangement. Ryker, Rogers and Beaujard (1971) assert that broken homes, overcrowded housing conditions and low income are all factors that have been shown to correlate with poor school achievement. There is no doubt that the average Indian pupil would suffer more frequently from all three factors than would the average white pupil (Coleman, 1966).

Ebel (1966) did one of the better jobs of discussing the social consequences of testing, and all of his major conclusions appear to be very negative to a child from a minority group. The danger of placing a somewhat permanent stamp on any child due to the results of a test is always present, according to Ebel, and this stamp can ruin his self-esteem, reduce his educational motivation, and to some degree determine his social status as an adult. He also claimed that testing may foster a narrow conception of ability and reduce the diversity of talent available to schools and society; he also pointed out the possibility that testing may place education and the destinies of individual human beings under the control of test makers. Although Ebel may have overstated the case, he made some points that must be considered. The possibility of making education more impersonal, inflexible and mechanistic is always present to a greater or less degree. Kirkland (1971, p. 303) has examined the number of standardized tests used in recent years and stated "this (number) represents from three to five standardized tests per pupil per year"; she is clearly of the opinion that educators are

making too much use of standardized tests in the educational process today. She is also of the opinion that the simple matter of how a person thinks of himself will influence his test behavior/performance, and the level of aspiration will usually be increased with the amount of success the child experiences. As noted previously, some studies have shown a positive correlation between self-concept and academic performance. Money and Brennan (1969; p. 22) have stated that "some personality disabilities drive the individual to compensatory success", i.e., due to real or assumed personality defects an individual may compensate by working harder to achieve success. Merrill (1947) has stated that Indian youngsters are inclined to develop a passiveness or turning-in and become shy and uncommunicative. Money's and Brennan's comments were made in relation to white individuals who suffered from personality disorders in the psychosexual sphere, while Merrill was commenting on the personality development of Indians in general.

THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

The WISC is one of the two commonly used individual tests of intelligence. Burstein (1965, p. 843) states in the Sixth Mental Measurement Yearbook that "it (the WISC) has not displaced the older Stanford-Binet, but has certainly come to rival its predecessor as an instrument of choice in the testing of school age children". He further stated that studies are quite consistent with earlier works of this sort,

characterizing the WISC as a well-standardized, stable instrument, correlating well with other tests of intelligence. This test has been translated into at least four foreign languages and many studies have been conducted in an attempt to show its efficiency as a measure of general personality functions by combining various subtest scores. Schafer (1948) and Rapport (1968) have been two of the recognized leaders in this trend. Also active in the efforts to make a clinical-diagnostic instrument of the WISC have been Glasser and Zimmerman (1967). Cronbach (1960) has been one of the testing authorities who has questioned this effort to make a clinical instrument out of the WISC by using patterns of subtest scores.

Although many studies have been done where various group tests were administered to Indian children to measure intelligence, only one study was found where the Stanford-Binet had been applied to Indian children, and only one where the WISC had been used. In the latter study, Cundick (1970) used the Wechsler Pre-School and Primary Scale of Intelligence and the WISC on Indian children of the Southwest. He had 27 subjects to whom he applied the Wechsler Pre-School and Primary Scale and 26 subjects to whom he applied the WISC. He compared means and standard deviations of these two groups with those reported in the manuals for the two tests. On the Wechsler Pre-School and Primary Scale, he reported that the Indian children "scores (were) significantly below the expected means on all verbal tasks ($<.001$) and on three of the five

performance tasks" (p. 152). On the WISC the Indian students were significantly lower than the established means on all verbal tasks, but only the Picture Arrangement subtest was found to be significantly lower on the performance tasks. The Peabody Picture Vocabulary Test was also administered to the same students, and Cundick (1970, p. 153) reported that "the Indian students means were significantly below 100". Cundick concluded:

Wechsler Performance Scales can be used with Indian children populations in the Southwest United States and will provide normative data that will roughly approximate standardization samples, provided the children have had at least one year of school.

It is perhaps significant that Indian reservations and tribes of Southwestern United States are larger than those reservations and tribes involved in this study.

Selmer and Iscoe (1966) applied the WISC to 7, 8, and 9-year old Negro and white subjects in the southern part of the United States and compared the results with those obtained on the Ravens Progressive Matrices Intelligence Test. The WISC Full Scale I.Q. was consistently higher at the .001 level of significance for all age levels. The authors concluded that their results suggest the WISC is not appropriate for Southern Negroes because those measured as retarded were able to function effectively in their environment, i.e., functional intelligence needed is evidently different from that of the standardized population.

Fitch (1966) applied the WISC and the Ravens Progressive

Matrices to 25 first and second grade pupils and 25 fifth and sixth grade pupils from Spanish speaking backgrounds and found that the Ravens correlated higher with the WISC Verbal Section than with the WISC Performance Section at the first and second grade level than it did at the fifth and sixth grade level. The author concluded that these results indicate a progressively greater problem with language as a non-English speaking child advances in school.

In response to Jensen's (1969) opening article on intelligence in the Harvard Educational Review, Dr. James D. Nelson, a neuropsychiatrist, examined the WISC and claimed that the Information, Comprehension, and Vocabulary subtests to be highly weighted in favor of children who start school with a good command of the English language. Nelson (1969, p. 619) also faults the Arithmetic subtest because "it is weighted in favor of the child whose parents have sat down and taken time to teach him to count and figure"; the Digit Span subtest is criticized because it will favor "the child whose parents have taught him self-control". Nelson lists the Picture Completion, Picture Arrangement, Block Design, Object Assembly, Coding, and Mazes as the WISC subtests that are the more accurate indicators of intelligence when applied to minority group children.

In a personal letter to this writer L. Madison Coombs; who was associated with the Research and Evaluation Office of the Bureau of Indian Affairs in Washington; D.C. for many years, commented as follows:

I think your impression that very little has been done with individually administered I.Q. tests with Indian students is correct. I am sure such tests have been given to Indian students here and there, from time to time for diagnostic or guidance purposes, but I do not know of any studies of at all recent vintage which were concerned with the racial identification of the students. Certainly, I do not know of any which include students from the Blackfeet, Fort Belknap or Rocky Boy Reservations.

Coombs indicated in the same letter that his 1950 study, which was done in collaboration with the University of Kansas, purposely omitted intelligence testing because they did not believe a valid measurement was available. This conclusion was based on the fact that they considered nearly all group intelligence tests to be highly verbal and contained items that were drawn primarily from the major culture of the country.

The WISC has one important advantage over most intelligence tests in that it delivers a verbal and a performance (nonverbal) I.Q. scores. Glasser and Zimmerman (1967, p. 5) commented that "the culturally handicapped, such as the bilingual child, can be given non-penalizing parts of the test". Sekyra (1968) used the WISC, the Columbia Mental Maturity Scale (CMMS), and the Stanford-Binet (Form L-M) on Negro children in Mississippi in an effort to determine the correlation of the three tests when applied to Negro children. He referred to a study by Adkinson which concluded that Choctaw Indians performed relatively poorer on the CMMS than they did on the other two tests. Sekyra (1968, p. 15) concluded that Negro norms on the Stanford-Binet

were significantly higher in terms of derived mental ages than on the WISC or the CMMS; he commented on the results as follows:

Based on these data, it would seem appropriate to assume that neither the WISC nor the CMMS is giving adequate indication of intellectual functioning for Negroes. Future studies should be made regarding the validity of the CMMS and WISC scores when assessing members of the Negro population.

Munn (1965, p. 415) stated that the WISC Performance Scale "is designed to measure non-verbal symbolic processes", and pointed out that higher correlations are obtained between the Stanford-Binet and the WISC as a whole, which would indicate that the Stanford-Binet is based more on verbal items and would be less appropriate for Spanish and Indian speaking children than the WISC. In his general discussion of intelligence tests, Munn cautioned that tests scores do not show the qualitative aspects of mental growth, and suggested that intelligence test scores not be used as an isolated measure/predictor of performance.

Mercer (1971, p. 4) stated that the American psychologist needs a good test to measure the intelligence of "those who don't happen to be middle-class White Anglo-Saxon Protestants". She evidently believes that low scores reported for minority groups are primarily due to the fact that these children have not had the opportunity to learn the cognitive skills commonly measured by intelligence tests and the assumed experiential background is commonly not available to minority children.

The WISC seems to be particularly well suited to this study because of its Verbal and Performance sections; and one of the basic assumptions is that the scores achieved by Indian children will be significantly higher on the Performance Section than on the Verbal Section. Some generalizations relative to the Indian personality may also be made on the basis of results of this study, although this is not considered to be a basic aim of the study, in view of the fact some questions have been raised by recognized authorities in the field of testing as to whether the WISC can be used in this manner. Suggestions by Schafer (1948) in The Clinical Application of Psychological Tests will be used in making such observations. He is one of the recognized authorities who has supported the idea that the WISC can be used in this manner.

SUMMARY

The American Indian children have been one of the favorite targets of social scientists and psychologists when it comes to selecting groups to be evaluated by various tests. The initial results of intelligence testing of Indian children lead to what has been termed the "erroneous conclusion" that the Indian was an inferior subject for the educational process. Early investigators overlooked a number of considerations which are now considered significant, including the importance of language and other cultural factors that influenced

test results in a significant manner.

During the period from 1930 to 1940 a number of investigators began to take into account many of the factors which had been overlooked in the earlier studies, and results began to show the Indian equal to or even superior to the whites on some tests. This information brought on a brief period of what has been called "defensive type testing" to prove the white child equal to the Indian child. A more reasonable position seems to have developed about 1940 when authorities in the field of testing seemed to agree that there was no real difference in native or inherent abilities of the white and Indian child when all of the various factors were taken into account. Some writers charged that many people, including educators, still do not seem aware of the fact that there are no differences in potential or capacity between minority group children and white or majority group children. Jensen (1969) started the controversy anew with an article claiming that the Negro and Indian were both inferior to the white child in intelligence.

Some important personality differences exist between the Indian and white child, and it appears that the cultural influences are extremely significant in this area. There is some disagreement on just what the differences in personality structure are between the Indian and the white child and how these differences might be provided for in the school setting. The Indian child is apparently more group-centered and less aggressive than the white child. The white child is more apt

to compensate for feelings of inferiority by achieving in some other area, while the Indian child is more apt to withdraw. Although many writers refer to major personality differences between the white and Indian child, no comprehensive personality description of the Indian was found in the literature.

An unlimited amount of material is available on the achievement of the Indian child in terms of performance on standardized achievement tests in comparison to his white counterpart. Very little disagreement can be found in this area as to how the Indian child performs on these tests of school achievement. The Indian child achieves as well as the white child during the first few years of school but falls behind at a point somewhere between the fourth and seventh grades. The performance of the Indian children as a group appears to become progressively worse in comparison to the white children as a group. A number of reasons are suggested for this progressively poorer achievement, but language difficulty and emotional problems appear to be the most frequently mentioned.

The WISC has certain features that make it particularly appropriate for this study. Although it is a newer test than the Stanford-Binet, it has certain characteristics that make it highly applicable to this type of study, including a great deal of use in related studies in recent years. Probably the most desirable feature of this test has to do with the two separate I.Q. scores that are derived from it,

one of which is primarily verbal and the other that is primarily a performance type. Among the nonverbal factors measured by the WISC are the following: (1) eye-hand coordination, (2) visualization of the gestalt, (3) organization and planning, (4) visual-memory and perception, (5) directionality, (6) patterns and part-to-whole, (7) working to a model, (8) experience and exposure, (9) manipulation, (10) sequential awareness, (11) auditory training, (12) visualization techniques, (13) associative techniques, (14) visual memory, and (15) concrete experience (Banas and Wills, 1969).

Only one study was found that dealt with the performance of Indian children on the WISC, which is very likely due to the fact that the test is time consuming to administer and score, and the Indian educators have seldom had the personnel and other resources to accomplish any more than the basic educational program.

CHAPTER III

DESIGN OF THE STUDY

INTRODUCTION

There are seven Indian reservations in Montana, and there are at least ten different tribes represented in the state's Indian population of approximately 37,500. According to the Bureau of Indian Affairs (1965) approximately 70 per cent of the Montana Indians reside on or near the seven reservations in the state.

The data used in this study was collected during the period from July 1, 1967 to July 1, 1970 through the ESEA Title III Pupil Personnel Services Project. The test results used in this study are from Indian children who were enrolled members on the Browning, Rocky Boy and Fort Belknap Indian reservations. The test results on the white children in this study are from children attending the same schools as the Indian subjects. All tests were administered by examiners who were certified by the Montana State Department of Public Instruction as properly qualified to administer the Wechsler Intelligence Scale for Children.

POPULATION DESCRIPTION

Harold J. Boyd of the Department of Indian Affairs in Helena, Montana estimated the Indian population of Montana as 37,579 in a memorandum issued May 28, 1970. However, estimates of the Montana Indian

population tend to vary because, as Berry (1968, p. 2) stated, "none of the nations in this hemisphere have ever adopted an official definition of who is an Indian". The United States Bureau of Census and the Bureau of Indian Affairs operate under different definitions of who is an Indian.

The Bureau of Indian Affairs breaks the total Indian population in Montana down into the following categories:

Enrolled on reservations	23,589
Non-enrolled on reservations	2,240
Enrolled off reservations	3,800
Non-enrolled off reservations	<u>7,950</u>
	37,579

According to this report, males outnumber females by 18,977 to 18,602.

This report breaks the population down into the following age groups:

0 - 15	18,044	48%
16 - 21	3,360	9%
22 - 54	12,518	36%
55 and over	3,657	10%

The Bureau of Indian Affairs in Helena also supplied the following population figures for the three Indian reservations from which the sample for this study was drawn:

Browning	6,959
Fort Belknap	1,985
Rocky Boy	<u>1,350</u>
	10,294

The Blackfeet Indian Reservation at Browning extends eastward from Glacier Park, southward from the Canadian border through the foothills of the Rocky Mountains toward the Great Plains area of eastern Montana. It is one of Montana's largest reservations with large land areas in Glacier and Pondera counties. Although there are a total of approximately 12,000 enrolled members of the Blackfeet tribe, only about sixty per cent live within the reservation boundaries. The present-day Blackfeet are descendants of a loose confederacy of Piegans, Bloods, and Blackfeet proper, all of Algonquian stock, who gained control of much of the area between the Saskatchewan and Yellowstone rivers prior to the coming of the white man (Bureau of Indian Affairs, 1968). The Blackfeet own over 900,000 acres of land, and farming and ranching are the primary means of earning a living for most tribal members.

Most of the Indian children from the Blackfeet Reservation attend public schools in communities near or on the reservation. The few exceptions are enrolled in non-reservation boarding schools. The Cut Bank Boarding School, which was the last federally operated school for Indians on the reservation, terminated its academic program in 1956. Dormitories are still operated to provide homes for children from isolated districts (Bureau of Indian Affairs, 1965). Children living in these dormitories attend the Browning Public School System.

The Fort Belknap Reservation is located in north central Montana and is home for nearly two thousand Indians of Gros Ventre

(Atsina) and Assiniboine Tribes. Although once bitter enemies, these two tribes have lived together amicably for almost eighty years (Bureau of Indian Affairs, 1968). There are also two hundred non-enrolled Indians, mostly Chippewas and Crees, on the nearly 600,000 acres of land held by the tribe. The Gros Ventres come from Algonquian stock and the Assiniboines from the Yanktonia Sioux. Intermarriage with non-Indians has been a common practice for generations, and English is the language of common use.

Most of the inhabitants of this reservation live in the Milk River Valley and near the Little Rocky Mountains. Children from the northern end of this reservation usually attend school in Harlem and Dodson. There is a public elementary school and a twelve-year Catholic mission school at Hays for children in the southern end of this reservation. The facilities of the mission school are quite limited and the majority of the high school age children attend public school in Harlem and Dodson or off-reservation boarding schools. The Fort Belknap Reservation lacks sufficient resources to provide an adequate living for all of its residents, and it is quite common for people from this reservation to move to Butte or other larger Montana communities to secure employment. Some families support themselves by farming, ranching or other agricultural employment.

The Rocky Boy Reservation is located in the Bear Paw Mountains of North Central Montana. The reservation is located in the southwestern

part of Hill County and the northeastern part of Chouteau County. According to the BIA (1968), Chippewa (Ojibwa) Indians from Minnesota moved west into the Dakotas, then into Canada, and back again into Montana about one hundred years ago; during the same period Chief Little Bear moved a number of Canadian Cree Indians into Montana. In 1896 Congress appropriated money to have the Army move all of these Indians back to Canada; the legend has it that the Indians beat the troops back to Montana. The Rocky Boy Reservation was created by Executive Order in 1916 for these landless Indians; the reservation now incorporates nearly 110,000 acres.

Schools on the reservation were transferred from the BIA to the Havre Public Schools in 1960. An independent school district for the reservation was created in 1969 and the Indians assumed control of their elementary school at that time. A new school had been built at the reservation headquarters during the period that the area was a part of the Havre Public School System. Most elementary-age school children attend this school at Rocky Boy; junior and senior high school age students attend school in Box Elder.

"The Indian Education Report for 1969-1970" from the Montana State Department of Public Instruction reported enrollments for schools involved in this study as follows:

<u>School</u>	<u>Total Enrollment</u>	<u>Indian Enrollment</u>
<u>Blackfeet</u>		
Babb	97	97
Browning	1,939	1,703
Cut Bank	1,749	259
East Glacier	90	60
Heart Butte	164	164
Valier	407	56
	<u>4,446</u>	<u>2,339</u>
<u>Fort Belknap</u>		
Dodson	166	53
Harlem	540	249
Hays-Lodge Pole	279	274
St. Paul's Mission	156	156
	<u>1,141</u>	<u>732</u>
<u>Rocky Boy</u>		
Box Elder	250	193
Havre	3,387	479
St. Judes	451	5
	<u>4,088</u>	<u>677</u>

From these figures it is obvious that Indian children in this study are drawn from schools where only Indians are enrolled down to a point where the Indians are a distinct minority.

SAMPLING PROCEDURE

Both the Indian and white students used in the samples for this study were attending schools in the project area served by the Pupil Personnel Services Project at the time they were tested. Prior school experience was not considered in this study; it was assumed that attendance in schools outside of the Pupil Personnel Project area would

be just as likely for the Indian children as it would be for the white children. The Indian children may have attended a federal boarding school outside of this state, which is an experience that the white children would not have had. There seemed to be no valid manner of evaluating different school experiences even if they had been identified.

The Pupil Personnel Services Project placed no restrictions or rules on how children were selected for referral; this matter was left entirely up to each local school. A quota system was determined on the basis of the total school enrollment at one time, but it was abandoned when it was found to be unworkable. Classroom teachers were commonly the person who initiated the referrals, and their most common concern had to do with the lack of achievement or behavioral problems; these two reasons accounted for nearly 60 per cent of the stated reasons for referral of both white and Indian children. No apparent difference was found between the reasons for the referral of white and Indian children. School guidance personnel were the second most frequent source of referrals, and a large majority of these referrals were based on a desire of the counselor for assistance or consultation regarding the counseling procedure. Although it was possible for a parent to initiate the referral of their child, only 2 per cent of the referrals originated from this source, and most of these were in the three communities where the project had offices (Harlem, Conrad, and Big Sandy). District Courts and juvenile officers made a very limited number of requests for

evaluations by the project staff. In all cases, parents had to agree to the referral for any staff member to see a child for testing or counseling.

Some selectivity may well have been involved on the part of teachers, parents, and others making referrals, but the data presented later in this study indicates that a broad spectrum of pupils were referred in terms of the I.Q.'s represented. Although some referrals were made specifically because the teachers believed a child should be in a special education class, many children were referred with an indication that he was believed to be quite bright but was not achieving at that level in school. Only about 20 per cent of those children referred for possible placement in special education were found to be eligible on the basis of the I.Q. score attained.

As the WISC is limited to an age span of from five to fifteen years, definite age limits are established for this study by the use of this test. The writer anticipated that there would be very few cases below the age of eight years; and a concentration of cases in the age range from eight to fourteen was expected. Approximately 10 per cent of the pupils referred for testing were fourteen years of age and older in the white population; approximately 15 per cent of the Indian pupils referred were in the age group from fourteen years and older. Slightly over twice as many boys as girls were referred for testing in both the Indian and white population with the ratio of boys to girls somewhat

higher in the Indian population. Eighty-one male Indian subjects and twenty-four female Indian subjects were used in this study; there are seventy-three male white subjects and thirty-two female white subjects in this study.

All WISC record forms for all Indian children tested by PPS project personnel were reviewed and checked by this writer for accuracy and completeness, and it was found that there were 105 acceptable test results on Indian children available for use in this study. Thirty-four test results were eliminated because they were incomplete (less than ten subtests administered) or contained statements from the examiner indicating that they did not consider the results valid. WISC record forms of white pupils attending the same schools as those attended by the Indian children in the sample were also examined for acceptability in terms of completeness and accuracy. A total of 234 WISC record forms were available on these white pupils, and only eleven of these record forms were found to be unsuitable for inclusion in the white sample group.

A decision was made that 105 cases in the white sample would be adequate for the study in view of the fact there were only 105 Indian test results available; this decision was based on the fact that each test result form contained ten subtest scores, a Performance I.Q. score, a Verbal I.Q. score, and a Full Scale I.Q. score, and use of the total available white test results presented a very big job in terms of the

data that had to be handled. The method for systematic sampling outlined by Sax (1968) was used; each test record form was numbered and the entrance point was established by using a list of random numbers (Snedecor, 1962), and every second record form was selected thereafter.

METHODS OF COLLECTING AND ORGANIZING DATA

The WISC tests were scored by the examiner administering the test to the child based on the scoring criteria in the WISC Manual (Wechsler, 1949). The WISC scoring criteria booklet by James O. Massey (1965) was available to the examiners for additional information. The office secretary, or one of the other examiners, commonly checked computation of the examiner who administered the test; these computations were rechecked by this writer for all cases included in this study.

After checking the accuracy of the scoring on each test, the scaled scores were recorded for each individual student on the record form, and a master worksheet was made to record the scaled scores of all individuals into the two groups. The Verbal I.Q., Performance I.Q., and Full Scale I.Q. were also posted on this master worksheet.

By using scaled scores and the three different I.Q.'s all ages could be combined to arrive at means for the total Indian group and the total white group. These composites of the scaled scores and the three I.Q.'s served as the basis for combining subtest scores in an effort to evaluate school skills as outlined by Glasser and Zimmerman (1967). Under Wechsler's scoring system all subtests have a mean scaled score or

ten on each subtest and a standard deviation of three, so plotting the two groups in this study on the graph found on page 147, provided a graphic representation of how they differ from the Wechsler standardization sample and from each other.

The WISC differs from other individual tests of intelligence for children in that the concept of mental age as a basic measure of intelligence is renounced (Wechsler, 1949). I.Q.'s are obtained by comparing each individual's performance with the scores earned by individuals in his own age group; Wechsler terms this a "deviation intelligence quotient" and points out this concept has been employed in some group tests, notably the Otis Tests and Pinter General Ability Tests. Wechsler (1949, p. 4) commented on this procedure as follows:

By keeping the standard deviation of I.Q.'s identical from year to year, a child's obtained I.Q. does not vary unless his peers varies; if the standard deviation were not made identical, a child's obtained I.Q. might vary considerably from year to year, even though his relative ability remained constant.

An I.Q. of 100 on the WISC is set equal to the mean total score for each age, and the standard deviation is set equal to fifteen I.Q. points. The percentile limits place the highest one per cent of I.Q.'s at 135 and above, the lowest one per cent with I.Q.'s of 65 and below, and the middle 50 per cent of the children at each age will have I.Q.'s from 90 to 110 (Wechsler, 1949, p. 16).

The scaled scores on the WISC have been so derived as to provide,

at each age and for each of the separate tests, a mean scaled score of ten and a standard deviation of three scaled score points. Wechsler (1949) states that this was accomplished by preparing cumulative frequency distributions of raw scores for each test at each level and setting each percentile point at its appropriate standard score value on a theoretical normal curve with a mean of ten and a standard deviation of three. Basing the data on one hundred and five Indian cases and an equal number of cases for the white control group in this study, the estimate standard error can be determined by the following formula (Ferguson, 1966);

$$\overline{SX} = \frac{\sigma}{N}$$

\overline{SX} = estimated standard error of arithmetic mean

σ = standard deviation in the population

N = number of cases in the sample

In considering the question of whether or not the group used in the sample is different from the norm group, the ratio of the deviation sample mean from the population mean, divided by an estimate of the standard deviation of the sampling distribution of the mean would provide the following formula to determine the t-ratio for a one sample t-test from the population (Ferguson, 1966):

$$t = \frac{\bar{X} - \mu}{S\bar{X}}$$

\bar{X} = mean of the sample

μ = mean of the population

$S\bar{X}$ = estimated standard error of sample mean

The null hypothesis will be assumed, i.e., there will be no significant difference between means of the Indian children on subtests scores, Verbal I.Q., Performance I.Q., or Full Scale I.Q. when compared to norms of the test or norms of the control group. Stating this in formula form will be as follows:

$$H_0 = \mu_1 - \mu_2 = 0$$

No statistical difference was considered significant unless the .01 level of confidence or beyond was achieved. All data was posted on the Fortram Coding Form GX28-7327-6 U/M050 and turned over to the Montana State University Computer Center, where the data was key punched onto IBM cards and the program was run on the computer. All cards were doubled checked by running them through the verifiers used in the MSU Computer Center.

ANALYSIS OF DATA

Due to the lack of research on the WISC as applied to Indian children and the apparent disagreement on the question of heredity and

environment found in the literature, it was deemed advisable for the purpose of this study that the null hypotheses be assumed as follows:

1. There is no significant difference between means of the scaled scores of the Indian subjects and the white subjects in this study on the General Information subtest of the WISC.

2. There is no significant difference between means of the scaled scores of the Indian subjects and the white subjects in this study on the Arithmetic subtest of the WISC.

3. There is no significant difference between means of the scaled scores of the Indian subjects and the white subjects in this study on the Similarities subtest of the WISC.

4. There is no significant difference between means of the scaled scores of the Indian subjects and the white subjects in this study on the Vocabulary subtest of the WISC.

5. There is no significant difference between means of the scaled scores of the Indian subjects and the white subjects in this study on the Picture Completion subtest of the WISC.

6. There is no significant difference between means of the scaled scores of the Indian subjects and the white subjects in this study on the Picture Arrangement subtest of the WISC.

7. There is no significant difference between means of the scaled scores of the Indian subjects and the white subjects in this study on the Block Design subtest of the WISC.

8. There is no significant difference between means of the scaled scores of the Indian subjects and the white subjects in this study on the Object Assembly subtest of the WISC.

9. There is no significant difference between means of the scaled scores of the Indian subjects and the white subjects in this study on the Coding subtest of the WISC.

10. There is no significant difference between means of the scaled scores of the Indian subjects and the white subjects in this study on the General Comprehension subtest of the WISC.

11. There is no significant difference between the mean of the Verbal I.Q. achieved by the Indian subjects and the mean of white subjects in this study.

12. There is no significant difference between the mean of the Performance I.Q. achieved by the Indian subjects and the mean of white subjects in this study.

13. There is no significant difference between the mean of the Full Scale I.Q. achieved by the white subjects and the mean of Indian subjects in this study.

14. There is no significant difference between the performance of Indian children on the WISC whether they were tested by a male or a female examiner.

SUMMARY

The scaled subtest scores, Verbal I.Q., Performance I.Q. and Full Scale I.Q. scores achieved by a group of 105 Indian children from three Indian reservations in Montana were compared, as a group, with the standardized scores as determined by the publisher of the Wechsler Intelligence Scale for Children and a group of 105 white children from the same area of Montana. These same test scores were examined to determine if there was a difference in results obtained when Indian children were examined by a female examiner as compared to those results obtained by male examiners. The test results were examined to determine if there were particular subtests on the WISC on which Indian children deviated from the white sample and the test maker's standards; the information obtained may assist examiners in the future when they administer the WISC to Indian children referred for testing by classroom teachers.

There were a total of 139 Indian pupils tested during the three years PPSP operated, and 105 of these tests were found to be usable in this study. A total of 234 WISC test results were available on white pupils, and 223 of these tests were usable. However, only 105 of the test results of white children were randomly selected for use in this study. The Indian population is 139 and the white population 234 for the purposes of this study. In both cases the sample was 105.

CHAPTER IV

RESULTS

This study was an investigation of the application of the Wechsler Intelligence Scale for Children (WISC) to Indian children from three reservations in North Central Montana. The results reported in this chapter are based on data secured by examiners working in the Elementary and Secondary Education Act Title III Pupil Personnel Services Project during the period from July 1, 1967 to July 1, 1970. A summary of the results may be found on pages 147, 148, and 149.

AGE

A total of 105 test results of both Indian and white children were used in this study; the Indian sample contained eighty-one male subjects and twenty-four female subjects, and the white sample had seventy-three male subjects and thirty-two female subjects. The chronological age range in the Indian sample was from six years one month to fifteen years nine months, and the white sample from six years seven months to fifteen years eleven months. The mean age for the Indian sample was 11.03, and the mean age for the white sample was 11.2 years.

Hillway (1969, p. 55) indicated that "when the difference between two groups is tested for significance, the appropriate statistic is t , and the method is called the t -method". Garrett (1962) gives the critical value of t for 208 degrees of freedom as 2.60; the actual

t-value attained in the t-test on the age of the two groups is 0.549. As the critical value is not attained, the null hypothesis is retained, i.e., there is no significant difference between the mean age of the two groups in this study when tested at the .01 level of significance. This level of significance is highly important to this study in that the chance of this difference between the two groups being due to anything other than chance is less than one in one hundred. In effect it can be assumed that the age mean difference between the two groups need not be considered as a likely factor in testing the other hypothesis in this study. As the age range is also quite similar, it seems safe to accept the fact that the two groups are basically the same in terms of age.

VERBAL SUBTESTS

Table II presents the results of the five subtests that make up the Verbal Section of the Wechsler Intelligence Scale for Children (WISC).

TABLE II
MEAN SCALED SCORES OF INDIAN AND WHITE SUBJECTS
ON THE VERBAL SECTION OF THE WISC

SUBTEST	MEAN		D.F.	CRITICAL .01	t-TEST
	INDIAN	WHITE		t-VALUE	VALUE
Information	6.562	9.114	208	2.60	6.141
Comprehension	6.371	8.933	208	2.60	5.746
Arithmetic	6.010	8.219	208	2.60	5.878
Similarities	7.629	10.448	208	2.60	5.493
Vocabulary	6.962	9.724	208	2.60	6.083
Verbal I.Q.	79.552	95.400	208	2.60	6.941

Information subtest. This subtest is considered to be a measure of information extracted by the subject from his experience and education (Wechsler, 1965); in a sense it is a test of old learning and a reflection of cultural background in addition to being a measure of memory. Rapport, Gill and Schafer (1968) consider this subtest a measure of early environment and education, as well as requiring memory of specific facts; they suggest that performance on this subtest can be blocked by temporary anxiety. According to Lutey (1971), the Information subtest correlates highest with the Vocabulary subtest, but she questions the idea that temporary anxiety is likely to influence the results in a significant manner.

The examiner reads the questions to the subject as written in the manual; the examiner may ask the subject to explain his answer more fully, but he is directed not to ask leading questions or spell the words in the question for the subject. The test is not timed, and the examiner continues through the thirty questions unless the subject misses five consecutive questions. Under these circumstances, patience of the examiner may be important to the results of this subtest.

The 105 Indian subjects achieved a mean scaled score of 6.562; the mean scaled score for the 105 white subjects was 9.114. Scaled scores on the WISC are "normalized standard scores with a mean of 10 and s.d. of 3" (Cronbach, 1960, p. 194). The t-value for significance at the .01 level of confidence for 208 degrees of freedom is 2.60; the t-value

when the two scaled scores are compared is 6.141 for this subtest, which exceeds the critical value and requires that the null hypothesis be rejected. There is a significant difference between the Indian and white groups in this study on the Information subtest when tested as the .01 level of significance.

In view of the difference between the two groups, it might be useful to examine the rationale or assumption underlying this subtest. It is assumed that the thirty questions included in the subtest cover a broad range of material that allow an adequate sampling of information and that such information may be acquired by a youngster who experiences the usual opportunities in this society (Glasser and Zimmerman, 1968). As noted above, it is also assumed that the range of an individual's information is a measure of his intellectual capacity and that more intelligent children will have broader interests, greater curiosity and enjoy greater mental stimulation. The evidence indicates that when one examines the questions on this subtest that the information required to answer correctly is learned primarily in school, so the assumption that a comparable educational program is available to all children is important to this subtest. As mentioned previously in this study, a number of studies have shown achievement of Indian children to fall below that of white children after the fourth year of schooling, especially in federal boarding schools and mission schools. Although none of the Indian children involved in this study were attending

federal boarding schools at the time they were tested, it is very likely that some of them had attended such schools prior to the time that they were tested.

Comprehension Subtest. This subtest is composed of 14 problem questions and, according to Glasser and Zimmerman (1968), are designed to measure comprehension of behavioral situations that are largely social in nature. Probably the basic assumption is that social and moral behaviors are acquired and utilized by children through everyday living experiences as well as through school and formal education. The assumption that more intelligent children will have greater knowledge to draw from in solving practical problems and have a greater capacity to synthesize such knowledge is basic to this subtest. Wechsler (1965) calls this subtest a measure of the common sense of a child; he also indicates that poor verbalizers often do poorly on this test. Lutey (1971, p. 7) made the observation that this subtest "requires conceptual manipulation of information obtained in the subject's cultural and educational background"; moral codes of the individual and abstract thinking are also involved. Rapport, Gill and Schafer (1968), who are more inclined to a clinical approach, consider the Comprehension subtest as reflecting emotional status and requiring judgment in reality situations and delay of impulses. This subtest correlates highly with the Information and Vocabulary subtests (Lutey, 1971). Glasser and

Zimmerman (1968, p. 46) noted that "this test allows for some sex differences to be observed, favoring boys". In view of this observation it is worth noting that there are eighty-one male subjects in the Indian sample and seventy-three in the white sample.

Wechsler (1949) reported reliability at .59 for this subtest at age 7 1/2 years, .73 at 10 1/2 years, and .71 at 13 1/2 years, which is the lowest reliability reported for any of the five subtests on the verbal section of the WISC. Glasser and Zimmerman (1968, p. 53) indicated that Comprehension is "particularly vulnerable to maladjustment, more than any other subtest". They also noted that over-dependency, overly concrete thinking, nonverbal and perfectionistic children will tend to score low on this subtest.

The fourteen questions are read to the subject and it is permissible to repeat the questions; the examiner is instructed to repeat the question if no response is obtained after ten or fifteen seconds. All fourteen questions are read to the subject unless he experiences three consecutive failures. Examiner judgment enters into the score received to some extent in that answers may receive 2, 1, or 0 points; however, the test manual provides specific criteria and sample answers.

The Indian subjects achieved a mean scaled score of 6.371; the white sample achieved a mean scaled score of 8.933 on this subtest. A t-test value of 5.746 resulted from these two scores, which is beyond

the .01 level of significance of 2.60, and the null hypothesis must be rejected.

Glasser and Zimmerman (1968, p. 46) noted that "socially acceptable answers are important to success on this portion of the WISC". Obviously, "socially acceptable" may be quite different in the Indian culture from that which is "socially acceptable" in the white culture. Low reliability of this subtest must also be taken into account when considering the above results. This mean score of 6.371 for the Indian group on this subtest is next to the lowest of the ten subtest means.

Arithmetic Subtest. Mental alertness is considered to be a major factor in success on this subtest. Arithmetic correlates highly with global measures of intelligence (Lutey, 1971). It avoids verbalization and reading difficulties to some extent, and in combination with the Information subtest is considered to be a good estimate of a subject's scholastic achievement. Wechsler (1965) noted that performance may be affected by fluctuations of attention, transient emotional reactions and educational background. Concentration is an obvious requirement for success. Lutey (1971) stated that this subtest correlates most highly with the Information and Vocabulary subtests and is a moderately good measure of global intelligence. Anxiety may influence results in a negative manner on this subtest, but authorities seem to disagree as to the level of anxiety that is significant

(Cronbách, 1960; Rapport, Gill and Schafer, 1968; Lutey, 1971). A good deal of agreement is found among these authorities that only an elementary knowledge of arithmetic is required for success on this subtest. However, the subject must have the ability to translate work problems into arithmetic operations. Glasser and Zimmerman (1968, p. 59) noted that "important clues to personality and attitudes toward school achievement" are often revealed by the performance on this subtest. Reliability is reported at .63 at 7 1/2 years of age, .84 at 10 1/2 years of age, and .77 at 13 1/2 years of age (Wechsler, 1949).

This subtest contains a total of sixteen problems; the first thirteen are read to the subject and the last three are read by the subject. There are maximum time allowances for each problem, and timing must start after the first reading of the problem; however, the problem may be repeated at the subject's request, or if the examiner believes that the subject did not understand the problem when it was read the first time. Scoring is completely objective and the examiner is not called on to make judgments in scoring. Timing is obviously highly important to the score received in that the subject secures no points if he exceeds the maximum time allowed. In view of the previous discussion on time as it fits into the Indian culture, this point may be highly significant to the results secured on this subtest.

The Indian sample scaled score mean is 6.01 on this subtest, which is the lowest mean of any of the ten subtests. The mean scaled

score of the white sample is 8.219, which is also the lowest mean achieved by the white group on any of the ten subtests. A t-value of 5.878 resulted when these two means are tested, which is well above the 2.60 value for 208 degrees of freedom at the .01 level of significance. The null hypothesis must be rejected and acceptance given to the fact that there is a significant difference between the two groups on the Arithmetic subtest.

As discussed above, mental alertness and concentration are considered basic to success on this subtest. The question arises whether or not the difference may be attributed to the lack of concentration, which is often associated with a high level of anxiety. As noted in Chapter II, the research on anxiety and achievement/performance has produced mixed results in attempting to answer this question. Although a certain amount of anxiety apparently has a positive effect on achievement, extreme anxiety can be a negative factor.

The strict time limits of this subtest must also be considered when examining the results. In addition to being anxiety producing, time is a much different element in the Indian and white cultures. In addition to the question of time and anxiety factors involved in the results, one must take into consideration Wechsler's point that Arithmetic and Information are fairly good estimates of a subject's

scholastic background. Do the differences on these two subtests indicate a difference in educational background? Are these results merely due to the "cross over phenomenon" noted by Bryde (1965) on the Pine Ridge Reservation in South Dakota? He found that Indian achievement kept up with or was even slightly higher than white children until about the fourth year in school; after the fourth year of school, the Indian child tended to fall further and further behind the white child. Bryde referred to this tendency as the "cross over phenomenon".

Similarities Subtest. This subtest is based on the assumption that the more intelligent an individual is the wider his range of ability to discriminate will be. Additionally, the more intelligent the person is, the broader his interests are likely to be; the more intelligent person is often assumed to have more creativity and imagination (Biehler, 1971), and will, therefore, be able to discern essential relationships to a greater degree. Wechsler (1965) has stated that the major ability involved in this subtest is that of being able to perceive the common elements of the terms he is asked to compare; a degree of verbal comprehension is required for even minimal success. Logical and abstract thinking are both involved in this subtest, and concept formation and the ability to relate facts are also required of the subject. Glasser and Zimmerman (1968, p. 60) term this subtest a measure of "qualitative aspects of relationships which the subject has abstracted

from his environment". They also have stated that obsessive-compulsive children probably will do very well on this subtest; conversely, the overly concrete approach will result in lowered scores.

Reliability coefficients at the three age levels of 7 1/2, 10 1/2, and 13 1/2 years are reported as .66, .81 and .79 respectively (Wechsler, 1949). There are four introductory analogies ("Lemons are sour but sugar is _____") given to subjects under eight years of age and suspected mental defectives; there are twelve "similarities" ("How are a plum and a peach alike?") in addition to the analogies. All items are administered unless the subject experiences three consecutive failures--if that happens, this subtest is discontinued. Timing is not involved in this subtest, but judgment of the examiner enters into the scoring in that the subject may receive a score of two points, one point, or zero, depending on the quality of the answer. Specific criteria for scoring are provided in the examiner's manual, but some judgment on the part of the examiner is required.

The Indian sample earned a mean scaled score of 7.629, and the white sample a mean scaled score of 10.448. This subtest is the only one where the white sample exceeded the mean of 10.0 that was established by Wechsler in his original sample. The null hypothesis is again rejected at the .01 level of significance; the critical value is 2.60 and the derived t -value is 5.493, so a significant difference in the two groups is confirmed on this subtest.

This subtest requires the subject to explain how the following pairs are alike: plum and peach, cat and mouse, beer and wine, piano and violin, paper and coal, pound and yard, scissors and copper pan, mountain and lake, salt and water, liberty and justice, first and last, and the numbers 49 and 121. There seems to be little reason to claim a cultural factor is involved in these pairs of words. However, if the subtest is a measure of the ability to abstract by means of verbalization, as indicated by Glasser and Zimmerman (1968), the question of language deficiency must be considered. The question of why white children from North Central Montana achieve their highest score on this subtest is also worthy of consideration. As other subtest scores on the Verbal section are below the established mean of 10.0, there is no apparent or obvious explanation for the fact that the white sample exceeded the mean on this subtest. Perhaps there are some unidentified environmental factors present that contribute to the success of the white sample on this particular subtest; as the Indian sample also scored highest on this subtest of the five subtest that make up the Verbal section, it would seem that some common environmental elements may be present in both the Indian and white cultures. However, the results also raise the question of whether or not Indian children may think more concretely than white children. Rigidity of thought processes or negativism and distortion of thought processes are mentioned as factors that may depress scores on this subtest; however, Glasser and

Zimmerman (1968, p. 66) also stated that "low scores can indicate distrust", which is an interesting point for conjecture in relation to Indian children who are attending a school where they are in a minority and are tested by a white examiner.

Vocabulary Subtest. Wechsler (1965) has described this subtest as a good measure of general intelligence, an index of schooling and learning, and a source of evidence of the subject's fund of verbal information and general range of his ideas. Word knowledge from experience and education are obvious sources of success on this subtest. Wechsler mentioned the qualitative aspects of the subtest as being one of its special merits; the answers given may indicate differences in reasoning ability and tell something about the cultural background of the subject. This subtest is sometimes pointed to as a rough measure of the subject's optimal intellectual efficiency in that it reflects acquired range of ideas, experiences and interests. Rapport, Gill and Schafer describe it as being dependent on early education and resistant to deterioration in terms of emotional disturbances. Cohen (1957, p. 454) stated that "if a single subtest is needed to measure present intellectual functioning via a verbal avenue, Vocabulary should be the subtest of choice".

In discussing the rationale behind this subtest, Glasser and Zimmerman (1968) pointed out that definition of words implies the reorganization of ideas through manipulation of verbal signs and symbols, and this ability has long been accepted as one criterion of intelligence.

However, they made the additional observation that home background and educational opportunity may contribute importantly to the score. One might safely say that this test is assumed to be a measure of learning ability, verbal information and range of ideas which are influenced by a child's educational background and his cultural setting.

This subtest consists of forty words which theoretically are arranged in the order of ascending difficulty. The first five items are scored either as two or zero points, which has caused some authorities to question the discrimination of the scale at an early age (Glasser and Zimmerman, 1968). The remaining thirty-five terms are scored as two, one or zero point answers. Testing is discontinued when the subject has five consecutive failures, but time is not a factor in testing. Obviously examiner judgment may influence the results on this subtest, although scoring guidelines are provided in the manual. Glasser and Zimmerman (1968) made the point that results are dependent on socioeconomic status, the amount of exposure to facts and general information, the amount of formal schooling, and a child's native language. If these authorities are correct in this statement, anticipating the lowest score for any of the subtests for the Indian sample might be in order. Wechsler (1949) reported reliability at 7 1/2 years of age as .77, at 10 1/2 years of age at .91, and at 13 1/2 years of age at .90, which are the highest reliability coefficients of the five Verbal subtests for all three ages.

Somewhat surprisingly the mean scaled score for the Indian sample on this subtest is surpassed only by the Similarities subtest in the Verbal section of the test. The Indian sample achieved a mean scaled score of 6.962 on the Vocabulary subtest, while the white sample had a mean scaled score of 9.724. The critical value for the t-test is 2.60, and the derived t-test value for the two means on this subtest was 6.08, which required that the null hypothesis be rejected when tested at the .01 level of significance.

If the results obtained by the Indian sample for this subtest are somewhat unexpected, it is that the score held up as well as it did in face of the factors described that should contribute to a lowered score. The question of why the mean proved to be the second highest of the five verbal subtests when there are a number of factors present that are apt to lower scores has to be one of the major considerations when examining the results secured on the WISC. Perhaps the language problem is not as great as one might expect from the literature reviewed, or educational opportunity is better than average. However, the latter possibility does not seem to hold true for those other subtests that are considered to be a measure of educational background. As the Indian and white samples were drawn from the same schools, it is difficult to explain the significant difference in the two means if educational opportunity is an important factor measured by this subtest.

SUMMARY AND DISCUSSION OF VERBAL SECTION

The only subtest that is timed on the Verbal Section of the WISC is Arithmetic, and the Indian sample had the lowest mean scaled score on that part of this section; however, it should be noted that the white sample achieved their lowest mean on the same subtest. As noted in the earlier discussion, mental alertness and concentration are required for the subject to enjoy success on the Arithmetic subtest. In discussing the knowledge required in this subtest, Glasser and Zimmerman (1968, p. 55) stated that "this kind of knowledge is primarily taught in the public school system". The question then arises whether the schools attended by these children were ineffective in teaching some of the fundamentals necessary for success on this subtest. However, it was also noted in the previous discussion that this subtest measures the ability to utilize abstract concepts of numbers and numerical operations, which are considered to be measures of cognitive development. Concentration and attention are non-cognitive functions, so the test may suffer from either cognitive or non-cognitive factors; however, the emphasis of the authorities seemed to be on non-cognitive factors, i.e., mental alertness and concentration. There is some agreement by the authorities that the Arithmetic subtest is quite susceptible to the effects of anxiety, and Glasser and Zimmerman (1968, p. 59) noted that "the authority dominated youngster who is eager to please may

do quite well while the resistant child may do very poorly". In view of the fact that both the Indian and white means are the lowest of the five subtests on the Verbal Section in Arithmetic, one must consider the possibility of anxiety and/or "resistant child" as an answer. Are both the white and Indian children in Northern Montana inclined to be more independent, and thus achieve lower scores?

Consideration should be given to the fact that both the Indian and white sample achieve their highest means on the Similarities subtest. As a matter of fact, the rank order of both groups is the same for the five subtests. This fact points out that there are certain commonalities present in the results even though the white group is consistently higher than the Indian group. Explanation becomes difficult when one attempts to offer something that can be supported by the data from this study or other literature. However, there is obviously a somewhat common educational background influencing the results, and there is also some common culture for the two groups. The question also arises whether or not language may be the reason for the consistently higher achievement by the white sample in view of the consistency in rank order of the subtests:

It is also to be noted that the Indian mean verbal I.Q. is 79.552, as compared to 95.400 for the white sample, which is slightly more than one standard deviation below the white mean. In the highly verbal world of the school of today, it is apparent that the Indian

children will experience extreme difficulty in achievement when traditional instructional methods are used.

PERFORMANCE SUBTESTS

The Performance Section of the WISC contains five subtests, all of which are timed. A maximum time is allowed on all five of the subtests for the subject to earn any points, and bonus points are awarded for fast solutions/answers. As pointed out in the previous discussion, time is apt to be viewed quite differently by the Indian and white child; authorities seem to be in general agreement that a timed test will tend to deliver lower scores for Indian children than for white children. However, the authorities are also in general agreement that nonverbal or performance tests are more appropriate measures of intelligence for children from a different culture or language background. In a sense, it appears that there is a negative factor (time) and a positive factor (performance or nonverbal tests) involved in this section of the WISC when testing Indian children. As Cronbach (1960, p. 203) pointed out, "educational handicaps show up directly in a verbal test," but he also noted that performance tests are developed through learning and every culture provides some amount of training along the lines of these tests. Evidently there are some subtle effects on attitude and motivation that affect all tests. For example, the educated classes of America are taught from early childhood to take intellectual matters seriously, and

the child is rewarded for answering adults' seemingly pointless questions.

Table III depicts in graphic form the results of the five subtests of the Performance Section of the WISC.

TABLE III
MEAN SCALED SCORES OF INDIAN AND WHITE SUBJECTS
ON THE PERFORMANCE SECTION OF THE WISC

SUBTEST	MEAN		D.F.	CRITICAL .01	t-TEST
	INDIAN	WHITE		t-VALUE	VALUE
Picture Completion	8.686	9.981	208	2.60	3.093
Picture Arrangement	7.819	9.152	208	2.60	3.226
Block Design	8.143	9.105	208	2.60	2.568
Object Assembly	8.771	9.295	208	2.60	1.423
Coding	7.667	9.543	208	2.60	4.712
Performance I.Q.	87.638	96.076	208	2.60	4.513

Picture Completion Subtest. Wechsler (1965) stated that this subtest is a measure of the subject's ability to differentiate essential from the non-essential detail, which is based on perceptual and conceptual abilities required in the visual recognition and identification of familiar objects and forms. He also sees visual alertness and memory as important to success with this subtest. Rapport, Gill and Schafer (1968) claim that the major factors involved are concentration and appraisal of relationships. Cohen (1959) found little correlation between this subtest and any other of the nine subtests. However, the description of factors involved in this subtest are quite similar to

those mentioned for the Arithmetic subtest.

This subtest consists of twenty pictures that have an important element missing, and the subject is required to name the missing element within fifteen seconds. These tasks are arranged in ascending order of difficulty. Glasser and Zimmerman (1968, p. 74) have noted that the test is easy and quick to administer, has good face validity, requires a minimum of verbalization, has appeal for children, and has a good range; they also note that it is "helpful in evaluating a child whose perception is adequate but whose ability to reproduce by visual-motor means is poor." Reliability coefficients are .59 at 7 1/2 years of age, .66 at 10 1/2 years of age, and .68 at 13 1/2 years of age (Wechsler, 1949).

The Indian group scaled score mean was 8.686, and the white mean was 9.981. The critical t-value is 2.60 and the t-value for the two means was 3.09, which requires that the null hypothesis be rejected when tested at the .01 level of significance. Based on the t-test at this level the fact that there is a difference between the two groups is accepted. The Indian mean on this subtest is surpassed only by that of Object Assembly of the five subtests on the Performance portion of the WISC. According to Glasser and Zimmerman (1968) low scores on this subtest may be due to anxiety, negativism, poor attention, and lack of concentration. As noted in earlier results on the Verbal section, these factors were also mentioned as reasons for low scores, yet the Indian mean is among the highest on this test for the Indian sample. In a sense,

the higher mean on this subtest by the Indian subjects confuses the results. The white mean of 9.981 is very close to Wechsler's mean of 10.0. Although the subtest allows a maximum time of fifteen seconds per item, time is seldom a factor--the child either knows or does not know the answer very quickly, and there are no bonus points for speed.

The question of why the white children are significantly higher than the Indian children becomes more significant when considering the results on the subtest in view of the decreased cultural/language factor on performance type tests noted above. As time seems to be largely ruled out also, Cronbach's comments on habits, attitudes, and motivation as cultural products seems to be the only answer if heredity is rejected.

Picture Arrangement Subtest. This subtest consists of eleven different cut-up pictures of picture sequences that the subject is required to assemble or put in proper order. Time bonuses are quite important on the test in that the subject can earn from zero to seven points, depending on the time factor. This subtest is based on the rationale that placing a series of related pictures in a logical order is considered one criterion of intelligence. The synthesis of parts into intelligible wholes is required for the subject to be successful on this subtest; perception, visual comprehension, social alertness and common sense are also mentioned as factors that are measured by this subtest (Glasser and Zimmerman, 1968). Wechsler (1965) emphasizes the

ability to comprehend and size up the total situation and the ability to get the idea of a whole story as basic to success on this subtest; he also mentions the ability to interpret social situations as being important. Cohen (1959) noted that it shows high error variance but is the best measure of general intelligence of the Performance subtests. Lutey (1971, p. 15) calls this subtest "the most ambiguous and promiscuous of any of the subtests".

Wechsler (1949) reports reliability coefficients as .72 at 7 1/2 years of age, .71 at 10 1/2 years of age, and .72 at 13 1/2 years of age, which is the least fluctuation over these age groups of any of the ten subtests. Pairing with the Block Design subtest of the Performance Section is suggested as a good measure of nonverbal general intelligence (Glasser and Zimmerman, 1968). These authorities also noted that this subtest is attractive to children due to its comic strip format, and the situations are reasonably familiar to most children. However, crucial to success is the presence of typical life experiences, either actual experiences or through reading or television.

The mean scaled score of the Indian sample was 7.819, and the white sample a mean of 9.105, which produced a t-test value of 3.226; this value exceeds the .01 critical t-value of 2.60 and required rejection of the null hypothesis and acceptance of the fact that the two groups are different in terms of this subtest.

This subtest stresses perception of details in somewhat the same way as Picture Completion; low scores on Picture Arrangement, Picture Completion, and Block Design are an indication of possible perceptual defects, although Picture Arrangement stresses the ability to organize stimuli in sequential progression. Perseveration on these subtests is the classic sign of perceptual problems, while random shuffling of the pictures is considered to be an indication of anxiety. Glasser and Zimmerman (1968) list visual-motor coordination, perception, analysis, synthesis, and reproduction of abstract designs as factors measured by this subtest.

The mean achieved by the Indian sample is the lowest of the five subtests in the Performance Section except for the Coding subtest (7.666), and the Coding subtest is considered to be a measure of visual-motor dexterity, social adaptation, and maturity. Coding has stringent time limits, and motivation is highly important to success on time tests.

Block Design Subtest. As noted in the previous discussion, this subtest ranks high as a measure of "G" (global intelligence) and non-verbal intelligence; Wechsler (1965) also refers to it as a measure of the ability to analyze and form abstract designs and a measure of visual-motor organization ability. Rapport, Gill and Schafer (1968) view it as involving the ability to differentiate a pattern into parts, reproducing it, and concept formation. Lutey (1971) has noted that it correlates

highly with Object Assembly, Picture Completion and Picture Arrangement at most ages. Cohen (1959) supported Wechsler's position that this subtest is the best measure of "G" among the Performance tests; it is also a good measure of perceptual organization. Glasser and Zimmerman (1968, p. 81) supported the comments of other authorities and noted that "logic and reasoning must be applied to space relationships" on this subtest.

This subtest consists of ten two-dimensional designs that the subject must reproduce with multicolored blocks within specified time limits. Although the blocks have red, white, blue and yellow sides, only the red and white sides are used and the blue and yellow sides serve as distractors. The point scale ranges from zero to seven on the seven designs administered to subjects over eight years of age and those who are not suspected mental defectives (Wechsler, 1949). The first three designs also have time limits, but the scoring ranges from zero through two, depending on whether the subject is successful on the first or second try within the time limits allowed. The time factors must be considered highly significant in view of the different orientation to time in Indian culture. The reliability coefficients on this subtest are given by Wechsler (1949) as .84, .87, and .88 at the three age groups of 7 1/2, 10 1/2, 13 1/2 years. This is the highest reliability coefficient of any subtests on the Performance Section, and is exceeded only very slightly by Vocabulary on the Verbal Section.

The scaled score mean for the Indian sample on the subtest was 8.143, and the white sample mean was 9.105. The critical t -value is 2.60, and the t -test value for these two means at the .01 level of significance is 2.568. On this subtest the null hypothesis is sustained at the level tested and the conclusion that there is no significant difference between the two groups is accepted. Glasser and Zimmerman (1968, p. 83) indicated that this subtest "can be interpreted separately, as a specific measure of perceptual organization and spatial visualization ability." Cohen (1959) claimed that Block Design is an excellent measure of non-verbal intelligence.

Glasser and Zimmerman (1968, p. 84) stated "it is undoubtedly the most culture-fair of the subtests," which makes the achievement of the Indian group on this subtest more significant. If the time factor influenced the Indian performance in a negative manner to even a slight degree, the difference may be even less than noted. Block Design is sometimes charged with being susceptible to a learning set; and success or failure on early items can influence later items of the subtest.

Object Assembly Subtest. This subtest consists of four cut-up, jigsaw type picture puzzles of a man, a horse, a face, and an automobile that must be assembled within prescribed time limits. Point values on each item range from zero to nine with five bonus points available for speed (time) on each item. Reliability coefficients are given by

Wechsler (1949) as .63 at 7 1/2 years of age, .63 at 10 1/2 years of age, and .71 at 13 1/2 years of age, which places this subtest among the lower three in terms of reliability.

Visual and motor functions are involved in this subtest, and it correlates highest with Block Design. Cohen (1959) marked this subtest as the poorest measure of general intelligence ("G") and indicated that its major value is a measure of perceptual organization when used in conjunction with Block Design. Lutey (1971) noted that mind set on human anatomy seems to be established in some subjects due to the fact the first three items are a manikin, a profile, and a hand. However, adequate perception, visual-motor coordination, and simple assembly skill are all apparently involved in success on this subtest, but it is considered too unreliable to be used alone in interpretation without careful reservation (Cohen, 1959).

The use of this subtest is justified on the basis of the fact that it is a simple, intrinsically interesting test, high face validity, and it is the only subtest other than Block Design that combines perception and visual motor skill. Glasser and Zimmerman (1968) noted that this subtest is notably unreliable, lacks a satisfactory upper range for superior children, and does not have a progression of design difficulty; children oriented toward concrete thinking and/or action oriented apparently find less difficulty with this subtest than children who are oriented more to abstract thinking and are less action oriented. Anxiety

has been reported as influencing results on this subtest in both a negative and positive manner.

The mean scaled score of the Indian sample was 8.771, which is the second high mean on the Performance Section subtests, and the mean for the white sample was 9.295. The critical t-value at the .01 level of significance is 2.60, and the t-test value was 1.393 for this subtest. The null hypothesis is sustained and it is accepted that there is no significant difference between the two groups when tested at the .01 level.

In the examination of results of the WISC subtests it becomes more and more obvious that the Indian group measured up much better on the Performance Section than on the Verbal Section. All five of the subtests on the Verbal Section resulted in rejection of the null hypothesis but two out of the five Performance Section subtest results have sustained the null hypothesis at this point. As visual and motor functions are apparently among the primary functions involved in the Object Assembly and Block Design subtests, it appears that the fact that the Indian sample was not significantly lower on both of these subtests certifies to the fact that these subtests are measuring somewhat common elements. As noted earlier in this discussion, other authorities have reported higher achievement by Indians on nonverbal intelligence tests.

Coding Subtest. This subtest requires that the subject match and copy symbols using a guide of symbols associated with simple shapes or numerals, and the time element or speed is highly important to success. The rationale obviously based on the concept that the ability to learn these combinations of symbols and to associate them in the context of the subtest within stringent time limits is one criterion of intelligence.

This subtest is also apparently a measure of visual-motor dexterity, the ability to absorb new material in an associative way, and to do it with a high degree of speed and accuracy (Glasser and Zimmerman, 1968). Somewhat surprisingly this subtest correlates highest with Information and Vocabulary from the Verbal Section of the WISC, but it is not considered to be a good measure of general intelligence (Lutey, 1971). Females tend to do better on Coding than males of the same age, and Lutey (1971) stated that depressed scores can be anticipated where there is a predominance of males, which is the case in this study. Anxiety is also suggested as a factor that may depress scores on the Coding subtest.

Reliability coefficients for the other subtests were "computed by the split-half technique with appropriate correlation for full length of the test by the Spearman-Brown formula" (Wechsler, 1949, p. 13). He pointed out this technique could not legitimately be used for estimating the reliability of the Coding subtest, which is essentially a speed test.

The mean scaled score for the Indian sample was 7.667, which is the lowest mean achieved on the five subtests of the Performance Section. The mean for the white sample was 9.543. When the t-test is applied to these means, a t-value of 4.710 is derived, which exceeds the critical value of 2.60 at the .01 level of significance. These results require that the null hypothesis again be rejected and a real difference between the two groups be accepted.

As Wechsler (1965) himself described this subtest as essentially a speed test, it is necessary that recognition be given again to the different concept or attitude toward time that is found in the Indian and white cultures. No suggestion was found in the literature reviewed as to an adjustment factor that might be used when Indian children are tested under such time limits. The suggestion was made by some examiners in the Pupil Personnel Services Project that time limits be followed when arriving at the actual or reported I.Q., but that the child should be allowed to proceed so long as he is working on an item. Achievement after the time limit has passed would be used to determine "potential I.Q." for the slower working subjects. However, this concept would have little value on the Coding subtest because the material is quite simple for all children and the amount finished within the time limit is the only real challenge.

SUMMARY AND DISCUSSION OF PERFORMANCE SECTION

Although all subtests making up the Performance Section have definite time limits, the Indian sample has a mean I.Q. of 87.638, as compared to 79.552 on the Verbal Section, which is a difference of nearly one-half of a standard deviation. The white sample has a mean I.Q. of 96.076 on the Performance Section as compared to 95.400 on the Verbal Section.

The Object Assembly subtest shows the least difference between the two groups of any of the five subtests on this section. Success on this subtest requires an ability to put things together and to see the relationship of individual parts to the whole; visual and motor functions are basic to success on this subtest. As noted by Cohen (1959), Object Assembly correlates highly with Block Design; he indicated that Object Assembly is one of the poorest measures of general intelligence. Descriptions of the Block Design subtest tend to be similar to those of Object Assembly. Wechsler (1965) noted that Block Design requires the subject to analyze the whole into its component parts and is a measure of creative ability, along with Object Assembly. Cohen (1959) classifies the Block Design as one of the best measures of general intelligence among the Performance subtests.

Considering the description of the Block Design and Object Assembly subtests and the fact that the difference between two groups is the

smallest on these two subtests, some support might be assumed for the idea that visual perceptual skills are fairly well developed among Indian pupils in comparison to verbal skills.

The greatest difference between the Indian and white groups is found on the Coding test, which is basically a speed test. The importance of time in the white culture as compared to Indian culture is worthy of consideration in relation to this subtest.

Some variations are present in the results on the Performance Section that were not found on the Verbal Section. The Indian highest mean scaled score is Object Assembly (8.771), while the highest subtest for the white sample is Picture Completion (9.981); the low subtest for the white sample is Block Design (9.105), while the low for the Indian group is Coding (7.667). On the Verbal Section both the Indian and white sample scored highest on Similarities and lowest on Arithmetic.

The differences noted on the Performance Section in terms of high and low scores may be more significant than the similar results on the Verbal Section. The Indian high on Object Assembly may indicate that visual perception skills are comparatively high, and their low on Coding may support the contention that speed (time) tests put the Indian child at a disadvantage. The white high score on Picture Completion apparently attests to their ability to concentrate on essential rather than irrelevant details, but this subtest is considered as one of the poorer measures of general intelligence when the WISC is used. The

lowest score on Block Design for the white group tends to indicate some problems in perception, analysis, and reproduction of abstract design in a relative sense, but the white group scaled score is still higher than that achieved by the Indian sample. It is interesting to note that the high mean scaled score of the Indian sample is 1.21 mean scaled score points below the highest score of the white sample, and their lowest mean scaled score is 1.438 mean scaled score points below the lowest mean of the white sample.

The difference between the Performance I.Q. is 8.438 points in favor of the white sample, which may be compared to the 15.848 point difference on the Verbal I.Q. in favor of the white sample. As the standard deviation is 15 points on the WISC, this difference on the Performance Section amounts to one-half of one standard deviation. The Full Scale I.Q. is 95.333 for the white sample and 81.810 for the Indian sample, which yields a t-test value of 6.491; this value is significant at the .01 level, and the null hypothesis must be rejected.

MALE AND FEMALE EXAMINERS

As indicated in the statement of the problem for this study, one of the questions to be examined by this study was whether or not female examiners might secure different results than male examiners administering the WISC to white and Indian children. As there were 105 subjects in each of the two groups, there were 103 degrees of freedom on all

t-tests made in examining the basic question; the critical value of 2.63 at .01 level of significance for a t-test with 103 degrees of freedom (Garret and Woodworth, 1962).

A total of seventy Indian children were tested by male examiners and thirty-five by female examiners. The mean age for those subjects tested by male examiners was 10.882 and 11.321 for those tested by female examiners; the t-test value is 0.860 when these two means are tested, and the null hypothesis is retained. There is no significant difference in terms of the mean ages of the two groups when tested at the .01 level of significance.

As indicated by the following table, the critical level of 2.63 was not achieved on any of the five subtests of the Verbal Section of the WISC when tested on the basis of the sex of the examiner, and the null hypothesis must be retained in all cases.

TABLE IV

MEAN SCALED SCORES OF INDIAN SUBJECTS ON THE VERBAL SECTION TESTED BY MALE AND FEMALE EXAMINERS

SUBJECT	MALE	FEMALE	D.F.	CRITICAL t-VALUE .01	t-TEST VALUE
Information	6.471	6.743	103	2.63	0.481
Comprehension	6.271	6.571	103	2.63	0.496
Arithmetic	5.671	6.686	103	2.63	2.217
Similarities	7.529	7.829	103	2.63	0.411
Vocabulary	6.514	7.857	103	2.63	2.147
Verbal I.Q.	78.329	82.00	103	2.63	1.195

Although none of the five subtests show a significant difference at the level tested, there is a higher mean on all five subtests in favor of the female examiners.

As indicated by the following table, all five subtests on the Performance Section also fail to achieve a level of significant difference when tested at the .01 level.

TABLE V
MEAN SCALED SCORES OF INDIAN SUBJECTS ON THE PERFORMANCE
SECTION TESTED BY MALE AND FEMALE EXAMINERS

SUBTEST	MALE	FEMALE	D.F.	CRITICAL t-VALUE .01	t-TEST VALUE
Picture Completion	8.429	9.200	103	2.63	1.260
Picture Arrangement	7.414	8.629	103	2.63	1.930
Block Design	8.200	8.029	103	2.63	0.280
Object Assembly	8.786	8.743	103	2.63	0.084
Coding	7.386	8.229	103	2.63	1.343
Performance I.Q.	86.457	90.000	103	2.63	1.238

Somewhat less difference between the subjects tested by female and male examiners is noted on the Performance Section than on the Verbal Section, but none of the ten subtests of the two sections attain the critical value required at the .01 level of significance. There is, of course, no significant difference between the two groups at the .01 level on either the Verbal or Performance I.Q. The Full Scale I.Q. for those Indian subjects tested by male examiners had a mean of 80.50 and those tested by female examiners achieved a mean of 84.429. This difference

produces a t-test value of 1.352, which does not attain the critical value of 2.63 required at the .01 level of significance. The null hypothesis is retained.

On the basis of the data from this study there is little evidence to support the possibility that female and male examiners will secure different results at a significant level on the WISC when administering this test to Indian subjects. Although the female examiners secured slightly higher means on all five of the Verbal Section subtests, the male examiners secured slightly higher means on two of the Performance Section subtests.

SEX OF SUBJECTS

The subjects in this study were divided into four groups on the basis of sex for the purpose of further checking whether the sex of subjects in the study would produce significantly different results. The female Indian group, the male Indian group, the white female group, and the white male groups were tested against each other to determine if there were significant differences on any of the variables in this study.

In no case was the mean age of the four groups significantly different at the .01 level of confidence. The mean age for the Indian female group was 11.173 years, the Indian male group 10.086, the white female group 11.375, and the white male subjects 11.128 years.

Information Subtest. On this subtest the differences are in the expected direction except where the Indian male is compared with the white female group. The white female group is not significantly higher than the Indian male groups at the .01 level on this subtest, although the total white group was significantly higher than the Indian total group at that level. However, the white female group is significantly higher than the Indian female group, and the white male group is significantly higher than both the male and female Indian group on this subtest at the .01 level of confidence. There is no ready explanation for the fact that the males in both groups are higher than their female counterparts, but the information may be of value to examiners in the future.

TABLE VI
MEAN SCALED SCORES ON THE INFORMATION
SUBTEST BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	5.792	24	103	2.63	1.595
Indian Males	6.790	81			
Indian Females	5.792	24	54	2.67	2.900
White Females	8.125				
Indian Females	5.792	24	95	2.63	4.843
White Males	9.548				
Indian Males	6.790	81	111	2.63	2.395
White Females	8.125				
Indian Males	6.790	81	152	2.61	5.748
White Males	9.548				
White Females	8.125	32	103	2.63	2.077
White Males	9.548				

Comprehension Subtest. As noted previously, this subtest seems to measure the child's ability to use practical judgment in usual social actions or the extent to which social acculturation has taken place. Glasser and Zimmerman (1968) noted that there is some sex difference in this subtest that seems to favor boys. The white female group is significantly higher than the Indian female group at the .01 level; the white male group is also significantly higher than the Indian female group at this level. The Indian male group is also significantly lower than the two white groups when tested at the .01 level. There is no significant difference between the Indian female and the Indian male group, and there is no significant difference between the white female and the male groups on this subtest. The difference favoring male subjects is present, but not at a significant level when tested at the .01 level of confidence.

TABLE VII
MEAN SCALED SCORES ON THE COMPREHENSION
SUBTEST BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	5.333	24	103	2.63	2.017
Indian Males	6.679	81			
Indian Females	5.333	24	54	2.67	3.176
White Females	8.750				
Indian Females	5.333	24	95	2.63	4.972
White Males	9.014				
Indian Males	6.679	81	111	2.63	3.022
White Females	8.750	32			
Indian Males	6.679	81	152	2.61	4.988
White Females	9.014	73			
White Females	8.750	32	103	2.63	0.352
White Males	9.014	73			

Arithmetic Subtest. As noted earlier, this subtest is a measure of the subject's ability to concentrate; mental alertness is a basic requirement for success. General agreement is found that the elementary knowledge of mathematics that is required on this subtest is acquired and becomes internalized in the course of life experiences. Obviously, this level varies with the age of the subject and the socioeconomic status of his family and is influenced by many other factors related to motivation and attitude. Money may well be one of the most practical experiences the child has in learning certain basic mathematical concepts. On this subtest both the white female and white male groups are significantly higher than the Indian female group when tested at the .01 level of significance; both of the white groups are also significantly higher than the Indian male group when tested at the same level. As the white group was significantly higher than the total Indian group, both of these results might have been anticipated. The difference between the white female and the white male group is very small on this subtest.

TABLE VIII

MEAN SCALED SCORES ON THE ARITHMETIC
SUBTEST BY SEX GROUPS.

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	5.583	24	103	2.63	1.057
Indian Males	6.136				
Indian Females	5.583	24	54	2.67	3.219
White Females	8.188	32			
Indian Females	5.583	24	95	2.63	3.835
White Males	8.233	73			
Indian Males	6.136	81	111	2.63	3.863
White Females	8.188				
Indian Males	6.136	81	152	2.61	4.938
White Males	8.233	73			
White Females	8.188	32	103	2.63	0.068
White Males	8.233	73			

Similarities Subtest. As noted in the previous discussion, this subtest is a measure of the qualitative aspects of relationships which the child has abstracted from his environment; remote memory, capacity for associative thinking, interests and reading patterns, and the ability to select and verbalize appropriate relationships between somewhat dissimilar objects or concepts are all called into operation during this subtest. Based on the fact that the total white group was significantly higher than the total Indian group, it could be anticipated that both female and male whites would be significantly higher than the Indian male and female groups. The results supported the anticipated difference except in the case of the Indian female group and the white female

group; where the difference proved to not be significant when tested at the .01 level of confidence. The white males were significantly higher than both of the Indian groups, and the white females were significantly higher than the Indian male group.

TABLE IX
MEAN SCALED SCORES ON THE SIMILARITIES
SUBTEST BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	7.708	24	103	2.63	0.126
Indian Males	7.605	81			
Indian Females	7.708	24	54	2.67	2.551
White Females	10.313	32			
Indian Females	7.708	24	95	2.63	3.033
White Males	10.507	73			
Indian Males	7.605	81	111	2.63	3.633
White Females	10.313	32			
Indian Males	7.605	81	152	2.61	4.834
White Males	10.507	73			
White Females	10.313	32	103	2.63	0.233
White Males	10.507	73			

Vocabulary Subtest. Massey (1967, p. 24) has noted that this subtest measures the "ability to express oneself relying on word knowledge from environment and education." A vocabulary test is commonly included in intelligence tests and is often considered to be the best of verbal intelligence or learning ability. The subject's fund of information, richness of ideas, kind and quality of language, and degree of abstract thinking are also measured by this subtest. As the total white

group was significantly higher than the total Indian group when tested at the .01 level, it was anticipated that this fact would hold true when the total group was broken down into sex groups. However, the white female group failed to exceed the Indian male group when tested at the .01 level of confidence. Both the Indian male and white male groups exceed their female counterparts on this subtest, but not at a significant level when tested at the .01 level. Table X below summarizes the group comparisons.

TABLE X
MEAN SCALED SCORES ON THE VOCABULARY
SUBTEST BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	5.958	24	103	2.63	1.843
Indian Males	7.259	81			
Indian Females	5.958	24	54	2.67	3.080
White Females	8.813	32			
Indian Females	5.958	24	95	2.63	5.055
White Males	10.123	73			
Indian Males	7.259	81	111	2.63	2.458
White Females	8.813	32			
Indian Males	7.259	81	152	2.61	5.566
White Males	10.123	73			
White Females	8.813	32	103	2.63	1.789
White Males	10.123	73			

Picture Completion Subtest. This subtest is primarily a measure of visual alertness and visual memory, in addition to perception of the whole in relation to its parts. There is also an element of measuring

the ability to differentiate essential from nonessential parts; concentration and attention are also important elements of the test. The total white group was significantly higher than the total Indian group when tested at the .01 level of significance, and it could be reasonably anticipated that the two white groups would be significantly higher than the two Indian groups when divided on the basis of sex. However, only in the case of the comparison of white males with the Indian females is the difference between the Indian and white groups significant at the .01 level of confidence. The Indian males are significantly higher than the Indian females when tested at the same level of confidence, as indicated in the following table.

TABLE XI
MEAN SCALED SCORES ON THE PICTURE COMPLETION
SUBTEST BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	6.958	24	103	2.63	3.411
Indian Males	9.198	81			
Indian Females	6.958	24	54	2.67	2.585
White Females	8.969	32			
Indian Females	6.958	24	95	2.63	4.706
White Males	10.425	73			
Indian Males	9.198	81	111	2.63	0.397
White Females	8.969	32			
Indian Males	9.198	81	152	2.61	2.574
White Males	10.425	73			
White Females	8.969	32	103	2.63	2.258
White Males	10.425	73			

Picture Arrangement Subtest. This subtest requires the subject place a series of pictures in a logical order so that a sensible and consistent story emerges; a maximum time allowance is given for each of the the eleven items and bonus points are awarded for speed. Synthesis of parts into intelligible wholes, planning involving sequential and causal events, perception and visual comprehension are all factors involved in this subtest. Glasser and Zimmerman (1968) indicated that this subtest is a measure of social alertness and common sense. The Indian males are significantly higher than the Indian females on this subtest when tested at the .01 level, but the white females were not significantly higher than the Indian females. The Indian females are significantly lower than the white males, but the Indian males are not significantly lower than the white females, although the Indian males are significantly lower than the white males when tested at the .01 level of significance.

TABLE XII
MEAN SCALED SCORES ON THE PICTURE ARRANGEMENT
SUBTEST BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	6.292	24	103	2.63	2.861
Indian Males	8.272	81			
Indian Females	6.292	24	54	2.67	2.119
White Females	8.219	32			
Indian Females	6.292	24	95	2.63	5.045
White Males	9.562	73			
Indian Males	8.272	81	111	2.63	0.083
White Females	8.219	32			
Indian Males	8.272	81	152	2.61	2.919
White Males	9.562	73			
White Females	8.219	32	103	2.63	2.219
White Males	9.562	73			

Block Design Subtest. As early as 1923 Kohs used colored blocks as a non-verbal measure of intelligence (Thorndike and Hagan, 1969). Perception, analysis, synthesis and reproduction of abstract designs are factors measured by this subtest; visual-motor coordination, logic and reasoning are also important to success on this subtest. This subtest is considered to be a good measure of general intelligence, and it is commonly interpreted separately as a specific measure of "perceptual organization and spatial visualization ability" (Glasser and Zimmerman, 1968, p. 83). Only in the case of comparing the Indian males and white males and when the white females are compared to white males is there a significant difference at the .01 level of confidence. The consistent

high achievement of the white males to this point on all subtests is worth noting, and it should be remembered that speed is important on this subtest.

TABLE XIII
MEAN SCALED SCORES ON THE BLOCK DESIGN
SUBTEST BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL T-VALUE	T-TEST VALUE
Indian Females	7.917	24	103	2.63	0.428
Indian Males	8.210	81			
Indian Females	7.917	24	54	2.67	0.232
White Females	8.094	32			
Indian Females	7.917	24	95	2.63	2.595
White Males	9.548	73			
Indian Males	8.210	81	111	2.63	0.206
White Females	8.094	32			
Indian Males	8.210	81	152	2.61	3.152
White Males	9.548	73			
White Females	8.094	32	103	2.63	2.874
White Males	9.548	73			

Object Assembly Subtest. This subtest is of the formboard type and requires the synthesis of parts into an organized, integrated whole. Adequate perception, visual-motor coordination and simple assembly skills are important to success on this subtest; an ability to see spatial relationships and to assemble material drawn from life into a meaningful whole are required (Glasser and Zimmerman, 1968). The subject has a maximum time allowance on each of the four items and earns a higher score for speed of assembly. Both this subtest and Block Design combine

perception and visual-motor skills, but the results are somewhat different on the two subtests. On the Block Design the white male group was significantly higher at the .01 level when compared to the Indian males and white females; however, as indicated in the following table, there is no significant difference among the four groups on the Object Assembly subtest when tested at the .01 level of significance.

TABLE XIV
MEAN SCALED SCORES ON THE OBJECT ASSEMBLY
SUBTEST BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	8.333	24	103	2.63	1.002
Indian Males	8.901	81			
Indian Females	8.333	24	54	2.67	0.577
White Females	8.781	32			
Indian Females	8.333	24	95	2.63	1.841
White Males	9.521	73			
Indian Males	8.901	81	111	2.63	0.221
White Females	8.781	32			
Indian Males	8.901	81	152	2.61	1.485
White Males	9.521	73			
White Females	8.781	32	103	2.63	1.214
White Males	9.521	73			

Coding Subtest. Speed is a major factor on this subtest, but visual-motor dexterity and the ability to absorb new material presented in an associative context is also tested. However, speed and accuracy are the most important factors (Massey, 1965), but Glasser and Zimmerman (1968, p. 94) noted that "a premium on compulsive drive rather than

orientation to competence in new learning" is highly important. These same authors stated that this subtest must be considered one of the poorest of the WISC subtests. When the total white group was compared to the total Indian group, the white group was significantly higher at the .01 level of confidence. Both the white females and white males are significantly higher than the Indian male group when tested at the .01 level of significance; however, neither white group is significantly higher than the Indian female group when tested at the .01 level.

TABLE XV

MEAN SCALED SCORES ON THE CODING
SUBTEST BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	8.292	24	103	2.63	1.147
Indian Males	7.481	81			
Indian Females	8.292	24	54	2.67	1.630
White Females	9.781	32			
Indian Females	8.292	24	95	2.63	1.894
White Males	9.438	73			
Indian Males	7.481	81	111	2.63	3.519
White Females	9.781	32			
Indian Males	7.481	81	152	2.61	4.511
White Males	9.438	73			
White Females	9.781	32	103	2.63	0.593
White Males	9.438	73			

Verbal I.Q. The scores achieved on the Information, Comprehension, Arithmetic, Similarities and Vocabulary subtests determine the Verbal I.Q., and it seems very reasonable to expect that the Indian

subjects will be below the white subjects in view of the fact that they were significantly below the whites when the total groups were compared. It has also been pointed out that the language problem is more important on this section of the WISC for the Indian subjects than on the Performance Section. The two Indian groups are significantly below the two white groups when tested at the .01 level of significance, but the difference between the Indian males and Indian females is not significant when tested at the .01 level of confidence. The difference between white females and males is not significant when tested at the .01 level of significance.

TABLE XVI
MEAN SCALED SCORES ON THE VERBAL I.Q.
BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	75.542	24	103	2.63	1.514
Indian Males	80.741	81			
Indian Females	75.542	24	54	2.67	3.474
White Females	92.688	32			
Indian Females	75.542	24	95	2.63	5.226
White Males	96.589	73			
Indian Males	80.741	81	111	2.63	3.587
White Females	92.688	32			
Indian Males	80.741	81	152	2.61	6.207
White Males	96.589	73			
White Females	92.688	32	103	2.63	1.019
White Males	96.589	73			

Cronbach (1960, p. 199), commenting on poor verbal scores, noted that it "is easily understood in the case of the child from a bilingual home." He also made the point that Verbal-Performance differences are often found where no handicap can be identified.

Performance I.Q. Cronbach (1960) pointed out that the Performance I.Q. may be negatively influenced by emotional blocking because it demands a longer period of steady work and sometimes a series of trial-and-error operations. A deliberate, slow or cautious approach will lower the score on this portion of the WISC. Although the Indian group is considered to be suffering from both a language problem and a more deliberate life-style, they do much better on the Performance Section than on the Verbal Section. The white female group is not significantly higher than the Indian female group when tested at the .01 level of significance, and the difference between the white females and Indian males is even less. However, the white male group is significantly higher than both Indian groups.

TABLE XVII
 MEAN SCALED SCORES ON THE PERFORMANCE
 I.Q. BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	83.458	24	103	2.63	1.698
Indian Males	88.877	81			
Indian Females	83.458	24	54	2.67	2.018
White Females	91.406	32			
Indian Females	83.458	24	95	2.63	4.890
White Males	98.123	73			
Indian Males	88.877	81	111	2.63	0.877
White Females	91.406	32			
Indian Males	88.877	81	152	2.61	4.456
White Males	98.123	73			
White Females	91.406	32	103	2.63	2.452
White Males	98.123	73			

Full Scale I.Q. Cronbach (1960, p. 202) noted only one short-coming of the WISC, i.e., insufficient range to measure very high and very low abilities. He charged that neither the WISC nor the Stanford-Binet is based on a clear theory of intelligence and neither makes a serious attempt to separate mental ability from other aspects of adaptation. He expressed the hope that an intelligence test will be designed that is based on a clear theory of mental processes, and goes on to state that such an instrument will provide a total score that will most certainly correlate substantially with Weschler's. As the Full Scale I.Q. is arrived at by combining the Verbal and Performance sections of

the WISC, it could be anticipated that the Full Scale I.Q. would fall between the Verbal and Performance I.Q.'s; however, the two white groups are significantly higher than the two Indian groups in all cases at the .01 level of significance.

TABLE XVIII
MEAN SCALED SCORES ON THE FULL SCALE
I.Q. BY SEX GROUPS

PAIRS	MEAN	N	D.F.	CRITICAL .01 t-VALUE	t-TEST VALUE
Indian Females	77.375	24	103	2.63	1.773
Indian Males	83.123	81			
Indian Females	77.375	24	54	2.67	3.106
White Females	91.313	32			
Indian Females	77.375	24	95	2.63	5.533
White Males	97.096	73			
Indian Males	83.123	81	111	2.63	2.654
White Females	91.313	32			
Indian Males	83.124	81	152	2.61	6.050
White Males	97.096	73			
White Females	91.313	32	103	2.63	1.717
White Males	97.096	73			

SCATTER OF SUBTEST SCORES

Much has been written about both the Wechsler Adult Intelligence Scale and the Wechsler Intelligence Scale for Children being used as a personality test by examining the distribution of the subtest scores. Wechsler (1966, p. 163) refers to this as "patterning and pattern analysis" in discussing the Wechsler Adult Intelligence Scale and points

out patterns of subtest scores that are indicative of organic brain disease, schizophrenia; anxiety reaction types, mental defectives, and sociopaths. Although some authorities seem to accept this principle on the Wechsler Adult Intelligence Scale, others question the concept.

Glasser and Zimmerman (1968, p.36) commenting on subtest analysis of the WISC, stated that "the prediction of specific types of behavior from subtest scores is open to considerable criticism."

Wechsler (1949) cautioned against the use of the WISC in this manner and pointed out that some subtests have fairly low reliabilities that make such interpretations extremely questionable. Cronbach (1960, p. 201) states there must be a difference of "greater than 3 scaled-score units" or more than 15 I.Q. points for the difference to be taken seriously; he also stated that "indices representing scatter of subtest scores are worthless as diagnostic signs." Cronbach also noted that Roy Schafer and David Rapport both support the principle of "scatter analysis" strongly when it is used to identify or distinguish personality groups. Lutey (1971) discussed this question at some length and concluded that subtest analysis may reveal unexpected discrepancies, but she interpreted this fact as merely an indication that should alert the examiner to use further tests to determine the reason for the discrepancy. Lutey (1971, p. 5) made the following observation that is particularly pertinent to this study.

If the subject is a member of a group that differs in known ways from general or standardization sample, the subject's scores should be analyzed by reference to the select group of which he is part. Within select groups, differences in the characteristic performances of the group may be found for males as compared to females.

By using the data provided in this study, an examiner administering the WISC to Indian subjects may make some meaningful observations as suggested by Lutey. However, this study does not provide data on the question of whether or not subtest scores can be analyzed as a means of individual personality assessment.

SUMMARY

The data presented in this chapter indicates that the WISC delivers some significantly different results for Indian and white children when differences are tested by the t-test at the .01 level of significance. The data was based on 105 Indian subjects and 105 white subjects who had been tested by qualified examiners in the ESEA Title III Pupil Personnel Services Project during the period from July 1, 1967 to July 1, 1970 in a ten-county area in North Central Montana.

When the total Indian group was compared to the total white group on the Verbal Section of the WISC, the Indian group was significantly lower than the white groups on all five of the subtests and the Verbal I.Q. score. However, the Indian group scores followed the same rank order as those of the white group.

When the total Indian group was compared to the total white group on the Performance Section of the WISC, the difference was reduced on all subtests in comparison to the Verbal Section, but the whites were significantly higher on three of the five subtests and on the Performance I.Q. score at the .01 level of significance. In no case did the mean score of the Indian group exceed that of the white group on either the Verbal or Performance Sections.

The question of whether or not female examiners would secure significantly different results than male examiners when administering the WISC to Indian subjects was tested for all ten subtests, the Verbal I.Q., the Performance I.Q., and the Full Scale I.Q. Although the female examiners secured somewhat higher results on all subtests, on the Verbal Section, none of these differences were statistically significant at the .01 level. The female examiners also achieved slightly higher results on three of the five Performance subtests, but none of these were statistically significant at the .01 level. The female examiners secured a mean I.Q. of approximately four points higher than the male examiners on the Verbal, Performance, and Full Scale I.Q. sections.

When the Indian and white groups were divided on the basis of sex into four groups for comparison purposes, some interesting results were observed. The Indian males exceeded the Indian females on all subtests except Similarities and Coding; however, it was statistically significant only on the Picture Completion and Picture Arrangement.

subtests. White males were also consistently higher on all subtests except on Coding, although the difference was statistically significant at the .01 level only on the Block Design subtest. The Indian male group exceeded their female counterparts by 5.199 I.Q. points on the Full Scale. The white males exceeded the white females by 3.901 I.Q. points on the Verbal Scale, by 6.717 points on the Performance Scale, and by 5.783 points on the Full Scale. Although the Indian males exceed the Indian females, the white females exceed the Indian males by nearly 12 I.Q. points on the Verbal Scale, by 2 1/2 points on the Performance Scale, and slightly over 8 I.Q. points on the Full Scale. The difference between the white females and the Indian males is statistically significant at the .01 level on the Verbal and Full Scale I.Q. sections.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to examine the results obtained on the Wechsler Intelligence Scale for Children (WISC) when applied to Indian subjects from three Indian reservations in North Central Montana who were referred for testing to the PPS project. More specifically, the study attempted to determine if the Indian results were significantly different on the ten subtests, the Performance I.Q., the Verbal I.Q., and the Full Scale I.Q. at the .01 level of confidence from an equal number of white subjects referred for testing who were attending the same schools as the Indian subjects. The question of whether the sex of the examiner administering the test made any significant difference on the results obtained was also examined. In addition this study proposed to establish local norms to guide examiners in the future when administering the WISC to both Indian and white children from the area involved in this study who are referred for testing by school personnel. As a corollary to this point it was proposed that certain subtests would be identified that appear to be most appropriate to this type of Indian subject, so that prorating the intelligence quotient on the basis of less than five subtests on each of the two major sections of the WISC (Performance and Verbal) might be used to determine an I.Q. for these Indian subjects, as is suggested by Wechsler (1949). As a number of authorities (Wechsler, 1949; Glasser and Zimmerman, 1968; Cohen, 1959; Rapport, Gill

and Schafer, 1968) have identified what the various subtests apparently measure, it was suggested that teaching methodology might be developed as a result of identifying weak and strong points in the intellectual make-up of the Indian subjects referred for testing.

THE PROBLEM AND PROCEDURES

In a general sense, the problem of this study was to determine what differences an examiner might anticipate when the Wechsler Intelligence Scale for Children was administered to both Indian and white children from schools in a large area of North Central Montana. The study also dealt with the question of whether the WISC is an appropriate instrument to be used to test both Indian and white children from these certain schools in this ten-county area in North Central Montana who are selected for testing by school personnel. In a somewhat more specific sense this study provided information as to how appropriate the WISC is to determine placement in special education classes of certain Indian and white children from this area of Montana.

These two general questions were not stated as specific questions to be answered as a result of this study because they are somewhat subjective in nature. A competent examiner does not normally recommend placement in special education classes purely on the basis of an I.Q. score or objective data; he learns to look for reasons other than mental retardation when a subject secures a low score on an I.Q. test. However,

this study proposed to establish some local norms to assist examiners when using the WISC in the area of North Central Montana where the test data was collected. It was thought that this point was particularly important for examiners who were administering the WISC to Indian children. The examiner can determine if scores achieved by a subject tested for special education follows the pattern established by the data in this study.

In a more specific sense, this study provides data that indicates how selected white and Indian students in North Central Montana differ in performance on the WISC, but the qualitative differences rather than the quantitative differences may be the most important information provided. As the various subtests apparently measure some different factors of intelligence (Cohen, 1959), instructional methods might be designed that are more appropriate to the mental processes of certain white and Indian children from the area where the data was collected.

In a very specific sense, this study tested by the t-test method whether selected Indian and white students from a specific area of Montana are significantly different at the .01 level of confidence on the ten subtests commonly administered on the WISC, the Verbal I.Q., the Performance I.Q., and the Full Scale I.Q. The question of whether significantly different results at the .01 level of confidence were secured by examiners of different sex when administering the WISC to the Indian subjects was also tested.

POPULATION AND GROUP SELECTION

The sample for this study consisted of 105 Indian children referred for testing from three of Montana's seven Indian reservations and 105 white children who were attending the same schools as the Indian subjects. Both groups were divided into male and female groups so that comparisons could be made among the four groups on the ten subtests, the Performance I.Q., the Verbal I.Q., and the Full Scale I.Q. There were twenty-four female Indian subjects, eighty-one male subjects, thirty-two female white subjects, and seventy-three male subjects.

COLLECTING THE DATA

The data for this study were obtained from the files of the ESEA Title III Pupil Personnel Services Project. The tests were administered during the period from July 1, 1967 to July 1, 1970, and were available as a result of this writer's association with the project as project director. The original WISC Record Forms and related information on each child was used in all cases for subjects included in this study. All tests used were administered by examiners who had been certified by the Montana State Department of Public Instruction.

TESTING THE HYPOTHESES

All of the fourteen hypotheses were tested by the t-test method, and no statistical difference was considered significant unless the .01 level of confidence or beyond was achieved. After careful checking of the original WISC Record Form of each subject, the scaled scores were recorded on the IBM Fortran Coding Form GX28-7327-6U/M050. These forms were delivered to the Montana State University Computer Center where the information was key-punched, verified, and t-tests were run.

SUMMARY OF FINDINGS

A question basic to the study was whether there was any significant difference between the Indian and white groups as to their age. The mean age for the Indian group was 11.028 years, and the mean age for the white group was 11.203 years. This difference is not statistically significant as the .01 level of confidence. The Indian group ranged in age from 15.75 years to 6.08 years, and the white group from 15.92 years to 6.58 years.

There were seventy-three males and thirty-two females in the white sample, and eighty-one males and twenty-four females in the Indian sample. The highest Full Scale I.Q. score of an Indian subject was 117, and the lowest was 46; the highest Full Scale I.Q. of a white subject was 131, and the lowest 55. The following table shows the percent of

each group in the Wechsler (1949) system of classification.

TABLE XIX

FULL SCALE I.Q. FREQUENCY DISTRIBUTION OF WHITE AND INDIAN
SUBJECTS ACCORDING TO WECHSLER'S
INTELLIGENCE CLASSIFICATION

I.Q.	CLASSIFICATION	NUMBER		PER CENT		
		WHITE	INDIAN	WHITE	INDIAN	WECHSLER
130 & above	Very Superior	2	0	1.9	0.0	2.2
120-129	Superior	6	0	5.7	0	6.7
110-119	Bright Normal	11	3	10.5	2.9	16.1
90-109	Average	50	26	48.6	24.6	50.0
80- 89	Dull Normal	17	25	16.2	23.9	16.1
70- 79	Borderline	12	34	11.4	32.4	6.7
69 & below	Mental Defective	7	17	6.7	16.2	2.2

Data presented in this table indicates that the white sample of this study is very similar in each category to that of Wechsler's standardization sample, but the Indian sample is markedly different in all seven categories.

Hypothesis 1: There is no significant difference between means of the scaled scores achieved by Indian subjects and those of white subjects in this study on the Wechsler Intelligence Scale for Children on the General Information subtest.

On this variable a significant difference at the .01 level of confidence was found between the Indian and white groups in this study; the Indian mean was 6.562 and the white 9.114. The Wechsler mean on all subtests is 10.00. The mean for the Indian females was 5.792, for Indian males 6.790, for white females 8.125, and for white males 9.548.

These results suggest a bias on this subtest that is favorable to males of both groups. The male examiners testing Indian children had a mean of 6.471, as compared to 6.743 for the female examiners; however, this difference is not statistically significant at the .01 level of confidence.

The above hypothesis is rejected and a significant difference between the two groups on the General Information subtest is accepted on the basis of the above results.

Hypothesis 2: There is no significant difference between means of the scaled scores achieved by Indian subjects and those of white subjects in this study on the Wechsler Intelligence Scale for Children on the Arithmetic subtest.

On this variable a significant difference at the .01 level of confidence was found between the Indian and white groups in this study; the Indian mean was 6.01 and the white 8.219. The mean for the Indian females was 5.583, for Indian males 6.136, white females 8.188, and for white males 8.233. The male examiners testing Indian children had a mean of 5.671 on this subtest, as compared to 6.686 for female examiners. This difference is not statistically significant at the .01 level of confidence. It should be noted that both male groups are again higher than their female counterparts.

Hypothesis two is rejected and a significant difference between the two groups on the Arithmetic subtest is accepted on the basis of the results of this study.

Hypothesis 3: There is no significant difference between means of the scaled scores achieved by Indian subjects and those of white subjects in this study on the Wechsler Intelligence Scale for Children on the Similarities subtest.

On this variable a significant difference at the .01 level of confidence was found between the Indian and white groups in this study; the Indian mean was 7.629, and the white 10.448. The mean for the Indian females was 7.708, for Indian males 7.605, for white females 10.313, and for white males 10.507. The male examiners testing Indian children had a mean of 7.529 on this subtest, as compared to 7.829 for female examiners. This difference is not statistically significant at the .01 level of confidence.

Hypothesis three is rejected and a significant difference between the two groups on the Similarities subtest is accepted on the basis of the results in this study.

Hypothesis 4: There is no significant difference between means of the scaled scores achieved by Indian subjects and those of white subjects in this study on the Wechsler Intelligence Scale for Children on the Vocabulary subtest.

On this variable a significant difference at the .01 level of confidence was found between the Indian and white groups in this study; the Indian mean was 6.962 and the white 9.724. The mean for Indian females was 5.958, for Indian males 7.259, for white females 8.813, and for white males 10.123. The males in both groups are again higher than the females. The male examiners testing the Indian children secured a mean of 6.514 on this subtest, as compared to 7.857 for female examiners.

This difference is not statistically significant at the .01 level of confidence.

Hypothesis four is rejected and a significant difference between the two groups on the Vocabulary subtest is accepted on the basis of the results in this study.

Hypothesis 5: There is no significant difference between means of the scaled scores achieved by Indian subjects and those of white subjects in this study on the Wechsler Intelligence Scale for Children on the Picture Completion subtest.

On this variable a significant difference at the .01 level of confidence was found between the Indian and white groups in this study; the Indian mean was 8.686 and the white was 9.981. The mean for Indian females was 6.958, for Indian males 9.198, for white females 8.969, and for white males 10.425. The males in both the white and Indian groups are again higher than the females. The male examiners testing Indian children secured a mean of 8.429 on this subtest, as compared to 9.200 for female examiners, which is not statistically significant at the .01 level of confidence.

Hypothesis five is rejected and a significant difference between the two groups on the Picture Completion subtest is accepted on the basis of the results in this study.

Hypothesis 6: There is no significant difference between means of the scaled scores achieved by Indian subjects and those of white subjects in this study on the Wechsler Intelligence Scale for Children on the Picture Arrangement subtest.

On this variable a significant difference at the .01 level of

confidence was found between the Indian and white groups in this study; the Indian mean was 7.819 and the white was 9.152. The mean for Indian females was 6.292, for Indian males 8.272, for white females 8.219, and for white males 9.562. Once again male subjects are higher than the females. The male examiners testing Indian children secured a mean of 7.414, as compared to 8.629 for female examiners. This difference is not statistically significant at the .01 level of confidence.

Hypothesis six is rejected and a significant difference between the two groups on the Picture Arrangement subtest is accepted on the basis of the results of this study.

Hypothesis 7: There is no significant difference between means of the scaled scores achieved by Indian subjects and those of white subjects in this study on the Wechsler Intelligence Scale for Children on the Block Design subtest.

On this variable a significant difference at the .01 level of confidence was not attained between the Indian and white groups in this study; the Indian mean was 8.143 and the white was 9.105. The mean for Indian females was 7.917, for Indian males 8.210, for white females 8.094, and for white males 9.548. The male examiners testing Indian children secured a mean of 8.200, as compared to 8.029 for female examiners. This difference is not statistically significant at the .01 level of confidence.

Hypothesis seven is sustained for the two groups on the Block Design subtest and there is no significant difference between them based on the results in this study.

Hypothesis 8: There is no significant difference between means of the scaled scores achieved by Indian subjects and those of white subjects in this study on the Wechsler Intelligence Scale for Children on the Object Assembly subtest.

The least amount of difference between the two groups was found on this variable; the Indian mean was 8.771 and the white was 9.295, which is not statistically significant at the .01 level of confidence. The mean for Indian females was 8.333, for Indian males 8.901, for white females 8.781, and for white males 9.521. The mean secured by male examiners testing Indian children was 8.786 on this subtest, as compared to 8.743 for female examiners. This difference is not statistically significant at the .01 level of confidence.

Hypothesis eight is sustained for the two groups on the Object Assembly subtest and there is no significant difference between the two groups based on the results of this study.

Hypothesis 9: There is no significant difference between means of the scaled scores achieved by Indian subjects and those of white subjects in this study on the Wechsler Intelligence Scale for Children on the Coding subtest.

On this variable a significant difference at the .01 level of confidence was found between the Indian and white groups in this study; the Indian mean was 7.677 and the white was 9.543. The mean for Indian females was 8.292, for Indian males 7.481, for white females 9.781, and for white males 9.438. Both the Indian and white females are higher than their male counterparts on this subtest, but the difference is not statistically significant at the .01 level of confidence.

Hypothesis nine is rejected and a significant difference between the two groups on the Coding subtest is accepted on the basis of the results in this study.

Hypothesis 10: There is no significant difference between means of the scaled scores achieved by Indian subjects and those of white subjects in this study on the Wechsler Intelligence Scale for Children on the General Comprehension subtest.

On this variable a significant difference at the .01 level of confidence was found between the Indian and white groups in this study; the Indian mean was 6.371 and the white mean was 8.933. The mean for Indian females was 5.333, for Indian males 6.679, for white females 8.750, and for white males 9.014. Although both the Indian and white males are higher than their female counterparts, it is not statistically significant at the .01 level of confidence.

Hypothesis ten is rejected and a significant difference between the two groups on the General Comprehension subtest for the two groups in this study is accepted.

Hypothesis 11: There is no significant difference between the mean of the Verbal I.Q. achieved by Indian subjects and that of white subjects in this study on the Wechsler Intelligence Scale for Children.

On this variable a significant difference at the .01 level of confidence was found between the Indian and white groups in this study; the Indian mean was 79.552 and the white was 95.400. The mean for Indian females was 75.542, for Indian males 80.741, for white females 92.688, and for white males 96.589. The difference between the Indian

females and the Indian males is not statistically significant at the .01 level of confidence, nor is the difference between the white male and female groups.

Hypothesis eleven is rejected and a significant difference between the two groups on the Verbal I.Q. score is accepted.

Hypothesis 12: There is no significant difference between the mean of the Performance I.Q. achieved by Indian subjects and that of the white subjects in this study on the Wechsler Intelligence Scale for Children.

Although the difference between the two groups is decreased on the Performance I.Q. as compared to the Verbal, there is still a significant difference on this variable between the two groups at the .01 level of confidence. The Indian mean was 87.638; the white mean was 96.076. Indian females had a mean I.Q. of 83.458, Indian males 88.877, white females 91.406, and white males 98.123; although the males are higher in both groups, the higher achievement is not statistically significant at the .01 level of confidence.

Hypothesis twelve is rejected and a significant difference between the two groups at the .01 level of confidence on Performance I.Q. is accepted.

Hypothesis 13: There is no significant difference between the mean of the Full Scale I.Q. achieved by Indian subjects and that of the white subjects in this study on the Wechsler Intelligence Scale for Children.

The Indian mean for the Full Scale I.Q. was 81.810; the mean for the white group was 95.333. The difference is statistically significant

at the .01 level of confidence. The Indian females achieved a mean of 77.375 on the Full Scale I.Q., the Indian males 83.123, the white females 91.313, and the white males 97.096; the differences between the Indian male and female, and the white male and female are not statistically significant at the .01 level of confidence.

Hypothesis thirteen is rejected and a significant difference between the two groups at the .01 level of confidence on the Full Scale I.Q. at the .01 level of confidence on the Full Scale I.Q. is accepted.

Hypothesis 14: There is no significant difference between the performance of the Indian children on any of the ten subtests, the Performance I.Q., the Verbal I.Q., or the Full Scale I.Q., whether they were tested by female or male examiners.

Although female examiners secured slightly higher results when testing Indian children on eleven of the thirteen variables, none of the results were statistically significant at the .01 level of confidence. The null hypothesis for hypothesis fourteen is sustained on all t-tests of this factor.

A basic assumption of Wechsler (1958, p. 7) is that intelligence is global and involves the capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment. He emphasizes that "General intelligence cannot be equated with intellectual ability however broadly defined, but must be regarded as a manifestation of the personality as a whole" (Wechsler, 1950, p. 78). From this point of view, general intelligence can be viewed as social

and practical, as well as abstract (Lutey, 1967). As illustrated by Table XX, page 147, the pattern of high and low subtest scores of the total white and Indian groups is very similar, even though the white scores are consistently higher.

The difference between Indian male and female performance on the WISC are presented in Table XXI, page 148, and indicates that an examiner should anticipate some different results when testing Indian males and females from the three reservations involved in this study. A bias in favor of male subjects on the WISC seems to be indicated on eight of the subtests.

The differences between white male and white female performance on the WISC are presented in Table XXII, page 149; these differences tend to parallel the differences found between the Indian male and Indian female subjects and raise some important questions as to why the very similar differences between the sexes occur in both the Indian and white groups. The question must be considered if there are common cultural differences in the white and Indian societies that give males an advantage when tested on the WISC.

These three tables should be helpful to examiners administering the WISC to both white and Indian children in this area of Montana in the future. The examiner should take into account the basis and/or method of referral described in this study when making use of these results.

TABLE XX SCORES ACHIEVED BY TOTAL WHITE AND TOTAL INDIAN GROUPS ON THE WISC

PART I SCALED SCORES										PART II SUMMARY				
Verbal Scores					Performance Scores					Verbal Test Scores	Raw Scores	Scaled Scores		
Scaled Scores	Information	Comprehension	Arithmetic	Similarities	Vocabulary	Pic. Comp.	Pic. Arrgm.	Blk. Design	Obj. Assmb.	Coding	Scaled Score			
20	20	Information	INDIAN X 6.562	WHITE O 9.114
19	19	Comprehension	6.371	8.933
18	18	Arithmetic	6.010	8.219
17	17	Similarities	7.629	10.448
16	16	Vocabulary	6.962	9.724
15	15	MEAN	6.707	9.289
14	14	Performance Test Scores		
13	13	Picture Completion	8.686	9.981
12	12	Picture Arrangement	7.819	9.162
11	11	Block Design	8.143	9.105
10	10	Object Assembly	8.771	9.295
9	9	Coding	7.667	9.543
8	8	MEAN	8.217	9.415
7	7	Verbal I.Q.	79.552	95.400
6	6	Performance I.Q.	87.638	96.076
5	5	Full Scale I.Q.	81.810	95.333
4	4			
3	3			
2	2			
1	1			
0	0			

TABLE XXI SCORES ACHIEVED BY INDIAN MALE AND FEMALE SUBJECTS ON THE WISC

PART I SCALED SCORES										PART II SUMMARY				
Verbal Scores					Performance Scores					Verbal Test Scores		Raw Scores	Scaled Scores	
Scaled Score	Information	Comprehension	Arithmetic	Similarities	Vocabulary	Pic. Comp.	Pic. Arrgn.	Blk. Dsgn.	Obj. Assmb.	Coding	Scaled Score	MALE X	FEMALE O	
20	20	Information	6.790	5.792
19	19	Comprehension	6.679	5.333
18	18	Arithmetic	6.136	5.583
17	17	Similarities	7.605	7.708
16	16	Vocabulary	7.259	5.958
15	15	MEAN	6.894	6.075
14	14	Performance Test Scores		
13	13	Picture Completion	9.198	6.958
12	12	Picture Arrangement	8.272	6.292
11	11	Block Design	8.210	7.917
10	10	Object Assembly	8.901	8.333
9	9	Coding	7.481	8.292
8	8	Verbal I.Q.	80.741	75.542
7	7	Performance I.Q.	88.877	83.458
6	6	Full Scale I.Q.	82.123	77.375
5	5			
4	4			
3	3			
2	2			
1	1			
0	0			

TABLE XXII SCORES ACHIEVED BY WHITE MALE AND FEMALE SUBJECTS ON THE WISC

PART I SCALED SCORES										PART II SUMMARY			
Scaled Scores	Verbal Scores					Performance Scores				Verbal Test Scores	Raw Scores	Scaled Scores	
	Information	Comprehension	Arithmetic	Similarities	Vocabulary	Pic. Comp.	Pic. Arrgn.	Blk. Design	Obj. Assmb.				Coding
20	Information	MALE x 9.548	FEMALE 0 8.125
19	Comprehension	9.014	8.750
18	Arithmetic	8.233	8.188
17	Similarities	10.507	10.313
16	Vocabulary	10.123	8.813
15	MEAN	9.485	8.838
14	Performance Test Scores		
13	Picture Completion	10.425	8.969
12	Picture Arrangement	9.562	8.219
11	Block Design	9.548	8.094
10	Object Assembly	9.521	8.781
9	Coding	9.438	9.781
8	MEAN	9.699	8.769
7	Verbal I.Q.		
6	Performance I.Q.		
5	Full Scale I.Q.		
4	96.589 92.688		
3	98.123 91.406		
2	97.096 91.313		
1			
0			

CONCLUSIONS

Based on the inferences that may be drawn from the data presented in this study the following conclusions are in order:

1. Although the white children are higher on all subtests on the WISC than the Indian children, the pattern of subtest scores is remarkably similar. This point tends to indicate that the white and Indian subjects involved in this study may be quite similar in a qualitative way in terms of their intelligence; Wechsler's stress on the fact that intelligence is a manifestation of the personality as a whole requires that these Indian and white subjects be viewed as much more similar than the literature seemed to indicate.

2. The low scores achieved by both the Indian and white groups on the Arithmetic subtest raises a number of questions. Glasser and Zimmerman (1967, p. 55) described this subtest as "a measure of the child's ability to utilize abstract concepts of numbers and numerical operations;" however, it is also considered to be a measure of concentration and arithmetic reasoning. Wechsler (1949) stressed mental alertness, concentration, and arithmetic reasoning as factors involved in this subtest; Rapport, Gill and Schafer (1968) classed this subtest in their attention and concentration group. It might also be interpreted a measure of freedom from disruptive anxiety, and it might be clustered

with Coding and Digit Span as "an anxiety triad." Coding is next to the lowest subtest score on the Performance Section for the Indians, but it is the second highest for the whites. Could this be due to greater anxiety among the Indian subjects? If anxiety or lack of concentration is associated with the poor performance on the Arithmetic subtest by these two groups, examiners administering the WISC might want to consider dropping this subtest and prorating the other four subtests to determine the Verbal I.Q., although Cohen (1959) concludes from factor analysis that this subtest is a moderately good measure of "G."

3. The total white group achieved their highest score of all ten subtests on the Similarities subtest; the Indians also score highest on this subtest of the five subtests on the Verbal Section, but four of the five subtests on the Performance Section are higher than their Similarities subtest score. Wechsler (1949) considered this subtest to be a measure of the individual's ability to perceive the common elements of the terms he is asked to compare. Assessing logical and abstract thinking ability is involved, as is concept formation and the ability to relate facts, according to Lutey (1967). Evidently these children in North Central Montana are skilled in concept formation, logic, and judgment; the Indian children are also comparatively better at these skills than they are at the skills involved in the other four subtests of the Verbal Section.

4. The range of scores on the Performance Section is

substantially less for both the Indians and whites when it is compared to the range on the Verbal Section. The Performance I.Q. is over eight points better than the Verbal I.Q. for Indians, but the difference is less than one I.Q. point for the whites. These results tend to confirm the idea that language is a depressing factor for the Indian group to a greater degree on the Verbal Section and suggests that the Performance I.Q. may be a better measure of ability than Verbal I.Q. for certain bilingual subjects when the WISC is used. It might also be conceivable that there is some positive bias for the Indian subjects that improved their score on the Performance Section.

5. The white males are significantly higher on the Information subtest than the white females; they are also significantly higher on the Vocabulary subtest. These two subtests share the distinction of being the best measure of "G", and that Information has as one of its major functions that of assessing information from experience and education. As education is very likely a fairly common experience, the difference on this subtest must come largely from "experience." Wechsler indicates that Vocabulary is an index of schooling and learning but also gives evidence of the subject's fund of verbal information and general range of ideas. The question again must be raised if this subtest has a male bias in terms of the questions used. On the Performance Section, Picture Completion shows the greatest difference in favor of the white males. This subtest assesses the subject's ability to

differentiate essential from non-essential detail and involves the use of basic perceptual and conceptual abilities. Visual alertness and visual memory are also involved. This subtest does not correlate highly with any of the other nine subtests, but correlates highest with Information and Vocabulary. Cohen also terms it one of the poorest measures of "G".

6. The bias in favor of male subjects holds in the Indian group to about the same extent as it was found in the white group, and the results tend to rule out some supposed cultural differences in how males and females are raised in the two cultures involved. If Wechsler's proposition that intelligence is in a sense a manifestation of the whole personality, the results of this study do not indicate any major personality differences in terms of the subtest scatter of males and females in the two cultures. As a matter of fact, the results would cause one to question whether there are really two cultures influencing the results. Bryde's (1966) results are somewhat contrary to this conclusion, but his study used the Minnesota Multiphasic Personality Inventory (MMPI) on Indian children from the Pine Ridge Reservation in South Dakota. Most of his subjects were attending all Indian schools, and the major differences between the Indians and the standardization population were found among the high school age group.

7. Rapport, Gill and Schafer (1968) have classified all the WISC subtests into four groups based on a combination of clinical

experience, theoretical considerations, and statistical findings. Their Verbal Group includes all of the subtests of the Verbal Section except Arithmetic; as the Arithmetic subtest is the low for both the Indians and whites, removing this score would not influence the means of the two groups significantly in terms of comparing the Verbal Section means. The Attention and Concentration Group consists of the Digit Span and the Arithmetic subtests, and scores on the Digit Span subtest were not used in this study. The Visual-Motor Coordination Group includes Object Assembly, Block Design, Coding and Mazes; the Mazes subtest scores were not used in this study. However, if the other three subtest scores are combined to determine a measure of visual-motor coordination it differs very little from the mean of the Performance Section for both Indians and whites. The fourth group of Rapport, Gill and Schafer is called the Visual Organization Group and consists of the Picture Arrangement and Picture Competition subtests. However, this combination of subtests does not differ significantly from the mean of the Performance Section for either the Indians or whites.

RECOMMENDATIONS

The following recommendations are made in hopes that further study of the appropriateness of the WISC for use with Indian subjects might be clarified further.

1. A study of anxiety level and performance on the Arithmetic

subtest of the WISC be conducted to determine if anxiety level and achievement in arithmetic has a positive correlation.

2. A study be conducted to determine if white children from North Central Montana are actually more skilled in concept formation, logic judgment, and abstract thinking as suggested by the high mean on the Similarities subtest. As the Indian children are also higher on this subtest than they are on any of the other five subtests on the Verbal Section, information from this suggested study may provide valuable information regarding mental development of children from this area of Montana.

3. As there are a number of efforts being made to develop instructional materials written in the language of most Indian tribes in Montana, an effort to translate the WISC into these languages should be made.

4. A study of questions and activities required on subtests where males scored significantly higher than females should be done to check the results in this study. The Information and Vocabulary subtests on the Verbal Section and the Picture Completion subtest on the Performance Section are the three subtests most deserving of such study, based on the results reported in this paper.

5. A study using the Minnesota Multiphasic Personality Inventory of children from the three Indian reservations included in this study would provide additional helpful information about possible effective

instructional methods that might be used in teaching certain Indian children in North Central Montana.

6. An additional study on using the WISC on Indian children that included the two subtests (Digit Span and Mazes) that are not used in this study would develop additional information that may be helpful to educators working with Indian pupils.

APPENDIX A
CORRESPONDENCE

John Lotz, Director CENTER FOR APPLIED LINGUISTICS
1717 Massachusetts Ave. N.W.
Washington, D. C. 20036

October 8, 1970

Mr. Ray L. Peck
Administrative Assistant
Office of the Dean
Montana State University
Bozeman, Montana 59715

Dear Mr. Peck:

Thank you for your letter of September 22 inquiring about studies using the WISC with Indian children. Miss Ohannessian is on leave of absence in Africa this year, so your letter has come to me.

I am afraid I cannot be much direct help. None of the persons who were directly involved with the survey we did in 1967 are presently here at the Center and I myself had very little contact with the work.

I am sending separately copies of some of the materials coming out of the study which may be of interest to you. One is the survey report, which lists the people involved in the study. Any of these might be of help. (Dr. Troike is in Taiwan on a Fulbright this year unfortunately, as he would have been one of the better sources. I believe the others except Miss Ohannessian are still where they were.)

Did Mr. Coombs tell you that the TESOL Association has had a contract with the BIA for a more in-depth survey of English teaching in a few schools, all Navajo, I think. Dr. James E. Alatis of the TESOL Association (% School of Languages and Linguistics, Georgetown University, Washington, D.C. 20007) could tell you whether they have encountered WISC. You might also want to contact Dr. Bernard Spolsky at the University of New Mexico in Albuquerque. He is directing a broader study, chiefly concerned with reading, on the Navajo reservation. He may be even more likely to contact this type of study.

I'm sorry not to be of more specific help. I hope these leads will prove fruitful. Please let me know if we can be of further assistance.

Sincerely yours,

s/s Dorothy A. Pedtke

(Miss) Dorothy A. Pedtke
Program Associate
English for Speakers of Other
Languages Program

DAP/dt

THE PSYCHOLOGICAL CORPORATION

304 East 45th Street
New York, N.Y. 10017

August 13, 1971

Mr. Ray L. Peck
Assistant Professor
Montana State University
Bozeman, Montana 59715

Dear Mr. Peck:

Thank you for sending us a copy of your thesis proposal. Your topic is an interesting one and I am eager to see your results. I do have two comments, however, regarding your proposal.

First, when you compare the Indian population to our normative sample or to your randomly selected white sample, it seems to me that the question of socioeconomic status should be considered. The Indian population is presumably of lower socioeconomic status than a random sampling of whites from the same area or than a stratified sampling of United States residents. Thus, I believe that unless your sampling of whites secures children of about the same socioeconomic level as the Indian children, you will be unable to determine whether profile differences are more related to racial or socioeconomic differences.

Second, I am not sure if your chosen statistic to evaluate the difference between the group of Indians and our normative sample is the most appropriate one. I would have thought that the appropriate statistic would have been the "t" test to evaluate the significance of the difference between two means as described, for example, on page 183 of Guilford's "Fundamental Statistics in Psychology and Education," fourth edition, 1965. Perhaps you would want to check this out.

The above comments are merely suggestions that you may want to discuss with your faculty advisors if you deem them of significant importance. In any event, I think your study should be a fine one.

Cordially,

s/s Alan S. Kaufman

Alan S. Kaufman, Ph. D.
Senior Research Associate
Test Division

ASK/dlm

THE UNIVERSITY OF SOUTH DAKOTA

Vermillion, South Dakota

October 28, 1970

Mr. Ray L. Peck
College of Professional Schools
Montana State University
Bozeman, Montana 59715

Dear Mr. Peck:

Your letter of September 2 to Pine Ridge finally caught up with me. Holy Rosary advises me that they sent you two copies of the book, The Sioux Indian Student. If you did not receive them, kindly advise, because we have more copies here at the University. In the bibliography you will find some pertinent references to your area.

Over the years, I did quite a bit of testing of Indian youngsters, grade school and high school, with the Binet. I found that in the majority of cases, they invariably score 10 to 15 points higher with the Binet than they did on the standard group I.Q. tests. I didn't gather the data together for a formal analysis because I didn't have time at the time.

Since I am very interested in your research area, would you please keep me posted from time to time on your findings?

The latest research on Indian education as a whole is that of Havighurst. I am enclosing copies of what is available right now. That final offering on the Draw-A-Man test might be of interest to you. I'm also enclosing a reprint of an article that might be pertinent in your review of the literature.

Good luck in your project.

Sincerely yours,

s/s John F. Bryde
John F. Bryde, Ph. D.
Ed. Psych. & Guidance

JFB:ph

Enclosure: 2

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UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Indian Affairs

Washington, D.C. 20242

December 11, 1969

Mr. Ray L. Peck
Pupil Personnel Services Project
1506 - South Fifth Avenue
Bozeman, Montana 59715

Dear Mr. Peck:

Your letter of December 8 to Mr. L. Madison Coombs is being forwarded to him at his home address in Arlington, Virginia, as he has retired from Federal service. Mr. Coombs has told us he will be glad to respond to you.

Sincerely,

s/s Anna Durovich

Staff Assistant
Research and Evaluation

Arlington, Virginia
4501 Arlington Blvd.
Apt. 225

December 19, 1969

Mr. Ray L. Peck
Pupil Personnel Services Project
1506 South Fifth Avenue
Bozeman, Montana 59715

Dear Mr. Peck:

This is in response to your letter of December 8 which Miss Anna Durovich of the Bureau of Indian Affairs Research and Evaluation Office forwarded to me at my suggestion. I am not sure that I can be of as much help to you as you had hoped but I will put down such reactions as I have.

First of all, I want to refer you to The Education of American Indians- A Survey of the Literature by Dr. Brewton Berry of the Research Foundation at Ohio State University. This is no doubt the most definite bibliography on Indian education that has been done. If Montana State University does not have it, it is available from ERIC. From p. 31 to p. 36 Berry reviews the question of the intelligence of Indian students as being possibly related to the relatively low achievement of this group by comparison with national norms. His general conclusion is that in the earlier and less sophisticated years of intelligence testing some investigators, noting the generally low performance of Indian students on intelligence tests, assumed that they were inferior, mentally, but that since 1940 the theory of racial differences in this regard has become pretty much discredited and in recent years very little such comparative research has been done. For example, in American Indian Education - A Selected Bibliography done recently for ERIC-Cress at New Mexico State University by Cecilia Martinez and James Heathman, I find only one study concerned with the measurement of the intelligence of Indian students. This is Assessing the Intellectual Ability of Indian and Metis Pupils at Ft. Simpson, N.W.T. by R. S. MacArthur of the Canadian Department of Northern Affairs and National Resources in 1962. This also is available from ERIC.

I think your impression that very little has been done with individually administered I.Q. tests with Indian students is correct. I am sure such tests have been given to Indian students here and there, from time to time for diagnostic or guidance purposes but I do not know of any studies of at all recent vintage which were concerned with the racial identification of the students. Certainly I do not know of any which include

students from the Blackfeet, Fort Belknap, or Rocky Boys reservations.

In the large scale testing project which I did in the 1950's in collaboration with the University of Kansas, we did not include any test of mental ability. In citing the reasons for this we said:

"Some readers may feel that, inasmuch as intelligence is admittedly an important factor in the learning process, not attempting to measure it was a serious omission. The plain fact is that, in the opinion of the investigators, a valid measurement of the intelligence of pupils was not possible in the present study.-----Nearly all group intelligence tests are highly verbal. Those which claim to be non-verbal in content must rely on verbalism in the giving of directions. Nearly all intelligence tests, individual as well as those of the group type, contain items drawn from the major culture of the country. This, it was felt, would operate against the underacculturated groups in the study, both Indian and white. No instrument was found which satisfied all of the requirements and contained none of the disadvantages mentioned above."

"We accept the concept of innate mental capacity which differs qualitatively and quantitatively from individual to individual as a valid one. It would be very helpful in educational situations if we could measure it as such. In truth, however, we have never been able to do this. From the moment of birth environmental influences begin to act upon the individual. These do not change his innate capacity but they prevent the accurate measurement of it. The same language handicaps or other cultural disadvantages which adversely affect the educational achievement of a child would tend to influence his intelligence test scores. Achievement tests, on the other hand, are designed to cover material which presumably has been "taught" in school. By use of them we simply seek to discover how much the child has learned. They are not invalidated merely because the learner faces learning disadvantages so long as the content is consistent with the courses of study and the learning goals of the school which the child attends. No such validity can be claimed for a verbalized, culture laden, group test which purports to measure the innate mental capacity of an underacculturated child."

That was written over ten years ago and I am not sure that I would say it is very much differently now, except that it in no way takes into account the possibilities of the different kinds of innate intelligence. And, of course Arthur Jensen has come along with his blockbuster since then.

The study on Equality of Educational Opportunity in 1965 (the now famous "Coleman Report") used what they called verbal and non-verbal

ability tests. The Indian pupils in the study were well below the white pupils on all tests, of course, as were all other ethnic minorities except the Oriental Americans who were close to the national norms. The Indian pupils did score higher, in general, than Mexican Americans, Negroes, or Puerto Ricans. However, their margin of superiority was less clear cut in the case of verbal ability than on any other of the tests. If you have not done so you may wish to give some attention to the Coleman study.

It has been suggested that one reason Indian children do less well by comparison with national norms at the upper grade levels than at the lower ones is because of the increasingly abstract nature of the material they are called upon to learn. This has not proved to be a popular theory with anthropologists or linguists, nor, for that matter, some psychologists who are interested in the matter. The latter are more inclined to believe that anomie and cultural alienation are the chief causes. However, I am intrigued with the idea that cultural learning styles may have something to do with it. The Southwestern Cooperative Educational Laboratory at Albuquerque has done some work on styles of learning involving minority group children. Also the Center for Applied Linguistics, Washington, D.C. has done some work for the Bureau of Indian Affairs in this field. If you are interested you might write Miss Sirarpi Ohannessian of CAL at 1717 Massachusetts Ave. N.W., Washington, D.C. 20036.

I am afraid that I have mostly rambled on and may not have been of any help to you at all. At any rate, I wish you well with your doctoral program. I might add that the Northwest Educational Laboratory at Portland has also had a strong interest in Indians and Robert Rath there might be of some help to you.

Sincerely yours,

s/s L. Madison Coombs

L. Madison Coombs

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LITERATURE CONSULTED

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