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# WISC-III Performance Patterning Differences Between Native American and Caucasian Children

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# WISC-III PERFORMANCE PATTERNING DIFFERENCES BETWEEN NATIVE AMERICAN AND CAUCASIAN CHILDREN

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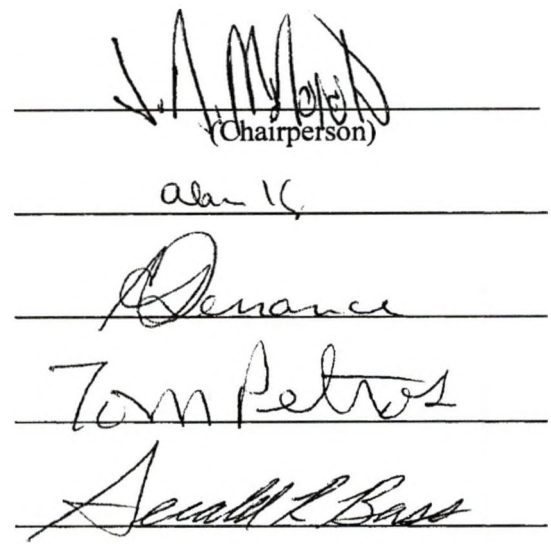
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ABSTRACT

Native American children are sometimes inappropriately assessed, diagnosed, and labeled using Western European standardized intelligence measurements. The use of these measures with Native American children leads to questions regarding appropriate placement issues. Many clinicians are unfamiliar with these unique cultural differences. Some studies suggest the possibility of a "Native American Pattern" on the Wechsler Intelligence Scales for Children (McShane & Plas, 1982). Mishra (1982) also found cultural bias with Information, Similarities, and Vocabulary subtests on the WISC-R when comparing Anglo and Navajo children with matching Full Scale IQ's. The present study investigated the Wechsler Intelligence Scale for Children (WISC-III; Wechsler, 1991) patterning differences between Native American and Caucasian children. The study sample consisted of 89 Native American children that have attended or are currently attending a tribally controlled boarding school in Wahpeton, North Dakota, and 70 Caucasian children that were assessed at the University of North Dakota.

Many important factors related to cultural differences can impact performance on intelligence measurements. This becomes especially concerning when Native American children are assessed with intelligence measures developed primarily for the majority culture and these scores are used for important placement decisions. The degree to which these factors measurably impact Native American children is not well understood. This

study may have provided some important clues and information related to patterning performance differences between Native American and Caucasian children.

# CHAPTER I

## INTRODUCTION

There has recently been an increased emphasis on attempting to understand score pattern differences between Native and non-Native American children on assessment measures developed and standardized primarily on majority-culture members. The wide use and misuse of measures such as the Wechsler Intelligence Scale for Children (Wechsler, 1991) with Native American populations in clinical and educational settings require a better understanding of these cultural performance differences and their many sources.

There are many culturally-associated reasons for how and why Native American children score differently than Caucasian children on intellectual performance tests. Some studies such as Neisser et al. (1996) found that school personnel make important decisions such as grade assignment and remedial instruction needs based largely on the results from intellectual testing. Neisser et al. (1996) further suggest that Native American children are often inappropriately diagnosed using these majority-culture derived measurements. The inappropriate use of intelligence tests in particular can lead to unreliable diagnostic, assessment, and treatment decisions. Beiser and Gotowiec (2000) further note that IQ scores are often considered powerful predictors of academic success and can thus lead to a biasing or Rosenthal effect on Native American children.

Anastasi (1988) argues that the basic approach to developing culture-fair tests has often been neglected entirely or inadequately executed in the field of clinical psychology. She also discusses the difficulties of attempting to develop tests that would adequately address the unique and complex differences across a wide range of cultures. She emphasizes the importance of considering the role of culture and tribal differences in the use and development of intelligence testing measurements. She further emphasizes that cultures and subcultures consist of different values, beliefs, and behavioral norms which influence member preparedness to respond to demands that extend beyond their traditional environment.

Dana (1986) suggests environmental factors also play an important role in determining performance on intelligence tests. Attitudes about different cultures and lifestyles can also create problems for Native Americans being assessed by these standardized tests. These attitudes can include skepticism regarding the measure being used and negative views about being evaluated by the "White Man's" psychological measurements. These differences in attitudes require special consideration by psychologists and researchers working with Native American children and clients. This "special consideration" has not been historically adequate in neutralizing the adverse effects of cultural beliefs on test performance. In the present study it is hoped to provide data that extends present knowledge about the item content of the WISC-III and its impact on score differentials between Native American and Caucasian children.

There are several key terms that are used throughout this study that require formal definition. These terms are defined as follows: Intelligence: this emphasizes the ability to adjust or adapt to the environment, the ability to learn, or the ability to perform abstract thinking (i.e., to use symbols and concepts). Wechsler (1991) states that intelligence is composed of many qualitatively different abilities such as knowledge of information, problem solving skills, and number sequencing abilities. Another key term is Native American, Native, or American Indian: Described as any group or individual who can demonstrate a blood quantum or ancestral lineage to any federal, state, or locally recognized tribe. This term also includes any person who becomes a member of such a tribe through ceremonial adoption and strives to live in traditional Indian fashion (McDonald, Morton & Stewart, 1993). Finally, Biculturalism: Described as identification with both the European-American culture and Native American culture (LaFromboise, Trimble & Mohatt, 1990).

## Cultural Effects and IQ testing

Anastasi (1988) argued that cultural differences related greatly to test content, and many non-reading and non-language tests include items of information that are specific to certain cultures. She further pointed out that the subject may be required to understand the function of various objects that are uncommon because of his or her cultural background. The rapidly growing American educational system often requires intelligence testing for admission purposes as well as for individual counseling.

Language continues to be an important performance factor for many tests that can impact such groups as Native American children in the education system. Items that potentially disadvantage individuals from different cultural groups continue to be included in most major intelligence test batteries.

Jenkins and Ramsey (1991) emphasize that psychology has often been insensitive to the potential effect of cultural differences and minority issues when constructing and developing intelligence assessment techniques. Minority populations were often excluded from normative samples used for intelligence test design. Dana (1986) argues that it is particularly regrettable that Native American and other minority populations were not included in the development of the Wechsler Scales. Even after the publication of the Wechsler Scale revisions (WAIS-R, WISC-R, WPPSI), the argument concerning bias in intelligence testing with minorities continues. Hoffman, Dana, and Bolton (1985) note that these biases also frequently occur for personality tests such as the Minnesota Multiphasic Personality Inventory (MMPI) as well.

Few studies have examined intelligence performance patterning differences among Native American children and adolescents. There remains an urgent need for research and increased understanding of the effects of culture on intelligence test performance. With the plethora of mental health problems among Native Americans on reservations and urban communities, culturally-sensitive psychological tests hold promise for the most valid measures of performance deficits.

McShane (1987) suggested that mental health professionals and institutions have had difficulty addressing prevalent and serious mental health problems facing Native American people. Researchers, clinicians, and mental health professionals, especially non-Native Americans, are often not aware of cultural differences which exist even within the Native American population. Some Native Americans are assimilated into the majority Caucasian American society while others are more traditional. Dana (1986) suggested that acculturation be considered as a moderator variable that affects the results of assessment instruments when given to people who are of varying levels of acculturation and differ in culture from the population for which the instrument was originally designed.

McDonald, Jackson, and McDonald (1991) argued that racism, prejudice, and differences in customs are only a few factors that may cause Native American students to feel higher levels of test anxiety than their non-Native American counterparts in school settings. Neely and Shaughnessy (1984) suggested that factors influencing Native American test scores are usually noted as sources of bias and are well-documented in the literature. The culture and belief systems of Native American people are important factors that should be understood and accounted for when conducting assessment with Native American people (Dana, 1993). Native Americans vary in their degree of influence by knowledge of majority culture lifestyle, which needs to be taken into

account. It is also important to understand the cultural differences can exist between tribes.

Native American children are also influenced by their parents' unemployment, poor educational resources, and alcoholism that may influence performance on intellectual tests. Historical injustices have also led to many negative attitudes about Native American people and their way of life, which include attitudes of pity, prejudice, and sympathy (Dana, 1993). These factors are not accounted for when Native Americans are assessed on intelligence measurements and assessment techniques, which may influence their performance. Within all tribal groups many traditional people may be skeptical or suspicious of assessment instruments and non-Indian assessors. This skepticism is in part due to historical changes forced upon the Indian way of life by the federal government and majority culture way of life. Knowledge and awareness that several generations of Native Americans experienced such treatment may help clinicians working with this population determine appropriate assessment, diagnosis, and treatment.

McDonald, Morton, and Stewart (1993) suggested there is a lack of knowledge by some clinicians regarding the culture of Native American patients which may increase the potential for inappropriate diagnosis. Non-Indian clinicians need cross-cultural knowledge and training when working with this population to help understand special issues affecting Native Americans. Clinicians who are appropriately educated regarding the unique challenges that face Native Americans can increase the likelihood of

successful treatment and assessment of this population (Dana, 1993; Maser & Dinges, 1993; McDonald et al., 1993).

Native Americans and Intelligence Testing

Mishra (1982) looked at the possibility of cultural bias with items from the WISC-R by examining 77 items from Information, Similarities, and Vocabulary subtests, comparing Anglo and Navajo children. Subjects in both groups represented families of low socioeconomic status. All subjects were individually administered the ten regular subtests of the WISC-R. A certified school psychologist with extensive experience in administering and scoring the WISC-R with subjects of varying ages and cultures was used for testing and scoring procedures. All regular subtests of the WISC-R were administered to all subjects, but only scores on Information, Similarities, and Vocabulary subtests were analyzed in the study. These items were hypothesized to be more sensitive to cultural bias than items on the other subtests. The two groups were matched on Full Scale IQ to control for the effects of overall ability differences between the groups studied. The groups were then compared on percentages of subjects in each group who passed each item on the subtests. The assumption was that group differences on the rate of passing each item must be due to cultural bias since the two groups were matched on ability.

The results showed that 15 items, or 19 percent of the total items examined, were possibly biased against the Navajo children. For each of those items, a significantly

lower percentage of Navajo subjects passed the item as compared to Anglo subjects. The author advised caution when interpreting these findings due to the fact that nonhomogeneous groups were used and subjects came from low socioeconomic families residing in isolated areas. Caution was also warranted in generalizing these findings to Native Americans from other tribes in different regions, due to cultural differences that exist between tribes. The authors encouraged researchers to examine the possibility of these differences occurring with other tribes using the Wechsler scales and other intelligence measures.

Beiser and Gotowiec (2000) examined Verbal and Performance WISC-R subscale scores from 691 Native American and 234 non-Native American children in Grades 2 and 4. The participants were assessed at four sites in North America including the Northern Woods, Plains, Northwest Coast, and the Southwest Desert. The study revealed similar results as found in research looking at patterning differences with Native American children. The results were similar in that the Native children had substantially lower Verbal IQ scores than non-Native children. The results also found a high percentage of differences related to factors such as health, socioeconomic status, parental attitudes toward school and cultural separation, and English language skills in the Native compared to the non-Native children.

McShane and Plas (1982) examined the Wechsler performance patterns of Native American children using the WISC, WISC-R, and WPPSI subtest scores re-categorized to

the Bannatyne scheme. The samples consisted of 142 Ojibwa Native American children ranging in age from 4.5 to 16 years and evenly distributed on the variable of sex. The majority of the children were referred for testing due to educational difficulties, problems with suspected otitis media influencing learning, and high potential and giftedness.

The groups were administered the WISC or the WISC-R and divided into traditional or acculturated groups based on their Verbal-Performance IQ ratio. Those subjects who exhibited nine-point or greater discrepancies between Verbal and Performance IQs were assigned to the traditional group, while those whose discrepancy was eight points or less were assigned to the acculturated group. The Bannatyne categories are a combination of three subtests to measure Verbal Conceptualization, Spatial Abilities, Sequencing Abilities, and Acquired Knowledge (Wechsler, 1991).

McShane and Plas (1982) referred to a study conducted by Smith, Coleman, and Dokecki (1977) which reported that learning disabled (LD) children showed a pattern of Spatial > Verbal Conceptualization > Sequential > Acquired Knowledge on the WISC-R regardless of their Full Scale IQ, as long as the Full Scale IQ score exceeded 75. McShane and Plas assumed that a performance-oriented traditional Native American child would demonstrate a Bannatyne pattern of Spatial > Sequential > Verbal Conceptualization > Acquired Knowledge on the Wechsler scales. A secondary hypothesis by the authors was that highly assimilated Native American children would

display a pattern of performance more closely related to the norming group than to that of the Native American group.

The results indicated that a pattern of Bannatyne scores of Spatial > Sequential > Verbal Conceptualization > Acquired Knowledge was indeed displayed within the traditional group. However, no significant differences between Bannatyne scores were observed for the assimilated group. The authors suggested future work should explore the relationship between these Verbal/Performance discrepancies and Bannatyne scores. The article further expressed a need for more research with Native American populations. The authors contended that more attention needs to be given to the differences in the discrepancies of the Verbal and Performance scores across assimilated and traditional Native American individuals.

Hale, Raymond, and Gajar (1982) evaluated the possibility of test bias with the Verbal IQ as measured by the Wechsler Intelligence Scale for Children-Revised (WISC-R), and the relation of Verbal IQ scores to academic achievement in two different socioeconomic status groups. Their participant pools consisted of 144 children between the ages of seven to 12, who were randomly selected from a larger pool of children identified for or placed in special education classes. The subjects fell into one of three groups: those classified as emotionally disturbed, those classified as learning disabled, and those classified as mentally retarded. Besides the WISC-R being used, the subjects

were also categorized according to the Hollingshead Index of Social Position. Subjects were grouped according to socioeconomic status of either middle or low class.

Results indicated the regression lines for the middle and low SES groups did not differ significantly for the prediction of reading scores using the Verbal IQ score from the WISC-R as the predictor. The study provided evidence suggesting when bias is defined as significantly different regression lines, the WISC-R Verbal IQ score is a non-biased predictor of reading across SES groups.

Dauphinais and King (1992) examined literature related to Native American children and assessment issues. They also looked at information related to historical, psychosocial, and sociocultural perspectives. These perspectives were used to examine the interface between psychological assessment and Native American children. The authors also reviewed literature on psychoeducational and personality assessment with Native American children. The findings suggested that many assessment instruments used with Native American children have not been tested for their reliability and validity. They also found that culture and culturally diverse needs of Native American children have not been considered in the assessment process. They further suggested that the process involved with psychological assessment can present problems for Native American children and Native Americans in general. Many of these differences continue to cause problems throughout the assessment process related to the design and outcome of the assessment process.

Brescia and Fortune (1989) argued that testing Native American students with intelligence measurements and educational tests standardized with majority culture can lead to invalid results. They further emphasized that current intelligence and aptitude test theories are not geared toward Native American cultures. These tests are frequently used in educational settings within reservation school systems for placement and grading, which can lead to questions regarding appropriateness. Native American students face unique challenges, and possible biases, with the use of these achievement, aptitude, and intelligence tests.

Work done by McCullough, Walker, and Diessner (1985) examined the Wechsler scales in the assessment of Native Americans of the Columbia River Basin. All the students were enrolled in a private, tribally-operated junior and senior high school on a reservation in the Pacific Northwest. The Columbian River Basin was defined geographically as the region from northern Washington state to southern Oregon, from the Cascade range in the west to the Rocky Mountains in the east. The majority of the students were members of the Confederated Tribes and Bands of the Yakima Indian Nation. Students (N=75) ranged in age from 12 to 19 years of age. Of the total, three students were considered learning disabled.

Thirty-three students (9 females and 24 males) ranging in age from 16 to 19 years were assessed with the WAIS. Forty-two students (21 females and 21 males) ranging from 12 to 16 were assessed with the WISC-R. All students spoke fluently in American

English and attended public school during their elementary school years. The results were consistent with studies of other Native American groups in that the Verbal IQ scores of the WAIS and WISC-R were significantly below the normative mean, while the Performance IQ scores were at or above the normative mean. Furthermore, Verbal and Full Scale IQ scores were significantly correlated with a measure of reading achievement. However, for achievement in math, the Verbal IQ was a fair correlate ($r$ = .38), the Full Scale IQ did not correlate at all ($r$ = .04), and the Performance IQ was inversely correlated($r$ = -.41).

The authors suggested their findings demonstrated a need for greater understanding of cultural differences and interaction with intelligence, and how cultural orientation and differences are reflected in standardized test scores. They further argued that a question of ethics arises in considering whether Native Americans have been assessed, diagnosed, and treated with biased assessment techniques. Psychologists were encouraged to be aware of cultural differences and how these can influence test results, and more importantly, the interpretation of results. Due to the lack of Native American psychologists and low interest by non-Native American psychologists in working with this population, this area continues to be neglected. More needs to be done to develop intelligence measurements and instruments that are culturally-appropriate with this population.

Native American Children and Other Factors

Native American children are sometimes influenced by unique factors that can influence their scores and patterning performance on intelligence testing measurements. These factors are not well understood by clinicians and researchers, and require special consideration when assessing this population. Unger (1977) reported that 25-35% of all Indian children are removed from their families and placed in foster care homes. It is further reported that an alarming number of Native American children and adolescents are becoming involved in gang-related activities. This can also lead to more Native American adolescents committing suicide and abusing alcohol and drugs.

The National American Indian Court Judges Association (1985) found that suicide among American Indian adolescents has increased dramatically on many reservations in the last 20 years. However, they also point out that suicide rates on some reservations has not increased. This lack of increase was related to tribes possessing certain unique factors. The tribes with low adolescent suicide rates tended to be more traditional in their daily living, and their adolescents were able to remain at home because of employment and educational opportunities existing within the community. The two main factors considered to lead to adolescent suicide on reservations are chronic depression and acute stress.

The National American Indian Court Judges Association (1985) further suggested that environmental factors seem to contribute to chronic depression and suicide among

Native American adolescents. These factors include breakdowns of tribal traditions, lack of effective and competent adult role models, alcoholic parents, broken families, early marriage, failure to gain education, and unemployment. There also appears to be a sub-group of adolescents following friends or relatives who have recently committed suicide (i.e., "copycat" suicides). These suicides are a common trend or theme within some reservation communities where high suicide rates are sometimes viewed as a "normal" process.

Suicide and alcoholism rates on many reservations have reached epidemic levels, and suicide rates for American Indians are three to ten times the rates for the general population (Peters, 1981). Some communities are plagued with suicides and alcoholism, in epidemic proportions, with no effective support services available. Depression is a frequently diagnosed mental disorder among Native Americans.

Another major problem within the reservations is the high rate of inhalant abuse by Native American children and adolescents, and in many cases, adults. The use of inhalants is quite popular among American Indian youth; inhalant abuse by Indian youth is almost twice the U.S. average for all adolescents between the ages of 12 to 17 (Oetting, Edwards, & Beauvais, 1988; May, 1982; Young, 1987). Inhalant abuse involves huffing or sniffing gasoline, glue, markers, and other toxic chemicals, with the intention of getting a quick and cheap high.

Oetting et al. (1988) postulated several conditions that increase one's susceptibility to inhalant use, such as behavior (deviance), educational problems, emotional problems, and peers' influence. The authors further stated that inhalants are often the first chemical tried by Native American youth. They further noted that school surveys may not accurately reflect the true prevalence of inhalant abuse in school-aged children since many users are truants and drop out of school. The tendency to overestimate and label all Indian youth as inhalant abusers must be avoided, even though levels of inhalant use are comparatively high for Indian youth.

## Native Americans and Education

Jenkins and Ramsey (1991) argued that there are extremely low numbers of college-educated Native Americans; very few doctorate degrees have been awarded to Native Americans. They further explained that as a result of such low numbers, relatively little research is being devoted to Native American populations. They also suggest there is a lack of social mobility within Native American communities. The lack of social mobility can be seen as a result of high unemployment, poor education resources, and alcoholism. Many of the basic necessities of life are nonexistent in some communities, and the rural environment within a reservation settings often make it impossible for some Native American people to receive important living necessities.

McDonald, Jackson and McDonald (1991) utilized the State-Trait Anxiety Inventory (Spielberger, Gursuch, & Lushene, 1977) to assess differences between non-

reservation and reservation Native American individuals and non-Native American college students. Results indicated that Native Americans indeed do experience greater anxiety levels than their majority culture peers. These findings support the contention that Indian college students encounter difficulties derived from cultural differences that lead to higher levels of anxiety. Price and McNeill (1992) point out that traditional Native American college students (i.e., those who are highly committed to their culture) are less likely to seek counseling than non-traditional Native Americans.

## Cultural Orientation

Few psychologists have studied the relation between biculturalism and intelligence testing in Native American children. Redfield, Linton and Herskovitz (1936) originally described acculturation as changes in the original patterns of cultural groups that have continuous, first-hand contact with each another. Currently used assessment measures of intelligence are standardized by European-American norms which could be defined as culture-specific toward the majority culture lifestyle.

Oetting and Beauvais (1993) proposed the Orthogonal Theory of Biculturalism, which suggests that the more culturally competent one is in both the native and majority cultures, the more successful and well-adjusted that individual will be. A high level of knowledge pertaining to the values, beliefs and customs of one's culture is indicative of highly culturally competent individuals. LaFromboise, Coleman, and Gerton (1993) further point out that highly bicultural individuals also display a strong sense of

identification, participation in cultural activities, good communication skills, and knowledge about cultural norms and customs in both cultures.

Anastasi (1988) suggested that cultural differences influence processes within cultures that bring about group differences in behavior. This can be important in many ways such as understanding how some cultural differences may affect only certain responses on a particular test and impact the validity for certain groups. Understanding how cultural differences may affect performance on certain test items can also be important in developing cultural fair measurements.

## Purpose and Present Study Hypotheses

The purpose of this study was to examine patterning differences on the WISC-III between 89 Native American and 70 Caucasian children. The main objective was to examine differences between the Full Scale IQ (FSIQ), Verbal IQ (VIQ), and Performance IQ (PIQ) on the WISC-III. Another important part of this study was to examine individual subtest item performance differences on the Information, Vocabulary, Similarities, Arithmetic, and Comprehension subtests of the WISC-III comparing the Native American and Caucasian groups, similar to the Mishra (1982) study that found differences on some of the items from these subtests. Factors such as socioeconomic status (SES) were also looked at in this study, and it was determined if at least one parent was employed in the family.

Comparing the two groups was expected to help determine how Native American and Caucasian children score on the WISC-III. It was also hoped to identify important subtest item differences which can help determine possible culturally-mediated differences in test performance. Additionally, the results from these data can potentially help clinicians obtain some appropriate information toward determining cultural differences with Native American children on the WISC-III. The results can help understand the importance of developing appropriate and culturally relevant assessment measures of all kinds, when assessing Native American children.

The specific hypotheses in this study are:

1. Native American Children would display a mean Performance IQ score greater than Verbal IQ on the WISC-III, and Caucasian children would display the opposite.

2. Some individual item scores on the Verbal subtests of Vocabulary, Information, Similarities, Arithmetic, and Comprehension of the WISC-III would show significantly higher scores for Caucasian children compared to Native American children.

3. Caucasian children would score significantly higher on the mean Full Scale IQ score compared to the Native American children.

# CHAPTER II

# METHODOLOGY

## Participants

Archival data from two groups of children were used for comparison in this study. The Native American group was selected randomly from archival data from the Circle of Nations Indian School in Wahpeton, North Dakota and consisted of 89 subjects. The Native American group consisted of children attending a boarding school for primarily behavioral and education difficulties. They were tested at the school to determine the need for educational and psychological programs. The primary diagnoses of the Native American group was Conduct Disorder and Disruptive Behavior Disorder.

The Caucasian group was selected randomly from archival data from the University of North Dakota Psychology Department. The data were originally collected by University of North Dakota Clinical Psychology graduate students and professors and consisted of 70 subjects. They were tested specifically for educational and psychological difficulties, and research purposes.

There was an attempt to incorporate into each sample an approximately equal number of males and females. There were 48 males and 41 females in the Native American group, and 44 males and 26 females in the Caucasian group. The mean age for the Native American group was 12.33 years and the mean age for the Caucasian group

was 9.01 years. The sample included Native American and Caucasian children ranging from 1st grade to 8th grade. All Native American children participants were enrolled members of a federally recognized tribe.

## Materials

For all subjects, data were used from the administrations of the following assessment instruments (see Appendix A): a) Demographic Questionnaire, and b) The Wechsler Intelligence Scale for Children-III (WISC-III) (Wechsler, 1991).

Informed Consent. Participation in this study was anonymous. The subject's name was coded on the Demographic Questionnaire separately from the archival data. Forms were maintained in the Indians in Psychology Doctoral Education (INPSYDE) Program office by the researcher to ensure security and to prevent any association of individuals with the experiment.

Demographic Questionnaire. Items on the demographic sheet assessed the participant's background, and each subject was given a sequential code number. The demographic survey established age, gender, years in school, whether at least one parent was employed, primary diagnosis (if applicable), and race (specific tribal identity for Native American children). These variables were examined to provide information regarding general characteristics of the sample.

Wechsler Intelligence Scale for Children-III (WISC-III). The Wechsler Intelligence Scale for Children-III was previously administered to all participants by University of

North Dakota graduate students and clinical psychologists. The WISC-III is an individually administered clinical instrument used to assess the intellectual ability of children aged 6 years through 16 years, 11 months. It yields the traditional three composite IQ scores: Verbal, Performance, and Full Scale, as well as four index scores: Verbal Comprehension, Perceptual Organization, Working Memory, and Processing Speed. The WISC-III consists of 13 subtests, six verbal and seven performance. The six verbal subtests include Vocabulary, Similarities, Arithmetic, Digit Span, Information, and Comprehension. Performance subtests include Picture Completion, Coding, Block Design, Mazes, Picture Arrangement, Symbol Search, and Object Assembly.

Verbal Subtests:

The Vocabulary subtest comprises several words for which the subject is asked to orally describe the meaning. Words of increasing difficulty are presented orally by the examiner one at a time. The examiner simultaneously points to the written form of the word. After four consecutive errors the subtest is discontinued.

The Similarities subtest contains pairs of words, and the subject is asked to describe the similarity between various paired objects or concepts. After four consecutive errors, which was changed from the WISC-R of three consecutive errors, the subtest is discontinued.

The Arithmetic subtest requires the subject to solve the arithmetic problem mentally and respond orally. Problems are presented one at a time, with increasing

difficulty and increasing time limits of 30, 45, and 75 seconds. After three consecutive errors the subtest is discontinued.

The Digit Span subtest consists of two tasks: Digits Forward and Digits Backward. For both of these tasks, the subject is required to repeat orally a series of numbers in either forward or backward sequence. The subtest is discontinued after failure of both trials of any item.

In the Information subtest, the subject orally answers several questions about general information that tap the examinee's knowledge of common events, objects, places, and people. The subtest is discontinued after five consecutive errors.

In the Comprehension subtest, the examinee is asked several questions requiring him/her to solve everyday problems and show understanding of social rules and concepts. For example, a subject might be asked a question similar to the following: "Why are children required to go to school?" The subtest is discontinued after three consecutive failures.

Performance Subtests:

For Picture Completion, the subject is presented with a picture of an object with a portion missing and is asked to identify the missing portion of the picture. For example, a drawing of a windmill with a missing fan may be presented. The subtest is discontinued after five consecutive incorrect responses.

The Coding subtest includes two levels, Coding A and Coding B, and a series of

simple shapes or numbers are each paired with a simple symbol. The subtest is discontinued after the 120-second time limit or if the subject finishes before the time limit.

In the Block Design subtest, the subject is required to make designs using red and white cubes. The examiner demonstrates the first trial by making a design with cubes and then asks the subject to do the same with identical cubes later. For later trials, the subject must make an identical copy of a two-dimensional block design that is illustrated on a card. The subtest is discontinued after two consecutive failures.

The Mazes subtest of the WISC-III requires subjects to solve a set of increasingly difficult mazes, printed in a response booklet, which the subject solves using a red pencil. The subtest is discontinued after two consecutive failures.

The Picture Arrangement subtest consists of sets of pictures that must be arranged in a series to tell a sensible story. The pictures, which are drawn in a comic strip style, are presented one set at a time. The subject must rearrange each set so that it has meaning. The subtest is discontinued after three consecutive failures.

The Symbol Search subtest consists of a series of paired groups of symbols with each pair consisting of a target group and a search group. The subject scans the two groups and indicates whether or not a target symbol appears in the search group. The subtest is discontinued after the 120-second time limit or if the subject finishes before the time limit.

The Object Assembly subtest of the WISC-III involves the use of cardboard, puzzle-like pieces to construct a figure of a common object. Each set of pieces is presented one at a time. The puzzle-like pieces are administered in an order that must be rearranged by subject to resemble an object. There is no discontinue rule with this subtest and all items are administered to the subject regardless of success or failure.

## Procedure

After securing approval from the Circle of Nations Indian School and Institutional Review Board (IRB), periodic trips were made to the Circle of Nations Indian School in Wahpeton, North Dakota, and to the UND Psychology Department to record the data and complete that portion of the study. This consisted of taking coded forms to these institutions and recording information from the archival data. Recorded were the scores for each subject from the WISC-III including Verbal IQ, Performance IQ, and Full Scale IQ scores and scores from the individual items on the Verbal IQ subscales. Lastly, the demographics sheet was completed for each subject. Coded forms were also used to collect demographics information from the Circle of Nations School and the UND Psychology Department.

## Data Analysis

All scored test protocols were coded and computer analyzed utilizing the SPSS statistics program. Descriptive statistics were conducted on all the variables. Such

statistics recorded the frequency and percentages of subject responses on the demographic questionnaire.

After examining the descriptive statistics, two other types of analyses were conducted. These included Analysis of Variance (ANOVA), and Bonferroni Corrected t-tests in order to control for type one error when determining which Verbal subtest items produced significant group differences. The primary analysis was a series of Independent Sample t-tests and Analysis of Variance (ANOVA) comparing the means of the two groups on Performance and Verbal subscale scores, Verbal IQ, Performance IQ, and Full Scale IQ of the WISC-III. The Bonferroni corrected t-tests were conducted to examine the differences between the sub-sample of the Native American and Caucasian groups (30 subjects in each group of comparable ages) on each item from the Verbal subtests of Information, Similarities, Arithmetic, Vocabulary, and Comprehension subtests. This sub-sample was selected by statistically calculating the two groups by age to determine what two samples would not differ significantly on age.

# CHAPTER III

# RESULTS

## Sample Characteristics

There were 67 female subjects and 92 males which comprised the two groups of Native American and Caucasian children from the Circle of Nations Indian School in Wahpeton, ND, and the University of North Dakota Psychology Department. There were 41 females and 48 males in the Native American group, and 26 females and 44 males in the Caucasian group. The mean age for all subjects was 10.87.

The average grade in school for all subjects was 5.29 (1 pertaining to first grade status, 2 pertaining to second grade status, 3 pertaining to third grade status, 4 pertaining to fourth grade status, 5 pertaining to fifth grade status, 6 pertaining to sixth grade status, 7 pertaining to seventh grade status, and 8 pertaining to eighth grade). The average grade in school for the Native American group was 6.66 and the average age was 12.33. The average grade in school for the Caucasian group was 3.54 and the average age was 9.01.

The mean parental employment status for all subjects was 1.26 (0 pertaining to employment information unavailable, 1 pertaining to at least one parent employed, and 2 pertaining to no parents employed). The mean employment status in the Native American group was 1.43, and the mean employment status in the Caucasian group was 1.04.

In the Native American group there were 33 subjects of Sioux ancestry, 19 subjects of Ojibwa/Chippewa ancestry, 10 subjects of Omaha ancestry, five subjects of Pima ancestry, four subjects of Menominee ancestry, four subjects of Gros-Ventre ancestry, four subjects of Ute ancestry, two subjects of the Three Affiliated Tribes (composed of Arikara, Mandan, and Hidatsa ancestry), two Shoshone/Ho-Chunk, two Potawatomi, two Oneida, one Apache, and one Blackfeet. Table 1 displays Information about the characteristics of the sample.

The number of participants of each gender, the mean age, grade, Verbal IQ, Performance IQ, and Full Scale IQ are presented in Table 2 for each group. The mean Verbal IQ score for the Native American group was 80.56, the mean Performance IQ score was 95.34, and the mean Full Scale IQ score was 86.34. The mean Verbal IQ score for the Caucasian group was 101.13, the mean Performance IQ score was 103.53, and the mean Full Scale IQ score was 101.86. Table 3 displays the mean WISC-III and standard deviations of scores for the Verbal IQ, Performance IQ, and Full Scale IQ scores for each group.

In the Native American group the grades in school included Fourth (4), Fifth (10), Sixth (22), Seventh (29), and Eighth (24). Parental employment status for the Native American group included three with no information available, 45 with at least one parent employed, and 41 with no parent employed. The primary diagnoses for the Native American group were as follows: Attention Deficit Hyperactivity (continued on page 30)

Table 1

Information Regarding Sample

| Characteristic | M | SD | % | Frequencies | |
|---|---|---|---|---|---|
| | | | | Native American | Caucasian |
| Age | 10.87 | 2.20 | | | |
| Gender | | | | | |
| Female | | | 42.1% | 41 | 26 |
| Male | | | 57.9% | 48 | 44 |
| Grade In School | | | | | |
| First | | | 2.5% | 0 | 4 |
| Second | | | 11.3% | 0 | 18 |
| Third | | | 10.7% | 0 | 17 |
| Fourth | | | 9.4% | 4 | 11 |
| Fifth | | | 12.6% | 10 | 10 |
| Sixth | | | 18.2% | 22 | 7 |
| Seventh | | | 20.1% | 29 | 3 |
| Eighth | | | 15.1% | 24 | 0 |
| Diagnosis | | | | | |
| Attention Deficit Hyperactivity Disorder | | | 34.6% | 6 | 49 |
| Conduct Disorder | | | 12.6% | 20 | 0 |
| Separation Anxiety Disorder | | | 10.1% | 0 | 1 |
| Disruptive Behavior Disorder | | | 10.1% | 16 | 0 |
| Depressive Disorder, Not Otherwise Specified | | | 6.9% | 9 | 2 |
| Generalized Anxiety Disorder | | | 3.8% | 6 | 0 |
| Other | | | 6.3% | 24 | 1 |
| No Diagnosis | | | 15.7% | 8 | 17 |
| Parental Employment | | | | | |
| At Least One Parent Employed | | | 70.4% | 45 | 67 |
| No Parent Employed | | | 27.7% | 41 | 3 |
| Information Not Available | | | 1.9% | 3 | 0 |

Note. Female n = 67; Male n = 92.

Table 2

Descriptive Data by Race

| Race | N | M, F | Mean Age | Mean Grade | Mean Verbal IQ | Mean Performance IQ | Mean Full Scale IQ |
|---|---|---|---|---|---|---|---|
| 1. Native American | 89 | 48, 41 | 12.33 | 6.66 | 80.56 | 95.34 | 86.34 |
| 2. Caucasian | 70 | 44, 26 | 9.01 | 3.54 | 101.13 | 103.53 | 101.86 |

Note. N refers to total number of subjects in each group; M refers to number of male subjects in each group; F refers to number of females subjects in each group.

Table 3

Means and Standard Deviations (within parentheses) for WISC-III IQ Scores for Each Race (Native American and Caucasian)

| WISC-III | Native American n = 89 | Caucasian n = 70 |
|---|---|---|
| Verbal IQ | 80.56 (12.83) | 101.13 (15.42) |
| Performance IQ | 95.34 (13.97) | 103.53 (14.54) |
| Full Scale IQ | 86.34 (11.98) | 101.86 (14.77) |

(continued from page 28) Disorder (6), Conduct Disorder (20), Depressive Disorder Not Otherwise Specified (9), Oppositional Defiant Disorder (15), Disruptive Behavior

Disorder (16), Adjustment Disorder (2), Generalized Anxiety Disorder (6), Major Depressive Disorder (2), Dysthymic Disorder (5), and No Diagnosis (8).

In the Caucasian group, there were 44 males and 26 females. Grades in school included, First (4), Second (18), Third (17), Fourth (11), Fifth (10), Sixth (7), and Seventh (3). Parental employment status for the Caucasian group included, 67 with at least one parent employed and 3 with no parent employed. The primary diagnosis for the Caucasian group was distributed as follows: Attention Deficit Hyperactivity Disorder (49), Depressive Disorder Not Otherwise Specified (2), Oppositional Defiant Disorder (1), Separation Anxiety Disorder (1), and No Diagnosis (17). The mean age for the Caucasian group was 9.01 and the mean grade level 3.54 (as defined earlier). Table 4 displays the Descriptive Statistics for the Native American and Caucasian samples.

One-Way ANOVAs for the Native American and Caucasian Groups

A series of one-way analysis of variance (ANOVA) was used for comparison of the Native American and Caucasian groups between the Wechsler Intelligence Scale for Children-III scores (Verbal IQ, Performance IQ, and Full Scale IQ). As hypothesized, the Caucasian group scored significantly higher on WISC-III Verbal IQ and Full Scale IQ scores. The Caucasian group also scored significantly higher on Performance IQ, which was not hypothesized.

As hypothesized, a significant difference was revealed between the two groups in terms of Verbal IQ scores, $\underline{F}(1, 157) = 12.99$, $\underline{p} < .000$, with the (continued on page 33)

Table 4

Descriptive Statistics for the Sample

| Characteristic | | M | SD | % | |
|---|---|---|---|---|---|
| | | | | Native American | Caucasian |
| Age | | | | | |
| | Native American | 12.33 | 1.34 | | |
| | Caucasian | 9.01 | 1.61 | | |
| Gender | | | | | |
| | Female | | | 46.0% | 37.1% |
| | Male | | | 54.0% | 62.9% |
| Grade | First | | | 0.0% | 5.7% |
| | Second | | | 0.0% | 25.7% |
| | Third | | | 0.0% | 24.3% |
| | Fourth | | | 4.5% | 15.7% |
| | Fifth | | | 11.2% | 14.3% |
| | Sixth | | | 24.7% | 10.0% |
| | Seventh | | | 32.6% | 4.3% |
| | Eighth | | | 27.0% | 0.0% |
| Diagnosis | | | | | |
| | Attention Deficit Hyperactivity Disorder | | | 6.7% | 70.0% |
| | Conduct Disorder | | | 22.5% | 0.0% |
| | Oppositional Defiant Disorder | | | 16.9% | 1.4% |
| | Disruptive Behavior Disorder | | | 17.9% | 0.0% |
| | Other | | | 16.9% | 0.0% |
| | No Diagnosis | | | 19.1% | 27.2% |
| Parental Employment | | | | | |
| | At Least One Parent Employed | | | 50.6% | 95.7% |
| | No Parent Employed | | | 46.0% | 4.3% |
| | Information Not Available | | | 3.4% | 0.0% |
| Tribal Affiliation | | | | | |
| | Sioux | | | 37.1% | |
| | Ojibwa/Chippewa | | | 21.3% | |
| | Omaha | | | 11.2% | |
| | Pima | | | 5.6% | |
| | Other | | | 24.8% | |

Note. Female n = 67; Male n = 92.

(continued from page 31) Caucasian group scoring higher. As hypothesized, a significant difference was also revealed between the groups in terms of Full Scale IQ scores, $F(1, 157) = 53.51$, $p < .000$, with the Caucasian group scoring higher. A significant difference was also revealed between the two groups in terms of Performance IQ scores, $F(1, 157) = 84.24$, $p < .000$, with the Caucasian group scoring higher, which was not hypothesized but an interesting finding worth mention. Significant differences were revealed within the Native American group in terms of the group scoring higher on Performance IQ versus Verbal IQ, as hypothesized. The mean Performance IQ for the Native American group was 95.34 ($SD = 13.97$) and the mean Verbal IQ for the Native American group was 80.56 ($SD = 12.83$) which was significant, $F(1, 158) = 30.07$, $p < .000$. No significant differences were observed between Verbal IQ and Performance IQ scores with the Caucasian group.

## One-Way ANOVAs for Subscale Scores

A series of one-way analyses of variance (ANOVA) was used for comparison of the Native American and Caucasian groups between the WISC-III subscale scores (Picture Completion, Information, Coding, Similarities, Picture Arrangement, Arithmetic, Block Design, Vocabulary, Object Assembly, and Comprehension). This analysis was conducted only on the 10 subscales which contribute to the calculation of IQ scores for the purpose of the study. The means and standard deviations (in parentheses) for the WISC-III subscale scores are listed in Table 5.

Table 5

Means and Standard Deviations (in parentheses) for WISC-III Subscale Scores

| WISC-III | Native American | Caucasian |
|---|---|---|
| Information SS | 6.67 (2.85) | 10.63 (3.70) |
| Similarities SS | 7.45 (2.92) | 10.23 (2.96) |
| Arithmetic SS | 6.62 (2.31) | 9.24 (3.11) |
| Vocabulary SS | 5.30 (2.70) | 9.57 (3.42) |
| Comprehension SS | 6.83 (3.61) | 10.50 (3.44) |
| Picture Completion SS | 10.30 (3.40) | 10.39 (3.17) |
| Block Design SS | 9.75 (3.70) | 11.07 (3.63) |
| Coding SS | 8.19 (2.50) | 9.01 (3.52) |
| Picture Arrangement SS | 8.25 (3.76) | 9.87 (4.10) |
| Object Assembly SS | 9.34 (3.20) | 11.19 (2.90) |

Note. SS refers to Subscale Scores for each subtest of the WISC-III.

A significant difference was revealed between the two groups in terms of the Caucasian group scoring significantly higher on eight of the ten WISC-III subscale scores. A significant difference was revealed between the two groups on the Verbal subscales in terms of the Information subtest scores, $\underline{F}(1, 157) = (58.10)$, $\underline{p} < .042$. A significant difference was also revealed between the two groups in terms of Similarities subtest scores, $\underline{F}(1, 157) = (35.13)$, $\underline{p} < .000$. A significant difference was also revealed between the two groups in terms of Arithmetic subtest scores, $\underline{F}(1, 157) = (37.18)$, $\underline{p} < .000$. A significant difference was also revealed between the two groups in terms of Vocabulary subtest scores, $\underline{F}(1, 157) = (78.10)$, $\underline{p} < .000$. A significant difference was also revealed between the two groups in terms of Comprehension subtest scores, $\underline{F}(1, 157) = (42.20)$, $\underline{p} < .000$.

A significant difference was revealed between the two groups on the Performance subscales in terms of Picture Arrangement subtest scores, $\underline{F}(1, 157) = (6.81)$, $\underline{p} < .010$. A significant difference was also revealed between the two groups in terms of Block Design subtest scores, $\underline{F}(1, 157) = (5.06)$, $\underline{p} < .026$. A significant difference was also revealed between the two groups in terms of Object Assembly subtest scores, $\underline{F}(1, 157) = (14.53)$, $\underline{p} < .000$. No other significant differences were observed between the other Performance subtest scores of the WISC-III.

Information Regarding Sub-Sample

In order to test hypothesis 2 more appropriately, that hypothesized certain items from the Verbal subtests would favor the Caucasian group, a sub-set (30 Native American and 30 Caucasian) of the original sample was used for this comparison. This was done in order to account for age differences and develop a more appropriate sample for the comparison on the WISC-III Verbal subscales. In this sub-sample, comparisons were also conducted on WISC-III scores of Verbal IQ, Performance IQ, and Full Scale IQ subscale scores, similar to the original sample.

There was a total of 60 subjects in this sub-sample. There were 22 females subjects and 38 males which comprised the two groups of Native American and Caucasian children in this sub-sample. There were 12 females and 18 males in the Native American group, and 10 females and 20 males in the Caucasian group. The mean age for all subjects was 10.68.

The average grade in school for all subjects was 5.28 (3 pertaining to third grade status, 4 pertaining to fourth grade status, 5 pertaining to fifth grade status, 6 pertaining to sixth grade status, seven pertaining to seventh grade status, and eight pertaining to eighth grade status). The average grade in school for the Native American group was 5.73 and the average age was 11.00. The average grade in school for Caucasian group was 4.83 and the average age was 10.40.

The mean parental employment status for all subjects was 1.18 (0 pertaining to employment information unavailable, 1 pertaining to at least one parent employed, and 2 pertaining to no parents employed). The mean employment status in the Native American group was 1.40, and the mean employment status in the Caucasian group was 1.00. Table 6 displays the Information Regarding the sub-sample.

The mean age for the Native American group was 11.00 and the mean age for the Caucasian group was 10.40. Tribal affiliation for the Native American group was as follows: Sioux (9), Omaha (7), Ojibwa/Chippewa (6), Menominee (3), Pima (1), Gros-Ventre (1), Three Affiliated Tribes (1), Shoshone/Ho-Chunk (1), and Potawatomi (1). Table 7 displays the means and percentages for the sub-sample.

The mean age for the Caucasian group was 10.37, the mean grade level (as defined earlier) 4.83, the mean Verbal IQ score was 105.30, the mean Performance IQ score was 104.17, and the mean Full Scale IQ score was 105.17. The mean age for the Native American group was 11.00, the mean grade level (as defined earlier) 5.73, the mean Verbal IQ score was 86.03, the mean Performance IQ score was 98.53, and the mean Full Scale IQ score was 91.20 (see Table 8). The mean scores and standard deviations for Verbal IQ, Performance IQ, and Full Scale IQ are presented in Table 9 for each group of the sub-sample.

Table 6

Information Regarding Sub-Sample

| Characteristic | M | SD | % | Frequencies | |
|---|---|---|---|---|---|
| | | | | Native American | Caucasian |
| Age | 10.68 | 1.10 | | | |
| Gender | | | | | |
| Female | | | 36.7% | 12 | 10 |
| Male | | | 63.3% | 18 | 20 |
| Grade In School | | | | | |
| Third | | | 6.7% | 0 | 4 |
| Fourth | | | 20.0% | 4 | 8 |
| Fifth | | | 28.3% | 8 | 9 |
| Sixth | | | 30.0% | 11 | 7 |
| Seventh | | | 13.3% | 6 | 2 |
| Eighth | | | 1.7% | 1 | 0 |
| Diagnosis | | | | | |
| Attention Deficit Hyperactivity Disorder | | | 40.0% | 5 | 19 |
| Disruptive Behavior Disorder | | | 15.0% | 9 | 0 |
| Oppositional Defiant Disorder | | | 13.3% | 7 | 1 |
| Conduct Disorder | | | 5.0% | 3 | 0 |
| Depressive Disorder, Not Otherwise Specified | | | 5.0% | 1 | 2 |
| Other | | | 6.8% | 4 | 0 |
| No Diagnosis | | | 15.0% | 1 | 8 |
| Parental Employment | | | | | |
| At Least One Parent Employed | | | 71.4% | 13 | 30 |
| No Parent Employed | | | 23.3% | 14 | 0 |
| Information Not Available | | | 5.0% | 3 | 0 |

Note. Female n = 22; Male n = 38.

Table 7

Descriptive Statistics for the Sub-Sample

| Characteristic | M | SD | % | |
|---|---|---|---|---|
| | | | Native American | Caucasian |
| Age | | | | |
| Native American | 11.00 | 1.01 | | |
| Caucasian | 10.40 | 1.10 | | |
| Gender | | | | |
| Female | | | 40.0% | 33.3% |
| Male | | | 60.0% | 66.7% |
| Grade | | | | |
| Third | | | 0.0% | 13.3% |
| Fourth | | | 13.3% | 26.7% |
| Fifth | | | 26.7% | 30.0% |
| Sixth | | | 36.7% | 23.3% |
| Seventh | | | 20.0% | 6.7% |
| Eighth | | | 3.3% | 0.0% |
| Diagnosis | | | | |
| Attention Deficit Hyperactivity Disorder | | | 16.7% | 63.3% |
| Conduct Disorder | | | 10.0% | 0.0% |
| Oppositional Defiant Disorder | | | 23.3% | 3.3% |
| Disruptive Behavior Disorder | | | 30.0% | 0.0% |
| Other | | | 16.7% | 6.7% |
| No Diagnosis | | | 3.3% | 26.7% |
| Parental Employment | | | | |
| At Least One Parent Employed | | | 43.3% | 100.0% |
| No Parent Employed | | | 46.7% | 0.0% |
| Information Not Available | | | 10.0% | 0.0% |
| Tribal Affiliation | | | | |
| Sioux | | | 30.0% | |
| Ojibwa/Chippewa | | | 20.0% | |
| Omaha | | | 23.3% | |
| Menominee | | | 10.0% | |
| Other | | | 16.7% | |

Note. Female n = 67; Male n = 92.

Table 8

Descriptive Data by Race for Sub-Sample

| Race | N | M, F | Mean Age | Mean Grade | Mean Verbal IQ | Mean Performance IQ | Mean Full Scale IQ |
|---|---|---|---|---|---|---|---|
| 1. Native American | 30 | 18, 12 | 11.00 | 5.73 | 86.03 | 98.53 | 91.20 |
| 2.Caucasian | 30 | 20, 10 | 10.37 | 4.83 | 105.30 | 104.17 | 105.17 |

Note. N refers to total number of subjects in each race; M refers to number of male subjects in each race; F refers to number of female subjects in each race.

Table 9

Means and Standard Deviations (within parentheses) for WISC-III Sub-Sample

| WISC-III | Native American n = 89 | Caucasian n = 70 |
|---|---|---|
| Verbal IQ | 86.03 (14.05) | 105.30 (15.51) |
| Performance IQ | 98.53 (13.11) | 104.17 (14.00) |
| Full Scale IQ | 91.20 (12.88) | 105.17 (14.36) |

One-Way ANOVAs for Sub-Sample WISC-III Scores

A series of one-way analysis of variance (ANOVA) was used for comparison of the Native American and Caucasian sub-sample groups between the Wechsler

Intelligence Scale for Children-III scores (Verbal IQ, Performance IQ, and Full Scale IQ), as in the original sample (see Table 9). The Caucasian group scored significantly higher on the WISC-III Verbal IQ scores, $F(1, 59) = 25.43$, $p < .000$ and on the Full Scale IQ scores, $F(1, 59) = 15.73$, $p < .000$. No significant differences were observed between the groups in terms of Performance IQ. Significant differences were also revealed between the Verbal IQ and Performance IQ scores within each group (Native American and Caucasian). Significant differences were revealed in terms of the Native American group scoring higher on Performance IQ versus Verbal IQ. The mean Performance IQ for the Native American group was 98.53 ($SD = 13.11$) and the mean Verbal IQ for the Native American group was 86.03 ($SD = 14.05$), a difference which was significant, $F(1, 58) = 16.15$, $p < .000$. No significant differences were observed between Verbal IQ and Performance IQ scores with the Caucasian group.

Bonferroni Corrected t-tests

A series of analyses of variance (ANOVA) was used for comparison of the Native American and Caucasian groups on the Verbal subscale scores of the WISC-III, focusing on Verbal subscale items of Information, Similarities, Arithmetic, Vocabulary, and Comprehension, as hypothesized.

In light of the high number of Univariate F-tests conducted, the comparisons were further evaluated using the Bonferroni corrected t-test. This was conducted utilizing Dunn's Table with a t value which was associated with 30 comparisons and 30 degrees of

freedom. The t value was 3.52, which was squared to formulate the F value of 12.39. This was used as the critical F used to evaluate the observed F's. In terms of individual item differences for the Verbal subscale scores, there were many interesting significant differences revealed through the Bonferroni corrected t-tests when utilizing the critical F value of 12.39.

In terms of the Information subscale item differences, the Caucasian group scored significantly higher compared to the Native American group on item 13. A significant difference was revealed between the two groups in terms of Information subscale item 13, $F(1, 59) = (16.52)$, $p < .000$ (see Table 10). The WISC-III Information subtest item found to be significant is listed in Table 12. No other significant differences were observed between the other Information subscale item scores of the WISC-III.

In terms of the Similarities subscale item differences, the Caucasian group scored significantly higher compared to the Native American group on item 15. A significant difference was revealed between the two groups in terms of Similarities subscale item 15, $F(1, 59) = (20.32)$, $p < .000$ (see Table 10). The WISC-III Similarities subtest item found to be significant is listed in Table 12. No other significant differences were observed between the other Similarities subscale item scores of the WISC-III.

In terms of the Arithmetic subscale item differences, no significant differences were observed between the groups on Arithmetic subscale item scores of the WISC-III.

In terms of the Vocabulary subscale item differences, the Caucasian group scored significantly higher compared to the Native American group on items' 15 and 21. A significant difference was also revealed between the two groups in terms of Vocabulary subscale item 15, $\underline{F}(1, 59) = (16.90)$, $\underline{p} < .000$. A significant difference was also revealed between the two groups in terms of Vocabulary subscale item 21, $\underline{F}(1, 59) = (14.13)$, $\underline{p} < .000$ (see Table 10). The WISC-III Vocabulary subtest item questions that were found to be significant are listed in Table 12. No other significant differences were observed between the other Vocabulary subscale item scores of the WISC-III.

In terms of the Comprehension subscale item differences, no significant differences were observed between the groups on the Comprehension subscale item scores of the WISC-III.

Bonferroni Critical t-test holding Full Scale IQ as a Covariate

A series of analyses of variance (ANOVA) was used for comparison of the Native American and Caucasian groups between WISC-III Verbal subscale items' on each subscale (Information, Similarities, Arithmetic, Vocabulary, and Comprehension), holding Full Scale IQ as a covariate. Conducting this analysis would allow the assumption to be made that the significant differences revealed is a possible form of cultural bias on those particular items. By holding Full Scale IQ as a covariate would also help to control for the effects of overall ability differences between the groups.

Table 10

WISC-III Items Found Significant for Verbal Subtests with Bonferroni Corrected t-tests

| WISC-III Subtest | Item Number | % Passing Caucasian | | % Passing Native American | | F | p |
|---|---|---|---|---|---|---|---|
| Information | 13 | 80.0 | | 33.0 | | *16.52 | .000 |
| | | Score 1 | Score 2 | Score 1 | Score 2 | | |
| Similarities | 15 | 16.6 | 36.6 | 10.0 | 0.0 | *20.32 | .000 |
| | | Score 1 | Score 2 | Score 1 | Score 2 | | |
| Vocabulary | 15 | 0.0 | 53.3 | 6.6 | 6.6 | *16.90 | .000 |
| | 21 | 3.3 | 43.3 | 0.0 | 6.6 | *14.14 | .000 |

Note. * Denotes significance at the F Critical level = 12.39.

In light of the high number of Univariate F's conducted, the comparisons were further evaluated using the Bonferroni Corrected t-test. This was conducted utilizing Dunn's Table with a t value which was associated with 30 comparisons and 30 degrees of freedom. The t value was 3.52, which was squared to formulate the F value of 12.39. This was used as the critical F used to evaluate the observed F's. In terms of individual item differences for the Verbal subscale scores, there were many interesting significant differences revealed through the Bonferroni Corrected t-tests when utilizing the critical F value of 12.39.

In terms of individual item differences for the Verbal subscale scores when holding Full Scale IQ as a covariate, significant difference were continued to be revealed in terms of the Information subscale items' 12 and 13 showing the Caucasian group scored significantly higher compared to the Native American group, as found earlier. A significant difference was revealed between the two groups in terms of Information subscale item 12, $\underline{F}(1, 59) = (24.28)$, $\underline{p} < .000$. A significant difference was also revealed between the two groups in terms of Information subscale item 13, $\underline{F}(1, 59) = (15.50)$, $\underline{p} < .000$ (see Table 11). The WISC-III Information subtest item questions that were found to be significant are listed in Table 12. No other significant differences were observed between the other Information subscale item scores of the WISC-III.

In terms of the Similarities subscale item differences, the Caucasian group scored significantly higher compared to the Native American group on items' 12 and 15, as found earlier. A significant difference was revealed between the two groups in terms of Similarities subscale item 12, $\underline{F}(1, 59) = (12.52)$, $\underline{p} < .000$, which was not revealed earlier when not holding Full Scale IQ as a covariate. A significant difference was also revealed between the two groups in terms of Similarities subscale item 15, $\underline{F}(1, 59) = (13.06)$, $\underline{p} < .000$ (see Table 11). The WISC-III Similarities subtest item questions that were found to be significant are listed in Table 12. No other significant differences were observed between the other Similarities subscale item scores of the WISC-III.

In terms of the Arithmetic subscale item differences, the Caucasian group scored significantly higher compared to the Native American group on item 17, which was not revealed earlier when not holding Full Scale IQ as a covariate. A significant difference was revealed between the two groups in terms of Arithmetic subscale item 17, $\underline{F}(1, 59) = (12.77)$, $\underline{p} < .000$. (see Table 11). The WISC-III Arithmetic subtest item question that was found to be significant is listed in Table 12. No other significant differences were observed between the other Arithmetic subscale item scores of the WISC-III.

In terms of the Vocabulary subscale item differences, the Caucasian group scored significantly higher compared to the Native American group on items' 11 and 21. A significant difference was revealed between the two groups in terms of Vocabulary subscale item 11, $\underline{F}(1, 59) = (16.65)$, $\underline{p} < .000$, which was not revealed earlier when not holding Full Scale IQ as a covariate. A significant difference was also revealed between the two groups in terms of Vocabulary subscale item 21, $\underline{F}(1, 59) = (13.31)$, $\underline{p} < .000$, as found earlier (see Table 11). The WISC-III Vocabulary subtest item questions that were found to be significant are listed in Table 12. No other significant differences were observed between the other Vocabulary subscale item scores of the WISC-III.

In terms of the Comprehension subscale item differences, the Caucasian group scored significantly higher compared to the Native American group on item 13, which was not revealed earlier when not holding Full Scale IQ as covariate. A significant difference was revealed between the two groups in terms of Comprehension subscale

item 13, $F(1, 59) = (13.41)$, $p < .000$ (see Table 11). The WISC-III Comprehension subtest item question that was found to be significant is listed in Table 12. No other significant differences were observed between the other Comprehension subscale item scores of the WISC-III.

Table 11

WISC-III Items Found Significant when holding Full Scale IQ as a Covariate with Bonferroni Corrected t-tests

| WISC-III Subtest | Item Number | % Passing Caucasian | | % Passing Native American | | F | p |
|---|---|---|---|---|---|---|---|
| Information | 12 | 80.0 | | 53.0 | | *24.28 | .000 |
| | 13 | 80.0 | | 33.0 | | *15.50 | .000 |
| | | Score 1 | Score 2 | Score 1 | Score 2 | | |
| Similarities | 12 | 13.3 | 53.3 | 10.0 | 26.6 | *12.52 | .000 |
| | 15 | 16.6 | 36.6 | 10.0 | 0.0 | *13.06 | .000 |
| Arithmetic | 17 | 56.6 | | 20.0 | | *12.77 | .000 |
| | | Score 1 | Score 2 | Score 1 | Score 2 | | |
| Vocabulary | 11 | 10.0 | 80.0 | 33.3 | 43.3 | *16.65 | .000 |
| | 21 | 3.3 | 43.3 | 0.0 | 6.6 | *13.31 | .000 |
| | | Score 1 | Score 2 | Score 1 | Score 2 | | |
| Comprehension | 13 | 50.0 | 20.0 | 13.3 | 13.3 | *13.41 | .000 |

Note. * Denotes significance at the F Critical level = 12.39.

Table 12

WISC-III Verbal IQ Subtest Item Questions Found Significant

| WISC-III Subtest | Item | Question |
|---|---|---|
| Information | 12 | *What does the stomach do? |
| | 13 | **Who was Christopher Columbus? |
| Similarities | 12 | *In what way are a PAINTING and a STATUE alike? |
| | 15 | **In what way are TEMPERATURE and LENGTH alike? |
| Arithmetic | 17 | *Phil earned 36 dollars; he was paid 4 dollars an hour. How many hours did he work? |
| Vocabulary | 11 | *What is an ISLAND? |
| | 15 | ***What is a FABLE? |
| | 21 | **What does BOAST mean? |
| Comprehension | 13 | *Why is it good to hold elections by secret ballot? |

Note. *Denotes significant items when holding Full Scale IQ as a covariate. **Denotes significant items continuing to be significant when holding Full Scale IQ as a covariate. ***Denotes items no longer significant after holding Full Scale IQ as a covariate.

## One-Way ANOVAs for Subscale Scores of the Sub-Sample

A series of one-way analyses of variance (ANOVA) was used for comparison of the Native American and Caucasian sub-sample groups between WISC-III subscale scores (Picture Completion, Information, Coding, Similarities, Picture Arrangement,

Arithmetic, Block Design, Vocabulary, Object Assembly, and Comprehension). The means and standard deviations (in parentheses) for the WISC-III subscale scores are listed in Table 13. A significant difference was revealed between the two groups in terms of the Caucasian group scoring significantly higher on five of the ten WISC-III subscale scores.

A significant difference was revealed between the two groups on the Verbal subscales in terms of Information subtest scores, $\underline{F}(1, 59) = (24.11)$, $\underline{p} < .000$. A significant difference was also revealed between the two groups in terms of Similarities subtest scores, $\underline{F}(1, 59) = (19.85)$, $\underline{p} < .000$. A significant difference was also revealed between the two groups in terms of Arithmetic subtest scores, $\underline{F}(1, 59) = (10.38)$, $\underline{p} < .000$. A significant difference was also revealed between the two groups in terms of Vocabulary subtest scores, $\underline{F}(1, 59) = (28.10)$, $\underline{p} < .000$. No other significant differences were observed between the other Verbal subscale of the WISC-III.

A significant difference was revealed between the two groups on the Performance subscale in terms of Object Assembly subtest scores, $\underline{F}(1, 59) = (5.35)$, $\underline{p} < .024$. No other significant differences were observed between the other Performance subscale scores of the WISC-III.

Table 13

Means and Standard Deviations (in parentheses) for WISC-III Subscales in Sub-Sample

| WISC-III | Native American | Caucasian |
|---|---|---|
| Information SS | 7.17 (2.87) | 11.60 (4.03) |
| Similarities SS | 7.83 (3.32) | 11.33 (2.73) |
| Arithmetic SS | 7.77 (2.60) | 10.07 (2.92) |
| Vocabulary SS | 6.53 (2.70) | 10.63 (3.26) |
| Comprehension SS | 8.40 (4.45) | 10.23 (3.81) |
| Picture Completion SS | 10.90 (3.79) | 10.20 (3.28) |
| Block Design SS | 10.77 (3.30) | 11.90 (3.60) |
| Coding SS | 8.07 (2.80) | 9.00 (3.45) |
| Picture Arrangement SS | 8.60 (4.11) | 10.20 (3.92) |
| Object Assembly SS | 9.90 (2.32) | 11.43 (2.79) |

Note. SS refers to Subscale Scores for each subtest of the WISC-III.

# CHAPTER IV

# DISCUSSION

Simply stated, most of the hypothesized results were demonstrated and one was not. Several findings from the data could have been anticipated, yet several were interestingly different from past studies. All in all, the findings conclusively demonstrated support for a patterning difference with the Wechsler Intelligence Scale for Children-III (WISC-III), and there were some intriguing results that warrant further research attention.

The Native American subjects which comprised children from the Circle of Nations Indian School in Wahpeton, ND, scored higher on the mean Performance IQ scores than the mean Verbal IQ scores within their own group, as hypothesized. This finding is consistent with other research that exists looking at pattern performance differences with Native American children. The Caucasian group did not score higher on the mean Verbal IQ scores compared to the mean Performance IQ scores within their own group as hypothesized. It was predicted that the Caucasian group would score higher on the mean Verbal IQ score versus the mean Performance IQ scores within their own group. This may be due to the fact that most Caucasian children (70%) had a diagnosis of Attention Deficit Hyperactivity Disorder which may have influenced or impacted their Verbal IQ scores. The findings suggest that Native American children may be stronger

with intellectual skills in the Performance IQ subscales versus Verbal IQ subscales when compared to their Caucasian counterparts.

It was predicted that some of the individual item scores on the Verbal subtests of Information, Similarities, Arithmetic, Vocabulary, and Comprehension of the WISC-III would show significantly higher scores for the Caucasian children compared to the Native American children demonstrating possible item bias. The obtained results are in line with the findings by Mishra (1982) who showed 15 items (19%) of the 79 items from Information, Similarities, and Vocabulary subtests of the WISC-R to be biased against the Navajo versus Anglo sample of participants.

In the present study 30 subjects from the Native American sample and 30 subjects from the Caucasian sample were matched as close as possible on age. They were also compared on Verbal subtest items from Information, Similarities, Arithmetic, Vocabulary, and Comprehension of the WISC-III. From these five Verbal subscales four of the 121 items analyzed were found to favor or be significantly higher for the Caucasian children compared to the Native American children.

Further demonstrations of this finding were seen when comparing the subscale scores of the WISC-III between the Native American and Caucasian samples. When comparing the overall sample of Native American children (89) versus Caucasian children (70) the Caucasian sample scored significantly higher on the mean WISC-III subscale scores of Information, Similarities, Picture Arrangement, Arithmetic, Block

Design, Vocabulary, Object Assembly, and Comprehension. This was also found on five of the ten mean WISC-III subscale scores when comparing the sub-sample of Native American (30) and Caucasian (30) children in order to match them on age. The Caucasian sub-sample was found to score significantly higher on mean subscale scores of Information, Similarities, Arithmetic, Vocabulary, and Object Assembly.

Scores on all 121 items from the WISC-III Verbal subtests of Information, Similarities, Arithmetic, Vocabulary, and Comprehension were obtained for the sub-sample of 30 Caucasian and 30 Native American subjects. Some of the items on these subtests are scored as zero for failing, or 1 and 2 for passing. These items were scored in this manner to provide a consistent measure for the Bonferroni-corrected t-test used to compare the Native American and Caucasian samples on each item.

The Verbal subtest item comparison revealed several interesting findings. The Native American and Caucasian groups were first compared using an analysis of variance (ANOVA) on individual items from the Verbal subtests of Information, Similarities, Arithmetic, Comprehension, and Vocabulary. These subtests were analyzed because some of the questions in them are thought to be unfair toward ethnic groups such as Native Americans. These subtests are combined with the Performance subscales to determine intellectual performance and ultimately placement determinations for Native American children in school settings. Additionally, Native American populations were not used in the standardization and norming of these tests. This analysis was conducted

to help understand and determine patterning differences that may exist between Native American and Caucasian children.

Bonferroni-corrected t-tests using Dunn's Table were conducted comparing the two groups on WISC-III Verbal subtest items first by using no scales as a covariate. Secondly, the items were compared using the Bonferroni-corrected t-test by holding Full Scale IQ as a covariate. This helped control for the fact that these groups were not matched on Full Scale IQ. By holding Full Scale IQ as a covariate the assumption could be made that the significant differences revealed between the groups on each item of the Verbal subtests is possibly a result of cultural bias.

Several interesting results were revealed when comparing the Native American and Caucasian groups on the Verbal subtest items when not holding Full Scale IQ as a covariate. The Information subtest items revealed that item 13 significantly favored the Caucasian group. When looking more closely at item 13 this question asks the child, "Who was Christopher Columbus?" This question could be looked at as culturally unfair to the Native American group. This question also continued to show significance when holding Full Scale IQ as a covariate. This item showed the greatest significant difference between the groups and was the question within the Information subtest that the Native American subjects got the higher percentage incorrect compared to the other items. Many Native American groups view Christopher Columbus as a negative figure in their history and not as the celebrated hero as many Caucasian individuals do. This difference

between the groups may also be due to Native American children having less exposure to knowledge about the importance of Christopher Columbus.

When holding Full Scale IQ as a covariate, item 12 from the Information subtest was found to significantly favor the Caucasian group. This question asks, "What does the stomach do?" Several interesting hypotheses could be explored to explain this finding. Native American children are unfamiliar with many of the terms within the Information subtest due to language barriers and being raised in highly traditional families. The bodily functions of human organs may also be unfamiliar to some Native American children, especially if raised in traditional families.

Another interesting finding was that the study conducted by Mishra (1982) comparing Navajo and Anglo children on the WISC-R and matching them on Full Scale IQ also found item 12 to significantly favor the Anglo children. Like item 13 from the WISC-III item 12 from the WISC-R asks the child to describe who Christopher Columbus is. This was interesting to consider and may further support the questions regarding the possibility of cultural bias with certain items from the WISC-III.

Several interesting significant differences were also revealed within the Similarities subtest where two items highly favored the Caucasian versus Native American sample participants. Caucasian children scored significantly higher on item15 and item 12 when holding Full Scale IQ as a covariate. Item 15 asks the child, "In what ways are temperature and length alike?" This may also be unfair due also to language

barriers or grasping the concepts of each word because of unfamiliarity. Exposure to words such as temperature and length can also be viewed as fairly new concepts to many Native American cultures. A few generations ago these people were not at all familiar with these concepts. Exposure to these concepts can have a tremendous impact on knowledge about them. Whether or not Native American children are more traditional or assimilated can also influence their understanding regarding such terms. Studies need to be conducted to determine how these factors influence scores on intelligence measurements.

Item 12 asks the child to explain how a painting and a statue are alike. These terms may favor the Caucasian group due to the fact that the words, statue in particular, may be unfamiliar to some Native American children especially those brought up in highly traditional families. Such children are taught more about their own language values and less about English language values.

Within the Arithmetic subtest, Caucasian children scored significantly higher compared to Native American children on item 17. This question asks the child to interpret the mathematics of the question, "Phil earned 36 dollars; he was paid 4 dollars an hour, how many hours did he work?" With Native American people facing high unemployment rates and less exposure to such mathematical concepts this question could be viewed as culturally unfair toward Native American children. It is difficult for Native American children to get jobs, especially on reservations. Comparatively, Caucasian

children may be pushed more by their family to seek employment when they are of younger ages. Differences in performance expectations regarding mathematics within reservation school systems may also influence Native American children and their leaning process.

Within the Vocabulary subtest, Native American children failed a significantly higher percentage of questions compared to the Caucasian children on items 15 and 21, and item 11 when holding Full Scale IQ as a covariate. This subtest asks the child to tell the meaning of certain words. The words that significantly favored the Caucasian children compared to the Native American children were fable and boast. This difference could be due to language barriers and some Native American children having less exposure to many of these words. Many Native American children are raised in environments that may value these concepts less or not use them as often as Caucasian children.

When holding Full Scale IQ as a covariate item 11 was found to significantly favor the Caucasian group. This item asks to describe the meaning of the word island. This could once again be due to a language barrier with this term being unfamiliar to some Native American children. It was also interesting to note that item 15 from the Vocabulary subtest no longer significantly favored the Caucasian group when holding Full Scale IQ as a covariate.

Within the Comprehension subtest, item 13 was found to significantly favor the Caucasian children compared to the Native American children but only when holding Full Scale IQ as a covariate. Item 13 asks the child to explain, "Why is it good to hold elections by secret ballot?" This could be viewed as culturally biased because more Caucasian children may be exposed to political processes such as elections and terms such as a secret ballot. These concepts may also be viewed as foreign to some Native American children who are raised in highly cultural environments and by highly traditional families.

It was also predicted in this study that the Caucasian children would score significantly higher on the mean Full Scale IQ score compared to the Native American children. As predicted, the results supported this hypothesis. The Caucasian group had a mean Full Scale IQ score of 101.86 and the Native American group had a mean Full Scale IQ score of 86.34. This difference was statistically significant. This finding was also revealed when comparing the groups within the sub-sample. In the sub-sample the Caucasian group had a mean Full Scale IQ score of 105.17 and the Native American group had a mean Full Scale IQ score of 91.20. This difference was also statistically significant.

A series of one-way analyses of variance (ANOVA) was used for comparison of the Caucasian and Native American groups on Verbal and Performance subscale mean scores, both in the entire sample and again in the sub-sample. Both comparisons of each

sample found interesting results. When comparing the entire sample (159) the Caucasian group scored significantly higher on Information, Similarities, Picture Arrangement, Arithmetic, Block Design, Vocabulary, Object Assembly, and Comprehension. The fact that the Caucasian group scored significantly higher on these subtests helps support the possibility of cultural bias within these subtests. Furthermore, by comparing the groups on subscale scaled scores this helps get a better view and a better comparison of the groups in terms of standardized scores, which the scaled scores represent. This helps to rule out age differences and focus on subtest differences regardless of age variations.

The Caucasian and Native American groups were also compared on Performance and Verbal subtest mean scores within the sub-sample (60). The sub-sample was created to compare the two groups on the Verbal subtest items by making them more similar on age as well as grade level. Within the sub-sample Caucasian children scored significantly higher on mean scaled scores in Information, Similarities, Arithmetic, Vocabulary, and Object Assembly.

These findings suggest that more needs to be done to understand patterning differences that exist between Native American and Caucasian cultures. In many cases Native American children are inappropriately assessed and diagnosed on IQ assessment measurements that were designed and created using cultural groups other than Native Americans. However, Native American children continue to be assessed on such IQ

assessment measurements and are placed in school settings such as special education classes as a result of such measurements.

The author feels these measurements would be more useful if taking into account acculturation and developing more appropriate items to substitute for those items found to be inappropriate or culturally unfair. More research needs to be conducted to test Native American children by comparing them on age groups and other important related factors in order to gain a clear understanding about IQ scoring patterns. In addition, more needs to be done to understand these item differences. Further research is needed to help determine appropriate ways to develop more useful and culturally fair measurements. The results of this study suggest that cultural influence has some degree of impact on IQ test score patterns between Native American and Caucasian children, yet determining exactly how and to what degree remains to be conclusively established.

One possible limitation to the study is the age difference between the Native American and Caucasian children. It would have been more appropriate to have equal age groups in order to get a good comparison of item analysis and to understand cultural factors more clearly. The mean age for the entire sample in the Caucasian children was 9.01 and the mean age for the Native American children was 12.33. Appropriate age groups were created in the sub-sample for item comparison, which brought the mean ages closer. In the sub-sample, the mean age for the Caucasian children was 10.37 and the mean age for the Native American children was 11.00. The study would have benefited

from collecting samples of equal age groups for a good comparison of the item differences within the entire sample. This would have been useful when comparing the groups on item differences and IQ performance scores.

Another important limitation to the study was the fact that a good portion of the entire sample had some form of psychiatric diagnosis (84.4%). It would have been more informative to collect data on children of both groups that had no psychiatric diagnosis in order to match the subjects more closely. In studies with Native American children that currently exist, data is collected with some form of psychiatric diagnosis with the subject. No data exists on IQ performance scores in Native American children with no psychiatric diagnosis or special educational needs. The author hopes more research can be conducted by testing Native American children that have no psychiatric diagnosis or special education needs.

Another limitation to the study was that fact that the Caucasian group had a higher percentage of Attention Deficit Hyperactivity Disorder diagnoses while the Native American group had a higher percentage of Conduct Disorder diagnoses. Again, it would have been more appropriate to have more similar diagnoses or groups with no psychiatric diagnosis. Finally, the Caucasian group had a significantly higher percentage of parents where at least one was employed versus a higher percentage of Native American children with no parent employed. This could influence the knowledge and understanding of the

Caucasian children compared to the Native American children by possibly having better access to social influences which may have given them an advantage.

This study provided some interesting initial clues to understanding how Native American and Caucasian children score and pattern differently on intelligence measures such as the WISC-III. The study also provided some interesting clues to understanding differences between Native American and Caucasian children on Verbal subtest items from the WISC-III. In addition, the study provided some interesting patterning performance differences regarding specific areas of the WISC-III such as the subscale score and item analysis. The investigator hopes more interest is developed and devoted to this area and more is done to consider how to more appropriately assess Native American children.

Native American children face great disadvantages when assessed and compared on intelligence measurements that are normed and standardized on majority culture groups. More needs to be done to understand and utilize the findings of research with Native American children. Furthermore, appropriate intelligence measurements need to be developed to help assess Native American children especially with high rates of mental health problems facing this group. Placement considerations of Native American children in school programs such as special education can have a lifelong impact. If further research could more clearly identify patterning performance on measurements

such as the WISC-III, the future of Native American children and educating them appropriately would be highly strengthened.

# APPENDIX A

# RESEARCH PACKET

Demographics Questionnaire

Subject # _____

Demographics

1. Age:_____
2. Gender: Male___ Female___
3. Tribal Affiliation (if applicable):_____
4. Grade in School:_____
5. Diagnoses_____
6. At least one parent/guardian employed: Yes____ No____

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