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Predicting Body Mass Index in Northern Plains American Indian Children

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PREDICTING BODY MASS INDEX IN NORTHERN PLAINS AMERICAN INDIAN CHILDREN

by

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This dissertation meets the standards for appearance, conforms to the style and format requirements of the Graduate School of the University of North Dakota, and is hereby approved.

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TABLE OF CONTENTS

LIST OF TABLES

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ABSTRACT

Obesity has become a major health concern for American Indians. Obesity prevalence is higher for minority groups, however American Indians consistently have higher rates than any other U.S. population. Of more concern is the trend towards higher rates of overweight and obesity in American Indian children. Obesity has been associated with many health concerns such as coronary heart disease, high blood pressure, and type 2 diabetes mellitus in both American Indian adults and children. The purpose of this study is to identify predictor variables that may be contributing to the development or possibly maintenance of obesity in American Indian children. The sample consisted of 291 tribally enrolled American Indian students (grade 3-5). In addition, a smaller sample of 80 parents/caregivers participated in this study. Child participants completed several questionnaires pertaining to the following topics: demographics, diet and physical activity, weight-related attitudes, psychological/emotional, and cultural identity. Parents/caregivers completed a similar research packet and most items were related to parent/caretaker's personal attitudes and behaviors. Two multiple regression analyses were conducted to observe the predictive power of independent variables on child BMI scores. The first data analyses were structured hierarchically to investigate the contributions of the following five blocks or sets of predictor variables: (a) demographic variables (i.e., gender and SES), (b) food selection and physical activity measures (i.e.,

food choice intention, knowledge of fatty foods, food self-efficacy, physical activity, and sedentary behavior), (c) attitudes about body size (i.e., body dissatisfaction, attitudes toward body size, attempted weight loss), (d) emotional eating variables (i.e., self-esteem and emotional eating), and (e) cultural identity. A simultaneous multiple regression was also conducted on a pre-selected set of parental/caretaker variables (adult/caretaker BMI, birth weight of 1st child, and parent/caretaker body dissatisfaction) to assess their relationship to the dependent variable (child BMI). This study found that 33% of Northern Plains American Indian children were overweight and 20% were at risk for becoming overweight. Results also revealed that demographics, diet and physical activity, and weight-related attitudes explained a significant amount of variance (41.5%) in child BMI. Statistically significant unique contributions were observed for gender, food choice intentions, sedentary behaviors, attitudes towards body size, body dissatisfaction, and attempted weight loss. In addition, results showed that parent/caretaker BMI, birth weight of 1st child, and parent/caretaker body dissatisfaction explained a significant amount of variance (15%) in child BMI scores; however, none of the predictors accounted for a significant unique contribution to the overall model.

CHAPTER I

INTRODUCTION

Obesity is fast becoming one of the greatest health concerns in this country (Field, Barnoya, & Golditz, 2002), as excess weight has been linked to many diseases and disorders and ultimately a shortened life-span (Larsson, Bjorntorp, & Tibblin, 1981; Field et. al., 2002). It is especially concerning that the number of children and adolescents in the United States, who are overweight and obese, are dramatically increasing (Thompson & Smolak, 2001; Troiano & Flegal, 1998). In particular, ethnic minority children, including those of American Indian descent are at extremely high risk for becoming overweight and obese (Kumanyika, 1993; Dounchis, Hayden, & Wilfley, 2002).

Obesity is defined by Brownell and Wadden (1991) as occurring when an individual measures 20% over the ideal weight for his/her age, sex, and height. As mentioned above, obesity is approaching epidemic proportions among American youth, and those most at risk are minorities (Kumanyika, 1993). As many as 23% of American Indian preschoolers are above the 95th weight-for-height percentile of the National Center for Health Statistic Centers for Disease Control (NCHS-CDC) compared to the expected 5 percent (Kumanyika, 2002). Biological, behavioral, and cultural factors are each viewed as important contributors to the development of childhood obesity and will be reviewed in the body of this paper (Crawford, Story, Wang, Ritchie, & Sabry, 2001).

However, of particular concern in understanding obesity and its risk factors among ethnic minority people is the influence of culture as it forms the environmental context in which behavior occurs. Consistent with this perspective, Ritenbaugh's (1982) declaration that obesity is a "culture-bound" syndrome and his suggestion that its etiology is culture specific and related to the behavioral norms of the particular group context in which the individual lives. Physical activity (Going, Levin, Harrell, Stewart, Kushi, Cornell et. al., 1999), dietary practices (Gittelsohn, Wolever, Harris-Giraldo, Hanley, & Zinman, 1998), ethnicity and cultural norms (Kumanyika, 2002), body image (Kumanyika, 1993), parental and environmental influences (Troiano & Flegal, 1998), and socioeconomic status (Crawford et. al., 2001) have all been linked to the obesity epidemic in Native American people.

Obesity was rarely seen among American Indian people through the 1940's; however since that time it has been increasing at ever steeper growth rates until reaching what is now epidemic proportions among Native American people (Story, Evans, Fabsitz, Clay, Holy Rock, & Broussard, 1999a). There are over 500 federally recognized tribes and around 1.9 million American Indians living in the U.S. (Crawford et. al., 2001). Each tribe exhibits distinct values, beliefs, and traditions, but are also related through striking similarities such as dangerously high rates of obesity and obesity-related health concerns such as diabetes, hypertension, and coronary heart disease (Story, Stevens, Evans, Cornell, Juhaeri, Gittelsohn, et. al., 2001; Kumanyika, 1993). Breedon (2002) reports 4.5 per 1000 American Indians living in the U.S. have Type 2 Diabetes Mellitus (DM) which can begin developing as early as 10 years of age. Type 2 DM and obesity are major

health concerns among the American Indian tribes of North America and they often coexist (i.e., are highly correlated) in both adults and children (Breedon, 2002; Fagot-Campagna, Pettitt, Engelgau, Burrows, Geiss, Valdez et.al., 2000; Codding & Hinack, 2001; Knowler, Pettitt, Saad, Charles, Nelson, Howard et. al., 1991). Diabetes frequently occurs within families, with data revealing that the risk of developing diabetes increases 2.3 times when an individual has one diabetic parent and 3.9 times when both parents are diabetic (Codding & Hisnanick, 2001). Breedon (2002) declared that acanthosis nigricans, an additional risk factor for diabetes, is much more common among American Indian children than other racial/ethnic groups. Acanthosis nigricans is a skin discoloration in the creases around the neck, and has been correlated with excessive insulin production (Breedon, 2002). Patel (2003) recently reported that acanthosis nigricans was identified in 9% of Turtle Mountain elementary and middle school American Indian students. Diabetes has also been cited as the leading cause of mortality and morbidity among American Indian adults (Story et. al., 2001).

The physical effects of being overweight are extremely damaging; however, the stigmatization and psychological effects of obesity should not be underestimated as they can also be quite damaging (Stunkard & Wadden, 1992). Youths suffering from obesity are treated worse than average or underweight children and tend to be withdrawn or excluded. These children often report feelings of alienation, depression, anger, embarrassment and low self-esteem (Braet, Mervield, & Vandereycken, 1997). Youth obesity is also associated with increased suicide attempts, behavior problems, and social difficulties (Stunkard & Wadden, 1992). In reaction to emotional stress, some children

may overeat (Bauch, 1973) and a vicious cycle of emotional eating, weight gain, and dieting may emerge. Data from a section of the Pathways project[1] (Caballero, 1999), revealed that many American Indian children are concerned about their weight and body image; and are currently practicing weight modification techniques, such as following a restrictive diet, increasing exercise (Davis, & Lambert, 2000), and even engaging in starvation methods (Story et. al., 2001).

Although the prevalence of being overweight or obese is clearly higher among American Indian children than in the U.S. population, little is understood about the risk factors associated with this health problem for American Indian children (Gallaher, Hauck, Yang-Oshida, & Serdula, 1991). The overall goal of this proposed study is to identify relevant risk factors that may contribute to the development and possibly maintenance of childhood obesity in American Indian children. Such potential risk factors may then aid in the design and development of primary and/or secondary prevention programs for American Indian youth. Two primary questions will be addressed in this study. First, I will attempt to predict American Indian children's weight (i.e., BMI) using demographic (gender and SES), diet and physical activity (food choice intentions, knowledge of fatty foods, food self-efficacy, physical activity, and sedentary behavior), weight-related attitudes (body dissatisfaction, healthy body perceptions, attitudes towards body size, and attempted weight loss), psychological/emotional (self-esteem and emotional eating), and cultural identity. Second, I will attempt to predict

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[1]Pathways is a multi-centered obesity prevention program focusing on providing intervention through education related to diet and physical activity in 6 tribal communities.

American Indian children's weight (i.e., BMI) using parental predictors such as birth weight of 1st child, parent/caretaker body dissatisfaction, and parent/caretaker BMI.

Prevalence of Obesity

Rates of obesity continue to escalate throughout the nation and it has quickly become an epidemic that cuts across race/ethnicity, gender, and age (Field et. al., 2002). Data from the National Health and Nutrition Examinations (NHANES I, II, & III), which are conducted every 10 years, show a steady increase in prevalence rates across time and serves as the most commonly cited reference data for obesity rates in the U.S. (Troiano & Flegal, 1998). The most recent NHANES III collected in 1988-1994 revealed that 32% of American adults were overweight and 22.5% were obese (Flegal, Caroll, Kuczmarski, & Johnson, 1998); and in some subgroups overweight prevalence rates were as high as 75% (McGinnis & Ballard-Barbash, 1991). An additional, and particularly troubling, concern is the growing number of children, adolescents (Rosner, Prineas, Loggie, & Daniels, 1998; Troiano & Flegal, 1998) and preschoolers (Centers for Disease Control and Prevention, 1996) who are either overweight or at risk for becoming overweight. The Centers for Disease Control and Prevention's 1994 Pediatric Nutrition Surveillance Report indicated that 12% of 53,747 children between the ages of 2 and 4 were already overweight, and other estimates have suggested that between 10% and 50% of all American children are obese, as defined by body mass index (BMI) scores greater than 95th percentile of the NHANES II reference data (Thompson, Davis, Gittelsohn, Going, Becenti, Metcalfe, et, al., 2001). More recent data from the NHANES III, has shown that 11% of American

children and adolescents are overweight (>95th percentile) and 14% are at risk for becoming obese (between 85th and 95th percentile) (Troiano & Flegal, 1998).

As disturbing as these numbers are, even more devastating are the trends toward higher levels of obesity in minority populations (McGinnis & Ballard-Barbash, 1991). For example, several ethnic groups, comprising more than 20% of the U.S. population (Kumanyika, 1993), are at extraordinary risk for developing obesity (Kumanyika, 2002; Broussard, Johnson, Himes, Story, Fichtner, Hauck, et. al., 1991). African American adolescent (Rosner et. al., 1998) and adult (Osvold & Sodowsky, 1995) females are more overweight than the general public, with adult African American females twice as likely to be obese than U.S. Caucasian women (Kumanhika, Wilson, & Guilford-Davenport, 1993). In general, NHANES III data revealed that two-thirds of African American and Mexican American females were either overweight or obese, and 20% of African American and Mexican American males were also obese (Kumanyika, 2002). A higher prevalence of being overweight and obese has also generally been found in various American Indian samples (Broussard et. al., 1991).

Obesity and American Indians

The prevalence of obesity has been found to be higher than national rates in several American Indian tribes and groups including the Mescalero (Gallaher et. al., 1991; Hauck, 1992), Southwest U.S. tribes (Broussard et. al., 1991), Navajo (Gilbert, 1992), Pueblo (Davis 1993), and tribes from the Northern Plains (Zephier, 1999). Data from the National Medical Expenditure Survey (1987) indicated that American Indians are consistently heavier than any other U.S. subpopulation (Broussard, Johnson, Himes,

Story, Fichtner, Hauck, et. al., 1991). In summarizing the prevalence data concerning American Indian adults, adolescents, and children, Broussard and colleagues (1991) report that an estimated 48% of American Indian adult males and over 50% of adult females are either overweight or obese compared to 32% of males and 33% of females in the NHANES II reference data (i.e., U.S. population). Similar percentages of American Indian adolescents are also overweight or obese. Sadly, obesity often develops very early in an American Indian child's life as 11.2% of preschoolers (ages 0-4) have BMIs in the 95th percentile with the highest rates occurring at 1-year of age (14.5%) (Broussard et. al., 1991).

Recent data collected in 2002-2003 from the Turtle Mountain Community Headstart program located on the Turtle Mountain Indian reservation (Belcourt, ND) has also revealed alarming levels of obesity among this subset of American Indian children. Out of the total 277 headstart children, ages 3-5, 26% were considered obese and 17.7% were classified as overweight (Patel, 2003). Comparisons were relatively similar for males and females, which indicates that over 40% of these students are at serious risk for developing adolescent and adult obesity. BMI data collected during the 2001-2002 school year from the Turtle Mountain Elementary and Middle School also found consistently high percentages of being overweight or obese (between 41% and 50%) for children and youth from kindergarten through the eighth grade (Patel, 2003). Rates once again were similar between males and females. It is apparent that obesity is extremely prevalent among Turtle Mountain Chippewa children and youth, and, furthermore, it is developing early, and as one might expect, continuing to be evident at least through early

adolescence (i.e., middle school grades). Data such as these underscore the importance of developing and implementing effective strategies for treating and preventing obesity in minority populations (Kumanyika, 2002), especially in American Indian communities such as the Turtle Mountain Band of Chippewa.

The Onset and Development of Obesity

Genetics

Some researches argue that heredity is the primary determinant of childhood obesity (Stunkard, Foch, Hrubec, 1986; Sorenson, Hoist, & Stunkard, 1992), and it is true that a child has a 40% chance of becoming obese if one parent is obese, with chances of obesity doubling when both parents are obese (Davis, Gomez, Lambert, & Skipper, 1993). Furthermore, studies have found that childhood obesity is highly predictive of adolescent and adult obesity (Abraham & Nordsieck, 1960; Zack, Harlan, Leaverton, & Coroni-Huntley, 1979; Stark, Atkins, Wolff, & Douglas, 1981), supporting the theory that once begun obesity remains stable throughout an individual's life. Once an excessive amount of body fat has accumulated during childhood, it becomes extremely difficult to reverse the effects (Price, 2001).

The high prevalence of being overweight and obese in people of American Indian descent suggests the possibility of a genetic predisposition for obesity (Callaher et. al., 1991; Stunkard et. al., 1986; Sorensen et. al., 1992; Poskitt, 1993). Some researchers have even hypothesized that American Indians may have a "thrifty" genotype (Neel, 1962; Crawford et. al., 2001), which historically might have served an adaptive function by allowing them to survive periods of famine by easily storing fat during periods in

which food was in abundance. However, in current times of relative plenty and increased sedentary lifestyles, such a mechanism would greatly contribute to the onset and maintenance of obesity. Despite this theory, however, no specific genotype has yet been identified (Price, 2002). Data from the Mescalero tribe revealed that obese Mescalero children were 2.5 times more likely to have obese mothers when compared to nonobese children, and maternal obesity was one of the most powerful predictors of childhood obesity (Gallaher et. al., 1991). It is evident that genetics may increase one's risk for developing obesity; however, the data to date clearly recognize the importance of environmental and cultural variables as significant contributors to the development, maintenance and exacerbation of weight problems and obesity.

Cultural Attitudes and Norms

Ethnic identity and acculturation are important variables that may be related to the onset/development and possible prevention of obesity in ethnic populations (Thomas & Smolak 2001; Winkleby, Albright, Howard-Pitney, Lin, & Fortmann 1994) . For example, Ravussin and colleagues (1994) found that a traditional Native American lifestyle may serve as a protective factor against developing obesity. Their research showed that a Pima Indian tribe that lived a more traditional lifestyle had lower rates of obesity and diabetes compared to a more acculturated Pima tribe (Ravussin, Valencia, Esparza, Bennett, & Schulz, 1994; Stevens et. al., 2001). The traditional Pima Indians were more likely than the acculturated tribes to use hunting and gathering activities to obtain their food supply, thereby engaging in more physical activity and ingesting less high-fat, majority-culture foods. These results further suggest that American Indians who

strongly identify with American Indian attitudes and norms may be less vulnerable to risk factors associated with obesity compared to those who more strongly identify with westernized, majority culture in the United States. Despite this possibility, Kumanyika (1993) suggests that ethnic populations are more likely than other non-ethnic populations to normalize obesity within social and family environments, which may increase their risk for the development of obesity. Lopez, Blix, and Blix (1995) compared body image perceptions among Latina women raised in the U.S., Latina women who have immigrated to the U.S. after the age of 16, and non-Latina white women. Overall, Latina women selected larger body shapes as ideal, compared to non-Latina women, with Latina's born in the U.S. endorsing ideal body sizes that were more similar to white women, suggesting less acculturated Latina's were more accepting of a larger body size and even preferred them to smaller body types. Furthermore, as a group, Latina women believed that their Latina friends would choose heavier ideal images than they themselves would select, which suggests that peers may also reinforce larger body types. Overall, the Latina culture may place less emphasis on being thin, especially when there has been limited exposure to westernized culture.

Other studies also provide support for Kumanyika's (1993) theory. For example, results from a survey conducted among the Navajo Indians indicated that many older traditional adults selected heavier body types as being healthier than thinner body types (White, Ballew, Gilbert, Mendlein, Mokdad, & Strauss, 1997). In another study, Osvold and Sodowsky (1995) reported that traditional American Indian women were less concerned about shape and weight than African American women. Stevens et. al.

(1999b) reported similar findings in a study examining weight-related attitudes and behaviors in American Indian children. A larger percentage of children, who reported a strong cultural identity, as assessed in the Knowledge, Attitudes, and Behaviors questionnaire (Stevens, Cornell, Story, French, Levin, Becent et. al., 1999a), selected heavier body sizes as being healthier than children reporting weaker, traditional cultural identity. As indicated earlier, American Indian adults and children have higher prevalence of overweight and obesity than any other ethnic group. These studies suggest that ideals regarding shape and weight are influenced by cultural identity, which may additionally influence eating habits. In contrast to Ravussin et al.'s (1994) findings that a tribe of traditional Pima Indians had less obesity than a less traditional tribe, there is evidence that many traditional American Indians may view food and eating differently than more acculturated American Indians, and that this different perspective may encourage obesity (Kumanyika, 1993). For example, food is extremely important in establishing familial and social relationships and eating large quantities of food may be acceptable and encouraged by more traditional American Indians. Furthermore, feasting after, or during, traditional ceremonies is common and discarding food may be considered unacceptable. Although these studies suggest the importance of cultural identity in weight problems such as obesity, Stevens et. al. (1999) is the only study that has directly examined this issue in children. Additional research examining parents' influences on their children's weights also point to the importance of culture on obesity in children. For example, African American mothers were more accepting of their heaviest daughter when compared to white mothers, suggesting that black women may show more tolerance for

obesity, and, therefore, their children may also find obesity more acceptable. In another study, Alexander, Sherman, and Clark (1991) found that Mexican-American mothers who had obese children preferred more chubby babies than mothers of non-obese children. Similarly, Kimm, Sweeney, and Janosky (1991) reported significant main effects for race in determining a caretaker's ideal body image, with nonwhite caretaker's weighing significantly more than white caretaker's. Kemper, Sargent, Drane, Wanzer, Valois, and Hussey (1994) also reported that African American girls perceived their parents as being more satisfied with their weight and felt less pressure to be thin when compared to white females, once again suggesting that certain ethnic groups may condone and support a heavier body type. In this group, African American girls also selected significantly larger ideal body sizes than their white peers. Such normalization among ethnic groups may condone and even reinforce childhood obesity. There are no specific studies assessing the role of parental ethnic identity's influences on childhood obesity in American Indians, however researchers do suggest that cultural beliefs and attitudes may be contributing to the obesity epidemic in Native American people (Story et. al, 1999).

Physical Activity

Living a sedentary lifestyle has been associated with greater health concerns for adult men and women. In 1988 a longitudinal study conducted with over 30,000 men (age 40-75), who were initially free of diabetes, indicated that long-term television viewing increased risk for developing diabetes. Leitzmann, Stampfer, Golditz, Willett, and Rimm (2001) found that out of the 37,918 men, 1058 cases of diabetes were reported during the 10-ten-year follow-up. Results revealed that more time spent watching

television was significantly correlated with a greater risk for developing diabetes, compared to those men who reported less television viewing. The authors concluded that increasing physical activity may reduce risk of diabetes, whereas prolonged exposure to television may be contributing to the development of this illness. Similar findings for women were reported by Hu, Li, Colditz, Willett, and Manson (2003). Sedentary behaviors, especially television watching, were related to an elevated risk for the development of obesity and Type 2 DM. Hu and colleagues reported that even moderate exercise was associated with lowering the risk for developing diabetes. Another study reported very low levels of activity for adult women, especially ethnic minority women (King, Castro, Wilcox, Eyler, Sallis, & Brownson, 2000). These authors reported that only 9% of American Indian, Hispanic, African American, and Caucasian women (age 40 and over) met the criteria of the definition of being regularly active, with the majority of the women reporting high levels of inactivity. American Indian women reported being the least physically active (59%) followed by African American women (57%). Furthermore, Wolf and colleagues (1993) report that less than one-fifth of Hispanics and Asians met the year 2000 goal for strenuous activity and less physical activity was correlated with higher BMI scores for this group.

Recent increases in childhood obesity have also been linked to decreased physical activity in all children (Wolf, Gortmaker, Cheung, Gray, Herzog, & Golditz, 1993; Stauss, Rodzilisky, Burack, Colin, 2001; Anderson, Crespo, Bartlett, Cheskin, & Pratt, 1998; Obarzanec, Schreiber, Crawford, Goldman, Barrier, Frederick, & Lakotos, 1994). Recent reports from 92 children, age 10 to 16, indicated that they spent 75.5% of their

day in sedentary activities such as watching television, playing computer, and doing homework and only 1.4% of their day participating in rigorous physical activity (Stauss, Rodzilisky, Burack, & Colin, 2001). Several additional studies have reported similar findings. For example, compared to the general population, Hispanics and Asians (Wolf et. al., 1993), African American girls (Obarzanec et. al., 1994), non-Hispanic black and Mexican American girls (Anderson et. al., 1998), Cree (Bernard, Lavallee, Gray-Donald, & Delisle, 1995) and Pima (Fontvielle, Kriska, & Ravussin 1993) American Indians were less physically active. This increase in sedentary activities in children is primarily attributed to an increase in television viewing, and this rise has been correlated with childhood obesity (Dietz & Gortmaker, 1985). Anderson and colleagues (1998) reported that one-fourth of U.S. children view television for at least 4 hours per day. Dietz and Gortmaker (1985), state that individual's who spend a large proportion of their time viewing television each day, expend less energy and are less physically fit than the average viewer. Children who viewed 4 or more hours of television a day had a greater percentage of body fat than children who only watch around 2 hours per day. Gordon-Larsen, Adair, and Popkin (2002) found that overweight prevalence was associated with high levels of television and video viewing among Caucasian boys and girls. Results indicated that increases in moderate to vigorous activity greatly reduced the odds of being overweight in Caucasian boys, non-Hispanic black boys, and girls. Robinson (1999) found that simply reducing television, videotape, and video game use was significantly correlated with BMI reductions among 3rd grade students. Fontvielle et. al. (1993) found that Pima Indian children (N = 82) reported significantly less sport leisure activity and

considerably more time viewing television and videos than their Caucasian peers, and obesity was positively correlated with time spent watching television in both Pima and Caucasian groups. Results also suggested that television viewing may significantly reduce participation in less sedentary activities, such as sports and play. In conclusion, U.S. children are watching more television and are not involved in enough rigorous physical activity, which may be contributing to the obesity epidemic. These studies clearly and strongly support a connection between inactivity, increased television viewing, and weight problems such as obesity. Furthermore, they support the importance of developing primary prevention programs for children targeted at increasing physical activity in order to reduce the risk of obesity and obesity-related disorders, such as diabetes.

Diet

Dietary practices are also important contributors to the development of obesity in children (Story et. al., 1999; Bellew, White, Strauss, Benson, Mendlein, & Mokdad, 1996). Bonner (1996) reports that 80% of all U.S. children and adolescents' food consumption includes more fat than recommended, thereby increasing risk of obesity. Minority children with less environmental amenities are especially at increased risk for obesity, high serum levels, and dietary consumption patterns that are in excess of U.S. Dietary Guidelines (Bonner, 1996). Unhealthy eating patterns such as these will likely follow into adolescence will likely contribute to the earlier onset of obesity-related illnesses such as diabetes and cardiovascular disease (Kemper, Snel, Verschuur, & Storm-Van Essen, 1990). In addition, minority groups such as American Indians, receive food

provided through supplemental federal food programs (Dillinger, Jett, Macri, and Grivetti, 1999) , which reportedly exceed dietary guidelines for minority children (Bonner, 1996).

Food intake patterns and cultural variables must all be taken into account when attempting to identify obesity risk factors for American Indians. The Pima Indian adults and children have the highest prevalence rates for obesity for all American Indian groups. It has been suggested that the insufficient availability of healthy foods is a major contributing factor to their obesity epidemic (Story et. al., 1999). Knowler, Pettitt, Sadd, Charles, Nelson, Howard, Bogardus, & Bennett (1991) report that the Pima tribe has undergone an historically recent rapid economic and social change, which may be contributing to the high prevalence rates of obesity in the adult tribal members and their children. Historically, being overweight or obese was virtually nonexistent among Pima Indians; however once introduced to high-fat westernized foods and sedentary living, traditional practices such as hunting and gathering became less common among tribal members and obesity rates skyrocketed (Knowler, Pettitt, Savage, & Bennett, 1981). Similar findings have also been discussed for the Navajo Indians. Sugarman, White, & Gilbert (1990) report that Navajo children have had a consistent increase in heights and weights over the past three generations. Traditionally, the Navajo would eat wild game, corn, berries, and fruit, but these food preferences were quickly abandoned when the majority culture introduced prepared foods and soda pop. Although high cultural identification has been linked to obesity through acceptance of heavier body types, it is also evident that living a more traditional lifestyle in terms of exercise and diet is very

beneficial for Indian people and prevents the onset of being overweight and obese . As stated earlier, maintaining such traditions may help prevent against obesity even though traditional perspectives may be more tolerant of heavier weights (Ravussin et. al., 1994).

As suggested above, dietary preferences and food preparation are rooted in cultural traditions and attitudes (Kumanyika, 1993). Gittelsohn, Harris, Burris, Kakegamic, Landman, Sharma et. al. (1996) recently examined patterns of food consumption and preparation in the Ojibway-Cree tribe. They found that the tribe classified as "unhealthy" foods such as pop, candy, chips, chocolate, and fruits. These foods were referred to as "junk food" and are perceived as being introduced by the white culture, in contrast to their traditional "bush" foods which were considered "healthy" and are obtained by hunting and gathering activities of tribal members (e.g., wild game, berries, and vegetables). The authors pointed out that taste was obviously an important variable when classifying foods, because fruits such as bananas and apples which are sweet and nuts and popcorn which are salty were referred to by the natives as "junk food." A commonly held belief uncovered in this study was that homemade foods, regardless of similarity to store bought, were healthier. Gittelsohn et. al. (1996) also reported that tribal members ate three meals a day with 1 or 2 snacks,--chips (75%), apples (63%), and bannock (bread, 56%) were the most preferred snack foods. Interestingly, despite the consensus that "junk food" was unhealthy, direct observations revealed that items such as pop, candy, and chips were the most frequently purchased items at the local grocery store. Another intriguing finding was that greater consumption of "bush" foods actually tended to increase an individual's risk for diabetes, a finding that

is inconsistent with reports from earlier cited studies (Ravussin et. al. 1994; Sugarman et. al., 1990). However, this is not an alarming deviation when considering each tribe exhibits distinct hunting and gathering techniques and food selection and preparation, which may account for differences in preventative or causative effects of traditional practices associated with obesity. Another possible explanation is that these data are based on self-reports of food intake and may not reflect actual food consumption. For example, despite acknowledged self-report of the unhealthiness of "junk food," these foods were among the most frequently purchased at the local grocery store.

The Ojibway-Cree tribal members engage in several dietary practices that increase risk for developing diabetes. Tribal members reported a high consumption of junk foods and bread and butter groups and also utilized more fatty methods for preparing certain food dishes (Gittlesohn, Wolever, Harris, Harris-Giraldo, Hanely, & Zinman, 1998). Fat is commonly used in food preparation or added for consumption or both. Many use fats to prepare bannock (bread), potatoes, canned meat, and eggs. Foods preferred by tribal member are often high in simple sugars and low in dietary fiber (Gittelsohn et. al., 1996; Gittelsohn et. al., 1998). Overall, American Indians report wide use of butter, lard, whole milk, fry bread, and fried meat and vegetables; and may drink more sweetened soda than other groups. In addition, many American Indians receive commodities such as canned meats, cheese, butter, shortening, and oil, which reportedly are high in fat as well as energy (Story et. al., 1999). Even though supplemental programs provide a much needed service, many of the items are highly sweetened, high in fat and sodium, and are provided in large quantities. Dillinger et. al. (1999) examined the impact of supplemental food

programs on two American Indian communities in California. Most tribal members referred to USDA food commodities as "unhealthy" and reported that there was a general limited variety of available food items. Disliked commodity foods included: butter, cornmeal, canned plums, prunes, and powdered milk. Many tribal member requested items that were rarely provided by the supplemental groups (e.g., wheat bread, vitamin supplements, fresh milk, deer meat, whole grain products). Several tribal members also preferred non-perishable canned goods, fresh vegetables and meat, and fruit juices. Tribal members identified "junk foods" such as chips, pastries, spoiled produce or and stale bread as inappropriate foods distributed by some community food programs, suggesting that American Indians are concerned about the nutritional content of their food and that they are aware that their food selection may contribute to an inadequate diet. However, because of the grim situation, as discussed in next section, in which many Native Americans find themselves, they have no choice but to utilize the supplemental food programs to supply food for their families.

Socioeconomic Factors

Socioeconomic factors that are common among ethnic minority groups may also be contributing to the development of obesity in minority children (Fontvielle, 1993). For example, American Indians have lower educational attainment, income, and less financial assets compared to majority-culture individuals, and such factors have been associated with increased risk for obesity (Kumanyika, 2002;). In one study, mothers having greater levels of education served healthier foods to their children (Olvera-Ezzell, Power, & Cousins, 1990) and less educated white individuals reported greater consumption of high-

fat diets compared to Hispanic persons (Winkleby, Albright, Howard-Pitney, Lin & Fortmann, 1994). In addition, discretionary income may relate to food purchasing and activity selection in minorities. This is especially pertinent to American Indians as they are one of the poorest minority groups residing in this country (Crawford, Story, Wang, Ritchie, & Sabry, 2001). Reports from 1990 indicated that around 31% of U.S. American Indians were living below poverty levels (Story et. al., 1999) and an estimated 80% of Northern Ontario Ojibway-Cree Indians were unemployed and relied on welfare as their main source of income (Gittelsohn et. al., 1996). As a result of high poverty rates across most tribal communities, many Native Americans receive government support either in the form of commodity food products or food stamp programs. For example, Sugarman and colleagues (1990) report that 35% of Navajo Indians receive WIC (Women, Infant, Children) assistance or commodities, and as mentioned earlier, there are several nutritional concerns associated with supplemental food items and the variety of food products is often quite limited.

Similarly, community/location variables must also be considered when examining the factors associated with obesity risk. American Indians living on reservations, especially rural reservations, may not have access to an appropriate variety of food or community fitness facilities (Fontvielle, 1993; Kumanyika, 1993). The potential effects of sociocultural factors on physical activity and fitness has not been adequately examined, despite its potential to impact activity and fitness via a plethora of avenues (Fontvielle, 1993; Lindquist, Reynolds, & Goran, 1999). In one study, researchers found that over half of the American Indian women ($\underline{n}$ = 738) participants reported being significantly

less active than African Americans, Caucasians, and Hispanic women (King, Castro, Eyler, Wilcos, Sallis, & Brownson, 2000). Some physical activity barriers described by these women were lack of education, not being in good health, and being self-conscious about their bodies (King, et. al., 2000). Environmental barriers have also been noted by young American Indian children (grade 3-5) including things such as weather conditions, safety concerns, and chores (Thompson, Davis, Gittelsohn, Going, Becenti, Metcalfe, et.al., 2001). Fontvielle et. al. (1993) also suggested that a lack of seasonal sports facilities (i.e., indoor swimming pool) may serve as another barrier to increasing physical activity levels for youth living on the reservation.

Psychosocial Stressors and Eating Patterns

Psychosocial stressors can result in heightened emotional states and have been associated with childhood and adolescent weight gain (Miller & Downey, 1999). Bruch (1973) state that children may learn at an early age to associate food with emotional states. Through modeling, parents provide their children with cultural attitudes and behaviors related to food and eating. Studies reveal that problematic eating patterns of parents are often transferred to their children (Fisher & Birch, 2001). For example, when parents repeatedly offers food to a child who is emotionally distressed, they may eventually begin to confuse stressful emotional states with feelings of hunger. The act of eating, especially identified comfort foods, can serve as a coping mechanism for many individuals, and Bruch (1973) suggests that this pattern may begin early in life and may be associated with an overwhelming lack of control, sometimes described by obese people.

Family dysfunction may also be related to abnormal feeding patterns, thereby increasing one's risk for obesity. In a study conducted by Christoffel (1989), parental factors such as poor communication, neglect of age appropriate nutrition, the stress of separation of a child from his or her parents, substance abuse, maternal depression, and psychological enmeshment between a child and mother were commonly associated with the development of severe childhood obesity. In another study, Favaro and Santonastaso (1995) found a close link between the mothers' emotional health and children's obesity. Results showed that mothers' with more psychiatric symptoms were associated with higher BMI scores in their children. These findings are alarming, especially when obese children tend to be more emotionally immature and dependent on their mothers for emotional health (Bruch 1973). In sum, studies in this area stress the importance of "family factors" and suggest that the examination of childhood obesity development include behavioral and psychological factors of the children's parents (Poskitt, 1993; Favaro & Santonastaso, 1995).

The experience of such stressors along with the emotional distress that often accompanies weight problems such as body dissatisfaction may result in negative emotional states such as, depression and low self-esteem. In a recent meta-analysis conducted by Miller and Downey (1999), lower self-esteem was associated with heavier body weight. Furthermore, Breat, Mervielde, & Vandereycken (1997) examined the psychological aspects of childhood obesity in 139 obese children and 150 nonobese children. Results revealed that all obese children reported more negative physical perceptions and lower feelings of self-worth. In addition, parents of obese children

identified more behavior problems on the Child Behavior Checklist compared to parents of nonobese children. In a study examining these issues in nonwhite minority children, Kimm, Sweeney, and Janosky (1991) reported that nonwhite obese children also displayed lower self-esteem than white obese and nonobese children; a difference that was especially noteworthy among younger girls and adolescent males. For males, self-esteem was related to intellectual school status and was inversely related to obesity severity. The authors suggest that the social stigma associated with being obese significantly contributes to lower self-esteem.

Obesity and Body Dissatisfaction

Obesity has also been associated with lower body pride and overall higher rates of body dissatisfaction, another rapidly growing trend among American Indians (Story, et. al., 2001). Wadden and Phelan (2001) state that obese individuals are especially at risk for body dissatisfaction based on reports from such individuals who recall great emotional pain associated with being overweight. Across all ethnic groups, there is a significant reduction in body disturbance following weight loss (Sorbora & Geliebter, 2002). Whether American Indian, Caucasian, or another ethnic group, American youth are all exposed to current societal ideals of beauty and feel the pressure to conform to the "thin is in" trend (Wadden & Phelan, 2001). Even young children show a preference for thinner peers and are exposed to stereotypes and prejudice against fat people (Loewy, 1998). Body dissatisfaction was once only thought to plague the upper-class white female (Gustafson-Larson & Terry, 1992), however such concerns and dissatisfaction have been steadily growing along with the increasing rates of obesity in minority

populations (Dounchis et. al., 2001). Although obesity isn't inevitably associated with body dissatisfaction (Kumanyika, Wilson, & Guilford-Davenport, 1993; Wadden & Phelan, 2001), other studies reveal a striking association between the two (Terry & Bass, 1984; Rolland, Farnill, & Griffiths, 1997; Robinson, Chang, Haydel, & Killen, (1991); Story et. al. 2001; Story, Tompkins, Bass, & Wakefield, 1986). Furthermore, this association is also present among minority groups (even those that have traditionally been more tolerant of greater weight or increased body size) and it can no longer be considered an inconsequential concern among minority youth. Although findings are not always consistent, several studies indicate that obesity is related to body dissatisfaction in a variety of cultural groups (Lopez, Blix, & Gray, 1995; Rolland, Farnill, & Griffiths, 1997; Robinson, et. al., 1991; Thompson, Corwin, & Sargent, 1997).

Although the literature suggests that American Indian people may be, at least historically, more accepting, tolerant, and even reinforcing of obesity, there is growing evidence that majority culture's emphasis on thinness is affecting American Indian youth. Therefore, American Indian youth may be caught between the proverbial rock and a hard place; parents and other significant adults accept, promote, and even reinforce greater body weight, yet, as any adolescent in this country, American Indian youth are consistently faced with beauty ideals that are associated with thinness. Increases in body fat have been associated with less satisfaction in one's body size and shape, which additionally has been correlated with low self-esteem, depression, eating disorders and weight reduction techniques in American Indians (Story et. al., 2001; Davis & Lambert, 2000; Thompson & Smolak, 2001). These weight reduction techniques include even self-

starvation methods in both adults and in children (Gardner, 2001; Dounchis, Hayden, & Wilfley, 2001). Results from a study conducted by Snow and Harris (1989) indicate that Pueblo Indian females and Hispanics are unhappy with their current weight and report a strong desire to be thinner, and as participants weight increased so did disturbed eating patterns.

Story, Stevens, Evans, Cornell, Juhaeri, Gittelsohn et. al., (2001) examined dieting, weight perceptions, and self-efficacy for healthy eating habits and engaging in physical activity in American Indian elementary children. Results revealed that 56% of 1441 third, fourth, and fifth grade students reported that they had previously dieted to lose weight and 48% were dieting during data collection. In addition, heavier kids were more likely to select thinner body types as being healthier (Story et. al., 2001). Stevens and colleagues (1999) also reported high percentages of weight-related and body image concerns in fourth-grade, American Indian children ($\underline{n} = 304$). In this study 38% of the participants had previously tried to lose weight, usually by increasing exercise and to a lesser extent by modifying diet. Increasing exercise was the most commonly reported weight-loss technique utilized, indicating that native children associate overweight and lack of exercise; however they may be unaware of additional contributors of obesity, such as eating an "unhealthy" diet. Additionally, children who felt "unhappy" about their weight were more likely to engage in weight-modification techniques. Researchers, however, were unable to assess the impact of body weight on weight-related attitudes in this group. Currently, only one study (Story et. al., 2001) examines weight-related attitudes in relation to BMI in American Indian children, therefore, Stevens and

colleagues state that future research should also examine the relationship between BMI and dieting behaviors in American Indians.

Steinberg and Phares (2001) suggest that parents' weight-related attitudes and behaviors are very influential on their children's views of their bodies. Parents actively make comments regarding weight and engage in their own weight-reduction techniques, which will likely influence their children's ideas of body preference. Body image disturbance demonstrated in mothers was predictive of body image dissatisfaction (Rieves & Cash, 1996) and disordered eating (Attie & Brooks-Gunn, 1989) in their adolescent daughters. Overall, studies indicate that parental influences affect body dissatisfaction in children. Overall, however, the relationship between parental attitudes about weight and shape and children's body image disturbances has not been well-established in the literature (Steinberg & Phares, 2001). In particular, there are no specific studies addressing American Indian parental influences on children's body dissatisfaction.

Present Study Hypotheses

The current work was heavily based on information provided by the PATHWAYS studies (Stevens et. al. 1999a, Stevens et. al., 1999b, Story et. al., 2001). PATHWAYS included 6 American Indian tribes: Pima-Maricopa, Tohono O'dham, Navajo, White Mountain Apache, Oglala Lakota, and Sicangu Lakota. PATHWAYS has supplied a significant amount of information related to variables associated with obesity in American Indian populations, yet Story et al. (2001) clearly reported that because of vast diversity among tribal communities, findings are not representative of all American

Indian youth. Stevens et al, (1999b) reported weight loss attempts and weight-related attitudes were prevalent in American Indian youth. However, authors noted a major concern with the lack of BMI data to indicate how these variables relate to the current obesity epidemic in tribal communities. Story et al. (2001) addressed this concern by examining weight-related attitudes in relation to BMI in American Indian children, yet did not include variable such as sedentary behavior, barriers to physical activity, cultural identity, self-esteem, or emotional eating to assess their influence on child BMI. These variables have also been linked to the obesity developing (Dietz & Gortmaker, 1985; Fontvielle et.al., 1993; King et. al., 2000, Thompson et. al., 2001; Bruch, 1973; Kumanyika, 1993) and should be included when examining this epidemic in American Indian communities. In addition, PATHWAYS did not include parental information, which is a significant factor when studying BMI in children (Troiano & Flegal, 1998; Davis et. al., 1993). As stated above, parents can normalize and even reinforce unhealthy eating habits and inactivity through their own behavior (Fisher & Birch, 2001); therefore, it is expected that such parental variables will be important for increasing our understanding of obesity among American Indian children.

The current study has included weight-related attitudes, as well as, barriers to physical activity, cultural identity, self-esteem, emotional eating, and parental variables as potential predictors of child BMI. This research will add to the existing literature on the relationship between BMI and weight-related behaviors. And, will also supply new information related to additional variables as mentioned above, which may be predictive

of increased BMI in American Indian children. Finally, the current study will examine the obesity epidemic in a less studied native tribe, the Turtle Mountain Band of Chippewa.

It was hypothesized that independent variables entered in 5 blocks: 1) Demographics (gender and SES); 2) Diet and Physical Activity (food choice intentions, knowledge of fatty foods, food self-efficacy, YRBSS, and sedentary activity); 3) Weight related attitudes (body dissatisfaction, attitudes towards body size, and weight loss attempts); 4) psychological/emotional (self-esteem and emotional eating); 5) cultural identity would predict American Indian children's Body Mass Index scores. Specifically, it was hypothesized that each model would explain a significant amount of variance in children's BMI, and furthermore, each model would contribute a statistically significant amount to the variance explained. It was also hypothesized that data from parental reports will be predictive of their child's BMI score.

CHAPTER II

METHOD

Participants

The sample consisted of approximately 291 tribally-enrolled American Indian students from an Ojibway/Chippewa tribe located on the northern plains. Students in grades 3-5 (N=291), attending a school in the reservation school district were recruited to participate in this study. Recruitment efforts were implemented through the school system with the assistance from the local Tribal Diabetes Prevention Program. In addition, a smaller subsample of parents/caregivers (N = 80) were also included in this study. Primary caregivers were identified by their presence at school parent-teacher conferences and consent was obtained prior to or following the conference. School officials report that over 70% of parents attend such conferences.

Materials

The child research packet consisted of: 1) informed assent; 2) a demographic questionnaire; 3) the Knowledge, Attitudes, and Behaviors Questionnaire-Modified (KAB; Stevens, et. al., 1999a); 4) the Physical Activity module of the Youth Risk Behaviors Surveillance Survey (YRBSS); 5) the Emotional Eating subscale of the Dutch Eating Behaviors Questionnaire (DEBQ; Van Strien, Frijters, Bergers, & Defares, 1986); and 7) the Perceived Competence Scale for Children (Harter, 1985).

The parent/caregiver research packet consisted of: 1) informed consent; 2) a demographic questionnaire; 3) the Cultural Identity Subscale of the Native Identity Scale (NIS; Gonzalez & Bennet, 2000); 4) the Exercise and Physical Activity modules of the Behavior Risk Factor Surveillance System (BRFSS); 5) the Knowledge, Attitudes, and Behaviors Questionnaire-Modified (KAB; Stevens et. al., 1999a); 6) the Figure Rating Scale (Stunkard, Sorenson, & Schulsinger, 1983) 7) the Emotional Eating subscale of the Dutch Eating Behaviors Questionnaire (DEBQ; Van Strien et. al., 1986); and 8) the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1962).

Informed Consent/Assent

Participation was confidential, as a subsample of the children were matched to their parents/caretakers information. The subject's name only appeared on the informed consent form (See Appendix A and J); a number was assigned and they were matched to data from the appropriate parent/caretaker. A subsample of parents also received an informed consent for their participation in the study. These forms were secured in a locked file cabinet at the University of North Dakota by the researcher, which ensured security and prevented any association of individuals in this study. On these forms, potential participants were advised of the voluntary nature of this study, the amount of time involved, and the potential risks and benefits of participation. Also included were my name and phone number, my advisors' names and phone numbers, and UND's Institutional Review Board's phone number in case any subject had questions regarding this study.

The informed consent/assent was written in an age appropriate format for child participants, which was reviewed in class. Active consent was used. Parents were informed about the nature of the study and were informed that their child would be included in the study upon receipt of their signed informed consent form. A section on the informed consent was made available for this purpose. Before data collection, all signed and returned informed consents were reviewed, and identified children (those with signed informed consents) were included in the data collection. Monetary compensations in the form of gift certificates were provided to the parents/caregivers ($15.00) and child participants ($10.00) for their participation in the study.

Demographic Sheet

Items on the demographic sheet (See Appendix B and K) assessed the parent's and child participant's background. The child demographic survey established: gender, age, grade, ethnicity, who they live with most of the time, number of siblings, and favorite school activity. An additional question was also included to assess family income by asking the student if their family receives food stamps and/or commodities. The parent/caretaker demographic survey established: gender, age, relationship to child in study, ethnicity, marital status, living arrangement, number of persons living in their home, level of education, employment status, annual household income, federal assistance through food programs, height and weight, and birth weight of their child or children participating in the study. Demographics provided information regarding the general demographic characteristics of the sample. Gender and SES were examined as predictors of BMI.

Criterion Measures

Body Mass Index

Body Mass Index (BMI) is one of the most popular forms of assessment used to identify obesity and has been used in several epidemiological studies assessing the relationship between weight and disease (Field et. al., 2002). The BMI is a relatively easy and reliable form of assessment (James, Ferro-Luzzi, & Waterlow, 1988; Rosner, Prineas, Loggie, & Daniels, 1998). Weights and heights of the child participats in this study were directly measured by staff from the Tribal Diabetes Prevention Program. To obtain an estimate of a participant's BMI, their weight (in kilograms) was divided by their height (in meters) squared (Field et. al. 2002). The derived score was then compared to the ideal BMI for their age group to determine weight status derived from percentiles established by Must, Dallal, and Dietz, (1991). BMI scores provided by the Tribal Diabetes Prevention Program were recalculated for accuracy check. According to the World Health Organization and the National, Hearth, Lung, and Blood Institute, the following BMI scores can be classified as follows: 18.5-24.9 (normal weight); 25-29.9 (overweight); $\geq$ 30 (obese); $\leq$ 18.5 (underweight). Overweight is also defined as an individual BMI exceeding the 95th percentile for the participant's age, sex and height, while at risk for being overweight is between the 85th and 95th percentiles, healthy weight is between 5th and 85th percentiles, and underweight is less than 5th percentile (Must, et. al., 1991). The Hannan, Wrate, Crowen, and Freeman (1995) reported that the BMI is the easiest and most reliable method for assessing body fat. In order to assess parental BMI scores, self-report was utilized. On the demographic sheet, parents/caretakers were asked

to include their current height and weight. BMI scores were categorized based the World Health Organization and the National, Heart, Lung, and Blood Institute recommendations for parents.

The Tribal Diabetes Prevention Program had a protocol that they followed in order to notify parents about their child's BMI status. The program collaborated with the school nurse and letters were mailed out to parents informing them that their child is overweight or at risk for becoming overweight. Parents were encouraged to contact the Tribal Diabetes Prevention Program for further information regarding treatment options provided through their program.

Predictor Measures

Demographics

Gender and SES. Gender was indicated by gender selected by the child on the questionnaire inquiring about body image. In addition, gender was checked against name on informed consent before separating the informed consent forms from the research packet, for a small portion of children circled items on both male and female silhouettes. Socioeconomic status was assess by asking the children two questions: 1) Does your parents get a monthly EBT food stamp card (Yes =1, N = 0); 2) Does your family get monthly commodities (Yes =1, No = 0). The response provided for the two questions were added to provide a total score.

Diet and Physical Activity

Diet. Diet was assessed using a variety of measures abstracted from the *Knowledge, Attitudes, and Behaviors Questionnaire* (KAB; Stevens et. al., 1999a) (See

Appendix E): 1) *Food Choice Intention; 2) Nutritional Knowledge; 3) Food Self-Efficacy.* The KAB, in its entirety, is a questionnaire that has been developed to assess knowledge, attitudes, and behavior associated with diet and physical activity in American Indian children in grades 3-5. The readability of the KAB was evaluated at a 2nd grade level to ensure that elementary students would be able to comprehend materials. There are several dimension included in the KAB survey, which include assessment of physical activity, diet, weight-related behaviors, body image, and cultural identity. Stevens and colleagues originally administered the KAB to a group of 32 third-, fourth-, and fifth-grade American Indian students for pretest evaluation. Several items were deleted or reworded according to responses of pretest group, and a final version was derived. Test-retest reliability and internal consistency was examined in 371 fourth-grade, American Indian children and suggested that the test was a reliable measure of knowledge, attitudes, and behaviors associated with physical activity and diet in elementary school-age, American Indian children. Several tribal members were asked to review items on the measure throughout its development to ensure cultural appropriateness of the instrument.

In order to examine food choice intention and knowledge about nutritional value of food, the food choice intention and knowledge of fatty food section of the KAB questionnaire was utilized in this study, which was presented in pictorial format. The child were presented with two different food items (e.g., one item higher in fat in sugar content) and asked to select the food item that they would prefer to eat. This allowed an age-appropriate format for selecting food preference. Healthy food choices were awarded a score of 1 and unhealthy selections a score of zero, as noted in previous work (Story et.

al., 2001). Knowledge about nutritional value of food was assessed using a similar pictorial method. Children were instructed to identify which presented food contains more "fat." Children were awarded one point for correct response and zero points for incorrect and "don't know" responses. Food self-efficacy is an 8-item measure ($\alpha = 0.46$) to assess children's perceived ability to select healthy food items. Items were summed to obtain a total food self-efficacy score, with higher scores indicating greater food self-efficacy (i.e., more confidence in self to select foods lower in fat and sugar).the food choice intention and knowledge of fatty food section of the KAB questionnaire was utilized in this study, which was presented in pictorial format. The child were presented with two different food items (e.g., one item higher in fat in sugar content) and asked to select the food item that they would prefer to eat. This allowed an age-appropriate format for selecting food preference. Healthy food choices were awarded a score of 1 and unhealthy selections a score of zero, as noted in previous work (Story et. al., 2001). Knowledge about nutritional value of food was assessed using a similar pictorial method. Children were instructed to identify which presented food contains more "fat." Children were awarded one point for correct response and zero points for incorrect and "don't know" responses. Food self-efficacy is an 8-item measure ($\alpha = 0.46$) to assess children's perceived ability to select healthy food items. Items were summed to obtain a total food self-efficacy score, with higher scores indicating greater food self-efficacy (i.e., more confidence in self to select foods lower in fat and sugar).

To assess food preference, knowledge of fatty foods, and food self-efficacy in parents/caretakers the same questions and food items from the KAB questionnaire were

utilized, however they were written instead of pictorial format (See appendix N). This allowed for direct comparison between parental food choice intentions and food knowledge and their child's food choice intention and knowledge about food. In addition, three questions were included to assess food frequency and are as follows: 1) at school for breakfast I will go up for seconds; 2) at school for lunch, I will go up for seconds; and 3) during the week, I go out to east in a restaurant or get fast foods. All items were answered as always, sometimes, or never. The items were summed to provide a total food frequency score; however, food frequency was not included in the final analyses.

Physical Activity. Eight-items assessing physical activity were extracted from the *Youth Risk Behavior Surveillance Survey* and were used to examine activity level in child participants (YRBSS; Center for Disease Control and Prevention, 1999) (See Appendix D). The YRBSS is a widely used measure for the assessment of health-related behaviors in young people (e.g., smoking, diet, and exercise). The YRBSS was developed by the Centers for Disease Control and Prevention (CDC) in the early 90's to monitor health risk behaviors that were contributing to death, disease, and social problems for American's youth. One such risk that was identified during development was inadequate physical activity in adolescent groups. To further assess this issue, the YRBSS included eight-items pertaining to exercise and physical activity such as the amount of time one engages activity and inactivity. The YRBSS provides comparable national, state, and local data, which will allow for comparison between activity levels in American Indian participants and other populations. Brener, Kann, McManus, Kinchen, Sundberg, & Ross (2002)

assessed the reliability of the YRBSS in a group of 4619 white, black, and Hispanic students and indicated that overall, students were reliable reporters of health risk behaviors over time. Three items of the YRBSS were utilized in the current study to determine level of physical activity within the last 7 days: 1) how many days did you exercise or participate in physical activity for at least 20 minutes that made you sweat and breath hare, such as basketball, soccer, running, swimming laps, fast bicycling, fast dancing, or similar type of hard exercise; 2) How many days did you participate in physical activity for at least 30 minutes; 3) How many days did you do exercise to strengthen or tone your muscles, such as push-ups, sit-ups, or weightlifting? To obtain a total subscale score for physical activity, the three items were summed and divided by total number of items. In addition, to assess sedentary behavior, one item from the YRBSS was utilized (On a regular day after school, how many hours to you watch TV?).

To assess physical activity in parents/caregivers, the exercise and physical activity modules of the *Behavior Risk Factor Surveillance System* was used (BRFSS; Center for Diseases Control and Prevention (CDC), 2002) (See appendix M). The BRFSS was developed by the CDC in 1984 to monitor the prevalence of significant health risks among adults 18 years of age and older that were associated with morbidity or mortality. The BRFSS is largely used in the U.S. to track health related behaviors, including the major health concern of unhealthy national levels of inactivity. The BRFSS provides state-to-state comparisons of health related behavior. One question on the BRFSS was utilized in this study to examine level of moderate activity within 7 days: 1) How many days per week do you do moderate activities in a week? In addition, to assess sedentary

behavior, parents were asked to report hours of screen time (e.g., computer, television viewing, video games) during an average weekday and weekend day.

Barriers to Physical Activity. In addition to YRBSS physical activity items, questions from the *Weight and Lifestyles Inventory* (WALI; Wadden & Foster, 2001) pertaining to physical activity preference, and participants were provided with multiple forms of physical activity as follows: walking, riding bike, swimming, running/jogging, basketball, dancing, football, and other. Following was one question assessing participation in their favorite activity within past week (i.e., for the activity that you like most, how many time have you participated in this activity in the past week?). And, an additional question related to personal and environmental barriers to physical activity participation. Barriers to physical activities for parent/caretaker participants were assessed in the same format as with child participants. Participants were instructed to identify the main barrier to physical activity limiting their participation. Barriers were dichotomized into no barriers identified (coded 1) and barriers identified (coded 2). These questions helped to identify potential sociocultural barriers that may be associated with inadequate physical activity in American Indian communities.

Weight-Related Attitudes

Body Dissatisfaction. Body image refers to an individual's mental picture about his or her body size and appearance, and his or her emotional response to this perception. A common method of assessment is to simply ask participants to identify their current ideal body size and their actual body size from a group of various body silhouettes. The participant's actual size is a reflection of what they perceive their current size resembles

and corresponds to the identified silhouette. Their ideal body image corresponds to the silhouette that they most desire or prefer to resemble. The discrepancy between their actual body size and their preferred body silhouette was used as an index of body dissatisfaction. Body contours included in the *Knowledge, Attitudes, and Behaviors Questionnaire* was used to assess body image dissatisfaction in children (KAB; Stevens et. al, 1999a) (See appendix H). This scale consisted of eight contour drawings that have been adapted to resemble American Indian children and range from very underweight to very overweight. Each body silhouette was identified with a letter (A-H) to assist with identification of particular body types. Participants were instructed to complete three questions pertaining to body image: 1) which image shows the size that you think is most healthy; 2) which image shows the size that you think you are; 3) which image would you most like to look like? Following each question was a list of letters that correspond to their figure selections, and they were instructed to simply circle a letter(s) that identifies their selected silhouette pertaining to each question. The first question provides information based on the child's perception of what is considered a healthy size, and the last two questions provide information that was used to identify level of body dissatisfaction. The same scale was included in the parent's research packet, however questions only inquired about which image is the healthiest for each gender (See appendix Q). In order to assess the healthiest body image, participants could identify more than one silhouette, resulting in taking the mean score if more than one silhouette was selected.

In order to assess parental body dissatisfaction, the *Figure Rating Scale* was used (FRS; Stunkard, Sorenson, Schulsinger, 1983) (See appendix S). The FRS is a measure that is commonly used in the eating disorder literature to identify body dissatisfaction. The scale includes 9 body contour drawings each varying in size, with a range from very underweight to very overweight. Parents/caretakers were instructed to circle the person that corresponds to their "ideal" size and to mark an "I" beside it. In addition, they were asked to circle the figure that most resembles their current size and to mark a "C" beside it. The discrepancy between their "ideal" body size and their "current" body size was used as an index of their level of body dissatisfaction. Thompson & Albate (1991), reported the FRS test-retest reliability for self-perception" and "self-ideal" were .83 and .71, respectively.

Additional questions pertaining to weight-related attitudes taken from the KAB were also included (Stevens et. al., 1999a) (See Appendix I). The questions assessed attitudes towards body size and dieting behaviors, which provided additional information on severity of body image dissatisfaction. As mentioned earlier, the questions were simplified to be age appropriate for 3rd, 4th, and 5th grade students. A Cronbach's alpha of .57 was reported. In a recent study of weight-related attitudes among American Indians Stevens et al. (1999b) found that most children understood the questions and were able to supply appropriate information regarding their shape, weight, and dieting techniques. Parent's weight-related attitudes were assessed with the same scale (See appendix R).

Attitudes Towards Body Size. As indicated in previous studies (Stevens et. al. 1999) attitudes towards body size were measured by compiling three questions identified

on the KAB questionnaire (Stevens et. Al., 1999a) related to body image. To get a total score for attitudes toward body size the following three items were summed: 1) do you think you are too skinny, about right, or too fat; 2) would you like to be skinnier than you are right now; and 3) how do you feel about your weight? Parental attitudes towards body size were calculated in the same manner (See appendix R).

Attempted Weight Loss. To assess level of attempted weight loss, 6 dichotomous items were selected from the weight related attitudes sections of the KAB questionnaire, as performed in a previous study (Story, Stevens, Evans et. al., 2001). The questions are as follows: 1) Have you ever tried to lose weight; 2) Are you now trying to lose weight; 3) I changed what or how much I ate to lose weight; 4) I exercised more to lose weight; 5) I skipped a whole meal to lose weight; 6) I went for a whole day without eating to lose weight. Parental weight loss attempts were also assessed with the weight-related and behaviors section of the KAB questionnaire (Stevens et. al., 1999a) (See appendix P) and total scores were derived in the same manner (e.g., sum of responses of 6 dichotomized items).

Psychological/Emotional

Emotional Eating. The *Dutch Eating Behaviors Questionnaire* (DEBQ: Stien, et. al., 1986) is a 46-item measure that identifies three specific patterns of eating: (1) restrained eating (10-items); (2) emotional eating (26-items); and (3) external eating (10-items). All three subscale have high internal consistency (r = .80) and also have high factorial validity as indicated by the following Cronbach's alpha for each emotional eating subscale: .94 (13-item), .93 (9-item), and .86 (4-item).

Factorial validity results have suggested the presence of two main dimensions to emotional eating: eating in response to diffuse emotions, and eating in response to clearly labeled emotions. The emotional eating scale can then be given in order to assess each independently or in combination by administering it via one of three versions: (1) emotional eating-diffused and labeled (13-items); (2) emotional eating-diffused (9-items); or emotional eating-labeled (4-items). The 13-item and 4-item emotional eating subscales were administered to 729 and 763 obese and nonobese males and females, respectively. Correlation coefficients for each item on the 13-item scale were greater than .56, and correlations for the 4-item version revealed coefficients greater than .64.

In the proposed study, the 13-item emotional eating subscale that measures both diffused and clearly labeled emotional eating situations which will be included in the parent/caretaker research packet (see appendix F and O), while the 4-item emotional eating subscale that identifies clearly labeled emotional eating states will be included in the child research packet (see appendix F and O). To obtain emotional eating score, the sum scores were divide by the number of items in the scale.

Self-esteem. The *Self-Perception Profile for Children* (SPPC; Harter, 1985) is a 36-item self-report questionnaire that is designed to tap five competence domains: Scholastic Competence, Social Acceptance, Athletic Competence, Physical Appearance, Behavioral Conduct, and one Global Self-Worth domain (see appendix G). The SPPC is appropriate for children in grades third through sixth. The SPPC is designed to identify children's "domain-specific-judgments of their competence," and also tap into their "global perceptions of the esteem as a person." The SPPC contains two columns, with

two different reactions to a certain situation. The children are provided with instructions on how to complete the SPPC. First, they are asked to identify which of the two columns describes them. Secondly, once they have selected a column, they are instructed to check one of the two provided boxes that state whether the person in that situation is "A lot like Me" or a "Little Like Me." The instructions state that only one box of the four boxes provided should be marked. The items are scored between 1 and 4, with 4 representing the most adequate self-judgment and 1 representing the least adequate self-judgment. Items on the SPPC are counterbalanced. Internal consistency, as represented by Cronbach's alpha, were acceptable. Reliability testing for each subscale was conducted with four samples and Cronbach's alphas are as follows: Scholastic Competence ($\geq$ .80), Social Acceptance ($\geq$ .80), Athletic Competence ($\geq$.80), Physical Appearance ($\geq$ .76), Behavioral Conduct ($\geq$ .77), Global Self-Worth ($\geq$.78) (Harter, 1985). For the purpose of this study, the Global Self-Worth (GSW) scale was utilized, which includes the following six items: 6, 12, 18, 24, 30, and 36. To obtain a GSW score, the items were summed and divided by the number of items comprising the GSW subscale.

The *Rosenberg Self-Esteem Scale* (RSE; Rosenberg, 1979) is a brief 10-item questionnaire measuring one domain of "self-esteem" (see appendix and P). Though originally designed for high school students it has been successfully used with other groups, including adults. The RSE is a commonly used research instrument and has been been cited in several studies examining body image and eating disorders (Thompson & Heinberg, 1993). Excellent internal consistency of the RSE has been reported, with a .92 Guttman scale coefficient. Test-retest data also indicate excellent reliability with two

tests showing coefficients of .85 and .88. The concurrent, predictive, and construct validity of the RSE has also been demonstrated in several studies (Mautner, Owen, Furnham, 2000; Thompson & Heinberg, 1993). In addition, the RSE highly correlates with other well established self-esteem inventories (i.e., Coopersmith Self-Esteem Inventory) (Fischer & Corcoran, 1994). Furthermore, predictive correlations between RSE scores on measures of anxiety, depression, and peer-group reputation (Fischer & Corcoran, 1994) have also been reported. The RSE was included in the parents/caretakers research packets to assess self-esteem in this group. To obtain a mean score, the item were summed and divided by total number of items comprising the RSE.

Culture

Cultural Identity. The *Cultural Identity Scale* is a seven-item survey included in the *Knowledge, Attitudes, and Behaviors* questionnaire and will be used to assess level of ethnic identity among child participants (KAB; Stevens et. al., 1999a, 1991b) (See appendix C). The cultural identity scale of the KAB was developed in collaboration with American Indian tribal members and focuses primarily on concepts that young children can comprehend such as self-identification and ethnic involvement. Because the construct of ethnic identity is complex, many of the items included in the KAB ethnic identity scale focus on concrete behaviors (e.g, language and activities). Each question has a score value of 0 or 1 and the sum ranges from 0-7, with a median score of 3. Cultural identity score categorizations are as follows: 0 to 2 (low), 3 to 5 (medium), and 6-7 (high). Cronbach's alpha was reported at 0.6, and test-retest correlation was 0.7 (Stevens, et. al., 1999b).

To assess cultural identity in parents a portion of the *Native Identity Scale* (NIS) was used (Gonzalez & Bennett, 2000) (See appendix L). The NIS is a 25- item survey, which assesses four main dimensions of Native identity: Centrality subscale (pride in Native identity) (9 items); Humanistic (similarities of non-Natives and Native regardless of ethnicity) (7 items); Public Regard (perceptions of how non-Natives view Natives) (4 items); and Oppressed Minority (recognition of other oppressed groups) (5 items). A 7-point Likert format anchored by (7) strongly agree and (1) strongly disagree is used to assess participant's views. Scores for each subscale can be obtained by summing response values and dividing by total number of questions to derive the mean for each of the four factors. Alphas, as assessed by Cronbach's alpha, were .83 for the overall scale, .80 for Centrality, .64 for Oppressed Minority, .49 for Humanist, and .48 for Regard subscale. In addition, the scale includes four items that assess cultural identity by inquiring about involvement in cultural activities. The items assessed tribal identification, number of non-Native friends, and participation in traditional activities. For the purpose of this study, the author of this measure (J. Gonzalez, personal communication, May 15, 2003) recommended including only the four items assessing culture identity: 1) how often do you attend Native American Religious Ceremonies; 2) How often do you attend Native American celebrations; 3) What powwow activities do you participate in; 4) Can you speak and understand the Mitchif/Ojibway language. In addition, two items of interest from the KAB Cultural Identity Scale were also included: 1) do you gather wild berries; 2) Do you hunt or fish? To obtain a total Native Identity score, the six items were summed, with a range of 0-15.

Procedures

After securing approval from the Institutional Review Board (IRB) and tribal officials, primary recruitment effort consisted of recruiting participants from a school located in the reservation school district. School officials were notified about the study and asked to participate. Collection of BMI scores and completion of research packets took place during school hours. Collection of BMI scores was completed in collaboration with the Turtle Mountain Tribal Diabetes Prevention program and active consent was used. Along with the collection of heights and weights for BMI calculations, the children were asked to complete a research packet (estimated time to complete was 60 minutes) during a regularly scheduled health period. Questionnaires were designed in a simple format and were appropriate for 3-5 graders. Prior to administration of packets, a small pilot study was completed to assess the appropriateness of research packets in this sample. A small sample of elementary teachers (n=4) were asked to review the research packets to assess the readability of the questionnaires and to ensure that 3-5 grade students were able to comprehend the material. Questionnaires were modified based on teacher panel recommendations. The content of the questionnaires were not altered, and only minor modifications (e.g., adding detailed instructions to the SPPC self-esteem scale and adding a kid friendly title to the research packet) were recommended by teaching staff. Teachers were compensated with a $50.00 gift certificate for their time. Following pilot testing, students were identified by signed informed consents (N=291), and asked to complete the research packet. Turtle Mountain Elementary 3rd through 5th grade teaching staff administered the research packet during a regularly scheduled health class. The

teaching staff presented the material orally item-by-item for the entire class, while students were responsible for filling in the questionnaires. Participating teachers were provided with $25.00 gift certificates for their assistance with this project. The teachers were not able to view any of the student's responses. In addition, to ensure confidentiality, teachers were instructed to provide students with privacy folders or arrange the classroom as they would for a testing situation. The principle investigator was available in the school system to answer any questions and collected completed research packets. Students, who did not supply a signed informed consent form, were provided with reading material related to health. Their classroom teacher assigned the educational materials. Students were assigned identification numbers to maintain confidentiality and records of BMI scores and completed research packet were stored in a locked cabinet at the University of North Dakota

A small sample of parents/caregivers were also recruited through the Turtle Mountain school system (n =101). The primary recruitment took place during an end-of-semester report card day. The PI was available and recruited parents prior to or following their conference with their child's teacher. Parents/caretakers were asked if they would like to participate in the study and if they had time to complete the packet before they left the school. They were asked to review and sign the informed consent before completing the research packet. An area was designated for parents to complete the questionnaires and the principle investigator was available to answer question related the survey. Turtle Mountain Elementary school officials reported that over 70% of parents attend report card day. Teachers in grades 3, 4, and 5 were also asked to supply parents with informed

consent for their child's participation in the study. Parents who consented to participation were instructed to leave the informed consent with the teacher, which were later supplied to the PI. Informed consent forms were also sent home with students, whose parents were absent from parent-teacher conferences, therefore all students in grades 3-5 had the opportunity of participating. Signed informed consents were returned to their teachers, and PI would periodically collect informed consents from participating classrooms.

Data Analyses

All completed questionnaires were coded and entered into the computer. All items were labeled for reliability check. In addition, 15% of the questionnaires were randomly selected and reentered for accuracy checks. SPSS 11.0 was utilized to analyze the data. Descriptive statistics were conducted on all variables. Such statistics provided mean scores, standard deviations, frequencies, and/or percentages for each of the demographic and questionnaire variables. After examining descriptive statistics, two multiple regressions were conducted. In addition, bivariate correlations were conducted to examine the relationship between variables.

1) First, a hierarchical multiple regression was constructed to examine the predictive power of 5 blocks of independent variables: 1) Demographics (gender and SES); 2) Diet and Physical Activity (food choice intentions, knowledge of fatty foods, food self-efficacy, YRBSS, and sedentary activity); 3) Weight related attitudes (body dissatisfaction, attitudes towards body size, and weight loss attempts); 4) psychological/emotional (self-esteem and emotional eating); 5) cultural identity on American Indian children's Body Mass Index (BMI) scores.

2) Second, a simultaneous multiple regression was conducted to observe the predictive power of parental/caretakers characteristics, attitudes, and behaviors on children's Body Mass Index (BMI) scores.

In addition, bivariate correlations were conducted to examine the strength and direction to child BMI scores covaried with items on parent's questionnaires in order to examine patterns of convergence and disparities between the two sets of variables.

CHAPTER III

RESULTS

An Overview of the Analytic Plan

In the first group of analyses descriptive statistics were generated to examine the nature and characteristics of the two samples in this study (children and parents/caretakers). In the second group of analyses bivariate correlation analyses were conducted to determine the strength and direction of relationships between groups of selected variables. The third group of analyses consisted of a series of multiple regressions conducted to examine predictors of children's BMI. These analyses were structured hierarchically to investigate the contributions of the following five blocks or sets of predictor variables: (a) demographic variables (i.e., gender and SES), (b) food selection and physical activity measures (i.e., food choice intention, knowledge of fatty foods, food self-efficacy, physical activity, and sedentary behavior), (c) attitudes about body size (i.e., body dissatisfaction, attitudes toward body size, attempted weight loss), (d) emotional eating variables (i.e., self-esteem and emotional eating), and (e) cultural identity. Finally, a simultaneous multiple regression was conducted on a pre-selected set of parental/caretaker variables (adult/caretaker BMI, birth weight of 1st child, and parent/caretaker body dissatisfaction) to assess their relationship to the dependent variable (child BMI).

Descriptive Analyses

Demographic Characteristics in Child Sample

Participants (N=291) in this sample were girls (n=153) and boys (n=137) in grades 3 through 5. Two children failed to report their gender. The largest number of participants were in 5th grade (37%) followed by 4th grade (36%) and 3rd grade (27%). Participants ranged in age from 8 to 12 years old, but 40% of the sample was 10 years of age. The majority of participants (155 or 53%) reported living with mom and dad, while 25% reported living with mom only, 8% reported living with grandparents, 8% reported living with dad only, and 3% reported living with foster parents. Participants reported having between 0 and 13 siblings with the average number being 3.64. All of the participants reported being American Indian, and 43% referred to themselves as "Chippewa;" however, another 43% reported that they did not know their tribal affiliation. The majority of participants (53%) reported that their parent(s) receive a monthly Electronic Benefits Transfer (EBT) food stamp card, 24% said their parent(s) do not receive EBT food stamps, and 23% said that they did not know if their parents received monthly EBT. See table 1 for more information regarding these descriptive analyses.

Table 1. Descriptives: Child Demographics

Characteristic	***n***	***M***	***SD***	***%***
Age	290	9.80	.950	
Gender				
Male	137			47.0
Female	152			53.0
Grade				
3	79			27.0
4	105			36.0
5	107			37.0

Table 1. Continued

Characteristic	*n*	*M*	*SD*	%
Living arrangement				
Mom & Dad	155			53.0
Mom	74			25.0
Dad	22			8.0
Grandparents	24			8.0
Other	9			3.0
Fosterparents	7			2.0
Siblings	288	3.64	2.41	
Ethnicity				
American Indian	291			100
What do you call yourself				
Chippewa	124			43.0
I don't know	123			43.0
Mitchif	21			7.0
Sioux	9			3.0
Ojibway	7			2.0
Metis	2			1.7
Anishanabe	3			1.0
Monthly EBT				
Yes	155			53.0
No	69			24.0
I don't know	67			23.0
Commodities				
Yes	127			44.0
No	113			39.0
I don't know	49			17.0
Favorite after school activity				
Playing sports	132			46.0
Playing video games	57			20.0
Other	44			15.0
School clubs	29			10.0
Watching TV	27			9.0

Physical Characteristics in Child Sample

Thirty-two students were missing data pertaining to their BMI and their acanthosis nigricans status, resulting in 259 students with measured and calculated BMI scores, category, and acanthosis nigricans status. Participants averaged 55.60 inches in height

and 97.94 pounds in weight. BMI scores ranged from 14.20 to 41.20 with a mean of 21.68 and a standard deviation of 4.75. BMI scores were used to classify participants as underweight (1%), normal or healthy weight (40%), at risk for becoming overweight (17%) or overweight (28%) using standards developed by Must et. al., (1991). Finally, 9% of participants tested positive for Acanthosis Nigerians. See table 2 for more information regarding these descriptive analyses.

Table 2. Descriptives: Child Physical Characteristics

Characteristic	***n***	***M***	***SD***	*%*
Height	259	55.60	3.12	
BMI scores	259	21.70	4.75	
BMI Category				
Healthy	122			47.0
Overweight	85			33.0
Risk overweight	51			20.0
Underweight	1			0.4
Acantosis Nigricans				
Negative	233			81.0
Positive	26			9.0

Diet in Child Sample

In relation to food choice intentions the majority of participants selected the healthier food item for five of the eight food pairs. Pretzels were chosen over potato chips by 62% of the sample; cold cereal was chosen over eggs and bacon by 55% of the sample; a regular-size hamburger was chosen over an extra-large hamburger by 71% of the sample; a bag of oranges was chosen over a bag of tortilla chips by 70% of the sample; and toast without butter was chosen over a donut by 70% of the sample. Conversely, corn with butter was chosen over corn without butter by 95% of the sample;

regular pop was chosen over diet pop by 52% of the sample; and ice cream was chosen over a popsicle by 56% of the sample (see table 3).

In general, participants demonstrated adequate knowledge about fatty food choices. Specifically, the majority of participants (61%) knew that fried meat was generally fattier than grilled meat (23%); corn with butter (75%) has more fat than corn without butter (12%); fried potatoes (69%) have more fat than boiled potatoes (16%); potato chips (72%) have more fat than pretzels (15%); and fried eggs (80%) contain more fat than cold cereal (9%). Finally, more participants (43%) chose fry bread as having more fat than tortillas (25%) (see table 3).

Table 3. Descriptives: Child Diet

Character	***n***	***M***	***SD***	***%***
Food Choice Intentions	286	3.88	1.80	
Pretzels	179			62.0
Potato Chips	111			38.0
Corn w/butter	289			95.0
Corn w/o butter	5			5.0
Ice Cream	163			56.0
Popsicle	127			44.0
Cold Cereal	159			55.0
Eggs & Bacon	130			45.0
Regular hamburger	204			71.0
Extra big hamburger 85			29.0	
Bag of oranges	202			70.0
Bag of tortillas	88			30.0
Toast no butter	202			70.0
Donut	88			30.0

Table 3. Continued.

Character	*n*	*M*	*SD*	%
Regular pop	149			52.0
Diet pop	140			48.0
Knowledge of Fatty Foods	291	4.00	1.53	
Fry Bread	126			43.0
Don't know	91			32.0
Tortilla	71			25.0
Fried Meat	177			61.0
Grilled Meat	65			23.0
Don't know	47			16.0
Corn w/butter	216			75.0
Don't know	38			13.0
Corn w/o butter	35			12.0
Fried Potato	200			69.0
Boiled Potato 47			16.0	
Don't know	43			15.0
Fried eggs	231			80.0
Don't Know	31			11.0
Cold cereal	28			9.0
Pretzels	43			85.0
Chips	209			72.0
Don't know	37			13.0
Food Self-Efficacy	283	7.21	2.27	

Physical Activity in Child Sample.

Participants reported that their favorite after-school activity was playing sports (46%), playing video games (20%), participating in school clubs (10%), or watching television (9%). Students reported engaging in vigorous activity an average of 4.70 days per week, moderate activity 4.61 days per week, and strength training 4.08 days per week. The majority of participants reported in the following forms of physical activity:

basketball (62%), biking (60%), jogging (54%), swimming (51%), walking (46%), football (34%), and dancing (28%). Several participants reported that various "barriers" interfered with their engaging in physical activity. The most common barrier reported was not having a ride to the fitness center (21%). The remainder of students endorsed the following reasons for not engaging in physical activity: I don't feel safe on the bike path because there are no leash laws (18%); they (activities) are not here for me to do (14%); I'm too tired (10%); and I don't like my body (3%). Finally, participants reported watching television: more than five hours a day (12%), four hours per day (8%), three hours per day (12%), two hours per day (19%), one hour per day (23%), less than 1 hour per day (19%) and 8% did not watch television at all. (see Table 4).

Table 4. Descriptives: Child Physical Activity

Characteristic	***n***	***M***	***SD***	***%***
YRBSS Total	288	2.99	1.79	
Vigorous Activity	290	3.83	2.38	
Moderate Activity	290	1.85	2.28	
Strength Training	290	3.29	2.31	
Favorite PA				
Basketball	178			61.0
Biking	173			60.0
Jogging	157			54.0
Swimming	146			50.0
Walking	133			46.0
Football	98			34.0
Dance	80			28.0
PA in past week	284	4.84	7.32	
Barriers to PA				
No ride	61			21.0
Not here for me to do	39			14.0
Don't feel safe	51			18.0
I am too tired	28			10.0
I do not like my body	7			3.0

Table 4. Continued.

Characteristic	*n*	*M*	*SD*	%
Sedentary Behavior	289	3.75	1.77	
1 hour per day	67			23.0
>1 hour per day	55			19.0
2 hours per day	54			19.0
3 hours per day	34			12.0
<5 hours per day	33			12.0
No TV	24			8.0
4 hours per day	22			8.0

Weight-Related Attitudes in Child Sample

Attitudes towards body size revealed that the majority of participants (70%) believed that their body was "just right," while 23% believed they were "too fat," and 7% believed they were "too skinny." Similarly, 68% reported that they were happy with their weight or never think about it, while 32% reported being unhappy with their current weight. Despite these attitudes, 51% of participants reported that they would like to be skinnier than they are now and only 49% reported being satisfied with their current weight. Similarly, 58% of participants reported trying to lose weight in the past, and 41% reported currently trying to lose weight. The following weight loss methods were reported by participants: changed diet (54%), exercised more (61%), skipped a whole meal (26%), and skipped meals for entire day (15%) (see Table 5).

Table 5. Descriptives: Child Weight-Related Attitudes

Characteristic	*n*	*M*	*SD*	%
Healthy Body Size	289	3.80	1.50	
Male	137	3.96	1.43	
Female	153	3.61	1.55	
Body Dissatisfaction	288	.84	1.43	
Male	137	.57	1.37	
Female	151	1.09	1.45	

Table 5. Continued.

Characteristic	*n*	*M*	*SD*	%
Attitudes Towards Body Size	289	1.16	1.19	
Too Skinny	19			7.0
Male	7			5.0
Female	12			8.0
Just Right	202			70.0
Male	101			78.0
Female	101			66.0
Too Fat	69			23.0
Male	29			21.0
Female	40			26.0
Would you like to be skinnier				
Yes	147			51.0
Male	56			40.0
Female	92			60.0
No	140			49.0
Male	79			58.0
Female	61			40.0
How do you feel about current weight				
Happy	195			68.0
Male	99			72.0
Female	97			63.0
Unhappy	93			32.0
Male	38			28.0
Female	55			36.0
Weight Loss Attempts	256	2.46	1.92	
Ever tried to lose weight				
Yes	167			58.0
Male	79			58.0
Female	89			58.0
No	120			42.0
Male	57			42.0
Female	63			41.0
Now trying to lose weight				
Yes	117			41.0
Male	51			
Female	66			
No	167			59.0
Male	84			61.0
Female	83			54.0

Table 5. Continued.

Characteristic		*n*	*M*	*SD*	%
Changed diet					
Yes		123			54.0
	Male	48			35.0
	Female	75			49.0
No		146			46.0
	Male	76			56.0
	Female	70			46.0
Exercised more					
Yes		165			61.0
	Male	79			58.0
	Female	86			56.0
No		105			39.0
	Male	48			35.0
	Female	57			37.0
Skipped whole meal					
Yes		68			26.0
	Male	37			27.0
	Female	31			20.0
No		197			74.0
	Male	85			62.0
	Female	112			73.0
Whole day w/o eating					
Yes		39			15.0
	Male	24			18.0
	Female	15			10.0
No		225			85.0
	Male	96			70.0
	Female	129			84.0

Psychological/Emotional and Cultural Identity in Child Sample

The average score for child emotional eating was 2.12 with a possible range of 0-12. Self-esteem score for children in this sample averaged 3.00 on the Global Self-Worth subscale of the Perceived Competence Scale (Harter, 1985). And, the average score for cultural identity for children in this sample was 2.45 with a possible range of 0-7 (see Table 6).

Table 6. Descriptives: Child Psychological/Emotional and Cultural Identity

Characteristic	*n*	*M*	*SD*	%
Psychological/Emotional				
Emotional Eating	290	2.12	1.54	
Self-Esteem				
Global Self-Worth	273	3.00	.74	
Cultural Identity	290	2.54	1.69	

Demographic Characteristics in Parent/Caretaker Sample

The total sample of parent/caretaker participants (N=101) was reduced to 80 (67 females and 13 males) because of missing data or the inability to match parents with children in the other sample. The majority of participants in this sample were biological parents (86%), with the remaining participants being stepparents (5%), adoptive parents (4%), grandparents (3%), guardians (1%), and foster parents (1%). The majority of participants in this sample (55%) were married, while 32% were single, 8% were divorced, 4% were separated, and 1% were widowed. The majority of participants in this sample (55%) lived with a spouse/partner, while 30% lived only with their children, 9% lived with a significant other, 5% lived alone, and 1% lived with relatives. The majority of parents/caretakers were American Indian (99%), while 1% reported being White. The majority of parents/caretakers (72%) referred to themselves as "Chippewa," while the remaining reported being "Mitchif," (17%), "Sioux," (4%), "Metis" (3%), "Ojibway," (1%), "Anishanabe," (1%), "Three Affiliated," (1%), and "Three Nations" (1%) (see table 7).

A substantial proportion of parents/caretakers (25%) had a college degree, while 47% had some college, 18% had a high school education, and 9% had less than a high school education. The majority of participants (72%) were employed for wages, while

9% were students, 4% were homemakers, 4% were self-employed, 4% were unemployed for more than one year, 4% were unable to work, 3% were retired, and 1% were unemployed for less than one year. Annual household income dispersion in this sample was as follows: $20,000-$30,000 (23% of parents/caretakers); $10,000-$20,000 (20% of parents/caretakers); less than $10,000 (15% of parents/caretakers); $40,000-$50,000 (14% of parents/caretakers); $50,000-$60,000 (9% of parents/caretakers); $60,000-$70,000 (6% of parents/caretakers); and more than $70,000 (5% of parents/caretakers). Twelve percent of the parents received monthly commodities, 32% received monthly EBT food stamp cards, and 17% received monthly Women, Infant, and Children (WIC) support (see table 7).

Table 7. Descriptives: Parent/Caretaker Demographics

Characteristic	***n***	***M***	***SD***	***%***
Age	38	36.44	6.60	
Gender				
Male	13	17.0		
Female	66	84.0		
Relationship to child				
Biological parent	68			86.0
Adoptive parent	3			4.0
Stepparent	4			5.0
Grandparent	2			3.0
Guardian	1			1.0
Fosterparent	1			1.0
Total # of people in house	78	5.05	1.60	
Ethnicity				
American Indian	99			99.0
Caucasian	1			1.0
What do you call yourself				
Chippewa	57			72.0
Mitchif	13			17.0
Metis	2			3.0

Table 7. Continued.

Characteristic	*n*	*M*	*SD*	%
Ojibway	1			1.0
Anishanabe	1			1.0
Sioux	3			4.0
3 Affiliated	2			2.0
Marital Status				
Married	43			55.0
Single	25			32.0
Divorced	6			8.0
Separated	3			4.0
Widowed	1			1.0
Living Arrangement				
Living w/partner	44			55.0
Living w/children	24			30.0
Living w/SO	7			9.0
Living w/relatives	1			1.0
Education				
College 1-3 yrs.	37			47.0
College 4 or more	20			25.0
Grade 12 or GED	14			18.0
Grade 9-11	6			8.0
None	1			1.0
Grade 1-8	1			1.0
Employment				
Employed wages	57			72.0
Student	7			9.0
Self-employed	3			4.0
Unemployed< 1yr	3			4.0
Homemaker	3			4.0
Unable to work	3			4.0
Retired	2			3.0
Unemployed >1yr	1			1.0
Annual Household Income				
>$10,000	12			15.0
$20,000-$30,000	18			23.0
$10,000-$20,000	16			20.0
$40,000-$50,000	11			14.0
$50,000-$60,000	7			9.0
$30,000-$40,000	6			8.0
<$70,000	5			6.0
$60,000-$70,000	4			5.0
Birth weight of 1st child	60	7.05	1.44	

Table 7. Continued.

Characteristic	*n*	*M*	*SD*	%
Monthly EBT				
Yes	25			32.0
No	54			68.0
Monthly Commodities				
Yes	9			12.0
No	70			88.0
Monthly WIC				
Yes	25			17.0
No	54			82.0

Physical Characteristics in the Parent/Caretaker Sample.

The mean height of participants in this sample was 64.90 inches, the mean weight was 186.13 pounds, and the mean BMI was 31. Using BMI categories from the World Health Organization and the National, Heart, Lung, and Blood Institute; one half of the parents/caretakers were categorized as obese, 34% were categorized as overweight (34%), and 16% were categorized as normal weight (see table 8).

Table 8. Descriptives: Parent/Caretaker Physical Characteristics

Characteristic	*n*	*M*	*SD*	%
Height	78	64.90	3.80	
Weight	79	186.13	44.18	
BMI	77	31.00	7.13	
BMI category				
Healthy	12			16.0
Overweight	26			34.0
Obese	39			50.0

Diet in the Parent/Caretaker Sample

Food choice intentions of parents/caretakers were evenly distributed between healthy and unhealthy items. The majority of the parents/caretakers selected the following items: potato chips (62%) over pretzels (36%); corn with butter (82%) over

corn without butter (18%); popsicles (60%) over ice cream (40%); eggs and bacon (53%) over cold cereal (47%), a regular hamburger (75%) over an extra big hamburger (25%); bag of oranges over bag (66%) of tortilla chips (34%); toast without butter (53%) over a donut (47%); a regular pop (63%) over diet pop (37%). Parents/caretakers were very knowledgeable about fatty foods with the majority correctly identifying the six fattier foods in paired choices: fry bread (86%) versus tortillas (14%), fried meat (97%) versus grilled meat (3%), corn with butter (95%) versus corn without butter (5%), fried potatoes (96%) versus boiled potatoes (4%), fried eggs (91%) versus cold cereal (9%), and chips (98%) versus pretzels (2%) (see table 9).

Table 9. Descriptives: Parent/Caretaker Diet

Characteristic	***n***	***M***	***SD***	***%***
Food Choice Intentions	64	3.84	1.53	
Potato Chips	48			62.0
Pretzels	28			36.0
Corn w/butter	64			82.0
Corn w/o butter	14			18.0
Popsicle	46			60.0
Ice Cream	30			40.0
Eggs & Bacon	42			53.0
Cold Cereal	37			47.0
Regular hamburger	50			75.0
Extra big hamburger	20			25.0
Bag of oranges	50			66.0
Bag of tortillas	26			34.0
Toast no butter	40			53.0
Donut	36			47.0

Table 9. Continued

Character	*n*	*M*	*SD*	%
Regular pop	47			63.0
Diet pop	28			37.0
Knowledge of Fatty Foods	78	5.63	.79	
Fry Bread	67			86.0
Tortilla	11			14.0
Fried Meat	77			97.0
Grilled Meat	2			3.0
Corn w/butter	75			95.0
Corn w/o butter	4			5.0
Fried Potato	76			96.0
Boiled Potato	3			4.0
Fried eggs	72			91.0
Cold cereal	7			9.0
Chips	77			98.0
Pretzels	2			2.0
Food Self-Efficacy	73	7.69	1.95	

Physical Activity in the Parent/Caretaker Sample.

Parents/caretakers reported engaging in moderate activity on average 4.06 days per week. Favorite forms of physical activity included walking (84%), biking (38%), dancing (40%), running (23%), basketball (19%), swimming (18%), aerobics (6%), and golfing (3%). A large proportion (61%) of parents/caretakers reported not engaging in exercise more often because of not having time. Other reported barriers to increasing activity included: being too tired (7%), not having activities to do (15%), not feeling safe on bike path because there are no leash laws (6%), and not liking my body (5%). Finally,

participants in this sample reported 7.69 average hours of screen time (e.g., watching television, playing video games, or computer) per week (see Table 10).

Table 10. Descriptives: Parent/Caretaker Physical Activity

Characteristic	***n***	***M***	***SD***	***%***
Sedentary behavior	64	7.65	6.25	
PA preference				
Walking	67			84.0
Running	18			23.0
Biking	30			38.0
Aerobics	5			6.0
Golfing	2			3.0
Dancing	32			40.0
Swimming	14			18.0
Basketball	15			19.0
Participation in PA 6 mos.	68	35.46	55.25	
Barriers to PA				
Availability	12			15.0
Time	48			61.0
Self-Conscious	4			5.0
Too Tired	13			17.0
Safety	5			6.0

Weight-Related Attitudes in the Parent/Caretaker Sample

Participants' attitudes towards body size indicated that the majority (73%) believed themselves to be "too fat," while 26% reported being "just right," and 1% reported being "too skinny." Similarly, 84% of parent/caretakers reported that they would like to be skinnier than they are now, and only 16% were satisfied with their current weight. In addition, 56% of parent/caretakers reported being unhappy with their current weight percent report, while 44% reported being happy with or never thinking about their weight. Finally, 78% of the participants in this sample have tried to lose weight in the past, and 49% reported currently trying to lose weight. The following weight loss

methods were reported by participants: changed diet (71%), exercised more (68%), skipped a whole meal (51%), and skipped meals for entire day (30%) (see Table 11).

Table 11. Descriptives: Parent/Caretaker Weight-Related Attitudes

Characteristics	***n***	***M***	***SD***	***%***
Healthy Body Size				
Male	77	3.88	.853	
Female	80	3.79	.577	
Body Dissatisfaction	67	2.25	1.39	
Attitudes Towards Body Size	77	2.17	1.04	
Are you:				
Too Skinny	1			1.0
Just Right	21			26.0
Too Fat	58			73.0
Would you like to be skinnier				
Yes	67			84.0
No	13			16.0
Feel about weight:				
Happy	34			44.0
Unhappy	93			56.0
Weight Loss Attempts	78	3.46	1.20	
Ever tried to lose weight				
Yes	62			78.0
No	18			22.0
Now trying to lose weight				
Yes	38			49.0
No	40			51.0
Changed diet				
Yes	57			71.0
No	23			29.0
Exercised more				
Yes	54			68.0
No	26			32.0
Skipped whole meal				
Yes	41			51.0
No	39			49.0
Whole day w/o eating				
Yes	24			30.0
No	56			70.0

Table 12. Descriptives: Parent/Caretaker Psychological/Emotional and Cultural Identity

Characteristics	*n*	*M*	*SD*	%
Psychological/Emotional				
Emotional Eating	80	13.5	9.23	
Self-Esteem	77	20.5	4.31	
Cultural Identity				
NIS	80	4.14	3.02	

Bivariate Correlations

Bivariate correlation analyses revealed many significant relationships between child BMI and predictor variables and between various independent variables or predictors. To ease presentation and understanding of these data, they are presented in the following sets of related variables: (a) demographic variables, (b) diet and physical activity, (c) weight-related attitudes, and (d) parent/caretaker predictor measures. There were no significant correlations (see table 13) between child BMI and demographic variables (i.e., gender and SES).

Table 13. Child BMI with Child Demographics Correlational Matrix: Gender and SES.

Item	**CBMI**	**Gender**	**SES**
CBMI	---		
Gender	-.03	---	
SES	-.10	.03	---

Correlations regarding child BMI and child diet and physical activity measures provided many significant correlations. Child BMI was positively correlated with food choice intentions ($r = .19$, $p < .01$). Food choice intention was also positively correlated with food self-efficacy ($r = .36$, $p < .01$) and negatively correlated with sedentary behavior ($r = -.24$, $p < .01$). Lastly, child food self-efficacy was positively correlated with child physical activity ($r = .24$, $p < .01$) (See table 14).

Table 14. Child BMI with Diet & Physical Activity Correlational Matrix: Body Mass Index, Food Choice Intentions (FCI), Knowledge of Fatty Foods (KFF), Food Self-Efficacy (FSE), Physical Activity (PA), Barriers to Physical Activity (BPA), Sedentary Behaviors (SB).

Item	CBMI	FCI	KFF	FSE	PA	BPA	SB
CBMI	---						
FCI	.19**	---					
KFF	.16	.16	---				
FSE	.08	.36**	.15	---			
PA	-.04	.04	.09	.24**	---		
BPA	.03	.06	-.09	-.04	.02	---	
SB	.14	-.24**	.03	-.05	-.12	.07	---

**** p < .01 (2-tailed)**

Correlations in relation to child BMI and child weight-related attitudes also revealed several significant positive correlations. Child BMI correlated positively with child body dissatisfaction ($r = .46$, $p < .01$), child attitudes towards body size ($r = .46$, $p < .01$) , and child attempted weight loss ($r = .51$, $p < .01$). Child body dissatisfaction was positively correlated with attitudes towards body size ($r = .40$, $p < .01$) and attempted weight loss ($r = .32$, $p < .01$). Additionally, attitudes toward body size was positively correlated with attempted weight loss ($r = .47$, $p < .01$) (see Table 15). Correlations between child BMI and child psychological/emotional showed one significant correlation. Child BMI was negatively correlated with child emotional eating ($r = -.18$, $p < .01$). No significant correlations were revealed for child BMI and cultural identity (see Table 16).

Table 15. Child BMI with Weight-Related Attitudes: CBMI, Body Dissatisfaction (BD), Healthy Body Perceptions, Attitudes Towards Body Size (ATBS), Attempted Weight Loss (AWL).

Item	CBMI	BD	HBP	ATBS	AWL
CBMI	---				
BD	.44**	---			
HBP	-.07	-.20**	---		
ATBS	.46**	.40**	-.09	---	
AWL	.51**	.32**	-.15*	.47**	---

**** p < .01 (2-tailed)**

Table 16. Child BMI with Psychological/Emotional and Culture: CBMI, Emotional Eating (EE), Self-Esteem (SE), Cultural Identity

Item	CBMI	EE	SE	CI
CBMI	---			
EE	-.18**	---		
SE	-.10	.01	---	
CI	.00	-.02	.00	---

**** p < .01 (2-tailed)**

Bivariate correlations results for child BMI and parent/caretaker variables displayed three significant relationships. Child BMI was significantly correlated with parent/caretaker BMI ($r = .29$, $p < .01$), parent's birth weight of their first child ($r = .31$, $p < .01$), and parent/caretaker body dissatisfaction ($r = .33$, $p < 01$). In addition, parent/caretaker BMI was positively correlated with parent/caretaker body dissatisfaction ($r = .51$, $p < .01$) (see Table 17).

Table 17. Correlation Matrix: Child BMI with parent/caretaker BMI (PBMI), birth weight of 1st child (BW), and parent/caretaker body dissatisfaction (PBD).

Item	CBMI	PBMI	BW	PBD
CBMI	---			
PBMI	.29**	---		
BW	.31**	.13	---	
PBD	.33**	.51**	.084	---

**** p < .01 (2-tailed)**

Bivariate correlations results for parent/caretaker variables and child variables (other than BMI) revealed several statistically significant relationships. Parent/caretaker SES was positively correlated with child SES ($r = .34$, $p < .01$) and negatively correlated with child self-esteem ($r = -.23$, $p < .05$). Parent/caretaker food choice intention was positively correlated with child barriers to physical activity ($r = .26$, $p < .05$) and child body dissatisfaction ($r = .28$, $p < .05$). Parents knowledge of fatty foods was positively correlated with child attitudes towards body size ($r = .24$, $p < .01$) and child attempted weight loss ($r = .28$, $p < .01$). Parent/caretaker body dissatisfaction was positively correlated with child food self-efficacy ($r = .31$, $p < .01$) and child attempted weight loss ($r = .38$, $p < .01$) and negatively correlated with child emotional eating ($r = -.32$, $p < .01$). Parent attempted weight loss was negatively correlated with child sedentary behavior ($r = -.24$, $p < .05$). Lastly, parent/caretaker emotional eating was negatively correlated with child cultural identity ($r = -.31$, $p < .01$) (see Table 18).

Table 18. Correlation Matrix: Parent/caretaker predictor variables with child predictor variables. Variables with P identify parent/caretaker predictors. Socioeconomic status (SES), food choice intentions (FCI), knowledge of fatty foods (KFF), food self-efficacy (FSE), physical activity (PA), barriers to physical activity (BPA), sedentary behavior SB), body dissatisfaction (BD), healthy body perceptions (HBP), Attitudes towards body size (ATBS), attempted weight loss (AWL), self-esteem (SE), emotional eating (EE), and cultural identity (CI)

Item	SES	FCI	KFF	FSE	PA	BPA	SB	BD	HBP	ATBS	AWL	SE	EE	CI
PSES	.34**	.16	.04	.03	-.07	-.03	.04	-.1	.09	-.13	.06	-.23*	-.12	-.18
PCI	.17	.06	-.21	-.04	.09	.26*	.03	.28*	.13	.01	-.05	.16	-.06	.24
PKFF	-.11	.19	.13	.14	-.09	.12	-.05	.00	-.15	.24*	.28*	-.17	-.03	.00
PFSE	.11	-.04	-.07	-.06	.14	.13	-.13	.00	.03	.10	.14	-.09	-.00	.19
PPA	-.04	-.04	-.11	.21	.15	.06	.16	.07	-.02	-.05	.05	.01	-.00	.04
BPA	-.05	-.08	-.08	-.02	-.12	.04	.03	-.05	-.13	.11	.00	.02	-.04	-.04
PSB	.01	-.22	-.08	-.13	-.02	.04	.19	.01	.01	-.02	-.10	.10	.19	-.23
PBD	-.17	-.02	.24	.31*	.05	.03	.03	-.09	-.00	.19	.38**	-.15	-.32**	.14
PHBP	-.08	-.02	.11	-.06	-.11	-.03	-.07	-.10	.08	.05	-.03	.06	-.11	-.03
PATBS	.04	-.12	-.04	-.07	.04	.12	-.20	-.10	.04	.13	.03	-.18	-.14	-.01
PAWL	.11	-.03	-.13	-.15	-.00	.02	-.24*	-.04	-.07	.07	.0	-.14	-.10	-.01
PSE	-.03	.17	.03	-.07	.19	-.02	-.06	.15	-.04	-.04	-.02	.02	.03	.21
PEE	-.03	-.13	.09	.07	-.13	-.11	-.04	-.18	.05	.02	-.01	.13	-.03	-.31**
PCI	-.08	.08	.06	.17	.04	-.07	-.14	-.08	.00	.11	.19	.01	-.13	.20

*** p < .05, ** p < .01**

Multiple Regression Analyses

Predicting Child's BMI with Child Predictors.

A hierarchical set of multiple regression analyses were conducted to examine how well various sets of predictors account for the variance in children's BMI scores. Table 19 shows the overall results of these regression analyses, while table 20 shows the unique contributions of statistically significant individual predictors within each set of predictors.

In the first block of these hierarchical analyses the child's gender and SES were entered into the model; however, together they only accounted for 1% of the total variance in BMI scores. In the second block, diet and physical activity variables (food choice intentions, knowledge of fatty foods, food self-efficacy, physical activity, and

sedentary behavior) were entered into the model. These additions significantly increased the explained variance by 7.9%; however, it appears that the only significant predictors in this block were food choice intentions ($\beta = .236$, $p < .01$) and sedentary behavior ($\beta = .186$, $p < .01$). Higher BMI scores appear to be related to higher healthy food choice intentions and higher amounts of sedentary behavior. In the third block, weight-related variables (body dissatisfaction, attitudes towards body size, and attempted weight loss) were entered into the model, resulting in a significant increase (32.6%) in variance explained in BMI scores. In this analysis, gender ($\beta = -.135$, $p < .05$), food choice intentions ($\beta = .148$, $p < .05$), sedentary behavior ($\beta = .129$, $p < .05$), body dissatisfaction ($\beta = .262$, $p < .0001$), attitudes towards body size ($\beta = .218$, $p < .001$), and attempted weight loss ($\beta = .289$, $p < .0001$) all made significant unique contributions. Overall, model three explained 41.5% of variance in children's BMI. In the fourth block psychological/emotional variables (self-esteem and emotional eating) were entered into the model; however, they did not significantly increase explained variance in BMI. Finally, in the fifth block cultural identity was added to the model but it did not result in a significant increase in variance explained in BMI.

In sum, greater BMI scores were related to healthier food choice intentions, more hours of sedentary behavior, greater body dissatisfaction, higher negative attitudes towards body size, and more weight loss attempts. Additionally, child BMI was negatively related to gender, indicating that girls had lower BMI scores than boys.

Table 19. Hierarchical Multiple Regression Analyses Predicting Child Body Mass Index (BMI) from Child Demographics, Child Diet & Physical Activity, and Child Weight Related Attitudes.

Model	R	R^2	ΔR^2	SE	F
1	.10	.010	.010	4.75	1.134
2	.30	.088	.079	4.62	2.705**
3	.64	.415	.326	3.73	12.940**

*** p < .05, ** p < .01**

Predictors: Model 1: Gender, SES

Model 2: Gender, SES, food choice intention (FCI), knowledge of fatty foods (KFF), food self-efficacy (FSE), physical activity (PA), sedentary behavior (SB)

Model 3: Gender, SES, food choice intention (FCI), knowledge of fatty foods (KFF), food self-efficacy (FSE), physical activity (PA), sedentary behavior (SB), body dissatisfaction (BD), attitudes towards body size (ATBS), attempted weight loss (AWL).

Table 20. Hierarchical Multiple Regression for Model 3: Significant predictor variables

Variables	b	SE	β	t	part
Block 2					
Diet & PA					
FCI	.59	.19	.22	3.08**	.20
SB	.49	.18	.19	2.78**	.18
Block 3					
Demographics					
Gender	-1.21	.52	-.13	-2.32*	-.12
Diet & PA					
FCI	.37	.16	.14	2.38*	.12
SB	.35	.15	.13	2.39*	.12
Weight-Related Att.					
BD	.90	.20	.27	4.60**	.24
ATBS	.87	.25	.22	3.42**	.18
AWL	.74	.15	.29	4.81**	.25

*** p < .05, ** p < .01**

Predictors: Block two: Food Choice Intentions (FCI), Sedentary Behavior (SB); Block Three: Body Dissatisfaction (BD), and Attitudes Towards Body Size (ATBS).

Predicting Child BMI with Parent/Caretaker Predictors

The bivariate correlations between parent/caretaker predictor variables and child BMI were examined to select potential predictors to be entered into the multiple regression model. This procedure was used because the large number of potential predictors coupled with the relatively small sample size made a regression with all of the parent predictors unfeasible. Because of the use of this procedure, this analysis must be considered exploratory and attempts should be made to replicate these results. Examination of these bivariate correlations revealed three statistically significant relationships between parent/caretaker variables and child BMI. Parent/caretaker's BMI score, birth weight of the first child, and parent/caretaker body dissatisfaction was significantly correlated with child BMI. In order to assess the predictive power of these variables on child BMI a simultaneous multiple regression was used. The overall model was significant $F(3,48)=2.83$, $p <. 05$ and it did explain 15% of the variance in child BMI scores (see table 21). However, none of the predictors made a significant contribution to the formation of the regression equation (see table 22).

Table 21. Simultaneous Multiple Regression Analyses: Predicting Child BMI from Parent/Caretaker BMI, Birth weight of 1st child (BW), and Parent/Caretaker body dissatisfaction (PBD).

Model	R	R^2	SE	F
1	.387	.150	4.59	2.825*

*** p < .05, ** p < .01**

Table 22. Simultaneous Multiple Regression for Model 1: Unique contribution of predictor variables

Variables	b	SE	β	t	part
PBMI	.10	.11	.15	.98	.131
BW	.77	.45	.23	1.72	.228
PBD	.63	.54	.18	1.17	.155

**** p > 0.01 (2-tailed)**

CHAPTER IV

DISCUSSION

Diabetes has been cited as the leading cause of mortality and morbidity among American Indian adults (Story et al., 2001) and its occurrence is highly correlated with obesity (Breedon, 2002, Fagot-Campagna, Pettitt, Engelgau, Burrows, Geiss, Valdez, et. al., 1991). Although, tribal programs, such as the Diabetes Prevention Program[2] are aimed at addressing diabetes risk factors such as obesity, data from the current study indicate that children in the Turtle Mountain community continue to be at risk for developing obesity and possibly diabetes.

Approximately 33% of this sample of northern plains American Indian children was overweight and another 20% was at risk for becoming overweight. These overweight and obesity data are consistent with prevalence rates reported in other studies (Brousasard et al., 1991; Story et al., 2001). In addition, 9% of the children in this sample tested positive for acanthosis nigricans, also consistent with previous findings within this tribal community (Patel, 2003).

The current study examined two research questions regarding BMI scores in American Indian children. The first research question focused on the extent to which various demographics, diet and physical activity measures, weight-related attitudes,

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[2] Tribal Diabetes Prevention Program is aimed at prevention of diabetes through community education and intervention in tribal communities.

psychological/emotional variables, and cultural identity would predict BMI scores in this sample of American Indian children. The second research question focused on the ability of parent/caretaker characteristics, attitudes, and behaviors to predict their child's BMI. Because of sample size and other considerations, however, these analyses must be considered exploratory and interpreted cautiously.

Predicting Children's BMI using Children's Predictors

Bivariate correlations and a hierarchical multiple regression were conducted to address this study's first research question. Bivariate correlations were initially conducted to help understand interrelationships among a child's BMI and other measures assessed in this study.

Bivariate correlations revealed many significant and interesting relationships between children's BMI and their demographic and other predictor variables. There was a significant positive correlation between food choice intentions and food self-efficacy and children's BMI. The healthier the child's food choice intensions or the higher his or her food self-efficacy the higher their BMI. However, there were also significant positive correlations between children's BMI and body dissatisfaction, attitudes towards body size, and weight loss attempts. Children with higher BMI scores reported more body dissatisfaction, more negative attitudes towards their body size, and more weight loss attempts. Finally, there was a negative correlation between children's BMI and emotional eating, with those with higher BMI's reporting less emotional eating. These correlations are interpreted in greater detail in the multiple regression section of this discussion.

Bivariate correlations also showed several statistically significant relationships among various predictor variables for children in the current sample. A child's food choice intention was positively correlated with his/her food self-efficacy, which indicates children with healthier food choice intentions also have higher food self-efficacy. Food choice intention was negatively correlated with sedentary behaviors. Therefore, children with healthier food choice intentions are less like to engage in sedentary behavior (e.g., television viewing). Food self-efficacy was positively correlated with physical activity, indicating that children with higher food self-efficacy also engage in more physical activity. Finally, a children's body dissatisfaction was related to negative attitudes towards body size and a greater number of attempts at weight loss.

It is interesting to note children with healthier food choice intentions were engaging in less sedentary behavior; this is an unexpected correlation, when considering the correlation between BMI and these two predictor variables. Higher child BMI was associated with healthier food choice intentions and more sedentary behavior. This finding may represent a mediator effect, yet further examination of these variables are needed to identify the relationship among BMI, healthy food intentions, and sedentary behavior. Also, interestingly, children in this sample with higher food self-efficacy were also participating in more physical activity. This finding may suggest that kids who report higher perceived ability to select healthier foods may also demonstrate higher perceived ability to participate in physical activity, yet, physical activity self-efficacy was not assessed in the current study and may be important to assess in future studies.

Hierarchical multiple regression was used to directly address the first research question by examining the extent to which different types of variables might compliment or be redundant with each other in building a predictive model for children's BMI. Thus, groups of variables were entered in a theoretically determined hierarchy to examine the ability of predictors entered in later steps to explain BMI variance beyond that accounted for by predictors entered in earlier steps.

Basic demographic characteristics (i.e., gender and SES) of children were entered into the multiple regression model in the first step and contrary to expectations results showed that these variables did not explain a significant amount of variance in children's BMI. American Indians are one of the poorest ethnic groups in the nation, with a substantial proportion of the population living below the poverty level. However, even though a large percentage of the children in this sample endorsed receiving EBT food stamps and commodities, SES was not found to be an important factor in predicting obesity in this study's sample.

The addition of diet and physical activity variables (i.e., food choice intention, knowledge of fatty foods, food self-efficacy, physical activity, barriers to physical activity, and sedentary behavior) in the second model statistically increased the overall variance explained; however, the predictors still only accounted for a small portion of variance in children's BMI (7.9%). It was hypothesized that these predictors would explain a greater proportion of the variance in BMI considering the current literature linking diet and physical activity to overweight and obesity in children (Hu, Li, Colditz, Willett, & Manson, 2003, Wolf, Gortmaker, Cheung, Gray, Herzog, & Golditz, 1993,

Strauss, Rodzilisky, Burack, Colin, 2001; Anderson, Crespo, Bartlett, Cheskin, & Pratt, 1998; Obarzenec, Schreiber, Crawford, Goldman, Barrier, Frederick, & Lakotos, 1994; Story et al., 1999; Bellew, White, Strauss, Benson, Mendelien, & Mokdad, 1996). Examination of the individual predictors revealed that only two variables (healthy food choice intensions and sedentary behavior) made statistically significant contributions to explaining variance in children's BMI.

Consistent with findings from a previous study (Story et al., 2001) healthy food choice intentions were related to greater BMI. This finding is intriguingly counter-intuitive in that many people likely believe that overweight and obese children make unhealthy food choices. Interpreting this result must be done cautiously recalling that healthy food intention is not the same as actually measuring what children eat. It is possible heavier children's food choice intentions are healthier than their actual food choices. Another possible explanation may relate to the attempts at weight loss in this sample. A large percentage of children reported that they were currently trying to lose weight by changing their diet. Therefore, children with higher BMI scores may have been dieting during the time of the study and may have been very sensitized to healthier food choices. A third explanation may be the unavailability of healthy foods, which might hinder their ability to follow through with their intentions (Bonner, 1996). A previous study found that Ojibway-Cree parents demonstrated knowledge regarding "unhealthy" food, yet consistently purchased "junk food" items such as pop, candy, and chips. Therefore, children in this sample may have intentions and perceived ability to select healthier foods, but such foods may not be made available in their environment.

Interestingly, most children in the sample had appropriate knowledge of high fat foods. The majority of children correctly identified the fatty food in a forced pair choice. Although, children in this sample appear to have knowledge of fatty foods, a large portion still selected high-fat and high-sugar foods on several items related to food choice intentions. This finding may be related to the moderate scores seen in this sample on the food self-efficacy measure. These data suggest that children in this sample are educated about healthy food; however, they may question their capability to actually make healthy food choices.

Sedentary behavior was also a statistically significant predictor of children's BMI. Children with higher levels of sedentary behavior had greater BMI. Several children in the current sample endorsed sedentary behaviors such as playing video games and watching television as their favorite after school activity. These findings were consistent with existing literature citing screen time as a contributing variable to the obesity epidemic in children (Fontvielle et al., 1993; Dietz & Gortmaker, 1985; Gordon et al., 2002). These findings, along with current findings, further support the importance of developing primary prevention programs for children targeting decreases in sedentary behavior paired with increases in physical activity. Such intervention/prevention programs might also benefit by considering the barriers to physical activity noted in this sample of American Indian children.

Barriers to physical activity are cited as influential variables to consider when designing obesity prevention programs in Native American communities (King et al. 2000; Thompson et al., 2001). Children in this sample identified sociocultural barriers

to physical activity, which should be taken into account. Children in the current study reported not feeling safe on their community bike path because of the absence of leash laws for dogs. A substantial number of children also reported that the resources needed to engage in various physical activities are not available within their community. Increasing physical activity is a common treatment approach for obesity, and these findings suggest that when implementing such an approach in native communities, one must also address the issue of barriers to physical activity.

The introduction of weight-related attitude variables (i.e., body dissatisfaction, healthy body perceptions, attitudes towards body size, and attempted weight loss) in the third regression model resulted in a statistically significant increase (32.6%) in variance explained in children's BMI. This substantial increase in total variance explained was associated with statistically significant contributions from the following predictors: (a) attempts at weight loss, (b) body dissatisfaction, and (c) attitudes towards body size. These findings reflect the strong relationship between weight-related attitudes and obesity in American Indian children, a finding consistent with those of previous studies (Stevens et al., 1999; Story et al., 2001). High prevalence of body dissatisfaction, poor attitudes towards body size, and attempts at weight loss are clearly evident in this sample of young American Indian children. Several children in this sample viewed themselves as too fat, with over half of the children reporting that they would like to be skinnier. Additionally, the majority of children reported having tried to lose weight in the past, and a large portion (41%) indicated they were currently trying to lose weight. The most common methods used in attempting to lose weight were exercising more and changing

diet, which is consistent with findings from other tribal communities (Stevens et al., 1999; Story et al., 2001).

It is also interesting to note that in the first two models, gender was not a significant predictor; however, in the third model it became a statistically significant predictor variable. Gender's predictive power was enhanced in the presence of weight-related variables (i.e., attempted weight loss, body dissatisfaction, and attitudes towards body size). These results may represent a possible suppressor effect, suggesting that weight-related variables may be accounting for different portions of the variance in children's BMI; therefore, allowing gender to make more contribution to variance explained.

The inclusion of psychological/emotional variables (i.e., self-esteem and emotional eating) as predictors in the fourth regression model did not significantly increase the variance explained in children's BMI. One explanation for these results may be that self-esteem can be a difficult construct to measure in American Indian children. During the pilot study, used to develop this study's measures, teaching staff indicated that the Self-Perception Profile for Children (this study's self-esteem measure) would present the most difficulty for children to answer. A portion of children omitted several items on this scale, resulting in several incomplete assessments. Missing items resulted in decreased self-esteem scores and may have influenced the final analyses. A similar explanation may apply to measuring emotional eating in children. The Dutch Emotional Eating Scale, although simplified for this age group, was not developed for use in this population. The construct of emotional eating may have been too abstract for

elementary school aged children; though Bruch (1973) reports that emotional eating may develop early in life. Another explanation for this study's results may be that overweight or obese children eat at such a high frequency that they don't associate feeling states with the act of eating.

The final regression model included a measure of cultural identity, but it did not significantly contribute to the variance explained in children's BMI. Measurement issues are also important to consider when interpreting these results since there are no appropriate measures of acculturation for specific Native American communities (Story et al., 1999). It is difficult to assess cultural identity with a single scale, because there is great diversity among tribal groups. As reported earlier, the KAB (Stevens et. al., 1999a) was developed based on six tribal groups; however, their norms, attitudes, and beliefs likely differ from the Turtle Mountain Band of Chippewa that were sampled in the current study. Cultural identity questionnaires should be specific to a tribal group's values, norms, and belief system. Additionally, it is important to note that a large percentage of students in this sample reported confusion related to their own ethnic identity. The entire sample was able to identify themselves as American Indian, yet, many students reported that they did not know what to call themselves (e.g., Chippewa, Ojibway, Mitchif, etc). These findings may indicate a lack of reinforcement, encouragement, and education about cultural identity. Overall, the children scored in the moderate range on their cultural identity scale, suggesting that this sample is probably somewhat assimilated to westernized culture. It is important to address this issue in relation to obesity, as it has been suggested that a stronger cultural identity may serve as

a protective factor against obesity while identifying more with westernized culture may increase the risk for obesity in Native American communities (Knowler et al., 1981; Ravussin et al., 1994).

Predicting Children's BMI using Parent/Caretaker Measures

Bivariate correlations and a multiple regression were conducted to examine this study's second research question concerning whether parent/caretaker's characteristics, attitudes, and behaviors were related to their children's BMI. Bivariate correlations were first conducted to help describe relationships between children's BMI and parent-caretaker characteristics, attitudes, and behaviors. In addition, these analyses also examined interrelationships between children's characteristics, attitudes, and behaviors and parent/caretakers' characteristics, attitudes, and behaviors.

Bivariate correlations between children's BMI and parent/caretaker variables revealed three statistically significant relationships. There was a significant relationship between a child's BMI and his or her parent/caretaker's BMI with higher BMI in parent/caretaker BMI being associated with a higher BMI in the child. There was also a significant relationship between a child's BMI and the birth weight of the parent/caretaker's first child with higher children's BMI being associated with higher birth weights in their parent/caretaker's first-born child. Finally, parent/caretaker body dissatisfaction was also correlated with children's BMI with higher levels of parent/caretaker body dissatisfaction being related to higher BMI in children. The identified correlation will be addressed in further detail in the parent/caretaker multiple regression discussion section.

Bivariate correlations between parent/caretaker variables and child variables (other than BMI) were also examined and revealed several interesting correlations. Child SES was positively correlated with parent/caretaker SES suggesting that even children as young as 3rd grade can relatively accurately report their family's SES level. Child food self-efficacy was positively correlated with parent/caretaker body dissatisfaction indicating that children with higher food self-efficacy had parent/caretakers with higher body dissatisfaction. Child body dissatisfaction was positively correlated with parent/caretaker food choice intentions indicating that children with greater body dissatisfaction had parents with healthier food intentions. Child attitudes towards body size and attempted weight loss were positively correlated with parent/caretaker knowledge of fatty foods indicating that children with more negative attitudes towards their body size and more attempts at losing weight had parents/caretakers with greater knowledge of fatty foods. Children's attempts at weight loss were also positively correlated with parent/caretaker body dissatisfaction indicating that children with more weight loss attempts had parents/caretakers with greater body dissatisfaction.

When interpreting the relationship between children's food self-efficacy and parent/caretaker body dissatisfaction, it is important to recall that overweight and obese children also had higher levels of food self-efficacy. Therefore, it may be that parent/caretakers of these children also had higher BMI's, which is associated with increased body dissatisfaction (Wadden & Phalen, 2001). Overall, the above correlations suggest that children's weight-related attitudes (i.e., body dissatisfaction,

attitudes towards body size, and attempted weight loss) are associated with parent/caretaker attitudes and behaviors, which is consistent with the literature showing very influential relationships between parental influences and children's body dissatisfaction and dieting (Steinberg & Phares, 2001, Riveves & Cash, 1996; Attie & Brooks-Gunn, 1989). The majority of parents/caretakers in this sample (73%) viewed themselves at "too fat," with 78% indicated that they have tried to diet in the past and 49% were dieting during data collection. It may be that parents in this sample are modeling and possibly reinforcing negative weight-related attitudes in this sample of children.

Child self-esteem was negatively correlated with parent/caretaker SES indicating that children with higher self-esteem had parents/caretakers with lower SES. These results are surprising when considering the literature relating poverty with increased psychosocial stressors in American Indian communities (Fontvielle, 1993, Kumanyika, 2002), which may be expected to impact self-esteem. One possible explanation for this finding relates to the general high rate of poverty within the Turtle Mountain Community. Low socioeconomic status may be somewhat normalized in this community and may not be considered an influential factor contributing to or hindering self-esteem within this sample. Child emotional eating was negatively correlated with parent/caretaker body dissatisfaction indicating that children with greater emotional eating scores had parents/caretakers with less body dissatisfaction. Finally, parent/caretaker emotional eating was negatively correlated with child cultural identity

indicating that children with stronger cultural identities had parents/caretakers with lower emotional eating scores.

The above correlation may suggest that possible distress related to parent/caretaker body dissatisfaction may be affecting their children's eating styles. Brush (1973) reports that children demonstrate the potential to associate food with feeling states, and current findings indicate that parent/caretakers may be communicating (verbally or non-verbally) their dissatisfaction towards their body shape to their children; thus creating a distressing environment and increasing child emotional eating patterns. Brush (1973) further states that children learn to cope with such familial stress (e.g., parental body dissatisfaction) by eating "comfort foods." Also intriguing is the relationship in this sample between child cultural identity and parent/caretaker emotional eating. One explanation for this finding is that children who indicate stronger cultural identity may receive more education and reinforcement related to their culture, and therefore, parents may also accept more traditional values, attitudes, and norms; thus engaging in less eating patterns that may be inconsistent with traditional norms (e.g., emotional eating).

Many bivariate correlations were conducted to examine this research question potentially inflating the type I error rate. Moreover, many of the statistically significant correlations may have ceased to be significant if a more stringent alpha would have been adopted to try to control the type I error rate (e.g., a Bonferroni adjustment). Therefore, some of the significant findings might be a product of increased type I error; however, the point of the analyses is not to confirm significant relationships, but to suggest

potential avenues for future work in the area of relating parent/caretaker information to their child's BMI.

A multiple regression model using three parental variables (i.e., parent/caretaker birth weight of 1st child, parent/caretaker body dissatisfaction, and parent/caretaker BMI) was conducted to examine this study's second research question. This model explained a statistically significant amount of variance in child BMI scores (15%). However, when examining predictor variables' unique contributions, none of the variables made statistically significant individual contributions to the model. Therefore, only in combination do these predictor variables explain children's BMI suggesting that these predictors share a substantial amount of predictive variance in children's BMI and are redundant with each other.

The fact that higher parent/caretaker BMI and parent/caretaker body dissatisfaction were related to higher children's BMI is not surprising when considering research indicating that children have a 40% chance of developing obesity if one parent is overweight or obese (Davis et al., 1993) and that obesity is highly correlated with body dissatisfaction (Wadden & Phelan 2001). Additionally, it is not surprising to find that a child' BMI was higher if his or her parent/caretaker's first-born child has a higher birth weight. Similar findings were reported among the Mescalero tribes where maternal obesity was positively correlated with higher birth weight, and infants and preschoolers born from obese mothers were above the 95th percentile for BMI (Kamanyika 1993). Therefore, since the majority of parents/caretakers in the current sample were biological mothers who were also overweight and obese, there may be a connection between

maternal obesity and development of obesity in children. However, because of the exploratory nature of these findings, further studies need to examine maternal characteristics in relation to birth weights in a more rigorous manner in order to draw any specific conclusions on this matter.

Limitations, Conclusions and Future Issues

Limitations of this study primarily concern the generalizability of the findings. Recruitment of most participants occurred during parent-teacher conferences, though some participants were recruited by sending information from the school home with the child. This recruitment approach may jeopardize the external validity of this study's findings because parents of lower SES or single parent families may have had more difficulty attending the parent-teacher conferences. In addition, the sample of American Indian children was almost exclusively of Chippewa descent. Therefore, caution should be used if attempting to generalize these results to members of other American Indian tribes. Another limitation concerns the reliance on self-report data obtained in a group setting. Children may not be the most accurate reporters and may have answered in a social desirable manner on some items. Also, the primary investigator was not available in the classroom to ensure proper administration of the research packet; however, teaching staff were provided with detailed instructions for administration. Another important limitation to address was the small parent/caretaker sample size. The small sample of parents/caretakers limit's the external validity of those findings. Further, due to the small sample size, the examination of predictor variables was exploratory in nature, and needs to be interpreted with caution. A final limitation noted is that the

results are correlational and do not provide information related to the directionality of the effect between BMI and the predictor variables.

The strengths of this study include a large sample of American Indian children from the Turtle Mountain Band of Chippewa Reservation. Additional strengths include having the assistance and support of the teaching staff at the elementary school. Teachers administered the questionnaire during a regularly scheduled health class providing children with item-by-item instructions and further individual clarification when necessary. Although administration was in a group format, administration was consistent with testing procedures for elementary students (e.g., privacy folders or desk spacing) to ensure confidentiality and increase the likelihood of obtaining valid responses. Finally, the primary investigator was available in the school system and provided assistance to the teaching staff.

The current study provides relevant information related to possible predictor variables associated with BMI in young, American Indian children. This study's limitations and its results introduce the possibility of several interesting follow-up studies. First, because self-report measures were used in this study, future studies should consider including physiological and/or observational measures to provide more accurate assessment of variables such as diet and physical activity. Second, because this study is correlational and lacks directionality, future studies might benefit by examining mediator and/or moderator effects of predictor variable, to enhance understanding of how the variable may be influencing predictive power. Third, future studies should consider examining the extent to which identified variables (i.e., food preference, sedentary

behaviors, body dissatisfaction, attitudes towards body size, and attempted weight loss) are able to predict group membership (e.g., obese vs. non-obese) with American Indian children. Follow-up studies examining the importance of such variables in American Indian communities might assist with the development of culturally appropriate intervention and prevention strategies. Fourth, future studies should consider examining, possibly in a qualitative format, the definition of dieting behavior in young, American Indian children. "Dieting" appeared to be a relatively common behavior in this study's sample, and follow-up studies exploring in more detail children's understanding of "dieting" would help define how such practices might be contributing to the obesity epidemic. The final suggestion concerns further exploration of the relationships observed in this study between parent/caretaker variables and children's BMI. These relationships should be assessed in a more rigorous manner to determine whether they can be replicated. This is the first study to examine parental factors associated with obesity in American Indian children and the exploratory nature of its analysis and its limitations highlight the need for additional, more rigorous, studies of the impact parental characteristics, attitudes, and behaviors have on their children's BMI among American Indians.

APPENDICES

APPENDIX A
Assent Form
Child Participant

My name is Tami Jollie-Trottier, and I am a graduate student at the University of North Dakota. I want to invite you to be in a study to that is looking at things that might predict obesity in American Indian children. You will be asked to complete some surveys that ask questions about eating, exercise, self-esteem, and other things that may relate to childhood obesity. The whole survey will take you about 30 to 45 minutes to complete. Researchers will be there to help you read through the questions. You will be able to take a couple of short breaks so you do not get too tired. Because I am looking at obesity, I will work with the Tribal Diabetes Prevention Program. People from the diabetes program go to your school every year and take your height and weight and they will be able to get your Body Mass Index score. I will be using your Body Mass Index score in my study. You understand that you do not have to let me see your Body Mass Index score and you do not have to do my study.

You understand that you will receive $10.00 for being in this study. You know that if you get tired, you can take a break. Also, if you get tired or do not want to continue, you can quit at any time. Your answers to the surveys will stay a secret and we will not tell anyone.

You do not have to be in this study, you are doing it because you want to. If you have any questions about this study, I understand that I can ask the person helping me read the surveys or I can call Dr. Doug McDonald at 701-777-4495 or Dr. Jeffrey Holm at 701-777-3792. I have read everything and still want to be in the study.

_____

Child's Name Date

APPENDIX B
Demographics-Child Form

ALL ABOUT ME!

Office Use Only	ID #:_____ BMI score: _____

Start Here:

How old are you? _____ **years old**

What grade are you in? (circle one)

Third **Fourth** **Fifth**

Who do you live with most of the time? (circle one)

Mom
Dad
Mom and Dad
Grandparents
Fosterparents
Other: _____

If you are American Indian, what do your call yourself:

Chippewa **Mitchif** **Metis** **Ojibway** **Anishanabe** **Sioux** **I don't know**

Does your family get an EBT (food stamp) card for grocery shopping (circle one)

Yes **No** **Don't know**

Does your family get commodity foods? (circle one)

Yes **No** **Don't know**

What is your favorite after school activity?
Playing sports **Watching T.V.** **Playing Video Games** **School Clubs**

Other:_____

APPENDIX C
Knowledge, Attitudes, and Behaviors Questionnaire
Ethnic Identity Scale

1) Do you understand your tribal/Indian language when someone else speaks it?
   Yes
   No
   I do not belong to any tribe

2) Can you speak your tribal language (example; Mitchif)?
   Yes, I can talk easily
   Yes, I can speak a few words
   No
   I do not belong to any tribe

3) What language do you speak most at home?
   English
   Indian Language
   Other: _____

4) Do you play traditional Indian games?
   Yes
   No
   I don't know

5) Have you been to a ceremony like a sweatlodge, sundance, or naming ceremony?
   Yes
   No
   I don't know

6) Do the adults in your house teach you about your tribe?
   Yes
   No
   I do not belong to any tribe

7) Do the adults in your house gather wild berries, tea, or other wild foods, and/or hunt animals?

   Yes
   No
   I don't know

APPENDIX D

Youth Risk Behavior Survey
Physical Activity Questionnaire
Child Form

*** When answering questions 1-3, think only about the last 7 days.**

1. How many days did you exercise or participate in physical activity for at least 20 minutes that made you sweat and breath hard, such as basketball, soccer, running, swimming laps, fast bicycling, fast dancing, or similar type of hard exercise?
   - A. 0 days
   - B. 1 day
   - C. 2 days
   - D. 3 days
   - E. 4 days
   - F. 5 days
   - G. 6 days
   - H. 7 days

2. How many days did you participate in physical activity for at least 30 minutes that **did not** make you sweat or breath hard, such as fast walking, slow bicycling, skating, pushing a lawn mower, or mopping floors?
   - A. 0 days
   - B. 1 day
   - C. 2 days
   - D. 3 days
   - E. 4 days
   - F. 5 days
   - G. 6 days
   - H. 7 days

3. How many days did you do exercise to strengthen or tone your muscles, such as push-ups, sit-ups, or weightlifting?
   - A. 0 days
   - B. 1 day
   - C. 2 days
   - D. 3 days
   - E. 4 days
   - F. 5 days
   - G. 6 days
   - H. 7 days

4. On a regular day after school, how many hours do you watch TV?
   A. I do not watch TV on an average school day
   B. Less than 1 hour per day
   C. 1 hour per day
   D. 2 hours per day
   E. 3 hours per day
   F. 4 hours per day
   G. 5 or more hours per day

5. In a regular week when you are at school, on how many days do you go to physical education (Phy. Ed) classes?
   A. 0 days
   B. 1 day
   C. 2 days
   D. 3 days
   E. 4 days
   F. 5 days

6. During a regular physical education (Phy. Ed) class, how many minutes do you spend actually exercising or playing sports?
   A. I do not take Phy. Ed
   B. Less than 10 minutes
   C. 10 to 20 minutes
   D. 21 to 30 minutes
   E. More than 30 minutes

7. During the past year, on how many sports teams did you play? (Include any teams run by your school or community groups.)
   A. O teams
   B. 1 team
   C. 2 teams
   D. 3 or more teams

8. During the past year, how many times were you injured while exercising, playing sports, or being physically active and had to be treated by a doctor or nurse?
   A. 0 times
   B. 1 time
   C. 2 times
   D. 3 times
   E. 4 times
   F. 5 or more times

9. *Please check the types of physical activity that you enjoy: Check only those that you have participated in during the last year.*

____ *Walking* ____ *Riding bike* ____*Swimming*
____ *Running/Jogging* ____ *Basketball* ____*Dancing*
____ *Football* *Other (please list):*_____

10. *For the activity that you like the* ***most****, how many times have done this activity in the past week?* _____ ***times***

11. *If you do not participate in this activity as much as you would like, what is the main reason that you don't do this or other physical activities more often?*

___ *They are not here for me to do*
___ *I do not have a ride to the fitness center*
___ *I do not like my body*
___ *I am too tired*
___ *I don't feel safe on our bike path because of dogs*
___ *Other (please list):*

_____

12. *How often do you snack between meals while watching television?*

Always Sometimes *Never*

APPENDIX E
Knowledge, Attitudes, and Behaviors
Food Self-Efficacy

At the store, I ask for a popsicle instead of ice cream.

Always Sometimes Never

I can eat fruit (for example: banana, apple, or orange) every day.

Always Sometimes Never

I drink water instead of kool-aid or pop

Always Sometimes Never

At home, I'd rather have cheese pizza instead of pepperoni pizza.

Always Sometimes Never

I ask for corn with no butter

Always Sometimes Never

I drink diet pop instead of regular pop.

Always Sometimes Never

At school, I try a new vegetable

Always Sometimes Never

At the store, I ask to buy fruits instead of potato chips.

Always Sometimes Never

Food Frequency

At school for breakfast I will go up for seconds.

Always Sometimes Never

At school for lunch, I will go up for seconds.

Always Sometimes Never

During the week, I go out to eat in a restaurant or get fast foods.

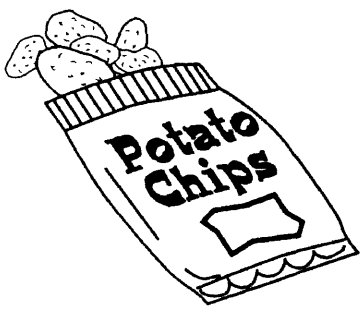
Always Sometimes Never

APPENDIX E
Knowledge, Attitudes, and Behaviors
Food Choice Intentions

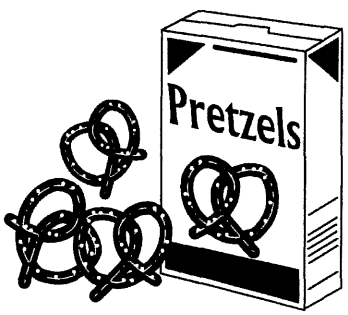
What Would You Do?

---

1 Which would you pick for a snack?



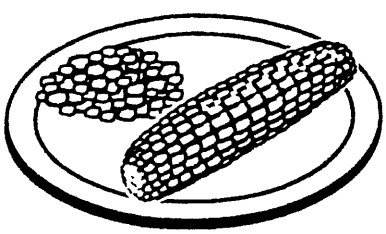
1
potato chips



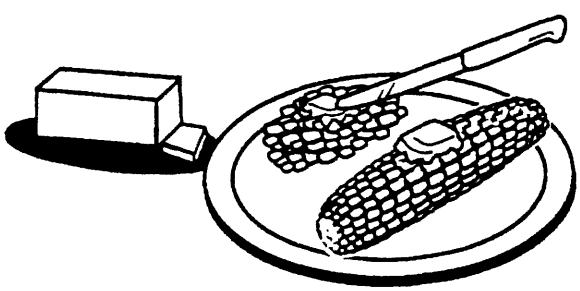
2
pretzels

---

2 Which would you do?



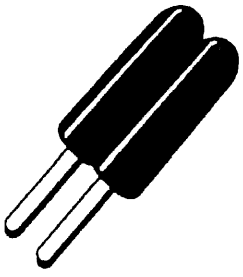
1
eat corn with no butter



2
eat corn with butter

---

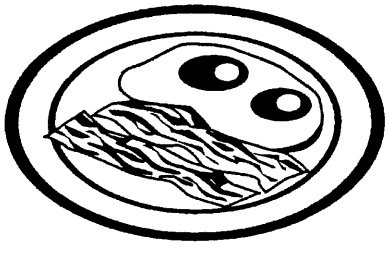
3 Which one would you ask for?



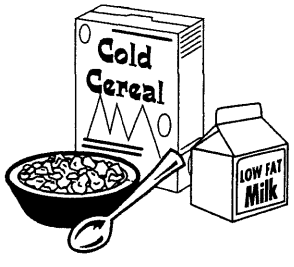
1
popsicle

2
ice cream

4 Which would you choose for breakfast?

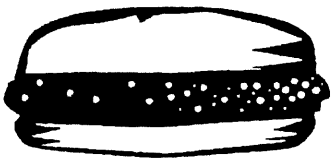


1
eggs, bacon

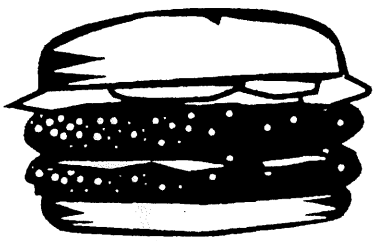


2
cold cereal

5 Which would you order at a fast food restaurant?

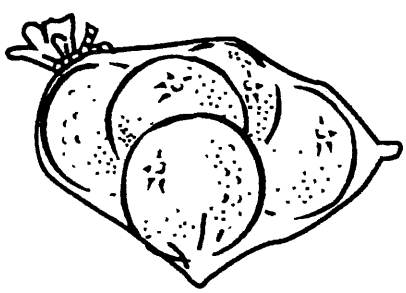


1
regular hamburger

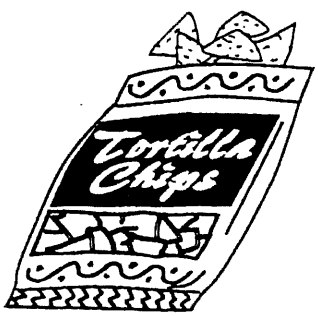


2
extra big hamburger

6 Which food would you ask the adults in your house to buy?

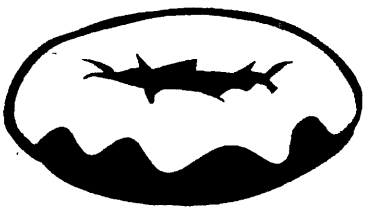


1
bag of oranges

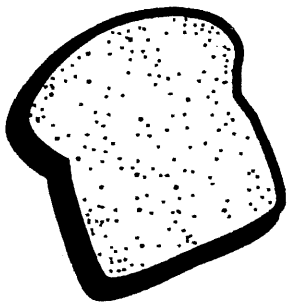


2
bag of tortilla chips

7 Which would you choose to eat in the morning?



1
donut



2
toast with no butter

8 Which would you choose to drink?

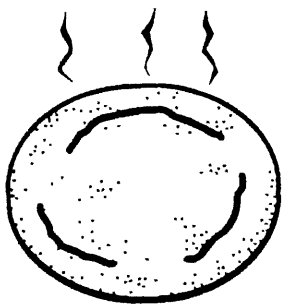
1
diet pop

2
regular pop

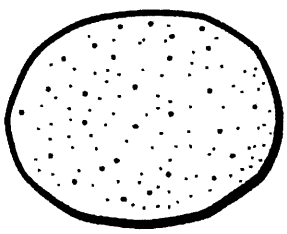
Appendix E
Knowledge of Fatty Foods

Which Food Has More Fat?

1 fry bread tortilla don't know



1



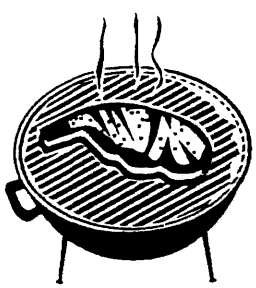
2

?

3

2 meat fried in a pan meat cooked on a grill don't know

1

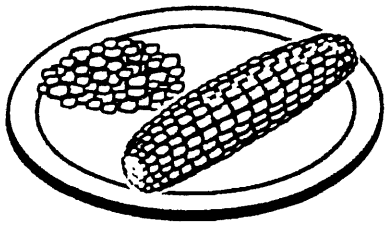


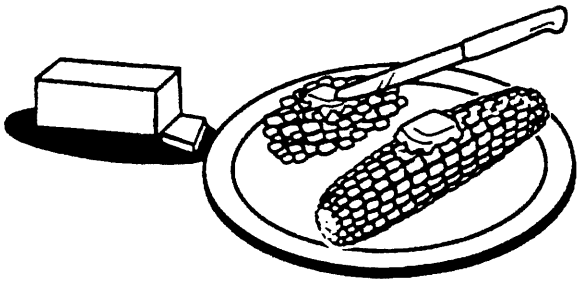
2

?

3

3 corn with no butter corn with butter don't know

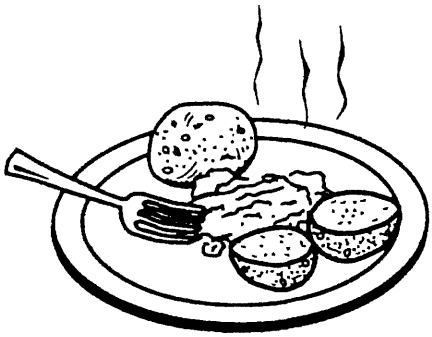




?

1 2 3

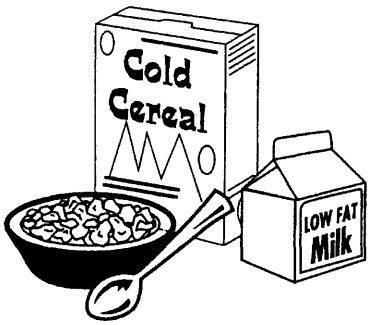
4 boiled potato fried potato don't know

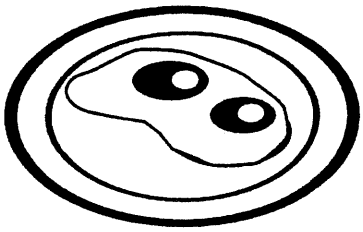


?

1 2 3

5 cold cereal fried eggs don't know

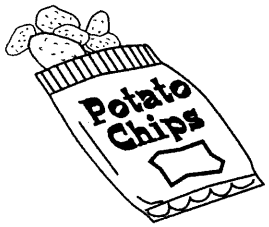




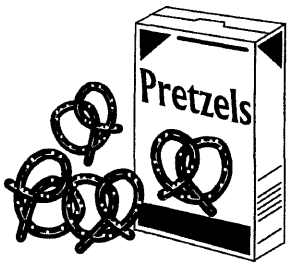
?

1 2 3

6 chips pretzels don't know



1



2

?

3

APPENDIX F
Dutch Eating Behaviors Questionnaire
Emotional Eating

Do you want to eat when you are sad?

Always Sometimes Never

Do you want to eat when you feel lonely?

Always Sometimes Never

Do you want to eat when somebody makes you mad?

Always Sometimes Never

Do you want to eat when you are bored?

Always Sometimes Never

APPENDIX G

What I Am Like

Instructions: Below there are two columns; each column has two choices for you to choose from. First pick the column that best describes you. Second, check the box that says if the statement is "Really True for Me" or "Sort of True for Me." You should only have one box out of the four boxes checked for each item.

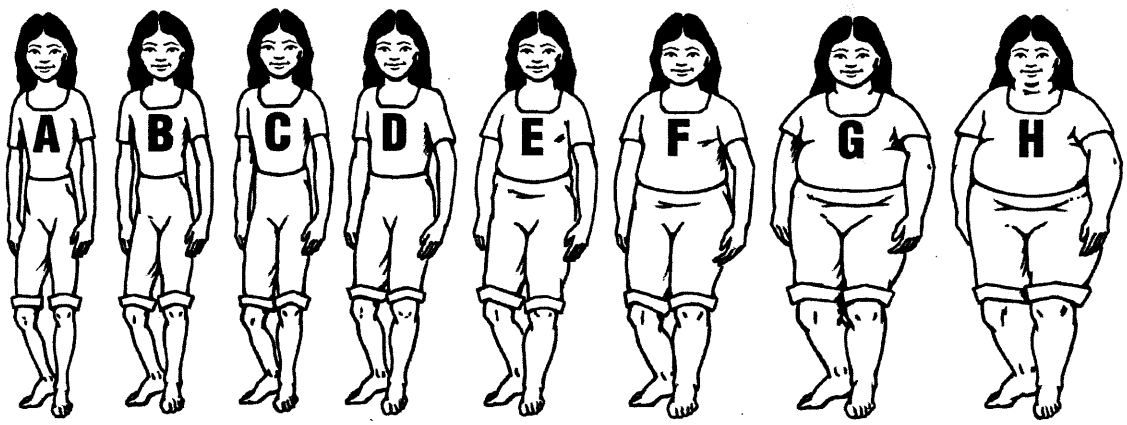
SAMPLE SENTENCE

Really True for me	Sort of True for me		Really True for me	Sort of True for me
☐	☐	Some Kids would rather play outdoors in their free time **BUT**	Other kids would rather watch T.V. ☐	☐

	Column 1			Column 2	
1. ☐	☐	Some Kids feel that they are *very good* at their school work **BUT**	Other kids *worry* about whether they can do the school work assigned to them. ☐	☐
6.☐	☐	Some kids are often *unhappy* with themselves **BUT**	Other kids are pretty *pleased* with themselves. ☐	☐
12. ☐	☐	Some kids *don't* like the way they are leading their life **BUT**	Other kids *do* like the way they are leading their life. ☐	☐
26.☐	☐	Some kids wish that more people their age liked them **BUT**	Other kids feel that most people their age *do* like them. ☐	☐

APPENDIX H
Knowledge, Attitudes, and Behaviors (Silhouettes)

Girls



Which student or students show the sizes that you think are most healthy?

A B C D E F G H

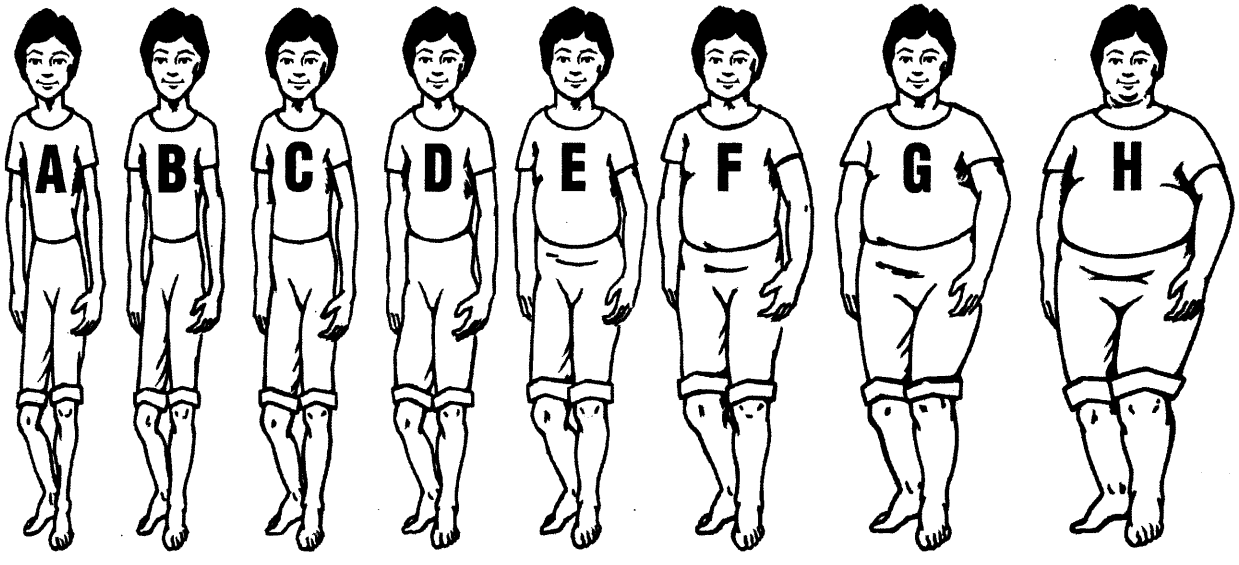
Which student shows the size that you think you are?

A B C D E F G H

Which student size would you like to look like?

A B C D E F G H

APPENDIX H
Boys



Which student or students show the size that you think are most healthy?

A B C D E F G H

Which student shows the size that you currently are?

A B C D E F G H

Which student shows the size that you would like to be?

A B C D E F G H

APPENDIX I
Knowledge, Attitudes, and Beliefs
Attitudes Towards Body Size

1. Do you think you are?

Too Skinny Just Right Too Fat

2. Would you like to be skinnier than you are now?

Yes No

3. How do you feel about your weight?

Happy/Never think about it Unhappy

4. Have you ever tried to lose weight?

Yes No

5. Are you <u>now</u> trying to lose weight?

Yes No

6. Circle the "Yes" beside all the things you have done to try to lose weight and "No"besides all the things you have <u>never</u> done to try to lose weight.

a.	I changed what or how much I ate to lose weight	Yes	No
b.	I exercised more to lose weight	Yes	No
c.	I skipped a whole meal to lose weight	Yes	No
d.	I went for a whole day without eating to lose weight	Yes	No
e.	I ate only cooked food to lose weight	Yes	No
	Or		
f.	I have never tried to lose weight	Yes	No

7. Have you ever done anything else to lose weight? (please list)

_____

_____

_____

APPENDIX J
Consent Form
Parent/Caretaker

My name is Tami Jollie-Trottier and I am a fourth-year graduate student in Clinical Psychology at the University of North Dakota. I am inviting your child to participate in a study that will attempt to identify variables that are associated with overweight and obesity. The main purpose of this study is to investigate potential risk factors for childhood obesity in American Indian youth. In order to determine your child's risk for obesity, your child's height and weight will be taken and their body mass index (BMI) score will be calculated by the Tribal Diabetes Prevention Program. I will be collaborating with the Tribal diabetes program and will have access to there BMI data set for the purpose of the current study. In addition, in order to determine potential risk factors, your child will be asked to fill out a series of questionnaires, which assess factors such as physical activity, eating patterns, dieting, cultural identity, self-esteem, and body dissatisfaction. The research packet will take between 30 to 45 minutes for your child to complete. Personal information provided by your child will be strictly confidential. Personal information gathered from the questionnaires will not be provided to any one other than the co-investigators. Your child will be assigned a code and their name will not appear on the survey. The information will be gathered from elementary children enrolled in the reservation school district.

Your child's participation in this study is strictly voluntary. He/she may withdraw at anytime for any reason. Your child will not be asked any questions as to why they have decided to withdraw from the study. They will be thanked for their time and cooperation. There will be no negative consequences for choosing to withdraw from the current study. Your child will received $10.00 for there participation.

There are no overt risks associated with participation in this study. A possibility does exist that some questions might make your child feel uncomfortable. He/she will always have the option of not answering any question they choose not to answer. If your child were to experience distress from answering any questions on the questionnaires, he/she will be confidentially referred to the appropriate resources and you the parent will be informed immediately. Your child will receive no direct or immediate benefit from participation in this research study. However, indirect results may lead to benefits to others in the future.

There is a possibility that the results of this study will be published in a professional journal or presented at professional conferences. However, no specific individual will be identified in the published literature. All personal information will be kept strictly confidential.

If you have nay questions regarding this research study you may contact Tami Jollie-Trottier (701-777-3241), Doug McDonald (701-777-4497) or Jeffery Holm (701-777-3792), or UND's Institutional Review Board (701-777-4278). Preliminary results will be available in the Summer of 2004.

If you have objections to your child participating in this study, please sign the informed consent and return this form to the designated school official and your child will be excluded from this study. You will be provided with a copy of this informed consent for future reference.

I have read and understand the above information. I acknowledge that my son/daughter may withdraw from the research study at any time and that their participation is completely voluntary.

Please sign and return if you **do** want your child to participate in this study.

_____
Parent's/Caretaker's Signature Date

_____
Name of Child Participating in Study Grade

_____
Name of Child Participating in Study (if more than one) Grade

_____
Name of Child Participating in Study (if more than one) Grade

Consent Form
Parents/Caretaker
(Please Keep This Copy)

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_____

Parent's/Caretaker's Signature Date

_____

Name of Child Participating in Study Grade

_____

Name of Child Participating in Study (if more than one) Grade

_____

Name of Child Participating in Study (if more than one) Grade

Informed Consent
Parent/Caretaker Participant

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Your participation in this study is strictly voluntary. You may withdraw at anytime for any reason. You will not be asked any questions as to why you have decided to withdraw from the study. There will be no negative consequences for choosing to withdraw from the current study. You will received $15.00 for your participation in this study.

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_____

Parent's/Caretaker's Signature Date

_____

Name of Child Participating in Study Grade

_____

Name of Child Participating in Study (if more than one) Grade

_____

Name of Child Participating in Study (if more than one) Grade

Informed Consent
Parent/Caretaker Participant
(Please Keep This Copy)

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If you have no objections to participating in this study, please sign the informed consent You will be provided with a copy of this informed consent for future reference.

I have read and understand the above information. I acknowledge that I may withdraw from the research study at any time and that my participation is completely voluntary.

_____

Parent's/Caretaker's Signature Date

_____

Name of Child Participating in Study Grade

_____

Name of Child Participating in Study (if more than one) Grade

_____

Name of Child Participating in Study (if more than one) Grade

APPENDIX K

Demographic Sheet
Parent Form

ID #: _____
Child's ID #:_____

Gender: Male ____ F ____ Age:_____

Please check your relation to child in study:
Biological Parent: _____
Adoptive Parent: _____
Stepparent: _____
Guardian: _____
Other: _____

Please circle your ethnicity:

American Indian **African American** **Caucasian** **Other**: _____

If you are American Indian, how do you refer to yourself: (please circle only one response)

Chippewa **Mitchif** **Metis** **Ojibway** **Anishanabe** **Sioux** **I don't know**

I am currently (check one):
____: Single
____: Married
____: Divorced
____: Separated
____: Widowed

Currently, I am (check all that apply):
____: Living alone
____: Living with a spouse/partner
____: Living with significant other
____: Living with children
____: Living with parents/stepparents
____: Living with other relatives
Please indicate total number of persons living in your home: _____

What is the highest grade or year of school you completed?

1) Never attended school or long attended kindergarten
2) Grades 1 through 8 (Elementary)
3) Grades 9 through 11 (Some high school)
4) Grades 12 or GED (High school graduate)
5) College 1 year to 3 years (Some college or technical school)
6) College 4 years or more (College graduate)

Are you currently:

1) Employed for wages
2) Self-employed
3) Out of work for more than 1 year
4) Out of work for less than 1 year
5) A homemaker
6) A student
7) Retired
8) Unable to work

Is your annual household income from all sources:

1) Less than $10,000
2) $10,000 to $20,000
3) $20,000 to $30,000
4) $30,000 to $40,000
5) $40,000 to $50,000
6) $50,000 to $60,000
7) $60,000 to $70,000
8) More than $70,000

Do you receive monthly commodities? **Yes** **No**

Do you received monthly EBT (food stamps)? **Yes** **No**

About how much do you weight without shoes? ___ ___ ___ **Pounds**

About how tall are you without shoes? ___**(ft)**/___ ___**(inches)**

Birth weight of child(ren) participating in the study: ___ Pounds; ___ Current **Grade**
___ **Pounds**; ____ **Current** Grade
___ **Pounds**; ____ **Current Grade**

Check here if you do not remember child's birth weight _____

APPENDIX L

Native Identity Scale
Cultural Identity Subscale

Please answer the following questions about yourself.

How often do you attend Native American Religious ceremonies (Sweatlodge, Sundance, Vision quest, etc.)? (please circle the best answer)

Rarely/Never **Sometimes** **Often** **Very Often**

How many of these did you attend in the last year? _____

How often do you attend Native American celebrations (Powwows, Wacipe, Native Sporting events, naming ceremonies, etc.)?

Rarely/Never **Sometimes** **Often** **Very Often**

How many of these did you attend in the last year? _____

Please circle the powwow activities that you participate in.

Dancer **Singer Vendor/crafts or food** **Other** _____

Can you speak and understand the Mitchif/Ojibway language?

Yes **No**

How often do the adults in your house teach your child about their tribe?

Rarely/Never **Sometimes** **Often** **Very Often**

How often do the adults in your house gather wild berries, tea, or other wild foods, or hunt animals?

Rarely/Never **Sometimes** **Often** **Very Often**

What tribe or tribes are you from?

_____

Of your five best friends, how many are not Native American? _____

APPENDIX M

Behavioral Risk Factor Surveillance System
Physical Activity Questionnaire
Parent/Caregiver Form

Exercise:

1) During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?

1) Yes
2) No
3) Don't know/Not sure
4) Refused

Physical Activity:

1) When you are at work, which of the following best describes what you do?

1) Mostly sitting or standing
2) Mostly walking
3) Mostly heavy labor or physically demanding work
4) Don't know/Not sure
5) Refused

** We are interested in two types of physical activity: vigorous and moderate. Vigorous activities cause large increases in breathing or heart rate while moderate activities cause small increases in breathing or heart rate.

2) Now, thinking about the moderate physical activities you do(when your not working) in a usual week, do you do moderate activities for at least 10 minutes at a time, such as brisk walking, bicycling, vacuuming, gardening, or anything else that causes small increases in breathing or heart rate?

1) Yes
2) No
3) Don't know/Not sure
4) Refused

3) How many days per week do you do these moderate activities for at least 10 minutes at a time?

1) __ __ Days per week
2) Do not do any moderate physical activity for at least 10 minutes at a time
3) Don't know/Not sure
4) Refused

4) On days when you do moderate activities for at least 10 minutes at a time, how much total time per day do you spend doing these activities?

1) __ __ minutes per day
2) Don't know/Not sure
3) Refused

5) Now thinking about the vigorous physical activities you do (when not working) in a usual week, do you do vigorous activities for at least 10 minutes at a time, such as running, aerobics, heavy yard work, or anything else that causes large increases in breathing or heart rate?

1) Yes
2) No
3) Don't know/Not sure
4) Refused

Please check the types of physical activity that you enjoy: Check only those that you have participated in during the last year.

____ *Walking* ____ *Running/Jogging* ____ *Biking*
___ *Aerobic class* ____ *Golf* ____ *Dancing*
___ *Swimming* ____ *Basketball*
____ *Other (please describe):*_____

For your most preferred activity, how many times have your participated in this activity in the past six months? ____ *times*

What is the main reason that you do not participate in this or other physical activities more often?

___ *They are not available*
___ *I don't have enough time*
___ *I am self-conscious about my body*
___ *I am too tired/lack energy*
___ *I feel unprotected on bike path because there is no enforced leash law*
___ *Other (please describe):* _____

How many hours do you spend watching television, videos, or playing on the computer during an: average weekday? ____ average weekend day? _____

How often do you snack between meals or in front of the television?
Very Often Often Seldom Never

APPENDIX N
Knowledge, Attitudes, and Behaviors
Foods Self-efficacy

At the store, I buy popsicles instead of ice cream.
Always Sometime Never

I supply fruit (for example: banana, apple, or orange) in my house every day.
Always Sometimes Never

I drink water instead of kool-aid or pop
Always Sometime Never

At home, I order or make cheese pizza instead of pepperoni pizza.
Always Sometime Never

I serve corn with no butter
Always Sometime Never

I drink diet pop instead of regular pop.
Always Sometime Never

At home, I try to serve a new vegetable
Always Sometime Never

At the store, I buy fruits instead of potato chips.
Always Sometime Never

Which would you usually select for a snack?
A bag of Potato Chips A bag of Pretzels

Which would you usually do?
Eat corn with no butter Eat corn with Butter

Which one do you usually eat?
Popsicle Ice Cream

At home for breakfast I will have a second helping of food
Always Sometimes Never

At home or work for lunch, I will have a second helping of food
Always Sometimes Never

During the week, I go out to eat in a restaurant or get fast foods

Always Sometimes Never

Food Choice Intentions

Which would you usually choose for breakfast?

Eggs, Bacon Cold Cereal

Which would you order at a fast food restaurant?

Regular hamburger Super sized Hamburger

Which food do you usually buy for your household?

Bag of oranges Bag of tortilla chips

Which would you usually choose to eat in the morning?

Donut Toast with no butter

Which would you usually choose to drink?

Diet pop Regular pop

Knowledge of Fatty Foods

Please circle which food has more Fat?

1) An averaged size Fry Bread	or	A tortilla
2) Meat fried in a pan	or	Meat cooked on a grill
3) Corn with no butter	or	Corn with butter
4) Boiled potato	or	Fried potato
5) Cold cereal	or	Fried eggs
6) Chips	or	Pretzels

Please answer the following questions for your child who is participating in the study.

How often does your child eat commodities?

Always Sometimes Never

Do you get a monthly EBT (Food Stamp) card?

Yes No

Do you get WIC (Women Infants and Children) assistance?
Yes *No*

In the last week, how often has your child eaten breakfast, lunch, dinner, or a snack at the following places:

____: *Grandparent's house*
____: *Aunt's/Uncle's house*
____: *Friend's house*
____: *Restaurant*

*Who prepares meals at your home?*_____

*Who does the grocery shopping?*_____

*Please list your favorite foods:*_____
_____

Please list your child's favorite foods:

_____
_____

During a typical week, how many meals does your child eat at a fast-food, restaurant, café, or convenience stores
*Breakfast:*_____*meals a week*
*Lunch:*____*meals a week*
*Dinner:*____*meals a week*

APPENDIX O
Dutch Eating Behaviors Questionnaire
Emotional Eating

Do you have the desire to eat when you are irritated?
Never Seldom Sometimes Often Very Often

Do you have a desire to eat when you have nothing to do?
Never Seldom Sometimes Often Very Often

Do you have a desire to eat when you are depressed or discouraged?
Never Seldom Sometimes Often Very Often

Do you have a desire to eat when you are feeling lonely?
Never Seldom Sometimes Often Very Often

Do you have a desire to eat when somebody lets you down?
Never Seldom Sometimes Often Very Often

Do you have a desire to eat you are cross (angry)?
Never Seldom Sometimes Often Very Often

Do you have a desire to eat when you are approaching something unpleasant to happen?
Never Seldom Sometimes Often Very Often

Do you get the desire to eat when you are anxious, worried, or tense?
Never Seldom Sometimes Often Very Often

Do you have a desire to eat when things are going against you or when things have gone wrong?
Never Seldom Sometimes Often Very Often

Do you have a desire to eat when you are frightened?
Never Seldom Sometimes Often Very Often

Do you have a desire to eat when you are disappointed?
Never Seldom Sometimes Often Very Often

Do you have a desire to eat when you are emotionally upset?
Never Seldom Sometimes Often Very Often

Do you have the desire to eat when you are bored or restless?
Never Seldom Sometimes Often Very Often

APPENDIX P

Rosenberg Self-Esteem Scale (RSE)

On the whole, I am satisfied with myself

Strongly Agree Agree Disagree Strongly Disagree

At times I think I am no good at all

Strongly Agree Agree Disagree Strongly Disagree

I feel that I have a number of good qualities.

Strongly Agree Agree Disagree Strongly Disagree

I am able to do things as well as most other people

Strongly Agree Agree Disagree Strongly Disagree

I feel I do not have mush to be proud of.

Strongly Agree Agree Disagree Strongly Disagree

I certainly feel useless at times.

Strongly Agree Agree Disagree Strongly Disagree

I feel that I'm a person of worth.

Strongly Agree Agree Disagree Strongly Disagree

I wish I could have more respect for myself.

Strongly Agree Agree Disagree Strongly Disagree

Overall, I think I am a failure

Strongly Agree Agree Disagree Strongly Disagree

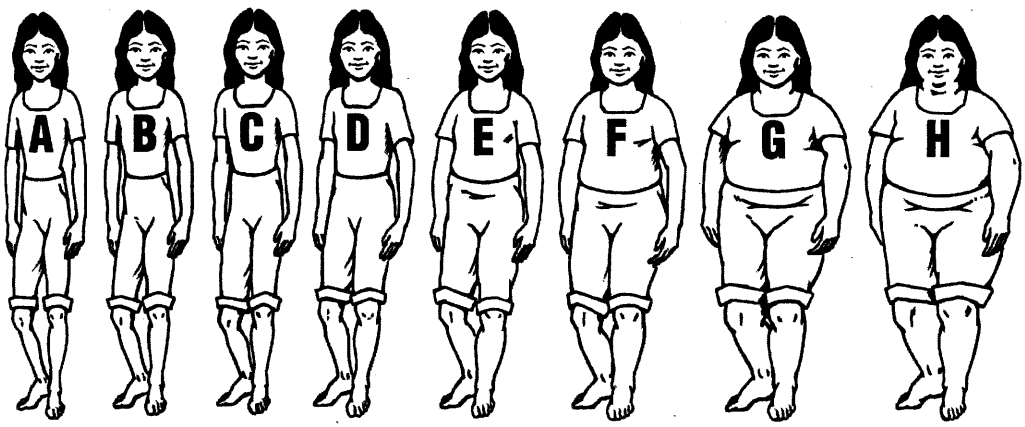
I take a positive attitude towards myself.

Strongly Agree Agree Disagree Strongly Disagree

APPENDIX Q
Knowledge, Attitudes, and Behaviors
Attitudes Towards Body Size (Silhouettes)

Please complete for each gender

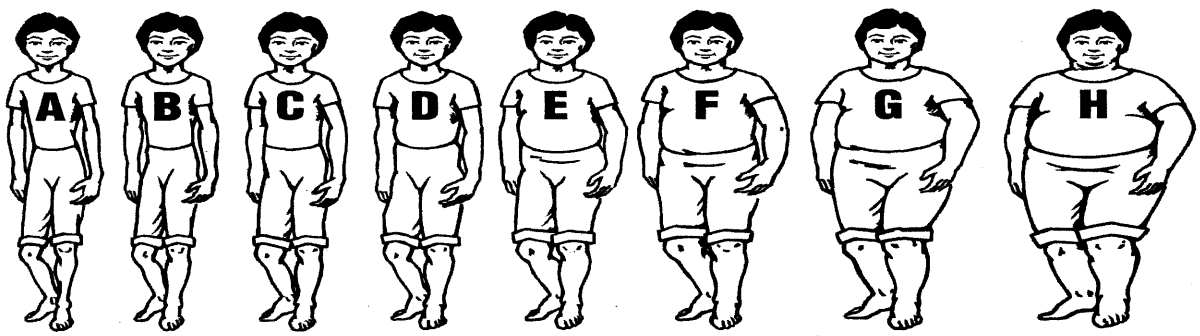
Girls



Which student(s) show the sizes that you think are most healthy?

A B C D E F G H

Boys



Which student(s) show the sizes that you think are most healthy?

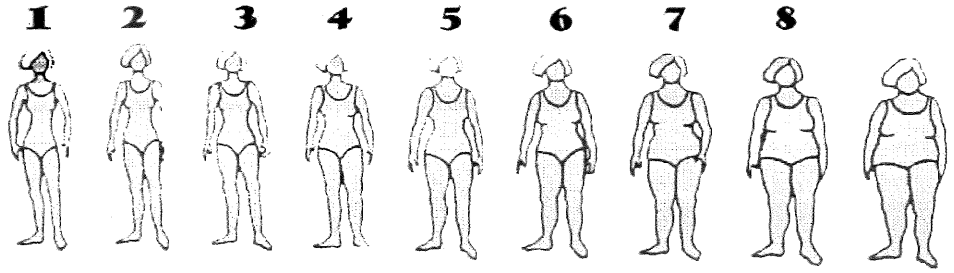
A B C D E F G H

APPENDIX R
Figure Rating Scale

Please circle the person that corresponds best to your "ideal" size and mark an "I" beside it.

Please circle the person that corresponds best to your "current" size and mark a "C" beside it

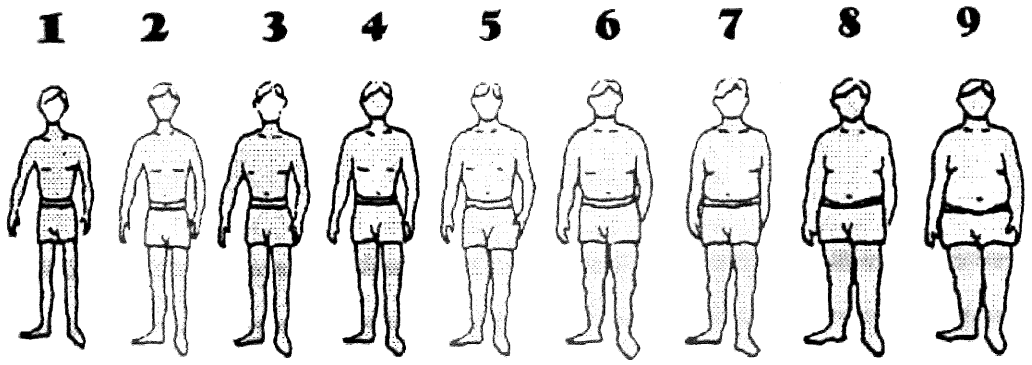
Women



Please circle the person that corresponds best to your "ideal" size and mark an "I" beside it

Please circle the person that corresponds best to your "current" size and mark a "C" beside it

Men



APPENDIX S

Attitudes Toward Body Size
Parent Form

1. Do you think you are?

   Too Skinny About Right Too Fat

2. Would you like to be skinnier than you are now?

   Yes No

3. How do you feel about your weight?

   Happy/Never think about it Unhappy

4. Have you ever tried to lose weight?

   Yes No

5. Are you <u>now</u> trying to lose weight?

   Yes No

6. Circle the "Yes" besides all the things you have ever done to try to lose with and the "No"besides all the things you have <u>never</u> done to try to lose weight.

a. I changed what or how much I ate to lose weight	Yes	No
b. I exercised more to lose weight	Yes	No
c. I skipped a whole meal to lose weight	Yes	No
d. I went for a whole day without eating to lose weight	Yes	No
e. I ate only cooked food to lose weight	Yes	No
Or		
f. I have never tried to lose weight	Yes	No

7. Have you ever don anything else to lose weight? (please list)

   _____
   _____
   _____
   _____

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