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Relationship Between Body Esteem and Relative BMI in At Risk/ Overweight 4-7 Year Olds

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RELATIONSHIP BETWEEN BODY ESTEEM AND RELATIVE BMI IN AT RISK/OVERWEIGHT 4-7 YEAR OLDS

by

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ABSTRACT

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The purpose of this study was to examine how body esteem affects a child's relative BMI. In a current childhood obesity prevention study, the Revised Body Esteem Scale (BES) data for 223 at risk for overweight/overweight children between the ages of 4-7 was analyzed. The scores range from 0-60, with higher scores being associated with higher body esteem. Additional covariates examined in relationship to the children's BES included age, gender, race, parental BMI, marital status, and income. The majority of the study population was African American (79.8%) girls (63.2%). Body Esteem was determined to be the most influential variable on a child's relative BMI ($p < .001$) followed closely by parental BMI. Age, race, and gender all were found significantly influential as well ($p < .05$). The findings from this study will add new insight into the relationship between body esteem, BMI, and the covariates in this special population.

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CHAPTER 1

Introduction

Currently, more than 72 million U.S. adults (Center for Disease and Control, 2009b) and 12.5 million U.S. children (United States Department of Human Health Services, 2009) are classified as being overweight or obese. The term 'obesity' specifically references excessive amounts of fat on the body, while 'overweight' references excessive amounts of body weight consisting of fat, water, bone, and muscle (National Institute of Health, 2008). As a result of the steady rise in obesity rates, the term 'obesogenic' has been coined by the CDC to describe the current American society and its unhealthy environment complete with unhealthy food and activity habits. The problem associated with the increasing rate of obese Americans often is related to the lack of affordability and accessibility to healthy eating and physical activity. Effective policies and interventions should focus on addressing these barriers to healthier lifestyle habits (CDC, 2009b).

Obesity is associated with many health problems such as type 2 diabetes, cancer, stroke, respiratory problems, gallbladder disease, arthritis, and coronary heart disease (CDC, 2009e; Jung, 1997; NIH, 1985; Van Itallie, 1979). It is not so surprising, then, that obesity is negatively associated with both quality of life (Kushner & Foster, 2000) and longevity (Jung, 1997; NIH, 1985; Van Itallie, 1979). Health-related quality of life instruments are one of the best methods of measuring health perceptions of overweight and obese individuals (Kushner & Foster, 2000). Overweight and obese people perceive themselves as having poor overall health which will get worse over time (Kushner & Foster, 2000). While illnesses accompanying weight gain decrease quality of life

(Kushner & Foster, 2000), psychological well being is also jeopardized and has been deemed the 'greatest adverse effect of obesity' due to the amount of internal suffering the disease produces (NIH, 1985). Regarding longevity, higher mortality rates have been linked to overweight and obese individuals (Jung, 1997; NIH, 1985; Van Itallie, 1979). Morbidly obese individuals have been known to have mortality ratios as high as 1200% (NIH, 1985). Obesity is also a very expensive condition. In 1997, annual obesity-related medical treatments cost $69 billion (Jung, 1997); in 2000, the annual cost was $117 billion (CDC, 2009a); and as of July 2009, the annual cost was $147 billion and rising (CDC, 2009e). The economic cost of childhood obesity in 1979 was reported to be approximately $35 million (CDC, 2009a). More recent costs have been reported to be in excess of $127 million (CDC, 2009a). Thus, interventions which successfully lower the incidence and prevalence of obesity will also lower associated expenditures by individuals and the health care system.

People who are obese also suffer from significant social and psychological problems. Social discrimination and isolation of obese people are well documented (Dietz, 1998; Strauss, 2000; Strauss & Pollack, 2003; USDHHS, 2001). Overweight children tend to have fewer friendships than normal weight children (Strauss & Pollack, 2003). Being socially unaccepted by peers is thought to lead to poor psychological health including poor self esteem and even depression (Strauss & Pollack, 2003). Researchers need to intervene on an overweight child's psychological health early on in life to ensure a optimal psychological well-being as an adult. Overall, the consequences of obesity are severe. Negative influences on health, quality of life and life span, imposition of significant economic burdens, and infliction of psychological and social distress are all

consequences of being obese. In spite of these alarming consequences, the obesity epidemic continues to spread across all populations.

Children are at especially high risk for becoming obese adults. The CDC recently stated that since 1980, adult obesity rates have doubled and child obesity rates have tripled (CDC, 2009a). The increasing prevalence of obesity among children has been linked to the obesity of the parents. Whitaker, Wright, Pepe, Seidel, and Dietz (1997) found that having one or more obese parents significantly increased the chances of raising an obese child. This finding is particularly true for children under age 10 regardless of whether they are normal weight or obese. However, while genetics plays a major role in determining a child's risk for becoming obese, Hill and Trowbridge (1998) suggest that since a family's genetic makeup does not change very quickly, the rapid growth in obesity rates must be related to factors other than having a family history of obesity. Positively influencing non-genetic factors across multiple systems appears to be the key to reversing the current obesity epidemic trend for both adults and children, and until all systems are positively influenced (i.e., home, school, workplace, and community), the trend will continue to climb and threaten our future generations.

Statement of the Problem

Childhood obesity has been deemed a pandemic in the 21st century, and overweight and obese children are at the mercy of a 'toxic' environment of unhealthy lifestyles (Stender, Burghen, & Mallare, 2005). Childhood obesity is a term that applies to children aged 2-18 who have a BMI above the 95th percentile for age and gender according to BMI charts created by the CDC (Institute of Medicine, 2005). A BMI between the 85th and 95th percentile indicates that a child is at risk for becoming

overweight. A current CDC report compared the rate of overweight children from the late 1970s to the early 2000s as follows: ages 2-5 went from 5% - 13.9%; ages 6-11 went from 6.5% – 18.8%; ages 12-19 went from 5% - 14.4% (CDC, 2008). This climbing trend of childhood obesity has captured the interest of many researchers who are currently investigating all possible causes for the epidemic.

Since children are still developing both physically, cognitively, and emotionally, it is important to address factors which may influence emotional as well as physical health. It has been recently found that self esteem, body image, and emotional well-being play significant roles in children's' psychological health, and, thus, psychological health is compromised if the child is overweight (Wardle & Cooke, 2005). The influences of being overweight or obese on psychological health is an area that has not been widely studied (Wardle & Cooke, 2005) Therefore, it is clear that more attention should be devoted on increasing current understandings of the impact of psychological health on obesity in order to inform intervention design and policy development in efforts to promote optimal health and well-being among this particularly vulnerable population.

Purpose of the Study

The purpose of this study is to determine whether body esteem negatively affects relative BMI in at risk/overweight 4-7 year olds.

Research Question

Is there a relationship between relative BMI and perceived Body Esteem in at risk/overweight children ages 4-7?

Significance of the Study

The findings from this study will add new insight into the relationship between relative BMI and Body Esteem among at risk and overweight 4-7 year old children. In addition, the findings will also provide further knowledge pertaining to how covariates such as parental BMI, parent's marital status, household income, age, gender, and race contribute to the relationship between a child's relative BMI and their perceived Body Esteem. Previous childhood obesity studies have not examined the above mentioned relationships in such a young population. So, the results of this study will contribute to intervention planning and research studies involving 4-7 year old children who are at risk or overweight.

CHAPTER 2

Review of Literature

Obesity is rapidly becoming a major epidemic in today's society. The number of overweight and obese adults and children continue to rise, 72 million and 12.5 million, respectively (CDC, 2009b; USDHHS, 2009). The mean BMI for adult men and women in the United States as of 2002 was 28.0 (Ogden, Fryar, Carroll, & Flegal, 2004) which is in between the BMI classifications of overweight (25-30) and obese (30-35) (CDC, 2006). Between 2003 and 2004, overweight children in the United States equaled almost half the number of overweight adults, 17.1% and 32.2% respectively (Ogden et al., 2006). The percent of overweight children currently holds steady at 17%, but when the number of children at risk for becoming overweight is included, this percentage doubles to 34% (USDHHS, 2009). In 2002, the mean BMI range for boys and girls ages 4-7 was between 16.3-17.0 and 15.9-16.6, respectively, gradually increasing with age (Ogden et al., 2004). According to CDC growth charts (2000), these BMIs mentioned for boys and girls ages 4-7 are right beneath at risk for overweight classification ranges (16.9-17.4 for boys; 16.8-17.6 for girls). Once boys and girls turn 8, their mean BMI jumps to 18.4 and 18.3, respectively, classifying both genders as at risk for overweight (CDC, 2000; Ogden et al., 2004). This increasing BMI trend only continues to climb, with both genders reaching overweight classifications by age 19 (Ogden et al., 2004). If the number of overweight children in the United States continues to rise, then the number of overweight children will surpass that of overweight adults.

Obesity related diseases such as Type 2 diabetes, coronary heart disease, and respiratory problems, once considered only adult diseases, are now becoming more

prominent among overweight children. The annual death toll attributed to obesity in 1999 was 280,000 (Allison, Fontaine, Manson, Stevens, & Van Itallie, 1999), and this number has most likely only increased in the past decade. The annual medical costs of treatment for ailments due to overweight and obese in children has gone from $35 to $127 million over the course of the 20 year period of 1979-1999 (CDC, 2009a), and a current 2009 CDC report states obesity costs at $147 billion annually. Environmental and biological factors that may influence the continual increase in the incidence of childhood obesity include race, gender, age, socioeconomic status, parental influences, and psychological well-being. Even though biological factors such as race and age are generally deemed unchangeable as opposed to the remaining environmental factors, all of these factors need to be addressed in interventions targeting the prevention of childhood obesity in order to be effective.

Ethnic Influences on Childhood Obesity

When discussing the potential risk factors and determinants associated with childhood obesity, it is important to mention the prevalence among different ethnicities and socioeconomic classes. From 1976-1980, the prevalence of overweight girls between the ages of 6-11 was 5.2% (Caucasian), 11.2% (African American), and 9.8% (Mexican). From 1999-2002, the prevalence of overweight girls ages 6-11 increased to 13.1 (Caucasian), 22.8% (African American), and 17.1% (Mexican). For boys aged 6-11 from 1976-1980, the prevalence of overweight was 6.1% (Caucasian), 6.8% (African American), and 13.3% (Mexican). From 1999-2002, these numbers had risen to 14.0% (Caucasian), 17.0% (African American), and 26.5% (Mexican) (National Center for Health Statistics, 2004). From this data, it is apparent that African American girls and

Mexican boys have experienced the biggest gains in childhood overweight and obesity over the course of about 20 years.

The 2003-2004 National Survey of Children's Health found similar results among a sample of 5-18 year olds in that as a whole group, African American children were 50% more likely to be overweight than Caucasian children and Hispanic children 30% more likely to be overweight than Caucasian children (Lutfiyya, Garcia, Dankwa, Young, & Lipsky, 2008). Males were also more likely than females in all ethnicities to be overweight children. However, this finding is inconsistent with another study by Danielzik, Czerwinski-Mast, Langnase, Dilba, and Muller (2004) that found females were found to be more likely to be overweight (11.2%) than males (9.2%) in a sample of 5-7 year old children. One explanation for this discrepancy is the latter study designated overweight as being greater than or equal to the 90^{th} percentile for BMI rather than the universal standard of overweight being greater than or equal to the 85^{th} percentile. Also, the latter study only looked at an age group difference of 2-3 years while the former study looks at a much broader age range. Regardless, the reality is that both genders are experiencing a high rate of overweight and obesity.

Researchers have even looked at the preschool years as a period of concern for the development of problems associated with childhood overweight and obesity. In a study of 2,271 children who were 3 years old, Kimbro, Brooke-Gunn, and McLanahan (2007) found that 35% were overweight or obese, and Hispanic children were twice as likely as their African American or Caucasian peers to be overweight or obese. Linked to these findings are predictive factors of developing childhood obesity such as high birth weights, overweight or obese mothers, and taking a bottle to bed (Danielzik et al., 2004;

Kimbro et al., 2007). Children as young as 4 years old who are between the 50th and 75th percentile for their BMI have about a 50% chance of becoming overweight by the time they are 12 (Nader et al., 2006). Furthermore, any child between the ages of 2 and 4 that experienced at least one bout of being overweight had a 5 times greater chance of becoming overweight again by age 12 than their normal weight peers of the same age (Nader et al., 2006). Statistics related to childhood obesity have not wavered much in the past few years; rather, they continue to steadily get higher.

Socioeconomic Influences on Childhood Obesity

In terms of socioeconomic status, those children living in homes below 150% of the Federal poverty level for income and who have lacked preventive care in the last year tend to be the biggest group at risk for becoming overweight (Lutfiyya et al., 2008). A child's BMI appears to be related to poverty status and may be influenced by lower rates of participation in physical activity due to safety issues and unhealthy food due to low accessibility of affordable, healthy food options in neighborhoods (Lutfiyya et al., 2008). Children from low income households suffer from a lack of food availability due to financial woes and indirectly cause these them to engage in poor eating habits, ultimately leading to unhealthy growth (Anderson, Crespo, Bartlett, Cheskin, & Pratt, 1998). In addition, children of both genders who are overweight have been shown to grow up to become adults with lower household incomes and higher poverty rates than those children who grew up to be normal weight adults (Gortmaker, Must, Perrin, Sobol, & Dietz, 1993). Certain studies have identified gender-specific risk factors for overweight and obesity occurring in children. For instance, risk factors for boys include being raised

in single parent households with a smoking parent while for girls, low activity is the biggest risk factor (Danielzik et al., 2004).

Children who are overweight or obese are more likely to live with a single parent with a low household income as compared to a normal weight child (Gable & Lutz, 2000). Single parents tend to allow children more self-responsibility in terms of nutritional and activity decisions. These children in turn tend to choose packaged foods and sedentary activities such as television watching and video games instead of healthier choices putting them at greater risk for becoming overweight (Gable & Lutz, 2000). In the late 1970s and 1980s, a study performed by Lutz, Blaylock, and Smallwood (1993) found that lower income households had reduced vegetable consumption by 22% while higher income households only reduced their vegetable intake by 12%. Crockett and Sims (1995) also found that single parent households and two parent working households both are more likely to consume packaged foods high in fat and sodium. This unhealthy 'convenience' food consumption is setting these family types up for future health problems, namely obesity and its associated health problems. It is necessary for society to intervene on the unhealthy lifestyles of single parent households in order to promote healthy growth for the children living in these conditions.

The rate of obesity among low-income preschool aged children (2-4 years old) is 1 in 7 (CDC, 2009d). In 1998, 12.4% of low-income preschoolers were obese; in 2003, 14.5% were obese; and in 2008, 14.6% were obese (CDC, 2009d). So, between 2003 and 2008, the rate for low income preschoolers seems to have stabilized; however, the rate is still too high for that age range as it is for every additional age range above it. This

emerges, then as an ideal time to intervene with methods to prevent the development of obesity.

Obesity Related Health Risk Tracked into Adulthood

Certain other physical risk factors and determinants are associated with children being overweight or obese, all of which inevitably set children up for potentially carrying this societal burden into adulthood. A study by Sinaiko, Donahue, Jacobs, and Prineas (1999) repeatedly measured the height, weight, and systolic blood pressure of a group of co-ed 7-8 year olds for a period of 16-17 years. They concluded that children who become overweight increase their risk for developing cardiovascular disease as adults (Dietz, 1998) due to the significant relationship found between a childhood weight and BMI and the insulin, lipids, and systolic blood pressure levels seen in adulthood. In a 32-year follow-up study, adult mortality was found to be linked with childhood BMI (Engeland, Bjorge, Sogaard, & Tverdal, 2003). In the Bogalusa Heart Study, even 65% of overweight children as young as 2-5 years old with BMIs at or greater than the 85th percentile were found to be 4 times as likely to become overweight in adulthood compared to their same aged peers with BMIs less than the 50th percentile (Freedman et al., 2005).

Other adult health issues that stem from childhood obesity include sleep apnea induced pulmonary hypertension, left ventricular hypertrophy, and type 2 diabetes mellitus (Dietz, 1998; Sorof & Daniels, 2002; USDHHS, 2001). About 25% of overweight children have 2 or more risk factors for cardiovascular disease while a whopping 60% have at lease one cardiovascular disease risk factor (Dietz, 2004). In addition, the Bogalusa Heart Study findings revealed that overweight children were 4.5

times more likely to have an elevated systolic blood pressure reading and 2.4 times more likely to have an elevated diastolic blood pressure reading (Freedman, Dietz, Srinivasan, & Berenson, 1999; Sorof & Daniels, 2002).

The American Heart Association has "reclassified obesity as a major, modifiable risk factor for coronary heart disease" (Eckel & Krauss, 1998). Obesity is also a significant factor in the development of Type 2 diabetes. This disease, virtually unseen in children 20 years ago, now accounts for 8%-45% of all diabetes cases in children (Dietz, 2004; Hannon, Rao, & Arslanian, 2005). As more obese children develop diabetes in addition to other cardiovascular disease risk factors such as hypertension and dyslipidemia (Invitti et al., 2006), the prevalence of the metabolic syndrome becomes more prominent. The metabolic syndrome, or Syndrome X, is a combination of metabolic and cardiovascular issues occurring simultaneously including hypertension, glucose intolerance, increased cholesterol levels, and hyperinsulinemia (Reaven, 1988). Children who are considered to be severely obese have been found to have a 50% prevalence of the metabolic syndrome, and any child who is overweight has some presence of this syndrome which results in increased risks of cardiovascular complications as the child gets older (Weiss et al., 2004). Successfully intervening on at risk children before they become overweight is a formidable task. As overweight children become overweight adults, cardiovascular morbidity and mortality will continue to rise and impose a significant burden on individuals, communities, and the health care system (Eckel & Krauss, 1998; Sorof & Daniels, 2002).

Influence of Parental Obesity

The concern to tame childhood obesity receives heightened attention because there is a 70% chance that an overweight child will lead the same overweight lifestyle as an adult, and this chance increases by 10% if the child has an overweight parent (USDHHS, 2001). Obesigenic families, those families that include 2 obese parents who have a high dietary intake and low physical activity level, contribute substantially to a child's obesity risk. Girls from obesigenic families have been shown to have greater increases in their BMI from ages 5-7 than their peers from normal weight families, and this increased BMI remains unchanged from ages 7-11. Accompanying these higher BMIs are higher body fat percentages seen specifically at ages 9-11 (Davison & Birch, 2002; Davison, Francis, & Birch, 2005) In addition, diets higher in fat and excessive TV viewing were observed in the girls from the obesigenic families in comparison to their peers from normal weight families. Parents, thus, set the precedent for their children's future eating and activity patterns through their own lifestyle behaviors (Davison et al., 2005).

Epstein, Wing, Koeske, Andrasik, and Ossip (1981) conducted a family-based weight loss behavior modification study from which they concluded that in order to have success with behavior modification in children, all family members should be included in the intervention process. The more treatment sessions that the family attended, the more weight loss was experienced; furthermore, a parents' weight loss was positively correlated with their child's weight loss (Wadden, 1990). Parental engagement, family cohesion, parent-child communication (Ornelas, Perreira, & Ayala, 2007), and parental

encouragement (Bauer, Nelson, Boutelle, & Newmark-Sztainer, 2008) are factors which are positively associated with increased physical activity among adolescents.

In addition, Epstein et al. (1981) also found that children had better maintenance of learned behavior than their parents. While both children and parents followed a similar path during the treatment phase of the intervention, the children were the ones who retained and continued engaging in the healthy eating and activity habits. Epstein et al. concluded that children are capable of maintaining healthy habits through support and self-monitoring despite their parents' lack of self-control when it comes to maintaining healthy habits. Epstein's study offers insight into just how observant children really are. It also may be an indication that, while parents tend to be the designated role models for their children, their children still maintain an individual sense of what choice or choices are best for them.

Relationship of Psychological Aspects

Past research has focused on the psychological aspects associated with childhood obesity. In regards to youth physical activity, the psychological effects of being an overweight child include low self-esteem and even depression. These factors may be determinants for an inactive lifestyle due to increased perceptions of social discrimination (USDHHS, 2001). Obese children are often taller than their normal weight peers, and therefore, mistakenly stereotyped as being more mature and treated as such by adults who do not know their true age (Dietz, 1998). If an overweight child is expected to perform at an older child's level because of their appearance, the overweight child may become frustrated and experience a sense of failure because they cannot perform at the higher level requested of them resulting in potential isolation and inactivity (Dietz, 1998).

Interventions should include self-efficacy boosting strategies that promote healthy activity habits in addition to healthy eating habits so that overweight children realize that they do possess the capability of succeeding with the adoption of healthier lifestyles.

Studies have shown that children as young as 10 or 11 years old prefer to befriend children who are not overweight (Dietz, 1998; Richardson, Goodman, Hastorf, & Dornbusch, 1961). Even more alarming is that children as young as 6 years old already associate being overweight with being lazy and sloppy. Consequently, an overweight child tends to befriend younger peers who are excited about playing with the older child rather than discriminating against the older child's appearance (Dietz, 1998; Staffieri, 1967). Despite the convincing research claiming that overweight children are targets of repeated rejection by their non-overweight peers, an early study by Sallade (1973) compared the psychological adjustment between obese and non-obese 3rd, 5th, 8th, and 11th graders revealed that obese children may be more socially accepted than originally thought. This study also brought attention to self-concept, "the particular attitudes and valuations a child has towards himself or herself", rather than social and emotional adjustment as the culprit of overweight children's psychological problems. Poorer self-concept was high among both sexes and did not vary too much amongst the different grade levels. These findings are not consistent with viewpoints from a sample of pediatricians in a more recent study. Price, Desmond, Ruppert, and Stelzer (1989) conducted physician interviews and found that 71% of pediatricians believed that a strong correlation exists between childhood obesity and discrimination and rejection by peers. However, it is not known if the pediatricians had evaluated this belief with their overweight patients or if it was just a hypothesis; therefore, further research needs to be

performed to validate the claim of the pediatricians. Current research on the psychological consequences of childhood obesity is lacking but needs to be addressed as the rates of childhood obesity only continue rising.

Body Esteem and Dieting Behaviors

Discrimination experienced by overweight and obese children can be detrimental not only to self-concept but also to other areas of psychological well being, particularly body esteem. Well rounded body esteem, also known as body image, research discusses the prevalence of eating disorders, so it is important to at least skim the surface of the association between body esteem and the development of eating disorders. Researchers have investigated the word "dieting" and conducted interviews with children to better understand what thoughts children associate with that word. Schur, Sanders, and Steiner (2000) found very interesting results when they conducted a study with children aged 8-13 years. The average child in this age range defines "dieting behavior as a combination of exercise and altering food choices to avoid 'fattening' foods and eating more 'healthy' foods." Researchers also found that even though 50% of children in this age range desired to lose weight, only 16% actually had tried losing weight. Putting things into further perspective, only 2 out of 10 children who associated dieting with eating less actually ate less to attempt weight loss while the other 8 simply made modifications in their food and exercise choices. While dieting behaviors are often associated with girls, poor body esteem is found in both genders; 42% of boys in a study by Schur et al. reported trying to either lose or gain weight. Researchers from this study suggested that because 77% of children reported hearing about "dieting" from a parent, the parent(s) are a major influence on their children's eating habits and psychological well being.

In another study by Young-Hyman, Schlundt, Herman-Wenderoth, and Bozylinski (2003), researchers focused on African American children aged 5-10 years. Child skin tone dissatisfaction, weight related teasing, and a parent's categorizing their child as heavy were all found to be factors affecting a child's self-esteem. Children aged 8 and older had more targeted associations such as low appearance self-esteem being negatively affected by both their being overweight and having body size dissatisfaction. Stockton et al (2009) also found a positive relationship between the BMI of 8-10 year old African American girls and their engagement in dieting practices. These observations are indicative that just prior to the teenage years, body image is consuming the majority of children's psychological outlook, and this can turn into disordered eating if not addressed in a timely manner.

Culture, Socioeconomics, Age, Gender, & Body Esteem

Culture can have a big impact on a child's body esteem in relationship to their weight. It has been speculated that the Native American culture may be more willing than other cultures to engage in lifestyle changes due to their admission of being aware of chronic risk factors associated with their high BMIs (Rinderknecht & Smith, 2002). Harnessing this willingness to change from one culture may help to motivate the change across many other cultures that need lifestyle changes, too. The Korean culture has been speculated to associate being overweight as healthy. Korean parents aid in their children's positive body image by maintaining a positive attitude about their children being overweight (Davison & Birch, 2001). This may be the reason that among a group of 5^{th} and 6^{th} graders, only obese, rather than overweight, children were found to have poor self-esteem (Shin & Shin, 2008). So, this cultural study actually is one of the first

that shows that overweight and obese children in a given culture may experience different levels of impact when it comes to psychological health effects of BMI. Jansen, van de Looij-Jansen, de Wilde, and Brug (2008) conducted a study with 12-13 year old Dutch children and found that not necessarily being overweight but rather feeling overweight was related to psychological health. Society, therefore, needs to intervene with children prior to the teenage years in the hopes that early preventive measures will not allow BMI classification to compromise psychological well-being.

A study by Melgar-Quinonez and Kaiser (2004) assessed the relationship between feeding methods and overweight Mexican American children aged 3-5 who live in low socioeconomic condition. They concluded that rather than the feeding methods being the major culprit for the large number of overweight Mexican American preschool children, it was the low socioeconomic conditions in which they lived including low to middle income households, consuming too much energy from juice, sneaking food between meals, and having overweight mothers (Melgar-Quinonez & Kaiser, 2004). Negative psychological well-being has been shown to be associated with an individual's weight and this association is linked to socioeconomic features including a parent's marital status and employment status (Sjoberg, Nilsson, & Leppert, 2005). So, it can be deduced from the previously mentioned socioeconomic information that by reducing the low socioeconomic living conditions of young children, a reduction in weight may result which could ultimately prevent any future negative effects on psychological health associated with being overweight.

Sawyer et al. (2006) found that when compared to non overweight 4-5 year Australian boys, boys of the same age range that are already obese experience more

psychological health issues, namely emotional symptoms, as reported by both teachers and parents. Some of these psychological problems in preschool boys are attributed to their socioeconomic status rather than their BMI status. In addition, Sawyer et al (2006) also found that 4 to 5 year old girls who were already obese experienced both social and behavior problems including hyperactivity, peer problems, and conduct problems. However, the margin of difference between non overweight and overweight/obese children, both boys and girls, in this age group was small. Though the study dealt with Australian children, the implications observed from it can be utilized with 4-5 year old children across the world. A reduction of the amount of obese children living in low socioeconomic conditions has the potential to reduce the number of obese children with psychological health problems (Sawyer et al., 2006).

The perceptions of the African American culture has contributed to this group being classified as a high risk population for becoming overweight and obese, particularly African American females (Kumanyika, Morssink, & Agurs, 1992; Young, Gittlelsohn, Charleston, Felix-Aaron, & Appel, 2001). As mentioned previously, African American girls have the highest prevalence of obesity among other ethnicities, namely Caucasians and Mexican Americans. African American girls aged 8-10 have been found to be more likely to have poor body images and poor self-efficacy in terms of engaging in healthy activity and eating habits if their BMI exceeds the 85th percentile; however, weight was not found to be related to self-esteem (Stockton et al., 2009). A current study conducted interviews with 12-18 year old African American girls regarding their views on body image as well as weight, diet, and activity habits. Regarding body image, the girls reported that they were taught early on to disregard any negative reactions and

comments about their weight, and, therefore, never desired being skinny (Boyington et al., 2008). The only peer group that African American girls identified as being able to taunt them into feeling poor self-esteem was males (Boyington et al., 2008). Also interesting, this study found that the girls were not influenced by African American celebrity role models suffering from weight problems such as Oprah Winfrey and Toni Braxton because the girls did not view them as genuine due to their receiving incentives for talking about weight issues; basically, they girls mindsets were that these celebrities get paid for what they say (Boyington et al., 2008). The families and parents of African American girls have been singled out as young girls "body size references"; as the girls' age increases, their weight should increase accordingly (Boyington et al., 2008). African American girls tend to view other cultures, specifically that of Caucasians and Asians as being obsessed with body image and eating healthy and thereby having poor self-esteem; however, despite this observation, the African American girls view healthy eating practices as not being satisfying and avoid engaging in them (Boyington et al., 2008). When compared to Caucasian females, African American females are found to have a more positive outlook on their weight status and associating psychological health concerns (Kelly, Wall, Eisenburg, Story, & Neumark-Sztainer, 2005). The difference between cultures may play a major role in why Caucasian females have more negative outlooks on their weight and develop more psychological concerns than their African American peers.

In general, when it comes to weight and body-esteem, females tend to be portrayed as being more negatively affected. Females, more than males, tend to be more negatively affected by society's obesity stigmatization (Harris, Walters, & Waschull,

1991). Erickson, Hahn-Smith, and Smith (2008) found that among 3rd -6th graders, the lowest self-esteem was observed in the overweight older girls. Noteworthy is that self-esteem was highly predicted by body esteem. Stradmeijer, Bosch, Koops, and Seidell (2000) also found that overweight older girls had lower body esteem while overweight boys surprisingly had higher body esteem. In addition, preadolescent girls demonstrate more body dissatisfaction than boys (Wood, Becker, & Thompson, 1996). Preadolescent girls who are overweight tend to be more prone to the development of depression than boys their same age (Erickson, Robinson, Haydel, & Killen, 2000). This development of depression in early childhood may be the result of accumulation of excess body fat along with concerns about becoming overweight, particularly in preadolescent girls. Davison, Markey, and Birch (2000) found that in a group of 5 year old girls, their body dissatisfaction and weight concerns were negatively affected by their mother's own weight concerns which warrant the need to intervene on the home environment when trying to create an environment that promotes healthy eating and activity habits. In a study by Koroni (2009), elementary school aged males were more accepting of obese peers than elementary school aged females. In addition, children who were already obese viewed obesity as a negative trait, regardless of gender. Overweight and obese children with low self esteem and body dissatisfaction are the most vulnerable group to peer bullying (Fox & Farrow, 2009). Bullying victimization such as teasing, hitting, name-calling, and rumor spreading are more common among overweight and obese children versus normal weight children, and a majority of this negative behavior occurs in the school environment. Both overweight girls and boys not only are victims of bullying but also initiate bullying behaviors previously mentioned; however, only the boys engage in

rumor and lie spreading (Janssen, Craig, Boyce & Pickett, 2004). It may be noteworthy to mention that both genders may benefit from early intervention to ensure that they have positive psychological health prior to entering college or high school for that matter.

Females may not be the primary targets of low body-esteem associated with being overweight as literature shows that boys tend to be just as affected by their weight classifications. Strauss (2000) found that obese boys who experienced slightly lowered self-esteem at ages 9-10 were more likely to experience even lower self esteem by ages 13-14. Cortese et al. (2009) found that among 11-14 year olds, only girls who were at risk for becoming overweight were found to have greater body image dissatisfaction; however, obese boys displayed the same body dissatisfaction making them more prone to depression. A study of 5-18 year old urban Native Americans revealed a close relationship between females and males in terms of poor body image with females reporting 61% and males 41% (Rinderknecht & Smith, 2002). Despite the specific culture studied in the latter case, close trends between both genders may not be as extreme as previous research has implied.

Influencing Positive Body Esteem

Social discrimination experienced by overweight and obese children has a detrimental effect on their psychological well-being, particularly their body esteem. Therefore, influencing body esteem in young children is a vital aspect to lowering the rate that childhood obesity is occurring. On the flip side, whereas improving body esteem may help increase weight loss, losing weight can have a positive effect on psychosocial health such as improving body esteem (Myers, Raynor, & Epstein, 1998; Wadden et al., 1990). In order for children to want to be healthy and want to lead active lifestyles, they

must have a good sense of self-worth which results from positive self-esteem and a good body image (Shephard, 1983). With children, in particular, sports or other physical activity programs serve as “self-esteem” boosters (Shephard, 1983).

Huang, Norman, Zabninski, Calfas, and Patrick (2007) conducted a 1 year behavioral intervention study called PACE + (Patient-Centered Assessment and Counseling for Exercise Plus Nutrition Project) aimed at improving eating and physical activity habits in adolescents at risk for becoming overweight or who were already overweight with a mean age of 13. The study’s goal was to determine if the adolescents’ body esteem and self-esteem were negatively affected by the study’s intervention as had previously been observed in a college based population behavioral intervention called GRAD (Graduate Ready for Activity Daily) (Huang et al., 2007). However, the PACE study did not yield the same results as the GRAD study. Body esteem and self-esteem were not compromised by those children randomized to the intervention group in the PACE study regardless of the amount of weight lost. In fact, girls who were in the intervention group showed improved esteem when accompanied by weight loss or maintenance. Due to parental and cultural messaging, overweight adolescents begin developing lower self-esteem as they graduate from their early childhood years, and this lower self-esteem carries over into adulthood if not addressed in a timely manner (Dietz, 1998; Stunkard, 1967). A prime example of cultural messaging on overweight adolescents is shown in the case of an elite group of New England colleges displaying a higher rate of acceptance for normal sized girls even though these girls have the same credentials as the overweight girls who were not accepted (Canning, 1966; Dietz, 1998). As a key finding in the PACE + study, the researchers suggest that similar behavioral

interventions should be implemented before children reach early adulthood in order to prevent the development of negative psychological effects such as disordered eating and body dissatisfaction (Huang et al., 2007).

These findings are crucial in developing interventions to offset the steady climb of obesity in young children. If these interventions are to be successful, then it is adamant to target children prior to the start of adolescence (i.e., age 10) who tend to possess a healthy concept of what it means to "diet" because in order to succeed and adhere to behavior modifications suggested through interventions, children need to have a general concept of healthy eating and healthy activity. The United States Office of the Surgeon General has singled out parents as the most important role models in affecting their children's lives emotionally and physically, particularly when it comes to influencing healthy eating and activity habits (USDHHS, 2009). Therefore, parents should be the target audience for behavior modification interventions targeting childhood obesity.

Conclusion

The consequences of obesity can be devastating, especially to children, affecting not just physical health but also their psychological and social health. Negative effects have been documented in adolescent years. Therefore, the need for obesity prevention interventions in young children is clear. It appears that optimal childhood interventions will be able to positively affect psychological and social as well as physical health yet relationships between obesity factors are not well documented in young children. Therefore, the purpose of this study is to determine whether body esteem negatively affects relative BMI in at risk/overweight 4-7 year olds.

CHAPTER 3

Methodology

Research Design

Data for this thesis was obtained from the Team PLAY (Positive Lifestyles for Active Youngsters) study, which is currently being conducted at the University of Tennessee, Memphis campus. Team PLAY is a 2 year behavioral intervention study targeting children ages 4-7 who are in the 85th percentile or above for their BMI (Body Mass Index). This study is very similar to the PACE + study in that it aims at improving the physical activity and eating habits of children; however, unlike PACE, Team PLAY is a family-based intervention because it is the parents who serve as the models for their children's behavior and lifestyle changes. Funding for this research for this study was granted by the National Institute of Health (NIH) and permission for conducting the research was granted by the Institutional Review Board (IRB) for the Protection of Human Subjects through the University of Tennessee.

This study utilized baseline data from the Team PLAY study. The independent variable is body esteem, and the dependent variable is BMI. Covariates also examined included parental BMI, parent's marital status, household income, child's age, child's gender, and child's race. The purpose of this study is to determine whether body esteem negatively affects relative BMI in at risk/overweight 4-7 year olds. It is hypothesized that body esteem will be found to have a negative relationship with the relative BMI in 4-7 year olds who are at risk for becoming overweight or who are already overweight.

Population and Subjects

Of the 293 subjects who have screening visit data to date, 223 Caucasian and African American children between the ages of 4-7 who have completed body esteem data in addition to parental BMI data were included in this analysis. Subjects were recruited through pediatrician offices, Healthloop clinics, flyers, brochures, health fairs, postcards, Team PLAY website, and friend referrals. Eligibility criteria included being between ages 4-7, being healthy without any physical or mental disabilities that would limit activity, and being in the 85^{th} percentile or higher for BMI.

Procedures

Once families were recruited for the Team PLAY study, they were scheduled for a Screening Visit. Upon getting the legal guardians or parents to sign informed consents (Appendix A), the children were taken to an assessment room next door to their assigned clinic room in which their body weight and height were taken. Body weight was measured in kilograms (kg). The children were asked to remove their shoes and stand erect and still on a Detecto Balance Beam Scale. The first two measurements that fell within 0.2 kg of each other were accepted and documented. Height was measured in centimeters (cm). The children were asked to stand erect and look straight ahead against a stadiometer attached to the wall. The first two measurements that fell within 1.0 cm of each other were accepted and documented. Body Mass Index (BMI) was assessed as kg/m^2 and computed as such once the height and weight measurements were entered into a database specifically created for the Team PLAY study using CDC guidelines for assessing BMIs for children. To accurately assess the degree of overweight that each child truly was, relative BMI was used for the purposes of this analysis.

Assessment of Body Esteem

To cater to the pre-adolescent population within the study, Team PLAY used the 20-item Revised Body Esteem Scale (Mendelson & White, 1993). Reliability and validity for subjects as young as 7 years old have been previously reported (Mendelson & White, 1982). It is important to note that the original Revised Body Esteem Scale only offers a "Yes" or "No" response, but since Team PLAY involves such a young population yet to be explored, adding a "Sometimes" response option provided more variability in the responses of the pre-adolescent children. The original Revised Body Esteem Scale has demonstrated high internal reliability and consistency (Mendelson & White, 1993; Mendelson, White, & Mendelson, 1996). No validation study has yet been conducted with the "Sometimes" option added to the Revised Body Esteem Scale. The current study found the scale to be highly reliable for its 4-7 year old population ($a = 0.72$).

Children were administered the Body Esteem Scale Revised (Appendix B) while in the assessment room without their legal guardians or parents present to prevent any potential answering bias that might have occurred with the children's legal guardians or parents present during questioning. The children gave "Yes", "No", or "Sometimes" responses to such statements as "I like the way I look in pictures" and "My parents like my looks". The total score that children could get was 60, indicative of very high body esteem, and the lowest was 0, indicative of very low body esteem.

Measurement of Covariates

Parental BMI was assessed through taking the parent or legal guardian's height and weight. During the second clinic visit, the parent or legal guardian gets their BMI assessed in the same manner as previously described for the child.

Parent's marital status, total household income, child's age, child's gender, and child's race were assessed through a short demographic questionnaire (Appendix C) completed by the legal guardians or parents. These specific factors were looked at to determine if a relationship exists between these factors and the BMI classifications of children ages 4-7 years old. If a relationship was found, the next step was to determine if it was a positive or negative.

Due to the majority of participants being African American and Caucasian, all other race categories were dropped. For the purposes of analysis, household incomes were split into 2 major categories. The 2009 Federal Poverty Level chart was used to determine where the split between the original 6 categories should be and a clean cut down the middle was the end result. Also, marital status was condensed into 2 broad categories for analysis. Parents who were widowed, divorced, separated, or living with a partner were grouped under the unmarried category.

Statistical Analysis

All data analyses were performed using Statistical Package for the Social Sciences (SPSS) version 15.0. An alpha level of .05 was set as the criterion for significance. Preliminary analyses included examination of responses for body esteem, BMI, parental BMI, parent's marital status, total household income, child's age, child's gender, and child's race. Relevant demographic information for the response sample were presented using frequencies and percentages, and the mean and standard deviation were used to indicate the average scores and variability of scores for the sample. Exploratory analysis was also conducted to test the assumption underlying the application of the multiple linear regression (i.e., independence, normality, heteroschedasticity, and linearity).

Next, a general linear regression model was conducted to examine the relationships between body esteem (independent variable) and BMI (dependent variable) while controlling for the influences of parental BMI, parent's marital status, total household income, child's age, child's gender, and child's race. Within the regression model, correlations between different variables as well as the significance of variables in relation to the independent variable were examined.

CHAPTER 4

Results

Of the 240 children recruited for this study, 223 had complete data on all variables and were used for the analyses. The majority of our population was African American (79.8%), female (63.2%), and 6 or 7 years of age (68.1%). Regarding household data, most participants lived with an unmarried parent (53.8%) although those living with a married parent were not far behind (46.2%). Household income did not reveal a dominant range category. The two categories that presented the highest percentages included > $50,000 (28.7%) and < $10,000 (22.4%) which were the highest and lowest categories, respectively. The results from the descriptive analysis of the study population at the time of their initial clinic visit are shown in Table 1.

Table 1
Demographic Variables for Population (N = 223)

Variable	N(%)
Gender	
Boys	82 (36.8)
Girls	141 (63.2)
Age	
4	35 (15.7)
5	36 (16.1)
6	75 (33.6)
7	77 (34.5)
Race	
African American	178 (79.8)
Caucasian	45 (20.2)
Household Income	
< $10,000	50 (22.4)
10,000-19,000	29 (13.0)
20,000-29,000	33 (14.3)
30,000-39,000	20 (9.0)
40,000-49,000	28 (12.6)
> $50,000	64 (28.7)
Marital Status	
Married	103 (46.2)
Unmarried	120 (53.8)

General linear regression analysis was used to examine the relationship between body esteem and the relative BMI in 4-7 year old at risk/overweight children. The seven independent variables [body esteem, gender, age, race (recoded as Caucasian = 0; African American = 1), income (recoded as <10,000 - 29,000 = 0; 30,000 - >50,000 = 1), marital status (recoded as unmarried = 0; married = 1), and parental BMI] were entered into the regression equation simultaneously with child's BMI as the dependent variable. Preliminary examination of the results indicated there was no extreme multicollinearity in the data (all variance factors were less than 2.127) nor were there any influential data

points. Table 2 shows the means, standard deviations, and correlations among the variables.

Table 2
Standard Deviations (SD), Means, and Correlations between Body Esteem and Covariates

	CrelBMI	BES	Gender	PBMI	Income	Age	Marital Status	Race
CrelBMI	1.000							
BES	-.274*	1.000						
Gender	.134	.084	1.000					
PBMI	.275*	-.142	.069	1.000				
Income	-.069	.258*	-.034	-.229*	1.000			
Age	.169*	-.002	.065	-.017	-.038	1.000		
Marital Stat.	.134	-.250*	.021	.180*	-.616*	.022	1.000	
Race	-.237*	.253*	-.010	-.208*	.366 *	-.002	-.475*	1.000
Means	162.75	44.84		38.21		5.87		
SD	29.45	7.97		10.24		1.05		

*Correlation is significant at *a* .05

Table 3 reveals that the set of seven independent variables were shown to explain 20.7% of the variance in child's relative BMI (F = 8.002; $p < .001$) with five of the seven variables being significantly influential on child's relative BMI. These five significant variables included: body esteem (B = -.238), parental BMI (B = .226), age (B = .168), race (B = -.161), and gender (B = .130). Listed in order of significance, from highest to

lowest, it is evident that many variables affect a child's relative BMI, but body esteem and parental BMI have the largest impact. However, age was a close runner up behind body esteem and parental BMI in its impact on child's relative BMI. Race and gender had similar significant influences on child's relative BMI. However, marital status and household income did not show any significance at the levels indicated for the variables in Table 3 ($p < 0.05$ or $p < 0.001$).

Interpretation of the analyses of the above mentioned significant relationships reveals that as body esteem decreased, relative BMI increased. Also, as expected, females have higher relative BMI's than males and African Americans have higher BMI's than Caucasians. When age was looked at individually in regards to BMI and body esteem, no steady significant findings could be determined; however, when looked at as a whole, as age increased, relative BMI increased. In addition, as parental BMI increased so did the child's relative BMI.

Table 3
Results of Linear Regression of Independent Variables on Child's Relative BMI

Independent Variables	B	Beta	t
BES	-.879	-.238	-3.690**
Child's Gender	7.936	.130	2.122*
Parental BMI	.649	.226	3.566**
Household Income	7.900	.134	1.703
Child's Age	4.684	.168	2.764*
Parental Marital Status	2.007	.034	.414
Child's Race	-11.802	-.161	-2.280*
R-Square (entire model) = .207			

*p < .05. **p </= .001.

CHAPTER 5

Discussion

The purpose of this study was to determine if body esteem negatively affects relative BMI in at risk/overweight 4-7 year olds. As hypothesized, body esteem did have a negative effect on child's relative BMI within this particular population, meaning that as body esteem decreased, relative BMI increased. Past studies have examined the effect of a child's BMI on body esteem, whereas, the current study took a different approach and looked at how body esteem affects a child's BMI. Previous research of various populations has found significant relationships between BMI and body esteem (Huang et al., 2007; Stockton et al., 2009; Stradmeijer et al., 2000). However, this is the first study to date to explore the relationships between BMI and body esteem in preadolescent children ages 4-7.

A major limitation in this study was the population age. It is likely that age was a factor in validity and reliability of self-report body esteem measures. However, the internal reliability for the scale in this study was surprisingly high ($a = 0.72$). The Body Esteem Scale questionnaire was originally deemed reliable and valid for use by children as young as 7 years old (Mendelson & White, 1982). With this in mind, it seemed plausible that utilization of a shorter version of the original Body Esteem Scale would be a better fit for the special population in this study. Unfortunately, no similar studies were found which utilized self-reported body esteem information and BMI in this age group. Therefore, there is no precedent as to how to best document body esteem at these young ages. Maturation would become a limitation if this study had assessed body esteem at baseline and then again at the 2-year mark of the intervention due to the increased threat

to internal validity. A lot of maturation takes place between the ages of 4 and 7, and with a fairly even distribution of participants in each age category, inconsistencies in the answering of the questions concerning body esteem were observed.

A final limitation from the current study is instrumentation. The body esteem questionnaire was administered by a research assistant to each of the children. However, the research assistant was not the same for each child, and, therefore, could create a potential threat to internal validity. The manner in which the questionnaire was administered to each child may not have been consistent in terms of delivery. For example, if the research assistant was more enthusiastic on particular questions, a child might have answered “yes” to questions that they may have answered “no” to under different circumstances. It is difficult to conclude that this was the case; however, since no one observed each and every administration of the body esteem questionnaire at baseline, it can only be assumed that not every child received the same exact treatment due to the questionnaire being administered by different research assistants. The same can be concluded about the performing of the child and parent anthropometrics. Due to the shifting of staff members, all of the children and parents coming in for baseline measurements were measured by different research assistants. Despite the staff receiving the same training on how to properly perform child and parent anthropometrics and administer the body esteem questionnaire, discrepancies in the carrying out of these two outcome measures still exists. Even if the same person carried out both outcome measures on all of the participants, the margin of error would still exist but would not be nearly as big.

Despite these limitations, viable data did come from this study. Significant relationships found between children's relative BMI and variables such as age, parental BMI, race, and gender were supported by prior research studies. Age, as a variable, yielded a positive relationship with child's relative BMI, indicating that as children get older, their relative BMI increases as well. This supports research by Ogden et al. (2004) in which they found that, regardless of gender, as age increased, so did BMI. This study also found that, while children below 7 years of age had not yet been classified as even at risk of overweight, by the time both genders turned 8, they were classified at risk. In fact, by age 19, both genders were shown to reach overweight status (Ogden et al., 2004). The bottom line is that if childhood obesity is not successfully intervened upon, the number of overweight children will surpass that of overweight adults in the near future.

Others have reported that children who come from obesigenic families, including 2 obese parents, are more likely to have higher BMI's at an early age as well as higher body fat percentages (Davison & Birch, 2002; Davison, Francis, & Birch, 2005). This study supports these findings as we positively correlated parental BMI with child's relative BMI. If just having one parent who is overweight can raise the likelihood of becoming an overweight adult by 10%, then the reality is that parents set the precedent for their children's future eating and activity patterns through their own lifestyle behaviors; thus, making them the key audience for interventions targeting childhood obesity (Davison et al., 2005; USDHHS, 2001).

Regarding race, the current study found that African Americans have higher relative BMI's than Caucasians. This finding is supported by The National Survey of Children's Health which found that African American children were 50% more likely to

be overweight than Caucasian children (Lutfiyya et al., 2008). The National Center for Health Statistics (2004) also supports this finding. The latter findings indicated that from 1976-2002, African American girls, specifically, had the biggest gains in the prevalence of overweight children ages 6-11 in comparison to Caucasian girls or boys (National Center for Health Statistics, 2004).

In terms of gender, the current study found that females had higher relative BMI's than males. Danielzik et al.'s study (2004) assessing the BMI's of 5-7 year olds supports this finding. However, a couple of other studies suggest that males have higher BMI's than females. One of these studies includes ages 5-18 (Lutifiyya et al., 2008), which is a broad range and may not accurately describe the age range in the current study. The second of these contradicting studies looked at each age individually, and between the ages of 4 and 7, boys' BMI's were between 16.3 and 17.0, and girls' BMI's were between 15.9 and 16.6, respectively (Ogden et al., 2004). It is hard to know for sure the reason for the differences in the findings from the mentioned studies, especially with most of them examining the same age range. Plausible reasons for the different findings include different time frames of data collection as well as different geographic locations.

Since self-report in this age group may result in questionable outcomes, future studies should explore other assessment options. Even though research has found that children as young as 6 can distinguish between fat and thin friends (Dietz, 1998), this finding may not be generalizable across all pre-adolescent populations. The current study needs to be replicated with the same age group, especially since the findings indicated that body esteem negatively affects BMI in children as young as 4 years old. Most body esteem research focuses on adolescent children who are thought to be able to better

comprehend the concept of body esteem. However, it is apparent from the results of this study that overlooking pre-adolescent children's body esteem can prove to be detrimental in the long run when it comes to tackling obesity. A major obstacle in assessing a pre-adolescent population's body esteem is finding a tool that will provide both reliable and valid results. However, since the only current method of assessing body esteem available is self-report, the challenge remains of which self-report option will give the most reliable and valid results possible.

Also of interest would be to conduct a follow up study to examine the results of the intervention on the body esteem and BMI of these pre-adolescent children at the end of their 2 years of enrollment. Researchers should revisit this study once all of the data has been collected and analyzed at the end of the Team PLAY research study to examine and compare all of the Body Esteem Scale-Revised Questionnaire data to document any significant changes over the course of the 2 year intervention. Furthermore, additional studies involving lifestyle changes among pre-adolescent children need to include components not only regarding eating and activity habits, but also body esteem since this can have a significant impact on the on BMI in pre-adolescent children. The findings from this study indicate that body esteem begins affecting BMI as early as 4 years old. So researchers must intervene even earlier than previously thought to ensure that pre-adolescent children experience a healthy childhood that carries over into adulthood.

REFERENCES

Allison, D. B., Fontaine, K. R., Manson, J. E., Stevens, J., & VanItallie, T B. (1999). Annual deaths attributable to obesity in the United States. *Journal of the American Medical Association, 282* (16), 1530-1538.

Anderson, R. E., Crespo, C. J., Bartlett, S. J., Cheskin, L. J., & Pratt, M. (1998). Relationship of physical activity and television watching with body weight And level of fatness among children. Results from the third National Health And Nutrition Examination Survey. *Journal of the American Medical Association, 279* (12), 938-942.

Bauer, K. W., Nelson, M. C., Boutelle, K. N., & Newmark-Sztainer, D. (2008). Parental influence on adolescents' physical activity and sedentary behavior: Longitudinal findings from Project EAT-II. International Journal of Behavioral Nutrition and Physical Activity, *5* (12), Retrieved on November 10, 2009, from http://www.ijbnpa.org/content/5/1/12

Boyington, J. E. A., Carter-Edwards, L., Piehl, M., Hutson, J., Langdon, D., & McManus, S. (2008). Cultural attitudes toward weight, diet, and physical activity among overweight African American girls. Preventing Chronic Disease, 5 (2), Assessed on September 27, 2009, from http://www.cdc.gov/ped/issues/2008/apr/07_0056.htm

Canning, H., & Mayer, J. (1966). Obesity—its possible effect on college acceptance. New England Journal of Medicine, *275*, 1172-1174.

Centers for Disease and Control. (2000). 2000 CDC growth charts. Retrieved on October 21, 2009, from http://www.cdc.gov/growthcharts/data/zscore/bmiagerev.xls

Centers for Disease and Control. (2006). Health behaviors of adults: United States, 2002-2004. Vital and Health Statistics, 10 (230), Retrieved on October 21, 2009, from http://www.cdc.gov/nchs/data/series/sr_10/sr10_230.pdf

Center for Disease and Control. (2008). Physical activity and good nutrition: Essential elements to prevent chronic diseases and obesity 2008. Retrieved on September 26, 2008, from http://www.cdc.gov/nccdphp/publications/aag/pdf/dnpa.pdf

Center for Disease and Control. (2009a). Obesity: Halting the epidemic by making healthier easier. Retrieved on September 25, 2009, from http://www.cdc.gov/nccdphp/publications/AAG/obesity.htm

Center for Disease and Control. (2009b). Overweight and obesity. Retrieved on September 25, 2009, from http://www.cdc.gov/obesity/index.html

Center for Disease and Control. (2009c). Causes and consequences. Retrieved on September 25, 2009, from http://cdc.gov.obesity/causes/index.html

Center for Disease and Control. (2009d). Obesity prevalence among low-income, preschool-aged children 1998-2008. Retrieved on September 25, 2009, from http://www.cdc.gov/obesity/childhood/lowincome.html

Center for Disease and Control. (2009e). Study estimates medical cost of obesity may be as high as $147 billion annually: New community recommendations show ways to reduce burden. Retrieved on November 24, 2009, from http://www.cdc.gov/media/pressrel/2009/r090727.htm

Cortese, S., Falissard, B., Angriman, M., Pigaiani, Y., Banzato, C., Bogoni, G., Pellegrino, M., Cook, S., Pajno-Ferrara, F., Bernardina, B. D., Mouren, M. C., & Maffeis, C. (2009). The relationship between body size and depression symptoms in adolescents. *Journal of Pediatrics*, *154*, 86-90.

Crockett, S. J., & Sims, L. S. (1995). Environmental influences on children's eating. *Journal of Nutrition Education*, *27*, 249.

Danielzik, S., Czerwinski-Mast, M., Langnase, K., Dilba, B., & Muller, M. J. (2004). Parental overweight, socioeconomic status and high birth weight are the major determinants of overweight and obesity in 5-7 y-old children: Baseline data of the Kiel obesity study (KOPS). *International Journal of Obesity*, *28*, 1494-1502.

Davison, K. K., & Birch, L. L. (2001). Weight status, parent reaction, and self-concept in five-year-old girls. *Pediatrics, 107*, 46-53.

Davison, K. K., & Birch, L. L. (2002). Obesigenic families: Parents' physical activity and dietary intake patterns predict girls' risk of overweight. *International Journal of Obesity Related Metabolic Disorders*. *26* (9), 1186-1193.

Davison, K. K., Francis, L. A., & Birch, L. L. (2005). Reexamining obesigenic families: Parents' obesity-related behaviors predict girls' change in BMI. *Obesity Research*. *13* (11), 1980-1990.

Davison, K. K., Markey, C. N., & Birch, L. L. (2000). Etiology of body dissatisfaction and weight concerns among 5-year-old girls. *Appetite, 35*, 143-151.

Dietz, W. H. (1998). Health consequences of obesity in youth: childhood predictors of adult disease. *Pediatrics, 101*, 518-525.

Dietz, W. H. (2004). Overweight in childhood and adolescence. *The New England Journal of Medicine, 350* (9), 855-857.

Eckel, R. H., & Krauss, R. M. (1998). American Heart Association call to action: Obesity as a major risk factor for coronary heart disease, *Circulation, 97*, 2099-2100.

Engeland, A., Bjorge, T., Sogaard, A. J., & Tverdal, A. (2003). Body mass index in adolescence in relation to total mortality: 32-year follow-up of 227,000 Norwegian boys and girls. *American Journal of Epidemiology, 157* (6), 517-523.

Epstein, L. H., Wing, R. R., Koeske, R., Andrasik, F., & Ossip, D. J. (1981). Child and parent weight loss in family-based behavior modification programs. *Journal of Counseling and Clinical Psychology, 49* (5), 674-685.

Erickson, S. J., Hahn-Smith, A., & Smith, J. E. (2008). One step closer: Understanding the complex relationship between weight and self-esteem in ethnically diverse preadolescent girls. *Journal of Applied Developmental Psychology*, Article in press, doi: 10.1016/j.appdev.2008.11.004.

Erickson, S. J., Robinson, T. N., Haydel, K. F., & Killen, J. D. (2000). Are overweight children unhappy? *Archives of Pediatric and Adolescent Medicine, 154*, 931-935.

Fox, C. L, & Farrow, C. V. (2009). Global and physical self-esteem and body Dissatisfaction as mediators of the relationship between weight status and being A victim of bullying. *Journal of Adolescence*, Article in press, doi:10.1016/j.adolescence.2008.12.006.

Freedman, D. S., Dietz, W. H., Srinivasan, S. R., & Berenson, G. S. (1999). The relation of overweight to cardiovascular risk factors among children and adolescents: The Bogalusa heart Study. *Pediatrics, 103*, 1175-1182.

Freedman, D. S., Khan, L. K., Serdula, M. K., Dietz, W. H., Srinivasan, S. R., & Berenson, G. S. (2005). The relation of childhood BMI to adult adiposity: The Bogalusa Heart Study. *Pediatrics, 115* (1), 22-27.

Gable, S., & Lutz, S. (2000). Household, parent, and child contributions to childhood obesity. *Family Relations, 49*, 293-300.

Gortmaker, S. L., Must, A., Perrin, J. M., Sobol, A. M., & Dietz, W. H. (1993). Social and economic consequences of overweight in adolescence and young adulthood. *The New England Journal of Medicine, 329* (14), 1008-1012.

Hannon, T. S., Rao, G., & Arslanian, S. A. (2005). Childhood obesity and type 2 diabetes mellitus. *Pediatrics*. *116* (2), 473-480.

Harris, M. B., Walters, L. C., & Waschull, S. (1991). Gender and ethnic differences in obesity-related behaviors and attitudes in a college sample. *Journal of Applied Social Psychology*, *21*, 1545-1566.

Hill, J. O., & Trowbridge, F. L. (1998). Childhood obesity: Future directions and research priorities. *Pediatrics*, Supplement: 571.

Huang, J. S., Norman, G. J., Zabinski, M. F., Calfas, K., & Patrick, K. (2007). Body image and self-esteem among adolescents undergoing an intervention targeting dietary and physical activity behaviors. *Journal of Adolescent Health*, *40* (3), 245-251.

Invitti, C., Maffeis, C., Gilardnin, L., Pontiggia, B., Mazzilli, G., Girola, A., Sartoria, A.,Morabito, F., & Viberti, G. C. (2006). Metabolic syndrome in obese Caucasian children: prevalence using WHO-derived criteria and association with nontraditional cardiovascular risk factors. *International Journal of Obesity*, *30*, 627-633.

Institute of Medicine. Fact Sheet: Childhood obesity in the US: Facts and Figures. From: Preventing Childhood Obesity: Health in the Balance. Institute of Medicine, National Academies of Science. Washington, DC: National Academies Press; January 2005.

Jansen, W., van de Looij-Jansen, P. M, de Wilde, E. J., & Brug, J. (2008). Feeling fat rather than being fat may be associated with psychological well-being in young Dutch adolescents. *Journal of Adolescent Health*, *42*, 128-136.

Janssen, I., Craig, W. M., Boyce, W. F., & Pickett, W. (2004). Associations between overweight and obesity with bullying behaviors in school-aged children. *Pediatrics*, *113* (5), 1187-1194.

Jung, R. T. (1997). Obesity as a disease. British Medical *Bulletin*, *53* (2), 307-321.

Kaplan, K. M., & Wadden, T. A. (1986). Childhood obesity and self-esteem. *Journal of Pediatrics*, *109*, 367-370.

Kelly, A. M., Wall, M., Eisenburg, M. E., Story, M., & Neumark-Sztainer, D. (2002). Adolescent girls with high body satisfaction: who are they and what can they teach us? *Journal of Adolescent Health*, *37*, 391-396.

Kimbro, R. T., Brooke-Gunn, J., & McLanahan, S. (2007). Racial and ethnic differentials in overweight and obesity among 3-year-old children. *American Journal of Public Health*. *97* (2), 298-305.

Koroni, M., Garagouni-Areou, F., Roussi-Vergou, C. J., & Zafiropoulou, M. (2009). The stigmatization of obesity in children. A study in Greek elementary schools. *Appetite*, *52*, 241-244.

Kumanyika, S. K., Morssink, C., & Agurs, T. (1992). Models for dietary and weight Change in African-American women: Identifying cultural components. *Ethnicity And Disease*, *2* (2), 166-175.

Kushner, R. F., & Foster, G. D. (2000). Obesity and quality of life. *Nutrition*. *16*, 947-952.

Lutfiyya, M. N., Garcia, R., Dankwa, C. M., Young, T., & Lipsky, M. S. (2008). Overweight and obese prevalence rates in African American and Hispanic children: An analysis of data from the 2003-2004 National Survey of Children's Health. *Journal of the American Board of Family Medicine*, *21*, 191-199.

Lutz, S. M., Blaylock, J. R., & Smallwood, D. M. (1993). Household characteristics affect food choices. *Food Review*, *16* (2), 12-17.

Melgar-Quinonez, H., & Kaiser, L. L. (2004). Relationship of child-feeding practices to overweight in low-income Mexican-American preschool-aged children. *Journal of the American Dietetic Association*, *104*, 1110-1119.

Mendelson, B. K, & White, D. R. (1982). Relation between body-esteem and self-esteem of obese and normal children. *Perceptual and Motor Skills*, *54* (3), 899-905.

Mendelson, B. K., & White, D. R. (1993). Manual for the body-esteem scale for Children. *Research Bulletin*, *12* (2), Concordia University; Montreal, Quebec.

Mendelson, B. K., White, D. R., & Mendelson, M. J. (1996). Self-esteem and body esteem: Effects of gender, age, and weight. *Journal of Applied Developmental Psychology*, *17*, 321-346.

Myers, M. D., Raynor, H. A., & Epstein, L. H. (1998). Predictors of child psychological changes during family-based treatment for obesity. *Archives of Pediatric & Adolescent Medicine*, *152*, 855-861.

Nader, P. R., O'Brien, M., Houts, R., Bradley, R., Belsky, J., Crosnoe, R., Friedman, S., Mei, Z., & Susman, E. J. (2006). Identifying risk for obesity in early childhood. *Pediatrics*. *118*, 594-601.

National Center for Health Statistics. (2004). Health, United States, 2004 with chart book on trends in the health of America. National Center for Health Statistics. Hyattsville, MD.

National Institutes of Health Consensus Development. (1985). National Institutes of Health consensus development conference statement: Health implications of obesity, 5(9), 1-7, Retrieved on November 23, 2009, from http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=hsnihcdc&part=A1093#A1107

National Institute of Health, U.S. Department of Health and Human Services, & National Institute of Diabetes and Digestive and Kidney Diseases. (2008). Understanding adult obesity. Weight-control Information Network. Retrieved on September 25, 2009, from www.cdc.gov

Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999-2004. *Journal of the American Medical Association, 295* (13), 1549-1555.

Ogden, C. L., Fryar, C. D., Carroll, M. D., & Flegal, K. M. (2004). Mean body weight, height, and body mass index, United States 1960-2002. *Advance Data from Vital Statistics, 347*, Hyattsville, Maryland: National Center for Health Statistics.

Ornelas, I. J., Perreira, K. M., & Ayala, G. X. (2007). Parental influences on Adolescent physical activity: A longitudinal study. *International Journal of Behavioral Nutrition and Physical Activity, 4* (3), Retrieved on November 10, 2009, from http://www.ijbnpa.org/content/4/1/3

Price, J. H., Desmond, S. M., Ruppert, E. S., & Stelzer, C. M. (1989). Pediatricians' Perceptions and practices regarding childhood obesity. *American Journal of Preventive Medicine, 5*, 95-103.

Reaven, G. M. (1988). Role of insulin resistance in human disease. *Diabetes, 37*, 1595-1607.

Richardson, S. A., Goodman, N., Hastorf, A. H., & Dornbusch, S. M. (1961). Cultural uniformity in reaction to physical disabilities. *American Sociological Review, 26*, 241-247.

Rinderknecht, K., & Smith, C. (2002). Body-image perceptions among urban Native American youth. *Obesity Research, 10* (5), 315-327.

Sallade, J. (1973). A comparison of the psychological adjustment of obese vs. non-obese children. *Journal of Psychosomatic Research, 17*, 89-96.

Sawyer, M. G., Miller-Lewis, L., Guy, S., Wake, M., Canterford, L., & Carlin, J. B. (2006). Is there a relationship between overweight and obesity and mental health problems in 4- to 5-year-old Australian children? *Ambulatory Pediatrics, 6,* 306-311.

Schur, E. A., Sanders, M, & Steiner, H. (2000). Body dissatisfaction and dieting in young children. *International Journal of Eating Disorders*, *27*, 74-82.

Shephard, R. J. (1983). Physical activity and the healthy mind. *Canadian Medical Association Journal*, *128*, 525-530.

Shin, N. Y., & Shin, M. S. (2008). Body dissatisfaction, self-esteem, and depression in obese Korean children. *Journal of Pediatrics*, *152*, 502-506.

Sinaiko, A. R., Donahue, R. P., Jacobs, D. R., & Prineas, R. J. (1999). Relation of weight and rate of increase in weight during childhood and adolescence to body size, blood pressure, fasting insulin, and lipids in young adults: The Minneapolis children's blood pressure study. *Circulation, 99,* 1471-1476.

Sjoberg, R. L., Nilsson, K. W., & Leppert, J. (2005). Obesity, shame, and depression in school-aged children: A population-based study. *Pediatrics*, *116*, e389-e392.

Sorof, J., & Daniels, S. (2002). Obesity hypertension in children: A problematic of epidemic proportions. *Hypertension*. *40*, 441-447.

Staffieri, J. R. (1967). A study of social stereotype of body image in children. *Journal of Perspective Social Psychology*, *7*, 101-104.

Stender, S. R. S., Burghen, G. A., & Mallare, J. T. (2005). The role of health care providers in the prevention of overweight and type 2 diabetes in children and adolescents. *Diabetes Spectrum, 18* (4), 240-248.

Stockton, M. B., Lanctot, J. Q., McClanahan, B. S., Klesges, L. M., Klesges, R. C., Kumanyika, S., & Sherrill-Mittleman, D. (2009). Self-perception and body image associations with body mass index among 8-10-year-old African American girls. *Journal of Pediatric Psychology*, *34* (10), 1144-1154.

Stradmeijer, M., Bosch, J., Koops, W., & Seidell, J. (2000). Family functioning and psychosocial adjustment in overweight youngsters. *International Journal of Eating Disorders*, *27*, 110-114.

Strauss, R. S. (2000). Childhood obesity and self esteem. Pediatrics, 105(1), Retrieved on November 23, 2009, from http://www.pediatrics.org/cgi/content/full/105/1/e15

Strauss, R. S., & Pollack, H. A. (2003). Social marginalization of overweight children. *Archives of Pediatric and Adolescent Medicine*, *157*, 746-752.

Stunkard, A., & Burt, V. (1967). Obesity and the body image. II. Age of onset of disturbances in the body image. *American Journal of Psychiatry*, *123*, 1443-1447.

U.S. Department of Health and Human Services (2001). The Surgeon General's call to action to prevent and decrease overweight and obesity. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General.

U.S. Department of Health and Human Services (2009). Childhood overweight and obesity prevention initiative: Healthy youth for a healthy future. Retrieved on February 7, 2009, from http://www.surgeongeneral.gov/obesityprevention/factsheet/index.html

Van Itallie, T. B. (1979). Obesity: Adverse effects on health and longevity. *The American Journal of Clinical Nutrition*, *32*, 2723-2733.

Wadden, T. A., Stunkard, A. J., Rich, L., Rubin, C. J., Sweidel, G., & McKinney, S. (1990). Obesity in black adolescent girls: A controlled clinical trial of treatment by diet, behavior modification, and parental support. *Pediatrics*, *85* (3), 345-352.

Wardle, J., & Cooke, L. (2005). The impact of obesity on psychological well-being. *Best Practice and Research Clinical Endocrinology and Metabolism*, *19* (3), 421-440.

Weiss, R., Dziura, J., Burgert, T. S., Tamborlane, W. V., Taksali, S. E., Yeckel, C. W., Allen, K., Lopes, M., Savoye, M., Morrison, J., Sherwin, R. S., & Caprio, S. (2004). Obesity and the metabolic syndrome in children and adolescents. *New England Journal of Medicine, 350* (23), 2362-2374.

Whitaker, R. C., Wright, J. A., Pepe, M. S., Seidel, K. D., & Dietz, W. H. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *The New England Journal of Medicine*, *337* (12), 869-873.

Wood, K. C., Becker, J. A., & Thompson, J. K. (1996). Body image dissatisfaction in preadolescent children. *Journal of Applied Developmental Psychology*, *17*, 85-100.

Young, D. R., Gittlelsohn, J., Charleston, J., Felix-Aaron, K., & Appel, L. J. (2001). Motivations for exercise and weight loss among African-American women: Focus group results and their contribution towards program development. *Ethnic Health*, *6* (3-4), 227-245.

Young-Hyman, D., Schlundt, D. G., Herman-Wenderoth, L., & Bozylinski, K. (2003). Obesity, appearance, and psychosocial adaption in young African American children. *Journal of Pediatric Psychology, 28* (7), 463-472.

Patient Consent Form

Title: Treating Childhood Obesity with Family Lifestyle Change

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1. INTRODUCTION:

You and your child are being given the opportunity to participate in a research study because your child is between the ages of 4 and 7 and has a body mass index (also called BMI) that is over the 85th percentile for your child's age and gender. BMI is a way to report height and weight. A BMI that is over the 85th percentile puts a child at risk of becoming overweight.

The purpose of this study is to compare the standard way doctors in their offices try to teach parents to help their children who are overweight (or at risk of becoming overweight) grow in a healthy way to a more "intense" treatment that includes the standard way plus group sessions over a six month period. These group sessions are designed to teach you and your child healthy eating and a more active lifestyle.

Patients for this research study will be referred to the study from health care providers, hospitals, community agencies, schools, and churches in the Memphis metropolitan area. Patients may also refer themselves if they hear about the study from a friend or through advertisements. We hope to enroll 300 children and their parent(s). Screening and baseline study visits will take place at the UTHSC Department of Preventive Medicine Clinical Trials Unit, 66 N. Pauline, Suite 501, Memphis, TN. Group sessions will take place at various locations in Memphis and surrounding areas. These sessions will take place over a six-month period, but we will continue to follow your child's growth, eating patterns, and physical activity for two years. Follow-up visits will take place at the UTHSC Department of Preventive Medicine Clinical Trials Unit.

2. PROCEDURES TO BE FOLLOWED:

The following outlines the visits and procedures that will be performed as part of this research study. There will be six study clinic visits over an approximately two year period. At these study clinic visits we will collect information and take measurements. The study clinic visits are described in more detail below. All study clinic visits will last approximately 2 hours. The total estimated amount of time for participation is:

- *The standard method* – 12 hours.
- *The standard method plus group sessions* – 26 hours (as noted, these group sessions will take place in Memphis or surrounding areas such as The Urban Child Institute, 600 Jefferson Ave,

Parent/Legally Authorized Representative Initials _____

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Memphis, TN, The Neighborhood Christian Center, 785 Jackson Ave, Memphis, TN, Ed Rice Community Center, 2907 N. Watkins St, Memphis, TN, Hickory Hill Community Center, 3910 Ridgeway Rd, Memphis, TN, Cordova Community Center, 1017 N. Sanga Rd, Cordova, TN, New Bethel Baptist Church, 7786 Poplar Pike, Germantown, TN, Schoolfield United Methodist Church, 1621 Dellwood Ave, Memphis, TN, or at The Pursuit of God Church, 3171 Signal Street, Memphis, TN).

Screening Visit: This visit will last approximately 2 hours. The purpose of this visit is to review the study with you and make sure you and your child want to participate (this is what we are doing now). We will ask you to give us ways to contact you because it is very important for this study that we are able to maintain regular contact with you and your child in order to evaluate your child's progress through this program. This contact will also help assure that you and your child are following the program correctly.

You will be asked to provide your child's medical history. In addition, you and your child will complete questionnaires asking about your eating and activity habits and behaviors or feelings that might affect your child's diet and physical activity. We will obtain your child's vital signs and body measurements.

Also at this visit you will be randomized (assigned by chance, such as by the flip of a coin) to one of two ways to help your child have healthier growth. The 2 ways are (1) the standard method or (2) the standard method plus group sessions over a six month period. The group to which you will be assigned will be based on where your child primarily receives medical care. These two methods of helping your child have healthy growth will be described in more detail below. You and your child will be oriented to the method which you are randomized into at the next clinic visit. For this study, you are three times more likely to be assigned to the standard method plus group sessions.

This visit and the visits and procedures described below need to be completed by all participants in this study regardless of the method used to teach you to help your child grow in a healthy way. One to four weeks after this screening visit you and your child will be scheduled for a baseline visit.

Baseline Visit: At this visit your child will have a complete physical exam including body measurements and assessment of pubertal stage (Tanner Staging). We will also obtain your body measurements. Your child will have a DXA (Dual-Energy X-ray Absorptiometry) scan performed. The DXA scan is a study similar to an x-ray procedure but involves less radiation. A DXA scan can determine your child's body fat. The procedure will require your child to lie still on a table for 3 minutes while the measurements are taken. There will be no sedation required prior to this DXA procedure. This scan does not cause any discomfort. **For females only:** A urine sample for females who have begun to have menstrual periods will be taken to obtain a pregnancy test prior to performing DXA. If the pregnancy test is positive, no DXA scans will be done as part of this study and you and your child will be referred to your primary health care provider for care. After these measurements you and your child will meet with specialists in the areas of nutrition and exercise. Based on the questionnaires you filled out at the screening visit, they will suggest a healthy eating and physical

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activity plan for your child. You and your child will also be oriented to the method into which you are randomized. You will fill out a questionnaire that will determine your perception of your child's care provider's involvement in your attempts to improve your child's eating behaviors and physical activity.

We will teach you and your child how to use an accelerometer. An accelerometer is a device slightly smaller than a pager that fits onto a nylon belt that will fasten around your child's waist and will measure your child's activity level. Your child will be asked to wear the accelerometer for one week during waking hours, except when bathing or during water play.

Six months after this baseline visit you and your child will be scheduled for follow-up visit #1. For families assigned to receive the standard method, the follow-up visit #1 will be the next study activity. For families assigned to the additional more intense method, there will be 14 groups sessions between the baseline visit and the follow-up visit #1 (see below for information about the group sessions).

Follow-up visit #1 (6 months after you started the study): At this visit the following procedures will be done:

- Review of contact information
- Questionnaires about your child's diet, physical activity, and behaviors or feelings, health care provider support that might affect their diet and physical activity
- Body measurements (blood pressure, weight, height, waist and hip measures)
- Review of any problems you or your child have had regarding the study or doing what the study requires

Six months after this follow-up #1 you and your child will be scheduled for follow-up visit #2.

Follow-up visit #2 (one year after you started the study):

- Everything included in follow-up visit #1
- DXA scan (For females who have begun their menstrual cycle only: urine sample for pregnancy test)
- Routine Tanner Staging
- Body measurements of parent(s)
- Accelerometers given with instructions to return them one to the clinic one week post-visit
- Six months after follow-up #2 you and your child will be scheduled for follow-up visit #3.

Follow-up visit #3 (18 months after you started in the study): Same as follow-up visit #1. Six months after follow-up #3 you and your child will be scheduled for follow-up visit #4.

Follow-up visit #4 (2 years after you started the study): Same as follow-up visit #2.

Methods of helping your child achieve healthy growth:

The standard method – this way of teaching you to help your child to have healthy growth will be basically the same way that your pediatrician gives you general health advice. He or she will discuss

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the problem with you and suggest things that you can do at home to change your child's eating and activity patterns. How often you need to come in for follow-up visits will be decided by you and your pediatrician. Also, before the study begins, an expert on childhood growth will provide recommendations about healthy growth in children to your primary care doctor and they will be given information and aids that they may pass along to you. Total estimated amount of time for participation in the standard method is approximately 12 hours.

The standard method plus group sessions over a six month period – this method will include everything listed above plus 14 group sessions over a six month period. During the first 2 months, you and your child will attend weekly group sessions at one location in the Memphis or surrounding area, such as The Urban Child Institute, 600 Jefferson Ave., Memphis, TN, Neighborhood Christian Center, 785 Jackson Ave, Memphis, TN, Ed Rice Community Center, 2907 N. Watkins St, Memphis, TN, Hickory Hill Community Center, 3910 Ridgeway Rd, Memphis, TN, Cordova Community Center, 1017 N. Sanga Rd., Cordova, TN, New Bethel Baptist Church, 7786 Poplar Pike, Germantown, TN, Schoolfield United Methodist Church, 1621 Dellwood Ave, Memphis, TN, or at The Pursuit of God Church, 3171 Signal Street, Memphis, TN. During months 3 and 4 the sessions will be held once every 2 weeks. During months 5 and 6 the sessions will be held once a month. The sessions will be held on weekday evenings after school hours or on Saturdays. Each session will last approximately 60 minutes. Parents will participate in give and take discussions with group leaders trained in the area of nutrition, physical activity and behavioral techniques that can help promote healthy eating and increased physical activity in your child. While parents are at in their discussion group, the children will be led in physical activity. During the last 15 minutes of each group session, you and your child will get back together for a session review and closure. The physical activity sessions have been designed to be safe and fun by experts in the field of physical activity for children. Equipment used in the physical activity sessions such as hoola hoops or bean bags will be given to your child to take home and keep so that he/she may be physically active at home.

Standard method plus group session participants only: Following the end of the six month sessions, a member of our staff will call you monthly for the next six months for a brief (~5 minute) check-in to see how you and your child are doing and you will be sent further educational and support information in the mail.

3. RISKS ASSOCIATED WITH PARTICIPATION:

There are minimal risks associated with this research study. Potential risks to study participants include:

Physical Activity: Physical activity may result in injuries to muscle, ligaments, tendons and joints. Although we will be promoting moderate to vigorous physical activity for your child, the physical activity will not be particularly strenuous in nature, and general principles of injury prevention will be included in both groups to minimize the chances of injury.

Diet: As your child decreases overall food intake or consumption of foods with high sugar and fat content there is a risk of irritability and hunger. If this does occur, we anticipate it will last for only a short time (a few days) as your child's body and mind adjusts to a change in diet. Our nutrition and behavior experts will be available to answer questions and help you if this problem arises.

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Blood Pressure Assessment**:** You/your child may experience temporary discomfort during blood pressure recordings due to the pressure of the blood pressure cuff on the arm.

Questionnaires: The topics discussed in questionnaires may cause temporary embarrassment or emotional discomfort for some people.

DXA Scan: The DXA procedure involves minimal risk. A whole-body DXA scan results in less than one tenth the radiation exposure your child would receive from playing outside for one day.

Positive Pregnancy Test: There is a potential risk of psychological stress if a pregnancy test turns out to be positive. The parent/legally authorized representative (LAR) will be told the result of the test. After giving notice, to decrease psychological/social impact, you and your child will be referred to the Primary Care Health Care Provider for appropriate counseling.

Randomization: Although it is expected that all the study interventions will be either beneficial or neutral (with no effect at all), it is possible that the intervention to which you are assigned may later be shown to be less effective or to have more risks or side effects than other therapies.

4. BENEFITS ASSOCIATED WITH PARTICIPATION:

Obesity often begins and worsens in childhood, and continues in adulthood. Today there are few well-studied successful treatments for children at risk for overweight and overweight children, especially younger children. Your and your child's participation in this study will allow us to compare the standard doctor care group and the standard doctor care plus extra group sessions group to see if either treatment is effective in promoting healthy growth in children at risk for being overweight and, if so, which is best. This knowledge can be passed to other healthcare providers who care for young children and may help other young children, their parents, and health care providers in the future.

The possible **short-term** benefit of the study, in either the standard doctor care or the standard doctor care plus extra group sessions, is a healthier child who has less body fat, better eating habits, increased physical activity habits, less "sitting around" habits, and feels good about him or herself and his or her body. You will also meet with experts in the fields of nutrition, exercise, and behavior at baseline and they will help you set up a program of healthy eating and physical activity specifically for your child based on questionnaires you completed.

Additionally, if you agree, the physician that you designate as your child's primary care provider will be notified of your child's participation in this study and they will be provided materials about treating children who are at risk of becoming overweight from an expert in the field and learn new ideas about helping parents help their child grow in a healthy way. This may help your doctor provide your child better care in the future.

_____ I request my child's primary care provider be notified of my child's participation in this study.

_____ I do not want my child's primary care provider notified of my child's participation in this study.

The possible **long-term** benefits include a decreased risk of adult obesity and the serious diseases with which obesity is associated like diabetes, heart attack, stroke, bone and joint problems, and depression.

If you and your child are enrolled in the standard doctor care plus extra group sessions group, you and your child will get the benefit of "intense" counseling about healthy eating and a more active lifestyle in a group setting over a six month period. Following the group sessions, a member of our staff will call you monthly for the next six months to see how you and your child are doing and you will be sent further educational and support information in the mail.

5. ALTERNATIVES TO PARTICIPATION:

There are not a lot of places to go to get help in treating overweight young children, ages 4 to 7 years. Parents may seek the help of a dietician, nutritionist, a clinical psychologist or medical doctor, or join a facility that provides counseling by one of the providers listed above and/or includes a physical activity component (e.g. YMCA, Hope and Healing Center).

Should you choose not to participate in this study you will not have to complete the questionnaires, your child will not have to wear an accelerometer or have 6 whole-body DXA scans (per DXA protocol, 2 scans will be performed at each DXA session to ensure accurate results) performed in a 2-year period. Parents and their children who choose not to participate in this study will receive standard of care whether or not you participate in this study.

6. CONFIDENTIALITY:

We will maintain the confidentiality of any information about you or your child to the extent allowable by law. All study records will be kept in locked areas in the Preventive Medicine Clinical Trials Unit by assigned numbers. Only authorized clinical study personnel will have access to those areas. The master key which links your name with your study number will be maintained in a separate and secure location in the Department of Preventive Medicine. The clinical chart at your child's usual clinic will not contain any additional information related to this research study unless that information would ordinarily be contained in the chart (e.g. height and weight).

Individual subjects will not be identified in any presentations or publications based on the results of this research study.

Under federal privacy regulations, you have the right to determine who has access to your or your child's personal health information (called "protected health information" or PHI). PHI collected in this study may include your/your child's medical history, the results of physical exams, lab tests, x-ray exams, and other diagnostic and treatment procedures, as well as basic demographic information. By signing this consent form, you are authorizing the researchers at the University of Tennessee Health Science Center to have access to your/your child's PHI collected in this study and to receive your/your child's PHI from your/your child's physician and facilities where you/your child have received health care. In addition, your/your child's PHI may be shared with other persons involved in the conduct or oversight of this research, including the National Institutes of Health (NIH) and the Data Safety Monitoring board (DSMB).

The Institutional Review Board (IRB) at the University of Tennessee Health Science Center may review your/your child's PHI as part of its responsibility to protect the rights and welfare of research subjects. Your/your child's PHI will not be used or disclosed to any other person or entity, except as required by law, or for authorized oversight of this research study by other regulatory agencies, or for

other research for which the use and disclosure of your/your child's PHI has been approved by the IRB. Your/your child's PHI will be used only for the research purposes described in the Introduction of this consent form. Your/your child's PHI will be used until the study is completed. You may cancel this authorization in writing at any time by contacting the principal investigator listed on the first page of the consent form. If you cancel the authorization, continued use of your/your child's PHI is permitted if it was obtained before the cancellation and its use is necessary in completing the research. However, PHI collected after your/your child's cancellation may not be used in the study. If you refuse to provide this authorization, you/your child will not be able to participate in the research study. If you cancel the authorization, then you/your child will be withdrawn from the study. Finally, the federal regulations allow you to obtain access to your/your child's PHI collected or used in this study. However, in order to complete the research, your access to this PHI may be temporarily suspended while the research is in progress. When the study is completed, your right of access to this information will be reinstated.

7. COMPENSATION AND TREATMENT FOR INJURY:

You understand that you are not waiving any legal rights or releasing the University of Tennessee Health Science Center or their agents from liability for negligence. You also understand that, in the event of physical injury resulting from research procedures, the University of Tennessee Health Science Center does not have funds budgeted for compensation either for lost wages or for medical treatment. Therefore, the University of Tennessee Health Science Center does not provide for treatment or reimbursement for such injuries.

You also understand that, in the event of a medical emergency resulting from or occurring during this research study, emergency care may be provided for you at a local health care facility. Your or your child's insurance carrier will be billed for the costs associated with such emergency care.

8. QUESTIONS:

If you have questions about this research study, you can contact Dr. Marion Hare at 901-448-3752 during regular business hours. Additionally, Dr. Hare can be reached 24 hours a day at 901-448-5900 in the event of an injury related to this research. If you have any questions about your or your child's rights as a participant in this study or as a research subject, you can contact Dr. Terrence Ackerman, UTHSC IRB Chairman at 901-448-4824.

9. PAYMENT FOR PARTICIPATION:

If you and your child participate in this study, the parent/legally authorized representative will be paid $50 for the baseline visit, $25 for follow-up visits #1, #2, and #3, and $50 for follow-up visit #4. You will receive a total of $175. If you and your child are assigned to the standard method plus group sessions, your child will be given equipment that is used in the physical activity sessions, including books, music CDs, hoops, beach balls, scarves, and ribbons.

Parent/Legally Authorized Representative Initials _____

THE UNIVERSITY of TENNESSEE HEALTH SCIENCE CENTER
IRB NUMBER: 05-08294-FB
IRB APPROVAL DATE: 8/18/2009
IRB EXPIRATION DATE: 6/19/2010

10. COSTS OF PARTICIPATION:

There will be no additional costs to you because of your or your child's participation in this study. Parking will be paid for participants who drive to the clinic study visits and transportation will be provided if needed. You will be expected to provide your own transportation to the intervention group sessions.

11. PREMATURE TERMINATION:

It is not anticipated that there will be any condition for which the principal investigator of this study would recommend that you or your child be prematurely withdrawn from this study. Should you decide to withdraw from this study you must contact Dr. Marion Hare at 901-448-5900.

12. VOLUNTARY PARTICIPATION:

Participation in research is voluntary. You and your child will be urged to attend all study visits and complete all study measurements as planned. However, you can discontinue participation in the study at any time. If you miss a visit you will be contacted by the study coordinator to reschedule the visit and to provide assistance in completing the visit. If you decide not to join the study or withdraw from it, this will not influence your future medical care by the staff at the participating clinics.

Parent/Legally Authorized Representative Initials _____

THE UNIVERSITY of TENNESSEE HEALTH SCIENCE CENTER
IRB NUMBER: 05-08294-FB
IRB APPROVAL DATE: 8/18/2009
IRB EXPIRATION DATE: 6/19/2010

13. CONSENT OF SUBJECT:

You have read or have had read to me the description of the research study as outlined above. The investigator or his/her representative has explained the study to you and has answered all of the questions you have at this time. You have been told of the potential risks, discomforts, side effects and adverse reactions as well as the possible benefits (if any) of the study.

You knowingly and freely volunteer to participate in the study. You understand that you do not have to take part in this study and that your refusal to participate will involve no penalty or loss of rights to which you are entitled. You further understand that you are free to later withdraw your consent and discontinue participation in this study at any time. You understand that refusing to participate or later withdrawing from the study will not adversely affect your subsequent medical care.

You will receive a copy of this consent form for your records.

_____ _____ _____
Signature of Research Subject **Date** **Time**

_____
Printed Name of Research Subject

_____ _____ _____
Signature of Person Obtaining Consent **Date** **Time**

_____
Printed Name of Person Obtaining Consent

In my judgment, the subject or the legally authorized representative has voluntarily and knowingly given informed consent and possesses the legal capacity to give informed consent to participate in this research study.

_____ _____ _____
Signature of Investigator **Date** **Time**

_____ _____ _____
Signature of Legally Authorized Representative **Date** **Time**

_____
Relationship of Legally Authorized Representative

_____ _____ _____
Assent of Minor (Ages ≥ 8) **Date** **Time**

IRB NUMBER: 05-08294-FB
IRB APPROVAL DATE: 8/18/2009
IRB EXPIRATION DATE: 6/19/2010

THE UNIVERSITY of TENNESSEE HEALTH SCIENCE CENTER

Assent Discussion

Title: Treating Childhood Obesity with Family Lifestyle Change

☐ The assent discussion was initiated on ______________(date) at __________ (time).

The information was presented in age-appropriate terms.

The minor: ____(Subject's Name)

☐ Agreed to take part in the study on _________________(date) at _______________ (time).
☐ Declined to take part in the study. The minor declined for the following reason(s):

● ●

☐ An assent discussion was not initiated with the minor for the following reason(s):

- ☐ Minor is under 8 years of age
- ☐ Minor is physically incapacitated
- ☐ Minor is cognitively or emotionally unable to participate in an assent discussion
- ☐ Minor refused to take part in the discussion
- ☐ Other____

RESEARCHER/DESIGNEE STATEMENT: I hereby certify that I have discussed the research project with the research participant and/or his/her parent(s) or legal guardian(s). I have explained all the information contained in the informed consent document, including any risks that may be reasonably expected to occur. I further certify that the research participant was encouraged to ask questions and that all questions were answered.

____
Researcher/Designee Printed Name

______________________________ ________________ _______________
Researcher/Designee Signature Date Time (AM/PM)

____
Minor Subject Printed Name

___________________________________ ____________________ _________________
Minor Subject Signature Date Time (AM/PM)

THE UNIVERSITY of TENNESSEE HEALTH SCIENCE CENTER
IRB NUMBER: 05-08294-FB
IRB APPROVAL DATE: 8/18/2009
IRB EXPIRATION DATE: 6/19/2010

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Appendix B

BODY ESTEEM SCALE - REVISED

(To be completed by the interviewer based on the child's responses)

Participant Initials ☐☐☐☐

ID # ☐☐☐

Visit Type
- ○ SV
- ○ FU1
- ○ FU2
- ○ FU3
- ○ FU4

Month
- ○ Jan
- ○ Feb
- ○ March
- ○ April
- ○ May
- ○ June
- ○ July
- ○ Aug
- ○ Sept
- ○ Oct
- ○ Nov
- ○ Dec

Day ☐☐

Year
- ○ 2008
- ○ 2009
- ○ 2010

Data Reviewed by (At Clinic) ☐☐

***Instructions*: Read each statement answer choice to the child. Ask them to indicate which answer best describes their agreement with each statement.**

	Yes	Sometimes	No
1) I like the way I look in pictures.	○	○	○
2) Kids my own age like my looks.	○	○	○
3) I'm pretty happy about the way I look.	○	○	○
4) Most people have a nicer body than I do.	○	○	○
5) My weight makes me unhappy.	○	○	○
6) I like what I see when I look in the mirror.	○	○	○
7) I wish I were thinner.	○	○	○
8) There are lots of things I'd change about my looks if I could.	○	○	○
9) I'm proud of my body.	○	○	○
10) I really like what I weigh.	○	○	○

	Yes	Sometimes	No
11) I wish I looked better.	○	○	○
12) I often feel ashamed of how I look.	○	○	○
13) Other people make fun of the way I look.	○	○	○
14) I think I have a good body.	○	○	○
15) I'm looking as nice as I'd like to be.	○	○	○
16) I often wish I looked like someone else.	○	○	○
17) My looks upset me.	○	○	○
18) I'm as nice looking as most people.	○	○	○
19) My parents like my looks.	○	○	○
20) I worry about the way I look.	○	○	○

Appendix C

Demographic Information Form

Participant Initials

A	○	○	○	○
B	○	○	○	○
C	○	○	○	○
D	○	○	○	○
E	○	○	○	○
F	○	○	○	○
G	○	○	○	○
H	○	○	○	○
I	○	○	○	○
J	○	○	○	○
K	○	○	○	○
L	○	○	○	○
M	○	○	○	○
N	○	○	○	○
O	○	○	○	○
P	○	○	○	○
Q	○	○	○	○
R	○	○	○	○
S	○	○	○	○
T	○	○	○	○
U	○	○	○	○
V	○	○	○	○
W	○	○	○	○
X	○	○	○	○
Y	○	○	○	○
Z	○	○	○	○

ID #

0	○	○	○
1	○	○	○
2	○	○	○
3	○	○	○
4	○	○	○
5	○	○	○
6	○	○	○
7	○	○	○
8	○	○	○
9	○	○	○

Visit Type

● **SV**

Month

- ○ **Jan**
- ○ **Feb**
- ○ **March**
- ○ **April**
- ○ **May**
- ○ **June**
- ○ **July**
- ○ **Aug**
- ○ **Sept**
- ○ **Oct**
- ○ **Nov**
- ○ **Dec**

Day

0	○	○
1	○	○
2	○	○
3	○	○
4	○	○
5	○	○
6	○	○
7	○	○
8	○	○
9	○	○

Year

- ○ **2008**
- ○ **2009**
- ○ **2010**

Data Reviewed by (At Clinic)

	○	○	○	○	○	○	○	○	○	○
	○	○	○	○	○	○	○	○	○	○

Please provide the following information about your <u>child</u>:

ETHNICITY/RACE

○ Not Hispanic or Latino

AND

- ○ Caucasian
- ○ African American
- ○ Asian
- ○ Native American or Alaskan Native
- ○ Native Hawaiian or Other Pacific Islander
- ○ More than one race
- ○ Unknown or not reported

OR

○ Hispanic or Latino

AND

- ○ Caucasian
- ○ African American
- ○ Asian
- ○ Native American or Alaskan Native
- ○ Native Hawaiian or Other Pacific Islander
- ○ More than one race
- ○ Unknown or not reported

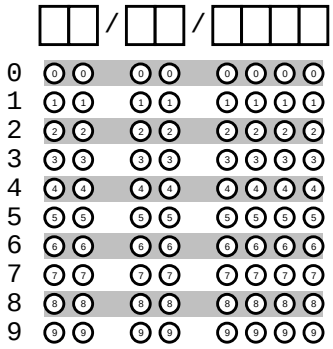
continued on back

Please provide the following information about <u>yourself</u>:

RELATION TO CHILD

○ Mother ○ Father ○ Grandparent ○ Legal Guardian ○ Other

DATE OF BIRTH



CURRENT MARITAL STATUS

○ Married ○ Living with partner ○ Separated ○ Divorced ○ Widowed ○ Single

HIGHEST LEVEL OF EDUCATION

○ Less than high school ○ High school graduate ○ Associate's degree

○ Some college ○ College graduate ○ Post-college education

EMPLOYMENT STATUS

○ Employed (full-time) ○ Employed (part-time) ○ Stay at home parent

○ Retired ○ Disabled ○ Unemployed ○ Student

FAMILY INCOME (past year)

○ Less than $10,000 ○ $10,000-$19,999 ○ $20,000-$29,999

○ $30,000-$39,999 ○ $40,000-$49,999 ○ More than $50,000

NUMBER OF CHILDREN IN THE HOME

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7+