AN INVESTIGATION OF THE EFFECTIVENESS OF NUTRITIONAL EDUCATION, PHYSICAL FITNESS, AND COGNITIVE-BEHAVIORAL THERAPY ON 9 TO 11 YEAR OLD GIRLS' SELF-CONCEPT, BODY IMAGE, AND PHYSICAL ACTIVITY

A thesis presented to the faculty of the Graduate School
of Western Carolina University in partial fulfillment of the
requirements for the degree of Master of Arts in Psychology.

By

Darla Hatch McCain, M.D.

Co-Director: Dr. Mickey Randolph, Professor, Department of Psychology
Co-Director: Dr. Candace Boan-Lenzo, Associate Professor, Department of Psychology
Committee Member: Dr. Lydia Aydlett, Professor, Department of Psychology

March 2009

TABLE OF CONTENTS

LIST OF FIGURES

ABSTRACT

AN INVESTIGATION OF THE EFFECTIVENESS OF NUTRITIONAL EDUCATION, PHYSICAL FITNESS, AND COGNITIVE-BEHAVIORAL THERAPY ON 9 TO 11 YEAR OLD GIRLS' SELF-CONCEPT, BODY IMAGE, AND PHYSICAL ACTIVITY

Darla Hatch McCain, M.D., M.A.

Western Carolina University (March 2009)

Co-Director: Dr. Mickey Randolph
Co-Director: Dr. Candace Boan-Lenzo

Childhood obesity has reached epidemic proportions. Despite the negative physical, psychological, social, academic, and financial effects of childhood obesity, few programs have been implemented successfully to address this burgeoning problem. The effects of a three-component intervention model, Life Fit, were examined. Participants included three 9 to 10 year old females who were overweight. The 10 week intervention consisted of two 2 hour sessions per week which included the following components: nutritional education, physical fitness, and cognitive-behavioral therapy.

This research was conducted as a single case study AB design. Data was collected on each of the following variables: nutritional measures (self-reported servings of fruits and vegetables and number of servings of sweetened beverages and sodas), physical fitness (cardiorespiratory endurance, upper body muscular strength and abdominal strength), anthropometric measure (BMI), physical activity levels (average daily pedometer counts), sedentary activity levels (number of self-reported hours in specific sedentary activities), self-concept (*Multidimensional Self-Concept Scale* (MSCS;

Bracken, 1992), and body image (*The Body Esteem Scale for Children* (Mendelson & White, 1994).

Data were interpreted using a visual inspection of graphed outcomes. Results revealed that participants improved their upper body endurance and cardiorespiratory fitness. All participants maintained their pre-intervention BMI. There were no improvements noted in the other measures. Limitations and implications for future research will be discussed in the paper.

Introduction

Childhood obesity has reached epidemic proportions. In 2003 through 2004, 17.1% of children and adolescents 2 through 19 years of age were overweight which approximates an alarming 12 and a half million youth in the United States (Centers for Disease Control and Prevention [CDC], 2004). Overweight children suffer the physical and emotional burdens of an increased body mass index (BMI). Furthermore, overweight youth are at increased risk of becoming adults who are overweight or obese with the long-term negative physical, psychological, and socioeconomic impacts that obese adults face (Mossberg, 1989; Whitaker, Wright, Pepe, Seidel, & Dietz, 1997). In the Bogalusa Heart Study, those children with the highest BMIs had the highest risk of becoming obese adults (Freedman, Khan, Serdula, Dietz, Srinivasan, & Berenson, 2005).

Although the full impact of pediatric obesity remains to be seen, the cause of obesity for the majority of children is simple - too great a caloric intake compared to energy expenditure. A large number of today's children eat a calorically dense, nutrient-poor diet. Adding to this problem is the decline in physical activity levels over the years while sedentary activities have increased. To effectively treat pediatric obesity and prevent further increases in the prevalence of pediatric obesity, programs must be developed to address this problem.

The following literature review will present the short- and long-term effects of childhood obesity, discuss the etiology of the problem, and focus on some of the specific issues associated with preadolescent females who are overweight. Following this review, a three component intervention program designed specifically to address these issues in this subgroup of overweight children will be presented.

Literature Review

Effects of At-Risk for Overweight and Overweight

To define the population of children who are overweight, body mass index is used. Body mass index (BMI) is the ratio of weight in kilograms to the square of height in meters. BMI is a widely used measure of body fatness and correlates well with more accurate measures of body fatness like dual energy X-ray absorptiometry (DXA)(Pietrobelli, Faith, Allison, Gallagher, Chiumello, & Heymsfield, 1998). BMI is a useful measure of health risk and has been shown to correlate with other measures of health like insulin and blood pressure (Whitaker et al., 1997). For children, sex-specific growth charts are used to plot and track BMI longitudinally. BMI between the 85th and 95th percentile for age and sex is considered "at-risk for overweight." A BMI at or above the 95th percentile is considered "overweight" in children (American Academy of Pediatrics [AAP], 2003).

Childhood overweight has negative effects on health-related quality of life. The World Health Organization (1948) defines health-related quality of life as a subset of quality of life directly related to an individual's health and includes physical, mental, and social well-being. Childhood overweight has been found to adversely affect health-related quality of life (Williams, Wake, Hesketh, Maher, & Waters, 2005). When a group of 106 severely obese 5 to 18 year old children with a mean BMI of 34.7 were compared to healthy peers, the severely overweight children were found to have a lower health-related quality of life similar to children diagnosed with cancer (Schwimmer, Burwinkle, & Varni, 2003).

Physical effects. The adverse physical impacts of childhood obesity include respiratory difficulties like sleep disordered breathing (Wing et al., 2003), asthma (Reilly et al., 2003), and decrease in exercise tolerance and cardiorespiratory fitness (Pate, Wang, Dowda, Farrell, & O'Neill, 2006). Cardiovascular impacts include an increased risk for hypertension [high blood pressure] (Sorof, Lai, Turner, Poffenbarger, & Portman, 2004) and dyslipidemias [abnormal lipid levels] (Lauer, Lee, & Clarke, 1988). When compared to a nonobese control group, 56 pre-pubertal obese children in one study were found to have increased intima-media thickness in their carotid arteries.(Wunsch, De Sousa, Toschke, & Reinehr, 2006). Increased intima-media thickness is a marker of early atherosclerotic change.

Compared to normal weight peers, overweight children also experience an increase in statural growth, earlier onset of puberty in girls (Wang, 2002), and increase in the incidence of type II diabetes (Hannon, Rao, & Arslanian, 2005). Children who develop type II diabetes are also more likely to experience the complications of diabetes like renal insufficiency and chronic renal failure at an earlier age than those individuals who develop diabetes in adulthood. There is an increased prevalence of fractures, musculoskeletal discomfort, and impairment in mobility in overweight children (Taylor et al., 2006b). Although rare, neurological complications of childhood obesity include pseudotumor cerebri [benign intracranial hypertension] (Dietz, 1998) which is characterized by intractable, severe headaches and may lead to visual loss in severe cases.

Obesity places youth at increase risk for hepatic steatosis [fatty liver]. The prevalence of fatty liver in 2 to 19 year olds in the United States is estimated to be 9.6%, and 38% of obese children have fatty liver (Schwimmer, Deutsch, Kahen, Lavine,

Stanley, & Behling, 2006). Fatty liver is potentially dangerous and can result in cirrhosis in severe cases. Cholelithiasis [gallstones] is another associated medical comorbidity of obesity. In a study of 493 obese children ages 8 to 19 years, the prevalence of gallstones was 2% occurring in the more severely obese of this group (Kaechele et al., 2006). Besides obesity, female sex was also found to be a risk factor for gallstones in this study.

Psychological effects. Unlike most negative physical impacts of childhood obesity, the psychosocial impacts are immediately apparent and distressing. Higher BMI values have been shown to predict greater negative self-concept and self-esteem (Biro, Striegel-Moore, Franko, Padgett, & Bean, 2006; Franklin, Denyer, Steinbeck, Caterson, & Hill, 2006) with lower self-concept having been noted in overweight girls as young as 5 years old (Davison & Birch, 2001). Overweight children with lower self-esteem are more likely to report feelings of sadness, loneliness, and nervousness compared to their overweight peers with higher self-esteem (Strauss, 2000).

In a longitudinal study of 2,054 girls aged 9 to 10 years through age 22 years, researchers studied the relationship between self-esteem and weight status (Biro et al., 2006). Using the Harter Self-perception scale which measures Global Self-worth, these researchers noted an inverse relationship between self-esteem and BMI. Additionally, they found that self-esteem was generally lower in middle adolescence for white girls compared to black girls. In their study, middle adolescence was defined as 13 to 16 years old.

Another recent study which examined the relationship between self-esteem and overweight status found similar results for global self-esteem. In this group of 2,813

boys and girls ages 9 to 13 years old, researchers also measured global self-worth using the Harter Self-perception Profile (Franklin et al., 2006). Additionally, they assessed perceived competence in the 5 domains measured on this scale: scholastic competence, social acceptance, athletic competence, physical appearance, and behavioral conduct. These researchers found that both obese boys and girls scored significantly lower than their normal weight peers on athletic competence, physical appearance, and global self-worth. The impact of obesity on perceived self-competence in girls was even more profound with obese girls scoring lower in these domains compared to obese boys. In addition to the lowered perceptions of self-competence that the obese boys face, obese girls in this sample were also found to differ significantly from their normal weight peers in social acceptance.

The relationship of overweight status and self-concept has been noted in children as young as 5 years old. Researchers studied a group of 197 girls with a mean age of 5.4 years (range 4.6 to 6.4 years) using the Pictorial Scale of Perceived Competence and Social Acceptance (PCSA) (Davison & Birch, 2001). The PCSA is multidimensional measure of self-concept which is developmentally appropriate for children ages 4 to 7 years. This scale assesses 4 dimensions of self-concept including physical ability, cognitive ability, peer acceptance, and maternal acceptance. In this sample of all non-Hispanic whites, overweight girls reported significantly lower perceived cognitive ability than their nonoverweight peers. Peer and maternal acceptance were not correlated with overweight. Furthermore, physical ability was correlated with overweight but only when mothers reported more restriction of their children's access to foods.

Overweight girls also report greater body dissatisfaction compared to their normal weight peers (Franklin et al., 2006; Davison & Birch, 2001; Thompson et al., 2007). To measure body shape perception, one group of researchers used gender specific, 9-figure scales in their study of 2,813 children (Franklin et al., 2006). Body dissatisfaction was measured as the difference between current perceived body shape and ideal body shape. Females were found to have greater body dissatisfaction than males, and obese boys and girls were found to have greater body dissatisfaction compared to their normal weight peers. In another study, the *Body Esteem Scale* was used to evaluate this sample of 5 year old girls (Davison & Birch, 2001). The *Body Esteem scale* assesses children's overall opinion about their body and physical appearance. In this sample, girls with higher weight status reported lower body esteem than girls with lower weight status. Thompson et al. studied a group of 325 girls ages 14 to 17 years old and found that overweight and at-risk for overweight girls thought their friends would be more accepting of them if they were more attractive compared to normal weight girls.

Although overweight youth are more likely to be teased by peers or families compared to their normal weight peers (Eisenberg, Neumark-Sztainer, Haines, & Wall, 2006; Thompson et al., 2007; Janssen, Craig, Boyce, & Pickett, 2004) with associated increases in child reported depression, anxiety, loneliness, and social physique anxiety (Storch, Milsom, DeBraganza, Lewin, Geffken, & Silverstein, 2007), they are also more likely to be perpetrators of bullying (Janssen et al., 2004). Weight-related teasing has also been found to negatively affect self-esteem and body image and has been consistently associated with depressive symptoms, suicidal ideation, and suicide attempts even after controlling for BMI (Eisenberg, Neumark-Sztainer, & Story, 2003). This form

of teasing was studied in a group of 4,746 adolescents in the 7th through 12th grades in Project EAT phase I. Adolescents who were teased about their weight were more likely to suffer emotional health problems compared to those not teased. Within this sample, 30% of girls and 25% of boys reported weight-related teasing from peers while 15% of the girls and 10% of the boys indicated weight-related teasing from peers and family. This is important because more than half of the girls who were teased by both sources reported suicidal ideation compared to 25% of girls who were not teased. Almost 25% of the girls teased by both sources reported attempting suicide. Of note, in this study when the researchers controlled for teasing, they did not find an association in adolescent girls between weight status and low self-esteem, suicidal ideation, suicidal attempts, or depressive symptoms.

Researchers were able to follow a group of 2,516 youth from the Project EAT phase I cohort into young adulthood (Eisenberg et al., 2006). They found that weight-teasing was more common in youth with higher BMIs. Furthermore, weight-teasing in adolescence was found to adversely affect self-esteem, body satisfaction, and depressive symptoms at the final follow-up in young adulthood.

In a study of 92 children aged 8 to 18 years old which examined the relationship between peer victimization, psychosocial adjustment, and physical activity, researchers found that overweight children who were subjected to teasing were more likely to self-report depressive symptoms, anxiety, loneliness, and social physique anxiety (Storch et al., 2007). Furthermore, peer victimization was negatively related to physical activity.

As children suffered more teasing, they were less likely to participate in physical activity which has implications for treatment of physically inactive obese youth.

The effects of family criticism about weight and shape are also long-lasting (Taylor et al., 2006a). In a retrospective study of 455 college women with high weight and shape concerns, researchers found that those women who reported hearing negative comments as children about their weight or shape from parents or siblings had higher scores on subscales of emotional abuse and neglect. Negative comments by parents were also associated with lower perceived social support from family and lower self-esteem. These researchers also noted that most of the sample participants reported that their parents or siblings made only a few negative comments and suggested that even a few negative comments may have detrimental impacts on children.

The association between obesity and bullying behaviors was studied in a group of 5,749 boys and girls aged 11 to 16 years (Janssen et al., 2004). Researchers used self-report of bullying behaviors to examine the relationship between BMI and relational and overt bullying behaviors as well as sexual harassment. They found that overweight children in this entire age range were more likely to be the victims of overt and relational bullying than their normal weight peers. When the use of bullying behaviors by these children was examined, there were no associations between BMI and bully-perpetrating in the 11 to 14 year old age group; however, a significant association was found in 15 to 16 year olds. Overweight boys and girls in this age group reported more use of overt bullying behaviors compared to their normal weight peers. Overweight boys also

reported greater use of relational bullying compared to peers. No associations were reported for sexual harassment and BMI.

Social effects. In addition to psychological difficulties, overweight children can also have social difficulties which can begin in preschool. In a study of 42 children aged 4 to 6 years, children chose significantly fewer chubby figures to be a potential friend compared to average or thin figures (Musher-Eizenman, Holub, Miller, Goldstein, & Edwards-Leeper, 2004). In fact, in selecting a best friend, these children chose the chubby figure only 7% of the time. These researchers also asked this group of children to rate these figures. The adjective ratings for the chubby figure were significantly lower than the thin and average figures.

Problems with establishing peer relationships are also pronounced in adolescence. In comparing a sample of 17,557 children ages 13 to 18 years old from the National Longitudinal Study of Adolescent Health, overweight youth received significantly fewer friendship nominations and fewer reciprocal nominations than their normal weight peers (Strauss & Pollack, 2003). Overweight youth were also found to be more isolated and more peripheral to social networks compared to their normal weight peers.

Social difficulties for overweight individuals also extend into romantic relationships. In a sample dataset from the Longitudinal Study of Adolescent Health, responses from questionnaires and interviews of 5,487 ethnically diverse adolescent females aged 12 to 17 years were analyzed (Halpern, King, Oslak, & Udry, 2005). For each one point increase in BMI in adolescent girls, the probability of having a romantic relationship decreased by 6%. Unfortunately, these types of relationship challenges track

into young adulthood. In the National Longitudinal Survey of Labor Market Experience, Youth Cohort (NLSY), 370 overweight participants aged 16 to 24 years were followed over seven years. Overweight women were 20% less likely to eventually marry compared to their non-overweight peers and overweight men were 11% less likely to be married (Gortmaker, Must, Perrin, Sobol, & Dietz, 1993).

Social marginalization in overweight children is likely the result of prejudice and discrimination. As noted earlier, anti-fat attitudes begin early (Musher-Eisenman et al., 2004). Children as young as 3 years old have been found to have negative attitudes about obesity (Cramer & Steinwert, 1998). In two study groups (group 1 n=30, group 2 n=83) of preschool children aged 3 to 5 years old, researchers examined body size stigmatization. Researchers found that chubby targets were more likely to be identified as "mean" compared to the average or thin targets who were more likely to be identified as "nice." The reason these children identified the target as "mean" or "nice" changed from more activity-based reasons to more appearance and body size reasons as the participants aged. Researchers also found that fewer positive adjectives and more negative adjectives were given to the chubby target compared to the thin or average target.

Overweight children become socially isolated by suffering prejudice not only from peers (Greenleaf, Chambliss, Rhea, Martin, & Morrow, 2006), but parents, general education teachers (Puhl & Brownell, 2001), and physicians (Puhl & Brownell, 2001). Prejudice has also been reported from physical education instructors (Greenleaf & Weiller, 2005). In a survey of 105 physical education teachers, participants endorsed moderate antifat attitudes and reported lower expectations for overweight youth

compared to normal weight youth.

Academic effects. Early in children's lives, overweight status can have academic impacts as well. As noted earlier, overweight girls were found to have lower scores on the cognitive ability domain of self-concept using the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (PCSA) (Davison & Birch, 2001). These lower self-perceptions of cognitive ability could negatively impact academic achievement. Childhood obesity has been associated with lower academic achievement in schools with certain normative behaviors and student body characteristics (Crosnoe & Muller, 2004). In an analysis of data from the Longitudinal Study of Adolescent Health, overweight adolescents had lower academic achievement when they attended schools in which there were higher rates of romantic activity and lower average body size among the students. These researchers suggested that increased romantic activity and lower average body size are social contexts in which obesity is more likely to be stigmatized. These social contexts could place overweight students in a hostile learning environment. Obesity is also associated with lower academic attainment in females. In the analysis of the NSLY cohort, women who had been overweight had completed fewer years of school compared to women who had not been overweight (Gortmaker et al., 1993).

Financial effects. In addition to negative academic outcomes, overweight status in adolescence has been associated with lower household incomes and higher rates of poverty (Gortmaker et al., 1993). In a study of 8,404 children aged 5 to 18 years who presented to a primary care clinic for well-child visits, health care expenditures were significantly higher and increased laboratory use was found in obese children relative to

their normal weight peers (Hampl, Carroll, Simon, & Sharma, 2007). Other financial impacts include obesity-associated annual hospital costs which have increased more than threefold from $35 million in 1979-1981 to $127 million during 1997-1990 in children aged 6 to 17 years (Wang & Dietz, 2002).

Etiology of Overweight

To understand how to prevent or treat childhood obesity, the cause of obesity must be understood. Secondary causes of childhood obesity like Prader-Willi syndrome, Cushing syndrome, and hypothyroidism are unusual (Schneider & Brill, 2005). Most children have primary obesity. For children with primary obesity, the etiology is thought to be multifactorial, a combination of genetics, environment, and behavior. Heritability is defined as the percentage of variance in a given trait that can be attributed to genetics. Heritability of body fatness is between 30% and 70% (Stunkard, Foch, & Hrubec, 1986); therefore, heritability does not explain all of the variance in overweight.

Environmental and behavioral factors are also influential in children's weight status (Rosenbaum, 2007). Early in a child's life, prenatal nutrition and early feeding practices impact childhood overweight but are beyond the scope of this review. In the school-age child, environmental and behavioral factors continue to influence weight status and include nutritional intake, physical activity, and sedentary activities. These factors interact with a child's genetic tendencies and cause an imbalance in energy favoring weight gain.

In the next section, a review of the nutritional factors that contribute to a child's energy imbalance will be presented. Current nutritional guidelines for children will be reviewed followed by information on what children are actually consuming. Finally,

modifiable patterns of nutritional behavior will be discussed.

Nutrition. Nutrition is the process by which an individual takes in and utilizes food material. A person's diet is the mixture of foods he or she eats. For some adolescents, however, the word "diet" has become synonymous with restriction of food intake. A nutritious diet is associated with many health benefits. The American Heart Association (AHA) and the American Academy of Pediatrics (AAP) recommend certain nutritional objectives for children. Unfortunately, most children do not meet these objectives. To begin to know how to help children meet these recommendations, we must first identify and understand the factors which contribute to nutrition behavior.

The AHA presented nutrition guidelines for children over 2 years old which have been endorsed by the AAP. These guidelines include recommendations for a balanced diet of fruits and vegetables, whole-grain breads and cereals, low-fat or nonfat milk and dairy products, and the use of vegetable oils and margarines low in saturated fats and trans fatty acids (American Academy of Pediatrics, 2006). The AHA also recommends reducing the intake of sugar-sweetened beverages and foods as well as reducing salt intake. There are many health benefits of the AHA diet. A diet high in fruits and vegetables is associated with a lower risk for chronic diseases (Centers for Disease Control, 2007).

In addition to recommendations for the types of foods to be eaten, daily estimated calories for children are also given based on age and level of activity. For example, the daily recommended calorie intake for sedentary children ages 9 to 13 years old is 1600 kilocalories for females and 1800 kilocalories for males. Increased physical activity requires additional calories based on level of activity. Moderately physically active

children will require an additional 0 to 200 kilocalories per day whereas very physically active children may need an additional 200 to 400 kilocalories per day.

Unfortunately, a gap exists between what is recommended and what children are actually consuming in both types of foods and quantities of calories. It is estimated that 80% of children in the United States eat less than 5 servings of fruits and vegetables per day. In a group of 878 adolescents aged 11 to 15 years, only 11.9% of this group met the recommendations for servings of fruits and vegetables (Sanchez, Norman, Sallis, Calfas, Cella, & Patrick, 2007). The vegetable servings that children are consuming consist primarily of potatoes, especially fried potatoes (Cavadini, Siega-Riz, & Popkin, 2000). The decrease in fruit and vegetable consumption begins in late infancy and continues throughout childhood (American Heart Association et al., 2006). In a study of over 2000 children in the Project EAT program, a downward trend in fruit and vegetable consumption was found as boys and girls transition from early to middle adolescence (Larson, Neumark-Sztainer, Hannan, & Story, 2007).

Although the trend of fat intake as a percentage of total calories is lower than in the mid-1960s, American children still have too great an intake of fat (Cavadini et al., 2000). In their study of adolescents, Sanchez et al. found only 32% of this group met the recommendations for dietary fat intake. According to the AHA guidelines, recommendations for the amount of dietary fat as a percentage of total kilocalories are 25% to 35% for children ages 4 to 18 years. For children older than 2 years, the AHA recommended intake of saturated fat as a percentage of total calories is less than 10%.

Milk product consumption has been increasingly replaced by the intake of fruit-flavored drinks, juices, and sodas (Mrdjenovic & Levitsky, 2003) which place children,

especially females, at risk of inadequate intake of calcium. Because adolescence is a critical period for accumulating peak bone mass, inadequate intake of calcium in adolescence places females at risk for osteoporosis later in life (American Academy of Pediatrics, 1999). In a 10 year longitudinal study of 2,371 girls aged 9 to 10 years old, researchers found that consumption of regular soda, fruit drinks, or coffee/tea was associated with significant decreases in the average daily intake of calcium (Striegel-Moore et al., 2006). Furthermore, they found that milk consumption in girls decreased by 25% over the course of the study.

In addition to displacing other nutritious foods, researchers found that with the exception of diet soda excessive sweetened drink consumption is associated with higher daily energy intake and increases in BMI (Striegel-Moore et al., 2006). Consumption of regular and diet soda increased in girls over the course of this study with consumption of regular soda increasing almost three fold. These researchers also suggested that the increase in daily energy intake associated with soda consumption may be partially related to concurrent fast food intake.

Another potential cause of increased caloric intakes is an increase in portion sizes. Portion sizes have increased since the early 1960s (Nielsen & Popkin, 2003). This has been termed “portion distortion” and is thought to contribute to the obesity epidemic in the United States. In a sample of 63,380 individuals aged 2 years and older from the Nationwide Food Consumption Survey (1977 to 1978) and the Continuing Survey of Food Intake by Individuals (1989 to 1991, 1994 to 1996, and 1998), food portion sizes were noted to increase from foods found in the home and outside the home for all food categories except pizza. For example, the average soft drink consumed increased from

13.1 ounces (144 kilocalories) to 19.9 ounces (193 kilocalories). These researchers also found that the largest portions were consumed in fast food restaurants.

In addition to the change in types and quantities of food groups consumed by children, nutritional patterns have also changed. Increases in meals away from home, breakfast skipping, increased snacking, fewer family meals, and increase in television viewing have all impacted nutrition in children over the last several decades. In a sample of 6,212 children aged 4 to 19 years who participated in the Continuing Survey of Food Intake by Individuals (CSFII) conducted from 1994 to 1996 and the Supplemental Children's Survey conducted in 1998, thirty percent of these children consumed fast food daily (Bowman, Gortmaker, Ebbeling, Pereira, & Ludwig, 2004). On the days that children in this study consumed fast food, they took in 187 kilocalories more per day than those children who do not consume fast food. Bowman et al. estimated that the increase in calories from fast food could contribute to an excess weight gain of about 6 pounds per year. Analyzing the same CSFII dataset and the Diet and Health Knowledge Survey, the United States Department of Agriculture (USDA) found that food consumed away from home has a higher ratio of fat to calories compared to foods prepared at home (Lin, Guthrie, & Blaylock, 1996). In this survey, fast food provided female adolescents with 11% of their daily calories which was the highest among all children in this study.

Children in the United States are also more likely to skip breakfast. In a sample of 9,919 adolescents and young adults aged 11 to 27 years from the National Longitudinal Study of Adolescent Health, there was a significant decrease in the number of days breakfast was reported eaten as adolescents transitioned to adulthood (Niemeier, Raynor, Lloyd-Richardson, Rogers, & Wing, 2006). Researchers also found that female

adolescents compared to other children in the CSFII survey had the highest tendency to skip morning meals (Lin, Guthrie, & Blaylock, 1996).

Skipping breakfast has also been associated with an increase in overweight (Niemeier et al., 2006). These researchers found that fewer days of breakfast consumption in adolescence predicted small increases in BMI in adulthood. This is thought to be due to increase hunger throughout the day which may lead to overeating and increased likelihood of snacking on unhealthy foods.

An increase in snacking has also been reported with some children receiving one third of their daily calories from snacks (American Heart Association et al., 2006). Researchers have found a significant increase in the number of calories children received from snacks from 1977-1978 (203 kilocalories) to 1994-1996 (351 kilocalories) (Nielsen & Popkin, 2003). As suggested earlier, this increase in calories from snacks may be the result of increases in portion sizes. The cause for concern is that an increase in calories from snacks may lead to excess consumption of calories and/or could supplant the intake of more nutritious foods.

Family meals are another important area of childhood nutrition. As children enter adolescence, the frequency of family meals decreases (Videon & Manning, 2003). Fewer family meals have been associated with poorer nutritional intakes in children. In an analysis based on the National Longitudinal Study of Adolescent Health, parental presence at the evening meal was found to be associated with lowered odds of poor consumption of fruits, vegetables, and dairy foods. Furthermore, parental presence at the evening meal was also associated with lowered odds of adolescents skipping breakfast.

Television viewing has also impacted nutritional patterns in children. In a study

of 548 sixth and seventh graders, television viewing was found to be inversely associated with fruit and vegetable intake (Boynton-Jarrett, Thomas, Peterson, Wiecha, Sobol, & Gortmaker, 2003). These authors suggested that this association may be due to increased requests for and subsequent intake of highly advertised foods at the expense of fruits and vegetables. Television has also been noted to change overall food consumption patterns. The television viewing and food consumption patterns of 91 families with children in the fourth, fifth, and sixth grades were studied (Coon, Goldberg, Rogers, & Tucker, 2001). Children in families with high television viewing during meals received on average more of their total calories from pizzas, snack foods, and sodas compared to children from families in which television viewing and mealtimes were separated. Similar to the study by Boynton-Jarrett et al., children in this study also had lower reported intakes of fruits and vegetables.

As shown in this review of nutrition, many factors have been identified which are contributing to the childhood obesity epidemic. The patterns of intake as well as the quality and quantity of foods children consume have influenced the energy equation favoring a positive energy balance. Another important consideration in this equation is energy expenditure. In the next part of this review, physical activity will be presented. First, the benefits of physical activity will be reviewed as well as the current recommendations for children. Then actual level of physical activity and trends of activity will be presented as they relate to children in general, preadolescents, and females.

Physical activity. The effects of overnutrition on childhood obesity are compounded by a decrease in physical activity. Physical activity is a key component of

energy balance and should be promoted in children and adolescents as a lifelong positive health behavior (Kohl & Hobbs, 1998). It is defined as any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above the basal level (Casperson, Powell, & Christenson, 1985). Exercise refers to the planned, structured, and repetitive bodily movement done specifically to improve or maintain one or more components of physical fitness. Exercise is considered a subset of physical activity (Kohl & Hobbs, 1998).

In a summary of the extant literature on physical activity in school-age youth, an expert panel found many benefits of physical activity in children (Strong et al., 2005). These positive health and behavior outcomes include reductions in total body and visceral adiposity in overweight children and reductions in systolic and diastolic blood pressure in hypertensive adolescents. Physical activity can also improve skeletal health by increasing bone mineral content and bone mineral density. Furthermore, regular physical activity in children has also been shown to improve psychological functioning. It is associated with an increase in self-esteem and self-concept as well as a decrease in anxiety and depression (Calfas & Taylor, 1994). Some studies have even shown a positive association between academic performance and physical activity.

To optimize health benefits, the CDC recommended level of activity for children in the United States is at least 60 minutes of daily moderate to vigorous physical activity in a variety of enjoyable individual and group activities (Strong et al., 2005). Children in the United States, however, are not meeting these recommendations. Since most children are in school and spend a large proportion of their time there, it is reasonable to assume that some of this requirement for physical activity would be met during the school day.

Unfortunately, this is not happening in most school systems. According to the CDC (American Academy of Pediatrics, 2006), only 8% of American elementary schools with existing physical education (PE) requirements provided daily PE classes for all grades for the entire year. In one study of 814 third grade students, the mean duration of PE was 33 minutes twice a week with only 25 minutes per week at a moderate to vigorous intensity level (Nader, 2003).

If children are not engaging in the recommended amount of physical activity during the school day, then this activity would need to occur during non-school hours. Most children, however, are not meeting the recommended levels at home either. Physical activity levels of 9 to 13 year olds from the Youth Media Campaign Longitudinal Survey (YMCLS) of 2002 showed that 22.6% of the youth in this telephone survey did not engage in any free-time physical activity (Centers for Disease Control, 2003). Furthermore, 61.5% of these children did not participate in any organized physical activity during the non-school hours. When physical activity levels are measured objectively, the evidence can be even more disappointing. Researchers found that when moderate to vigorous physical activity levels were measured objectively using accelerometers in a sample of 1,500 sixth grade girls, less than 1% met the CDC recommended guidelines (Pate et al., 2006). The girls in this sample averaged only 24 minutes of moderate to vigorous physical activity per day of which only 6 minutes per day were of vigorous intensity.

Although most children are not meeting the recommended levels of physical activity, older adolescents and females are more likely to not meet the guidelines compared to younger children and males. In a meta-analysis of physical activity levels, 6

to 7 year olds were more active in moderate to vigorous physical activity (46 minutes per day) compared with 10 to 16 year olds (16 to 45 minutes per day) (Sallis, 1993). Although this analysis found a decrease in activity levels for all children as they approach adolescence, activity levels in boys dropped less with age compared to females (2.7% per year and 7.4% per year, respectively). This trend was also found in a five year longitudinal study which measured energy expenditure in a group of boys and girls from age 5 until 10 years old (Goran, Gower, Nagy, & Johnson, 1998). These researchers found a significant decrease in total energy expenditure over time in girls compared to boys and explained this decrease in total energy expenditure by a 50% reduction in activity energy expenditure which occurred in this small sample of girls.

As evidenced in this review, low physical activity levels are contributing to the positive energy balance in children. Physical activity is not the only factor in the energy expenditure part of this equation. Sedentary behavior should also be considered as a potential contributor to the childhood obesity epidemic. In the next section, sedentary behaviors like television viewing will be discussed.

Sedentary activity. It has been proposed that physical activity is replaced with sedentary behaviors. Television watching, for example, has been found to replace more vigorous physical activities (Caroli, Argentieri, Cardone, & Masi, 2004). Although sedentary behaviors include using a computer, playing video games, and talking on the phone, television viewing is the predominant sedentary behavior among children in the United States.

According to Nielsen Media Research (2006), the total average time a household watches television during the 2005-2006 television year was a record 8 hours and 14

minutes per day which is a 3 minute increase from the previous television season. The average amount of television watched by individual viewers was a record 4 hours and 35 minutes which increased 3 minutes from the previous year. Adolescents aged 12 to 17 watched 3% more television than the previous year. Specifically, teen girls increased their viewing by 6%. Younger children aged 2 to 11 years old also watched more television during the 2005 to 2006 season, increasing their viewing by 4%.

Just as physical activity has been associated with certain positive health outcomes, sedentary behaviors have been associated with certain adverse health outcomes in children. In the *Growing Up Today* study of 10, 769 boys and girls aged 9 to 14 years old, those children who reported more time in sedentary recreational activities had greater increases in BMI at one year follow-up (Berkey et al., 2000). Girls in this study reported over 3 hours per day engaged in sedentary activities compared to boys who reported spending over 4 hours per day in sedentary activities. The positive correlation between increased television viewing and BMI has also been found in older adolescents. In the data from the California Teen Longitudinal Survey of adolescents 12 to 17 years old, adolescents who watched television more than two hours per day were twice as likely to be overweight at the three-year follow-up compared to adolescents who watched two hours or less (Kaur, Choi, Mayo, & Harris, 2003). In addition to an association with weight status, television and video watching have also been found to be positively correlated with systolic blood pressure in adolescents independent of weight status (Sugiyama, Xie, Graham-Maar, Inoue, Kobayashi, & Stettler, 2007). For each hour of television or video watched per day, there was a 0.5 mmHg increase in systolic blood pressure.

Like physical activity, gender differences in sedentary behaviors have also been documented. According to the CDC, inactivity is twice as common among females as males, 14% versus 7% respectively (AAP, 2006). Furthermore, as girls transition from early to mid-adolescence, they have been found to engage in more sedentary behaviors (Hardy, Bass, & Booth, 2007). In this study of 200 girls aged 12 to 15 years, 12 year old girls spent 45% of discretionary time in sedentary activity compared to 15 year olds who spent 63% of this time in sedentary activity. These sedentary behaviors included television viewing, sitting around talking with friends, computer use, and hobbies.

In the review of factors which promote childhood obesity, many modifiable behaviors have been presented. Improvements in nutritional habits as well as physical activity and sedentary activities can potentially have a positive impact on the energy equation favoring energy balance. Although a thorough understanding of nutrition and physical activity behaviors is integral to developing appropriate treatment for children who are overweight, psychological functioning must be understood as well as it can have a powerful effect on treatment effectiveness.

Psychological Functioning

In the following review, two important areas will be discussed: self-concept and body image. First, self-concept as a theoretical construct will be presented followed by a review of the current literature on the relationship of self-concept with age and gender. Body image will then be presented as a general concept. Lastly, body dissatisfaction will be discussed as it relates to gender and age.

Self-concept. In a general description, self-concept is a person's perception of himself and is shaped and developed through his experience with his environment

(Shavelson, Hubner, & Stanton, 1976). Self-concept and self-esteem have been used interchangeably in the literature and are essentially the same theoretical construct. Therefore, they will be presented in this review as referring to the same construct. Self-concept is important to understand because it influences the ways in which a person behaves. Seven features have been identified as critical to the construct definition of self-concept: organized, multifaceted, hierarchical, differentiable, stable, evaluative, and developmental.

According to Shavelson et al., self-concept can be conceptualized as an organized, hierarchical structure with a base and apex. The base is composed of multiple facets or domains while the apex is global self-concept. The domains must be differentiable or distinct from other constructs. Stability within self-concept refers to the idea that as one descends to the base of the hierarchy these domains of self-concept tend to vary more based on the situation. The apex, however, is thought to vary little with changes in situation.

The evaluative feature of self-concept refers to the idea that an individual forms evaluations of himself during his experiences (Shavelson et al., 1976). These evaluations can vary across cultures and individuals and can be made against a perceived ideal image or a peer. For example, differences have been noted in self-evaluations of physical appearance based on culture. In general, the ideal body shape desired by African Americans is larger than their perceived body figure which differs from Caucasians who usually desire a body figure thinner than their perceived body figure (Lawrence & Thelen, 1995). As a result of this difference in type of comparison for self-evaluation, global self-worth was found to be more negatively affected by increases in BMI in

Caucasians compared to African Americans (Biro et al., 2006).

The last of the seven features of self-concept is developmental. For children, this characteristic is a very important consideration. As children grow and mature, self-concept develops and differentiates (Harter, 1999). Over the years, children advance in their cognitive abilities from concrete to abstract thinkers. They also expand their network for social interactions which leads to more opportunities for social comparison.

Although there has been disagreement in the past about the hierarchal, multidimensional architecture of self-concept, most researchers today agree on this theoretical model. In a five-instrument factor analysis of child and adolescent multidimensional self-concept, researchers found evidence to support this model of general self-concept with six dominant factors (Bracken, Bunch, Keith, & Keith, 2000). In congruence with this theoretical model, Bracken's proposed model supports this theoretical structure and has the following domains: social, competence, affect, academic, family, and physical. Each of these domains overlaps somewhat with the others.

The six domains of self-concept are defined as follows (Bracken, 1992). Social self-concept describes how an individual interacts with others while competence self-concept is how capable an individual feels in his environment. It is notable that competence self-concept as a domain was least supported theoretically in the five-instrument factor analysis by Bracken and colleagues. It was found to overlap significantly with academic, social, and physical domains. Affect self-concept is defined as an individual's emotive behavior in any given situation. Academic self-concept is how capable an individual feels about school and school-related issues. Family self-concept is how accepted and comfortable an individual feels within his family. Lastly, physical

self-concept is how attractive an individual feels about himself. According to Bracken, each of these domains is strongly shaped by the individual's past and present interaction with his environment. These interactions will be shaped by age and gender. Therefore, in order to develop programs for children that foster growth or shape their self-concept, age and gender differences within these domains and overall self-concept must be taken into consideration.

Global self-concept in preadolescents. Self-concept develops as children mature socially and cognitively. Preschool and early elementary children have difficulty differentiating between actual and desired attributes and incorporating social comparisons (Harter, 1999). As a result, self-perceptions in this young age group are positively biased. There is a natural decline in positive self-perceptions as children enter middle childhood. This is due to older children making more social comparisons and maturing from the "all or none" thinking of early childhood. Older children's self-perceptions ultimately become more consistent with external indicators of competence like teacher and parent evaluation (Wigfield et al., 1997).

The transition from preadolescence to adolescence presents many challenges to children. As discussed earlier, this transition presents the physical challenges of puberty. It also presents challenges to global self-concept. In an analysis of age and sex effects on self-concept, global self-concept was found to decline from preadolescence to middle adolescence (Marsh, 1989). This is thought to be due in part to the increasing frequency of social comparisons that children in this age group make. These longitudinal declines in self-concept have also been noted in specific populations like obese children (Strauss, 2000) and females (O'Dea & Abraham, 1999).

Domain-specific self-concept in preadolescents. According to Shavelson et al., self-concept becomes more differentiated with age. As children mature, they are able to distinguish certain situations and contexts apart from their global sense of self in which their abilities are different. Since this concept of differentiation emerged, researchers have tried to document this trend. Marsh (1989) found, however, that differentiation of the dimensions of self-concept did not continue past preadolescence.

Global self-concept in females. Over the years, studies examining differences between genders regarding global self-concept have yielded mixed results. No significant global self-concept score differences between males and females were found in a sample of 2,501 students ages 9 to 19 years (Crain & Bracken, 1994). In a more recent meta-analytic review, however, researchers have provided evidence that females have lower general self-concept compared to males (Wilgenbusch & Merrell, 1999). This review was criticized for incorporating studies in the analysis which were based on a variety of theoretical constructs thus influencing the research outcome (Young & Sudweeks, 2005).

Gender differences in global self-concept may be more apparent when pubertal status is considered. In a study of 462 adolescents in Australia, researchers found that postpubertal males have higher global self-concept than post-pubertal females (O'Dea & Abraham, 1999). There was no statistical difference in global self-concept between prepubertal and postpubertal males, but there was a significant decline in global self-concept between prepubertal and postpubertal females in this sample.

Domain-specific self-concept in females. Small gender differences do emerge in elementary school students in specific domains (Jacobs, Lanza, Osgood, Eccles, &

Wigfield, 2002) and are consistent with stereotypes of gender roles. Boys tend to have higher self-perceptions in math, science, problem solving, athletic competence, physical appearance, and emotional stability. In a study of 2,969 seventh, eighth, and ninth graders using the *Children's Physical Self-Perception* profile, physical self-concept scores were higher in boys compared to girls (Hagger, Biddle, & Wang, 2005). Girls tend to have higher self-concept in the areas of reading, behavioral conduct, honesty-trustworthiness, and religion-spirituality (Harter, 1999; Marsh, 1989).

Body Image. Body image can be defined as an individual's body-related self-perceptions and attitudes (Huang, Norman, Zabinski, Calfas, & Patrick, 2007). Body image dissatisfaction can occur in both males and females; however, most of the research has focused on females as this group has shown greater difficulties with body dissatisfaction. When males do report body dissatisfaction, it tends to occur in the extremes of weight status. Obese males and underweight males have been found to have body dissatisfaction (Kostanski, Fisher, & Gullone, 2004). Females, on the other hand, can report body dissatisfaction regardless of weight status.

In fact, female body dissatisfaction has been deemed a normative experience in Westernized cultures with females as young as 9 years old report body image difficulties (Sands & Wardle, 2003). These researchers hypothesized that once the "thin ideal" is recognized as the societal standard, it becomes internalized, and internalization leads to awareness of the societal pressure to conform. This pressure to conform to an unrealistic image can lead to body dissatisfaction. These researchers proposed that interventions should target media influences and peers as these two informational sources were found in their study to promote awareness of the "thin ideal."

Although body image dissatisfaction is present in preadolescence, it tends to become more pronounced in adolescence (Kostanski et al., 2004). Research has shown that body dissatisfaction is associated with lower self-esteem in girls (Guiney, Alfred, Alfred, & Furlong, 1999). Body dissatisfaction has also been found to predict negative health behaviors like higher levels of dieting, unhealthy weight control behaviors, binge eating, lower levels of physical activity, and lower levels of fruit and vegetable intake (Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006).

An individual can experience anxiety in relation to evaluation of her body. This is termed social physique anxiety. Adolescent females have been found to have higher mean values on social physique anxiety scales compared to males (Kowalski, Mack, Crocker, Niefer, & Fleming, 2006). In this study of 621 adolescents with a mean age of 15 years, researchers measured coping skills used when adolescents experience this form of anxiety. They found that females most commonly used behavioral avoidance and short-term appearance management as their primary coping strategies whereas males used behavioral avoidance and acceptance as their main forms of coping. Behavioral avoidance includes deliberate attempts to keep away from the stressor and could include avoidance of activities like gym class or other physical fitness activities. Short-term appearance management includes ways to temporarily disguise the body through wearing baggy clothing, for example. This information on coping strategies may have therapeutic implications.

Interventions

The importance of all this research is finding potential areas to target for interventions. Overweight children, particularly females, have many problematic areas

which can and need to be addressed. Although the development of overweight is most likely influenced by a combination of genetic, environmental, and behavioral factors (Schneider & Brill, 2005), interventions which address environmental and behavioral influences can be effective. Interventions have included increasing physical activity, decreasing sedentary activity, providing nutritional education, and performing behavioral therapy (Collins, Warren, Neve, McCoy, & Stokes, 2006). Preventive interventions can be made at multiple levels. The level of intervention is dependent upon the target population.

Primary interventions. Primary or universal interventions are those that are directed at an entire population. The goal at this level is to help all children, regardless of current weight status, to live healthier lives and ultimately become healthy adults. The core of the program should be centered on health not weight (Society for Nutrition Education, 2003). The Society for Nutrition Education recommends that weight should be addressed in a healthful way rather than emphasizing obesity risks which can contribute to fear, shame, eating disturbances, and discrimination. It should consist of encouraging healthful nutritional patterns, increasing vigorous physical activity, decreasing sedentary activity, and increasing healthy body image and self-concept. Recently, researchers have found that interventions which target improving physical activity levels and dietary habits can be safely undertaken without increasing the likelihood of unhealthy eating and physical activity obsessions (Huang et al., 2007).

Secondary interventions. Secondary interventions are those that target at-risk groups within a population. The goal of a secondary prevention program would be to instill healthful values in the target group which will hopefully keep those children from

becoming overweight. For an overweight prevention program, normal weight children whose parents are obese would be a good target group for prevention because those children are at high risk of becoming overweight (Caballero, 2004).

Tertiary interventions. Tertiary interventions are those that target groups within the population who are exhibiting the target problem. The goal for an intervention at this level for overweight children would be to help them adopt healthier lifestyles and lose weight or reduce excessive weight gain. Successful tertiary interventions are desperately needed for overweight children. This study will use the Life Fit program. Because Life Fit will be used for at-risk for overweight and overweight children, it is considered a tertiary intervention for pediatric overweight; however, it could also be used for primary and secondary interventions for preadolescent females due to its emphasis on positive health behaviors.

Life Fit Intervention

The transition from preadolescence to adolescence represents a critical period when overweight may occur or worsen. There are changes in body composition that occur at this time. While most boys are noted to have a decrease in body fat as a percentage of body weight during adolescence, girls are noted to have an increase in fat and decrease in fat-free mass as a percentage of body weight (Dietz, 2004). Although this is a natural development, females' diets and activity patterns may further exacerbate this increase in body fat. Girls have shown many poor nutrition behaviors like skipping breakfast which place them at risk for obesity and other health issues. Additionally, females have also been found to have greater declines in physical activity and increases in sedentary activity as they transition into adolescence compared to males. As noted previously, girls show greater problems with self-concept than boys. Therefore, it is logical to intervene preventively in preadolescent girls in hopes to prevent further increases in BMI and complications from overweight.

This program used a three component approach to intervention: nutritional education, physical fitness, and cognitive-behavioral therapy. As shown in the literature review, nutrition and physical activity are critical areas in the energy equation which need intervention in overweight children; however, they are not the only concerns. Overweight children suffer psychological difficulties which will not be remedied with diet and exercise alone. Cognitive-behavioral therapy (CBT) can help promote physical health through targeting nutrition and physical activity behaviors, but CBT can also promote socioemotional health by targeting important areas like self-concept, body

image, and coping skills related to weight-teasing. In the next sections, each of these components will be discussed in detail. The rationale for inclusion for each component in the program will be presented followed by the program activities.

Nutritional Education

Rationale for inclusion. Nutritional education has been an integral part of many obesity interventions for children. As noted previously in the literature review, children, especially females transitioning into adolescence, show many unhealthy nutrition behaviors. Fortunately, all these behavioral choices are modifiable with appropriate support. In a systematic review of randomized trials for childhood obesity interventions, researchers found that interventions that include a dietary intervention can achieve relative weight loss (Collins et al., 2006).

Components of program. One of the most popular and effective dietary plans for use in preadolescent children is the Traffic Light Diet (Epstein, Myers, Raynor, & Saelens, 1998). This approach is a structured eating plan used to guide participants' eating patterns to meet age recommendations of the basic food groups. This plan incorporates foods into visually appealing categories based on a traffic light. Foods in the "Green" category, such as fresh vegetables and fruits, are labeled as "Go" foods while foods in the "Yellow" category, such as peanut butter, are labeled as "Caution" foods. Foods in the "Red" category like sodas and fried chicken are labeled as "Stop" foods. In this plan, there is no food which is completely off-limits. "Red" foods can be consumed but only a certain number of times per week based on an individualized plan. This program has shown success in preadolescent populations due to its cognitively appropriate, concrete food categorizations (Hart, Bishop, & Truby, 2002).

Children have been shown to increase their intake of fruits and vegetables when exposure increases (Sherry, 2005), especially if peer modeling is involved (Lowe, Horne, Tapper, Bowdery, & Egerton, 2004). One activity in this program involved bringing in fresh fruit and vegetables for a taste-testing party. Positive reinforcement was given to those participants who were willing to try these foods. This strategy was also used to expose the participants to new healthier ways of preparing their favorite snack items. For example, participants were shown how to prepare an individual pizza on a multigrain English muffin.

Availability and accessibility have also been shown to be important factors in fruit and vegetable consumption (Reinaerts, Nooijer, Candel, & Vries, 2007). Parents were encouraged to put away unhealthy food items like potato chips and candy and put out bowls of fresh fruit which are easily accessible to children. Children are then given freedom to choose and eat as much of these healthy items as desired.

Stimulus control strategies are taught to support healthy eating habits. Since television viewing during mealtime is associated with poorer nutritional intake and increased portion sizes, parents are encouraged to remove the television from the dining area. Soda consumption has also been associated with increased weight status. In a study of 644 children aged 7 to 11 years, participants reduced their consumption of carbonated beverages after a focused educational program targeting a decrease in soda consumption compared to the control group who received no intervention (James, Thomas, Cavan, & Kerr, 2004). A stimulus control strategy to target this problem would be to avoid bringing sodas in the home.

Physical Fitness

Rationale for inclusion. As physical activity levels decrease and sedentary activities have increased, it is necessary to develop programs which can alter these behaviors. The Promoting Lifestyle Activity for Youth (PLAY) program has been shown to increase the physical activity levels of children, especially girls (Pangrazi, Beighle, Vehige, & Vack, 2003). This program encourages the accumulation of 30 to 60 minutes of moderate to vigorous physical activity daily in nonschool hours. Another program which utilized pedometers in the four week intervention noted improvement in activity levels in females who were relatively inactive (Oliver, Schofield, & McEvoy, 2006).

In a systematic review of the literature, researchers found that habitual physical activity can have a positive influence on strength and endurance (Strong et al., 2005; Nemet, Barkan, Epstein, Friedland, Kowen, & Eliakim, 2005). Although most comprehensive programs incorporate a physical fitness component, some studies have shown that decreasing sedentary activities was as effective as increasing physical activity levels in reducing weight (Epstein, Paluch, Gordy, & Dorn, 2000).

Components of program. The Life Fit program incorporates components to increase habitual physical activity levels and decrease sedentary activities. To increase physical activity, children are taught a number of ways to engage in physical activity which are fun and can be incorporated into their everyday lives.

To address sedentary behaviors, stimulus control and positive reinforcement are incorporated into the Life Fit program. Programs that incorporate stimulus control or reinforcement to reduce sedentary behaviors have demonstrated effectiveness in decreasing sedentary behaviors in obese children (Epstein, Paluch, Kilanowski, & Raynor, 2004). In a study of 198 third and fourth grade students, a classroom curriculum

which targeted reduction in television and video game use resulted in a significant decrease in these behaviors as well as a significant relative decrease in BMI compared to the control group (Robinson, 1999). As part of a stimulus control strategy, parents are encouraged to remove the television from their children's bedroom. Participants also engage in a "No TV Week" incentive in which participants who are able to complete the week without watching any television receive a non-food prize.

Cognitive-Behavioral Therapy

Rationale for inclusion. Programs for overweight children incorporating cognitive-behavioral therapy have shown some long-term success (Braet & Van Winckel, 2000). One small-group therapy program for overweight adolescents ages 13 to 16 years old successfully incorporated the following cognitive-behavioral strategies: self-monitoring of eating and physical activity patterns, stimulus control strategies, family communication, stress management techniques, and relapse prevention (Jelalian & Mehlenbeck, 2002). These participants scored higher on physical self-worth and physical appearance after intervention.

Components of program. For this component, participants engage in peer and individual activities which addressed self-control strategies related to nutrition, physical activity, and sedentary activities. Activities addressing peer relations, self-concept, and body image are also incorporated. For example, to address self-concept, participants are asked to identify several characteristics about themselves that they like. Another important area to address in this program is weight-related teasing (Eisenberg et al., 2003). Weight-related teasing contributes substantially to socioemotional difficulties of overweight children. Through role-play activities, participants are taught effective

strategies to deal with this form of teasing. The next section will summarize the difficulties overweight females encounter and the hypotheses of the Life Fit program.

Statement of the Problem

Childhood obesity is a growing problem in the United States with an estimated 12 and a half million children ages 2 through 19 years who are overweight (Centers for Disease Control, 2004). Overweight children are at risk for many associated physical health problems which can be immediately apparent or may not be manifest until adulthood (Reilly et al., 2003). Childhood obesity is also associated with psychosocial difficulties (Davison & Birch, 2001; Franklin et al., 2006; Storch et al., 2007) and academic difficulties, (Crosnoe & Muller, 2004; Gortmaker et al., 1993) and possible long-term financial problems (Gortmaker et al., 1993; Hampl et al., 2007).

Although childhood obesity has a heritability between 40 and 70 percent, environmental and behavioral factors play a substantial role in expressing each individual's genetic tendencies (Stunkard, Foch, & Hrubec, 1986). In general, the simple explanation for childhood obesity is an energy imbalance due to high energy intake without concomitant expenditure through physical activity. Most children in the United States consume a diet which is energy-dense and nutrient-poor (American Academy of Pediatrics, 2006). Exacerbating this situation is a decline in physical activity levels with a concurrent increase in hours spent in sedentary activity.

Childhood obesity places a particular burden on females. First, childhood obesity increases the risk that females will enter puberty earlier as compared to males (Wang, 2002), and early pubertal timing has been associated with increased mental health problems in adolescents (Kaltiala-Heino, Marttunen, Rantanen, & Rimpela, 2003). Overweight females also have significantly greater declines in overall self-esteem as they

transition to adolescence compared to overweight males who have milder declines (Strauss, 2000). Weight-related teasing has also been reported more often by females compared to males (Eisenberg, Neumark-Sztainer, & Story, 2003), and this type of teasing is associated with an increase in depressive symptoms, suicidal ideation, and body dissatisfaction.

Body image and body esteem difficulties are also more obvious in females. Adolescent females have been found to have higher mean values on social physique anxiety scales compared to males (Kowalski, Mack, Crocker, Niefer, & Fleming, 2006). Furthermore, girls' body satisfaction is more negatively correlated to peer criticism than boys (Guiney et al., 1999). Since lower body satisfaction in females has been found to predict higher levels of dieting, unhealthy weight control behaviors and binge eating (Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006), interventions which target body perception are extremely important.

Making the transition from early childhood to adolescence can be difficult for any child; however, this time has been especially problematic for preadolescent females. Although there is a noted downward trend in physical activity levels and upward trend in sedentary activity levels for all children making this transition, researchers have found that activity levels in boys drop less with age as compared to females (Sallis, 1993). Furthermore, as girls transition from early to mid-adolescence, they have been found to engage in more sedentary behaviors (Hardy, Bass, & Booth, 2007). Lastly, early adolescent girls report more weight criticism during physical activity than boys (Faith, Leone, Ayers, Heo, & Pietrobelli, 2002).

With the rise in obesity, these trends in physical and sedentary activities are

especially concerning and may lead to increases in adolescent obesity. Compared to younger overweight children, adolescents who are overweight are more likely to become adults who are overweight (Mossberg, 1989). Due to the negative physical and psychosocial difficulties that overweight adolescent females may encounter and the decline in healthy behaviors as the transition into adolescence is made, the time to target healthy behaviors which may promote improved weight management is sooner rather than later.

Unfortunately, most pediatric weight gain prevention programs have not shown long term success in changing lifestyle behaviors. Although some have shown success, the intervention effect size has been small and replication of results has been disappointing (Stice, Shaw, & Marti, 2006). There are also no studies with documented success that incorporate nutrition, physical activity, and cognitive-behavioral therapy into one program for overweight preadolescent girls. This study used a multidimensional approach to weight management for preadolescent females. It included nutritional education, physical fitness, and cognitive-behavioral therapy to help overweight preadolescent girls make important lifestyle changes which they can carry with them through the years.

The following hypotheses were tested in the study:

Hypotheses

Hypothesis 1: It was hypothesized that participants would score better on measures of muscular strength and endurance after completing the Life Fit program. In a systematic review of the literature, researchers found that habitual physical activity can have a positive influence on strength and endurance (Strong et al., 2005; Nemet, Barkan,

Epstein, Friedland, Kowen, & Eliakim, 2005).

Hypothesis 2: It was hypothesized that participants would score higher on measures of cardiorespiratory endurance after completing the Life Fit program. In a group of 442 ninth grade girls, cardiorespiratory fitness as measured by a submaximal 3-stage step test improved after a physical fitness intervention emphasizing physically active lifestyle, physical activity self-monitoring, and problem-solving skills (Nemet et al., 2005; Young, Phillips, Yu, & Haythornthwaite, 2006).

Hypothesis 3: It was hypothesized that participants would have a lower BMI or no increase in BMI after completing the Life Fit program. In a meta-analytic review of obesity prevention programs for children and adolescents, study characteristics which correlated with larger effects sizes for prevention of weight gain included: female-only trials, intensive intervention (approximately 40 hours of intervention time), and median intervention time of less than 16 weeks (Stice, Shaw, & Marti, 2006). The Life Fit study possesses these characteristics. Although a 10 to 12 week intervention seems to be a relatively short time to see changes in BMI, studies using multidisciplinary interventions have documented significant decreases in BMI upon completion of a 3 month intervention (Collins et al., 2006; Nemet et al., 2005).

Hypothesis 4: It was initially hypothesized that participants would self-report fewer "red foods" eaten per week upon completion of the Life Fit program. The traffic-light diet has been used as part of many comprehensive treatment programs for childhood obesity with reductions in "red foods" noted post-treatment in several studies (Epstein, Myers, Raynor, & Saelens, 1998); however, upon completion of the pilot study, it was decided to use a less restrictive approach to nutritional management in terms of healthy

fats like nuts. The participants were taught portion control and a healthy, balanced diet based on the MyPyramid program. It was expected that in a qualitative examination of eating behaviors, post-intervention data would be coded as more balanced than pre-intervention data for participants in the study.

Hypothesis 5: It was hypothesized that participants would self-report higher total fruit and vegetable servings eaten per week after completing the Life Fit program. Evidence shows that promotion of and exposure to fruits and vegetables can result in increased consumption (Sherry, 2005).

Hypothesis 6: It was hypothesized that participants would self-report lower intakes of sweetened beverages and sodas consumed per week after completing the Life Fit program. In a study of 644 children aged 7 to 11 years, participants reduced their consumption of carbonated beverages after a focused educational program targeting a decrease in soda consumption compared to the control group who received no intervention (James, Thomas, Cavan, & Kerr, 2004).

Hypothesis 7: It was hypothesized that participants would self-report fewer hours of sedentary activity per week after completing the Life Fit program. In a study of 198 third and fourth grade students, a classroom curriculum which targeted reduction in television and video game use resulted in a significant decrease in these behaviors as well as a significant relative decrease in BMI compared to the control group (Robinson, 1999).

Hypothesis 8: It was hypothesized that participants would report more steps walked per week after completing the Life Fit program. In a study of 78 children who participated in a physical activity intervention using pedometers, there was no significant increase in pedometer counts after the 4 week intervention when all the children were

analyzed as a group. However, all female participants, except those with the highest baseline pedometer counts, showed a significant increase after intervention (Oliver, Schofield, & McEvoy, 2006). Since this study would consist of a group of preadolescent overweight females, it was very likely that their baseline level of physical activity would be lower than average.

Hypothesis 9: It was hypothesized that participants would score higher on global self-concept, social self-concept, and physical self-concept domains after completing the Life Fit program. Overweight adolescents who participated in a program of peer-based intervention and cognitive-behavioral therapy scored higher on physical self-worth and physical appearance after intervention (Jelalian & Mehlenbeck, 2002). It was expected that social self-concept would also be affected by the cognitive-behavioral therapy component of this intervention which targeted friendships and social skills.

Hypothesis 10: It was hypothesized that participants would score higher on the body esteem scales after completing the Life Fit program. A major focus of the curriculum for the cognitive-behavioral component of this program would be body image and body satisfaction: therefore, it was expected that participants would score higher on this measure upon completion of the intervention.

Methods

Participants

Participants included 3 students ranging in age from 9 to 10 years old from a rural elementary school in western North Carolina. The mean age for the participants was 9.33 (SD=0.58). Participation in the Life Fit program was voluntary. Participants were solicited through a flyer sent home to all fourth and fifth grade female students at the elementary school. Participants were screened for BMI through an initial telephone interview with the parent. Participants meeting criteria of BMI at or greater than the 85th percentile were deemed eligible and offered participation in the study. Parental consent and student assent were required of all participants in the study.

Participant 1. Participant 1 was a fifth grade African American girl whose mother enrolled her. Her parents were college graduates and her father is deceased. This participant had a long history of struggling with her weight. She had participated in a weight loss program through the YMCA without improvement in her weight status. This child's medical history was significant for allergies and asthma requiring routine maintenance medications plus intermittent use of oral steroids. Participant 1's pre-intervention BMI was 34.93 kg/m^2(greater than the 97th percentile). Her mother's goals for her daughter in the Life Fit program were "weight loss and improved physical stamina." Participant 1 reported that she wanted to participate in this program "to make new friends like her."

Participant 2. Participant 2 was a fourth grade Caucasian girl whose mother enrolled her. Her parents were college graduates, and she lived with her mother and

stepfather. This child's medical history was significant for seasonal allergies and asthma requiring routine maintenance medications. Participant 2's BMI was 25.17 kg/m^2 (greater than the 95^{th} percentile). Her mother's goals for her daughter in the Life Fit program were to "develop good eating habits, learn self control, and improve her self esteem." Participant 2 reported that she wanted to participate in this program because "it seemed like it was fun."

Participant 3. Participant 3 was a fourth grade Caucasian girl whose mother enrolled her. Her parents were high school graduates. This child's medical history was unremarkable. Participant 3's BMI was 24.13 kg/m^2 (greater than the 95^{th} percentile). Her mother's goals for her daughter in the Life Fit program were for her to learn to make better snack choices. Participant 3 reported that she wanted to participate in this program "to learn how to eat right."

Materials

The assessment materials used in this study included a demographics form (see Appendix C), informed child assent (Appendix A) and parental consent (see Appendix B), nutritional assessment form (see Appendix D), a physical fitness assessment form (see Appendix E), physical and sedentary activity form (see Appendix F), the *Multidimensional Self-Concept Scale* (MSCS; Bracken, 1992), and *The Body Esteem Scale for Children* (Mendelson & White, 1994). A cognitive-behavioral manual for group leaders was used in this study based on the Life Fit Manual by Boan-Lenzo and Randolph (2004) (Appendix G for a sample of activities) and a learning bag was given to each child (Appendix H). The learning bag contents varied by week and included handouts on nutrition, physical fitness, and coping as well as nutritious recipes.

Nutritional assessment. For this assessment, participants were given a journal in which they logged all the foods and beverages that they consumed per day. Participants recorded these in a journal (see Appendix K) each day for 7 days during baseline. Daily fruit and vegetable servings as well as sweetened beverage and soda servings were recorded for 7 days during baseline. This assessment was based on self-reported intakes. Individual participant journals were reviewed by researchers. This assessment was repeated during week 10.

Physical fitness assessment. The physical fitness assessment included a measure of cardiorespiratory endurance, a measure of muscular strength and endurance, and a measure of body composition. The purpose of this assessment was to establish a baseline for comparison upon completion of the intervention. Cardiorespiratory fitness was evaluated using a resting heart rate. Blood pressure was not obtained due to malfunction of the equipment at baseline. Heart rate was measured after participants performed a step test. Muscular strength and endurance were measured using number of push-ups and sit-ups completed. Body composition was measured using BMI. To obtain accurate height and weight for the BMI, a portable stadiometer and balanced scale was used. Measurements were taken at baseline and upon completion of the program.

Physical and sedentary activity assessment. A measure of each participant's level of activity was assessed. The purpose of this assessment was to establish a baseline for comparison upon completion of the intervention. Physical activity was assessed using daily pedometer counts which were logged in a journal (see Appendix I) by the participant for 7 days. These entries were verified by a parent as indicated by the parent placing their initials beside each entry. Researchers instructed the student and parent on

how to use the pedometer and log the data. Measurements were taken at baseline and upon completion of the program.

Nonschool sedentary activity was measured by logging self-reported number of hours the participant engaged in watching television, playing video games, talking on phone, and using home computer. Nonschool sedentary activity was logged in a journal (see Appendix J) each day for seven days by the child. Journal entries were verified by the parent as indicated with the parent initialing beside each entry. Researchers instructed the student and parent on what constituted sedentary activity. Measurements were taken at baseline and upon completion of the program.

Multidimensional Self-Concept Scale. The *Multidimensional Self-Concept Scale* (MSCS) is a self-report instrument which measures global self-concept and individual domains of self-concept. This instrument was administered to establish a baseline for comparison measure upon completion of the intervention. The MSCS contains 150-items and uses a modified Likert scale in which the respondent rates their agreement with each item. The respondent rates their agreement as *strongly agree*, *agree*, *disagree*, or *strongly disagree.* There is no neutral option on this rating scale. The MSCS contains statements that are worded positively as well as statements that are worded negatively. The MSCS includes items such as, "Most people like me," "I am a good person," "My parents don't trust me," "Learning is difficult for me," and "My skin is attractive". This instrument is designed for individuals ages 9 through 19 years. This MSCS measures six domains of self-concept including, Social, Competence, Affect, Academic, Family, and Physical. The MSCS can be administered individually or in a group.

The MSCS yields a Total Scale score, which is roughly equivalent to a global

self-concept and six subscale scores (Social, Competence, Affect, Academic, Family, and Physical). Both the Total Scale score and the six subscales generate standard scores, which have a mean of 100 and a standard deviation of 15. The Total Scale score is determined by summing the raw scores for all 150-items and converting this score to a standard score. The MSCS also provides a percentile rank and self-concept classification for the corresponding standard score. A high score on the MSCS is indicative of high self-concept in the particular domain or in the global self-concept, while a low score indicates low self-concept in the specific domain or in the global self-concept of an individual.

The norm sample of the MSCS included 2,501 students ranging in age from 9 through 19 years of age. The students included in the norming were in 5th through 12th grade. The standardization sample included students from all regions of the United States, and was representative of the various demographics of the country.

Numerous studies have provided support for the psychometric properties of the MSCS. The MSCS appears to be a highly reliable instrument with coefficients alpha exceeding .90 for the subscales at all ages. The only exception is coefficient alpha for the Competence subscale which ranges from .85 to .90. The internal consistency for the Total Scale is also quite high, with coefficient alphas ranging from .97 to .99 for all ages (Bracken, 1992). Test-retest reliability was also examined by Bracken (1992) and revealed that over a 4 week period there was no significant change in mean subscale or total scale scores. Additional analysis of the MSCS provided support for considering each subscale as a measure of a distinct facet of self-concept (Crain & Bracken, 1994).

Validity studies have provided support for the construct, concurrent, and criterion-

related validity of the MSCS (Crain & Bracken, 1994). Factor analysis investigating the MSCS and other instruments of self-concept or self-esteem has supported the hierarchical nature of the model, the existence of the global self-concept, and the intercorrelation of six primary factors that correspond to the six subscales of the MSCS (Crain & Bracken, 1994). Concurrent validity of the MSCS was also supported by the high positive correlations between the MSCS and the most widely used instruments of self-concept. According to Bracken and Howell (1991), these correlations ranged from .73 and .85 for the Coopersmith Self-Esteem Scale (Coopersmith, 1967) and the Piers-Harris Children's Self-Concept Scale (Piers, 1984). Research by Delugach, Bracken, Bracken, and Schicke (1992) examining MSCS convergent validity revealed moderate correlations (.69) with the Self-Description Questionnaire I (Marsh, 1988) and strong correlations (.80) with the Self-Description Questionnaire II (Marsh, 1990). Pre- and post-measures of this assessment were taken during week 1 and week 10 respectively.

The Body Esteem Scale for Children. The *Body Esteem Scale for Children* (Mendelson & White, 1994) was administered to establish a baseline for comparison measure upon completion of the intervention. As cited in Davison & Birch (2001), this instrument includes 24 items that assess overall, nonspecific body esteem of children. The instrument is designed for use with children between the ages of 8 and 15 years. Children endorse items like “I like what I look like in pictures,” “I’m proud of my body,” and “I wish I were thinner” using a 2-item response set of *Yes* and *No* based on their agreement with the statement. The instrument includes three subscales: appearance, weight, and attributions. These scores are combined to form an overall composite of body esteem or body image. The *Body Esteem Scale* is not a clinical instrument;

therefore, there are no norms defining healthy and problematic body esteem. The reliability and validity of the *Body Esteem scale* has been previously assessed. In an sample of 7 to 12 year old children, Mendelson and White reported that the *Body Esteem scale* had a split-half reliability of r=.85 (odd-even split) and displayed concurrent validity with the Physical Attributes subscale of the *Piers-Harris Self-Concept scale* (r=.67). Pre- and post-measures of this assessment were taken during week 1 and week 10 respectively.

Cognitive-behavioral manual. A cognitive-behavioral manual was designed for the group therapy leader. This cognitive-behavioral manual included activities designed to improve coping skills, such as dealing with weight-related teasing in a group format. It also contained activities which foster self-control strategies related to nutrition, physical activity, and sedentary activities. The goal was to improve each participant's self-concept, body image, and coping skills. Sample activities can be found in Appendix G.

Individual learning bag. A learning bag that contained a journal for nutrition and physical activity behaviors was given to each participant. In addition, this bag contained fun and informative books on nutrition and physical fitness which are grade-level appropriate, coping skills handouts, nutritious recipes, exercise handouts, and nutrition handouts (see Appendix H). The learning bag was also used to communicate each participant's individual progress to her parent(s). Book bag programs have been shown to foster parent-child reading and interaction at home as well as increased interest in purchasing fruits and vegetables (Drozd, Romaniello, Wearner, Carter, & Auld, 2006).

Procedure

Pilot study. A pilot study was conducted prior to implementation of the intervention to determine programming needs. Participants for the pilot study were solicited through flyers in the local community. Six participants originally enrolled. One participant dropped out after the first meeting. Of note, she did not meet the BMI requirements but wanted to learn more about healthy nutrition. One participant dropped out after five weeks when her family moved out of the county. One of the remaining participants did not meet the study criterion of BMI at or greater than the 85th percentile; however, due to that fact that she was the fraternal twin of a study participant who met the BMI criterion and the study numbers were low, she was allowed to enroll. The pilot study was run on the campus of Western Carolina University each Monday and Wednesday from 3:00 pm to 5:00 pm for 12 weeks. Parents were responsible for transporting participants to and from the study site.

The intervention ran from weeks two through eleven with pre- and post-intervention measures taken during week one and twelve. Each intervention session consisted of nutritional education based on the traffic light diet, physical fitness, and body image and coping skills activities. Although the traffic light diet is a well-researched diet that is conceptually appropriate for this age group, concern was raised about the confusion that arose for children when foods, like nuts, were designated in the "red" food category but clearly have health benefits. Due to this issue, the traffic light diet was not used in the formal study.

Another difficulty noted during the administration of the nutritional education part was that the participant who did not meet BMI criterion requirements would often remark about not needing to maintain a healthy diet because she did not need to lose weight. Her

statements routinely interfered with the other participants' learning. Based on this observation, it was decided to not include participants in the formal study who did not meet BMI requirements even if participant numbers were low.

Participants engaged in physical fitness in each session which consisted of a variety of activities from yoga, BoSu exercise, walking, running, jumping rope, dancing, and participant-directed obstacle courses. It was found that participants engaged in the physical activities more readily with material incentives; therefore, for the formal study, participants were provided with incentives from the first week of the intervention.

Participants also engaged in coping skills and body image activities. It was found that these participants seemed to enjoy role playing activities the best so more role playing was incorporated into the formal study. Participants were also requested to journal about their experiences with body image issues and weight teasing. It was found that this group struggled with follow through on these activities so it was decided not to emphasize this in the formal study.

Pre- and post-measures were obtained during weeks one and twelve. Several problems were noted during the data collection. During week one, a portable stadiometer was unavailable for use. Height measures were taken by placing participants by the wall, marking their height, and measuring. A portable stadiometer was obtained for week twelve data collection. When pre- and post-data was analyzed, it was found that one participant had a lower height at post-intervention indicating error in measurement. Ultimately, these results could not be analyzed.

Another problematic area was collecting nutritional data. Despite education on what to document, participants had difficulty with recording food information, such as

serving size. Furthermore, it was learned that two of the participants completed week long journals in the car on the way to the last session. Adding to this issue was that one of the participants struggled with spelling and written expression, and as a result her journals were difficult to read. Due to these difficulties, more teaching was given in the formal study on how to record for the food journals.

Intervention. The formal study intervention was administered 2 times a week for 10 weeks and took place from 2:30 p.m. to 4:30 p.m. on the campus of a rural elementary school in western North Carolina. Each session lasted for 2 hours and was run in a group therapy format. During week 1, pre-test data was collected as noted in the *Materials* section above. During weeks 2 through 9, each intervention session involved a 60 minute physical activity component, 30 minute nutritional component, and a 30 minute session on body image and/or coping skills. During week 10, post-intervention data measures were collected. Each session the participants took home a personalized learning bag which was to be reviewed with their parents. After reviewing the material and progress sheets in the bag, the parent initialed that they had reviewed the information.

The nutrition component focused on healthful, balanced eating habits. Each session participants received a healthy snack and water and then engaged in a nutritional activity. Nutritional activities included learning to read food labels, estimating portion sizes, identifying advertisement strategies in the food industry, and calculating sugar grams in soda. The physical fitness component consisted of dancing, walking, jumping rope, and engaging in participant-created obstacle courses. Participants received tickets for participation in physical activity which they could redeem for a trip to a prize box. The prize box contained non-edible reinforcers like stickers, pencils, and bracelets. The

cognitive-behavioral therapy sessions included activities which focused on self-concept, body image, and coping skills as designed in the cognitive-behavioral manual. Activities included relaxation techniques, role playing assertiveness and weight-teasing strategies, identifying the “thin ideal” in magazines and television media, and identifying positive self-attributes.

Results

Although results were originally intended to be analyzed through the use of paired samples t-tests, the number of participants precluded the use of this type of analysis. The use of a single case study AB design was determined to be the most appropriate method for evaluating the data. Data was interpreted using a visual inspection of graphed outcomes on each variable.

It was hypothesized that participants would show an increase in abdominal endurance and upper body endurance after completing the Life Fit program. Participant 1 demonstrated an increase in the number of sit-ups performed by the end of the program, whereas participant 3 demonstrated a slight increase in sit-ups and participant 2 demonstrated a slight decrease in sit-ups, shown in figure 1. However, all 3 participants demonstrated an increase in the number of push-ups performed by the end of the program, shown in figure 2.

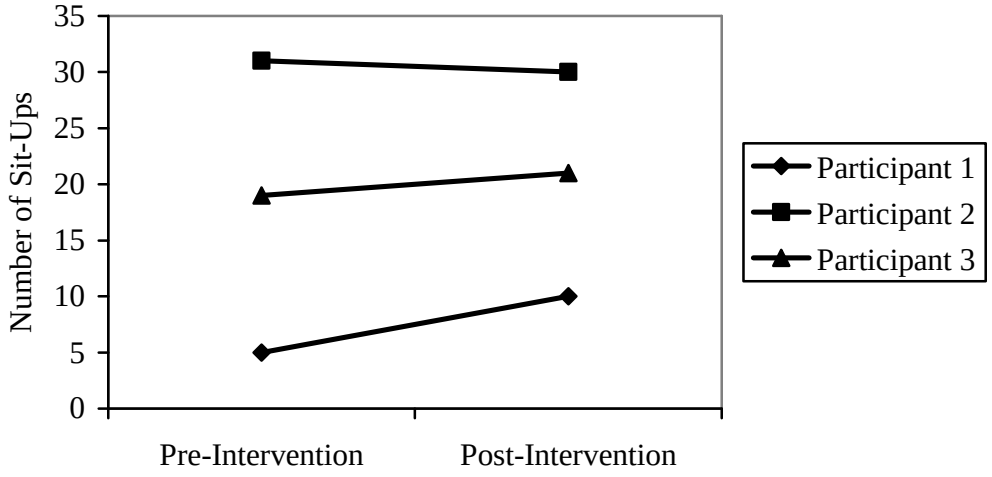

Figure 1: Pre- and Post-Intervention Abdominal Endurance

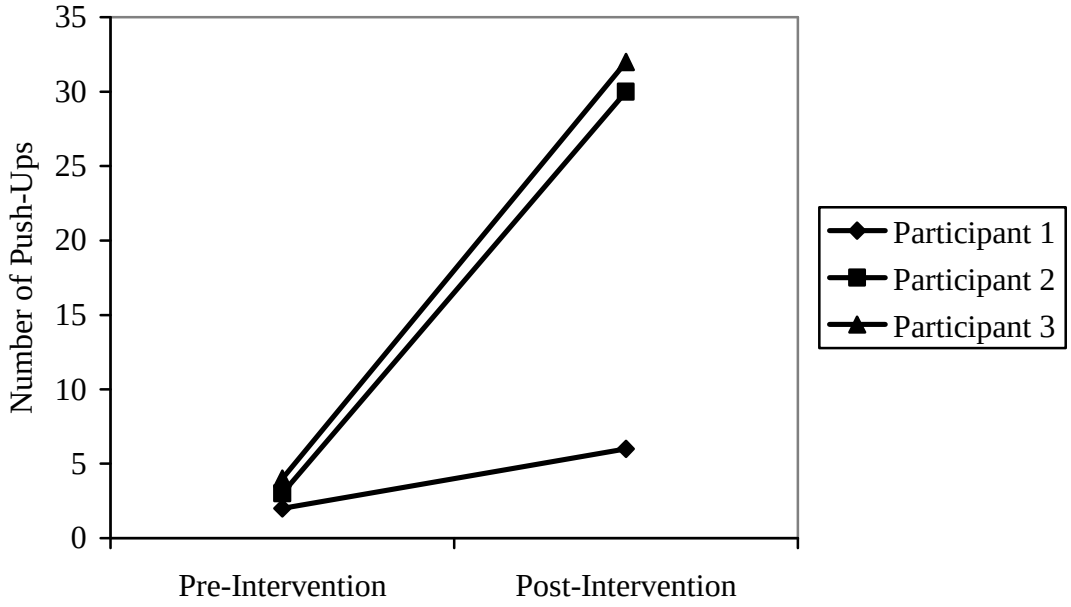

Figure 2: Pre- and Post-Intervention Upper Body Endurance

It was hypothesized that participants would demonstrate improvements in measures of cardiorespiratory endurance after completing the Life Fit program. All three participants demonstrated decreases in the recovery heart rate after a two minute step test indicating that their overall cardiorespiratory fitness improved.

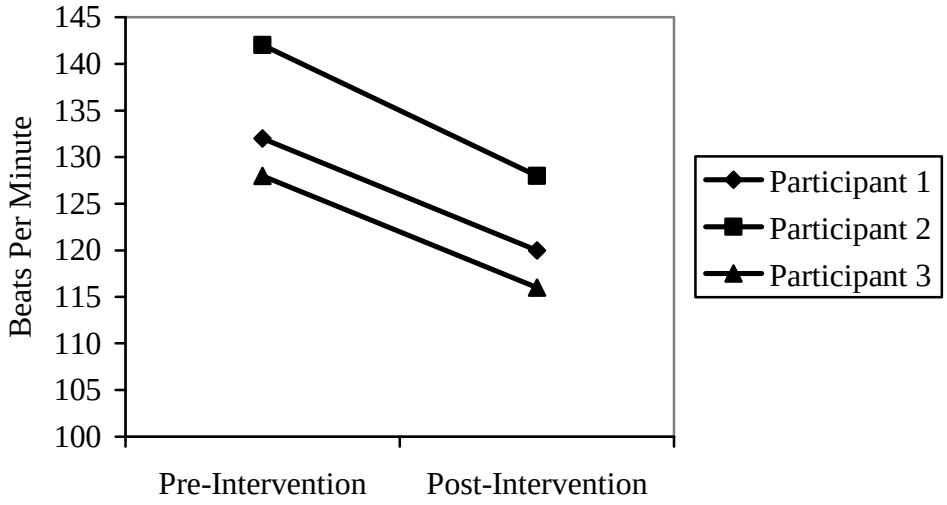

Figure 3: Pre- and Post-Intervention Recovery Heart Rate

It was hypothesized that participants would show a decrease in or no increase in BMI after completing the Life Fit program. Although the time period for this intervention was relatively short, the body mass indexes for these girls showed very little change. Participant 1 had a slight decrease in her BMI while the other 2 participants had a slight increase in their BMI, represented by figure 4.

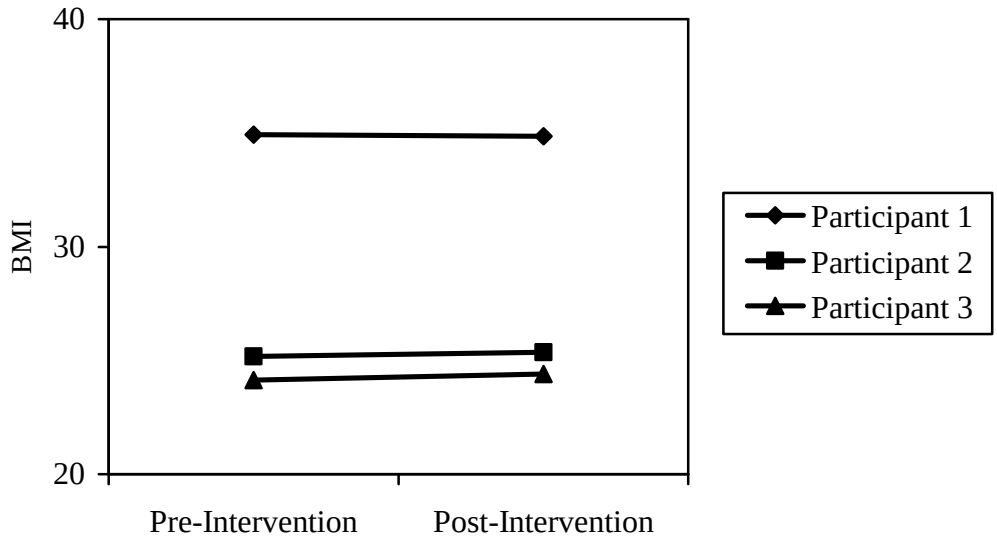

Figure 4: Pre- and Post- Intervention BMI

It was hypothesized that participants would show a decrease in number of servings of "red foods" eaten per week after completing the Life Fit program. After running the Life Fit pilot program, it was decided not to include the Traffic Light Diet as the basis for the nutritional portion of the program; therefore, Hypothesis 4 was not tested.

It was hypothesized that participants would show an increase in number of servings of fruits and vegetables eaten per week after completing the Life Fit program. Although nutritional journals were collected to gather pretest and posttest data for analysis, the data collected on these journals was inadequate to determine serving size rendering this data insufficient for comparison. For example, one participant compiled all of her post-intervention data immediately prior to turning it in rather than logging daily over the seven day period. A second participant omitted several meals and an entire

day from her log. As a result, Hypothesis 5 was not formally tested due to data collection difficulties. A cursory examination of the data suggests that there were not major changes in eating behavior pre- and post-intervention on the completed portions of the logs.

It was hypothesized that participants would show a decrease in number of servings of sweetened beverages and sodas consumed per week after completing the Life Fit program. Although nutritional journals were collected to gather pretest and posttest data for analysis, the data collected on these journals was inadequate to determine serving size rendering this data insufficient for comparison. As a result, Hypothesis 6 was not tested due to data collection difficulties.

It was hypothesized that participants would show a decrease in the number of self-reported hours of sedentary activity per week after completing the Life Fit program. Data was collected for 7 days during the pre-intervention period but only 5 days during the post-intervention period; therefore, each participant's self-reported sedentary activity level was averaged per day. Both participants 2 and 3 reported a decrease in the daily average number of hours of sedentary activity while participant 1 reported a slight increase in her daily average number of hours of sedentary activity, as seen in figure 5.

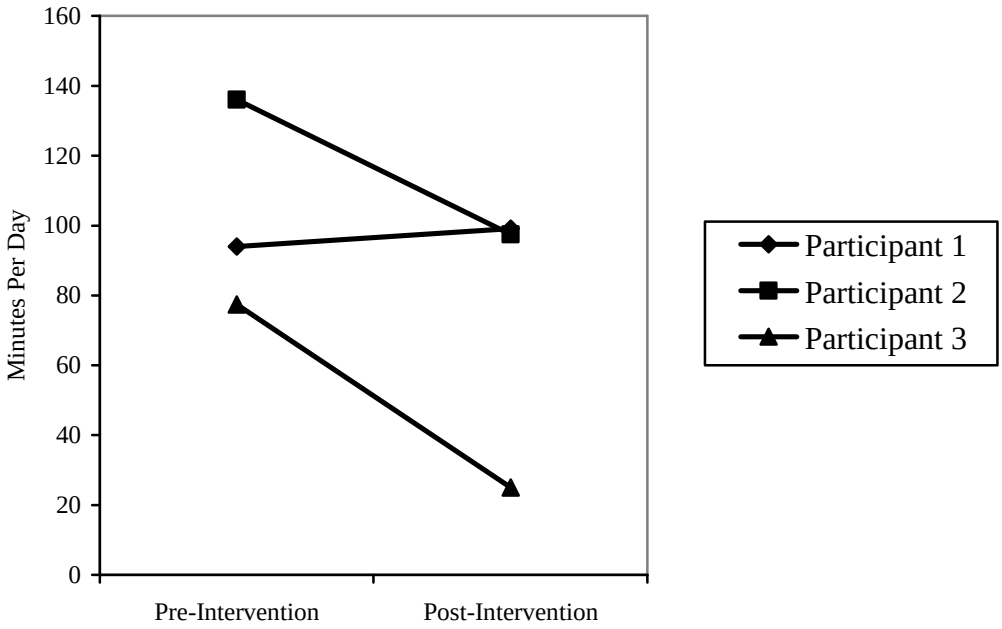

Figure 5: Pre- and Post-Intervention Average Sedentary Activity Level

It was hypothesized that participants would show an increase in the number of steps walked per week after completing the Life Fit program. Data was collected for 7 days during the pre-intervention period but only 5 days during the post-intervention period; therefore, each participant's self-reported pedometer counts were averaged per day. The average daily step count actually decreased for 2 of the 3 participants at the end of the program. Only participant 1 showed an increase in her average daily step count, shown in figure 6 below.

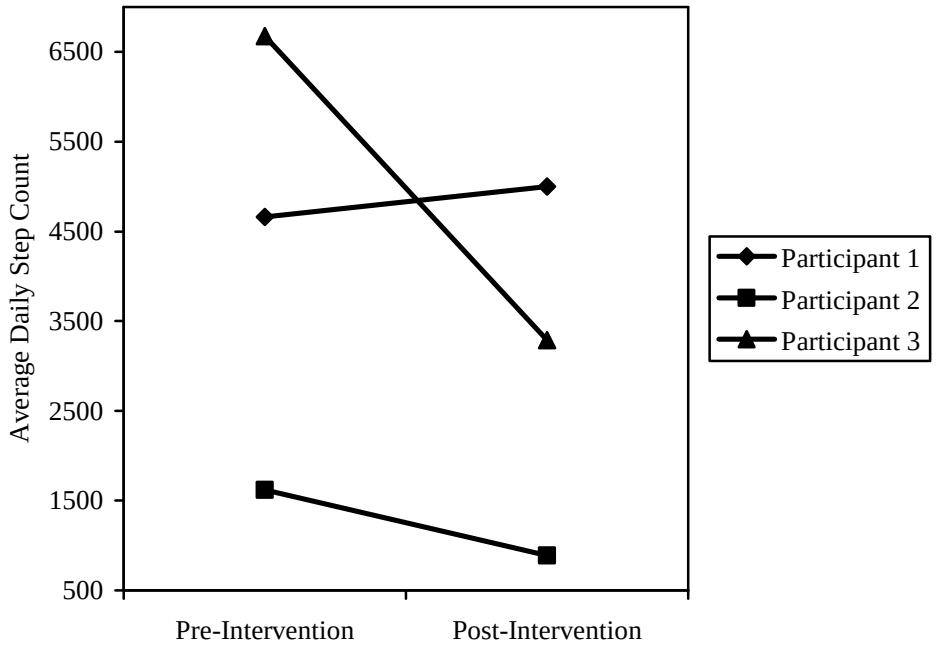

Figure 6: Pre- and Post-Intervention Pedometer Counts

Hypothesis 9 stated that participants would score higher on global self-concept, social self-concept, and physical self-concept domains upon completion of the Life Fit program. After the completion of the program, 2 of the participants reported a decrease in the social scale for the MSCS. However, participant 2 did report an increase on this scale as seen in figure 7.

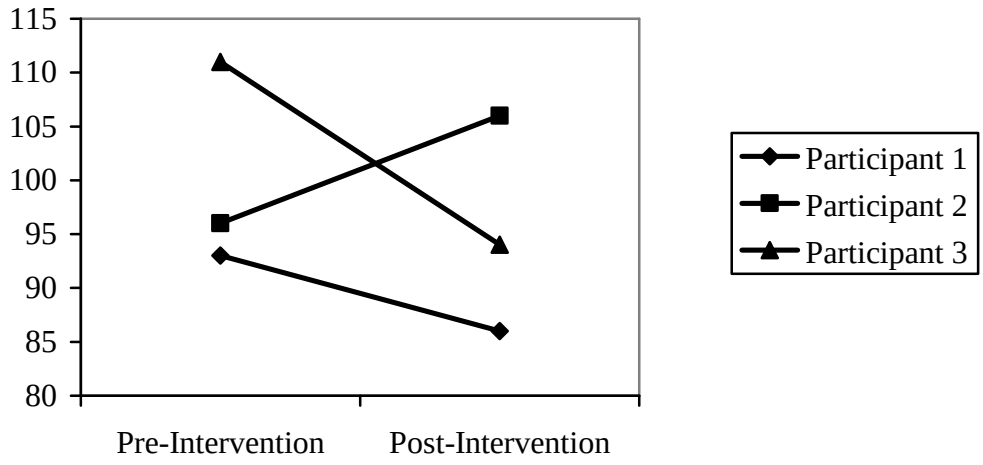

Figure 7: Pre- and Post-Intervention MSCS Social

On the physical scale for the MSCS, participant 2 also showed an increase in her scores after the program finished. Participant 1 showed no change in her score, while participant 3 reported a decrease in her score for this scale, demonstrated in figure 8.

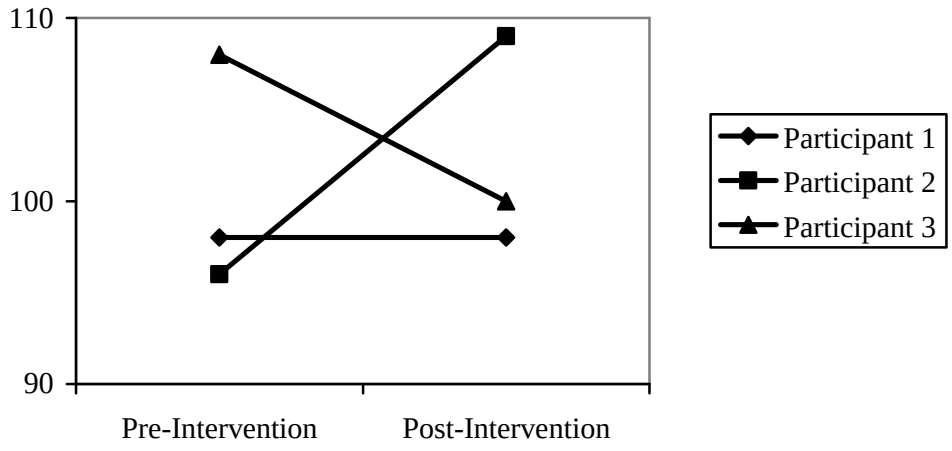

Figure 8: Pre- and Post-Intervention MSCS Physical

Both participants 1 and 2 reported an increase on their total scales for MSCS by the end of the program. Just as seen on the other 2 scales, participant 3 reported a decrease in her score on this scale as well, shown in figure 9.

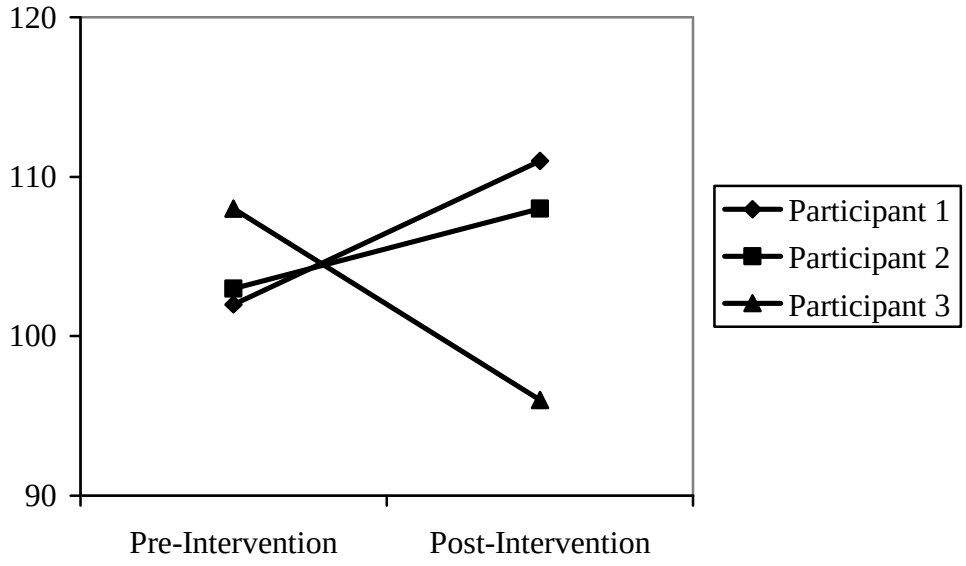

Figure 9: Pre- and Post-Intervention MSCS Total

Hypothesis 10 stated that participants would score higher on body esteem upon completion of the Life Fit program. Participant 1 demonstrated no change in her body esteem while participant 2 showed an increase. Lastly, participant 3 demonstrated a decrease in body esteem.

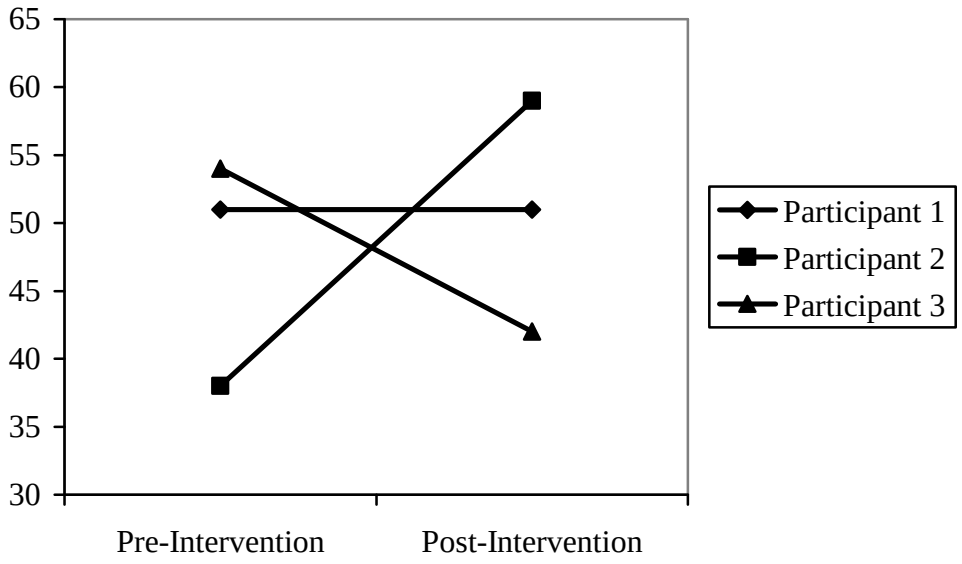

Figure 10: Pre- and Post-Intervention Body Esteem

Discussion

The purpose of this study was to positively influence the physical and emotional health of pre-adolescent overweight girls through a three-component program of nutritional education, physical fitness, and activities that target self-concept and body image. Overweight children face many more challenges compared to average weight children. The immediate challenges include medical complications like hypertension (Sorof, Lai, Turner, Poffenbarger, & Portman, 2004) and diabetes (Hannon, Rao, & Arslanian, 2005) as well as emotional stress from weight teasing (Eisenberg, Neumark-Sztainer, & Story, 2003) and poor body image (Franklin et al., 2006; Davison & Birch, 2001; Thompson et al., 2007). Long-term challenges can include heart disease (Wunsch, De Sousa, Toschke, & Reinehr, 2006) as well as lower educational attainment (Crosnoe & Muller, 2004) with resultant lower socioeconomic status (Gortmaker et al., 1993). Although boys suffer these weight-related issues, girls are burdened more by overweight status than boys in many aspects, like self-esteem (Strauss, 2000).

For the vast majority of children, overweight status is considered the result of an imbalance between caloric intake and caloric expenditure. Many programs have tried to help overweight children by promoting caloric expenditure through increased physical activity (Pangrazi, Beighle, Vehige, & Vack, 2003) and/or decreased sedentary activity (Epstein, Paluch, Gordy, & Dorn, 2000), and nutritional programs have targeted caloric intake through healthy diets and portions (Epstein, Myers, Raynor, & Saelens, 1998). Some programs have integrated both physical fitness and nutritional education (Nemet et

al., 2005; Stice, Shaw, & Marti, 2006). Unfortunately, there is a paucity of evidence to support that these programs are effective long term.

To date, there are no community programs that address energy balance through physical fitness and nutritional education as well as incorporating components that support the emotional health of overweight children. The Life Fit program was designed to address all three components that are important to the health and well-being of overweight girls. The Life Fit program was offered as an after school program at an elementary school in rural western North Carolina. The only requirements for participation were age (9-11 years), weight status at or above the 85th percentile, and female gender. The program was conducted for 10 weeks on Tuesdays and Thursdays immediately after school from 2:30pm to 4:30pm in the fall semester of 2008. Each session consisted of a healthy snack, 30 minute nutritional activity, 60 minutes of physical fitness, and 30 minute activity addressing body image or self-concept. The goals of the program were to increase physical endurance, increase markers of physical fitness, maintain or decrease BMI, decrease sedentary activity, and increase physical activity level. Nutritional goals included improving nutritional intake through decreases in soda intake and increases in fruits and vegetables. Lastly, self-concept and body image goals included increases in body esteem and measures of self-concept.

It was hypothesized that upon completion of the program participants would have improvements in physical endurance and markers of physical fitness. Results for upper body endurance indicated that participants did improve in these areas while results for abdominal endurance indicated that two of the three improved and one slightly decreased

her performance. The girls in this program reported that the sit-ups were more difficult to perform than the push-ups which may have affected their performance on this measure.

It was also hypothesized that participants would improve their cardiorespiratory status upon completion of the Life Fit program. All three participants improved their cardiorespiratory fitness suggesting that an additional 60 minutes of physical activity twice a week improved these participants' cardiovascular fitness. As cardiorespiratory fitness has been reported to be inversely associated with physiologic risk factors for chronic illnesses, such as high blood pressure, insulin resistance, and hyperinsulinemia (Pate et al., 2006), these results suggest that the study participants' risk for certain chronic illnesses have been lowered. These results, however, should not be generalized to other overweight populations as the sample size (N=3) for this research was small.

Another hypothesis for this study was that participants would decrease or maintain their BMI. Each of the participants would be considered overweight according to CDC guidelines. It has been suggested that reductions in BMI are more readily realized in overweight populations compared to more average weight populations. Although participants did not decrease their BMI, these results indicated that participants maintained their BMI so this hypothesis was partially supported. As each child's rate of gain in BMI was not known prior to the study, it is possible that slowing down the rate of gain in BMI or maintaining each child's BMI may be a more reasonable goal given the short duration of this program. It is also possible that with a longer program, decreases in BMI would be realized. Additionally, if participants incorporated the healthy habits that

they learned in Life Fit into their everyday experience, it is possible that improvements in BMI would be realized at a much later date.

It was also hypothesized that participants in the Life Fit program would demonstrate improvements in fruit and vegetable intake as well as decreases in sweetened beverage and soda consumption. Gathering nutritional information from study participants is fraught with difficulties; however, accurate assessment of dietary intake is necessary to identify targets for intervention (Harrington, Kohler, McClure, & Franklin, 2009). The most cost-conscious and frequently used approach is the self-report log. The self-reporting method, however, is susceptible to social desirability. Accurate completion of the food journals is also dependent upon the level of commitment of the participant and the understanding of the participant on how to fill in the information. In both the pilot program and formal study, there appeared to be some variability in cognitive development across participants which may have impacted their ability to record information to the specificity needed for meaningful analysis. Additionally, the participants were driven by extrinsic rewards and so completed the journals only to receive a reward. Participants, however, whose real motivation was to change their dietary habits, would likely have invested more effort in completing the journals.

In the formal study, participants were instructed by the group leader on how to complete the journals. The participants then engaged in a 24 hour dietary recall to allow the participants to use their new skills and help the group leader understand where additional training might be needed. To promote some degree of commitment by the participants, each girl was given an incentive for the return of the completed journal and a

parent was requested to sign off each day on the journal. The returned journals were notable for a lack of serving size estimates despite an apparent understanding by the participants on how to do this. Without an estimate of serving size, it was impossible to properly assess the measures in this study. Furthermore, two of the three participants' posttest journals appeared to have been filled out hastily and in one sitting rather than over the course of the full week. To address these issues for future studies, additional training for the participants on serving size would be needed. Consideration should also be given to providing an incentive for the parent's oversight of the journaling.

Although not formally measured, the participants food knowledge increased. At the start of the study, none of the participants could identify the three major energy sources (protein, fat, and carbohydrates) of foods. Furthermore, none of the participants could read a food label. By the end of the intervention, all the participants demonstrated a qualitative improvement in their food knowledge and skill in reading food labels. Any future studies should consider this aspect and consider objective measures.

Another hypothesis was that participants would engage in less sedentary activity upon completion of the Life Fit program. Like the food journals, this measure is dependent upon each participant's level of commitment. Unlike the food journals, however, there is less ambiguity about how to record this measure. Participants recorded the number of minutes spent engaged in television viewing, video games, nonschool-related computer use, and talking on the phone. Incentives were given for return of the completed journals. Like the food journals, there was some concern regarding the validity of the completed product. Results for this measure indicated that two

participants' level of sedentary activity decreased while the other participant's only slightly increased. It is possible that the decrease was due to poor self-reporting rather than an actual decrease.

It was hypothesized that by the end of the program participants would demonstrate an increase in the number of steps walked per day. Participants were fitted for pedometers based on their individual stride length and shown how to record their pedometer counts each night. Each parent was requested to sign off on the daily count. Participants received an incentive for return of the step counts at the end of the pretest and posttest periods. Results for this measure indicated that 2 of the three participants actually decreased the amount of walking after the intervention.

There were several factors that may have impacted this data collection. First, the participants had difficulty actually wearing their pedometers due to loss of the pedometers or complaints that the pedometers were uncomfortable. This may have caused the participants not to wear their pedometers leading to under-recording of actual steps per day. Secondly, the participants sometimes forgot to record their counts. Another possible factor to consider is that the baseline assessments did not provide an accurate measurement of physical activity due to reactivity. Research suggests that reactivity to wearing pedometers does not exist in children (Ozdoba, Corbin, & LeMasurier, 2004); however, other researchers have reported concerns that the novelty of wearing pedometers wanes after time and may lead to response bias at posttest (Lubans, Morgan, Callister, & Collins, 2009).

It is also possible, though, that these results could represent the participants' level of activity at the time of the posttest due to a historical confounder. The study started in September when the weather was more conducive to outdoor activity. By the study's conclusion in November, the temperature had dropped consistently in the 30s to 40s. Two of the three participants have asthma which is exacerbated by cold air so they could not participate in outdoor activities at home or school. Despite being shown how to participate in physical activities indoors, the poor weather may have impacted their overall activity level at posttest. To consider the effect of this potential confounder, a control group would have been useful.

Another hypothesis was that participants would score higher on global self-concept, social self-concept, and physical self-concept. Results for each of these measures indicated that two of the three participants' levels of global self-concept increased while the other participant's level decreased. Results for social self-concept indicated that two of the three participants had lower scores after the intervention. Lastly, for physical self-concept, one participant's score increased, one remained the same, and one decreased. It is important to note that each of the three participants scored in the average range for global self-concept and each of the domains at pre- and post-intervention. It is possible that with a clinical sample of participants who demonstrated below average scores or less on the MSCS at the pretest might have shown greater improvements in self-concept. An additional factor to consider is that on the day of posttest collection of this measure and the Body Esteem scale, participant 3 complained about the incentives that she would receive for completion of the measures, and the group

leader redirected her which was perceived as negative feedback by the participant. It is quite possible that this interaction negatively influenced her scores on these measures.

Lastly, it was hypothesized that participants would increase their body esteem upon completion of the Life Fit program. Results indicated that one participant's score increased, one remained the same, and participant 3's score actually decreased. It is possible that with a longer program increases in body esteem may have been realized. Lastly, as noted above, participant 3's score may have been influenced by her perceptions of a negative interaction at the time of data collection.

Limitations of the Study

There are several limitations to address with this study. This program was designed to be implemented with up to 10 participants in the treatment group and 10 matched participants in the control; however, only three participants enrolled. A control group, therefore, could not be established. This also impacted the sample size (N=3) which limits generalization of these results to a larger population. It is estimated that the elementary school site chosen had a lower than predicted prevalence of obesity in the student body. An elementary school with a higher prevalence of obesity might have yielded more participants.

The marketing for this program might have also impacted the number of participants. There was some concern by the elementary school personnel that parents might be offended with a marketing flyer which stated the program was for overweight girls. The wording on the flyer was approached in a delicate manner so as not to offend

parents. Ultimately, though, the flyer used the word, "overweight." Two flyers were sent home with the female students in the fourth and fifth grade. It is possible that more aggressive, widespread marketing to physicians' offices, for example, would have yielded more participants. Another possibility is that parents with children in the target participation group as identified on the flyer did not recognize that their children were overweight and eligible for this program. It has been shown that parents show poor awareness of their child's weight status (Carnell, Edwards, Croker, Boniface, & Wardle, 2005).

Another limitation of this study was the collection methods for the nutritional data. In general, the participants in the fall 2008 study completed the journals more thoroughly than the participants in the pilot study. This may have been a result of better preparation of the participants of what to document. Serving size estimates, however, were lacking on these journals despite education on how to determine or estimate serving size. This may be too challenging for children of this age group to understand and document. Increased family involvement and education on how to keep a nutritional journal may be useful for future projects in which nutritional data are collected. Another consideration would be to use a food questionnaire in place of a food journal. The Eating Habits Questionnaire, for example, is a self-report instrument that assesses food habits and food preparation style (Speck, Bradley, Harrell, & Belyea, 2000). Additionally, total calories and food servings can be assessed from this questionnaire. This instrument can be administered to groups in less than 30 minutes. Like all self-report measures, however, this assessment can be impacted by recall and social desirability factors.

This study was also limited by the amount of weeks it could be implemented. Due to the fall school schedule and holidays, it could not be run beyond 10 weeks which included a pretest and posttest week for data collection. Research has shown that extending studies of this nature beyond 16 weeks is without benefit to participants (Stice, Shaw, & Marti, 2006); however, eight weeks, the number of actual intervention weeks, may not have been sufficient to allow participants to incorporate healthful changes into their everyday experience and demonstrate changes in short-term measures like BMI.

Lastly, this study was designed to work directly with pre-adolescent girls on changing nutritional and physical fitness behaviors as well as improving self-concept and body image. Research suggests that family involvement is necessary in making these changes in children less than 12 years old (Barlow, 2007). Although some involvement was required of the participants' families in signing their logs and reviewing their homework folders, greater involvement by families would be necessary in order to effect significant changes in each participant's home environment. Additionally, motivational interviewing should be undertaken with families and participants to determine their readiness to move toward positive health behaviors. Some participants and their families in the pilot study and formal study did not seem ready to make changes at home to support positive health change. For example, one parent supplied her daughter with candy to eat before dropping her off at Life Fit sessions. Family involvement and their investment in change, therefore, should be considered necessary components for future Life Fit programming.

REFERENCES

A. C. Nielsen Company (2006). *Nielsen Report on Television*, A. C. Nielsen Company, New York, NY Retrieved March 8, 2007, from www.neilsenmedia.com

American Academy of Pediatrics. (2003). Policy statement: Prevention of pediatric overweight and obesity: Committee on nutrition. *Pediatrics*, 112(2), 424-430.

American Academy of Pediatrics. (2006). Policy statement: Active healthy living: Prevention of childhood obesity through increased physical activity. *Pediatrics*, 117(5), 1834-1842.

American Academy of Pediatrics: Committee on Nutrition (1999). Calcium requirements of infants, children, and adolescents. *Pediatrics*, 104, 1152-1157.

American Heart Association, Gidding, S. S., Dennison, B. A., Birch, L. L., Daniels, S. R., Gilman, M. W., Lichtenstein, A. H., Rattay, K T., Steinberger, J., Stettler, N., & Van Horn, L. (2006). Policy statement: Dietary recommendations for children and adolescents: A guide for practitioners. *Pediatrics*, 117(2), 544-559.

Barlow, S. (2007). Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary report. *Pediatrics*, *120*, S164-s192. Retrieved March 2, 2009, doi:10.1542/peds.2007-2329C

Berkey, C. S., Rockett, H. R., Field, A. E., Gillman, M. W., Frazier, L., Camargo, C. A., & Colditz, G. A. (2000). Activity, dietary intake, and weight changes in a longitudinal study of preadolescent and adolescent boys and girls. *Pediatrics*, 105(4), 56-68.

Biro, F. M., Striegel-Moore, R. H., Franko, D. L., Padgett, J., & Bean, J. A. (2006). Self-esteem in adolescent females. *Journal of Adolescent Health,* 39(4), 501-507.

Bowman, S. A., Gortmaker, S. L., Ebbeling, C. B., Pereira, M. A., & Ludwig, D. S. (2004). Effects of fast-food consumption on energy intake and diet quality among children in a national household survey. *Pediatrics*, 113(1), 112-118.

Boynton-Jarrett, R., Thomas, T. N., Peterson, K. E., Wiecha, J., Sobol, A. M., & Gortmaker, S. L. (2003). Impact of television viewing patterns on fruit and vegetable consumption among adolescents. *Pediatrics*, 112, 1321-1326.

Bracken, B. A. (1992). *Multidimensional Self-Concept Scale*. Austin, TX: PRO-ED.

Bracken, B. A., Bunch, S., Keith, T. Z., & Keith, P. B. (2000). Child and adolescent multidimensional self-concept: a five-instrument factor analysis. *Psychology in the Schools*, 37(6), 483-493.

Bracken, B. A., & Howell, K. K. (1991). Multidimensional self-concept validation: A three-instrument investigation. *Journal of Psychoeducational Assessment, 9*, 319-328.

Braet, C., & Van Winckel, M. (2000). Long-term follow-up of a cognitive behavioral treatment program for obese children. *Behavior Therapy*, 31(1), 55-74.

Caballero, B. (2004). Obesity prevention in children: Opportunities and challenges. *International Journal of Obesity*, 28, S90-S95.

Calfas, K. J., & Taylor, W. C. (1994). Effects of physical activity on psychological variables in adolescents. *Pediatric Exercise Science*, 6, 406-423.

Carnell, S., Edwards, C., Croker, H., Boniface, D., & Wardle, J. (2005). Parental perceptions of overweight in 3-5 year olds. *International Journal of Obesity*,

29(4), 353-355.

Caroli, M., Argentieri, L., Cardone, M., & Masi, A. (2004). Role of television in childhood obesity prevention. *International Journal of Obesity*, 28, S104-S108.

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports*, 100(2), 126-131.

Cavadini, C., Siega-Riz, A. M., & Popkin, B. M. (2000). U.S. adolescent food intake trends from 1965 to 1996. *Archives of Disease in Childhood*, 83(1), 18-24.

Centers for Disease Control and Prevention (CDC). (2004). *Obesity still a major problem*. Retrieved January 15, 2007, from www.cdc.gov/nchs/pressroom/06facts/obesity03_04/htm

Centers for Disease Control and Prevention. (2003). Physical activity levels among children aged 9-13 years: United States, 2002. *Morbidity and Mortality Weekly Report*, 52, 785-788.

Centers for Disease Control and Prevention. (2007). Fruit and vegetable consumption among adults-United States, 2005. *Morbidity and Mortality Weekly Report*, 56(10), 213-217.

Collins, C. E., Warren, J., Neve, M., McCoy, P., & Stokes, B. J. (2006). Measuring effectiveness of dietetic interventions in child obesity. *Archives of Pediatric and Adolescent Medicine,* 160, 906-922.

Coon, K. A., Goldberg, J., Rogers, B. L., & Tucker, K. L. (2001). Relationships between use of television during meals and children's food consumption patterns. Pediatrics, 107(1), e7. Retrieved April 9, 2007, from

www.pediatrics.org/cgi/content/full/107/1/e7

Coopersmith, S. (1967). *The antecedents of self-esteem.* San Francisco, CA: W. H. Freeman.

Crain, R. M., & Bracken, B. A. (1994). Age, race, and gender differences in child and adolescent self-concept: Evidence from a behavioral-acquisition, context dependent model. *School Psychology Review, 23,* 496-511.

Cramer, P. & Steinwert, T. (1998). Thin is good, fat is bad: How early does it begin? Journal of Applied Developmental Psychology, 19(3), 429-451.

Crosnoe, R., & Muller, C. (2004). Body mass index, academic achievement, and school context: Examining the educational experiences of adolescents at risk of obesity. *Journal of Health and Social Behavior*, 45, 393-407.

Davison, K. K. & Birch, L. L. (2001). Weight status, parent reaction, and self-concept in five-year-old girls. *Pediatrics*, 107(1), 46- 53.

Delugach, R. R., Bracken, B. A., Bracken, M. J., & Schicke, M. C. (1992). Self-concept: Multidimensional construct exploration. *Psychology in the Schools, 29,* 213-223.

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. *New England Journal of Medicine*, 350(9), 855-857. Retrieved January 22, 2007, from http://gateway.ut.ovid.com/gwl/ovidweb.cgi

Drozd, M., Romaniello, C., Wearner, R., Carter, V., & Auld, G. W. (2006). Benefits of a nutrition book bag program. *Journal of Nutrition Education and Behavior*, 38, 259-261.

Eisenberg, M. E., Neumark-Sztainer, D., Haines, J., & Wall, M. (2003). Associations of weight-based teasing and emotional well-being among adolescents. *Archives of Pediatric and Adolescent Medicine,* 157, 733-738.

Eisenberg, M. E., Neumark-Sztainer, D., & Story, M. (2006). Weight-teasing and emotional well-being in adolescents: Longitudinal findings from project EAT. *Journal of Adolescent Health,* 38(6), 675-683.

Epstein, L. H. (1988). *Stop Light Diet for Children*. Los Angeles, CA: Little Brown & Co.

Epstein, L. H., Myers, M. D., Raynor, H. A., & Saelens, B. E. (1998). Treatment of pediatric obesity. *Pediatrics,* 101, 554-570.

Epstein, L. H., Paluch, R. A., Gordy, C. C., & Dorn, J. (2000). Decreasing sedentary behaviors in treating pediatric obesity. *Archives of Pediatrics and Adolescent Medicine*, 154, 220-226.

Epstein, L. H., Paluch, R. A., Kilanowski, C. K., & Raynor, H. A. (2004). The effect of reinforcement or stimulus control to reduce sedentary behavior in the treatment of pediatric obesity. *Health Psychology*, 23(4), 371-380.

Faith, M. S., Leone, M. A., Ayers, T. S., Heo, M., & Pietrobelli, A. (2002). Weight criticism during physical activity, coping skills, and reported physical activity in children. *Pediatrics*, 110(2), 23-31.

Franklin, J., Denyer, G., Steinbeck, K. S., Caterson, I. D., & Hill, A. J. (2006). Obesity and risk of low self-esteem: A statewide survey of Australian children. *Pediatrics,* 118(6), 2481-2487.

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, 22-27.

Goran, M. I., Gower, B. A., Nagy, T. R., & Johnson, R. K. (1998). Developmental changes in energy expenditure and physical activity in children: Evidence for a decline in physical activity in girls before puberty. *Pediatrics*, 101(5), 887-891.

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. *New England Journal of Medicine*, 329(14), 1008-1012.

Greenleaf, C., Chambliss, H., Rhea, D. J., Martin, S. B., & Morrow, J. R. (2006). Weight stereotypes and behavioral intentions toward thin and fat peers among white and Hispanic adolescents. *Journal of Adolescent Health*, 39(4), 546-552.

Greenleaf, C., Weiller, K. (2005). Perceptions of youth obesity among physical educators. *Social Psychology of Education*, 8, 407-423.

Guiney, K. M., Alfred, U., Alfred, N. Y., & Furlong, N. E. (1999). Correlates of body satisfaction and self-concept in third- and sixth-graders. *Current Psychology: Developmental, Learning, Personality, Social*, 18(4), 353-367. Retrieved January 21, 2007, from www.ebscohost.com

Hagger, M. S., Biddle, S. J., & Wang, C. K. (2005). Physical self-concept in adolescence: Generalizability of a multidimensional, hierarchical model across gender and grade. *Educational and Psychological Measurement*, 65(2), 297-322.

Halpern, C. T., King, R. B., Oslak, S. G., & Udry, J. R. (2005). Body mass index, dieting, romance, and sexual activity in adolescent girls: Relationships over time. *Journal of Research on Adolescence*, 15(4), 535-559.

Hampl, S. E., Carroll, C. A., Simon, S. D., & Sharma, V. (2007). Resource utilization and expenditures for overweight and obese children. *Archives of Pediatric and Adolescent Medicine,* 161, 11-14.

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

Hardy, L. L., Bass, S. L., & Booth, M. L. (2007). Changes in sedentary behavior among adolescent girls: A 2.5-year prospective cohort study. *Journal of Adolescent Health*, 40, 158-165.

Harrington, K. F., Kohler, C. L., McClure, L. S., & Franklin, F. A. (2009). Fourth graders' reports of fruit and vegetable intake at school lunch: Does treatment assignment affect accuracy? *Journal of the American Dietetic Association*, 109, 36-44.

Hart, K. H., Bishop, J. A., & Truby, H. (2002). An investigation into school children's knowledge and awareness of food and nutrition. *Journal of Human Nutrition and Dietetics*, 15, 129-140.

Harter, S. (1999). *The construction of the self: A developmental perspective*. New York: Guilford Press.

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, 245-251.

Jacobs, J. E., Lanza, S., Osgood, D. W., Eccles, J. S., & Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across

grades one through twelve. *Child Development*, 73(2), 509-527.

James, J., Thomas, P., Cavan, D., & Kerr, D. (2004). Preventing childhood obesity by reducing consumption of carbonated drinks: Cluster randomized controlled trial. *British Medical Journal*, 328, 1237-1239.

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.

Jelalian, E. & Mehlenbeck, R. (2002). Peer-enhanced weight management treatment for overweight adolescents: Some preliminary findings. *Journal of Clinical Psychology in Medical Settings*, 9(1), 15-23.

Kaechele, V., Wabitsch, M., Thiere, D., Kessler, A. L., Haenle M. M., Mayer, H., & Kratzer, W. (2006). Prevalence of gallbladder stone disease in obese children and adolescents: influence of the degree of obesity, sex, and pubertal development. *Journal of Pediatric Gastroenterology And Nutrition*, *42*(1), 66-70. Retrieved Friday, April 06, 2007 from the MEDLINE with Full Text database.

Kaltiala-Heino, R., Marttunen, M., Rantanen, P., & Rimpela, M. (2003). Early puberty is associated with mental health problems in middle adolescence. *Social Science & Medicine*, 57(6), 1055-1064.

Kaur, H., Choi, W. S., Mayo, M. S., & Harris, K. J. (2003). Duration of television watching is associated with increased body mass index. *Journal of Pediatrics*, 143, 506-511.

Kohl, H. W., & Hobbs, K. E. (1998). Development of physical activity behaviors among children and adolescents. *Pediatrics*, 101, 549-554.

Kostanski, M., Fisher, A., & Gullone, E. (2004). Current conceptualization of body image dissatisfaction: have we got it wrong? *Journal of Child Psychology and Psychiatry*, 45(7), 1317-1325.

Kovacs, M. (2001). *Children's Depression Inventory (CDI).* North Tonawanda, NY: Multi-Health Systems.

Kowalski, K. C., Mack, D. E., Crocker, P. R., Niefer, C. B., & Fleming, T. (2006). Coping with social physique anxiety in adolescence. *Journal of Adolescent Health*, 39(2), 275.e9-275.e16. Retrieved December 19, 2006, from www.sciencedirect.com

Larson, N. I., Neumark-Sztainer, D., Hannan, P. J., & Story, M. (2007). Trends in adolescent fruit and vegetable consumption, 1999-2004: Project EAT. *American Journal of Preventive Medicine*, 32(2), 147-150.

Lauer, R. M., Lee, J., & Clarke, W. R. (1988). Factors affecting the relationship between childhood and adult cholesterol levels: The Muscatine study. *Pediatrics*, 82, 309-318.

Lawrence, C. M., & Thelen, M. H. (1995). Body image, dieting, and self-concept: Their relation in African-American and Caucasian children. *Journal of Clinical Child Psychology*, 24(1), 41-48.

Lin, B., Guthrie, J., & Blaylock, J. R. (1996). *The diets of America's children: Influence of dining out, household characteristics, and nutrition knowledge*. (Agricultural Economic Report No. 746). Washington DC: USDA.

Lowe, C. F., Horne, P. J., Tapper, K., Bowdery, M., & Egerton, C. (2004). Effects of a peer modeling and rewards-based intervention to increase fruit and vegetable consumption in children. *European Journal of Clinical Nutrition*, 58, 510-522.

Lubans, D. R., Morgan, P. J., Callister, R., & Collins, C. E. (2009). Effects of integrating pedometers, parental materials, and e-mail support within an extracurricular school sport intervention. Journal of Adolescent Heath, 44, 176-183.

Marsh, H.W. (1988). *Self-Description Questionnaire I.*San Antonio, TX: Psychological Corporation.

Marsh, H. W. (1989). Age and sex effects in multiple dimensions of self-concept: Preadolescence to early adulthood. *Journal of Educational Psychology*, 81(3), 417-430.

Marsh, H. W. (1990). *Self-Description Questionnaire II.*San Antonio, TX: Psychological Corporation.

Mendelson, B. K., & White, D. R. (1994). Manual for the Body Esteem Scale for Children. *Concordia University Research Bulletin*, 12(2), 1-10.

Mossberg, H. O. (1989). 40-year follow-up of overweight children. *Lancet*, 8661, 491-493.

Mrdjenovic, G. & Levitsky, D. A. (2003). Nutritional and energetic consequences of sweetened drink consumption in 6- to 13-year old children. *Journal of Pediatrics*, 142, 604-610.

Musher-Eizenman, D. R., Holub, S. C., Miller, A. B., Goldstein, S. E., & Edwards-Leeper, L. (2004). Body size stigmatization in preschool children: the role of control attributions. *Journal of Pediatric Psychology*, 29(8), 613-620.

Nader, P. R. (2003). Frequency and intensity of activity of third-grade children in physical education. *Archives of Pediatric and Adolescent Medicine*, 157(2), 185-190.

Nemet, D., Barkan, S., Epstein, Y., Friedland, O., Kowen, G., & Eliakim, A. (2005). Short- and long-term beneficial effects of a combined dietary-behavioral-physical activity intervention for the treatment of childhood obesity. *Pediatrics*, 115(4), e443-e449.

Neumark-Sztainer, D., Paxton, S. J., Hannan, P. J., Haines, J., & Story, M. (2006). Does body satisfaction matter? Five-year longitudinal associations between body satisfaction and health behaviors in adolescent females and males. *Journal of Adolescent Health*, 39(2), 244-251.

Nielsen, S. J. & Popkin, B. M. (2003). Patterns and trends in food portion sizes, 1977-1998. *Journal of the American Medical Association*, 289(4), 450-453.

Niemeier, H. M., Raynor, H. A., Lloyd-Richardson, E. E., Rogers, M. L., & Wing, R. R. (2006). Fast food consumption and breakfast skipping: Predictors of weight gain from adolescence to adulthood in a nationally representative sample. *Journal of Adolescent Health*, 39(6), 842-849.

O'Dea, J. A. & Abraham, S. (1999). Association between self-concept and body weight, gender, and pubertal development among male and female adolescents. *Adolescence*, 34(133), 69-79.

Oliver, M., Schofield, G., & McEvoy, E. (2006). An integrated curriculum approach to increasing habitual physical activity in children: A feasibility study. *Journal of School Health*, 76(2), 74-79.

Ozdoba, R. S., Corbin, C. B., & LeMasurier, G. C. (2004). Does reactivity exist in children when measuring activity levels with unsealed pedometers? *Pediatric Exercise Science*, 16, 158-166.

Pangrazi, R. P., Beighle, A., Vehige, T., & Vack, C. Impact of Promoting Lifestyle Activity for Youth (PLAY) on children's physical activity. *Journal of School Health*, 73, 317-321.

Pate, R. R., Stevens, J., Pratt, C., Sallis, J., Schmitz, K. H., Webber, L. S., Welk, G., & Young, D. R. (2006). Objectively measured physical activity in sixth-grade girls. *Archives of Pediatric and Adolescent Medicine*, 160, 1262-1268.

Pate, R. R., Wang, C., Dowda, M., Farrell, S. W., & O'Neill, J. R. (2006). Cardiorespiratory fitness levels among US youth 12 to 19 years of age. *Archives of Pediatrics and Adolescent Medicine*, 106, 1005-1012.

Piers, E. V. (1984). *Piers-Harris Children's Self-Concept Scale Revised Manual*. Los Angeles, CA: Western Psychological Services.

Piers, E. V., Harris, D. B., & Herzberg, D. S. (2002). Manual for the Piers-Harris children's self-concept scales revised edition (Piers-Harris 2). Los Angeles, CA: Western Psychological Services.

Pietrobelli, A., Faith, M. S., Allison, D. B., Gallagher, D., Chiumello, G., & Heymsfield, S. B. (1998). Body mass index as a measure of adiposity among children and adolescents: a validation study. *Journal of Pediatrics*, 132, 204-210.

Puhl, R., Brownell, K. D. (2001). Bias, discrimination, and obesity. *Obesity Research, 9*(12), 788-805.

Reilly, J. J., Methven, E., McDowell, Z. C., Hacking, B., Alexander, D., Stewart, L., &

Kelnar, C. J. (2003). Health consequences of obesity. *Archives of the Diseases of Children*, 88, 748-752.

Reinaerts, E., Nooijer, J., Candel, M., & Vries, N. (2007). Explaining school children's fruit and vegetable consumption: The contributions of availability, accessibility, exposure, parental consumption and habit in addition to psychosocial factors. *Appetite*, 48, 248-258.

Reynolds, W. M. (1989). *Reynolds Child Depression Scale*. Lutz, FL: Psychological Assessment Resources.

Robinson, T. (1999). Reducing children's television viewing to prevent obesity: A randomized controlled trial, *Journal of the American Medical Association*, 282, 1561-1567.

Rosenbaum, M. (2007). Epidemiology of pediatric obesity. *Pediatric Annals*, 36(2), 89-95.

Sallis, J. F. (1993). Epidemiology of physical activity levels and fitness in children and adolescents. *Critical Reviews in Food Science and Nutrition*, 33(4-5), 403-408.

Sanchez, A., Norman, G. J., Sallis, J. F., Calfas, K. J., Cella, J., & Patrick, K. (2007). Patterns and correlates of physical activity and nutrition behaviors in adolescents. *American Journal of Preventive Medicine*, 32(2), 124-130.

Sands, E. R., & Wardle, J. (2003). Internalization of ideal body shapes in 9-12 year-old girls. *International Journal of Eating Disorders*., 33, 193-204.

Schneider, M. B., & Brill, S. R. (2005). Obesity in children and adolescents. Pediatrics in Review, 26(5), 155-161.

Schwimmer, J. B., Burwinkle, T. M., & Varni, J. W. (2003). Health-related quality of life

of severely obese children and adolescents. *Journal of the American Medical Association,* 289(14), 1813-1819.

Schwimmer, J. B., Deutsch, R., Kahen, T., Lavine, J. E., Stanley, C., & Behling, C. (2006). Prevalence of fatty liver in children and adolescents. *Pediatrics,* 118, 1388-1393.

Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research,* 46, 407-441.

Sherry, B. (2005). Food behaviors and other strategies to prevent and treat pediatric overweight. *International Journal of Obesity*, 29, S116-S126.

Society for Nutrition Education. (2003). Guidelines for childhood obesity prevention programs: promoting healthy weight in children. *Journal of Nutrition Education and Behavior*, 35(1), 1-4.

Sorof, J. M., Lai, D., Turner, J., Poffenbarger, T., & Portman, R. J. (2004). Overweight, ethnicity, and the prevalence of hypertension in school-age children. *Pediatrics*, 113, 475-82.

Speck, B. J., Bradley, C. B., Harrell, J. S., & Belyea, M. J. (2000). A food frequency questionnaire for youth: Psychometric analysis and summary of eating habits in adolescents. *Journal of Adolescent Health*, 28(2), 16-25.

Stice, E., Shaw, H., & Marti, N. (2006). A meta-analytic review of obesity prevention programs for children and adolescents: The skinny on interventions that work. *Psychological Bulletin,* 132(5), 667-691.

Storch, E. A., Milsom, A., DeBraganza, N., Lewin, A. B., Geffken, G. R., & Silverstein, J. H. (2007). Peer victimization, psychosocial adjustment, and physical activity in

overweight and at-risk-for-overweight youth. *Journal of Pediatric Psychology*, 32(1), 80-89.

Strauss, R. S. (2000). Childhood obesity and self-esteem. *Pediatrics*, 105(1), e15. Retrieved April 13, 2007, from 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.

Striegel-Moore, R. H., Thompson, D., Affenito, S. G., Franko, D. L., Obarzanek, E., Barton, B. A., Schrieiber, G. B., Daniels, S. R., Schmidt, M., & Crawford, P. B. (2006). Correlates of beverage intake in adolescent girls: The national heart, lung, and blood institute growth and health study. *Journal of Pediatrics*, 148, 183-187.

Strong, W. B., Malina, R. M., Blimkie, C. J., Daniels, S. R., Dishman, R. K., Gutin, B. et al. (2005). Evidence based physical activity for school-age youth. *Journal of Pediatrics*, 146, 732-737.

Stunkard, A. J., Foch, T. T., & Hrubec, Z. (1986). A twin study of human obesity. *Journal of the American Medical Association*, 256(1), 51-54.

Sugiyama, T., Xie, D., Graham-Maar, R. C., Inoue, K., Kobayashi, Y., & Stettler, N. (2007). Dietary and lifestyle factors associated with blood pressure among U.S. Adolescents. *Journal of Adolescent Health*, 40, 166-172.

Taylor, C. B., Bryson, S., Doyle, A. A., Luce, K. H., Cunning, D., Abascal, L. B., Rockwell, R., Field, A. E., Striegel-Moore, R., Winzelberg, A. J., & Wilfley, D. E. (2006a). The adverse effect of negative comments about weight and shape from family and siblings on women at high risk for eating disorders. *Pediatrics*, 118(2), 731-738.

Taylor, E. D., Theim, K. R., Mirch, M. C., Ghorbani, S., Tanofsky-Kraff, M., Adler-Wailes, D. C., Brady, S., Reynolds, J. C., Calis, K. A., & Yanovski, J. A. (2006b). Orthopedic complications of overweight in children and adolescents. *Pediatrics*, 117(6), 2167-2174.

Thompson, J. K., Shroff, H., Herbozo, S., Cafri, G., Rodriguez, J., & Rodriguez, M. (2007). Relations among multiple peer influences, body dissatisfaction, eating disturbance, and self-esteem: A comparison of average weight, at risk of overweight, and overweight adolescent girls. *Journal of Pediatric Psychology*, 32(1), 24-29.

Videon, T. M., & Manning, C. K. (2003). Influence on adolescent eating patterns: The importance of family meals. *Society of Adolescent Medicine*, 32, 365-373.

Wang, G., &. Dietz, W. H. (2002). Economic burden of obesity in youths aged 6 to 17 years: 1979-1999. *Pediatrics*, 109(5), 81-87.

Wang, Y. (2002). Is obesity associated with early sexual maturation? A comparison of the association in American boys versus girls. *Pediatrics*, 110, 903-910.

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. *New England Journal of Medicine*, 337(13), 869-873.

Wigfield, A., Eccles, J. S., Yoon, K. S., Harold, R. D., Arbreton, A. J., Freedman-Doan, C., & Blumenfeld, P. C. (1997). Change in children's competence beliefs and subjective task values across the elementary school years: a 3-year study. *Journal of Educational Psychology*, 89(3), 451-469.

Wilgenbusch, T., & Merrell, K. W. (1999). Gender differences in self-concept among

children and adolescents: A meta-analysis of multidimensional studies. *School Psychology Quarterly*, 14, 101-120.

Williams, J., Wake, M., Hesketh, K., Maher, E., & Waters, E. (2005). Health-related quality of life of overweight and obese children. *Journal of the American Medical Association*, 293(1), 70-76.

Wing, Y. K., Hui, S. H., Pak, W. M., Ho, C. K., Cheung, A. Li, A. M., & Fok, T. F. (2003). A controlled study of sleep related disordered breathing in obese children. *Archives of Diseases of Children*, 88, 1043-1047.

World Health Organization. *Constitution of the World Health Organization*. Geneva, Switzerland: World Health Organization, 1948.

Wunsch, R., De Sousa, G., Toschke, A. M., & Reinehr, T. (2006). Intima-media thickness in obese children before and after weight loss. *Pediatrics*, 118(6), 2334-2340.

Young, D. R., Phillips, J. A., Yu, T., & Haythornthwaite, J. A. (2006). Effects of a life skills intervention for increasing physical activity in adolescent girls. *Archives of Pediatric and Adolescent Medicine,* 160, 1255-1261.

Young, E. L., & Sudweeks, R. R. (2005). Gender differential item functioning in the multidimensional self-concept scale with a sample of early adolescent students. *Measurement and Evaluation in Counseling and Development*, 38, 29-44.

Zeller, M., Kirk, S., Claytor, R., Khoury, P., Grieme, J., Santangelo, M., & Daniels, S. (2004). Predictors of attrition from a pediatric weight management program. *Journal of Pediatrics*, 144, 466-470.

APPENDICES

Appendix A: Life Fit Assent Form

I agree to take part in Dr. McCain's research program. This program is designed to improve the nutrition knowledge, physical activity level, and coping skills of girls between the ages of 9 and 11 years old. I understand that I can change my mind at any time and decide not to participate. If I have any questions, I will ask Dr. McCain. If I want to know the results of the research project, I can contact her by phone at (828) 337-5291, or by email at dhmccain@catamount.wcu.edu. She will then contact me following completion of the research project to explain what she learned in the study.

_____ _____

Print your name Date

_____ _____

Sign your name Date

_____ _____

Signature of Investigator Date

Appendix B: Life Fit Consent Form

I consent to my daughter's participation in the Life Fit project. This group is designed to improve the nutrition knowledge, physical activity level, and coping skills of girls between the ages of 9 and 11 years old. The project will be supervised by Mickey Randolph, Ph.D. (828-227-3359) and Candace H. Boan-Lenzo, Ph.D. (828-227-3451).

I understand that my daughter's participation in this project is entirely voluntary. I can withdraw consent at any time without penalty. If I choose to withdraw consent, the results of her participation, to the extent that she can be identified, will be removed from the project records or destroyed.

I understand the following points:

1. The purpose of this project is to improve the nutritional knowledge, physical activity level, and coping skills of students between the ages of 9 and 11 years old.
2. The project will involve data collection for project evaluation purposes. This data will be used to monitor the effectiveness of the Life Fit project in improving the nutritional knowledge, physical activity level, and coping skills of females.
3. The benefits that I may expect from my daughter's participation are an increase in her understanding of her nutritional needs, an increase in her physical activity level, and exposure to interventions targeting social problem-solving, body image, assertiveness, and self-esteem.
4. There are no foreseen discomforts, stresses, or risks associated with her participation in this project.
5. The data analysis will not be released with any individually identifiable form without parental consent, unless otherwise required by the law.
6. The results will not be used in any way by the school system that would affect instruction, placement or special services she receives.
7. It is my responsibility to discuss her participation in the Life Fit program with her health care provider and notify Life Fit personnel of any potential health problems that would affect her participation in this program.
8. If I have any concerns about how my daughter was treated during the study, I may contact the office of the IRB, a committee that oversees the ethical dimensions of the research process. The IRB office can be contacted at 227-3177. This research project has been approved by the IRB.

_____ _____

Signature of Participant's Parent or Legal Guardian Date

_____ _____

Signature of Investigator Date

Appendix C: Demographics Form

Directions: Please read questions carefully and fill in the blanks.

Name of person completing this form:_____

Relationship to participant:_____

SECTION 1: Participant General Information

1) Participant's Name:_____

2) Date of Birth_____

3) School_____ Grade_____

4) Ethnicity: _____White_____Black _____American-Indian
_____Asian _____Hispanic _____Other

5) Circle the highest level of education obtained by parents of participant.

Mother:

Unknown	Some High School	High School Diploma/GED
Some College	College Degree	Some Graduate School
Graduate School Degree		

Father:

Unknown	Some High School	High School Diploma/GED
Some College	College Degree	Some Graduate School
Graduate School Degree		

6) Please list the people who live at home and their relationship to the participant:__
_____
_____
_____
_____

SECTION 2: Contact Information

We do not anticipate any situation in which we would have to contact you emergently; however, we need you to complete the following information just in case.

1) Please indicate how you would like us to contact you **in case of an emergency** in order of preference:
   - Contact #1:_____
   - Contact #2:_____
   - Contact #3:_____

2) Please indicate how you would like us to contact you with **non-emergent** information in order of preference(home phone, cell phone, email):
   - Contact #1:_____
   - Contact #2:_____
   - Contact #3:_____

SECTION 3: Participant's Medical Information

1) Please list any medical conditions of the participant:_____
   _____
   _____
   _____

2) Please list any medications she takes. Include prescription medication, non-prescription medication, and supplements._____
   _____
   _____
   _____

3) Please list any allergies the participant has. Be sure to include any food allergies and list the specific reactions to those foods._____
   _____
   _____
   _____

4) Circle any of the following conditions that run in her family:

   Asthma Heart disease Overweight or Obesity

   Diabetes Anxiety Depression Other_____

SECTION 4: Nutritional Information

1) Where do you usually shop for groceries?_____
_____

2) Do you have soft drinks in your home? If yes, which ones?_____
_____
_____

3) Give us a sample of what she ate yesterday:

Breakfast:_____
_____
Lunch:_____
_____
Dinner:_____
_____
Snacks:_____
_____

4) Does she bring her lunch to school or buy it most days of the week?_____

5) What is your biggest nutritional concern for her?_____
_____

SECTION 5: Activity Information

1) What are her favorite hobbies?_____
_____
_____

2) What kinds of activities does she usually do on Saturdays and Sundays?_____
_____
_____

3) How many televisions do you have in the home?_____

4) Does she have a television in her room?_____

5) How much television does she watch on an average day during the school week?
_____

6) How much television does she watch each day on Saturday and Sunday?_____
_____

7) If she does watch television, what are her favorite programs?_____
_____
_____

8) Do you have video games in the home? If yes, which ones and how long she play them each day?_____
_____
_____

9) Do you have a computer at home? If yes, for what purpose does your child use it (school work, computer games, other)?_____
_____

10) If you do have a computer, do you have internet access?_____

11) Is she allowed to call her friends on the phone? If yes, on average how long each day does she talk on the phone?_____

12) Does she have a cell phone? If yes, how long does she talk on it each day? Does she have limits on the use of the cell phone?_____
_____
_____

SECTION 6: Coping Skills and Body Image Information

1) What are her strengths?_____
_____
_____
2) What does she struggle with?_____
_____
_____
3) List any academic difficulties she may have this year or in the past._____
_____
_____

Use the following body shape pictures to answer the next two questions:

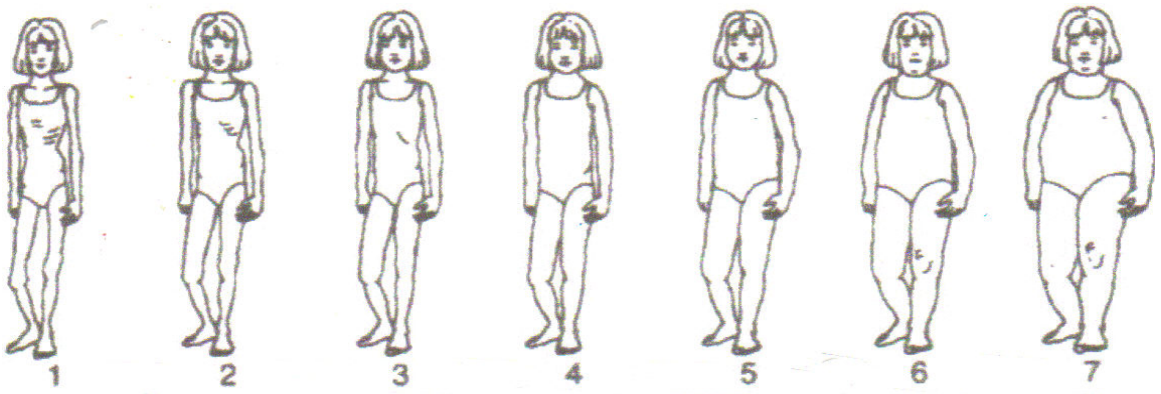

Figure 1. Body shape outlines for children (redrawn from Collins, 1991)

4) Which number do you think she would pick as the one which resembles her shape the most?_____
5) Which number do you think most closely resembles her body shape?_____
6) Which number do you think would be a healthy body shape for her?_____
7) Has she suffered any weight-related teasing? If yes, by whom? Please describe a recent teasing episode._____
_____
8) What do you hope she will get from this program?_____
_____
9) Is there anything else we should know about her that will help us work with her over the next 10 weeks?_____
_____

Appendix D: Nutritional Assessment

	Pre-intervention	Post-intervention	12 months
Number of "red" foods consumed			
Number of fruit servings			
Number of vegetable servings			
Number of sweetened beverages and non-diet sodas			

***This information will be obtained from participant's journal (see Appendix K).

Appendix E: Personal Fitness Assessment Record

Name:_____ DOB:_____ Age:_____

Pre-Intervention Date: _____ Chronological Age: _____

Post-Intervention Date:_____ Chronological Age: _____

12-month Date: _____ Chronological Age: _____

Cardio-respiratory Fitness

(Must be completed before exercise)

1. Resting Heart Rate

Pre-Int. _____ Post-Int. _____ 12-mo. _____

Age	2%	Mean	98%
9-11 yr	62	91	130

2. Blood Pressure (Systolic = _____)
Diastolic =

Pre-Int. _____ Post-Int. _____ 12-mo. _____

				SBP (mm Hg) by percentile of height				
Age (yr)	%BP	5%	10%	25%	50%	75%	90%	95%
9	90	110	110	112	113	114	115	116
	95	114	114	115	117	118	119	120
10	90	112	112	114	115	116	117	118
	95	116	116	117	119	120	121	122
11	90	114	114	116	117	118	119	120
	95	118	118	119	121	122	123	124
				DBP (mm Hg) by percentile of height				
9	90	71	72	72	73	74	74	75
	95	75	76	76	77	78	78	79
10	90	73	73	73	74	75	76	76
	95	77	77	77	78	79	80	80

11	90	74	74	75	75	76	77	77
	95	78	78	79	79	80	81	81

3. Step Test (Cardio-respiratory Endurance)

Recovery Heart Rate

Pre-Int. _____ Post-Int. _____ 12-mo. _____

4. Muscular Strength
Upper Body Endurance (no. of push-ups)

Pre-Int. _____ Post-Int. _____ 12-mo. _____

Abdominal Endurance (no. of sit-ups)

Pre-Int. _____ Post-Int. _____ 12-mo. _____

5. Body Composition
(Must be completed before exercise – shoes off for height and weight measurement)

Height Pre-Int. _____ Post-Int. _____ 12-mo. _____

Weight Pre-Int. _____ Post-Int. _____ 12-mo. _____

BMI Pre-Int. _____ Post-Int. _____ 12-mo. _____

Waist Circumference Pre-Int. _____ Post-Int. _____ 12-mo. _____

6. Sit and Reach Flexibility (record your longest reach)

Inches Pre-Int. _____ Post-Int. _____ 12-mo. _____

Appendix F: Physical Activity Assessment

Physical Activity Level
(Pedometer Count)

Pre-Int. Week 1	Post-Int. Week 10

Non-school Sedentary Activity

	Pre-Int.	Post-Int.
Total		
Weekend		
Weekday		

***Information obtained from participant's journal/log (see Appendix I and J)

Appendix G: Sample Activities-Life Fit Cognitive-Behavior Manual

Sample activities for the Life Fit cognitive-behavioral manual:

Topic: Dealing with stress

Session: What I Do When the Going Gets Tough
OBJECTIVES:

- Describe positive ways in which the individual handles stress

SESSSION:

- Most of us have ways to make ourselves feel better when we're stressed. What's one of your ways? What do you do to help yourself when you feel angry, worried, tense, or nervous? Maybe you talk to one of your parents or to a friend about what's bothering. Perhaps you take a long walk or spend time with a pet. Or perhaps you do something to take your mid off the stressful situation – like watching TV, going to a movie, or reading a book. Tell us what you do, and how you feel when you do it.
- Ask students to talk about their techniques for dealing with stress.
- Ask summary questions
    - Why is it important to find positive ways to handle stress?
    - What are some negative ways in which people try to handle stress?
    - Do you think fewer people would use alcohol and drugs if they knew how to handle stress in more positive ways?

HOMEWORK:

- Have the participants interview two other people to find out the positive ways that they deal with stress. It can be a parent, a best friend, a sibling, or a teacher. They should bring in several other techniques that people use to deal with stress.

Topic: Self-concept development
Session: Something I Am Good At
OBJECTIVES:

- Identify and describe a personal strength

SESSION:

- "Our topic for this session is, 'Something I Am Good At'. Some people feel like they are bragging if they talk about their strengths. But it is okay to feel good about what we do well and to tell others about it. You may want to tell us about a skill you perform well in sports, or about something you are good in at school, or something that else that you are good at. Take a moment and think it over."
- Ask the participants to share the things they are good at.
- Ask them summary questions:
    - How do you feel when talking about things you are good at?
    - Why is it important to know what your strengths are?

Topic: Friendships

Session: Making and Keeping Friends
OBJECTIVES:

- Describe how all persons need to belong and be accepted by others
- Demonstrate desirable skills for interacting with and relating to others
- Demonstrate tolerance and flexibility in group situations
- Demonstrate respect and understanding of differences among people

SESSSION:

- "We all need to be treated in friendly ways. And one of the best ways to be treated well ourselves is to be a good friend to others and to treat them well. So, let's talk about friendship. To get started, let's make a list of some ways to make a friend that works well. Then we'll make a list of ways to keep a friend."
- Under the heading "Making Friends" list several strategies described by participants. Do the same under the heading of "Keeping Friends."
- As each strategy is mentioned, discuss how ineffective it would be to do the opposite.
- Role play situations where the participants can act out the strategies
    - You are at a friend's house for a party. One of your friend's cousins, who is your age, is there too – but you have never seen him before. How do you make friends with the cousin?

HOMEWORK:

- Complete "Making Friends" homework sheet

Topic: Body Image

Session: Physical Appearance Assumption
OBJECTIVES:

- Identify common assumptions related to physical appearance
- Dispute these assumptions

SESSION:

- "The purpose of this session is to discuss the assumptions people have about their physical appearance. Each of the assumptions contains some truth and a lot of falsehood."
- Assumption 1: Physically Attractive People Have It All
    - "Beauty is as beauty does" -- explain and provide examples of how actions speak more loudly than looks. (have them think of people who have impressed them or are important in their life – rate them on appearance)
    - "First impressions don't always last" – explain and provide examples of how initial reactions to someone's appearance are not always frozen in our minds.

    - "Birds of a feather do flock together" – explain and provide examples of being attracted to people who are similar to us (include discussion of things like religious beliefs, school interests…)
- Assumption 2: The First Thing That People Will Notice About Me Is What's Wrong With My Appearance
    - This is a partial truth
    - Most people do not care about your physical flaws – these are things you care about. Other people have other things to think about than your body.
    - Get perspective, "so what if people do notice that you are short, overweight, have a scar….? What difference does that really make? Life goes on and you are a pretty likeable person." Work on self-statements that help keep perspective on the importance of other's judgments about your physical appearance
- Assumption 3: One's Outward Physical Appearance Is A Sign of the Inner Person
    - Have them think about them think about their own personal experiences – has somebody good-looking turned out to be thoughtful rather than egotistical? Do you know any blondes that are not air-heads? Do you know people who are overweight but not lazy?
- Assumption 4: If I Could Look Just As I Wish, My Life Would Be Much Happier
    - The problem with this assumption is that "unless I look the way I want to (taller, thinner,…) there's no way I can be happy." What makes you unhappy is not your physical appearance.
    - "Have you ever had the experiences in which the more you desperately wanted something, the less you appreciated what you had?" Get examples and give some.
    - Self-talk can be used to remind you that your goal is to achieve better body image, not to have a different body. Your new inner voice should be telling you something like, "I realize that my appearance does not prevent me from being happy. I do. I make myself unhappy trying to look my ideals."
- Assumption 5: If People Knew How I Really look, They Would Like Me Less
    - "Ask yourself how often you stopped liking someone upon discovering some imperfection in their appearance. How often have you said, 'I hadn't known that Sally had that scar on her knee, I'll be sure to avoid her now?'"
    - Use self-talk to help with this assumption, "I worried that I'd be hurt if people knew how I really look. But all my worrying makes me feel bad. Is it possible that I am making this into a bigger issue than it really is?"
- Assumption 6: By Controlling My Appearance, I Can Control My Social and Emotional Life
    - It is important to realize that you cannot effectively manage your self-esteem and your life by asking your appearance to do all the work
    - Your new inner voice needs to say something like, "Spending too much effort trying to 'fix' my looks is misdirected effort. Constant repairs on my appearance are only a temporary solution. I'm still unhappy with my

looks. I want to feel better permanently. So I need to focus on changing my mind instead of my looks. That's a change that will give me more control over my life."

- Assumption 7: My Appearance Is Responsible For Much Of What Has Happened To Me In My Life
    - It is true that appearance has affected some things in your life. Nevertheless, most things that have happened in your life had absolutely nothing to do with your looks.
    - History shows that attractiveness is not a prerequisite for success in most endeavors of life (give some historic examples). Ask for examples from world leaders, the arts, or literature.
    - Most of the people we've actually known who have touched our lives in significant ways are not necessarily great looking. Can you think of individuals whom you loved, liked, or admired for reasons that had nothing to do with their looks?
    - Use your self-talk by saying something like, "My appearance may have influenced some things in my life. But I'm ultimately responsible for my life. I can make choices about how I deal with any effects that my looks have."
- Assumption 8: I Should Always Do Whatever I Can To Look My Best
    - The words "should" and "always" imply that looking your best is your duty. The statement also suggests that by not looking your best you have failed
    - Why have you saddled yourself with this obligation? What do you expect will happen if you are able to look your best on all occasions? What would happen if you don't?
    - Do you require other people to have the best imaginable appearance at all times? Would you be so harshly judgmental if a friend wore less than perfect clothing, had a hair out of place, or got a zit?
    - Your new inner voice needs to speak out against perfectionism, "I enjoy how I look, but I could loosen up some. I don't have to look perfect all the time. When I look less than my best, nobody ever commands me to look better – no – body but me that is. I'm the one pressuring myself. It is okay to look acceptable, rather than look exceptional."
- Assumption 9: The Media's Messages Make It Impossible For Me To Be Satisfied With My Appearance
    - You can make a choice to not hold yourself to media standards that suggest the ideal appearance
    - Your new inner voice, "I'm tired of expecting myself to look like all those perfect bodies in the media. I don't have to look like them."
- Assumption 10: The Only Way I Could Ever Like My Looks Would Be To Change Them
    - This is a really self-defeating thought. You want to focus on your body image not on completely changing your appearance.

HOMEWORK:

- Questioning My Appearance Assumptions

Appendix H: Participant Learning Bag

Content of learning bag will vary each week and may include:

1. Books on nutrition and physical fitness with a third grade reading difficulty or less.

2. Nutritious recipes which participants can make with their parents.

3. Handouts which cover topics on nutrition, physical fitness, and coping skills.

4. Homework assignments on topics covered in curriculum.

Appendix I: Pedometer Count Log

My Step Count

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1							
Week 2							
Week 3							
Week 4							

Directions:

For participant: At bedtime each night, write down the number on your pedometer. After writing down the number, be sure to zero the count.

For parents: Please initial each day that you agree with the total count.

Appendix J: Sedentary Activity Log

Activity Journal

Amount of time spent in activity in minutes

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Watching Television							
Playing Video Games							
Talking on Phone							
Using Home Computer							

Directions:

For participant: Each day, write down number of minutes you did each of these activities.

For parent: Please initial your child's recording of activity that you agree with the time.

Appendix K: Life Fit Nutritional Journal

DIRECTIONS: Write down all food and drinks that you take in each day. Do your best to estimate the amount that you eat or drink. You can find serving sizes on most packaged items. Make sure to list any condiments (catsup, mustard, mayonnaise) and sauces that you add to your food. Parents: please check these logs daily and initial.

LIFE FIT NUTRITIONAL JOURNAL

	Monday	Tuesday	Wednesday
Breakfast			
Morning Snack			
Lunch			
Afternoon Snack			
Dinner			

LIFE FIT NUTRITIONAL JOURNAL

	Thursday	Friday	Saturday	Sunday
Breakfast				
Morning Snack				
Lunch				
Afternoon Snack				
Dinner				