MECHANISMS OF SELF-ESTEEM CHANGE IN OVERWEIGHT CHILDREN PARTICIPATING IN A FAMILY-BASED WEIGHT MANAGEMENT PROGRAM

By

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To my father and mother, Arnold and Cheryl Walker; and my husband Paul for all their support through the years.

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Overweight in children and adolescents is a national epidemic with significant medical and psychosocial consequences. Weight management programs are strongly recommended for children and adolescents to reduce complications of overweight, but few programs have examined the effects of these programs on psychosocial outcomes, particularly self-esteem. The aims of this study were to examine self-esteem and determine which factors impact self-esteem in the context of a weight management program. Data for this study was gathered as part of a larger study comparing the effects of a 'parent-only' family-based pediatric weight management program, a 'parent-plus-child' family-based pediatric weight management program, and a wait list control group targeting rural children aged 8 -14 years of age. We found that the behavioral interventions, relative to control groups, did not impact self-esteem, although a significant improvement in global self-esteem across time was observed for social, athletic, and global self-esteem. Gender differences were observed in self-esteem changes such that change in girls' physical self-esteem was predicted by improvements in body satisfaction. Reduction in peer victimization was associated with improvements in social and physical self-esteem. Weight status change, goal attainment, self-efficacy for healthy lifestyle behaviors, and locus of control did not appear to be associated with self-esteem in this study, although measurement limitations

may have complicated these findings. Despite some researchers' concerns that weight management programs may have a negative impact on children and adolescent's psychosocial functioning, these findings suggest that participation in a pediatric weight management program does *not* adversely affect pediatric self-esteem.

CHAPTER 1
INTRODUCTION

Overweight in children and adolescents is a national epidemic. Recent estimates indicate that over 33% of children and adolescents are either "at-risk" for overweight or overweight (Ogden et al., 2006). Although adult overweight and obesity are defined by body mass index (BMI) cutoffs, childhood obesity and overweight are defined according to a child's BMI percentile based on revised Centers of Disease Control and Prevention (CDC) growth charts. Specifically, children are classified as overweight if their BMI is at or above the 95th percentile and considered "at-risk" for overweight if their BMI is between the 85th and 95th percentile for gender and age (U.S. Department of Health and Human Services, 2001).

Obesity poses a particular concern in rural areas. Research examining rates of adult obesity across levels of urbanization finds obesity rates to be higher in rural areas (Patterson, Moore, Probst, & Shinogle, 2004). A comparison of childhood overweight rates in urban and rural areas by McMurray and colleagues (1999) reports that children in rural areas have a 54.7% increased risk of overweight compared to urban children. One reason for these differences may be that individuals from rural locations, particularly those in the southeastern United States, traditionally consume high fat and high calorie diets. Increased rates of sedentary behavior also reduce the potential for activity levels to offset increased caloric consumption (Pearson & Lewis, 1998). Rural obesity is further complicated because individuals living in rural areas may be medically underserved due to 1) limited health promotion programs, 2) higher rates of poverty (Economic Research Services, 1993), 3) higher percentages of patients without health insurance (Frenzen, 1993), and 4) lower numbers of health care providers. Thus, research targeting overweight children in rural areas of the United States is a significant priority and an objective of

Healthy People 2010 (U.S. Department of Health and Human Services, 2000) and the U.S. Surgeon General (U.S. Department of Health and Human Services, 2001).

Medical Complications

Children and adolescents who are overweight are at increased risk for significant medical complications including increased risk of endocrine, pulmonary, orthopedic, gastroenterological, and neurological concerns (American Academy of Pediatrics, 2003; Deckelbaum & Williams, 2001). Sixty percent of overweight children have at least one risk factor for cardiovascular disease and 25% of overweight children have at least two risk factors including hypertension, hyperlipidemia, and hyperinsulinemia (Strauss, 1999). Once considered "adult-onset" diabetes, type 2 diabetes is another significant medical complication for overweight children and adolescents (Goran, Ball, & Cruz, 2003) and accounts for 8-45% of all new cases of diabetes (Dietz, 2004). The prevalence of metabolic syndrome also increases with the severity of obesity. Metabolic syndrome is described as the link between insulin resistance and hypertension, dyslipidemia, type 2 diabetes, and other metabolic abnormalities (Reaven, 1988) and cited by some medical professionals to be a precursor of diabetes (Dietz, 2004). Metabolic syndrome is also associated with an increased risk of cardiovascular disease in adults. Rates of metabolic syndrome reach up to 50% in severely overweight children and increases in BMI have been associated with increased risk of metabolic syndrome (Weiss et al., 2004). Child and adolescent overweight status is associated with more severe obesity in adulthood and studies have suggested that up to 80% of overweight adolescents become obese adults. This risk is especially prevalent for girls (Dietz, 2004). Additionally, societal costs associated with child and adolescent overweight have tripled in the last 20 years and annual overweight-related hospital costs for 6-17 year olds reach up to $127 million per year (Goran et al., 2003).

Psychosocial Complications

Psychosocial complications for overweight children and youth include social stigmatization, peer victimization, depression, psychosocial maladjustment, and poorer body image compared to their non-overweight peers (Sjoberg, Nilsson, & Leppert, 2005; Zametkin, Zoon, Klein, & Munson, 2004; Zeller, Saelens, Roehrig, Kirk, & Daniels, 2004). The link between poor self-esteem and pediatric overweight has received significant attention. Broadly defined, self-esteem refers to the extent to which one values oneself as a person (Harter & Whitesell, 2003). Poor self-esteem is a notable complication of pediatric overweight because research links poorer self-esteem with negative consequences such as behavioral disorders, negative or depressed mood, and other emotional concerns (Harter, 1993). Conversely, higher self-esteem is associated with positive consequences (Shirk, Burwell, & Harter, 2003) and self-esteem improvements also are associated with improvements in other areas of functioning, such as a decrease in externalizing disorders (Haney & Durlak, 1998). Adverse effects of overweight on self-esteem in childhood and adolescence have potential long-term implications given that adolescent self-esteem may remain stable into adulthood (Harter & Whitesell, 2003).

A Brief Overview of Self-Esteem

A leading theory of self-esteem development by Harter (1985) combines James' theory (1892) that self-esteem is the ratio of successes to aspirations and Cooley's theory (1902) that self-esteem is the product of self-comparison against others (the "looking-glass" model). However, Harter extends James' theory by asserting that the ratio of successes to aspirations contributes to self-esteem only if competence in that domain is important to the individual. Harter also theorizes that each individual has multiple types of self-esteem for specific areas of functioning, such as academic competence, social competence, athletic competence, and so forth. Global self-esteem, or overall self-worth, is not necessarily a summation of these different types

of self-esteem, but rather an overall perception including only those types of esteem in which success is important to the individual. An example illustrating Harter's theory is an individual who perceives herself to have poor academic performance compared against her peers' performance. This would damage her self-esteem only if she perceives academic competence as important, and have no effect on her self-esteem if she does not value academic competence.

Normative self-esteem development provides support for this theory. Self-esteem development begins with the emergence of a sense of self as different from others (also known as self awareness) in early childhood at approximately age one. Around pre-school age, children begin to develop self-perception, which is largely positive and general at this point. School entry then provides expanded opportunities for mastery and comparison experiences, consistent with Cooley's "looking-glass" model of self-esteem. This is the point during which variability in self-esteem begins to emerge along a positive and negative continuum. Self-esteem continues along this pathway until the onset of puberty and adolescence, when most children experience a normative dip in self-esteem as peer comparisons and "fitting in" become more important. Most individuals then experience a rebound in self-esteem as they enter late adolescence and early adulthood, when individualization increases and the importance of the beliefs of others diminishes. Many researchers believe that this level of self-esteem then remains stable through adulthood (Harter, 1999).

Self Esteem in Overweight Children

Over ten years ago, French and colleagues (1995) reported that overweight in children was inversely associated with self-esteem and body-esteem, but noted that the association was modest and that lower scores often still fell within normal ranges. A number of studies since that time suggest that overweight children and adolescents report moderately lower levels of self-esteem compared to non-overweight adolescents and children (Manus & Killeen, 1995; Pesa,

Syre, & Jones, 2000; Stradmeijer, Bosch, & Koops, 2000; Strauss, 2000). However, these findings are not universal, as a number of other studies have not found an association between self-esteem and weight status (Gortmaker, Must, Perrin, Sobol, & Dietz, 1993; Renman, Engstrom, Silfverdal, & Aman, 1999; Rumpel & Harris, 1994; Swallen, Reither, Haas, & Meier, 2005). While a clear answer to this question may not exist, these findings point to the importance of examining factors that may lead some children who are overweight to be at greater risk for low self-esteem.

Although the data regarding the association between self-esteem and overweight is still mixed, a group of factors appear to place overweight children at-risk for the development of poor self-esteem. A review by Lowry, Sallinen, and Janicke (2007) examined potential moderating factors to help clarify this association. The development of self-esteem in overweight children compared to normative self-esteem development may differ in significant ways. Research suggests that overweight children, *particularly girls*, experience larger dips in self-esteem in adolescence than non-overweight children, perhaps due to the increasing importance of body shape and size as a component of many adolescents' global self-esteem ratings. In addition to gender and developmental differences, ethnicity also may interact with age and gender to impact the association between overweight and self-esteem. Research has consistently found that overweight White children experience poorer self-esteem than overweight African American children (Kaplan & Wadden, 1986; Wilson, Sargent, & Dias, 1994; Brown et al., 1998; Strauss, 2000; Young-Hyman, Herman, Scott, & Schlundt, 2000; Young-Hyman, Schlundt, Herman-Wenderoth, & Bozylinski, 2003; Kelly, Wall, Eisenberg, Story, & Neumark-Sztainer, 2005), perhaps due to the fact that larger body sizes may be more culturally acceptable among some African Americans (Wilson, Sargent, & Dias, 1994) and that African American parents may

misperceive their child's weight. Researchers also suggest that negative attitudes about weight may not be communicated to overweight African-American children (Young-Hyman, Herman, Scott, & Schlundt, 2000), which may lead to a more positive body image, (Kelly, Wall, Eisenberg, Story & Neumark-Sztainer, 2005) and ultimately contribute to higher self-esteem. Reports of self-esteem in overweight Hispanic children is mixed (Brewis, 2003; Mirza, Davis, & Yanovski, 2005), and differences in this population appear to be linked to identification with majority cultural standards of body shape (Lowry et al., 2007).

Other factors that may place overweight children at-risk for poorer self-esteem include a high incidence of teasing and peer victimization (Strauss & Pollack, 2003; Young-Hyman et al., 2003; Hayden-Wade et al., 2005; Sweeting, Wright, & Minnis, 2005; Stern et al., 2006; Thompson et al., 2007) and internal attributions about weight status (Pierce & Wardle, 1997). Additionally, positive social support may shield overweight children from decreases in self-esteem (Strauss & Pollack, 2003; Dishman et al., 2006). While the data are still mixed as to the association between *global* self-esteem and weight status, there is more evidence to support that specific domains of self-esteem, such as *physical, social*, and *athletic* self-esteem are more likely to be associated with overweight status. Given the influence of these factors on self-esteem in cross-sectional studies and the implications for future psychosocial functioning, these data highlight the need to examine self-esteem in the context of weight management programs.

Childhood Overweight and Weight Management Programs

Due to potentially severe medical complications, Expert Committee Recommendations suggest that children with a BMI at or above the 95th percentile undergo treatment for overweight (Barlow & Dietz, 1998). The committee also recommends that children and adolescents whose BMI is within the 85th to 95th percentile for their height and weight undergo additional screening for secondary complications including; 1) a family history of cardiovascular disorders,

hypercholesterolemia, or diabetes mellitus, 2) parental obesity, 3) high blood pressure, elevated total cholesterol, a large recent increase in BMI, and/or 4) child-adolescent concerns regarding weight status (Faith et al., 2001). Children or adolescents who present with one or more of the previous complications are recommended to undergo treatment, while children without secondary complications should be monitored annually. According to Expert Committee Recommendations (Barlow & Dietz, 1998), treatment should include primary behavioral goals of healthy eating and activity. Medical goals are also recommended if secondary complications are present. Gradual, permanent weight goals and behavioral changes are recommended based on the child's current weight status. Parent involvement is stressed as an essential component through parent training techniques including praise, use of non-food rewards, daily family meals, and maintaining a healthy, non-tempting home environment for the child. Support for these recommendations are found in a review of empirically supported treatments in pediatric obesity by Jelalian & Saelens (1999) which indicates that the essential components of childhood weight management programs include behavioral modification, parent training, healthy dietary habits, and increases in physical activity. Two studies utilizing treatment designs and components relevant to this dissertation are reviewed below.

One program designated as a well-established treatment (Jelalian & Saelens, 1999) is Epstein's Stop-Light Program (Epstein, Wing, & Valoski, 1985). This program combines dietary reductions (changes in eating behaviors and food intake) along with lifestyle activity. The Stop-Light Program is a simplified, child-friendly program that classifies foods into three categories: "green," "yellow," and "red." "Green" foods have less than 2 grams of fat per serving, "yellow" foods have between 2.0 and 4.9 grams of fat per serving, and "red" foods have 5.0 or more grams of fat per ser ving (Epstein, Roemmich, & Raynor, 2001). Epstein and colleagues (2001) also

recommend increasing fruit and vegetable intake as this has been shown to be an effective way to not only increase consumption of these foods, but also to decrease high fat and high calorie food consumption. During Epstein's programs, parents and children work with group leaders to set goals to reduce children and parents' "red" food consumption, to reduce daily caloric consumption, and to increase their physical activity level. Physical activity changes are based on "lifestyle activities" (such as walking), because the combination of lifestyle activities in weight management programs with dietary interventions is shown to be more effective than dietary interventions alone (Epstein & Goldfield, 1999). Data from Epstein's programs indicate that up to 30% of children treated across four treatment interventions had reached non-obese status at ten-year follow-up (Epstein, Valoski, Wing, & McCurley, 1994). An essential component of this program is parent involvement. Interestingly, parents who attended the program demonstrated a 12% decrease in their own overweight status at five year follow-up and a 15% decrease in their overweight status at ten year follow up (Epstein et al., 1994).

An alternative intervention model is presented by Golan and colleagues (Golan, Fainaru, & Wizman, 1998; Golan, 2006). Golan suggests that the home environment is the most important setting to shape children's dietary and activity behaviors and that parents are key figures in making and maintaining changes in that environment. Golan and Crow (2004) suggest that if parents are the main agents of change, then parents should be targeted in weight management programs to change the home environment rather than targeting the child. Her program does not target specific reductions in caloric intake and she considers her approach to be "health centered" rather than "weight centered." Golan's research has examined the effectiveness of her program by comparing a "parent-only" approach to a "child-only" or a "parent-plus-child" intervention. Her research demonstrates positive results in both child and parent weight status

with the “parent-only” approach compared to the two other interventions (Golan, 2006). Golan suggests that targeting the parent exclusively is more cost-effective and may buffer the child from potential negative psychosocial consequences that may occur due to participation in a weight management program.

Pediatric Weight Management Programs and Self-Esteem

Many studies have reported positive success in reducing weight status, reducing percent overweight, and reducing medical complications such as risk factors for cardiovascular disease. However, much less attention has been focused on the impact of these interventions on psychosocial functioning, and in particular, pediatric self-esteem. This is a particularly important question as researchers express concern regarding the impact of interventions for pediatric overweight on self-esteem and whether or not weight management programs may do more harm than good (O’Dea, 2005). Unfortunately, minimal or no outcome data on self-esteem for intervention participants has been reported by many of the empirically supported treatments for pediatric overweight.

Although Epstein and Golan have reported success in establishing long-term healthy body weights in children, incomplete data are available related to psychosocial functioning of children and parents involved in the programs. To our knowledge, Epstein and colleagues have not published data on self-esteem values or self-esteem change for children who participate in their intervention programs. Although Golan emphasizes the importance of self-esteem and protecting children against potential adverse effects from participation, she only has reported data concerning rates of disordered eating and not self-esteem changes for the children who participate in her interventions.

While these two research groups have not reported the impact of their intervention programs on child self-esteem, a recent review found that 20 published studies have reported

pre- and post-treatment self-esteem data in the context of a pediatric weight management intervention program (Lowry et al., 2007). Of these, 17 studies report evidence of increases in global self-esteem or components of self-esteem from pre- to post-treatment (Stoner & Fiorillo, 1976; Foster, Wadden, & Brownell, 1985; Mellin et al., 1987; Wadden, Stunkard, Rich, Rubin, Sweidel, & McKinney, 1990; Sherman et al., 1992; Sahota et al., 2001; Jelalian & Mehlenbeck, 2002; Braet et al., 2003; Brehm, Rourke, Cassell, & Sethuraman, 2003; Walker, Gately, Bewick, & Hill, 2003; Barton et al., 2004; Braet et al., 2004 [2-year follow-up: Braet, 2006]; Edwards et al., 2005; Gately et al., 2005; Sacher et al., 2005; Savoye et al., 2005; Jelalian, Mehlenbeck, Lloyd, Richardson, Birmaher, & Wing, 2006). Two studies report no change in self-esteem or components of self-esteem (Rohrbacher, 1973; Thomas-Dobersen, Butler-Simon, Fleshner, 1993) and only one study reports decreases in self-esteem (Cameron, 1999). However, this review is limited in that the number of pediatric weight management programs that examine self-esteem at baseline and post-treatment is minimal compared to the number of published pediatric weight management programs. Additionally, these 20 studies are widely variable with respect to methodology, statistical examination of results, and inconsistent reporting of demographic and outcome data, which makes drawing firm conclusions from these studies difficult.

Factors That May Impact Self-Esteem During Weight Management Programs

This study sought to explain the differences in self-esteem changes by examining a number of factors that theoretically may impact self-esteem in the context of a pediatric weight management program. Cross-sectional research has indicated that gender differences exist in self-esteem rates (Mendelson & White, 1985; Pesa et al., 2000; Israel & Ivanova, 2002), and it is likely that self-esteem will change in girls and boys differently. However, no study has examined gender differences in self-esteem within weight management interventions. Based on cross-

sectional research, differences based on age and ethnicity also exist, but, changes in self-esteem are not fully explained by developmental and ethnicity differences alone. Other factors that may influence self-esteem during a weight management intervention worthy of examination, with particular relevance to this dissertation, include the impact of weight status change, behavioral goal achievement, self-efficacy for healthy lifestyle behaviors, locus of control, peer victimization, and body satisfaction.

Impact of Changes in Weight Status

Three studies provide support for an association between self-esteem change and weight status change (Cameron, 1999; Walker et al., 2003; Jelalian et al., 2006). In these studies weight status change was associated with athletic, physical, and global self-esteem. In the only study to report a decrease in self-esteem from pre- to post-treatment, the pediatric participants did not experience a statistically significant change in weight status and reported feelings of failure due to their lack of success in meeting weight loss goals (Cameron, 1999). However, three older studies reported no statistically significant association between self-esteem change and weight status change (Rohrbacher, 1973; Stoner & Fiorillio, 1976; Wadden et al., 1990). Despite findings of differences in self-esteem in overweight girls and boys cross sectionally, no study has examined the impact of changes in weight status on self-esteem by gender for participants in a weight management program. This mixed pattern of results makes it difficult to draw definitive conclusions about the role of weight loss in self-esteem change subsequent to treatment, or the direction of potential effect. Regardless of the direction or effect of weight status change on self-esteem, it appears to be only one of a number of factors that may impact self-esteem in pediatric weight management programs (Lowry et al., 2007).

Impact of Behavioral Goal Achievement

Goal achievement has been suggested to be another factor that may impact self-esteem (Lowry et al., 2007). Research with children (not in the area of weight management) has demonstrated that achieving short-term goals is associated with enhanced self-learning, increased intrinsic interest in the subject at hand, a greater sense of mastery, and more personal self-efficacy, whereas achieving long-term goals demonstrates no such associations (Bandura & Schunk, 1981). In the context of weight management programs, behavioral goals to decrease the consumption of high fat, high calorie foods or to increase physical activity may be seen as short-term goals, whereas weight change may seen as a non-behavioral, long-term goal. The association between short-term behavioral goal attainment (such as weekly dietary and physical activity goals) and long-term outcomes (such as weight loss) has been clearly examined in adult weight management programs (Bandura & Simon, 1977; Israel & Saccone, 1979). In fact, researchers have recommended that future programs consider setting specific behavioral goals for participants due to the increased success for participants who set and achieve behavioral goals (Linde, Rothman, Baldwin, & Jeffery, 2006).

Minimal research has examined goal setting for pediatric participants in weight management programs. Given the positive association between self-esteem and mastery experiences in children, it is likely that goal setting may contribute to self-esteem as reaching intervention goals may be perceived as a mastery experience. These short term successes may also buffer potential disappointment if long-term weight status change goals are set and not achieved. Support for this association may be found in the only study to report that pediatric participants experienced a decrease in self-esteem pre- to post-treatment. In the study, children reported feelings of failure due to their lack of success in meeting weight loss goals (Cameron, 1999), although this association was not examined statistically. These findings highlight the need

for programs to set directly achievable short-term goals, such as dietary and physical activity changes, rather than indirect long-term goals, such as weight loss. They also highlight the need to examine the impact of self-efficacy for healthy lifestyle behaviors on self-esteem change for children participating in a weight management program.

Impact of Self-Efficacy for Healthy Lifestyle Behaviors

Self-efficacy is an individual's perception of how well he or she can achieve a behavior and is considered to be a critical component of behavior change (from Social Learning Theory; Bandura, 1977). Self-efficacy in children has been associated with academic functioning (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996), depressive symptoms (Bandura, Barbaranelli, Caprara, & Pastorelli, 1999), and perceived occupational self-efficacy (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). Research examining self-efficacy in overweight children has indicated that overweight children are less confident of their ability to overcome barriers to physical activity than non-overweight peers (Trost, Kerr, Ward, & Pate, 2001) and that self-efficacy is a very important determinant of physical activity change in children (Reynolds et al., 1990; Sallis et al., 1992; Trost, Pate, Ward, Saunders, & Riner, 1999).

Research examining self-efficacy for healthy lifestyle behaviors in the context of weight management interventions is mixed. Substantial evidence exists in the adult literature outlining the predictive association between high baseline self-efficacy and weight loss at post-treatment (Forster & Jeffery, 1986; Strecher, DeVellis, Becker, & Rosenstock, 1986; Edell, Edington, Herd, O'Brien, & Witkin, 1987; Stotland & Zuroff, 1991; Dennis & Goldberg, 1996; Linde, Rothman, Baldwin, & Jeffery, 2006), and during six-week (Bernier & Avard, 1986), one-year, and two-year follow-up (Jeffery et al., 1984). However, the evidence is very limited in pediatric samples and only one study has reported that self-efficacy was an important factor in weight loss

efforts in a school-based program (Perry et al., 1990). No study in adult or pediatric populations has examined the association between self-efficacy and self-esteem.

It is likely that as an individual's confidence or beliefs in his or her ability to perform a behavior successfully increases, so may self-esteem. Success in short-term goal attainment may lead to improvements in an individual's confidence, or self-efficacy. Although the path through which self-efficacy impacts self-esteem may be via goal attainment and mastery experiences, self-efficacy may also directly impact self-esteem by promoting more positive feelings towards the self and the individual's abilities. This highlights the need to determine if increased self-efficacy adds to the prediction of self-esteem above and beyond weight status and goal achievement. However, no research exists examining the association between self-efficacy and self-esteem for overweight children participating in weight management programs.

Impact of Locus of Control

An individual's sense of control of their weight, or locus of control, also has been linked to pediatric self-esteem (Pierce & Waddle, 1997). Locus of control is defined as a person's perceived responsibility for outcomes. Individuals with an internal locus of control believe that their behaviors have an impact on their outcomes while those with an external locus of control believe that external factors are responsible for their outcomes (Rotter, 1966). In a cross-sectional study, Pierce and Wardle (1997) reported that overweight 9 to 11 year old children who believed that they were responsible for their weight status had lower rates of self-esteem compared to children who did not believe that they were responsible for their weight status.

Data from the adult literature have suggested that an internal locus of control at baseline is associated with increased *weight loss* for obese adults participating in weight management programs (Balch & Ross, 1975; Wallston, Wallston, Kaplan, & Maides, 1976), but that adults with more internal attributions regarding their overweight status may experience lower *self-*

esteem during participation in weight management programs (Bryan & Tiggemann, 2001). In one of the few studies examining locus of control change across a weight management program, Tobias and MacDonald (1977) found that adult locus of control became more internalized during their participation in a weight control program, which is understandable as most programs target individual control over weight-related behaviors such as food intake and exercise. However, the researchers did not examine the impact of this increasing internalization on self-esteem.

Research on locus of control in pediatric weight management is limited. It is possible that some of these same mechanisms regarding locus of control in adult populations may generalize to pediatric populations including; 1) associations between internal locus of control and increased weight loss during intervention participation, 2) a trend for participants to experience more internal locus of control during intervention participation, and 3) a possible association between internal weight-specific locus of control and decreased self-esteem across the intervention, particularly with limited weight loss success. The only weight management intervention that reported decreases in self-esteem suggested that changes towards more internal attributions regarding weight status may have contributed to self-esteem changes (Cameron, 1999). Specifically, Cameron suggests that overweight children may maintain self-worth by de-emphasizing the value of weight status on their overall self-worth, and that placing a child in a weight management program directly opposes and weakens those coping strategies. However, this theory was not tested statistically in her treatment program, and none of the associations from adult weight management literature has been examined in pediatric populations.

Impact of Peer Victimization

Cross-sectional studies have repeatedly described the deleterious impact of peer victimization on self-esteem in overweight children. In a sample of 2,127 middle school children, degree of overweight was associated with depressed mood, low self-esteem, and greater levels of

peer victimization (Sweeting, Wright, & Minnis, 2005). Weight-based teasing was negatively associated with self-esteem in a sample of 117 African-American overweight youth (Young-Hyman, Schlundt, Herman-Wenderoth, & Bozylinski, 2003), and this pattern has been found in both Caucasian and African American samples (Stern et al., 2006). Researchers also have reported that overweight children experience victimization that is focused on appearance and body weight more than other characteristics. Furthermore, overweight children appear to be more influenced by peers' negative comments and attributions about their appearance than non-overweight youth (Hayden-Wade et al., 2005; Thompson et al., 2007).

Despite the well-documented association of peer victimization on self-esteem, no study has examined how rates of peer victimization or changes in peer victimization may affect self-esteem during participation in a weight management program. This is especially surprising given that positive social support through sport and club participation has been suggested to be associated with higher self-esteem independent of weight status (Strauss & Pollack, 2003; Dishman et al., 2006) and that many weight management programs may utilize the group format to buffer or diminish the negative effects of victimization and enhance self-esteem.

Impact of Body Satisfaction

Body satisfaction, also commonly referred to as body image, also has been linked to self-esteem in overweight children. Body image is frequently associated with physical self-esteem, particularly in Western cultures, but the two terms do represent different constructs (Lau, Lee, Ransdell, Yu, & Sung, 2004). Body satisfaction differs from physical self-esteem in that in the weight management literature body satisfaction most frequently refers to the discrepancy between actual and ideal body size whereas physical self-esteem refers to an individual's perceived judgment of physical appearance, which may be inclusive of more than just body size. French and colleagues (1995) hypothesized that body image may influence a significant portion

of global self-esteem for overweight youth. However, this association has rarely been examined statistically, despite mounting evidence that body image changes may account for and/or impact self-esteem changes in cross-sectional samples (Pesa et al., 2000), or that changes in body satisfaction may precede changes in global self-esteem. In studies examining self-esteem change, improvements are frequently noted in body satisfaction (Rohrbacher, 1973; Stoner & Fiorillo, 1976; Thomas-Dobersen et al., 1993; Jelalian & Mehlenbeck, 2002; Braet et al., 2003; Walker et al., 2003; Braet et al., 2004). This suggests that improvements in body satisfaction may be another factor that could impact domains of self-esteem. However, this association has rarely been examined in the context of pediatric weight management programs. Furthermore, gender differences in the association between body satisfaction and self-esteem in weight management programs has not been examined, despite the evidence that body satisfaction may have a greater impact on the self-esteem of girls when compared to boys (Pesa et al., 2000).

Summary

In summary, childhood overweight is a significant public health concern, associated with multiple medical and psychosocial consequences, particularly in rural areas (American Academy of Pediatrics, 2003; Deckelbaum & Williams, 2001; Zametkin et al., 2004). Overweight children are at greater risk for self-esteem deficits as compared to normal weight children (O'Dea & Abraham, 1999; Stradmeijer, Bosch, & Koops, 2000; Strauss, 2000), and self-esteem deficits appear to occur via the influence of several moderating factors (Lowry et al., 2007). Research suggests that gender differences exist in self-esteem rates and self-esteem change for overweight children. The impact of weight management programs on pediatric self-esteem has primarily focused on the impact of weight change. Cross-sectional research examining the effects of goal acquisition, self-efficacy, locus of control, peer victimization, and body satisfaction support the need to examine how these factors may impact self-esteem for girls and boys participating in a

weight management program. The specific purpose of this study is to examine the effects of a pediatric weight management program on self-esteem and possible mechanisms of change in self-esteem, based on the factors highlighted previously. The aims and hypotheses are listed below.

Current Aims and Hypotheses

Primary Aims

Aim 1: To examine the impact of the intervention groups on self-esteem

Hypothesis 1.1. We hypothesized that participants in the intervention groups (Behavioral Family Intervention [BFI] and Behavioral Parent Intervention [BPI]) would experience greater self-esteem improvements from pre-treatment to post-treatment relative to participants in the control group (Wait List Control [WLC]).

Aim 2: To determine the impact of weight status change on self-esteem

Hypothesis 2.1. We hypothesized that improvements in child weight status would be positively associated with greater self-esteem improvements from pre- to post-treatment.

Secondary Aims

Aim 3: To examine the impact of behavioral goal attainment on self-esteem

Hypothesis 3.1. We hypothesized that greater short term behavioral goal achievement (for dietary and physical activity changes) would be associated with greater self-esteem improvements from pre- to post-treatment.

Aim 4: To determine the impact of self-efficacy on weight status and self-esteem

Hypothesis 4.1. We hypothesized that greater pre-treatment child self-efficacy would be positively related to improvements in child weight status from pre- to post-treatment.

Hypothesis 4.2. We hypothesized that greater pre-treatment child self-efficacy would be positively related to greater self-esteem improvements from pre to post-treatment.

Hypothesis 4.3. We hypothesized that improvements in child self-efficacy from pre- to post-treatment would be positively related to greater self-esteem improvements from pre- to post-treatment.

Aim 5: To determine the impact of and association between weight-specific locus of control, weight status, and self-esteem in overweight children

Hypothesis 5.1. We hypothesized that greater pre-treatment internal weight-specific locus of control would be associated with poorer pre-treatment self-esteem.

Hypothesis 5.2. We hypothesized that participants in the intervention groups (BFI and BPI) would experience changes toward more internal weight-specific locus of control from pre- to post-treatment relative to participants in the control group (WLC).

Hypothesis 5.3. We hypothesized that the child's post-treatment weight-specific locus of control would interact with change in child weight status such that 1) internal weight-specific locus of control *with* reduction in weight status during the weight management program would be associated with greater self-esteem at post-treatment but that, 2) internal weight-specific locus of control *without* a reduction in weight status during the weight management program would be associated with lower self-esteem at post-treatment.

Aim 6: To examine the impact of peer victimization on self-esteem

Hypothesis 6.1. We hypothesized that greater pre-treatment child-rated peer victimization experiences would be associated with lower pre-treatment self-esteem.

Hypothesis 6.2. We hypothesized that reductions in child-rated peer victimization experiences would be associated with greater self-esteem improvement.

Hypothesis 6.3. We hypothesized that greater post-treatment peer victimization experiences would be associated with lower post-treatment self-esteem.

Aim 7: To examine the impact of body satisfaction on self-esteem

Hypothesis 7.1. We hypothesized that greater pre-treatment child-rated body dissatisfaction would be associated with lower pre-treatment self-esteem.

Hypothesis 7.2. We hypothesized that participants in the intervention groups (BFI and BPI) would experience greater reductions in ratings of body dissatisfaction from pre- to post-treatment relative to participants in the control group (WLC).

Hypothesis 7.3. We hypothesized that reductions in child-rated body dissatisfaction would be associated with greater self-esteem improvement.

Hypothesis 7.4. We hypothesized that greater post-treatment body dissatisfaction would be associated with lower post-treatment self-esteem

CHAPTER 2
METHODS

Data for this study were collected as part of a larger intervention study, Sensible Treatment for Overweight Rural Youth (Project STORY), which compared the impact of a Behavioral Family-Based Intervention (BFI) and a Behavioral Parent-Based Intervention (BPI) on weight status in overweight children in underserved rural settings. A Wait List Control (WLC) group was used to compare the effects of the two interventions. The intervention utilized a modified Stop-Light Diet (Epstein et al., 1985) and emphasized behavioral goals including reducing high fat foods and high sugar beverages (i.e., red foods), increasing fruit and vegetable consumption, and increasing physical activity rather than focusing primarily on weight loss. Parent and child self-esteem and body satisfaction issues were addressed during the intervention with special sessions focusing specifically on these concerns. For a full description of the design and methods of the larger Project STORY, please refer to the methodology paper by Janicke and colleagues (2007).

Participants

The 81 study participants who completed both pre-treatment and post-treatment assessments were overweight children between 8 and 14 years old (M=11.05, SD=1.6 years) and their parent(s) or caretaker who volunteered to participate in a weight management program designed to help children and parents adopt healthier lifestyle habits (dietary intake and physical activity) and to improve their weight status. Figure 2-1 provides a flowchart outlining the process by which participants were enrolled. Enrollment is described in more detail in the 'Recruitment' section under 'Procedures.' T-tests were conducted to assess for differences at baseline between participants who did (n = 81) and did not (n = 12) complete post-treatment assessments. The participants who did not complete post-treatment assessment were comprised of significantly

more girls (75% female vs. 62% female; $t = 2.597$, $df = 15$, $p = 0.020$), were younger ($M = 9.73$ [$SD = 1.74$] vs. $M = 11.07$ [$SD = 1.58$]; $t = 2.701$, $df = 91$, $p = 0.008$), in a lower grade ($M = 4.08$ [$SD = 1.88$] vs. $M = 5.65$ [$SD = 1.70$]; $t = 2.953$, $df = 91$, $p = 0.004$), and heavier (z-score $M = 2.48$ [$SD = .24$] vs. $M = 2.15$ [$SD = .41$]; $t = -2.708$, $df = 91$, $p = 0.008$) than participants who did complete post-treatment assessments. The two groups did not differ in ethnicity, parent marital status, parent highest education, or family income. Furthermore, no significant differences existed between baseline self-esteem ratings in any domain, or baseline ratings of weight-specific locus of control, peer victimization, body dissatisfaction, or self-efficacy. Given that no significant differences existed at baseline for self-esteem scores, only data from the 81 participants completing both assessment points were used in the analyses.

The resulting sample was primarily female (50 girls; 31 boys). The sample was moderately diverse with 64 Caucasians (79%), seven African Americans (8.6%), six Hispanics (7.4%), two Asian Americans (2.5%), and two Bi-racial participants (2.5%). The majority of families had currently married parents (76%), and two adults in the home (69%). Many of the parents had some college education (43%). The modal family income was between $20,000 – 39,999. All child-parent dyads were randomized to one of three four-month behavioral weight management interventions (family-based, parent-based, or wait-list control). Participants were recruited from four medically underserved rural counties, with enrollments of 22-27 participants per county. Tables 2-1 and 2-2 provide further baseline characteristics of participants.

Inclusion Criteria

Child criteria for participation included a BMI at or above the 85th percentile for sex and age. Parent criteria for participation included being a parent or legal guardian living in the same house as the child, 75 years old or younger, child and parent must live in the designated rural

area, and that the participating parent was primarily or equally responsible for food purchasing and meal preparation.

Exclusion Criteria

Child and parent exclusion criteria included the presence of a medical condition that contraindicated mild energy restriction or moderate physical activity, pregnancy in the participant(s), or if the child or parent was participating in another weight control program. Another exclusion criterion was medication use including: antipsychotic medication, systemic corticosteroids, prescription weight-loss medications, insulin, or other medications for diabetes. Additional exclusion criteria included conditions or behaviors likely to affect the conduct of the intervention such as: 1) parent or legal guardian unable to read English at the 5th grade level, 2) unwilling to accept randomization, 3) unable to travel to Extension office for intervention sessions, 4) likely to move out of the county within the next 18 months, 5) child or parent with major psychiatric disorder, 6) child with major cognitive or developmental delay, or 7) or any other condition/situation which in the opinion of staff would adversely affect participation in the intervention.

Procedure

Location of Intervention

All interventions were provided at Cooperative Extension offices in north central Florida. Cooperative Extension is a partnership among state, federal, and county governments with the goal of providing scientific knowledge and expertise to the greater public. The Florida Cooperative Extension Service is funded by the University of Florida and Florida A & M University. Cooperative Extension offices were selected as the setting in which to provide the interventions in order to enhance delivery of this program to the rural populations of interest by

providing the intervention in a trusted and established center directly in the participants' communities.

Recruitment

Recruitment occurred during the three months prior to the intervention phase in each county. A variety of recruitment methods were used including direct solicitation through mailers to all families in counties with at least one child 8-13 years old. Additional recruitment efforts included flyers provided to local physicians and pediatricians, presentations and flyers provided to youth and community groups (e.g., church and youth groups), and flyers provided to public health departments and school nurses for distribution. Each mailer, presentation, and flyer provided potential participants with a toll-free telephone number that the family could call to learn more about the study. A total of 154 families initially called to learn more about the study. A trained recruiter then made follow-up phone calls to describe the study and perform a brief phone screen to determine participant eligibility. Overall, 133 families met this first phase of eligibility criteria. Families that expressed interest and met initial eligibility requirements were scheduled for an in-person screening visit.

Initial In-Person Screening

Those families who met initial criteria and expressed interest during the initial phone screen were scheduled for an initial in-person assessment approximately two to three months prior to the beginning of the intervention in each county. During this visit, the study was described in detail and informed consent for participation was obtained. All parents completed a demographic and medical questionnaire for themselves and their child. Eligible families also were measured for height and weight. Two "Physician Approval Forms" were given to each interested family for their physician to complete. Families were required to return these approval forms to the study investigator in order to clear the parent and child to participate in the

intervention. An examination by a licensed physician was provided free of charge if needed for families with limited financial or healthcare resources.

Of the 133 families scheduled for an in-person screening visit, 111 families completed the initial in-person screening. Of these, two families were excluded because they did not meet eligibility criteria as the target child's body mass index (BMI) was below the 85th percentile for height and weight according to age and gender normative data published by the Centers for Disease Control and Prevention (CDC). See Figure 2.1 for participant flow through recruitment and assessments.

Schedule for Assessment

Each parent/child dyad completed three assessment visits over the course of the study. The first assessment occurred one to two weeks prior to the beginning of the intervention and served as the "pre-treatment" assessment. A total of 109 families were scheduled for pre-treatment assessment. Of these 101 families completed the pre-start assessment. Five families were excluded due to child BMI below the 85th percentile for gender and age. Within each county families were randomly assigned to treatment condition. Three families did not accept randomization (WLC n = 2; BFI n = 1). Thus, a total of 93 families accepted randomization and started treatment; Behavioral-Family Intervention (BFI; n = 33), Behavioral Parent Intervention (BPI; n = 34), or Wait List Control (WLC; n = 26) group.

Post-treatment assessment occurred at the completion of the four-month intervention and served as the "post-treatment" assessment. A total of 81 families completed pre- and post-treatment assessment (BFI n = 31; BPI n = 29; WLC n = 21). A final assessment visit occurred at six-months follow up to the intervention, or at 10-months following the beginning of the intervention in each county. Participants in the BFI or BPI group participated in a four-month intervention. The WLC group received the BFI intervention after post-treatment and six-month

follow-up. For the purposes of this study, only data from the “pre-treatment” and “post-treatment” assessments were used. The six-month follow-up assessment point will not be described in more detail. All assessment visits occurred at the local Cooperative Extension office in participating counties.

Interventionists

Interventionists included Cooperative Extension agents and a trained doctoral level psychologist(s), doctoral level graduate student, or a licensed and registered nutritionist. Cooperative Extension agents were included as interventionists with the philosophy that these agents could be trained in the program and then provide the program to the community again in the future in a cost-effective partnership. Cooperative extension agents have experience and training delivering programs to children and families, as well as experience in nutrition education. Every interventionist attended extensive training provided by the primary investigator and consultants regarding the program philosophy, behavioral change techniques, group therapy techniques, and goal setting. Each interventionist attended weekly supervision with the primary investigator throughout each wave of treatment.

Basic Intervention Program

The intervention utilized a modified Stop-Light Diet (Epstein et al., 1985) and emphasized behavioral goals including; reducing high fat foods and high sugar beverages (i.e., red foods), increasing fruit and vegetable consumption, and increasing physical activity rather than focusing primarily on weight loss. Each intervention followed a manualized treatment program to provide participants with didactic information about healthy lifestyle habits, to provide information on behavior change, and to maintain reliability across interventionists. During the program parents and children worked with group leaders to set goals to reduce their consumption of high-fat foods and increase fruit and vegetable intake.

Physical activity goals were targeted via a walking-based program. Parents and children were given pedometers and worked with group leaders to increase their daily steps. A study by Tudor-Locke and colleagues (2004) demonstrated that overweight children average approximately 3,000 steps less per day than their normal weight peers. Thus, the goal of the program was to increase steps for children and parents by approximately 3,000 steps per day above their baseline level.

The program also addressed self-esteem and body image. At the time of this intervention, little published research existed suggesting that previous childhood obesity interventions have directly addressed strategies to increase self-esteem in children participating in weight-management programs. In the current program, two sessions targeted self-esteem and body image concerns for overweight children directly through child sessions (if applicable) and indirectly through parent sessions. These sessions examined the impact of self-esteem and body image on parents and children and helped the participants to increase their self-esteem and body image through interactive activities during the session. Examples of these activities included sessions on how to handle teasing, focusing on behaviors (i.e., red food consumption or physical activity) instead of weight change, using positive self talk to build self-esteem, and parent modeling of positive self-esteem and body image.

Behavioral strategies were incorporated throughout all aspects of the program to achieve intervention goals and promote parent and child behavior change. Behavioral techniques have been shown to be effective methods to promote individual change, particularly in weight management settings (Jelalian & Saelens, 1999). Strategies used in this program included self-monitoring, goal setting, shaping, stimulus control, behavioral contracting, contingent attention, positive reinforcement, modeling, role playing, incentives, and portion size control (Janicke et

al., 2007). Group leaders worked carefully with each family to help them reach their goals through 1) gradual reductions in red foods and increases in physical activity, 2) behavioral contracting with children to reach food goals, activity goals, and family meal times, and 3) additional parent management strategies for reaching behavioral goals and managing child behavior.

Behavioral-Family Intervention (BFI) Group

The BFI groups consisted of concurrent parent and child sessions led by two trained group leaders each in the child and parent group, for a total of four group leaders. Parents and children participated in separate, but simultaneous groups, based on the superior findings of separating the parents and children into different groups (Brownell, Kelman, & Stunkard, 1983). Each week, the basic session format included parents and children meeting individually with the group leaders to review the previous week's goals and problem solve any barriers that occurred. A brief interactive didactic lesson then reviewed the current week's materials. In the child group this lesson was followed by an active game or activity to reinforce the week's lesson. Finally, at the conclusion of the session, the parents and children joined together with group leaders to set behavioral goals for the upcoming week.

Behavioral-Parent Intervention (BPI) Group

The BPI group consisted of parent-only contact with two trained group leaders. Each week, the basic session format began with parents meeting with the group leaders to review the previous week's goals and any barriers that occurred. A brief interactive didactic lesson followed and then the group leaders worked with parents to set behavioral goals for the parents and their children for the upcoming week. At home, parents were encouraged to serve as their child's interventionist and review the week's materials with their child and set weekly goals for dietary and physical activity changes.

Wait-List Control (WLC) Group

The WLC group received the BFI intervention (described above) after the six-month follow-up visit, or ten-months from the beginning of the initial intervention programs in each respective county. Participants in this condition completed assessments on the same schedule as families participating in the BFI and BPI.

Measures

Criterion Measure

Harter self-perception profile for children

The Self-Perception Profile for Children (SPPC; Harter, 1985) is a self-report assessment of the child's perception of his or her global self-worth and competence in six specific domains: scholastic competence, social acceptance, athletic competence, physical appearance, behavioral conduct, and global self-worth. Given gender differences in self-esteem, normative data for the measure is presented separately for boys and girls. Based on research identifying the scales most relevant to pediatric weight management programs (Jelalian & Mehlenbeck, 2002; Braet et al., 2003; Brehm et al., 2003; Walker et al., 2003; Braet et al., 2004; Braet et al., 2006; Jelalian et al., 2006), only the *social acceptance, athletic competence, physical appearance*, and *global self-worth* subscales will be examined in this study. For each item, the child was asked to choose between two statements to indicate which statement is most like him or her. The child was then asked to choose whether that statement was "sort of true for me" or "really true for me." The SPPC was developed specifically for children and has good internal consistencies ranging from .74 to .92 for the individual subscales. This measure has been shown to be sensitive to detect change in self-esteem over time (Strauss, 2000) in weight management programs with children (Gately et al., 2005; Walker et al., 2003). Internal consistency for the SPPC in this study for the social subscale was $\alpha = 0.785$ (pre-treatment) and $\alpha = 0.801$ (post-treatment). Internal

consistency for the athletic subscale was α = 0.842 (pre-treatment) and α = 0.850 (post-treatment). Internal consistency for the physical subscale was α = 0.833 (pre-treatment) and α = 0.877 (post-treatment). Internal consistency for the global subscale was α = 0.790 (pre-treatment) and α = 0.838 (post-treatment).

Predictor Measures

Demographic questionnaire

Parents completed a demographic questionnaire that provided a variety of information including parent and child dates of birth, parent and child ethnicity and gender, family income, parent occupations, and family composition. A copy of this questionnaire is provided in Appendix A.

Body height and weight

Study administrators assessed parent and child height and weight. Height without shoes was measured to the nearest 0.1 centimeter using a Harpendon stadiometer. Weight was measured with one layer of clothes on, without shoes, and with pockets emptied on a standard body weight scale. Height and weight were used to calculate BMI, which was then used to calculate pre-treatment and post-treatment z-scores. Pre-treatment z-score was then subtracted from post-treatment z-score to calculate a "z-score change" to reflect change in child weight status. Z-scores were selected as units of measurement in this study based on data that BMI z-score previously has been indicated to be an adequate measure of adiposity change over time (Hunt, Ford, Sabin, Crowne, & Shiel, 2007).

Daily habit log

A self-report food and activity form, the Daily Habit Log, was provided weekly to each participant so that they could monitor their food intake and daily steps. Each log had columns for foods consumed, the time the food was consumed, the amount of food consumed, and whether

the food was a green, yellow, or red food. Each Daily Habit Log also included a space for total daily steps as measured by the participant's pedometer. Participants were instructed how to complete the form during the first session of the intervention. The Daily Habit Log was completed by the parent and child; however, only the child's form was used for the purposes of this study. Children were encouraged to complete their logs with their parents' help and supervision. Although participants were encouraged to categorize food consumption into the "green, yellow, and red" categories, for the purposes of these analyses a trained interventionist reviewed each log with families at session check-in and reviewed the categorization and number of red foods consumed by each child. A copy of the Daily Habit Log is provided in Appendix B.

Group leader check in sheet

During "check-in," at the beginning of each session, an interventionist reviewed Daily Habit Logs individually with the family, focusing on the number of days that a child ate equal to or less than the previously agreed upon red food goal. This number was entered as the "Number of Days Met Red Food Goal" on the Check In Sheet. The same procedure was calculated for step data. For families that tracked fruit and vegetable goals, these data were included on the Check In Sheet as well. However, since not all families consistently tracked fruit and vegetable goal data, only red food and step goal attainment data were examined in this study. The number of days possible to meet red food and step goals each week was capped at six to exclude the day of the session. The final equation used to calculate goal achievement was: (# of days red food goals met + # of days step goals met) / (# of days possible to achieve red food goals + # of days possible to achieve step goals). A copy of the Check in Sheet is provided in Appendix C.

Self-efficacy questionnaire for healthy lifestyle behavior choices

A questionnaire to measure child self-efficacy for making various health lifestyle behavior choices was created for this study. Items included "(1) I feel confident that I can eat healthy

foods more often. (2) I feel confident that I can eat more fruits and vegetables more often. (3) I feel confident in that I can change habits to eat fewer junk foods. (4) I feel confident that I can change my habits to be more physically active. This means running, playing outside, or just getting up and moving around more often." These items were selected to assess for confidence in a variety of weight-related behaviors including dietary and physical activity behaviors. The questionnaire was scored on a four-point Likert scale (really not true for me, sort of not true for me, sort of true for me, or really true for me). Internal consistency for the self-efficacy questionnaire in this study was $\alpha = 0.660$ (pre-treatment) and $\alpha = 0.801$ (post-treatment). A copy of this measure is provided in Appendix D.

Modified weight locus of control scale

The original Weight Locus of Control (WLOC; Saltzer, 1982) is a four item weight-specific locus of control scale designed for adults. Original items include "(1) Whether I gain, lose or maintain my weight is entirely up to me. (2) Being the right weight is largely a matter of good fortune. (3) No matter what I intend to do, if I gain or lose weight, or stay the same in the near future, it is just going to happen. (4) If I eat right and get enough exercise and rest, I can control my weight in the way that I desire." Original items are scored on a six-point Likert scale (strongly disagree to strongly agree), with scores ranging from four to 24. Lower scores indicated internality and higher scores indicated externality. Saltzer (1982) found test-retest reliability coefficients of $r = 0.67$ over a 24-day interval and internal validity coefficients of $\alpha = 0.58$ and $\alpha = 0.56$ for the two administrations. This scale has been shown to be sensitive to detect change in weight management programs with adults (Bryan & Tiggemann, 2001).

For the purposes of this study, the scale was modified for use with children. The resulting items were "(1) Whether I gain or lose weight is up to me. (2) Being the right weight is mostly due to good luck. (3) No matter what I try to do to lose weight, it doesn't change anything. (4) If

I eat right and get enough exercise, I can control my weight." Additionally, items were scored on a four-point Likert scale (really not true for me, sort of not true for me, sort of true for me, or really true for me) to provide consistency with other child measures included in this study. These modifications resulted from consultation between the author, chair, and other doctoral-level graduate students. In order to further examine the reading level of these modifications, the scale was given to doctoral-level graduate students and doctoral level psychologists for their qualitative feedback as well. Internal consistency for the WLOC in this study was $\alpha = 0.360$ (pre-treatment) and $\alpha = 0.553$ (post-treatment). A copy of this measure was provided in Appendix E.

Schwartz peer victimization scale

The Schwartz Peer Victimization Scale (SPVS; Schwartz, Farver, Change, & Lee-Shin, 2002) is a five-item self-report measure that assesses peer victimization experiences over the past two weeks. Items assess both overt and relational victimization. The scale has been shown to have good internal consistency, and correlates well with teacher and peer reports of victimization and loneliness. Participants were asked to answer each question regarding the frequency of victimization experiences by selecting one of four multiple choice items: never, sometimes, often, or almost every day. Internal consistency for the SPVS in this study was $\alpha = 0.925$ (pre-treatment) and $\alpha = 0.910$ (post-treatment). A copy of this measure was provided in Appendix F.

Children's body image scale

The Children's Body Image Scale (CBIS; Truby & Paxton, 2002) is a measure of body size perception that has been shown to have adequate psychometric properties for use in boys and girls eight years and older. Previous research has indicated that it is a good measure of body dissatisfaction (Truby & Paxton, 2002) and reflects change in body size dissatisfaction across an intervention. The scale consists of seven pictures of a child ranging from thinnest to heaviest as reference points, with a separate set of pictures for boys and girls. The scale was administered by

giving the child a gender-matched pictorial scale and asking the child to circle the body shape that is most like his or her own (perceived figure). The child was then given another gender-matched pictorial scale and asked to circle the body shape that he or she would most like to have (ideal figure). The difference between the perceived and ideal figures was used as a measure of body size dissatisfaction.

Figure 2-1. Screening, assessment and intervention participation in Project STORY.

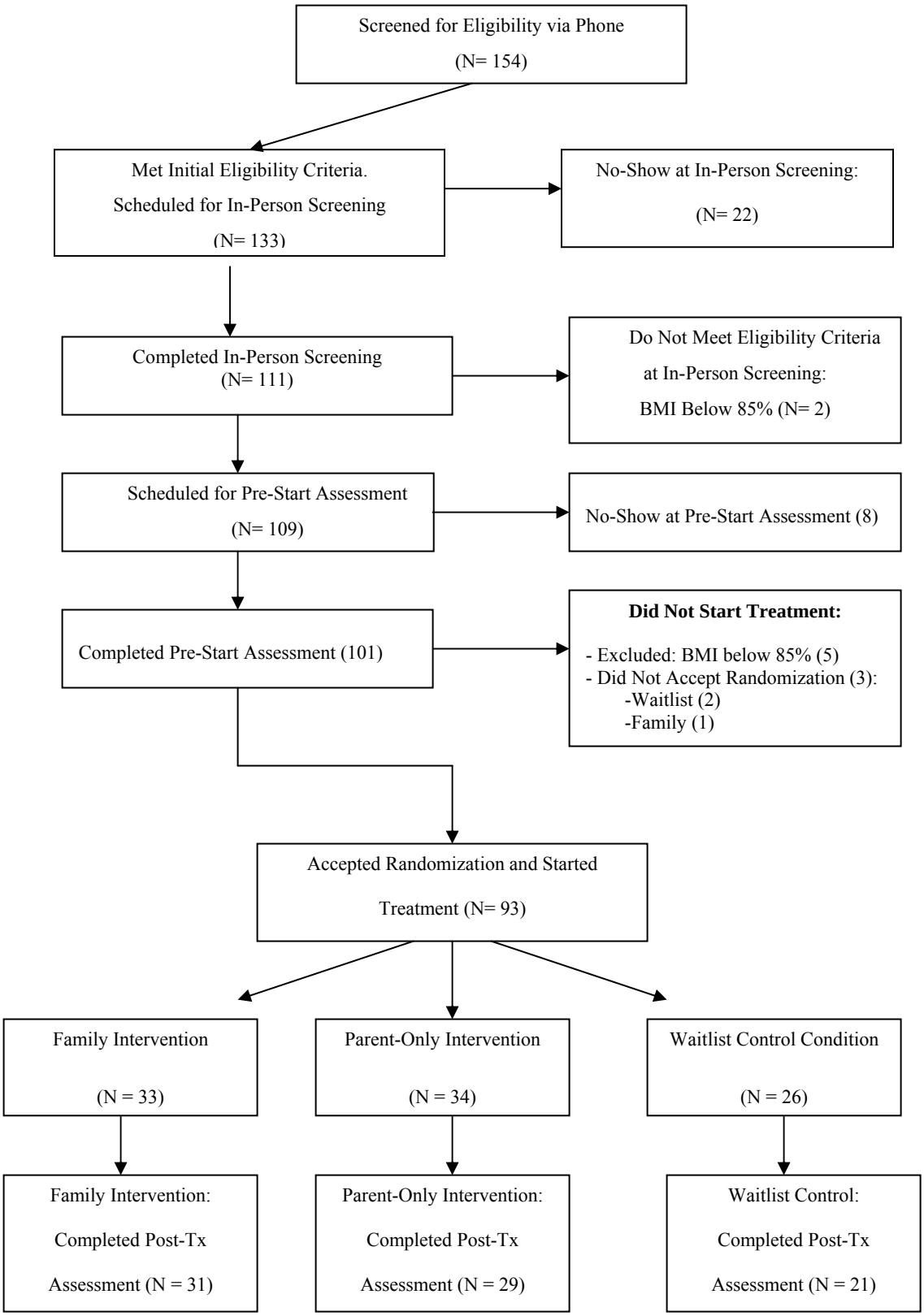


Table 2.1. Mean baseline characteristics of participants who completed pre-treatment and post-treatment assessment.

	All Conditions			**BFI**			**BPI**			**WLC**		
Characteristic	*Total (N=81)*	*Girls (n=50)*	*Boys (n=31)*	*Total (n=31)*	*Girls (n=20)*	*Boys (n=11)*	*Total (n=29)*	*Girls (n=14)*	*Boys (n=15)*	*Total (n=21)*	*Girls (n=16)*	*Boys (n=5)*
Age (yrs)	11.07 (1.58)	11.23 (1.6)	10.81 (1.6)	11.03 (1.6)	10.90 (1.7)	11.26 (1.4)	11.15 (1.4)	11.50 (1.3)	10.82 (1.5)	11.02 (1.81)	11.40 (1.7)	9.80 (1.9)
Grade	5.65 (1.70)	5.70 (1.7)	5.58 (1.7)	5.45 (1.7)	5.25 (1.9)	5.81 (1.3)	5.93 (1.5)	6.14 (1.4)	5.73 (1.75)	5.57 (1.9)	5.88 (1.7)	4.60 (2.2)
BMI z-score	2.15 (0.41)	2.13 (0.44)	2.20 (0.35)	2.20 (0.43)	2.22 (0.45)	2.15 (0.40)	2.21 (0.33)	2.20 (0.40)	2.22 (0.26)	2.02 (0.46)	1.96 (0.43)	2.20 (0.54)

Note. Values enclosed in parentheses represent standard deviations.

Table 2.2. Frequency (and percentage) of participants who completed pre-treatment and post-treatment assessment.

Frequency	**All Conditions**	**BFI**	**BPI**	**WLC**
Gender:				
Male	31 (38%)	11 (35.5%)	15 (51.7%)	5 (23.8%)
Female	50 (62%)	20 (64.5%)	14 (48.3%)	16 (76.2%)
Ethnicity:				
Caucasian	64 (79%)	23 (74.2%)	24 (82.8%)	17 (81%)
African American	7 (8.6%)	3 (9.7%)	1 (3.4%)	3 (14.3%)
Hispanic	6 (7.4%)	4 (12.9%)	1 (3.4%)	1 (4.8%)
Asian	2 (2.5%)	1 (3.2%)	1 (3.4%)	0 (0%)
Bi-racial	2 (2.5%)	0 (0%)	2 (6.9%)	0 (0%)
Other	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Income Range:*				
> $9,999	5 (6.3%)	2 (6.9%)	2 (6.9%)	1 (4.8%)
$10,000 – $19,999	10 (12.7%)	3 (10.3%)	4 (13.8%)	3 (14.3%)
$20,000 – $39,999	24 (30.4%)	14 (48.3%)	5 (17.2%)	5 (23.8%)
$40,000 – $59,999	19 (24.1%)	2 (6.9%)	9 (31%)	8 (38.1%)
$60,000 – $79,999	8 (10.1%)	2 (6.9%)	5 (17.2%)	1 (4.8%)
> $80,000	13 (16.5%)	6 (20.7%)	4 (13.8%)	3 (14.3%)
Parent Marital Status:				
Currently Married	62 (76.5%)	23 (74.2%)	25 (86.2%)	14 (66.7%)
Single, divorced	8 (9.9%)	3 (9.7%)	0 (0%)	5 (23.8%)
Single, never married	5 (6.2%)	2 (6.5%)	2 (6.9%)	1 (4.8%)
Single, co-habitating	1 (1.2%)	1 (3.2%)	0 (0%)	0 (0%)
Single, widowed	5 (6.2%)	2 (6.5%)	2 (6.9%)	1 (4.8%)
*Parent Age***	41.85 (9.06)	40.23 (9.50)	41.75 (7.638)	44.18 (9.974)

*Note. Income range data missing for two participants.

**Note. Parent Age is listed by Mean (Standard Deviation). Parent age missing data for one participant.

CHAPTER 3
RESULTS

Analyses and Statistical Significance

Given the number of analyses performed, the *p* value for significance for analyses related to the primary aims was kept at $p < 0.05$, while the *p* value for significance for secondary aims was set at $p < .01$ to prevent committing a Type I error (rejecting the null hypothesis when it is really true) (Grimm & Yarnold, 1995). Analyses included mixed model Repeated Measures ANOVA to assess for the impact of the treatment and gender on variables of interest (Aim 1, 5, 6, and 7). If appropriate, post hoc analyses including paired t-tests were conducted to examine main effect for time, and pairwise comparisons were conducted to examine significant main effects for treatment and gender.

Multiple regression analyses were utilized to examine the association between criterion and predictor variables (Aim 2, 3, 4, 5, 6, and 7). As cross sectional research has provided some evidence for gender differences in self-esteem, we included a moderator analysis to assess for differential impact of self-esteem among boys and girls (Mendelson & White, 1985; Pesa et al., 2000; Israel & Ivanova, 2002). The effect of the predictor variable on the criterion variable, and gender differences in those associations, were assessed by testing for moderating effects of gender via multiple regression, based on protocol recommended by Frazier and colleagues (Frazier, Tix, & Barron, 2004). Based on this approach, the predictor variable of interest was transformed into a z-score and tested against the criterion variable in block one to analyze for direct effects of the predictor variable on the variable of interest. Main effects for the predictor were indicated if the predictor was a significant contributor to the model. In order to examine potential moderation of gender, the variable for gender was dummy coded as either “1” or “-1.” Then a product (interaction term) was created by multiplying the z-score of the predictor variable

by the dummy coded variable for gender. The z-score for the predictor variable and the dummy coded gender variables were entered into block two. Then the product of the z-score predictor variable and dummy coded gender variable was entered into block three. Moderation was indicated if the unstandardized beta weight for the interaction between the predictor and gender was a significant contributor to the model.

Primary Aims

Significance values for primary aims were set at $p < 0.05$.

Aim 1: To Examine the Impact of the Intervention Groups on Self-Esteem

Four 2 x 3 x 2 mixed model ANOVAs were conducted to evaluate the within subjects **change** in *social, athletic, physical,* and *global self-esteem* from pre- to post-treatment examining the between subjects effects of treatment condition and gender. All self-esteem pre- and post-treatment means for girls and boys in each treatment condition are listed in Table 3-1.

Analysis of the model for *global self-esteem* indicated a significant main effect of time (F [1, 75] = 9.029, $p = 0.004$, $\eta^2 = 0.107$). The main effect of time was explored using post-hoc paired samples t-tests which indicated a significant improvement in *global self-esteem* from pre- to post-treatment for participants in the BPI condition ($t = -2.157$, $df = 28$, $p = 0.040$) and WLC condition ($t = -2.823$, $df = 20$, $p = 0.011$), but no significant change in *global self-esteem* over time for participants in the BFI condition ($t = 01.003$, $df = 30$, $p = 0.324$). The model indicated a non-significant main effect of gender (F [1, 75] = 0.070, $p = 0.793$, $\eta^2 = 0.001$), a non-significant main effect of treatment condition (F [2, 75] = 0.056, $p = 0.945$, $\eta^2 = 0.001$), a non-significant time by gender interaction effect (F [1, 75] = 2.414, $p = 0.124$, $\eta^2 = 0.031$), a non-significant time by treatment interaction (F [2, 75] = 0.974, $p = 0.382$, $\eta^2 = 0.025$), a non-significant treatment by gender interaction effect (F [2, 75] = 0.956, $p = 0.389$, $\eta^2 = 0.025$), and a non-

significant time by treatment by gender effect (F [2, 75] = 0.277, p = 0.759, η^2 = 0.007). Please refer to Figure 3-1 for a graph of mean change in global self-esteem by treatment condition.

Analysis of the model for *social self-esteem* indicated a significant main effect of time (F [1, 74] = 6.530, p = 0.013, η^2 = 0.081). The main effect of time was explored using post-hoc paired samples t-tests which indicated a significant improvement in *social self-esteem* from pre- to post-treatment for participants in the BPI condition (t = -2.587, df = 28, p = 0.015), but no significant change in *social self-esteem* over time for participants in the BFI (t = -0.163, df = 30, p = 0.872) or WLC (t = -1.573, df = 19, p = 0.132) conditions. The model indicated a non-significant main effect of gender (F [1, 74] = 0.037, p = 0.847, η^2 = 0.001), a non-significant main effect of treatment condition (F [2, 74] = 0.930, p = 0.399, η^2 = 0.025), a non-significant time by gender interaction effect (F [1, 74] = 1.333, p = 0.252, η^2 = 0.018), a non-significant time by treatment interaction (F [2, 74] = 0.954, p = 0.390, η^2 = 0.025), a non-significant treatment by gender interaction effect (F [2, 74] = 0.493, p = 0.613, η^2 = 0.013), and a non-significant time by treatment by gender effect (F [2, 74] = 0.248, p = 0.781, η^2 = 0.007). Please refer to Figure 3-2 for a graph of mean change in social self-esteem by treatment condition.

Analysis of the model for *athletic self-esteem* indicated a significant main effect of time (F [1, 75] = 6.268, p = 0.014, η^2 = 0.077). The main effect of time was explored using post-hoc paired samples t-tests which indicated a significant improvement in *athletic self-esteem* from pre- to post-treatment for participants in the BFI condition (t = -2.623, df = 30, p = 0.014), but no significant change in *athletic self-esteem* over time for participants in the BPI (t = -1.166, df = 28, p = 0.254) or WLC (t = -0.314, df = 20, p = 0.757) conditions. The model indicated a non-significant main effect of gender (F [1, 75] = 2.119, p = 0.150, η^2 = 0.027), a non-significant main effect of treatment condition (F [2, 75] = 0.140, p = 0.869, η^2 = 0.004), a non-significant

time by gender interaction effect (F [1, 75] = 0.104, p = 0.748, η^2 = 0.001), a non-significant time by treatment interaction (F [2, 75] = 1.011, p = 0.369, η^2 = 0.026), a non-significant treatment by gender interaction effect (F [2, 75] = 0.295, p = 0.746, η^2 = 0.008), and a non-significant time by treatment by gender effect (F [2 ,75] = 0.892, p = 0.414, η^2 = 0.023). Please refer to Figure 3-3 for a graph of mean change in athletic self-esteem by treatment condition.

Analysis of the model for *physical self-esteem* indicated a significant main effect of gender (F [1, 75] = 4.643, p = 0.034, η^2 = 0.058). Specifically, boys' mean *physical self-esteem* (M = 2.480, SE = 0.143) was higher than girls' mean *physical self-esteem* (M = 2.101, SE = 0.102). The model indicated a non-significant main effect of time (F [1, 75] = 2.743, p = 0.102, η^2 = 0.035), a non-significant main effect of treatment condition (F [2, 75] = 0.707, p = 0.497, η^2 = 0.018), a non-significant time by gender interaction effect (F [1, 75] = 2.740, p = 0.102, η^2 = 0.035), a non-significant time by treatment interaction (F [2, 75] = 1.158, p = 0.320, η^2 = 0.030), a non-significant treatment by gender interaction effect (F [2, 75] = 0.186, p = 0.831, η^2 = 0.005), and a non-significant time by treatment by gender effect (F [2, 75] = 1.846, p = 0.165, η^2 = 0.047).

In summary, participants in the BPI condition experienced significant *social self-esteem* and *global self-esteem* improvements over time. Participants in the BFI condition experienced significant improvements in *athletic self-esteem* over time. Participants in the WLC condition experienced significant improvements in *global self-esteem* over time. No treatment condition was significantly different than another group with regard to impact on self-esteem change over time. Gender differences were present in that boys had significantly higher mean *physical self-esteem* than girls; however, boys and girls did not differ in self-esteem improvements over time

or due to treatment. Self-esteem changes did not differ when examined by age, ethnicity, or county of treatment.

Aim 2: To Determine the Impact of Weight Status Change on Self-Esteem

All impact variable pre- and post-treatment means for girls and boys in each treatment condition are listed in Table 3-2. The average percent decrease in BMI z-score for child participants across conditions was 0.0417, $SD = 0.11$ (BFI: $M = 0.0365$ [$SD = 0.09$]; BPI: $M = 0.0734$ [$SD = 0.12$]; WLC: $M = 0.0057$ [$SD = 0.09$]). Multiple regressions based on procedures recommended by Frazier and colleagues (Frazier et al., 2004) were conducted to evaluate the association between **weight status change** and **change** in *social, athletic, physical*, and *global self-esteem*.

Block one of the regression analysis showed a non-significant direct effect for weight status change on *global self-esteem* ($R^2 = 0.038$, F [1, 80] = 3.096, $\beta = 0.194$, $t = 1.759$, $p = 0.082$), indicating that change in global self-esteem was not associated with change in weight status. Block two showed a significant direct effect for gender ($\beta = 0.218$, $t = 2.011$, $p = 0.048$), indicating that gender was significantly associated with change in global self-esteem. However, the unstandardized beta weight for the product of weight status and gender in block three was not significant ($\beta = 0.200$, $t = 1.772$, $p = 0.080$). Thus, gender was not a moderator of the association between weight status change and change in global self-esteem

Block one of the regression analysis showed a non-significant direct effect for weight status change on *social self-esteem* ($R^2 = -0.012$, F [1, 79] = 0.079, $\beta = 0.032$, $t = 0.281$, $p = 0.779$), indicating that change in social self-esteem was not associated with change in weight status. Block two showed a non-significant direct effect for gender ($\beta = -0.167$, $t = -1.482$, $p = 0.142$). The unstandardized beta weight for the product of weight status and gender in block

three was not significant ($\beta = 0.108$, $t = 0.925$, $p = 0.358$). Thus, gender was not a moderator of the association between weight status change and change in social self-esteem.

Block one of the regression analysis showed a non-significant direct effect for weight status change on athletic self-esteem ($R^2 < 0.001$, F [1, 80] < 0.001, $\beta = -0.002$, $t = -0.022$, $p = 0.983$), indicating that change in athletic self-esteem was not associated with change in weight status. Block two showed a non-significant direct effect for gender on athletic self-esteem ($\beta = 0.006$, $t = 0.054$, $p = 0.957$). The unstandardized beta weight for the product of weight status and gender in block three was not significant ($\beta = 0.084$, $t = 0.699$, $p = 0.487$). Thus, gender was not a moderator of the association between weight status change and change in athletic self-esteem.

Block one of the regression analysis showed a non-significant direct effect for weight status change on physical self-esteem ($R^2 = 0.038$, F [1, 80] = 3.091, $\beta = 0.194$, $t = 1.758$, $p = 0.083$), indicating that change in physical self-esteem was not associated with change in weight status. Block two showed a non-significant direct effect for gender on physical self-esteem ($\beta = 0.207$, $t = 1.904$, $p = 0.061$). The unstandardized beta weight for the product of weight status and gender in block three was not significant ($\beta = 0.184$, $t = 1.620$, $p = 0.109$). Thus, gender was not a moderator of the association between weight status change and change in physical self-esteem.

In summary, change in weight status was not associated with improvements in social, athletic, physical, and global self-esteem. Furthermore, no gender differences were observed.

Secondary Aims

Significance values for secondary aims were set at $p < 0.01$.

Aim 3: To Examine the Impact of Behavioral Goal Attainment on Self-Esteem

Multiple regressions were conducted to evaluate the association between goal attainment and **improvements** in *social, athletic, physical,* and *global self-esteem*. Data only from children in the BPI and BFI were used in these analyses, as families in the WLC did not complete weekly

habit logs or set goals. Mean goal attainment for the participants was approximately 40%, *SD* = 0.26 (BFI: *M* = 35% [*SD* = 0.27]; BPI: *M* = 44% [*SD* = 0.26]).

Block one of the regression analysis showed a non-significant direct effect for behavioral goal attainment on change in *global self-esteem* (R^2 = 0.006, *F* [1, 59] = 0.340, β = -0.076, *t* = -0.583, *p* = 0.562), indicating that change in global self-esteem was not associated with behavioral goal attainment. Block two showed a non-significant direct effect for gender on global self-esteem (β = 0.199, *t* = 1.507, *p* = 0.137). The unstandardized beta weight for the product of behavioral goal attainment and gender in block three was not significant (β = -0.039, *t* = -0.292, *p* = 0.772). Thus, gender was not a moderator of the association between behavioral goal attainment and change in global self-esteem.

Block one of the regression analysis showed a non-significant direct effect for behavioral goal attainment on change in *social self-esteem* (R^2 = 0.003, *F* [1, 59] = 0.162, β = -0.053, *t* = -0.403, *p* = 0.689), indicating that change in social self-esteem was not associated with behavioral goal attainment. Block two showed a non-significant direct effect for gender on social self-esteem (β = -0.243, *t* = -1.855, *p* = 0.069). The unstandardized beta weight for the product of behavioral goal attainment and gender in block three was not significant (β = -0.039, *t* = -0.292, *p* = 0.771). Thus, gender was not a moderator of the association between behavioral goal attainment and change in social self-esteem.

Block one of the regression analysis showed a non-significant direct effect for behavioral goal attainment on change in *athletic self-esteem* (R^2 = 0.007, *F* [1, 59] = 0.393, β = -0.082, *t* = -0.627, *p* = 0.533), indicating that change in athletic self-esteem was not associated with behavioral goal attainment. Block two showed a non-significant direct effect for gender on athletic self-esteem (β = 0.100, *t* = 0.747, *p* = 0.458). The unstandardized beta weight for the

product of behavioral goal attainment and gender in block three was not significant (β = -0.036, t = -0.268, p = 0.790). Thus, gender was not a moderator of the association between behavioral goal attainment and change in athletic self-esteem.

Block one of the regression analysis showed a non-significant direct effect for behavioral goal attainment on change in *physical self-esteem* (R^2 = 0.001, F [1, 59] = 0.035, β = 0.024, t = 0.186, p = 0.853), indicating that change in physical self-esteem was not associated with behavioral goal attainment. Block two showed a significant direct effect for gender on physical self-esteem (β = 0.351, t = 2.766, p = 0.008), indicating that gender was significantly associated with change in physical self-esteem. The unstandardized beta weight for the product of behavioral goal attainment and gender in block three was not significant (β = -0.203, t = -1.627, p = 0.109). Thus, gender was not a moderator of the association between behavioral goal attainment and change in physical self-esteem.

Attainment of red food goals and step goals was examined separately to identify if attainment of a particular type of goal (red food goal attainment and step goal attainment) was associated with self-esteem improvement, but these associations also were not significant. In summary, goal attainment was not associated with self-esteem improvement. Furthermore, gender was not a significant moderator of associations.

Aim 4: To Determine the Impact of Self-Efficacy on Weight Status and Self-Esteem

Multiple regressions were conducted to evaluate the association between **pre-treatment** self-efficacy for making healthy lifestyle choices and changes in weight status. Block one of the regression analysis showed a non-significant direct effect for pre-treatment self-efficacy on weight status change (R^2 = 0.008, F [1, 80] = 0.604, β = 0.087, t = 0.777, p = 0.439), indicating that pre-treatment self-efficacy was not associated with change in weight status. Block two showed a non-significant direct effect for gender on change in weight status (β = -0.087, t = -

0.768, $p = 0.445$). The unstandardized beta weight for the product of pre-treatment self-efficacy and gender in block three was not significant ($\beta = -0.063$, $t = -0.488$, $p = 0.627$). Thus, gender was not a moderator of the relationship between pre-treatment self-efficacy and weight status change.

Multiple regressions were conducted to evaluate the association between **pre-treatment** self-efficacy for making healthy lifestyle choices and **change** in *social, athletic, physical,* and *global self-esteem*. Block one of the regression analysis showed a non-significant direct effect for pre-treatment self-efficacy on change in *global self-esteem* ($R^2 = 0.017$, F [1, 80] = 1.348, $\beta = 0.130$, $t = 1.161$, $p = 0.249$), indicating that change in global self-esteem was not associated with pre-treatment self-efficacy. Block two showed a non-significant direct effect for gender on global self-esteem ($\beta = 0.188$, $t = 1.692$, $p = 0.095$). The unstandardized beta weight for the product of pre-treatment self-efficacy and gender in block three was not significant ($\beta = 0.155$, $t = 1.235$, $p = 0.221$). Thus, gender was not a moderator of the association between pre-treatment self-efficacy and change in global self-esteem.

Block one of the regression analysis showed a non-significant direct effect for pre-treatment self-efficacy on change in *social self-esteem* ($R^2 = 0.008$, F [1, 79] = 0.595, $\beta = 0.087$, $t = 0.772$, $p = 0.443$), indicating that change in social self-esteem was not associated with pre-treatment self-efficacy. Block two showed a non-significant direct effect for gender on social self-esteem ($\beta = -0.184$, $t = -1.629$, $p = 0.107$). The unstandardized beta weight for the product of pre-treatment self-efficacy and gender in block three was not significant ($\beta = 0.200$, $t = 1.589$, $p = 0.116$). Thus, gender was not a moderator of the association between pre-treatment self-efficacy and change in social self-esteem.

Block one of the regression analysis showed a non-significant direct effect for pre-treatment self-efficacy on change in *athletic self-esteem* (R^2 = 0.006, F [1, 80] = 0.472, β = 0.077, t = 0.687, p = 0.494), indicating that change in athletic self-esteem was not associated with pre-treatment self-efficacy. Block two showed a non-significant direct effect for gender on athletic self-esteem (β = -0.005, t = -0.041, p = 0.967). The unstandardized beta weight for the product of pre-treatment self-efficacy and gender in block three was not significant (β = 0.169, t = 1.322, p = 0.190). Thus, gender was not a moderator of the association between pre-treatment self-efficacy and change in athletic self-esteem.

Block one of the regression analysis showed a non-significant direct effect for pre-treatment self-efficacy on change in *physical self-esteem* (R^2 = 0.007, F [1, 80] = 0.587, β = 0.086, t = 0.766, p = 0.446), indicating that change in physical self-esteem was not associated with pre-treatment self-efficacy. Block two showed a non-significant direct effect for gender on physical self-esteem (β = 0.184, t = 1.638, p = 0.105). The unstandardized beta weight for the product of pre-treatment self-efficacy and gender in block three was not significant (β = 0.052, t = 0.413, p = 0.681). Thus, gender was not a moderator of the association between pre-treatment self-efficacy and change in physical self-esteem.

Multiple regressions were conducted to evaluate the association between **change** in self-efficacy for making healthy lifestyle choices and **change** in *social, athletic, physical,* and *global self-esteem*. Block one of the regression analysis showed a non-significant direct effect for change in self-efficacy on change in *global self-esteem* (R^2 = 0.001, F [1, 80] = 0.094, β = -0.034, t = -0.306, p = 0.760), indicating that change in global self-esteem was not associated with change in self-efficacy. Block two showed a non-significant direct effect for gender on *global* self-esteem change (β = -0.202, t = 1.805, p = 0.075). The unstandardized beta weight for the

product of change in self-efficacy and gender in block three was not significant (β = 0.026, t = 0.222, p = 0.825). Thus, gender was not a moderator of the association between change in self-efficacy and change in *global* self-esteem.

Block one of the regression analysis showed a non-significant direct effect for change in self-efficacy on *social self-esteem* (R^2 < 0.001, F [1, 79] = 0.008, β = 0.010, t = 0.088, p = 0.930), indicating that change in social self-esteem was not associated with change in self-efficacy. Block two showed a non-significant direct effect for gender on social self-esteem change (β = -0.170, t = -1.497, p = 0.138). The unstandardized beta weight for the product of change in self-efficacy and gender in block three was not significant (β = -0.058, t = -0.488, p = 0.627). Thus, gender was not a moderator of the association between change in self-efficacy and change in social self-esteem.

Block one of the regression analysis showed a non-significant direct effect for change in self-efficacy on *athletic self-esteem* (R^2 = 0.038, F [1, 80] = 3.113, β = 0.195, t = 1.764, p = 0.082), indicating that change in athletic self-esteem was not associated with change in self-efficacy. Block two showed a non-significant direct effect for gender on athletic self-esteem change (β = 0.036, t = 0.320, p = 0.750). The unstandardized beta weight for the product of change in self-efficacy and gender in block three was not significant (β = -0.114, t = -0.965, p = 0.338). Thus, gender was not a moderator of the association between change in self-efficacy and change in athletic self-esteem.

Block one of the regression analysis showed a non-significant direct effect for change in self-efficacy on *physical self-esteem* (R^2 = 0.001, F [1, 80] = 0.094, β = 0.034, t = 0.306, p = 0.760), indicating that change in physical self-esteem was not associated with change in self-efficacy. Block two showed a non-significant direct effect for gender on physical self-esteem

change (β = 0.202, t = 1.797, p = 0.076). The unstandardized beta weight for the product of change in self-efficacy and gender in block three was not significant (β = -0.079, t = -0.666, p = 0.508). Thus, gender was not a moderator of the association between change in self-efficacy and change in physical self-esteem.

In summary, self-efficacy for healthy lifestyle behaviors was not associated with change in weight status or self-esteem change for participants at any stage of the study. Furthermore, no gender differences were observed.

Aim 5: To Determine the Impact of and Association Between Weight-Specific Locus of Control, Weight Status, and Self-Esteem in Overweight Children

Multiple regressions were conducted to evaluate the association between **pre-treatment** weight-specific locus of control and **pre-treatment** *social, athletic, physical*, and *global self-esteem*. Block one of the regression analysis showed a non-significant direct effect for pre-treatment locus of control on *global self-esteem* (R^2 < 0.001, F [1, 80] < 0.001, β = -0.001, t = -0.009, p = 0.993), indicating that pre-treatment global self-esteem was not associated with pre-treatment locus of control. Block two showed a non-significant direct effect for gender on global self-esteem (β = 0.208, t = 1.852, p = 0.068). The unstandardized beta weight for the product of pre-treatment locus of control and gender in block three was not significant (β = 0.140, t = 1.221, p = 0.226). Thus, gender was not a moderator of the association between pre-treatment locus of control and pre-treatment global self-esteem.

Block one of the regression analysis showed a non-significant direct effect for pre-treatment locus of control on *social self-esteem* (R^2 = 0.005, F [1, 79] = 0.420, β = 0.073, t = 0.648, p = 0.519), indicating that pre-treatment social self-esteem was not associated with pre-treatment locus of control. Block two showed a non-significant direct effect for gender on social self-esteem (β = -0.161, t = -1.416, p = 0.519). The unstandardized beta weight for the product of

pre-treatment locus of control and gender in block three was not significant ($\beta = 0.091$, $t = 0.778$, $p = 0.439$). Thus, gender was not a moderator of the association between pre-treatment locus of control and pre-treatment social self-esteem.

Block one of the regression analysis showed a non-significant direct effect for pre-treatment locus of control on *athletic self-esteem* ($R^2 = 0.003$, F [1, 80] = 0.198, $\beta = 0.050$, $t = 0.445$, $p = 0.657$), indicating that pre-treatment athletic self-esteem was not associated with pre-treatment locus of control. Block two showed a non-significant direct effect for gender on athletic self-esteem ($\beta = 0.014$, $t = 0.123$, $p = 0.902$). The unstandardized beta weight for the product of pre-treatment locus of control and gender in block three was not significant ($\beta = 0.088$, $t = 0.746$, $p = 0.458$). Thus, gender was not a moderator of the association between pre-treatment locus of control and pre-treatment athletic self-esteem.

Block one of the regression analysis showed a non-significant direct effect for pre-treatment locus of control on *physical self-esteem* ($R^2 < 0.001$, F [1, 80] < 0.001, $\beta = -0.001$, $t = -0.012$, $p = 0.991$), indicating that pre-treatment physical self-esteem was not associated with pre-treatment locus of control. Block two showed a non-significant direct effect for gender on physical self-esteem ($\beta = 0.196$, $t = 1.746$, $p = 0.085$). The unstandardized beta weight for the product of pre-treatment locus of control and gender in block three was not significant ($\beta = 0.179$, $t = 1.562$, $p = 0.122$). Thus, gender was not a moderator of the association between pre-treatment locus of control and pre-treatment physical self-esteem.

A 2 x 3 x 2 mixed model ANOVA was performed to examine **change** in weight-specific locus of control from pre- to post-treatment, examining the between subjects effects of treatment condition and gender. Examination of the model indicated a non-significant direct effect of time (F [1, 75] = 3.316, $p = 0.073$, $\eta^2 = 0.042$), a non-significant direct effect of gender (F [1, 75] =

1.302, $p = 0.257$, $\eta^2 = 0.017$), a non-significant direct effect of treatment condition (F [2, 75] = 0.896, $p = 0.413$, $\eta^2 = 0.023$), a non-significant time by gender interaction effect (F [1, 75] = 0.028, $p = 0.868$, $\eta^2 < 0.001$), a non-significant time by treatment interaction (F [2, 75] = 0.833, $p = 0.439$, $\eta^2 = 0.022$), a non-significant treatment by gender interaction effect (F [2, 75] = 0.793, $p = 0.456$, $\eta^2 = 0.021$), and a non-significant time by treatment by gender effect (F [2, 75] = 0.513, $p = 0.601$, $\eta^2 = 0.013$). In summary, weight-specific locus of control did not change over time or due to treatment, and no gender differences were present in the sample.

Multiple regressions were conducted to evaluate the association between **post-treatment** weight-specific locus of control and **weight status** on **post-treatment** *social, athletic, physical*, and *global self-esteem*. In the sample, post-treatment locus of control was significantly associated with post-treatment *global self-esteem* ($R^2 = 0.116$, F [1, 80] = 10.322, $p = 0.002$), *social self-esteem* ($R^2 = 0.121$, F [1, 80] = 10.848, $p = 0.001$), *athletic self-esteem* ($R^2 = 0.103$, F [1, 80] = 9.074, $p = 0.003$), and *physical self-esteem* ($R^2 = 0.157$, F [1, 80] = 14.669, $p < 0.001$). However, weight status change was only a statistically significant predictor of post-treatment *athletic self-esteem* ($R^2 = 0.097$, F [1, 80] = 8.474, $p = 0.005$), and not statistically associated with post-treatment *social self-esteem* ($R^2 = 0.017$, F [1, 80] = 1.368, $p = 0.246$), *physical self-esteem* ($R^2 = 0.033$, F [1, 80] = 2.728, $p = 0.103$), or *global self-esteem* ($R^2 = 0.054$, F [1, 80] = 4.472, $p = 0.038$). Moderator effects were not indicated because the effect of the interaction (between weight-specific locus of control and weight status change) was not significant when the simple effects of the independent variables (weight-specific locus of control and weight status change) were controlled (interaction $\beta = 0.562$, $t = 0.686$, $p = 0.495$). No gender differences were observed when examining the interaction between post-treatment weight-specific locus of

control and change in weight status on post-treatment self-esteem (interaction $\beta = 0.071$, $t = 0.550$, $p = 0.584$).

In summary, weight-specific locus of control was not associated with participants' self-esteem. Weight-specific locus of control did not change over time or as a result of treatment for the participants. The interaction between weight status change and self-esteem change was not significant. Furthermore, no gender differences existed in the relationship.

Aim 6: To Examine the Impact of Peer Victimization on Self-Esteem

Multiple regressions were conducted to evaluate the association between **pre-treatment** peer victimization and **pre-treatment** *social, athletic, physical,* and *global self-esteem*. Block one of the regression analysis showed a significant direct effect for pre-treatment peer victimization on pre-treatment *global self-esteem* ($R^2 = 0.135$, F [1, 80] = 12.340, $\beta = -0.368$, $t = -3.513$, $p = 0.001$), indicating that pre-treatment global self-esteem was associated with pre-treatment peer victimization such that greater peer victimization was associated with poorer global self-esteem. Block two showed a non-significant direct effect for gender on global self-esteem ($\beta = -0.103$, $t = -0.980$, $p = 0.330$). The unstandardized beta weight for the product of pre-treatment peer victimization and gender in block three was not significant ($\beta = 0.122$, $t = 1.125$, $p = 0.264$). Thus, gender was not a moderator of the association between pre-treatment peer victimization and pre-treatment global self-esteem.

Block one of the regression analysis showed a significant direct effect for pre-treatment peer victimization on pre-treatment *social self-esteem* ($R^2 = 0.209$, F [1, 79] = 20.582, $\beta = -0.457$, $t = -4.537$, $p < 0.001$), indicating that pre-treatment social self-esteem was associated with pre-treatment peer victimization such that greater peer victimization was associated with poorer social self-esteem. Block two showed a non-significant direct effect for gender on social self-esteem ($\beta = 0.141$, $t = 1.409$, $p = 0.163$). The unstandardized beta weight for the product of pre-

treatment peer victimization and gender in block three was not significant (β = 0.031, t = 0.294, p = 0.770). Thus, gender was not a moderator of the association between pre-treatment peer victimization and pre-treatment social self-esteem.

Block one of the regression analysis showed a significant direct effect for pre-treatment peer victimization on pre-treatment *athletic self-esteem* (R^2 = 0.110, F [1, 80] = 9.806, β = -0.332, t = -3.132, p = 0.002), indicating that pre-treatment athletic self-esteem was associated with pre-treatment peer victimization such that greater peer victimization was associated with poorer athletic self-esteem. Block two showed a non-significant direct effect for gender on athletic self-esteem (β = -0.147, t = -1.396, p = 0.167). The unstandardized beta weight for the product of pre-treatment peer victimization and gender in block three was not significant (β = -0.108, t = -0.993, p = 0.324). Thus, gender was not a moderator of the association between pre-treatment peer victimization and pre-treatment athletic self-esteem.

Block one of the regression analysis showed a non-significant direct effect for pre-treatment peer victimization on pre-treatment *physical self-esteem* (R^2 = 0.064, F [1, 80] = 5.441, β = -0.254, t = 02.333, p = 0.022), indicating that pre-treatment physical self-esteem was not associated with pre-treatment peer victimization. Block two showed a significant direct effect for gender on physical self-esteem (β = -0.326, t = -3.153, p = 0.002), indicating that gender was associated with pre-treatment physical self-esteem, such that boys had higher pre-treatment physical self-esteem. The unstandardized beta weight for the product of pre-treatment peer victimization and gender in block three was not significant (β = 0.125, t = 1.173, p = 0.244). Thus, gender was not a moderator of the association between pre-treatment peer victimization and pre-treatment physical self-esteem.

Multiple regressions were conducted to evaluate the association between **change** in peer victimization and **change** in *social, athletic, physical,* and *global self-esteem*. Block one of the regression analysis showed a non-significant direct effect for change in peer victimization on change in *global self-esteem* (R^2 = 0.011, F [1, 80] = 0.910, β = -0.107, t = -0.954, p = 0.343), indicating that change in global self-esteem was not associated with change in peer victimization. Block two showed a non-significant direct effect for gender on change in global self-esteem (β = 0.190, t = 1.690, p = 0.095). The unstandardized beta weight for the product of change in peer victimization and gender in block three was not significant (β = -0.163, t = -1.414, p = 0.161). Thus, gender was not a moderator of the association between change in peer victimization and change in global self-esteem.

Block one of the regression analysis showed a significant direct effect for change in peer victimization on change in *social self-esteem* (R^2 = 0.083, F [1, 79] = 7.085, β = -0.289, t = -2.662, p = 0.009), indicating that change in social self-esteem was associated with change in peer victimization, such that reductions in peer victimization were associated with improvements in social self-esteem. Block two showed a non-significant direct effect for gender on change in social self-esteem (β = -0.228, t = -2.110, p = 0.038). The unstandardized beta weight for the product of change in peer victimization and gender in block three was not significant (β = -0.033, t = -0.299, p = 0.766). Thus, gender was not a moderator of the association between change in peer victimization and change in social self-esteem.

Block one of the regression analysis showed a non-significant direct effect for change in peer victimization on change in *athletic self-esteem* (R^2 = 0.031, F [1, 80] = 2.489, β = -0.175, t = -1.578, p = 0.119), indicating that change in athletic self-esteem was not associated with change in peer victimization. Block two showed a non-significant direct effect for gender on change in

athletic self-esteem (β = -0.026, t = -0.228, p = 0.820). The unstandardized beta weight for the product of change in peer victimization and gender in block three was not significant (β = -0.168, t = -1.447, p = 0.152). Thus, gender was not a moderator of the association between change in peer victimization and change in athletic self-esteem.

Block one of the regression analysis showed a significant direct effect for change in peer victimization on change in *physical self-esteem* (R^2 = 0.105, F [1, 80] = 9.302, β = -0.325, t = -3.050, p = 0.003), indicating that change in physical self-esteem was associated with change in peer victimization, such that reductions in peer victimization were associated with improvements in physical self-esteem. Block two showed a non-significant direct effect for gender on change in physical self-esteem (β = 0.138, t = 1.283, p = 0.203). The unstandardized beta weight for the product of change in peer victimization and gender in block three was not significant (β = -0.037, t = -0.327, p = 0.744). Thus, gender was not a moderator of the association between change in peer victimization and change in physical self-esteem.

Multiple regressions were conducted to evaluate the association between **post-treatment** peer victimization and **post-treatment** *social, athletic, physical,* and *global self-esteem.* Block one of the regression analysis showed a significant direct effect for post-treatment peer victimization on post-treatment *global self-esteem* (R^2 = 0.162, F [1, 80] = 15.253, β = -0.402, t = -3.905, p < 0.001), indicating that post-treatment global self-esteem was associated with post-treatment peer victimization, such that lower post-treatment peer victimization was associated with higher post-treatment global self-esteem. Block two showed a non-significant direct effect for gender on post-treatment global self-esteem (β = -0.002, t = -0.020, p = 0.984). The unstandardized beta weight for the product of post-treatment peer victimization and gender in block three was not significant (β = -0.060, t = -0.563, p = 0.575). Thus, gender was not a

moderator of the association between post-treatment peer victimization and post-treatment global self-esteem.

Block one of the regression analysis showed a significant direct effect for post-treatment peer victimization on post-treatment *social self-esteem* (R^2 = 0.213, F [1, 80] = 21.433, β = -0.462, t = -4.630, p < 0.001), indicating that post-treatment social self-esteem was associated with post-treatment peer victimization, such that lower post-treatment peer victimization was associated with higher post-treatment social self-esteem. Block two showed a non-significant direct effect for gender on post-treatment social self-esteem (β = -0.033, t = -0.328, p = 0.744). The unstandardized beta weight for the product of post-treatment peer victimization and gender in block three was not significant (β = -0.28, t = -0.274, p = 0.785). Thus, gender was not a moderator of the association between post-treatment peer victimization and post-treatment social self-esteem.

Block one of the regression analysis showed a non-significant direct effect for post-treatment peer victimization on post-treatment *athletic self-esteem* (R^2 = 0.033, F [1, 80] = 2.690, β = -0.181, t = -1.640, p = 0.105), indicating that post-treatment athletic self-esteem was not associated with post-treatment peer victimization. Block two showed a non-significant direct effect for gender on post-treatment athletic self-esteem (β = 0.175, t = -1.589, p = 0.116). The unstandardized beta weight for the product of post-treatment peer victimization and gender in block three was not significant (β = -0.035, t = -0.308, p = 0.759). Thus, gender was not a moderator of the association between post-treatment peer victimization and post-treatment athletic self-esteem.

Block one of the regression analysis showed a significant direct effect for post-treatment peer victimization on post-treatment *physical self-esteem* (R^2 = 0.113, F [1, 80] = 10.036, β = -

0.336, t = -3.168, p = 0.002), indicating that post-treatment physical self-esteem was associated with post-treatment peer victimization, such that lower post-treatment peer victimization was associated with higher post-treatment physical self-esteem. Block two showed a non-significant direct effect for gender on post-treatment physical self-esteem (β = -0.298, t = -1.898, p = 0.061). The unstandardized beta weight for the product of post-treatment peer victimization and gender in block three was not significant (β = 0.040, t = 0.372, p = 0.711). Thus, gender was not a moderator of the association between post-treatment peer victimization and post-treatment physical self-esteem.

In summary, pre- and post-treatment peer victimization ratings were significantly associated with many domains of pre- and post-treatment self-esteem for girls and boys. Analyses indicated that reductions in peer victimization ratings were associated with improvements in *social self-esteem* and *physical self-esteem*. All associations between peer victimization and self-esteem were such that more peer victimization was associated with poorer self-esteem. Gender differences were not observed.

Aim 7: To Examine the Impact of Body Image on Self-Esteem

Multiple regressions were conducted to evaluate the association between **pre-treatment** body dissatisfaction ratings and **pre-treatment** *social, athletic, physical,* and *global self-esteem*. Block one of the regression analysis showed a significant direct effect for pre-treatment body dissatisfaction ratings on pre-treatment *global self-esteem* (R^2 = 0.172, F [1, 80] = 16.372, β = -0.414, t = -4.046, p < 0.001), indicating that poorer pre-treatment global self-esteem was associated with greater pre-treatment body dissatisfaction. Block two showed a non-significant direct effect for gender on pre-treatment global self-esteem (β = -0.062, t = -0.601, p = 0.550). The unstandardized beta weight for the product of pre-treatment body dissatisfaction and gender in block three was not significant (β = -0.099, t = -0.905, p = 0.368). Thus, gender was not a

moderator of the association between pre-treatment body dissatisfaction and pre-treatment global self-esteem.

Block one of the regression analysis showed a non-significant direct effect for pre-treatment body dissatisfaction ratings on pre-treatment *social self-esteem* (R^2 = -.036, F [1, 79] = 2.876, β = -0.189, t = -1.696, p = 0.094), indicating that pre-treatment social self-esteem was not associated with pre-treatment body dissatisfaction. Block two showed a non-significant direct effect for gender on pre-treatment social self-esteem (β = 0.150, t = 1.337, p = 0.185). The unstandardized beta weight for the product of pre-treatment body dissatisfaction and gender in block three was not significant (β = 0.066, t = 0.556, p = 0.580). Thus, gender was not a moderator of the association between pre-treatment body dissatisfaction and pre-treatment social self-esteem.

Block one of the regression analysis showed a non-significant direct effect for pre-treatment body dissatisfaction ratings on pre-treatment *athletic self-esteem* (R^2 = 0.056, F [1, 80] = 4.691, β = -0.237, t = -2.166, p = 0.033), indicating that pre-treatment athletic self-esteem was not associated with pre-treatment body dissatisfaction. Block two showed a non-significant direct effect for gender on pre-treatment athletic self-esteem (β = -0.132, t = -1.203, p = 0.233). The unstandardized beta weight for the product of pre-treatment body dissatisfaction and gender in block three was not significant (β = -0.079, t = -0.680, p = 0.499). Thus, gender was not a moderator of the association between pre-treatment body dissatisfaction and pre-treatment athletic self-esteem.

Block one of the regression analysis showed a significant direct effect for pre-treatment body dissatisfaction ratings on pre-treatment *physical self-esteem* (R^2 = 0.100, F [1, 80] = 8.785, β = -0.316, t = -2.964, p = 0.004), indicating that poorer pre-treatment physical self-esteem was

associated with greater pre-treatment body dissatisfaction. Block two showed a significant direct effect for gender on pre-treatment physical self-esteem (β = -0.298, t = -2.889, p = 0.005), indicating that gender was significantly associated with pre-treatment physical self-esteem, such that boys experienced higher pre-treatment physical self-esteem. The unstandardized beta weight for the product of pre-treatment body dissatisfaction and gender in block three was not significant (β = -0.076, t = -0.700, p = 0.486). Thus, gender was not a moderator of the association between pre-treatment body dissatisfaction and pre-treatment physical self-esteem.

A 2 x 3 x 2 mixed model ANOVA was performed to examine change in body dissatisfaction ratings from pre- to post-treatment examining the between subjects effects of treatment condition and gender. Examination of the model indicated a significant main effect of time (F [1, 74] = 12.254, p = 0.001, η^2 = 0.142). The main effect of time was examined using paired samples t-tests which indicated a significant improvement in body dissatisfaction from pre- to post-treatment for participants in the BFI condition (t = 3.412, df = 30, p = 0.002) and participants in the BPI condition (t = 2.826, df = 27, p = 0.009), but no significant difference in body dissatisfaction over time for participants in the WLC (t = 0.170, df = 20, p = 0.867) condition. The model also indicated a non-significant direct effect of gender (F [1, 74] = 0.929, p = 0.338, η^2 = 0.012), a non-significant direct effect of treatment condition (F [2, 74] = 0.333, p = 0.718, η^2 = 0.009), a non-significant time by gender interaction effect (F [1, 74] = 0.333, p = 0.566, η^2 = 0.004), and a non-significant time by treatment interaction (F [2, 74] = 2.316, p = 0.106, η^2 = 0.059), a non-significant treatment by gender interaction effect (F [2, 74] = 3.180, p = 0.047, η^2 = 0.079), and a non-significant time by treatment by gender effect (F [2, 74] = 2.451, p = 0.093, η^2 = 0.062). In summary, body dissatisfaction ratings improved over time for

participants in the BFI and BPI conditions. Please refer to Figure 3-4 for a graph of mean change in body dissatisfaction by treatment condition.

Multiple regressions were conducted to evaluate the association between **change** in body dissatisfaction ratings and **change** in *social, athletic, physical,* and *global self-esteem*. Block one of the regression analysis showed a non-significant direct effect for change in body dissatisfaction ratings on change in *global self-esteem* (R^2 = 0.010, F [1, 79] = 0.751, β = -0.098, t = -0.867, p = 0.389), indicating that change in global self-esteem was not associated with change in body dissatisfaction. Block two showed a non-significant direct effect for gender on change in global self-esteem (β = 0.207, t = 1.869, p = 0.065). The unstandardized beta weight for the product of change in body dissatisfaction and gender in block three was not significant (β = 0.070, t = 0.626, p = 0.533). Thus, gender was not a moderator of the association between change in body dissatisfaction and change in global self-esteem.

Block one of the regression analysis showed a non-significant direct effect for change in body dissatisfaction ratings on change in *social self-esteem* (R^2 = 0.071, F [1, 78] = 5.882, β = -0.266, t = -2.425, p = 0.018), indicating that change in social self-esteem was not associated with change in body dissatisfaction. Block two showed a non-significant direct effect for gender on change in social self-esteem (β = -0.165, t = -1.515, p = 0.134). The unstandardized beta weight for the product of change in body dissatisfaction and gender in block three was not significant (β = -0.064, t = -0.581, p = 0.563). Thus, gender was not a moderator of the association between change in body dissatisfaction and change in social self-esteem.

Block one of the regression analysis showed a non-significant direct effect for change in body dissatisfaction ratings on change in *athletic self-esteem* (R^2 = 0.004, F [1, 79] = 0.310, β = -0.063, t = -0.557, p = 0.579), indicating that change in athletic self-esteem was not associated

with change in body dissatisfaction. Block two showed a non-significant direct effect for gender on change in athletic self-esteem (β = 0.011, t = 0.098, p = 0.922). The unstandardized beta weight for the product of change in body dissatisfaction and gender in block three was not significant (β = 0.066, t = 0.580, p = 0.564). Thus, gender was not a moderator of the association between change in body dissatisfaction and change in athletic self-esteem.

Block one of the regression analysis showed a non-significant direct effect for change in body dissatisfaction ratings on change in *physical self-esteem* (R^2 = 0.011, F [1, 79] = 0.847, β = 0.104, t = 0.921, p = 0.360), indicating that change in physical self-esteem was not associated with change in body dissatisfaction. Block two showed a non-significant direct effect for gender on change in physical self-esteem (β = 0.192, t = 1.727, p = 0.088). However, the unstandardized beta weight for the product of change in body dissatisfaction and gender in block three was significant (β = 0.301, t = 2.831, p = 0.006). Follow-up analyses were performed to further examine the interaction. These analyses indicated that change in body dissatisfaction ratings were not significantly associated with change in physical self-esteem for boys (β = -0.245, t = -1.363, p = 0.183), yet were approaching significance for girls (β = 0.359, t = 2.637, p = 0.011). Furthermore, improvements in girls' body satisfaction accounted for approximately 13% of the variance in change in physical self-esteem (R^2 = .129). Thus, gender was a moderator of the association between change in body dissatisfaction and change in physical self-esteem.

Multiple regressions were conducted to evaluate the association between **post-treatment** body dissatisfaction ratings and **post-treatment** *social, athletic, physical,* and *global self-esteem.* Block one of the regression analysis showed a significant direct effect for post-treatment body dissatisfaction ratings on post-treatment *global self-esteem* (R^2 = 0.108, F [1, 79] = 9.415, β = -0.328, t = -3.068, p = 0.003), indicating that poorer post-treatment global self-esteem was

associated with greater post-treatment body dissatisfaction. Block two showed a non-significant direct effect for gender on post-treatment global self-esteem ($\beta = 0.059$, $t = 0.549$, $p = 0.584$). The unstandardized beta weight for the product of post-treatment body dissatisfaction and gender in block three was not significant ($\beta = 0.085$, $t = 0.790$, $p = 0.432$). Thus, gender was not a moderator of the association between post-treatment body dissatisfaction and post-treatment global self-esteem.

Block one of the regression analysis showed a non-significant direct effect for post-treatment body dissatisfaction ratings on post-treatment *social self-esteem* ($R^2 = 0.069$, F [1, 79] = 5.759, $\beta = -0.262$, $t = -2.400$, $p = 0.019$), indicating that post-treatment social self-esteem was not associated with post-treatment body dissatisfaction. Block two showed a non-significant direct effect for gender on post-treatment social self-esteem ($\beta = 0.038$, $t = 0.345$, $p = 0.731$). The unstandardized beta weight for the product of post-treatment body dissatisfaction and gender in block three was not significant ($\beta = -0.095$, $t = -0.856$, $p = 0.395$). Thus, gender was not a moderator of the association between post-treatment body dissatisfaction and post-treatment social self-esteem.

Block one of the regression analysis showed a non-significant direct effect for post-treatment body dissatisfaction ratings on post-treatment *athletic self-esteem* ($R^2 = 0.036$, F [1, 79] = 2.938, $\beta = -0.191$, $t = -1.714$, $p = 0.091$), indicating that post-treatment athletic self-esteem was not associated with post-treatment body dissatisfaction. Block two showed a non-significant direct effect for gender on post-treatment athletic self-esteem ($\beta = -0.139$, $t = -1.250$, $p = 0.215$). The unstandardized beta weight for the product of post-treatment body dissatisfaction and gender in block three was not significant ($\beta = -0.076$, $t = -0.682$, $p = 0.497$). Thus, gender was not a

moderator of the association between post-treatment body dissatisfaction and post-treatment athletic self-esteem.

Block one of the regression analysis showed a significant direct effect for post-treatment body dissatisfaction ratings on post-treatment *physical self-esteem* (R^2 = 0.257, F [1, 79] = 27.015, β = -0.507, t = -5.198, p < .001), indicating that poorer post-treatment physical self-esteem was associated with greater post-treatment body dissatisfaction. Block two showed a non-significant direct effect for gender on post-treatment physical self-esteem (β = -0.118, t = -1.208, p = 0.231). The unstandardized beta weight for the product of post-treatment body dissatisfaction and gender in block three was not significant (β = -0.056, t = -0.568, p = 0.572). Thus, gender was not a moderator of the association between post-treatment body dissatisfaction and post-treatment physical self-esteem.

In summary, body dissatisfaction was associated with physical and global self-esteem at multiple time points. All associations between body dissatisfaction and self-esteem were such that more body dissatisfaction was associated with poorer self-esteem. Gender moderated the association between improvements in physical self-esteem and change in body dissatisfaction such that reductions in body dissatisfaction were approaching significance for association with change in girls' physical self-esteem, but were not significantly associated with change in boys' physical self-esteem. Participants in the BFI and BPI conditions experienced significant reductions in body dissatisfaction over time. No treatment condition was significantly different than another group with regard to the impact on body dissatisfaction.

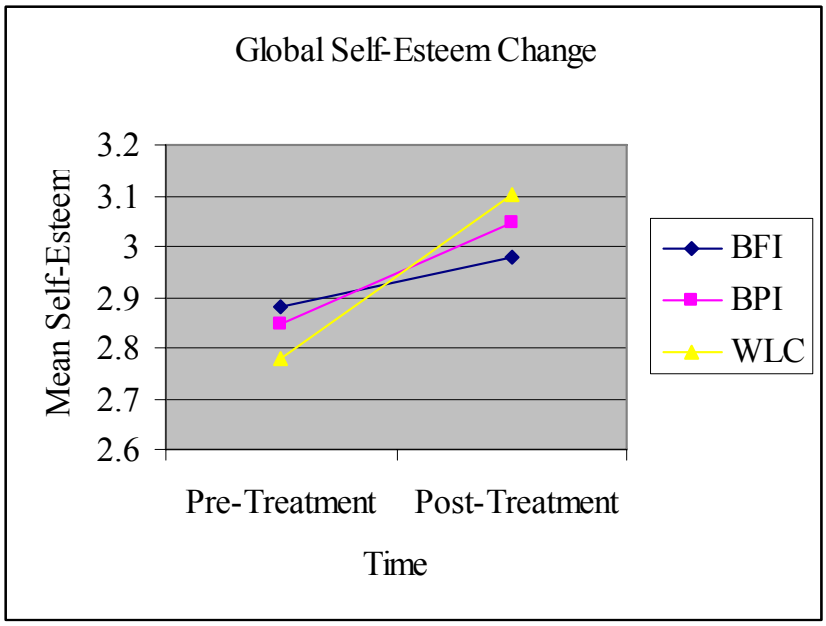


Figure 3-1. Global self-esteem change by treatment condition.

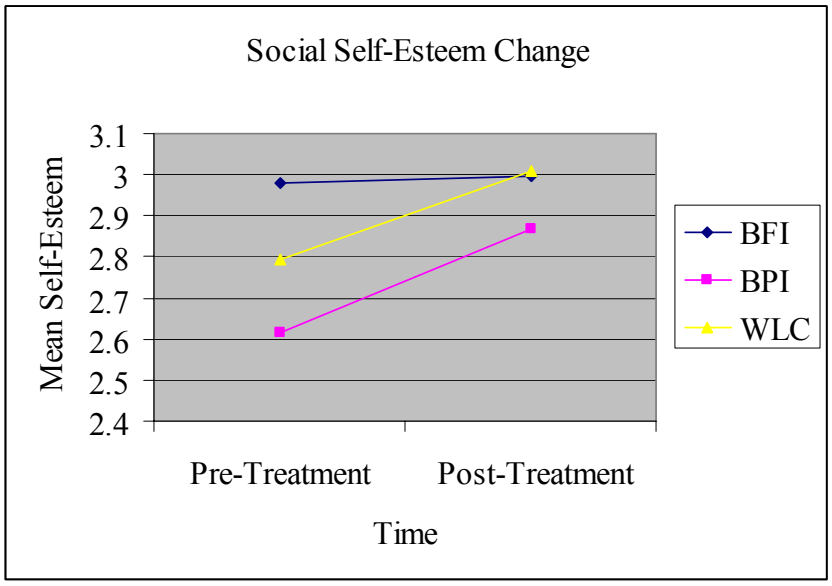


Figure 3-2. Social self-esteem change by treatment condition.

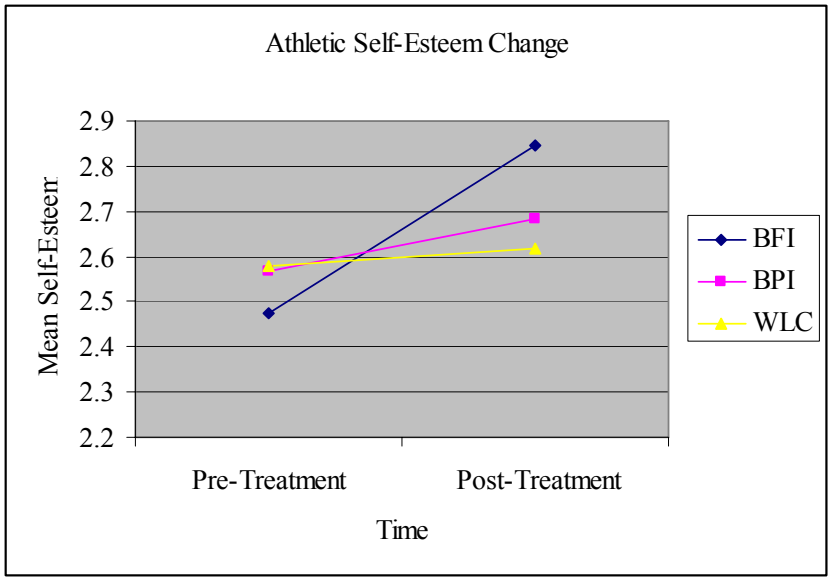


Figure 3-3. Athletic self-esteem change by treatment condition.

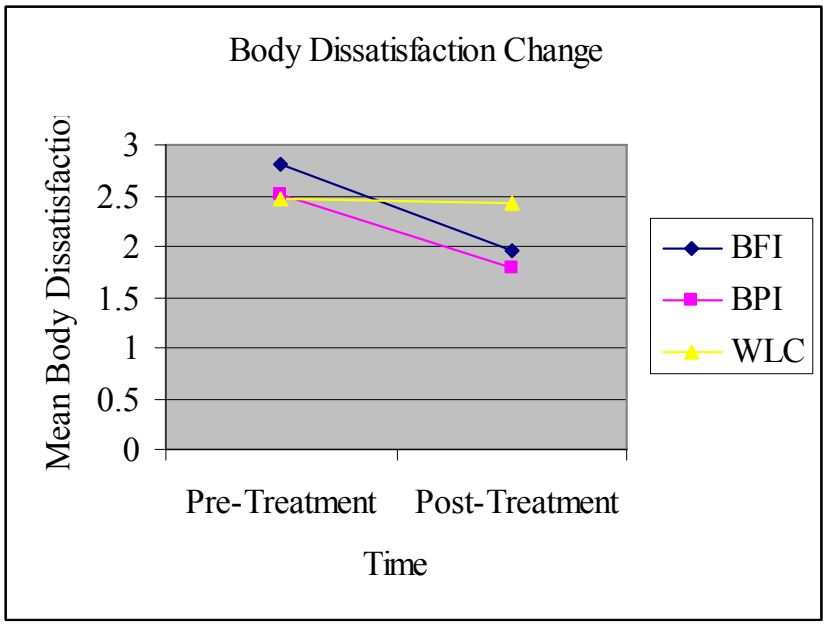


Figure 3-4. Body dissatisfaction change by treatment condition.

Table 3-1. Mean scores (standard deviations) of SPPC scores for children who completed pre-treatment and post-treatment assessment.

	Pre-treatment value	**Post-treatment value**
Total Sample		
Girls (n = 50)		
Social Self-Esteem	2.87 (0.79)	2.96 (0.78)
Athletic Self-Esteem	2.43 (0.88)	2.63 (0.85)
Physical Self-Esteem	1.98 (0.75)	2.22 (0.81)
Global Self-Esteem	2.77 (0.73)	3.05 (0.72)
Boys (n = 31)		
Social Self-Esteem	2.69 (0.71)	2.95 (0.68)
Athletic Self-Esteem	2.70 (0.60)	2.89 (0.66)
Physical Self-Esteem	2.52 (0.72)	2.51 (0.80)
Global Self-Esteem	2.95 (0.70)	3.01 (0.67)
BFI		
Girls (n = 20)		
Social Self-Esteem	3.00 (0.61)	2.92 (0.70)
Athletic Self-Esteem	2.29 (0.94)	2.72 (0.79)
Physical Self-Esteem	1.99 (0.73)	2.30 (0.66)
Global Self-Esteem	2.73 (0.82)	2.88 (0.70)
Boys (n = 11)		
Social Self-Esteem	2.93 (0.79)	3.14 (0.76)
Athletic Self-Esteem	2.80 (0.73)	3.08 (0.75)
Physical Self-Esteem	2.62 (0.85)	2.70 (0.90)
Global Self-Esteem	3.15 (0.73)	3.15 (0.79)
BPI		
Girls (n = 14)		
Social Self-Esteem	2.79 (1.03)	2.96 (0.90)
Athletic Self-Esteem	2.46 (0.97)	2.62 (1.00)
Physical Self-Esteem	1.92 (0.72)	2.46 (1.04)
Global Self-Esteem	2.80 (0.67)	3.18 (0.79)
Boys (n = 15)		
Social Self-Esteem	2.46 (0.67)	2.78 (0.65)
Athletic Self-Esteem	2.67 (0.56)	2.74 (0.61)
Physical Self-Esteem	2.52 (0.69)	2.40 (0.82)
Global Self-Esteem	2.88 (0.76)	2.92 (0.66)
WLC		
Girls (n = 16)		
Social Self-Esteem	2.78 (0.77)	2.99 (0.81)
Athletic Self-Esteem	2.58 (0.74)	2.53 (0.81)

Physical Self-Esteem	2.02 (0.85)	1.92 (0.70)
Global Self-Esteem	2.80 (0.71)	3.15 (0.68)
Boys (n = 5)		
Social Self-Esteem	2.83 (0.50)	3.07 (0.55)
Athletic Self-Esteem	2.57 (0.51)	2.90 (0.58)
Physical Self-Esteem	2.30 (0.58)	2.30 (0.55)
Global Self-Esteem	2.73 (0.35)	2.97 (0.49)

Table 3-2. Mean scores (and standard deviations) of impact variables for children who completed pre-treatment and post-treatment assessments.

	Pre-treatment value	**Post-treatment value**
Total Sample		
Girls (n = 50)		
BMI Z score	2.13 (0.44)	2.07 (0.51)
Self-Efficacy Score	13.76 (2.13)	13.38 (2.50)
WLOC Score	12.48 (2.13)	13.02 (2.58)
Peer Victimization Score	8.97 (4.00)	8.36 (3.11)
Body Dissatisfaction	2.76 (1.30)	2.14 (1.30)
Boys (n = 31)		
BMI Z score	2.19 (0.35)	2.09 (0.44)
Self-Efficacy Score	13.19 (1.62)	13.58 (2.35)
WLOC Score	13.13 (2.06)	13.58 (1.78)
Peer Victimization Score	8.55 (3.96)	8.94 (4.80)
Body Dissatisfaction	2.39 (1.17)	1.84 (1.51)
BFI		
Girls (n = 20)		
BMI Z score	2.22 (0.45)	2.20 (0.48)
Self-Efficacy Score	13.60 (2.28)	13.75 (2.49)
WLOC Score	12.30 (1.66)	12.60 (2.60)
Peer Victimization Score	8.75 (3.74)	7.75 (3.11)
Body Dissatisfaction	3.10 (1.52)	2.45 (1.15)
Boys (n = 11)		
BMI Z score	2.15 (0.40)	2.00 (0.56)
Self-Efficacy Score	13.73 (1.49)	13.09 (2.47)
WLOC Score	13.36 (1.57)	13.45 (1.81)
Peer Victimization Score	9.18 (5.36)	8.18 (4.94)
Body Dissatisfaction	2.27 (1.01)	1.09 (1.38)
BPI		
Girls (n = 14)		
BMI Z score	2.20 (0.40)	2.02 (0.59)
Self-Efficacy Score	14.14 (1.70)	13.71 (1.98)
WLOC Score	12.86 (2.32)	14.29 (1.64)

Peer Victimization Score	9.07 (4.70)	8.86 (2.77)
Body Dissatisfaction	2.57 (1.16)	1.31 (1.38)
Boys (n = 15)		
BMI Z score	2.22 (0.26)	2.11 (0.32)
Self-Efficacy Score	12.93 (1.67)	13.67 (2.38)
WLOC Score	13.07 (2.34)	13.67 (1.99)
Peer Victimization Score	8.93 (3.15)	10.00 (5.26)
Body Dissatisfaction	2.47 (1.41)	2.20 (1.42)
WLC		
Girls (n = 16)		
BMI Z score	1.96 (0.43)	1.94 (0.46)
Self-Efficacy Score	13.63 (2.36)	12.63 (2.87)
WLOC Score	12.38 (2.55)	12.44 (2.94)
Peer Victimization Score	9.13 (3.95)	8.69 (3.44)
Body Dissatisfaction	2.50 (1.10)	2.44 (1.21)
Boys (n = 5)		
BMI Z score	2.20 (0.35)	2.09 (0.44)
Self-Efficacy Score	12.80 (1.79)	14.40 (2.19)
WLOC Score	12.80 (2.49)	13.60 (1.34)
Peer Victimization Score	6.00 (1.00)	7.40 (2.51)
Body Dissatisfaction	2.40 (0.89)	2.40 (1.67)

CHAPTER 4
DISCUSSION

Findings Regarding Self-Esteem Change

This study adds to the mixed and methodologically limited research on the effects of weight management programs on pediatric self-esteem and mechanisms of change responsible for self-esteem change. Improvements in self-esteem over time were observed for several domains of self-esteem. However, behavioral intervention did not lead to significantly greater improvements in self-esteem relative to children in the no-treatment control group. These findings are similar to findings from three other studies that have found no change in self-esteem due to treatment for pediatric participants in a weight management program (Rohrbacher, 1973; Thomas-Dobersen et al., 1993; Huang, Norman, Zabinski, Calfas, & Patrick, 2007). However, a number of other studies have reported positive improvements in self-esteem for participants in pediatric weight management programs (Stoner & Fiorillo, 1976; Foster et al., 1985; Mellin et al., 1987; Wadden et al., 1990; Sherman et al., 1992; Sahota et al., 2001; Jelalian & Mehlenbeck, 2002; Braet et al., 2003; Brehm et al., 2003; Walker et al., 2003; Barton et al., 2004; Braet et al., 2004 [2-year follow-up: Braet, 2006]; Edwards et al., 2005; Gately et al., 2005; Sacher et al., 2005; Savoye et al., 2005; Jelalian et al., 2006). There are a number of methodological and sample considerations that may account for the difference between these studies and the current study.

A major difference between this study and much of the previous research in this area is the use of a control group. Of the studies that reported no change in self-esteem due to treatment, Thomas-Dobersen and colleagues' (1993) and Huang and colleagues' (2007) studies included control groups and were able to determine that self-esteem did not change due to treatment, despite changes in self-esteem that occurred over time. However, many of the studies that have

reported positive improvement in self-esteem over time did not utilize a control group for comparison (Wadden et al., 1990; Sherman et al., 1992; Sahota et al., 2001; Jelalian & Mehlenbeck, 2002; Brehm et al., 2003; Braet et al., 2004; Edwards et al., 2005; Sacher et al., 2005; Savoye et al., 2005; Jelalian et al., 2006). This makes it difficult to determine if the positive improvements seen in those studies were due to an effect of time or the intervention, particularly since we found change in self-esteem over time in 3 of the 4 domains of self-esteem examined. Other studies have utilized a control group, and have reported positive improvements in self-esteem, including social, physical, athletic, and/or global domains of self-esteem, from pre- to post-treatment with higher improvements in the treatment group relative to the control group (Stoner & Fiorillo, 1976; Foster et al., 1985; Mellin et al, 1987; Braet et al., 2003; Walker et al., 2003; Gately et al., 2005). However, the type of control groups utilized in these studies included both *overweight* and/or *non-overweight children*, who may not have been actively seeking treatment at the time.

In contrast, our control group was a group of treatment-seeking overweight children asked to delay treatment for several months, instead of a control group of individuals selected from a sample of convenience in the community who were not seeking treatment (Foster et al., 1985; Gately et al., 2005). Furthermore, all families in this program self-initiated contact with the study investigators to increase healthy lifestyle behaviors, and were not a sample of individuals referred for treatment by a healthcare provider that may have never directly indicated a desire for treatment (Cameron, 1999). Even though parents were likely largely responsible for initiating contact and participation in the study, all participating family members took part in screenings, assessments, and consented in person to the program. General treatment literature has indicated that the largest gains in treatment tend to occur early in treatment, and it is possible that the mere

act of initiating participation in treatment may have resulted in behavioral or emotional changes in participants and their families in all conditions. Indeed, application of the Transtheoretical Model (Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992; Prochaska & Velicer, 1997) with our study would indicate that all participants, even individuals in the control group, were in the 'Action' stage. According to the model, the Action stage is where change occurs and perhaps even the participants in our control group were ready, or possibly had already started, to make changes in their lifestyle habits. The fact that all participating family members (including participants in the control group) had contact with the investigators and agreed to the extensive terms of participation to be included in this intervention is evidence of some level of readiness for change. Therefore, the use of a treatment-seeking control group in this study had significant implications in the way in which we interpreted our data and makes this study distinctly different than other weight management programs that have examined pediatric self-esteem. However, it is only one of a number of factors to consider when interpreting our results.

Another factor that may have impacted our ability to detect more significant changes over time was that in this study, participants' baseline self-esteem scores were similar to the published normative data (Harter, 1985). The average norms for social, athletic, physical, and global self-esteem for girls and boys based on the Harter manual (1985) is presented in Table 4-1. Although we might have expected the self-esteem of the overweight children in this study to be lower than that of published norms, this was not the case. Furthermore, baseline self-esteem scores for our participants were closer to the *post*-treatment scores (rather than pre-treatment) for other weight management programs that have utilized the same self-esteem measure and published raw self-

esteem data (Brehm et al., 2003; Braet et al., 2004). Thus, it is possible that overweight children in this study had less room for improvement in self-esteem.

Given that many of the participants presented with relatively high or normative levels of self-esteem at baseline, follow-up analyses were utilized to examine the effects of the intervention on only participants who exhibited self-esteem ratings below the mean gender-specific normative level presented by Harter (1985). These analyses were conducted against our sample separately for girls and boys, due to the gender-specific nature of the normative data. The number of girls that presented with self-esteem below normative values and the number of girls that experienced improvements, no change, and decreases in self-esteem across time are presented in Table 4-2. Findings from analyses examining only girls that presented with lower than normative self-esteem at baseline paralleled the findings from the larger sample of girls in the study. Girls in this subsample experienced significant improvements in physical and global self-esteem over time, but again; the change was not due to the intervention as girls in all conditions experienced the improvements.

The number of boys that presented with self-esteem below normative values and the number of boys that experienced improvements, no change, and decreases in self-esteem across time are presented in Table 4-3. Findings were similar to the larger study such that boys that presented with lower than normative baseline self-esteem scores in this sample experienced a significant increase in social self-esteem over time (F [1, 12] = 11.176, p = 0.006), but improvements were not due to the intervention.

Another reason for the lack of significant intervention effects on domains of self-esteem (social, athletic, physical, global) may be the brief period of assessment. It is possible that changes in self-esteem for the intervention participants compared to the control group may not

become apparent until after more extensive opportunities for extended use and benefit from the self-esteem enhancing techniques taught in intervention. Furthermore, the intervention period may not have provided sufficient time for the effect of weight status or behavioral change to impact self-esteem. This would be consistent with a previous study which indicated that children in the intervention continued to experience gains in self-esteem during the follow-up period after the end of the active intervention compared to the control group (Mellin et al., 1987). However, another study reported improvements in the control group as well (Foster, Wadden, & Brownell, 1985). Follow-up data are not available at the time of this study, but examination of the follow-up data on self-esteem for the participants in this study will be critical to evaluate changes in self-esteem, or if self-esteem remains largely preserved at current rates.

Finally, examination of normative developmental changes in self-esteem are worthy of consideration. Indeed, results indicated that the behavioral interventions did not lead to greater changes in self-esteem than the control group, but a change across time was seen in global, social, and athletic self-esteem. This finding would seem to be contradictory to research indicating that normative self-esteem development includes a drop in self-esteem around adolescence, or more specifically around the onset of puberty (Harter, 1999; Strauss, 2000). This finding is also contradictory to the concerns of some researchers that weight management programs may have adverse psychosocial effects for pediatric participants (O'Dea, 2005). However, it is also possible that social desirability effects were present, due to the self-report nature of self-esteem assessment. Thus, improvements in self-esteem could be inflated across conditions due to reporting bias.

Self-Esteem in the Rural Population

Most of the previous research with rural populations suggests that rural children have *lower self-esteem* than their metropolitan peers (Roscigno & Crowley, 2001). However, our study found that self-esteem ratings for the participants were largely equivalent to normative means for self-esteem. Our data also are consistent with a recently published study of rural children who presented with self-esteem rates similar to normative means in the general population (Yang & Fetsch, 2007).

One reason that the participants' self-esteem ratings in this study were similar to normative levels may be that previous research has primarily focused on individuals in these communities who are "at-risk" due to factors such as limited financial resources, minority ethnicity status, or a lower educational attainment. However, our study (and Yang and Fetsch's study [2007]) was not comprised primarily of an economically, ethnically, or educationally "at-risk" sample. The similarity of our sample to national and statewide norms based on the 2000 U.S. Census Data (U.S. Census Bureau, 2007) supports that our sample is not "at-risk" because national means are higher than those of economically, ethnically, and educationally "at-risk" samples. For ethnicity, the U.S. sample was 80% Caucasian, while our final dataset consisted of 79% Caucasian children. The U.S. median household income in 2004 was estimated at $44,334, and the median income range for participants in this study was $40,000 - $59,999. However, it should be noted that the modal income range for participants in this study was the $20,000 – $39,999 range. National estimates of persons over the age of 25 years with a bachelor's degree or higher was 24.4%, and the frequency of parents with a bachelor's degree or higher in our sample was 21%. Estimates for the state of Florida were also similar to that of our sample and the national averages.

These findings have significant implications given that overweight individuals in rural communities are at increased risk for overweight status, and may be susceptible to greater medical complications of overweight due to limited healthcare resources. Therefore, it is important to establish whether or not they are also at risk for greater psychosocial complications, such as poorer self-esteem compared to non-overweight children. However, given the self-selection method of participation in our study, it should be noted that the families who participated in our program may have had more resources to devote the necessary time and effort to participate, and therefore may not be fully representative of the rural communities in which they live. These findings suggest that it may be important to consider demographic characteristics rather than viewing all children and families from rural areas as homogeneous.

Mechanisms of Self-Esteem Change

Impact of Weight Status Change

Although we expected to see significant associations between weight status change and self-esteem change, this was not the case. Perhaps the degree of weight change in our participants (*Mean* z-score change = 0.0417, *SD* = 0.11), was not large enough during the short time frame of assessment to be meaningful to the pediatric participants' self-esteem. Other programs have reported significant associations between weight status change and change in self-esteem (Cameron, 1999; Walker et al., 2003; Jelalian et al., 2006). Alternatively, three studies found no statistically significant relationship between self-esteem change and weight status change (Rohrbacher, 1973; Stoner & Fiorillio, 1976; Wadden et al., 1990). Moreover, three additional studies reported significant improvements in self-esteem, despite lack of significant weight loss, although the relationship was not examined statistically (Sherman, Alexander, Gomez, Kim, & Marole, 1992; Sahota et al., 2001; Brehm, Rourke, Cassell, & Sethurman, 2003). A common theme among the programs that did not find significant

association between weight status change and self-esteem and our program was that self-esteem was targeted directly during the intervention in each of these studies. Perhaps targeting self-esteem directly in the context of these programs reduces the impact of weight change on self-esteem. It will be interesting to examine the impact of weight status change on self-esteem change at 6-month follow-up in order to determine if the impact is significant, particularly if larger improvements in weight status are experienced by the participants.

Impact of Goal Attainment and Self-Efficacy for Healthy Lifestyle Behaviors

The lack of significant associations between goal attainment and self-esteem are especially noteworthy as the program attempted to de-emphasize the importance of weight and increase the emphasis on behavior, behavioral goals, and confidence in achieving these goals. Many other programs have also attempted to de-emphasize weight status change, and focus on behaviors as well, but this is the first study to examine the effects of behavioral goal attainment and self-efficacy for healthy behaviors on pediatric self-esteem. However, despite the program emphasis on behavior, attainment of goals and self-efficacy were not associated with self-esteem. It is possible that the positive reinforcement for children in the BPI condition was not enough to lead to self-esteem change, given that these children did not participate in the group directly and have interaction with the group leaders. It should be noted that the method of assessing goal attainment and the self-efficacy questionnaire used in this study were created specifically for this study, and therefore the reliability and validity of these measures are unknown. Clearly more research is needed to examine what factors are meaningful to children who participate in these programs and impact self-esteem.

Impact of Weight-Specific Locus of Control

Research in adult and pediatric samples would have supported associations between weight-specific locus of control and self-esteem change, given that previous research has reported such associations, particularly in the adult literature. Furthermore, adult literature has also indicated that internal locus of control may be associated with more positive psychosocial outcomes, such as more adaptive coping (Hilton, 1989). It is noteworthy that our findings seem to contrast with those of Cameron (1999), who had suggested that self-esteem deficits could occur because of increased internalization of locus of control due to weight management program participation. Our participants not only did not experience statistically significant changes in locus of control, but changes were not associated with self-esteem changes in boys or girls. However, it should be noted that the WLOC measure in this study had poor internal consistency, and thus findings regarding weight-specific locus of control with this population should be interpreted with caution. Finally, the locus of control measure utilized was created specifically for this study, and thus has not been validated previously; therefore the reliability and validity of the data obtained from this measure is unknown.

Impact of Peer Victimization

Peer victimization ratings at baseline and final assessment in this study were associated with poorer self-esteem scores for the entire sample. These findings are consistent with past research that has repeatedly indicated that higher levels of peer victimization are associated with poorer self-esteem in overweight youth (Young-Hyman et al., 2003; Hayden-Wade et al., 2005; Sweeting, Wright, & Minnis, 2005; Stern et al., 2006; Thompson et al., 2007). These findings further highlight the potentially deleterious impact that negative peer interactions can have on psychosocial functioning and self-esteem.

In this study, no significant change in peer victimization over time or due to the treatment was observed. This was not surprising, given that the treatment did not aim to change peer victimization experiences that occurred outside of the group setting. Our findings in this area also may have been hampered by measurement emphasis on peer victimization and not social support. Although the program did aim to enhance participants' ability to cope with these experiences, the measure used in this study did not capture changes in coping with peer victimization or changes in positive peer interactions or support, both of which have been associated with self-esteem in overweight children (Strauss & Pollack, 2003; Dishman et al., 2006). Furthermore, social support in rural youth typically has included extended family and community members, although other research has indicated that these support systems have changed in recent years (MacTavish & Salamon, 2003). Therefore, social support could have been an especially significant influence on self-esteem in our participants, but unfortunately, it was not assessed.

However, for participants who did experience reductions in peer victimization ratings, these reductions *were* associated with improvements in social self-esteem and physical self-esteem. This is not surprising as this teasing from peers would affect a child's perception of worth in social interactions, and thus impact social self-esteem. Furthermore, previous research has indicated that overweight children experience teasing that is more focused on appearance than other characteristics (Hayden-Wade et al., 2005; Thompson et al., 2007). Rationale for why these children felt that they were experiencing less peer victimization would have been an interesting concept to explore, but unfortunately was not assessed in this study. These findings support the need for continued assessment of peer interactions and the emotional consequences of negative interactions on child self-esteem, particularly for overweight children.

Impact of Body Dissatisfaction

Moderator analyses were conducted in this study to assess for gender differences based on past research that has demonstrated differences in boys' and girls' self-esteem (Harter, 1985). However, the only gender difference found in this study was the impact of reductions in body dissatisfaction on improvement in physical self-esteem for girls. Follow-up analysis indicated that this variable accounted for 13% of the variance in girls' physical self-esteem change. There was no significant association for boys. We also found that participants in the BFI and BPI conditions experienced significant reductions in body dissatisfaction ratings over time, but were not significantly different that the WLC condition. One possibility for this finding may be similar to the reasons hypothesized for changes in participants' self-esteem regarding readiness for change.

Findings regarding the association of body satisfaction to self-esteem change are supported by previous studies. Past research has demonstrated that girls' self esteem is more affected by overweight status and thus girls may experience more change in self-esteem when body satisfaction is improved compared to boys (Mendelson & White, 1985; Pesa et al., 2000; Israel & Ivanova, 2002). Girls may be more vulnerable to the effects of body dissatisfaction due to larger societal and media messages that emphasize appearance as a significant contributor to female perceptions of self-worth. Research has supported that girls of increasingly younger ages are influenced by these messages, also known as the "thin ideal" (Tiggemann, 2001; Sands & Wardle, 2003). Although this study did not examine the influence of the media or cultural stereotypes on our population, the fact that only girls' physical and global self-esteem were below normative data may serve to support that overweight status was negatively influential on these domains of girls' self-esteem, perhaps due to cultural and media stereotypes. Furthermore, other researchers have suggested that girls in rural communities also experience lower rates of

physical self-esteem and that these lower rates may be reflective of the media's emphasis on sexualization and appearance of girls and women (Yang & Fetsch, 2007).

Previous research has suggested that the impact of weight status change on self-esteem may be accounted for by changes in body dissatisfaction (Lowry et al., 2007). However, examination of the mediating effects of body dissatisfaction change on the association between weight status change and physical self-esteem improvement in this sample did not support body dissatisfaction as a mediator. Furthermore, weight status and body dissatisfaction were not significantly associated with each other at any assessment point, and interestingly, weight status at baseline was not predictive of body dissatisfaction for the girls in the sample ($R^2 = 0.06$, F [1, 49] = 3.096, $p = 0.085$).

Although it may be natural to assume that weight status would be related to body dissatisfaction, current research indicates that girls' levels of body dissatisfaction may be independent of weight status (Davison & Birch, 2001). In other words, girls' perceptions of their bodies may not be based solely on the size of their bodies, but also may be due to their perception of their body size in comparison to 'role models' in the larger society, who have become increasingly thinner and less representative of the general population. Research supports this assertion such that girls who demonstrate body dissatisfaction rates that are not associated with their weight status tend to be more influenced by the media, societal pressure for thinness, and cultural stereotypes regarding the importance of body size on global self-worth. Although we did not assess the impact of the media on our sample, it is possible that these associations would apply to our female participants given the similarity in our findings regarding body dissatisfaction, self-esteem, and weight status. However, all participants in this study were overweight, which makes it more difficult to find significant associations with limited weight

status variability. Perhaps it was overweight status and not *degree* of overweight that was most influential on self-esteem.

Although body dissatisfaction change was associated with physical self-esteem change in girls, it only comprised a small portion of the total variance for change. Furthermore, other impact variables examined in this study (weight status change, goal attainment, self-efficacy, or locus of control) were not significantly associated with girls' physical self-esteem change. It is possible that self-esteem change was also impacted by changes in social support or changes in the home environment such as more supportive parenting techniques or more attentive parenting resulting from parents who initiated participation in a weight management program, even if they were not currently attending the program at that time (which may have been the case for the WLC condition). However, these variables were not assessed by this study and their impact on self-esteem is purely theoretical.

Strengths of this Study

This study includes several unique components that address limitations in the literature examining the effects of weight management programs on pediatric self-esteem. First, to our knowledge, this is the only study to statistically examine the impact of variables on self-esteem change that have previously only been speculated to impact self-esteem in overweight children (including goal attainment, self-efficacy, and locus of control). Second, we believe this is the only research to examine the moderating impact of gender on self-esteem change in children participating in a family-based weight management program. Third, another major strength is that this study compared intervention changes to a waitlist control group comprised of overweight children. Without this control group, it is possible that we could have reached a different conclusion as to the impact of the intervention on self-esteem change. Fourth, we used statistical techniques to appropriately assess for intervention differences by treatment condition

and gender, and did not merely conduct analyses on the active treatment conditions or boys and girls separately. These analyses allowed us to use statistical analyses to assess for the interaction of variables of interest and determine if those differences were significant and meaningful, instead of only noting that they were different, as has been presented in other studies with similar findings (Huang et al., 2007). Fifth, a unique aspect of this study is that it was conducted exclusively with children from rural settings. Historically, there has been limited research examining psychosocial functioning of children in rural settings. Children living in rural communities are at increased risk for overweight in childhood and obesity in adulthood (McMurray et al., 1999) yet may have fewer healthcare resources available to them to address the complications associated with overweight. Research examining the psychosocial effects of health promotion programs in these communities fills an important need in the current treatment outcome literature.

Considerations and Limitations

Standard significance test values ($p < 0.05$) were used to assess for significance for the primary aims of this study (self esteem change due to treatment and the impact of weight status change on self-esteem change). However, a conservative p value ($p < .01$) was adopted for the secondary aims of this study. Although we feel that this more conservative approach was necessary, in order to find a balance between prevention of Type I and Type II errors, it nonetheless affected our interpretation of the data.

Several limitations may impact the interpretation of the current findings. First, the participants in this study largely did not experience change in self-esteem which limited the variance in self-esteem and thus made it more difficult to find an association between predictor variables and self-esteem change. Second, several components of the study limited the generalizability of our findings including a) that our sample consisted primarily of Caucasian

participants and b) that we utilized a specific treatment seeking population and rural setting. Third, this study included a limited time frame of assessment with lack of follow-up data. Fourth, measurement issues also may have impacted our findings. Several of the questionnaires were created specifically for this study and had not been previously examined to determine and ensure that they had adequate psychometric properties and would therefore be valid measurements of the intended constructs in this study. In fact, the WLOC had poor internal consistency. Furthermore, the peer victimization scale did not measure social support and therefore neglected to assess the potential buffering impact of positive social support or increases in social support that may have occurred due to participation in a program of similar peers. Moreover, although the Harter SPPC has been validated for children as young as eight years of age, some participants had difficulty understanding some of the concepts and how to complete the measure, even with assistance from an examiner.

Implications for Clinical Intervention and Research

Researchers have cautioned interventionists to be mindful when conducting this weight management program for children to ensure that they "do no harm" (O'Dea, 2005). There also has been debate at to whether pediatric weight management interventions may negatively impact self-esteem (Golan et al., 1998). Although this study indicates that self-esteem was not improved as a result of the treatment, it also indicates that participant self-esteem was not adversely affected. The importance of these findings are further amplified as our participants presented with self-esteem rates similar to normative, non-overweight samples, unlike the findings of other studies that have reported self-esteem rates for overweight children that are lower than their non-overweight peers. If lower self-esteem is more common for overweight children, then we might have expected to see a 'regression to the mean.' Instead, the children in our study were able to preserve their self-esteem. These findings do not remove the need for clinicians to be sensitive

when conducting this type of research, but they do suggest that carefully designed programs that are sensitive to self-esteem and body image, and respectful of participants do not result in adverse psychosocial effects for participants. We recommend that future interventionists continue to be mindful of these potential effects and to assess for positive, negative, and lack of changes in participants' psychosocial functioning during treatment.

This study specifically targeted self-esteem during the intervention. Although we cannot assess the impact that this component of the treatment may have provided to preserving our population's relatively high baseline self-esteem scores (i.e., we did not have a comparison intervention that did not target self-esteem), other research has suggested that targeting self-esteem and the use of a group format during the intervention is associated with more positive self-esteem outcomes (Lowry et al., 2007), and previous studies that found no association between weight status change and self-esteem change reported targeting self-esteem in the context of this group format during the intervention (Rohrbacher, 1973; Sherman et al., 1992; Jelalian et al., 2006). Participation in a group intervention of similar peers may provide an opportunity for social bonding, perceived support, group activities, and group problem solving. Perhaps the key to de-emphasizing the importance of weight status is not emphasizing behavioral goals, but rather promoting positive peer contact and support and providing positive self-esteem building exercises. Therefore, we recommend that future interventions address self-esteem directly and promote positive peer interactions during the intervention. Certainly further research on how to best address self-esteem change is needed. Given the associations found in this study between peer victimization and body satisfaction and self-esteem, we also recommend that clinicians provide children and families with coping skills to help them manage negative emotions or negative messages from their environment with non-food related techniques.

A number of implications for future research are suggested by these results. Additional research with rural populations will be necessary to better understand psychosocial complications for overweight status in this population, and the effects of weight management programs on psychosocial functioning. Given the importance of self-esteem on child functioning and possible long term effects of child self-esteem (Harter, 1999), we recommend that future research programs continue to examine self-esteem change and the variables that may lead to change in the context of weight management programs, particularly the impact of peer interactions and positive social support. Although this study found limited gender differences in self-esteem, future research should continue to examine self-esteem by gender given the strong gender differences in self-esteem found in other studies (Harter, 1985). Finally, future studies should include a no-treatment and/or waitlist control group of overweight and non-overweight youth for comparison so as to better understand normative changes in self-esteem.

Summary

In summary, we found that the intervention did not impact any domain of self-esteem, although a significant improvement in self-esteem across time was observed for social, athletic, and global self-esteem. Potential explanations for the results include the presence of a control group to assess for time effects and relatively high baseline ratings of self-esteem in our participants. Gender differences were observed in self-esteem changes such that change in girls' physical self-esteem was predicted by improvements in body satisfaction. Reduction in peer victimization was associated with improvements in social and physical self-esteem. Weight status change, goal attainment, self-efficacy for healthy lifestyle behaviors, and locus of control did not appear to be associated with self-esteem in this study, although measurement limitations may have complicated these findings. These findings are significant as this study indicates that participation in a weight management program does *not* adversely affect pediatric self-esteem.

Table 4-1. Harter normative mean scores and current study baseline mean scores for self-esteem by gender.

	Social	**Athletic**	**Physical**	**Global**
Harter norms				
Girls	2.87	2.61	2.68	2.98
Boys	2.94	3.08	2.97	3.07
Current study				
Girls	2.87	2.43	1.98	2.77
Boys	2.69	2.70	2.52	2.95

Note. Mean scores are averaged from mean scores provided by grade in the manual for the SPPC (Harter, 1985).

Table 4-2. Frequency of girls (total N = 50) with self-esteem ratings below normative values and the number of girls that experienced improvements, no change, and decreases in self-esteem across time.

	Social*	**Athletic**	**Physical**	**Global**
Baseline value below normative mean	25	22	40	27
Improvement	17	14	27	19
No change	2	6	6	4
Decrease	6	2	7	4

Note. Pre-treatment social self-esteem total N = 49 because score could not be calculated for one participant due to missing data.

Table 4-3. Frequency of boys (total N = 31) with self-esteem ratings below normative values and the number of boys that experienced improvements, no change, and decreases in self-esteem across time.

	Social	**Athletic**	**Physical**	**Global**
Baseline value below normative mean	15	21	22	19
Improvement	11	14	12	12
No change	3	4	2	3
Decrease	1	3	8	4

APPENDIX A
DEMOGRAPHIC QUESTIONNAIRE

Information about your Family

Child's Name: _____

Child's gender (please circle): **Boy / Girl**

Child's race (please circle)

Caucasian African American Hispanic Asian Bi-racial Other

Child's age: _____ Child's Date of Birth: ___/___/___ Child's grade in school: _____

Your Name: _____

Your Gender (please circle): **Male / Female**

Your race (please circle):

Caucasian African American Hispanic Asian Bi-racial Other

You are the child's (please check one):

Mother	_____	Father	_____
Step-Mother	_____	Step-Father	_____
Grandparent	_____	Other Legal Guardian	_____

Your (parent/guardian's) age: _____

Please indicate your current marital status (please check one):

Married _____ Single _____

Including yourself, how many adults live in your home: _____

Including your child, how many children live in your home: _____

What is the highest level (grade) of school you completed?

Middle school	_____	Some college	_____
Some high school	_____	Graduated college	_____
Graduated high school	_____	Post-Graduate school	_____

What is your current occupation?

_____

Estimated Family Income per Year (please check one).

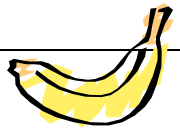
Below $9,999	_____	$40,000 - $59,999	_____
$10,000 - $19,999	_____	$60,000 - $79,000	_____
$20,000 - $39,999	_____	Over $80,000	_____

APPENDIX B
MODIFIED WEIGHT LOCUS OF CONTROL

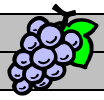
Instructions: We want to learn more about how you feel about changing when you eat and drink. Read each sentence carefully. Place a check below 1 of the 4 boxes on the right side of the page that shows how true each state is for you.

		Really *Not True* for Me	**Sort of *Not True* for Me**	**Sort of *True* for Me**	**Really *True* for Me**
1.	Whether I gain or lose weight is up to me.				
2.	Being the right weight is mostly due to good luck.				
3.	No matter what I try to do to lose weight, it doesn't change anything.				
4.	If I eat right and get enough exercise, I can control my weight.				

APPENDIX C
DAILY HABIT LOG



Time	Food or Drink	Amount	Calories	R-Y-G
Breakfast				
		Breakfast Total:		
Morning Snacks				
		Snack Total:		
Lunch				
		Lunch Total:		
Afternoon Snacks				



		Snack Total:		
Time	**Food or Drink**	**Amount**	**Calories**	**R-Y-G**
Dinner				
		Dinner Total:		
Evening Snacks				
		Snack Total:		
Daily Total Red Foods				
Daily Total Calories				
Daily Total of Fruits & Vegetables				
Total Daily Steps				

OTHER "OFF-FEET" ACTIVITIES

Activity	How Many Minutes

Bicycling	
Swimming	
Skate boarding or Roller Blading	
Other: _____	
Other: _____	
TOTAL DAILY MINUTES	_____

APPENDIX D
GROUP LEADER CHECK IN SHEET

Participant	Session					Food Intake Info					Steps					TV				
Week	Att	# Days Complete Logs	Base Cal	Avg Cal	Past Wks Red Goal	# Days Met Red Goal	New Red Goal	Avg Red Foods	Past Wks F&V Goal	# Days Met F&V Goal	New F&V Goal	Base Steps	Past Wks Goal	Avg Steps	# Days Met Goal	New Step Goal	Base Total Hrs. TV	Past Wks TV Goal	Weekly Total Hrs. TV	New TV Goal
Week #1 01/09/07																				
Week #2 01/16/07																				
Week #3 01/23/07																				
Week #4 01/30/07																				
Week #5 02/06/07																				
Week #6 02/13/07																				
Week #7 02/20/07																				
Week #8 02/27/07																				
Week #9 03/06/07																				
Week #10 03/13/07																				
Week #11 03/20/07																				
Week #12 03/27/07																				
Notes																				

APPENDIX E
SELF-EFFICACY QUESTIONNAIRE

Instructions: We want to learn more about how you feel about changing when you eat and drink. Read each sentence carefully. Place a check below 1 of the 4 boxes on the right side of the page that shows how true each state is for you.

		Really *Not True* for Me	**Sort of *Not True* for Me**	**Sort of *True* for Me**	**Really *True* for Me**
1.	I feel confident that I can eat healthy foods more often.				
2.	I feel confident that I can eat more fruits and vegetables more often.				
3.	I feel confident in that I can change habits to eat fewer junk foods.				
4.	I feel confident that I can my habits to be more physically active. This means running, playing outside, or just getting up and moving around more often.				

APPENDIX F
SCHWARTZ PEER VICTIMIZATION SCALE

For each question, please circle the best answer.

1. How often do other kids tease or make fun of you?

    A. Never

    B. Sometimes

    C. Often

    D. Almost every day

2. How often do other kids bully or pick on you?

    A. Never

    B. Sometimes

    C. Often

    D. Almost every day

3. How often do other kids hit or push you?

    A. Never

    B. Sometimes

    C. Often

    D. Almost every day

4. How often do other kids gossip or say mean things about you?

    A. Never

    B. Sometimes

    C. Often

    D. Almost every day

5. How often do other kids hurt your feelings by excluding you?

A. Never

B. Sometimes

C. Often

D. Almost every day

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