PREDICTORS OF ATTENDANCE IN A LONGITUDINAL RURAL INTERVENTION PROGRAM FOR OVERWEIGHT AND OBESE YOUTH

By

PAGE KLITZMAN

A THESIS PRESENTED TO THE GRADUATE SCHOOL OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

UNIVERSITY OF FLORIDA

2012

ACKNOWLEDGMENTS

I wish to thank my mentor, Dr. David Janicke, for his guidance and support through my graduate career thus far. I also thank members of my supervisory committee, as well as my colleagues in the University of Florida Pediatric Psychology Lab for their continuous help. I want to thank my family and friends for their unconditional love and encouragement.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

ANOVA	analysis of variance
ANCOVA	analysis of covariance
BMI	body mass index
BMI-z	body mass index – z-score
COHB	child opinions on healthy behaviors
E-FLIP	Extension Family Lifestyle Intervention Project
IFAS	Institute of Food and Agricultural Sciences
IRB	institutional review board
M	mean
η_p^2	partial eta squared
PACE	Patient-centered Assessment and Counseling for Exercise + Nutrition
PE	physical education
POHB	parent opinions on healthy behaviors
R^2	R-squared
SD	standard deviation
QOL	quality of life

Abstract of Thesis Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Master of Science

PREDICTORS OF ATTENDANCE IN A LONGITUDINAL RURAL INTERVENTION PROGRAM FOR OVERWEIGHT AND OBESE YOUTH

By

Page Klitzman

May 2012

Chair: David Janicke
Major: Psychology

Multiple efforts have been developed to address the pediatric obesity epidemic in the U.S., one of the most promising being behavioral family interventions. Higher attendance has been found to be related to a variety of positive outcomes, though many programs report experiencing less than optimal session attendance. There is little research on predictors of attendance in these programs, especially in effectiveness studies. The purpose of the current study is to determine variables that predict attendance in a pediatric family-based weight management program. Potential predictors examined in this study include demographic factors, child and parent weight status, distance from families' homes to the treatment site, child and parent motivation to develop healthier habits, as well as child and parent reasons for joining the program. Participants were 124 children, ages 8-12, and their parents, enrolled in a behavioral family weight management intervention. Participants' height and weight was collected, and questionnaires were completed. Average attendance was 7.63 of the 12 core sessions. Demographics and weight status were not significantly related to attendance. Distance to treatment site was inversely related to attendance. There was an inverse association between children's motivation and attendance. Parents who listed their weight loss as one of their top

three reasons for joining the program attended more sessions than those that did not list this as one of their top reasons for joining. The current study provides information that can inform future intervention and retention efforts. Given that distance is a barrier to some families, greater efforts to develop Internet and telehealth interventions could be beneficial. Moreover, it may be important for these programs to address parents' desires to lose weight, as well as emphasize other benefits to the programs besides weight loss (e.g., fitness, health). Future directions should focus on other predictors of attendance, including individual families' barriers to attendance, as well as children's psychosocial functioning, family functioning, and parent stress.

CHAPTER 1
INTRODUCTION

Childhood Overweight and Obesity

Prevalence

Pediatric overweight and obesity have become primary public health issues in the United States as their rates have climbed dramatically in recent years. According to a recent study, 31.8% of youth age 2-19 in the U.S. are overweight, which is defined as a child's body mass index (BMI) at or above the 85th percentile for their age and gender, while 16.9% of these youth are obese, with a BMI at or above the 95th percentile for their age and gender (Ogden, Carroll, Kit, & Flegal, 2012). More recent generations are becoming obese at an earlier age and are staying obese for longer, than previous generations (Lee et al., 2010).

Health Risks

It is important to note that overweight and obese youth are at greater risk for medical comorbidities and have higher mortality rates than people that do not become overweight and obese until adulthood (Acosta, Manubay, & Levin, 2008; Must & Strauss, 1999). Compared to youth of normal weight, overweight youth are more at risk for metabolic syndrome, type 2 diabetes, and cardiovascular risk factors such as high cholesterol and high blood pressure (Freedman, Dietz, Srinivasan, & Berenson, 1999). In addition, this population often displays other medical comorbidities such as sleep apnea (Mallory, Fiser, & Jackson, 1989), asthma (Unger, Kreeger, & Christoffel, 1990), and musculoskeletal problems (Chan & Chen, 2009).

Psychosocial Risks

A big issue that has developed is the stigmatization of overweight and obesity, which often has a negative influence on psychosocial functioning. For example, in one study examining stigmatization, figures that had an overweight body shape were rated by 9-year-olds to have low

levels of health, healthy eating, and levels of fitness, as well as poor academic success and social functioning relative to the other figures displaying children with various other disabilities (Hill & Silver, 1995). This negative belief was also seen in middle school students, who rated overweight children as having fewer positive qualities (e.g., friendly, smart, happy, honest) and more negative qualities (e.g., lonely, lazy, unhappy, ugly, sloppy) (Greenleaf, Chambliss, Rhea, Martin, & Morrow, 2006). Greenleaf and colleagues (2006) also found that these middle school children were less likely to engage in social, academic, and recreational activities with their overweight peers than with their peers of normal weight. In addition, in an overweight and obese sample, those adolescents that were obese were teased more about their weight (Neumark-Sztainer et al., 2002). Stern et al. (2007) found that in a sample of treatment-seeking overweight adolescents, teasing was negatively associated with lower overall quality of life (QOL), and this relationship was partially mediated by self-esteem. Furthermore, aside from other variables, obese children reported significantly lower quality of life than their non-overweight peers (Hamzaid et al., 2011).

Moreover, in comparison to children who are of normal weight, children who are overweight or obese exhibit more overall emotional distress and fewer educational plans for their future (Mellin, Neumark-Sztainer, Story, Ireland, & Resnick, 2002). More specifically, Erermis et al. (2004) found that obese treatment-seeking adolescents displayed more symptoms of depression and low self-esteem than adolescents of normal weight. Both overweight boys and girls were more likely than their normal weight peers to display body dissatisfaction (Crow, Eisenberg, Story, & Neumark-Sztainer, 2006). More generally, health-related quality of life (HRQoL) was found to be inversely related to BMI in samples of obese children and adolescents (de Beer et al., 2007; Hughes, Farewell, Harris, & Reilly, 2007; Tsiros et al., 2009). Disordered

eating patterns are often seen in obese adolescents, and these are associated with weight-related teasing (Neumark-Sztainer et al., 2002). Isnard et al. (2003) found that obese adolescents are more likely to engage in binge eating. Overweight adolescents are also more likely to display more externalizing symptoms of poor psychosocial functioning, including more parent- and teacher-reported behavioral problems (Stradmeijer, Bosch, Koops, & Seidell, 2000).

Factors Contributing to Overweight and Obesity

A calorie is "a unit of energy supplied by food" (CDC, 2011a). Simply put, fat production occurs when the calories consumed from food and drink exceed the number of calories burned during normal activities throughout the day and while engaging in exercise. In other words, fat production is the result of energy intake exceeding energy expenditure, or being "in calorie excess" (CDC, 2011a). Such energy imbalance over a long period eventually leads to obesity. There are numerous factors that impact consumption, and therefore lead to this intake vs. expenditure imbalance.

Genetics

In children, genetic predisposition to physical and psychological conditions, when combined with environmental factors, can result in the acquisition of a condition. Obesity is no different, as certain individuals that have a genetic predisposition, coupled with an environment that promotes weight gain, can begin to see this phenotype express itself. In other words, the "obesogenic" environment, including energy intake and expenditure, determines how extreme individuals' weight status will become when one is genetically predisposed to obesity (Loos & Bouchard, 2003). Loos & Bouchard (2003) go on to divide these individuals into groups: those with genetic obesity, or obesity with a strong genetic component; those with a strong predisposition, or those who would be overweight outside of an "obesogenic" environment; those with a slight predisposition; and those who are genetically resistant. Scientists isolated an

obese (ob) gene first in mice and rats, followed by a replication in humans. This gene's expression often results in hereditary obesity as well as a higher likelihood of diabetes (Zhang et al., 1994). Zhang and colleagues (1994) suggest that this mutation may signal central nervous system receptors, which can affect food consumption and autonomic nervous system functioning.

Food types

As the amount of food consumed has a clear positive relationship to weight gain, so too does food type. Decades ago, scientists discovered that a diet high in fat, low in fiber and high in simple carbohydrates caused weight gain in two strains of mice, the C57BL/6J and A/J (Surwit, Kuhn, Cochrane, McCubbin, & Feinglos, 1988). In a sample of children, dietary energy density was positively associated with weight status, as well as total energy, energy from fat, and added sugar intake (Vernarelli, Mitchell, Hartman, & Rolls, 2011). Although this study did not prove a causal relationship, a significant association did provide important possibilities for positive changes. Moreover, intake of certain foods, such as fruits and vegetables, can help prevent obesity. A longitudinal study of middle-aged women found that those with the greatest increase in fruit and vegetable intake over the 12-year study were 24% less likely to become obese than participants who had the greatest decrease in intake (He et al., 2004). Consumption of sugar-sweetened beverages has also been shown to play a role in weight gain in adolescents (Ebbeling et al., 2006). Studies have suggested a strong enough relationship between diet and weight gain that the Centers for Disease Control and Prevention has listed specific diet-related tips for parents to help prevent childhood overweight and obesity. Specifically, they suggest increasing the consumption of fruits, vegetables, whole-grains, low-fat or non-fat dairy products and lean proteins, while reducing the consumption of sugary beverages as well as sugar and saturated fat (CDC; 2011b). There are factors specific to the current time that appear to contribute to the

obesity epidemic. More people are consuming commercially prepared meals more often in 1999-2000 than in 1987, and the reported number of consumption of these meals is associated with BMI (Kant & Graubard, 2004). Furthermore, when eating out, portion sizes have dramatically increased from 1957 to 1997 (Putnam & Allhouse, 1999).

Physical activity

According to the Centers for Disease Control and Prevention (2004), there are numerous benefits to physical activity. Most importantly for childhood overweight and obesity, physical activity helps to maintain or decrease weight by increasing expenditure to equal intake. Physical activity also helps to build strong bones and muscles, reduce the risk for cardiovascular disease and some cancers, and reduce the risk for type II diabetes and metabolic syndrome. For those children who already have type II diabetes, physical activity can aid in the control of blood glucose levels. Physical activity was found to have other psychosocial benefits as well, including reducing the risk for depression and maintaining cognitive skills later in life (CDC, 2004). Children in the United States are recommended to get a minimum of one hour of moderate intensity physical activity each day (Strong et al., 2005). One study found that the range of children who met the recommendations was between 2% of 12 to 15-year-old Caucasian females and 61% of non-overweight 6 to 11-year-old African Americans (Centers for Disease Control, NHANES 2003-2004). There are likely multiple factors that negatively influence the amount and intensity of physical activity in children and adolescents. One factor is that physical education classes in U. S. schools has decreased. In 1991, 42% of children engaged in daily PE classes, while this proportion decreased to 33% in 2009 (Centers for Disease Control and Prevention, 2010).

The reverse is also true, as negative effects have been seen as a result of increased sedentary activity. Specifically, a longitudinal study showed that girls age 7 to 11 who exceeded

the American Academy of Pediatrics TV viewing recommendations, which is 2 hours per day, had a higher likelihood of being overweight and having a higher body fat percentage at age 11 than girls who did not exceed 2 hours of TV per day. The girls who watched more than 2 hours per day also showed a larger BMI increase over the course of the study (Davison, Marshall, & Birch, 2006). Overall, it is important to realize that beyond the numerous physical and psychological advantages physical activity can have, it also aids in balancing the energy intake vs. expenditure equation and preventing obesity.

Risk factors

Like genetics, demographics and environmental factors have been found to be positively associated with childhood overweight and obesity. In terms of race and ethnicity, multiple studies have found that children and adolescents of racial and ethnic minority backgrounds are most likely to be overweight. Adolescent girls that identified as Hispanic or from another minority background were found to have a greater risk of being overweight than those not from a minority background (Patrick et al., 2004). In a sample of middle and high school students, results for males showed that Hispanics have the highest rates of overweight, followed by African-Americans, then Caucasians. For females, African-Americans were found to have the highest rates of overweight, followed by Hispanics, then Caucasians (Delva, O'Malley, & Johnston, 2006). Haas and colleagues (2003) found that in children 6- to 11-years-old, African-Americans and Hispanics had higher rates of overweight than Caucasians, while in adolescents 12- to 17-years-old, Pacific Islanders and Hispanics had higher rates of overweight than Caucasians. Multiple influences could explain these racial and ethnic differences in weight status, including culture, lifestyle, and beliefs (Haas et al., 2003). For example, with different beliefs about body image, Caucasians may favor a smaller weight status than African-Americans (Haas et al., 2003). That culture-specific lifestyle often influences energy intake and expenditure.

For example, Delva, O'Malley, and Johnston (2006) found that Caucasian adolescents engaged in the most vigorous exercise and watched the least amount of television.

Socioeconomic status has also been found to be related to overweight status in multiple studies. Adolescents of a low socioeconomic status are more likely to be overweight than adolescents from higher socioeconomic status groups (Delva, O'Malley, & Johnston, 2006). Furthermore, adolescents who did not have health insurance or who had public health insurance were more likely to be overweight than adolescents with private health insurance (Haas et al., 2003). One such explanation of this association is that families of a lower socioeconomic status may not be as able to obtain healthy foods, since many of those foods are more expensive (Ogden, Carroll, McDowell, Tabak, & Flegal, 2006). In addition, these families often have more pressing needs to attend to, such as work or acute illness, and do not have time to prepare healthy foods. Moreover, families of a lower socioeconomic status may not have access to as many modes of exercise as families of middle and high socioeconomic statuses (Ogden, Carroll, McDowell, Tabak, & Flegal, 2006). This association with lack of access to opportunities for exercise is supported by Delva, O'Malley, and Johnston (2006), who found that socioeconomic status was positively associated with vigorous exercise and negatively associated with amount of TV watched.

Children living in rural areas are also at greater risk for being overweight or obese than children living in urban areas (Lewis et al., 2006; Lutfiyya, Lipsky, Wisdom-Behounek, & Inpanbutr-Martinkus, 2007). In a sample of school-age children, 25% of children living in rural areas were overweight, while only 19% of those living in urban areas were overweight (Joens-Matre et al., 2008). Lutfiyya and colleagues (2006) also found that children living in rural areas were at higher risk for poverty, pointing to potential causes for obesity linked to socioeconomic

status, and that they often do not get as much physical activity as other children, contributing to their tendency to be overweight. Furthermore, rural areas, due to their remote location, may have more expensive and less varied health foods and produce, as well as fewer nutritional resources, making them more obesogenic environments than urban areas (Peters, 2006).

Behavioral Family Interventions

Effectiveness

Since childhood overweight and obesity has become an epidemic and is seen to have numerous negative health and psychosocial consequences, many efforts have been developed for prevention and treatment. Interventions that have received the most empirical support for improving weight status in children are behavioral family interventions. Epstein, Paluch, Roemmich, and Beecher (2007) found that, not only are behavioral interventions effective, but those that involve the family, specifically the parents and children, are the most successful. School-aged children participating in a behavioral treatment condition were more likely to see positive changes in weight status than children in a comparison treatment, which included education with goal-setting lessons, or a cognitive intervention (Herrera, Johnston, & Steele, 2004). For obese children age 7 to 9, participants in a behavioral family intervention lost 5% more weight than participants in routine counseling (Kalavainen, Korppi, & Nuutinen, 2007). Preschool-aged children in a behavioral family intervention showed a greater reduction in BMI z-score than children in an education-only pediatric counseling group (Stark et al., 2011). Of note, Goldfield and colleagues (2001) demonstrated that group behavioral family treatments are more cost-effective than combination group plus individual family behavioral treatments.

What are they?

These interventions typically work with the child and their parent(s) in an individual or group format to help improve both eating and physical activity behaviors to improve weight

status, fitness and quality of life. They also include a health educational component and hands on assistance using behavior strategies to help families adopt healthier eating and physical activity habits. Some of these behavioral strategies include self-monitoring, goal setting, gradual shaping, positive communication, contingency management, stimulus control through environmental modification, and modeling (Herrera, Johnston, & Steele, 2004). In behavioral family interventions, self-monitoring entails keeping a daily log of both diet and physical activity. For diet, this logging includes the preparation method and type of food consumed, as well as the serving size. Self-monitoring of physical activity includes keeping track of the frequency and duration of exercise (Herrera, Johnston, & Steele, 2004). From these logs, intervention leaders have baseline measurements for each individual, which are used to set weekly goals for behavior change with each parent and child (Wilfley, Vannucci, & White, 2010). These goals focus on multiple aspects of a healthy lifestyle, such as increasing intake of fruits and vegetables, reducing high-fat food intake, increasing the number of physical steps walked daily, and decreasing hours spent watching TV or playing video games. The interventions also work with families to meet these goals using stimulus control (i.e., controlling the home environment) which includes methods such as removing high-fat foods from the home and increasing the availability of fruits and vegetables in the home (Wilfley, Vannucci, & White, 2010). These interventions are tailored to each individual family, and intervention leaders troubleshoot to overcome unique family barriers to attend sessions and make healthy lifestyle changes. Contingency management is another key aspect of behavioral family interventions, as positive reinforcement is used to encourage healthy changes. Examples of positive reinforcement include physical rewards and verbal praise (Herrera, Johnston, & Steele, 2004). Behavioral family interventions work with both the parent and the child in an effort to encourage parents and other members of the family to

model healthy behavior changes (e.g., healthy diet and physical activity) for the child in the program (Herrera, Johnston, & Steele, 2004).

Attendance

Attendance is extremely important with many treatment programs. This is scientifically supported, as attendance has been found to predict treatment success in multiple settings. For example, in a 15-week behavioral weight management program for obese men, attendance and weight loss were positively related to one another (Jeffery et al., 1984). Furthermore, in a sample of 9-13 year-old children with anxiety disorders enrolled in cognitive behavioral therapy, there was a significant association between combined mother and father attendance and lower externalizing behaviors (Podell & Kendall, 2011). Combined parent attendance was also associated with parent engagement (consisting of involvement, therapeutic relationship, and mastery of skill), suggesting that higher attendance is related to greater participation (Podell & Kendall, 2011).

Relevant to the current study, the existing literature supports a positive relationship between higher attendance and treatment success, or a decrease in weight, in behavioral family interventions (Kalarchain et al., 2009; Jelalian et al., 2008; Hunter, Steele, & Steele, 2008; Janicke et al., 2008). There could be multiple explanations for this relationship. First, these families do not get the education on healthy diet and physical activity, and therefore they may not know how to be healthier and manage their weight. Second, they do not have as many opportunities to work with intervention leaders to set goals to make healthy changes. Third, these families do not have the consistent support from intervention leaders and from other families to maintain changes. Fourth, they are not held accountable for the choices they make as regularly as those families that have better attendance. If they are not getting these assets, they are much less likely to make positive changes towards a healthier lifestyle.

Attendance rates

Unfortunately, mean participant attendance at behavioral family interventions was less than optimal. Past behavioral family weight management programs have reported that families attend an average of 40-68% of sessions (Williams et al., 2010; Janicke et al., 2011; Kalarchain et al., 2009; Janicke et al., 2008). Other behavioral family weight management programs found that 18-55% of families did not complete the program (Jelalian et al., 2008; Levine, Ringham, Kalarchian, Wisniewski, & Marcus, 2001; Zeller et al., 2004).

Barriers to attendance

Even though attendance was shown to significantly predict treatment outcome, many families face barriers to attendance. One of these barriers includes the time it takes both for families to attend groups and to complete the activities the treatment asks of them. Attending a treatment session is often a whole evening activity. Families are often trying to balance several activities simultaneously (e.g., other children's activities, parent's jobs, the participating children's homework). These difficulties, on top of the fact that group interventions do not have as much flexibility with scheduling as individual therapies, make attendance at these family interventions demanding. These programs also encourage families to eat healthier, which often includes preparing meals at home rather than eating out at restaurants, and to increase their physical activity habits. Both of these changes are inherently time consuming themselves. Another barrier to attendance is the distance these families must travel to get to the treatment site. Distance was identified as the most significant barrier in a past study examining barriers to veterans pursuing healthcare in rural areas (Buzza et al., 2011), suggesting that the families in the current study may see distance as a substantial barrier, especially given that they live in rural counties.

Historically, rural counties have higher rates of poverty than urban areas (Economic Research Services, 2011). Consequently, many of the families in effectiveness studies, especially those in rural areas, have other issues to attend to and therefore may face more of the above barriers than other treatment participants. For example, parents in rural counties are more likely to work multiple jobs or have fluctuating work schedules (Kelleher, Taylor & Rickert, 1992), which can interfere with attending treatment sessions or preparing home cooked meals. Moreover, they may have a more difficult time with transportation to and from treatment sessions if they do not own their own reliable vehicle.

Additionally, families know that by attending sessions, they will be held accountable for their unhealthy or healthy lifestyle behaviors. Therefore, families may be less likely to attend if they are having a difficult time meeting their treatment goals. On this same note, it is difficult to make lifestyle changes, and therefore participants may not meet the goals they set early and may give up on treatment. Finally, children may not have the desire to go to a treatment session to learn about healthy lifestyle behaviors after attending a full day of school. Similarly, children may not be motivated to make changes and attend treatment sessions, as they may have a hard time seeing the long-term positive health outcome of their changes.

Risk factors for poor attendance

Recognizing factors that are correlated with poor attendance is extremely important. As these are identified, those participants that are at risk for poor attendance can be targeted, and steps can be taken to help them to overcome the attendance barriers they face. Unfortunately, there is currently a paucity of research in this area, especially in behavioral family weight management programs. Some of the programs in the existing literature, all of which are efficacy studies, have identified certain populations that are at risk for low attendance (Kalarchain et al., 2009; Williams et al., 2010; Jelalian et al., 2008; Zeller et al., 2003). Specifically in terms of

demographics, minorities have been found to have worse attendance relative to Caucasians (Williams et al., 2010; Jelalian et al., 2008; Zeller et al., 2003). This is consistent with the broader therapy literature, which found that Caucasians have higher therapy attendance (King & Canada, 2004). In a sample of 6 to 17-year-olds, children that dropped out of the program were more likely to be older (Zeller et al., 2003). Although Jelalian and colleagues (2008) found no difference in attendance by socioeconomic status, two studies found that those that did not complete the program were more likely to have a lower income and be Medicaid recipients (Williams et al., 2010; Zeller et al., 2003). Similarly, while Williams and colleagues (2010) found no difference in attendance by weight status, other studies found that children with higher baseline weight status and percent overweight were more likely to drop out (Jelalian et al., 2008; Kalarchain et al., 2009). In terms of psychological status, one program found that children who did not complete the program had more self-reported depressive symptoms and lower self-concept than those children who completed the program (Zeller et al., 2003). Conversely, a study of adolescents found no difference in completers and noncompleters in self-concept (Jelalian et al., 2008). Family characteristics have also been found to predict attrition in behavioral family weight management programs. Children that did not complete the program were more likely to live in single parent households and have fewer people in the household (Williams et al., 2010; Kalarchain et al., 2009). Williams et al. (2010) also found that higher levels of family dysfunction were associated with dropping out and completing part of the program. Risk factors for attrition in behavioral family weight management effectiveness studies are still unknown, as many factors beyond demographics and a few psychological and family factors have not been examined.

The purpose of the current study is twofold. The first is to provide further clarification on the relationship between demographic and anthropometric variables and attendance in behavioral family weight management programs. The second is to extend the literature in this area. Previous research is limited to only a few variables beyond demographics (i.e., social support, self-concept, family functioning, and children's depressive symptoms), suggesting that we should look at additional variables to further explain the variance in attendance. Thus, we will examine reasons for joining the program and motivation to change health behaviors, both variables hypothesized to be associated with why people attend, rather than factors that keep them from attending. The current study is also unique, in that the intervention is an effectiveness trial and its results can therefore be applied in real world settings. This information can be critical and can help tailor intervention efforts in order to be more palatable and consequently not only impact attendance rates but also limit attrition.

Personal factors. The relationship between personal factors (i.e., demographics and weight status) and attendance is unclear based on the existing literature, and therefore these associations should be further studied before conclusions can be drawn. Since younger children are less likely to be enrolled in extracurricular activities and therefore will have more open schedules, it is expected that younger children will have better attendance than older children. Consistent with existing literature, it is hypothesized that minority ethnic and racial status will predict worse attendance. Although the existing literature on the role of income in attendance is mixed, it is predicted that families in the current study with a higher income will have better attendance, as they have fewer barriers to transportation, and group time (e.g., shift work, multiple jobs). Again, the existing literature on the relationship between weight status and attendance is mixed. We expect that those of a higher weight status will have a harder time

making healthy lifestyle changes, such as increasing physical activity patterns, and may therefore become discouraged and be less likely to regularly attend than those more easily meeting treatment goals. As a result, it is expected that children's and parents' lower weight status at baseline will predict better attendance.

Distance. Much of the current literature does not extend beyond demographics and a few personal and family factors. As a previously mentioned barrier to attendance, time is an important factor for families when it comes to activities. The distance that families have to travel to get to treatment sessions plays into the time commitment of groups, especially in rural counties. In a past study examining barriers to veterans pursuing healthcare in rural areas, distance was identified as the most significant barrier (Buzza et al., 2011). Moreover, in a past outpatient drug treatment program, clients who lived closer to the treatment site were 50% more likely to finish treatment than those who lived farther (Beardsley, Wish, Fitzelle, O'Grady, & Arria, 2003). Therefore, it is predicted that a shorter distance from families' homes to the treatment site will be associated with better attendance.

Motivation. The existing literature focuses primarily on barriers to attendance, and the current study was designed to focus somewhat more on variables associated with why families are coming to treatment, such as motivation to change and reasons for joining the program. In the eating disorders literature, a previous study found that motivation to change at baseline was positively associated with treatment outcome (Castro-Fornieles et al., 2011). As mentioned above, attendance was found to be related to positive changes, and therefore, it is expected that higher child and parent motivation at baseline will be significantly associated with better attendance.

Reasons for joining

To our knowledge, there is no existing literature examining participants' reasons for joining as related to treatment attendance. It is important to know why these families, both the children and the parents, join the programs, and how these reasons relate to attendance. Because no fitting measures existed, separate questionnaires for the child and parent were created for the current study. It included 8-10 reasons for joining the program, where participants indicated the three most accurate for them. A priori hypotheses were developed on three reasons for each the child and the parent, chosen by those that had possible associations with attendance.

In children, it is expected that those who list that they joined the treatment because they are picked on in school and concerned about their health will have better attendance than those that did not list these as a reason for joining, whereas those that listed that they joined the program because their parent wanted them to will have worse attendance than those that did not list this as a reason for joining. If children are picked on in school, they may want to lose weight in order to look better and decrease their probability of being a target for bullies. Therefore it is expected that these children will have better attendance than those that did not list that they joined the program because they are teased in school. If children are concerned about their health, they may want to attend more sessions in order to make more healthy lifestyle changes, and as a result, it is predicted that children that list this as a reason for joining will have better attendance than those that do not list this as a reason for joining. Those children that attend treatment solely because their parents want them to may not be as invested in making changes on their own and may resist attending groups more. Consequently, it is expected that these children will have worse attendance than children that do not list this as a reason for attending.

For parents, it is hypothesized that those who join the program because their child is picked on about their weight, they are worried about their child's health, or they want to lost

weight themselves, will have better attendance than those who do not list these as reasons for joining. The rationale for the first two hypotheses is the same as that for the children. It is projected that parents who join because they want to lose weight themselves will attend more in order to get help and support to make healthy changes and in turn, decrease their own weight status.

Current Study Aims

Aim 1

To identify personal factors, including demographics and weight status, as predictors of attendance in a longitudinal behavioral family weight management program.

Hypothesis 1a: Younger children will have higher attendance rates than older children.

Hypothesis 1b: Children of minority ethnic and racial background will have lower attendance rates than children of Caucasian background.

Hypothesis 1c: Children who come from families who have a higher income will have better attendance than children of families who have a lower income.

Hypothesis 1d: Children's lower BMI z-score at baseline will be significantly associated with higher attendance rates.

Hypothesis 1e: Parents' lower BMI at baseline will be significantly related to higher attendance rates.

Aim 2

To examine the association between distance from families' homes to the treatment site and attendance.

Hypothesis 2: A shorter distance from families' homes to the treatment site will be associated with better attendance.

Aim 3

To examine the relationship between child and parent motivation and attendance.

Hypothesis 3a: Higher child motivation at baseline will be associated with higher attendance rates.

Hypothesis 3b: Higher parent motivation at baseline will be associated with higher attendance rates.

Aim 4

To identify reasons for joining the program as predictors of attendance.

Hypothesis 4a: Children that joined the program because they are picked on in school will have better attendance than those that did not list that as a reason for joining.

Hypothesis 4b: Children that listed that they are concerned about their health as one of the top three reasons for joining the program will have higher attendance rates than those that did not choose that as one of their top reasons for joining.

Hypothesis 4c: Children that joined the program because their parents wanted them to will have worse attendance than those that did not join the program for this reason.

Hypothesis 4d: Parents that joined the program because their child is picked on about their weight will have higher attendance rates than those that did not list this as a reason that they joined the program.

Hypothesis 4e: Parents that marked that they joined the program because they are worried about their child's health will have better attendance than those that did not list this as a reason for joining.

Hypothesis 4f: Parents that listed that losing weight themselves is one of their top three reasons for joining the program will have higher attendance rates than those that did not list this as one of their top three reasons for joining.

CHAPTER 2
METHODS

Participants

Participants included one hundred twenty-four children and their parent or legal guardian, who were recruited for a family-based healthy lifestyle intervention program, the Extension Family Lifestyle Intervention Project (E-FLIP) for Kids. Eligible participants met the following inclusion criteria: (1) children were between the ages of 8-12 years; (2) families lived in a rural county; (3) children had a BMI at or above the 85th percentile for age and gender; (4) parent or legal guardian was willing to attend weekly intervention program with the child; (5) families were willing to be randomized to one of three intervention conditions; (6) families did not plan to move out of the area within the next 12 months; and (7) children and one of the participating parents must speak English. Families were excluded if they met any of the following criteria: (1) child was currently prescribed antipsychotics, systemic corticosteroids, or weight loss medication; (2) family was currently enrolled in another weight loss intervention; or (3) child had a medical or psychological condition that could interfere with treatment.

Procedures

The current protocol was approved by the governing IRB. Participants were recruited from direct mailings, radio announcements, and flyers distributed through physicians' offices, University of Florida IFAS extension offices, schools, and churches. Interested families completed an initial phone screening during which they were provided with a brief description of the study and initial eligibility was determined. If eligible and interested, they were then scheduled for an in-person screen to determine final eligibility and complete informed consent. Approximately two weeks prior to the intervention, eligible families also completed a baseline assessment during which they were informed of their randomization to either the family-based

intervention, the parent-only intervention, or the education control condition. At screening and baseline assessment visits child and parent participants completed the assessment protocol to allow for the collection of anthropometric, biological, and questionnaire data. Aside from participant treatment attendance data, all data for the current study was collected at these screening and baseline visits. Following baseline assessment and randomization to treatment condition, families subsequently participated in a 21-session treatment program over 12 months.

Intervention

In the family-based and education control interventions, parents and children participated in separate but simultaneous groups. In the parent-only condition, children did not attend treatment sessions. Participants in all three conditions are educated on healthy lifestyle behaviors, including, but not limited to, diet and physical activity patterns, sleep hygiene, self-esteem and body image. Participants in the behavioral family-based and parent-only conditions were encouraged to make changes to their diet to decrease the consumption of unhealthy foods and increase the intake of fruits and vegetables, as well as increase their physical activity and decrease their sedentary activity. Treatment leaders worked with participants individually to set dietary intake and physical activity goals to aid in making changes. Additionally, in the parent-only condition, parents learned how to set and carry out goals with their children. Participants tracked their diet in a daily food log and their physical activity using a pedometer.

Interventionists

Treatment sessions were held by postdoctoral psychologists and graduate students in clinical psychology, along with post-baccalaureate research assistants in pediatric psychology and University of Florida IFAS extension family consumer science agents and 4-H agents. Extension office agents held bachelor’s or master’s degrees and often worked in nutrition. All

treatment leaders participated in a one-day training prior to the start of treatment sessions, as well as weekly supervision phone calls with the principal investigator of the E-FLIP for Kids study.

Measures

Height and Weight

Both child and parent height and weight were collected by trained medical staff and were measured by a Harpendon stadiometer and a Tanita® BWB-800 Digital Medical Scale, respectively. Height and weight were used to calculate parent body mass index (BMI), defined as kg/m^2. Child BMI z-scores (BMI-z), or BMI value standardized based on children's age and gender, were calculated according to Center for Disease Control norms (Kuczmarski et al., 2002).

Distance to Treatment Site

The distance from families' homes to the treatment site (the University of Florida IFAS extension office in each county), was computed using Google Maps (Google Maps, 2011). The distance in miles for the quickest route along roadways was used.

Attendance

Participants' attendance was tracked at each of the treatment sessions. For the current analyses, attendance was defined as the number of sessions attended our of the first twelve core sessions.

Questionnaires Completed by Children

Child opinions on healthy behaviors

Motivation to change was assessed using the Child Opinions on Healthy Behaviors (COHB) questionnaire, which was created by the E-FLIP for Kids investigative team for use in the study. The COHB is a 3-item questionnaire that assesses how much children want to lose weight, change their diet to lose weight, and increase their physical activity to lose weight.

Questions were answered on a 4-point Likert scale ranging from “Not at all” to “Very much.” A total child motivation score was used for analyses in this study and was calculated by determining the sum of the three items. Cronbach’s alpha for this measure with this study sample is 0.625. This measure is displayed in Appendix A.

Reasons for joining the program

The Child Reasons for Joining Program questionnaire was developed by the E-FLIP for Kids investigative team for use in the study. Specifically, the items were generated by the principal investigator and graduate students on the research team based on interactions with participants in previous intervention trials. Ten possible reasons are listed (e.g., “I want to lose weight,” “I am concerned about my health,” “My mom/dad wanted me to be in the program”). Children were asked to select their top three reasons for joining the program. This measure is displayed in Table 3-3.

Questionnaires Completed by Parents and Legal Guardians

Demographics

Parents completed a questionnaire that covered background demographic characteristics for both themselves and their child, including traits such as age, gender, race and ethnicity, and family income.

Parent opinions on healthy behaviors

Motivation to change was assessed using the Parent Opinions on Healthy Behaviors (POHB) questionnaire, created for the E-FLIP for Kids study. The POHB is a 3-item questionnaire that assesses the extent to which parents want to lose weight, change their diet to lose weight, and increase their physical activity to lose weight. Questions were answered on a 5-point Likert scale ranging from “Not at all” to “Extremely.” A total parent motivation score was

used for analyses in this study and was calculated by calculating the sum of the three items. Cronbach's alpha with this study sample is 0.85. This measure is displayed in Appendix A.

Reasons for joining the program

The Parent Reasons for Joining Program questionnaire was developed for E-FLIP for Kids. Ten possible reasons are listed (e.g., "I am worried about the health risks to my child and me from being overweight," "I want to lose weight"). The items were generated by the principal investigator and graduate students on his research team based on interactions with participants in previous intervention trials. Parents were asked to select their top three reasons for joining. This measure is displayed in Table 3-3.

Data Analysis

All variables were checked for normality. Only distance to treatment was not normally distributed. As a result, a square root transformation was performed on the distance to treatment site to normalize this variable for subsequent analyses. Bivariate analyses (pearson r) or independent sample t-tests were used to assess if demographic variables were related to the outcome variable, treatment attendance. The sample was examined using descriptive statistics (e.g., means, SDs). For all of the subsequent analyses, attendance was tested as a dependent variable while all other variables were studied as independent variables, or predictors of attendance. To address aim one, the examination of demographic variables and weight status as predictors of attendance, both ANOVA and hierarchical regressions were run. For dichotomous and categorical independent variables (i.e., child gender, income, child race/ethnicity), ANOVA were conducted with attendance as the dependent variable. For continuous independent variables (i.e., child age, parent age, BMI-z, BMI), hierarchical regressions were run to test predictors of attendance. All demographic variables and weight status variables that were significantly associated with attendance were then controlled for with the use of ANCOVA or hierarchical

regressions. For hierarchical regressions, the control variable was entered in Block 1 and independent variable in Block 2. A hierarchical regression was performed for aim two, to test the association between attendance and the distance from participants' homes to the treatment site. For aim three, two separate hierarchical regressions were conducted to examine the relationships between attendance and child motivation and attendance and parent motivation. For aim four, a priori hypotheses were developed for three reasons for joining for both the children and the parents. Six individual ANCOVA were run to address these, each testing one reason for joining as a predictor of attendance.

CHAPTER 3
RESULTS

One hundred seventy-two child-parent dyads began treatment in waves 1 and 2 of the Extension Family Lifestyle Intervention Project (E-FLIP) for Kids study. Of those, 48 had missing data for at least one of the variables assessed in the current study and were therefore excluded from analyses. There were no significant differences in demographic variables or attendance between those participants that were excluded and those that were included in this study.

The current study analyses were conducted with 124 child-parent dyads. The children, ages 8-12 (M = 9.84, SD = 1.42), were 48.4% male and 51.6% female, with 67.7% identifying as Caucasian, 16.1% as African-American, 7.3% as Hispanic, 8.1% as Bi-racial, and 0.8% as Other. The majority of the sample (54%) listed an income of $20,000-59,999. Children had a mean body mass index (BMI) z-score greater than two standard deviations above the mean for their age and gender (M = 2.18, SD = .37), while parents' average BMI fell on the upper end of the range for the classification of Class 1 obesity (M = 34.22, SD = 7.81). Demographic and weight status information is presented in Table 3-1. Participants lived an average of 14.71 miles from the treatment site, with the large majority of participants (79%) living within 20 miles of the treatment site. Distance statistics are presented in Table 3-2. The overall attendance mean was 64%, which is equivalent to 7.63 of the 12 core sessions. An ANOVA revealed that there was no significant difference in attendance between the three treatment conditions. More detailed attendance data are presented in Tables 3-5 and 3-6.

The first aim of the study was to examine the role of personal factors, including demographics and weight status, as predictors of attendance. Individual ANOVA found that attendance did not significantly differ by child gender ($F(1, 122) = .29$, $p > .05$, $\eta_p^2 = 0$), income

($F(1, 122) = .77$, $p > .05$, $\eta_p^2 = .03$), or child race/ethnicity ($F(1, 122) = 1.56$, $p > .05$, $\eta_p^2 = .05$). A hierarchical regression revealed no significant association between child age and attendance ($t(122) = -1.02$, $R^2 = .01$, $p > .05$) or parent age and attendance ($t(122) = .94$, $R^2 = .01$, $p > .05$). There were also no significant relationships between child baseline BMI z-score and attendance ($t(122) = -1.24$, $R^2 = .01$, $p > .05$) or parent baseline BMI and attendance ($t(122) = .47$, $R^2 = 0$, $p > .05$). Because these analyses were not significant, neither demographic variables nor weight status was controlled for in subsequent analyses. Therefore, there was no need to run ANCOVA, so only ANOVA were run for categorical and dichotomous variables. Also, for continuous variables, the dependent variables in the subsequent analyses were placed in Block 1.

The second aim of the study was to determine the relationship between the distance from families' homes to the treatment site and attendance. A hierarchical regression found a significant association between distance and attendance ($t(122) = -2.73$, $R^2 = .06$, $p < .01$). Living closer to the treatment site is associated with better treatment attendance (b = -.66, $p < .01$). Results are displayed in Table 3-2.

Aim three of the study examined the relationship between both child and parent motivation to lose weight and attendance. Means and standard deviations for both child and parent motivation are displayed in Table 3-3. A hierarchical regression analysis found that total child motivation score was significantly associated with treatment attendance ($t(122) = -2.47$, $R^2 = .05$, $p = .02$). Specifically, lower motivation was related to better attendance (b = -.51, $p = .02$). A separate hierarchical regression found that parent motivation was not a significant predictor of attendance ($t(122) = -.78$, $R^2 = .01$, $p > .05$).

The fourth study aim was to examine reasons for joining the program as predictors of attendance. The percent of the sample that endorsed each reason is presented in Table 3-4.

Individual ANOVA were conducted for each reason for which apriori hypotheses were developed. In terms of the children's reasons for joining, those that listed one of their top three reasons for joining as being picked on in school (26.6% of the sample) did not significantly differ in attendance from those who did not list this as a reason for joining ($F(1, 122) = .87$, $p > .05$, $\eta_p^2 = .01$). Similarly, attendance did not significantly differ for the remaining two children's reasons for joining: because their parent wanted them to (21%; $F(1, 122) = .03$, $p > .05$, $\eta_p^2 = 0$) and because they were concerned about their health (44.4%; $F(1, 122) = 3.33$, $p > .05$, $\eta_p^2 = .03$).

In terms of parents' reason for joining the program, there was no significant difference in attendance between parents who listed their child being picked on about their weight as one of their top reasons for joining (17.7%) and parents who did not list this as a reason ($F(1, 122) = .77$, $p > .05$, $\eta_p^2 = .01$). There was also no difference between those that listed worry about health as one of their top reasons for joining (79.8%) and those that did not list this as a reason ($F(1, 122) = 1.66$, $p > .05$, $\eta_p^2 = .01$). However, an ANOVA found a significant difference in attendance in the third parent reason examined. Specifically, those parents that listed wanting to lost weight themselves as one of the top three reasons for joining exhibited higher attendance ($M = 8.63$) than those who did not list this as one of their top reasons for joining ($M = 7.04$; $F(1, 122) = 6.48$, $p = .01$, $\eta_p^2 = .05$).

Table 3-1. Demographic characteristics of sample.

	Mean	SD	%
Child Age	9.84	1.42	
Child BMI z-score	2.18	0.37	
Parent BMI	34.22	7.81	
Gender			
	Boys		48.4
	Girls		51.6
Child Race/Ethnicity			
	Caucasian		67.7
	African-American		16.1
	Hispanic		7.3
	Bi-racial		8.1
	Other		0.8
Median Family Income			
	Below 19,999		13.7
	20,000-39,999		28.2
	40,000-59,999		25.8
	60,000-79,999		13.7
	80,000-99,999		7.3
	Above 100,000		11.3

SD, Standard Deviation

Table 3-2. Distance from families' homes to treatment site.

	Mean	SD	%
Distance (Miles)	14.71	10.34	
1-10			41.1
11-20			37.9
21-30			4.8
31-40			8.1
41-50			3.2

SD, Standard Deviation

Table 3-3. Child and parent motivation scores and reasons for joining program.

	Mean	SD	Min	Max
Child Motivation[†^]	10.4597	1.46170	6	12
Parent Motivation[†§]	13.3952	1.81152	9	15

Table 3-4. Child and parent reasons for joining program

	% that endorsed "yes"
Child Reasons for Joining	
I want to lose weight.	95.2
I want to learn how to eat healthier.	72.6
I am concerned about my health.	44.4
I want to be around other kids who also want to be healthier.	28.2
I get picked on about my weight in school.	26.6
My mom/dad wanted to be in the program.	21.0
I want to spend time with my mom/dad.	8.1
My doctor told me I should join the program.	3.2
Parent Reasons for Joining	
I want to help my child lose weight.	85.5
I am worried about the health risks to my child and me from being overweight.	79.8
I want to lose weight.	37.1
Other steps I have taken to help my child eat healthier have not been successful.	25.0
My child gets picked on about his weight.	17.7
I want my child to get support from children his age.	16.1
I want to get support from other parents.	4.8
My child's doctor recommended the program to me.	0.8
My child really wants to lose weight and be healthier.	0.0
I want to spend more time with my child.	0.0

[†] Higher scores indicate higher motivation. [^]Out of a total possible score of 12. [§]Out of a total possible score of 15.

Table 3-5. Mean number of treatment sessions attended by treatment condition.

Condition	Mean	SD
Behavioral Family	7.05	3.70
Parent Only	7.36	3.73
Streamlined	8.56	2.60
Total	7.63	3.44

SD, Standard Deviation

Table 3-6. Number of sessions attended by participant percentage

Total number of sessions attended[†]	%
1-2	9.6
3-4	16.1
5-6	7.2
7-8	17.8
9-10	24.2
11-12	25.0

[†] Number of sessions attended of 12 total core treatment sessions conducted.

CHAPTER 4
DISCUSSION

About one third of children and adolescents in the United Stated are overweight or obese (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010), an alarming statistic especially given the many negative health and psychosocial consequences of childhood overweight and obesity (Freedman, Dietz, Srinivasan, & Berenson, 1999; Chan & Chen, 2009; Hamzaid et al., 2011; Erermis et al., 2004). Behavioral family interventions have proven extremely effective in comparison to other treatment options (Epstein, Paluch, Roemmich, & Beecher, 2007; Herrera, Johnston, & Steele, 2004; Kalavainen, Korppi, & Nuutinen, 2007; Stark et al., 2011). These interventions focus on encouraging children and their parents to implement healthy diet and physical activity changes using behavioral strategies (Herrera, Johnston, & Steele, 2004). One obstacle these programs face is motivating families to attend sessions consistently. The current study extends the literature by clarifying the role of demographics and weight status as risk factors for poor attendance, as well as identifying factors beyond demographics that are associated with attendance in effectiveness studies, specifically distance to treatment, child and parent motivation for behavior change, and child and parents' reasons for joining the intervention program.

Past community-based behavioral family weight management programs have reported that families attended an average of 40-68% of sessions (Williams et al., 2010; Janicke et al., 2011; Kalarchain et al., 2009; Janicke et al., 2009). Attendance rates for the current study are fairly consistent, as participants attended an average of 64% of the 12 core sessions, with no differences in attendance between conditions. Although this is at the higher end of the commonly observed range for community-based programs, it is still lower than ideal, and there is much more room for improvement. The current study's focus on community-based interventions is

important, as they face more barriers (e.g., fewer resources, transportation difficulties, limited availability of healthy foods). As treatment attendance was related to treatment success in previous programs (Kalarchain et al., 2009; Jelalian et al., 2008; Hunter, Steele, & Steele, 2008; Janicke et al., 2008), it is extremely important to identify risk factors associated with lower treatment attendance rates. The identification of predictors of low attendance can inform treatment intervention and retention efforts in order to ensure that all families, and especially those at-risk, attend more treatment sessions.

In the current study, a shorter distance from families' homes to the treatment site was associated with better attendance. This is consistent with a previous study that found that those that lived closer were more likely to complete a treatment program (Beardsley, Wish, Fitzelle, O'Grady, & Arria, 2003), and makes sense given the finding that rural U.S. military veterans believe distance is the most important barrier to healthcare (Buzza et al., 2011). Although our study does not allow us to definitely determine why shorter distance is predictive of better attendance, it is likely that a shorter distance to the treatment session site decreases the time and resource barrier that comes with attending treatment sessions. If families have other things to do (e.g., finish work before picking up the target child to attend session, pick up other children), having fewer miles to travel and therefore having less total travel time makes it easier to balance the numerous demands on families. This suggests that efforts to make participation in these programs more convenient and less burdensome may improve attendance rates for families in rural settings. Such efforts could include incorporating phone or internet sessions into the treatment format.

Contrary to our hypothesis and to findings in existing eating disorders literature (Castro-Fornieles et al., 2011), in the current study children's lower motivation to lose weight and change

their dietary and physical activity habits was associated with better treatment session attendance. There are a few possible explanations for this finding. First, it is possible that less motivated children are more resistant to making healthy lifestyle changes. This may cause parents to experience more difficulty helping their children adopt healthy lifestyle behaviors and greater distress. This may in turn cause parents to seek more consistent help from the interventionists. On the other hand, it is possible that motivated children make changes on their own and therefore their parents do not feel it necessary to attend groups. Examining outcome data related to changes in healthy diet habits and to motivation may shed light on these two possibilities. It is also possible that our measure of motivation did not adequately measure the child's motivation to make healthy lifestyle changes. Finally, there could be other extraneous variables that are not accounted for in the current study that are influencing this relationship. Certainly there is a need for more research in effectiveness settings before definitive conclusions can be drawn. For example, a well-validated motivation measure should be used, and post-assessments should include measures of children's resistance to parents and their tendency to make positive changes independently.

Contrary to our expectations, no significant association was found between parent motivation to change their own lifestyle behaviors to lost weight and session attendance. It is possible that parent motivation to change their own behavior is not that important, considering the program is supposed to be targeting children's health, thus parent motivation would not be significantly associated with attendance. One finding that does not support this theory is that attendance was higher for parents who listed losing weight as one of their top reasons for joining than parents who did not list this as a reason for joining. This suggests that parents' desires still influence attendance, despite the fact that the program focuses on children's health. A second

explanation for the lack of a significant association between parent motivation and attendance is that there are many other factors that affect attendance, so even if parents are motivated to attend, there are multiple barriers and child factors (e.g., time constraints, children's desires, difficulty making changes) that take precedence over motivation and mask its importance. Third, although it is possible that there is in fact no relationship between the two variables, it is also possible that parent motivation was not measured well, as the questionnaire was developed for the current study and is therefore not well-validated. For example, the questionnaire consisted of only three questions on parent motivation, which may not encompass the full scale of motivation.

Only one of the six hypothesized reasons for joining the program was significantly related to attendance. As there is no existing literature on reasons for joining, a priori hypotheses were not evidence-based. Those parents that listed a desire to lose weight themselves as one of their top three reasons for joining had better attendance than those that did not list this as a primary reason for joining. This is not surprising. While the program primarily targets child behavior and weight change, family-wide change is also emphasized. Thus, parents looking for help with their own weight loss may be likely to attend sessions regularly. This relationship may be strengthened because of the fact that there are few resources to support parent weight change in these communities. However, if this were the case, one would expect that parent motivation for change would have been positively correlated with session attendance, but this was not the case.

There are multiple possible explanations for the five insignificant results regarding child and parent reasons for joining the intervention program. Children that listed concern about their health as one of the top three reasons for joining the program did not have significantly higher attendance rates than those that did not choose that as one of their top reasons for joining. This

may be because children may have a hard time seeing the long-term health benefits of making positive changes and attending treatment, even though they chose concern about health as a reason for joining. Children that joined the program because they are picked on in school did not have significantly better attendance than those that do not list that as a reason for joining. Though teasing may be more salient than negative health outcomes, it is possible that these children may experience neglect from their peers more than overt victimization, as only 27% of children endorsed being teased about weight status as a reason for joining. Children that listed joining the program because their parents wanted them to did not have significantly better attendance than those that did not list this as a reason for joining. Only 21% of the children listed this as one of their main reasons for joining, which brings up the possibility of a social desirability bias. Children are aware of the treatment's purpose and fill out their questionnaires in front of treatment session leaders. Thus, they may not have wanted to admit that they were there only because their parents made them come, rather than for intrinsic reasons, and therefore may not have been honest about this. Furthermore, there may be other explanations for the insignificant findings between attendance and the child reasons for joining. There are multiple factors outside of the child's control that can impact attendance (e.g., parent's work schedule, family illnesses, transportation issues), and these factors can overshadow the child's reason for joining the program.

There are multiple possible justifications for the insignificant relationships between the parents' reasons for joining and attendance. Parents that listed joining the program because their child is picked on about their weight did not have significantly higher attendance rates than those that did not list this as a reason that they joined the program. Again, it is feasible that these children experience more neglect from their peers than overt victimization. If that is the case,

those parents that chose this as one of their reasons for joining would not differ in treatment attendance than those that did not list this as a reason. Parents that marked that they joined the program because they are worried about their child's health did not have significantly better attendance than those that did not list this as a reason for joining. This may be due to the fact that those parents that chose worry about health risks as a reason for joining may have had a difficult time communicating that health concern to their children, as health is likely very abstract for children. Therefore, concern about health may have not been enough of a drive to attend significantly more treatment sessions.

There may also be explanations for the five insignificant results beyond the lack of importance of the reasons for joining. For example, our measure only allowed participants to list their top three reasons for joining and did not allow insertion of reasons outside of those on the questionnaire. As a result, the current data may not encompass all participants' reasons for joining.

The current study findings do not support demographic variables (i.e., age, gender, ethnic and racial status, income) as risk factors for poor attendance in a behavioral family weight management program. One finding that was inconsistent with what we expected and with the existing literature is the lack of a difference in attendance by minority ethnic and racial status. Previous studies have found that Caucasians have better attendance relative to racial and ethnic minority groups (Williams et al., 2010; Jelalian et al., 2008; Zeller et al., 2003). One possible reason for this difference is the small percentage of our sample that was of an ethnic or racial minority (32.3%), which differed from the large percentages reported in two of the previous studies (Williams et al., 2010; Zeller et al., 2003). Moreover, the differences in attendance by race may be heavily influenced by socioeconomic status. Those same two previous studies found

significant differences in attendance by socioeconomic status as well (Williams et al., 2010; Zeller et al., 2003), whereas the current study did not. This could point to the theory that different races are more equivalent in terms of financial status in rural areas. Similarly, there could be multiple barriers to attendance across families in rural areas, which extend beyond the barriers faced by different races.

There was also no significant association between weight status and attendance in the current study, which is consistent with only one of the previous studies (Williams et al., 2010). This is contrary to what multiple other studies found, that children with higher baseline weight status and percent overweight were more likely to drop out (Jelalian et al., 2008; Kalarchain et al., 2009). This may have been due to the difference in sample between the current study, being an effectiveness study, and other past studies, which were efficacy studies. Additionally, because the majority of the children in the current sample was obese, many in the 99th percentile for their BMI, there may have been a lack of variance in weight status large enough to affect their ability to make changes and therefore meet treatment goals and continue to attend treatment sessions.

This study had multiple strengths and weaknesses. Childhood overweight and obesity is an extremely dangerous epidemic. There is a dearth of data predicting behavioral family weight management treatment attendance beyond demographic variables. The current study extends the existing literature by addressing additional predictors, including factors that may have a positive influence on attendance. Moreover, these factors were examined in an effectiveness setting, specifically in rural counties. Limitations for the current study include the reliance on self-report measures for two of the aims. Furthermore, new measures were developed for both motivation and reasons for joining. Therefore, these measures are not yet well-validated. Additionally, the measures for motivation, Child and Parent Opinions on Healthy Behaviors, relied on only three

items to measure motivation. There may also be a social desirability bias exhibited on this measure, as children completed the questionnaire in front of their parents and research personnel, and therefore may have answered more favorably than honestly. The Reasons for Joining the Program measure was created by the project coordinator and a few of the treatment session leaders based on past experience, whereas it may have been more valid had it been created through a more formalized questionnaire development protocol. In general, families are completing questionnaires for 30-60 minutes and thus, it is important to note that they may not put as much thought into some of their answers towards the end of their assessment. Another limitation is the inability to measure and account for the numerous other factors that can influence treatment session attendance in a family based intervention. For example, parent's jobs or other sibling's activities could impact attendance. Although a strength of this study was that it filled in a gap in the literature by examining attendance in a group effectiveness study in rural counties, this specificity inherently limits the generalizability of the results both to this particular sample and also to group interventions that cannot be flexible in scheduling. A final limitation is that the current study's analyses do not account for much of the variance in attendance, again suggesting that there are multiple other variables that influence treatment attendance.

There are multiple clinical implications that stem from the current study. First, it will be important in the future interventions to try to develop strategies that can limit the negative impact of time and travel for participants. This may include providing transportation for families, decreasing session time, or providing phone or Internet sessions in lieu of meeting in person each week. There is a great need for research in this area, focusing on the development and evaluations of such programs. One example is the Patient-centered Assessment and Counseling for Exercise + Nutrition (PACE+) program, which found some significant diet and physical

activity changes after a year-long intervention period (Patrick et al., 2006). The intervention began with a brief primary care visit, followed by providing families with written education, mailings, and phone sessions. Secondly, it will be important for future programs to emphasize benefits to parents beyond weight loss, such as fitness and health, in addition to addressing their desire to lose weight by working with them to make healthy lifestyle changes. It is difficult to draw conclusions based on the significant inverse relationship found between children's lower motivation and attendance as the mechanism is unknown, though we can say with certainty that it is important to emphasize that motivated children would still benefit from treatment.

The current study provides a base on which future research can build. Future studies should examine motivation as related to Prochaska's stages of change model (Prochaska, DiClemente, & Norcross, 1992). Participant's motivation could be assessed on the spectrum of change, and researchers could analyze how their level of motivation relates to attendance, and then tailor interventions to address how prepared they are to make changes. It would provide a more comprehensive and specific goal for retention strategies. The current study does not account for most of the variance in attendance with the analyses that were run, and therefore future studies should assess other factors in the prediction of attendance. Participants in the Extension Family Lifestyle Intervention Project (E-FLIP) for Kids study attend a one-year follow-up assessment where they will complete a checklist on their individual barriers to attendance. Further analyses should address responses on this checklist as possible factors affecting attendance and the current study's results. Families also complete measures on psychosocial functioning, family functioning and parent stress at their baseline assessment. These variables would also be important to examine as predictors of attendance in these programs.

Findings from the current study add valuable information to the limited literature on predictors of attendance in behavioral family weight management programs. By using a rural sample, the present study strived to identify variables related to attendance that are most significant for this specific population. This information may aid in the development of intervention and retention strategies in order to increase attendance in these programs, and therefore allow families greater treatment success. This is one of the few studies that extends beyond examining demographics as predictors of attendance in behavioral family weight management programs. Therefore, the significant relationships between attendance and distance to treatment, child motivation, and parents joining the program to lose weight themselves that were found in the current study are important to improving our knowledge of barriers and incentives to attending treatment.

APPENDIX A
OPINIONS ON HEALTHY BEHAVIORS

Child opinions on healthy behaviors

Please read each statement below and place an "x" below the box that describes how you feel about each of the questions.†

1. How much do you want to lose weight?
2. How much do you want to change what you eat and drink so you can be healthier?
3. How much do you want to increase how much you exercise and move around so you can be healthier?

†Questions were answered on a 4-point Likert scale: "Not at all," "A little bit," "Medium Amount," "Very Much."

Parental opinions on healthy behaviors

Please read each statement below and place an "x" below the box that describes how motivated you are to change you eating and exercise habits. Your answers to this question will NOT affect your participation in this study, so please be as honest as possible.†

1. How motivated are <u>you</u> to lose weight so you can be healthier?
2. How motivated are <u>you</u> to change what you eat and drink so you can be healthier?
3. How motivated are <u>you</u> to increase <u>your</u> exercise and activity level so you can be healthier?

†Questions were answered on a 5-point Likert scale: "Not at all," "Slightly," "Somewhat," "A Good Amount," "Extremely."

LIST OF REFERENCES

Acosta, M. C., Manubay, J., & Levin, F. R. (2008). Pediatric obesity: Parallels with addiction and treatment recommendations. *Harvard Review of Psychiatry*, 16, 80–96.

Beardsley, K., Wish, E. D., Fitzelle, D. B., O'Grady, K., & Arria, A. M. (2003). Distance traveled to outpatient drug treatment and client retention. *Journal of Substance Abuse Treatment*, 25(4), 279-285. doi: 10.1016/S0740-5472(03)00188-0

Buzza, C., Ono, S. S., Turvey, C., Wittrock, S., Noble, M., Reddy, G., & …Reisinger, H. (2011). Distance is relative: Unpacking a principal barrier in rural healthcare. *Journal of General Internal Medicine*, 26(Suppl 2), 648-654. doi: 10.1007/s11606-011-1762-1

Castro-Fornieles, J., Bigorra, A., Martinez-Mallen, E., Gonzalez, L., Moreno, E., Font, E., & Toro, J. (2011). Motivation to change in adolescents with bulimia nervosa mediates clinical change after treatment. *European Eating Disorders Review*, 19(1), 46-54. doi: 10.1002/erv.1045

Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), *National Health and Nutrition Examination Survey Data, 2003–2004*, U.S. Department of Health and Human Services, Hyattsville, MD.

Centers for Disease Control and Prevention (CDC; 2004). Physical activity for everyone: Physical activity and health. Retrieved from http://www.cdc.gov/nccdphp/dnpa/physical/everyone/health/index.htm.

Centers for Disease Control and Prevention. (2010). [Table illustration of the Trends in the Prevalence of Physical Activity]. *Youth Risk Behavior Surveillance (YRBS)*. Retrieved from http://www.cdc.gov/healthyyouth/yrbs/pdf/us_physical_trend_yrbs.pdf.

Centers for Disease Control and Prevention (CDC; 2011a). Balancing Calories: The Calorie Balance Equation. Retrieved from http://www.cdc.gov/healthyweight/calories/index.html#Striking%20a%20Balance.

Centers for Disease Control and Prevention (CDC; 2011b). Balancing Calories: Help Kids Develop Healthy Eating Habits. Retrieved from http://www.cdc.gov/healthyweight/children/index.html.

Chan, G., & Chen, C.T. (2009). Musculoskeletal effects of obesity. *Current Opinion in Pediatrics, 21*, 65-70.

Crow, S., Eisenberg, M. E., Story, M., & Neumark-Sztainer, D. (2006). Psychosocial and behavioral correlates of dieting among overweight and nonoverweight adolescents. *Journal of Adolescent Health*, 38, 569-574.

Davison, K. K., Marshall, S. J. & Birch, L. L. (2006). Cross-sectional and longitudinal associations between TV viewing and girls' body mass index, overweight status, and percentage of body fat. *The Journal of Pediatrics*, 149(1), 32-37. doi: 10.1016/j.jpeds.2006.02.003

de Beer, M. M., Hofsteenge, G. H., Koot, H. M., Hirasing, R. A., de Waal, H., & Gemke, R. J. (2007). Health-related-quality-of-life in obese adolescents is decreased and inversely related to BMI. *Acta Paediatrica*, 96(5), 710-714. doi: 10.1111/j.1651-2227.2007.00243

Delva, J., O'Malley, P. M., & Johnston, L. D. (2006). Racial/ethnic and socioeconomic status differences in overweight and health-related behaviors among American students: National trends 1986-2003. *Journal of Adolescent Health*, 39(4), 536-545. doi: 10.1016/j.jadohealth.2006.02.013

Economic Research Services. Rural Income, Poverty, and Welfare: Poverty Geography. Washington, D.C.: US Department of Agriculture; 2011.

Ebbeling, C. B., Feldman, H. A., Osganian, S. K., Chomitz, V. R. Ellenbogen, S. J., & Ludwig, D. S. (2006). Effects of decreasing sugar-sweetened beverage consumption on body weight in adolescents: a randomized, controlled pilot study. *Pediatrics*, 117(3), 673-680. doi: 10.1542/peds.2005-0983

Epstein, L. H., Paluch, R. A., Roemmich, J. N., & Beecher, M. D. (2007). Family-based obesity treatment, then and now: Twenty-five years of pediatric obesity treatment. *Health Psychology*, 26, 381–391.

Erermis, S., Cetin, N., Tamar, M., Bukusoglu, N., Akdeniz, F., & Goksen, D. (2004). Is obesity a risk factor for psychopathology among adolescents? *Pediatrics International*, 46, 296-301.

Freedman, D. S., Dietz, W. H., Srinivasan, S. R., & Berenson, G. S. (1999). The Relation of Overweight to Cardiovascular Risk Factors Among Children and Adolescents: The Bogalusa Heart Study. *Pediatrics*, 103(6), 1175.

Goldfield, G. S., Epstein, L. H., Kilanowski, C. K., Paluch, R. A., & Kogut-Bossler, B. B. (2001). Cost-effectiveness of group and mixed family-based treatment for childhood obesity. *International Journal of Obesity*, 25(12), 1843-1849. doi: 10.1038/sj.ijo.0801838

Google Maps. (2011). [Florida] [Street map]. Retrieved from http://maps.google.com/.

Greenleaf, C., Chambliss, H., Rhea, D. J., Martin, S. B., & Morrow, J. R. (2006). Weight Stereotypes and Behavioral Intentions toward Thin and Fat Peers among White and Hispanic Adolescents. *Journal of Adolescent Health*, 39(4), 546-552. doi: 10.1016/j.jadohealth.2006.01.013

Haas, J. S, Lee, L. B., Kaplan, C. P., Sonneborn, D., Phillips, K. A., & Liang, S. Y. (2003). The association of race, socioeconomic status, and health insurance status with the prevalence of overweight among children and adolescents. *American Journal of Public Health*, 93(12), 2105-2110.

Hamzaid, H., Talib, R. A., Azizi, N. H., Maamor, N., Reilly, J. J., & Wafa, S. W. (2011). Quality of life of obese children in Malaysia. *International Journal of Pediatric Obesity*, 6(5-6), 450-454. doi: 10.3109/17477166.2011.590206

He, K., Hu, F. B., Colditz, G. A., Manson, J. E., Willett, W. C., & Liu, S. (2004). Changes in intake of fruits and vegetables in relation to risk of obesity and weight gain among middle-aged women. *International Journal of Obesity*, 28(12), 1569-1574. doi: 10.1038/sj.ijo.0802795

Herrera, E. A., Johnston, C. A., & Steele, R. G. (2004). A Comparison of Cognitive and Behavioral Treatments for Pediatric Obesity. *Children's Health Care*, *33*(2), 151-167. doi: 10.1207/s15326888chc3302_5

Hill, A.J. & Silver, E.K. (1995). Fat, friendless and unhealthy: 9-year-old children's perception of body shape stereotypes. *International Journal of Obesity and Related Metobolic Disorders*, 19(6), 423-430.

Hughes, A. R., Farewell, K. K., Harris, D. D., & Reilly, J. J. (2007). Quality of life in a clinical sample of obese children. *International Journal of Obesity*, 31(1), 39-44. doi: 10.1038/sj.ijo.0803410

Hunter, H. L., Steele, R. G., & Steele, M. M. (2008). Family-based treatment for pediatric overweight: Parental overweight: Parental weight loss as a predictor of children's treatment success. *Children's Health Care*, 37(2), 112-125. doi: 10.1080/02739610802006510

Isnard, P., Michel, G., Frelut, M., Vila, G., Falissard, B., Naja, W., Navarro, J., & Mouren-Simeoni, M. C. (2003). Binge eating and psychopathology in severely obese adolescents. *International Journal of Eating Disorders*, 34, 235-243.

Janicke, D. M., Sallinen, B. J., Perri, M. G., Lutes, L. D., Huerta, M., Silverstein, J. H., Brumback, B. (2008). Comparison of Parent-Only vs Family-Based Interventions for Overweight Children in Underserved Rural Settings. *Archives of Pediatrics and Adolescent Medicine*, 162(12), 1119-1125.

Janicke, D. M., Gray, W. N., Matthews, A. E., Simon, S. L., Lim, C. S., Dumont-Driscoll, M. & Silverstein, J. H. (2011). A Pilot Study Examining a Group-Based Behavioral Family Intervention for Obese Children Enrolled in Medicaid: Differential Outcomes by Race. *Children's Heath Care*, 40(3), 212-231. doi: 10.1080/02739615.2011.590394

Jelalian, E., Hart, C. N., Mehlanbeck, R. S., Lloyd-Richardson, E. E., Kaplan, J. D., Flynn-O-Brien, K. T., & Wing, R. R. (2008). Predictors of attrition and weight loss in an adolescent weight control program. *Obesity*, 16(6), 1318-1323. doi: 10.1038/oby.2008.51

Joens-Matre, R. R., Welk, G. J., Calabro, M. A., Russell, D. W., Nicklay, E., & Hensley, L. D. (2008). Rural-Urban difference in physical activity, physical fitness, and overweight prevalence of children. *The Journal of Rural Health*, 24(1), 49-54. doi: 10.1111/j.1748-0361.2008.00136.x

Kalarchain, M. A., Levine, M. D., Arslanian, S. A., Ewing, L. J., Houck, P. R., Cheng, Y., Ringham, R. M., Sheets, C. A., & Marcus, M. D. (2009). Family-based treatment of severe pediatric obesity: Randomized, controlled trial. *Pediatrics*, 124(4), 1060-1068. doi: 10.1542/peds.2008-3727

Kalavainen, M. P., Korppi, M. O., & Nuutinen, O. M. (2007). Clinical efficacy of group-based treatment for childhood obesity compared with routinely given individual counseling. *International Journal of Obesity*, *31*(10), 1500-1508. doi:10.1038/sj.ijo.0803628

Kant, A. K. & Graubard, B. I. (2004). Eating out in America, 1987-2000: Trends and nutritional correlates. *Preventative Medicine*, 38(2), 243-249.

Kelleher, K. J., Taylor, J. L., & Rickert, V. I. (1992). Mental health services for rural children and adolescents. *Clinical Psychology Review*, *12*, 841-852.

King, A. C. & Canada, S. A. (2004). Client-related predictors of early treatment drop-out in a substance abuse clinic exclusively employing individual therapy. *Journal of Substance Abuse Treatment*, 26(3), doi: 10.1016/S0740-5472(03)00210-1

Kuczmarski, R.J., Ogden, C.L., Guo, S.S., Grummer-Strawn, L.M., Flegal, K.M., Wei, R. … Johnson, C.L. (2002). 2000 CDC growth charts for the United States: methods and development. *Vital Health Statistics*, *246*, 1-190.

Lee, J. M., Pilli, S. S., Gebremariam, A. A., Keirns, C. C., Davis, M. M., Vijan, S. S., & Gurney, J. G. (2010). Getting heavier, younger: Trajectories of obesity over the life course. *International Journal of Obesity*, 34(4), 614-623. doi: 10.1038/ijo.2009.235

Levine, M. D., Ringham, R. M., Kalarchian, M. A., Wisniewski, L., & Marcus, M. D. (2001). Is family-based behavioral weight control appropriate for severe pediatric obesity? *International Journal Of Eating Disorders*, 30(3), 318-328. doi: 10.1002/eat.1091

Lewis, R. D., Meyer, M. C., Lehman, S. C., Trowbridge, F. C. Bason, J. J. Yurman, K. H., & Yin, Z. (2006). Prevalence and degree of childhood and adolescent overweight in rural, urban, and suburban Georgia. *Journal of School Health*, 74(4), 126-132. doi: 10.1111/j.1746-1561.2006.00080.x

Loos, R. J. & Bouchard, C. (2003). Obesity – is it a genetic disorder? *Journal of Internal Medicine*, 254(5), 401-425. doi: 10.1046/j.1365-2796.2003.01242.x

Lutfiyya, M., Lipsky, M., Wisdom-Behounek, J., and Inpanbutr-Martinkus, M. (2007). Is rural residency a risk factor for overweight and obesity for U.S. children? *Obesity*, 15(9), 2348–2356.

Mallory, G.B., Fiser, D.H., & Jackson, R. (1989). Sleep-associated breathing disorders in morbidly obese children and adolescents. *Journal of Pediatrics*, 115(6): 892-897.

Mellin, A. E., Neumark-Sztainer, D., Story, M., Ireland, M., & Resnick, M. D. (2002). Unhealthy behaviors and psychosocial difficulties among overweight adolescents: The potential impact of familial factors. *Journal of Adolescent Health*, 31(2), 145-153. doi: 10.1016/S1054-139X(01)00396-2

Must, A., & Strauss, R. (1999). Risks and consequences of childhood and adolescent obesity. *International Journal of Obesity & Related Metabolic Disorders*, 23s2.

Neumark-Sztainer, D. D., Falkner, N. N., Story, M. M., Perry, C. C., Hannan, P. J., & Mulert, S. S. (2002). Weight-teasing among adolescents: Correlations with weight status and disordered eating behaviors. *International Journal of Obesity*, 26(1), 123-131. doi: 10.1038/sj.ijo.0801853

Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2012). Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. *The Journal of the American Medical Association*, 307(5), 483–490. doi: 10.1001/jama.2012.40

Ogden, C. L., Carroll, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999–2004. *Journal of the American Medical Association*, 395, 1549–1555.

Patrick, K, Calfas, K. J., Norman, G. J., Zabinski, M. F., Sallis, J. F., Rupp, J., Covin, J., & Cella, J. (2006). Randomized controlled trial of a primary care and home-based intervention for physical activity and nutrition behaviors: PACE+ for adolescents. *Archives of Pediatrics and Adolescent Medicine*, 160(2): 128-36.

Patrick, K., Norman, G., Calfas, K., Sallis, J., Zabinski, M., Rupp, J., & Cella, J. (2004). Diet, physical activity, and sedentary behaviors as risk factors for overweight in adolescence. *Archives of Pediatrics and Adolescent Medicine*, 158(4), 385-390.

Peters, J. C. (2006). Obesity Prevention and social change: What will it take? *Exercise and Sport Science Reviews*, 34(1), 4-9.

Podell, J. L. & Kendall, P. C. (2011). Mothers and fathers in family cognitive-behavioral therapy for anxious youth. Journal of Child and Family Studies, 20(2), 182-195. doi: 10.1007/s10826-010-9420-5

Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992) In search of how people change. Applications to addictive behaviors. *The American Psychologists*, 47 (9), 1102–1114.

Putnam J, & Allshouse J: Food Consumption, Prices and Expenditures, 1970–1997. In Frazao E (ed): "America's Eating Habits: Changes and Consequences." Washington DC: Food and Rural Economics Division, Economic Research Service, US Department of Agriculture. Agriculture Information Bulletin No. 750, 1999.

Stark, L. J., Spear, S., Boles, R., Kuhl, E., Ratcliff, M., Scharf, C., Bolling, C., & Rausch, J. (2011). A pilot randomized controlled trial of a clinic and home-based behavioral intervention to decrease obesity in preschoolers. *Obesity*, 19(1), 134-141. doi: 10.1038/oby.2010.87

Stern, M., Mazzeo, S. E., Gerke, C. K., Porter, J. S., Bean, M. K., & Laver, J. H. (2007). Gender, Ethnicity, Psychosocial Factors, and Quality of Life Among Severely Overweight, Treatment-Seeking Adolescents. *Journal of Pediatric Psychology*, 32(1), 90-94. doi: 10.1093/jpepsy/jsl013

Stradmeijer, M., Bosch, J., Koops, W., & Seidell, J. (2000). Family functioning and psychosocial adjustment in overweight youngsters. *International Journal of Eating Disorders*, 27(1), 110-114. doi:10.1002/(SICI)1098-108X(200001)27:1<110::AID-EAT14>3.0.CO;2-5

Strong, W. B., Malina, R. M., Blimkie, C. J., Daniels, S. R., Dishman, R. K., Gutin, B., ...Trudeau, F. (2005). Evidence based physical activity for school-age youth. *Journal of Pediatrics*,146(6), 719–720.

Surwit, R. S., Kuhn, C. M., Cochrane, C., McCubbin, J. A. & Feinglos, M. N. (1988). Diet-induced type-II diabetes in C57BL/6J mice. *Diabetes*, 37(9), 1163-1167.

Tsiros, M.D., Olds, T., Buckley, J.D., Grimshaw, P., Brennan, L., Walkley, J., Hills, A.P., Howe, P.R.C., Coates, A.M. (2009). Health-related quality of life in obese children and adolescents. *International Journal of Obesity, 33,* 387-400.

Unger, R., Kreeger, L., & Christoffel, K.K. (1990). Childhood obesity: medical and familial correlates and age of onset. *Clinical Pediatrics*, 29(7): 368-373.

Wilfley, D. E., Vannucci, A., & White, E. K. (2010). Early intervention of eating- and weight-related problems. *Journal of Clinical Psychology In Medical Settings*, *17*(4), 285-300. doi:10.1007/s10880-010-9209-0

Williams, N. A., Coday, M., Somes, G., Tylavsky, F. A., Richey, P. A., & Hare, M. (2010). Risk factors for poor attendance in a family-based pediatric obesity intervention program for young children. *Journal of Developmental and Behavioral Pediatrics*, 31(9), 705-712. doi:10.1097/DBP.0b013e3181f17b1c

Vernarelli, J. A., Mitchell, D. C., Hartman, T. J. & Rolls, B. J. (2011). Dietary energy density is associated with body weight status and vegetable intake in U.S. Children. *The Journal of Nutrition*, 141(12), 2204-2210. doi: 10.3945/jn.111.146092

Zeller, M., Kirk, S., Claytor, R., Khoury, P., Grieme, J., Santangelo, M., & Daniels, S. (2004). Predictors of attrition from a pediatric weight management program. *Journal of Pediatrics*, 144(4), 466-470.

Zhang, Y., Proeneca, R. Maffei, M. Barone, M. Leopold, L., & Friendman, J. M. (1994). Positional cloning of the mouse obese gene and its human homologue. *Nature*, 372(6505), 425-432.

BIOGRAPHICAL SKETCH

Page completed her bachelor's degree at the University of North Carolina at Chapel Hill in 2010. She is currently a second year graduate student in the Clinical and Health Psychology Program at the University of Florida with a concentration in pediatric psychology. Upon receipt of her master's degree in May 2012, she will continue her doctoral training in Clinical Psychology.