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The family influence on obesity and self-esteem and how obesity and self-esteem influences the family interactions later in life

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The family influence on obesity and self-esteem and how obesity and self-esteem influences the family interactions later in life

by

Allison E. Flittner

A dissertation submitted to the graduate faculty in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Human Development and Family Studies

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Iowa State University
Ames, Iowa
2012

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CHAPTER 1: GENERAL INTRODUCTION

The rate of childhood and adolescent obesity continues to increase (Center for Disease and Control and Prevention, 2011). Researchers and public policy makers have argued that the cause of increased childhood obesity is due to an increase in the amount of sugary foods consumed by children and a decrease in physical activity (Parson, Powers, Logan, & Summerbell, 1999). While these do contribute to childhood obesity, current research is investigating how other factors may influence childhood and adolescent obesity as well as the development of obesity into adulthood (Parson et al., 1999). Childhood and adolescent obesity has been shown to have a myriad of health effects that last into adulthood, including an increased risk of diabetes, heart disease, and mental health problems (Bronner, 1996; Stunkard, Faith, & Allison, 2003). Moreover, obesity in adolescence is related to being obese in adulthood (Bronner, 1996).

The influence of food perception, physical activity, leisure activities, parenting style, and child, maternal, and family stress on obesity are just a few areas currently being investigated (Ashcroft, Semmler, van Jaarsveld, & Wardle, 2008; Bronner, 1996; Birch, Savage, & Ventura, 2007; Lohman et al., 2009). In addition, current research has explored the impact of the family environment on obesity rates (Kitzman, Dalton III, & Buscemi, 2008; O'Brien et al., 2007; Harrison, et al., 2011; Lohman et al, 2009). Indeed, research has acknowledged that parents can have a direct effect (e.g., food available in the home, monitoring of food consumption) or indirect effect (e.g., parenting style) on their children’s eating habits and subsequent obesity (Ventura & Birch, 2007; Rhee, 2008). Research has shown parents with poor eating habits often have children with poor eating habits (Campbell et al., 2007).
Through parenting behaviors, adults set the tone for the home environment which promotes and encourages certain behaviors and practices in children. The research shows that a person’s parenting style influences how much they monitor their child’s eating habits, what type of food choice they give to their child, and how often they encourage their child’s positive behaviors (Hubbs-Tait, Kennedy, Page, Topham, & Harrist, 2008). Likewise, research has demonstrated that certain parenting styles are related to higher rates of obesity. In studies examining the influence of four different parenting styles (authoritative, authoritarian, permissive, and neglectful), authoritarian parenting was linked to the highest rates of childhood obesity and authoritative parenting was linked to the lowest rates of obesity (Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2005; Berge, Wall, Bauer, & Neumark-Sztainer, 2010). In addition, research has shown that implementing positive parenting styles help children who are overweight to lose weight (Rhee, 2008); however, little research has addressed how variations in maternal supportive parenting is related to adolescent’s obesity. In these aforementioned studies, parenting style was classified based on the parent’s responses to a questionnaire. Thus, this dissertation is one of the first to use a prospective approach and observational measures of parenting across adolescence to understand how a maternal supportive environment in early adolescence influences obesity during late adolescence.

While researchers have investigated the influence of parenting styles, there has been little research examining how obese parents interact with their children and if their own obesity influences their parenting style (Zeller, Boles, & Reiter-Purtill, 2008). There is research examining the effects of adult obesity on other areas of interpersonal relationships and life satisfaction, including relationship satisfaction with friends and significant others (Ball,
The result of this work has found that relationships and job satisfaction vary based on the weight status of the individual. While these studies examine interpersonal relationships obese individuals have with their friends and spouses, research has not yet investigated how weight status may influence an individual’s relationship with his or her own children. This study fills that void by examining how obese parents interact differently with their children.

In addition to the relationship of parenting and obesity, this study also considers the effects of self-esteem on obesity. Researchers have tried to understand if there is a relationship between self-esteem and obesity, as well as tried to establish the direction of the relationship (e.g., does obesity influence self-esteem or does self-esteem influence obesity). Often research studies find that there is a relationship between self-esteem and obesity (Strauss, 2000; Friedlander, Larkin, Rosen, Palermo, & Reline, 2003), however there are disputes about the direction of the relationship.

Besides assessing the relationship between self-esteem and obesity, this study examines the relationship between self-esteem and parenting. The relationship between parenting and self-esteem has also been scrutinized. Some research has demonstrated a relationship between parenting behaviors in adolescence and self-esteem in adulthood (DeHart, Pelham, Tennen, 2004; Whitbeck et al., 1991). Positive/warm parenting was related to higher levels of self-esteem in adolescence (DeHart et al., 2004; Whitbeck et al., 1991). Findings from this line of research also found that the gender of the parent was related to the changes in the child’s self-esteem (Gecas & Schwalbe, 1986; Allen, Hauser, Bell, & O’Connor, 1994). Self-esteem in adolescence has also been linked to parenting practices in adulthood (Mash and Johnston, 1983; Grimm-Thomas & Perry-Jenkins, 1994). Parents, who reported high
levels of self-esteem are more likely to display warmth to their children in adulthood (Grimm-Thomas & Perry-Jenkins, 1994).

The focus of this paper is to examine the influence of parenting in early adolescence on self-esteem and obesity and then the influence of self-esteem and obesity in adolescence on parenting adulthood. With this focus it is also important to take into consideration the influence of an individual’s own upbringing on how he or she parents their own children. Current research has shown a connection between how an individual was parented in adolescence and how they parent their children in adulthood (Neppl, Conger, Scarmella, & Ontai, 2009; Friesen, Woodward, Horwood, & Fergusson, 2012). This study is the first one to consider the influence of obesity and self-esteem on parenting while being able to control for an individual’s relationship with their own parents from adolescence.

The two studies of this project expand on this literature by examining the influence of maternal supportive parenting and self-esteem on adolescent obesity (Study 1) and the later effects of obesity and self-esteem on supportive parenting in adulthood (Study 2). The first paper of this dissertation advances the literature by addressing how maternal supportive parenting and self-esteem is directly linked to obesity but also how maternal supportive parenting indirectly influences the adolescent’s weight status during late adolescence. Specifically, this study examined the direct influence of a maternal supportive parenting during early adolescence (14-17 years old) on overweight and obesity in late adolescence (20-22 years old) and the mediating effect of adolescent self-esteem during late adolescence (17-19 years old) on these relationships. These effects were examined separately for male and female participants. In short, the first paper of the dissertation advances the research by examining how a maternal supportive parenting can directly and indirectly influence
adolescent obesity. This study also examined the influence of self-esteem on the adolescent’s development of obesity and the meditational role of self-esteem on the relationship between a maternal supportive parenting and obesity.

The second paper of this dissertation, “obesity and the family: the intergenerational transfer of a supportive parenting and the mediating effects of obesity and self-esteem,” extends the literature further by examining the role of a maternal supportive parenting in early adolescence on self-esteem and obesity (in middle adolescence), and how self-esteem (in middle adolescence) and obesity (in late adolescence) influence the individual’s expression of supportive parenting with their own children. This study is one of the first to consider how being obese may impact the supportive parenting provided to a child. In addition, this study takes into account the influence of an individual’s own interactions with their parents. This study explored the mediating effects of self-esteem from middle adolescence and obesity in late adolescence on the relationship between the individual’s own supportive parenting with his or her parents and the individual’s supportive parenting with his/her own children.

One of the strengths of the overall project is the availability and use of longitudinal data, which allows for continued examination of events from adolescence into adulthood. The longitudinal data allows the ability to control for events that occur during adolescence (e.g., being able to see how the adolescents’ were parented influences the interactions with their own children during adulthood). Unlike previous research, this study was able to utilize observations of parent-child interactions rather than relying on self-report. Again because of the study utilizing longitudinal data, the observations were of the parent and their adolescent, but also the adolescent, now an adult, and their own child.
There are some limitations of this dissertation as well. First, the sample is fairly homogenous. All of the participants are Caucasians from rural areas of the U.S. Midwest; thus, it may be difficult to generalize the results to other populations around the country. In addition, there is limited economic variability among the participants. Second, the participants of the study were asked to record their own height and weight. Some of the problems associated with self-report is under reporting of weight and over reporting of height (Nawaz, Chan, Abdurlrahman, Larson, Katz. 2001). This may have resulted in participants guessing their own weight/height and reporting inaccurate height/weight information. For the second study, the sample was further limited by the inclusion requirements. In order to be included in the analysis the individual needed to have a child who had participated in the parent-child observation. With the timing of the sample, this meant the child needed to be born before the parent was 30 years old. Because of this requirement over half of the original sample was removed from the study. In addition, the analyses are limited to only those individuals who had a child either in adolescence or early adulthood.

**Dissertation Organization**

The organization of this dissertation follows the alternative dissertation format and includes two manuscripts for journal submission. Chapter 2, “Adolescent obesity: The influence of parenting and self-esteem in early adolescence on obesity in late adolescence” is an empirical manuscript prepared for submission to the *Journal of Research on Adolescence*. The aim of the first study was to examine the effects of maternal supportive parenting and self-esteem on the adolescent development of obesity. For this study, Bayesian estimation was utilized to examine whether adolescent self-esteem at age 17-19 years mediated the
relationship between parent-adolescent interactions at age 13-17 years and weight status in late adolescence at age 20-22 years.

Chapter 3, “Obesity and the family: The effects of obesity and self-esteem on supportive parenting in adulthood” is an empirical manuscript prepared for submission to the Journal of Marriage and Family. The aim of this chapter was to continue to build upon Chapter 2 and examine the effects of weight status and self-esteem (from adolescence) on later supportive parenting during adulthood, ages 20-30. Chapter 3 reports whether self-esteem in middle adolescence and obesity in late adolescence, age 20-22 years, are related to later supportive parenting with their own children in adulthood. This study also considers the effects of intergenerational transfer of parenting style; by examining the relationship between how an individual is parented and how he or she goes on to parent his or her own child. Bayesian estimation was used to examine these relationships and to investigate if self-esteem and obesity influence an individual’s supportive parenting during adulthood after controlling for how the individual was raised by his or her own parent.

Finally, Chapter 4 is a general review and discussion of both studies. The primary findings from each study are discussed, including how they further current research on obesity and the family. Recommendations for future research are also provided.
Chapter 2. The Influence of Parenting and Self-Esteem in Early Adolescence on Obesity in Late Adolescence

A paper to be submitted to Journal of Research on Adolescence

Allison E. Flittner, Brenda J. Lohman, and Tricia K. Neppl

Abstract

Rising rates of obesity in the United States have resulted in trying to understand the influence of environmental and biological agents on adolescent and childhood obesity. While many researchers have focused on the influence of physical activity, food choices, and genetics on obesity rates, only a few studies have examined the influence of psychological processes, such as self-esteem, or the family environment on obesity development. Utilizing the Family Transitions Project (FTP), a longitudinal study that examines adolescents and their families over 23 years, this study extends the current state of the literature by considering the influence of supportive parenting on an adolescent’s development of obesity or being overweight. In addition, the mediating role of adolescent self-esteem on the relationship between supportive parenting and weight status were addressed. Results from the study show there was not a significant relationship between maternal supportive parenting in early adolescence and obesity in late adolescence. There was a significant relationship between maternal supportive parenting and self-esteem; however there was not a significant relationship between self-esteem and obesity. As a result, there was no meditational effect of self-esteem on the maternal supportive parenting and obesity relationship. Additional
analyses showed the results were not significantly different between male and female adolescents.

**Introduction**

Understanding the role of the parent-adolescent relationship on adolescent development has long been a concern among researchers. The parent-adolescent relationship has been found to influence an adolescent’s identity development, life satisfaction, academic achievement, and social and emotional development (Lerner & Steinberg, 2009). However, little research has addressed how the parent-adolescent relationship influences an adolescent’s chances of being obese. Furthermore, toward understanding the relationship between supportive parenting and obesity, it is important to consider the direct influence, but also how that relationship may be mediated by other individual characteristics. For the current study, the relationship between supportive parenting and obesity was evaluated, but also the meditational roles of self-esteem on this relationship. With the rising rates of adolescent obesity in the United States (Center for Disease and Control and Prevention, 2011), it is important to consider the influence of the parent-adolescent relationship on adolescent obesity.

Research on the parent-adolescent relationship and its effect on adolescent obesity often examines the influence of parenting style and its relation to particular feeding practices (Hubbs-Tait, Kennedy, Page, Topham, & Harrist, 2008; Hughes, Shewchuk, Baskin, Nicklas, & Qu, 2009). Current research has shown that parents have both a direct and indirect influence on their adolescent’s health and obesity (Harrison, et al., 2011). A direct way that parents influence their adolescent’s eating is by: food choices available in the household; the
eating habits they reinforce in their adolescent; and the eating behaviors they model for their adolescent (Ventura & Birch, 2007). A parent’s indirect means of affecting their child’s eating habits may be through parental reinforcement of adolescent unhealthy physical behaviors, general parenting style, and the influence of financial stressors on the parent-adolescent interactions (Ventura & Birch, 2007). This current study continues the examination of the parent-child relationship, but focuses on the influence of maternal supportive parenting on adolescent obesity.

While adolescent obesity has been related to different physical health conditions, there has been less consistent research about the effects of mental health on obesity (Parson, Powers, Logan, & Summerbell, 1999; Swallen, Reither, Haas, & Meier, 2005). Research has found that the relationship between self-esteem and obesity is complex (Mamun et al., 2007; Ata, Ludden, & Lally, 2007). Studies have shown that individuals who are obese tend to have lower self-esteem than healthy weight individuals (Strauss, 2000; Friedlander, Larkin, Rosen, Palermo, & Reline, 2003), however the direction between self-esteem and obesity is still being questioned (Friedlander, Larkin, Rosen, Palermo, & Reline, 2003). There has been limited research showing that being obese leads to lower reports of self-esteem (Swallen et al., 2005). In one study, there was a connection between low self-esteem in adolescence being related to poor physical health (Trzesniewski, et al., 2006). As a result of these mixed findings, the current study considered the influence between self-esteem in middle adolescence and obesity in late adolescence.
Theoretical Framework

The influence of the family environment on obesity is a complex topic. For research on the family environment it is important to consider this issue from a family systems perspective. Family Systems Theory explains individual development as a process of family interactions. Family members are interconnected and influence each other by their beliefs, actions, and values (White & Klein, 2008). Actions in families are often repeated and there are patterns of family interactions that emerge (White & Klein, 2008). Taking this one step further, the family interactions create rules and messages that are sustained in the family (White & Klein, 2008). In examining maternal supportive parenting, Family Systems Theory would suggest that patterns of parent-adolescent interactions are consistent across generations. These consistent patterns create messages that impact the adolescent’s self-esteem. As shown in Figure 1a and Figure 1b, this study examined the direct effect of maternal supportive parenting during early adolescence and self-esteem in middle adolescence on obesity in late adolescence. In order to examine the relationship between the individual and the family system, this study also considered the indirect effect of maternal supportive parenting on obesity, mediated through self-esteem (Figure 2).

Literature Review

Obesity

Maternal supportive parenting

Current research has demonstrated a relationship between parental feeding practices, general parenting behaviors surrounding food (e.g., modeling, food available in the home, etc.), and the frequency of family dinners with the chance of an adolescent becoming obese
The influence of parents stems from their prompting, use of rewards, restricting access to food, or controlling child food intake (Rhee K., 2008; Berge, Wall, Bauer, & Neumark-Sztainer, 2010). Because parenting practices directly influence an adolescent’s eating habits, researchers need to consider how parenting behaviors (e.g., monitoring, support) are related to a parent’s general parenting style (e.g., authoritative parenting).

In addition to direct influences of parenting on childhood obesity, there is also an indirect effect of parenting. Parenting style and family functioning can influence the amount of stress in the child’s life as well as the socioemotional development of the child. Both have been found to be related to a child’s development of obesity (Rhee, 2008); specifically, overweight adolescents are more likely to engage in unhealthy eating behaviors if they feel there is less family connectedness. Moreover, adolescents who reported feeling less family cohesion were more likely to have lower body satisfaction. While these previous studies did show the influence of family environment on the development of adolescent obesity, they did not consider how other characteristics of the individual could influence this relationship. This study fills that void by considering the possible influence of self-esteem on the relationship between the family environment and the development of obesity.

In addition to family connection, research has begun to examine how specific aspects of parenting style may influence a child’s eating habits. While parenting style may play a role in the child’s eating habits, a parent who is excessively restrictive over what a child eats may be faced with a child who rebels and feels like they want to eat the restricted food even more (Birch, Savage, & Ventura, 2007). In studies examining the influence of four different parenting styles (authoritative, authoritarian, permissive, and neglectful), authoritarian
parenting was linked to the highest rates of childhood obesity (Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2005; Berge et al., 2010). In these aforementioned studies, parenting style was classified based on the parent’s responses to a questionnaire. However, relying on an individual’s personal reflection of themselves can lead toward bias in his/her response (Bailey et al., 1998). Thus, the current study overcomes this limitation by examining observed maternal supportive parenting (e.g., communication, listening to adolescent, anger expressed towards the adolescent, etc.) as reported by an independent observer.

**Self-esteem**

Through parenting behaviors, adults set the tone for the home environment which promotes and encourages certain behaviors and practices in children. While there are clear effects of parenting on adolescent’s obesity (Rhee K., 2008; Berge et al., 2010; Rhee et al., 2005), there is less conclusive research on the relationship between obesity and adolescent self-esteem (Mendelson, White, & Mendelson, 1996; Swallen et al., 2005). Researchers have tried to understand if there is a relationship between self-esteem and obesity, as well as tried to establish the direction of the relationship (e.g., does obesity influence self-esteem or does self-esteem influence obesity). Often research studies find that there is a relationship between self-esteem and obesity (Strauss, 2000; Friedlander et al., 2003), however this research was based on cross-sectional studies rather than longitudinal work which makes it difficult to determine the direction of influence. Strauss (2000) demonstrated that the effects of obesity on adolescents’ self-esteem were dependent on the age of the participant. Strauss found that obese 9-10 year olds did not express differences in self-esteem from their non-overweight counterparts. However, when examining 13-14 year olds, there was a difference in self-esteem between overweight adolescents and healthy-weight children. Over time,
adolescents with lower self-esteem reported an increase in feelings of sadness, loneliness and nervousness (Strauss, 2000). In another study, decreases in self-esteem in 9-11 year old children were related to being obese (Friedlander et al., 2003).

Contrary to this research, other work has demonstrated that self-esteem and eating behaviors may have a causal and reciprocal relationship. Self-esteem has been related to eating disorders (Baumeister, Campbell, Krueger, Vohs, 2003). Researchers have demonstrated that there is a negative relationship between self-esteem and obesity in adolescence (Klaczyński, Goold, & Mudry, 2004); however this work was not able to establish a direction of effects. In order to establish direction, one study has investigated the relationship between binge eating and psychological well-being (Stice, Presnell, & Spangler, 2002). The study found that binge eating is related to eating disorders, including obesity. Psychological factors (including low self-esteem) were linked to increased likelihood of binge eating (Stice et al., 2002).

Recent research has found that there may be more effects of obesity on self-esteem than just the age of the participant. That is, self-esteem has been found to be based on feelings about appearance and interactions with others and less about actual weight (Mendelson et al., 1996; Ozmen, et al., 2007). Furthermore, an increase in teasing for being overweight was related to having a lower self-esteem (Eisenberg et al., 2003; Puhl & Latner, 2007). Researchers were not able to determine the interaction between being overweight and weight-based teasing (Eisenberg et al., 2003). These results might also be a consideration for parenting behaviors. That is, could supportive parenting have similar effects on the development of adolescent self-esteem? While this study does not examine parental teasing, it does consider how observed supportive interactions between a parent and their adolescent
may influence the weight of the adolescent, which may directly or indirectly influence self-esteem. The research in the area of self-esteem and obesity often overlooks the potential connection between parenting, self-esteem, and obesity and thus this study helps fill this void by examining the possible relationships among these three variables.

*Self-esteem and Parenting*

*Mother-adolescent interactions.* While the focus of the paper is the influence of parenting and self-esteem on adolescent obesity, in order to test the effect of mediation, it is also important to consider the existing relationship between parenting and self-esteem. As shown in Figure 2, parenting behavior may have more of an impact on adolescent development than solely their physical health. As research has previously demonstrated, parenting also has an impact on adolescent self-esteem. An adolescent’s self-esteem has been shown to increase with positive parent-adolescent interactions while negative parent-adolescent interaction inhibits self-esteem (Whitbeck et al., 1991). Likewise, maternal authoritative parenting was related to higher self-esteem in adolescence compared to permissive parenting (Milevsky et al., 2007). Reports of family connectedness have also been related to lower levels of psychosocial distress (Mellin, Neumark-Sztainer, Story, Ireland, & Resnick, 2002). In examining the influence of parenting on self-esteem, it is also important to consider the influence of gender on this relationship. Findings have also demonstrated that gender of the parent is related to the changes in the child’s self-esteem (Gecas & Schwalbe, 1986; Allen, Hauser, Bell, & O’Connor, 1994). For example, father-child interactions were not as predictive of adolescent self-esteem as mother’s interactions with their child (Allen et al., 1994). In order to account for the relationship between
parenting and self-esteem, this study also considered the mediation of self-esteem on the relationship between supportive parenting and obesity.

**Other Confounding Factors**

There are several demographic factors that have been shown to influence an adolescent’s development of obesity and self-esteem. This study assessed five potential confounding factors: adolescent’s gender; family income; mother’s marital status, mother’s education level, and mother’s body mass index (BMI). Specifically, parenting (Raley & Bianchi, 2006), self-esteem (Ata et al., 2007; Mendelson et al. 1996; Oldehinkel et al., 2008) and obesity (Heitmann, 2010) have been show to vary by gender (Ata et al., 2007; Oldehinkel et al., 2008). For parenting, mothers tend to be more supportive and expressive of praise, approval, and acknowledgement with daughters rather than with sons (Raley & Bianchi, 2006). In addition, females tend to have lower self-esteem and be faced with more teasing and pressure to be thin (Ata et al., 2007).

Regarding family income level, girls who come from low-income families are at a greater risk of being obese (Lee, Harris, & Gordon-Larsen, 2009; Parson et al., 1999). Moreover, low-income families are less likely to monitor their children’s eating behaviors (Lee et al., 2009). Finally, living in a low income household may result in limited access to health care, limited resources to provide a nutritious meal and limited amount of funds for treatment.

Many of the qualities of supportive parenting, such as providing an adolescent with warmth, setting rules and boundaries, monitoring behaviors, and being supportive, have been shown to be significantly influenced by the marital status of the parents (Simons & Johnson, 1996). Some research indicates that in single-parent homes, there is less income and more
stress on the family, resulting in less time and resources to devote to positive interactions between parent and child (Conger & Ge, 1999; Lempers, Clark-Lempers, and Simons, 1989). Research has also shown an influence of parental education on their interactions with their children. Parents with higher levels of education have been shown to be open to their children’s suggestions when faced with problems to work through as a family (Conger, Williams, Little, Masyn, & Shebloski, 2009). Finally, adolescents who have obese parents are more likely to be obese (Parson et al., 1999). For these reasons, each of these variables were consider as control variables.

**Central Aims and Hypotheses**

In understanding the role of parenting on the development of obesity and psychological development in adolescence, this study examined the relationship between observed maternal supportive parenting, adolescent self-esteem, and adolescent obesity. Three specific hypotheses were posed:

1. Maternal supportive parenting during early adolescence would decrease an adolescent’s likelihood of being obese in late adolescence (Figure 1a).
2. Higher self-esteem during middle adolescence would decrease an adolescent’s report of obesity in late adolescence (Figure 1b).
3. Self-esteem in middle adolescence would mediate the effects of maternal supportive parenting in early adolescence on adolescent development of being overweight/obesity in late adolescence (Figure 2).
Methods

Sample

Data was taken from the Family Transitions Project (FTP), which includes the Iowa Youth and Family Project (IYFP) and the Iowa Single Parent Project (ISPP). Families were contacted initially in 1989 to be a part of a longitudinal study, the IYFP. In order to qualify for the study families needed to have: (1) an adolescent in seventh grade, referred to as the target; (2) a sibling within four years of that target adolescent; and (3) reside in a two-parent home. The target, the sibling, and their parents all took part in the interviews and questionnaires. In 1989, 451 families who were all Caucasian and living in small towns or on farms in Iowa participated. The families were all lower-middle to middle-class families (Conger & Elder, 1994).

The families who participated in the ISPP study were contacted initially in 1991 (Neppl, Conger, Scarmella, & Ontai, 2009; Simons, 1996). In order to qualify for this study there needed to be: (1) an adolescent in the eighth or ninth grade (once again referred to as the target); (2), a sibling within four years of that target; and (3) they needed to be living in a single parent home. In combining the two projects to create the Family Transitions Project, only the ISPP target children who were enrolled in 9th grade were included, so as to be the same age as the youth already enrolled in the IYFP. All of the single-parent homes were headed by mothers who had divorced from their husbands within 2 years preceding the study. The ISPP target child, the sibling, and his or her single mother were all included in the interviews and questionnaires similar to that of IYFP. In the initial ISPP interview there were 108 families selected to be a part of the research study. In 1994, the two studies (IYFP
and ISPP) were combined to create the Family Transition Project (FTP), with a total of 559 families.

The overall retention rate for the study is 90% (Neppl, Conger, Scarmella, & Ontai, 2009). For the families that started in the IYFP, the first year of data used for this study was the third year of collection in order to include both the families from the IYFP and the ISPP. By the third year of the study, 11 families had already withdrawn from the larger study, leaving 548 families to participate in this current study. With the focus of the study being obesity, any target who was classified as underweight or had a missing weight status, were removed from the study (18 under weight, 58 missing weight). This left the sample at 472 families to participate. Another 10 families were missing data on the observed supportive parenting measure and were dropped from the study, leaving 462 participating families in the final sample.

**Procedure**

The basic procedures for both the IYFP and the ISPP were the same. After it was determined that the family met the criteria to be in the study, they were visited by field interviewers twice per year for the first couple of years and then after the target graduated high school he or she was visited every other year. In the first meeting with researchers the family was asked to complete a set of questionnaires. With the researcher present, each family member completed his or her own questionnaires independently from the other family members. Once the family completed the questionnaires they were sealed and taken by the researcher. The interviewer would also leave behind additional questionnaires for the family to finish before the second visit (Conger & Elder, 1994). The second visit occurred two
weeks after the first visit. In the second session, researchers would focus on observing the family interactions. The family was assigned a series of different tasks to complete, including a problem solving task and a discussion task (Conger & Elder, 1994).

For this study, only data from the family discussion task were analyzed. For this task, all family members (parents, target, and sibling) discussed a series of questions. The questions were printed on cards that were labeled for either parent or teenager to indicate who was to read the question. The questions on the cards related to school activities, family rules, and discipline. The individual who read the card would give their response to the question first. Then the remaining family members would provide their answer to the question. After everyone had given their response to the question, the family would then discuss the answers that were given. Once the family felt they had discussed the question thoroughly, they went on to the next card. This continued for 25 minutes (Neppl et al., 2009).

The task was designed to elicit both positive and negative interactions between the family members. During the interaction task the researcher was not present in the room, instead there was a video camera recording the interactions and there were cards left in the room instructing the family what to discuss. After the family completed the session, the recorded interactions were coded by researchers (Conger & Elder, 1994) using the Iowa Family Interaction Rating Scales (Melby & Conger, 2001; Melby et al., 1998). In order to include all of the targets in the FTP, only the mother-child interactions were used.
**Measures**

*Obese/overweight*

The G2’s body mass index (BMI) was calculated using adolescent’s self-reported height and weight (lbs/in\(^2\) * 703). BMI scores were then compared to the Center for Disease Control and Prevention (CDC) growth charts, using age and gender of the adolescent as reference values (Center for Disease Control and Prevention, 1999-2002). An adolescent was classified into one of four categories: underweight (BMI < 5\(^{th}\) percentile), healthy weight (BMI 5\(^{th}\) to 84\(^{th}\) percentile), overweight (BMI 85\(^{th}\) to 94\(^{th}\) percentile) or obese (BMI > 95\(^{th}\) percentile). Adolescents in the overweight and obese categories were combined to create the variable of interest (value = 1). The comparison group were adolescents classified in the healthy BMI group (value = 0). Since the focus of this paper is on overweight and obese adolescents, those who were underweight were omitted from the study. BMI was calculated from the height and weight measures of the target in 1997 when the adolescent was between the ages of 20-22 years old.

*Self-esteem*

To assess the adolescent’s self-esteem, the Rosenberg self-esteem scale was utilized (Rosenberg, 1965). It is a self-reported questionnaire that consisted of 10 questions. The adolescent was asked to respond to each of the questions using a 5-point scale (1-strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree). Two of the items were reverse coded. A composite mean score was created from this scale, with a higher score indicating more self-esteem. Self-esteem was measured in 1994 when the target adolescent was between the ages of 17-19 years old. The reliability score for this study was found to be \(\alpha=.90\).
Maternal supportive parenting

Maternal supportive parenting was a latent variable created from the following observed variables: positive mood (PM); listener responsiveness (LR); and warmth/support (WM). Each of these measures was based on a 9-point scale using the Iowa Family Interaction Rating Scales (Melby & Conger, 2001; Melby et al., 1998). Responses ranged from 1 - no evidence of the behavior, to 9 - highly characteristic of the parent (Melby et al., 1998).

Positive mood was characterized by the appearance or demonstration of content, happy, and optimistic positive behavior (Melby et al., 1998). Listener responsiveness was characterized by interactions that included showing an interest in another family member’s ideas, behaviors, and responses (Melby et al., 1998). Warmth/Support was characterized by interactions that included expressing appreciation, care, praise, concern, or support to the child (Melby et al., 1998).

Scores for the observation measures were taken from the discussion task. To get a more representative sample of the parenting behavior, the scores on each of the scales were taken at two different years of assessment (1991 and 1992) when the adolescent was 13-17 years old. The scores for each of these scales were then averaged across the two years. The interclass correlation of the video tape coding was found to be .40-.77. Using IBM SPSS 20.0, a principal component analysis was completed the eigenvalues were 1.96, .66, and .38. In addition, all of the variables had factor loadings greater than .40 (positive mood =.84, warmth/support =.67, and listener responsiveness =.47); making it significant to create an overall maternal supportive parenting variable. The reliability between these three measures was $\alpha= .726$. 
**Covariates.**

This study controlled for the adolescent’s gender (male=1), the number of years of completed education of the parent, the family’s reported income in dollars (log (income+1)), the mother’s report of marital status (married=1), and the mother’s report of overweight or obesity (overweight/obese=1, healthy=0). All control variables were assessed in 1991. As a result of potential differences in adolescent obesity rates and supportive parenting based on gender, models were tested separately for males and female targets.

**Results**

**Analytic Approach**

Utilizing IBM SPSS 20.0 software, descriptive statistics were run on each of the variables to assess minimum, maximum, mean scores, and standard deviations. Results are presented in Table 1. T-test was then used to analyze the sample differences between the final sample and original sample of participants. AMOS (Arbuckle & Wothke, 1999) was utilized to run correlations (see Table 2) and then path analysis using Bayesian estimation (see Figure 2 and 3). Since the variable obesity is a dichotomous variable, traditional maximum likelihood method of estimation was not appropriate. Maximum likelihood estimations assume that all variables are either ordinal or continuous (Quinn, 2004). While Bayesian estimations have been around for centuries, it has only been recently that there has been more use and acceptance of the Bayesian estimation; much of the observed increase in utilization of Bayesian estimation has been due to the increased availability and improvements in statistical software for computers (Gill, 2004; Arbuckle, 2010).
A key principle with Bayesian estimation is the reliance on probabilities and distribution of estimates, rather than a single point estimates (Arbuckle, 2010). This means that approach can be used with small as well with large samples (Lee & Song, 2004). When a large sample is used, the results reflect a similar format to those presented in maximum likelihood estimations. As such the parameter mean of the posterior distribution ($m$) would be equivalent to a beta coefficient ($\beta$) seen in maximum likelihood estimation. Likewise Bayesian estimation does not report $p$-values, instead it reports “credible intervals” ($ci$) which report the likelihood that an estimate does not contain zero (Arbuckle, 2010). The goodness-of-fit will also be evaluated for the model. Unlike the common model statistics for maximum likelihood estimation, Bayesian estimation in AMOS solely reports the posterior predictive (PP) $p$-value. For these models a good fit is when the PP falls between .3 and .7 (Gelman, Meng, & Stern, 1996; Lee & Song, 2004).

The demographics of the participating families (Table 1) showed that 45% of the targets were male, between the ages of 13-16 years old (currently enrolled in 9th grade), with an average age of 14.63 years old. Seventy-eight percent of the target’s came from two parent households. The target mothers’ ages ranged from 31 to 55 years old, with an average age of 39 years old. Most of the mothers had at least some college education. At the beginning of this study, most of the mothers were classified as either overweight or obese. Correlations between each of the variables are displayed in Table 2.

The covariate estimates for each of the variables is shown in Table 3. From the results, there was a significant influence of the mother’s education, mother’s marital status, and the family income on the expression of supportive parenting. Mothers with higher levels of education were more likely to express more supportive parenting towards their adolescent
(p<.05). In addition, the mother’s age and education level were also influential on the adolescent’s self-esteem. Adolescent males were more likely to express lower self-esteem. Male adolescents were less likely to be obese in late adolescence. In addition adolescent females were more likely to have supportive interactions with their mothers in comparison to male adolescents.

Bias in the Longitudinal Sample

With the large number of participants who either did not complete the study or were removed from the study, analyses were examined to see if the remaining sample was significantly different from the original sample. The results of an independent t-test showed that there were some differences between the original sample and the final sample used for this analysis. The reports for positive mood (t=−3.97, p<.05), listener responsiveness (t=−4.60, p<.01), and warmth/support (t=−2.97, p<.05) were significantly higher for the final sample in comparison to the original sample. In addition, the only demographical difference between the original sample and the final sample was the age of the mothers. The average age of the mother involved in the final sample was older than the average age of original sample (t=−2.21, p<.05).

After examining the differences between the original sample and final sample, each of the hypotheses were analyzed.

Hypothesis One

Maternal supportive parenting during early adolescence would decrease an adolescent’s likelihood of being obese in late adolescence.

To assess hypothesis one, the direct relationship between maternal supportive parenting in early adolescence and obesity in late adolescence was examined. Using Bayesian
estimation the results of the analysis demonstrated that there was not a significant
relationship between maternal supportive parenting in early adolescence and obesity in late
adolescence. Results for the analysis are shown in Figure 3a.

*Hypothesis Two*

Higher self-esteem during middle adolescence would decrease an adolescent’s report of
obesity in late adolescence

To assess hypothesis two, the direct relationship between self-esteem in middle
adolescence and obesity in late adolescence was examined. The results of the Bayesian
estimation showed there was not a statistically significant relationship between self-esteem in
middle adolescence and adolescent obesity in late adolescence. The results are shown in
Figure 3b.

*Hypothesis Three*

Self-esteem in middle adolescence would mediate the effects of supportive parenting in early
adolescence on the development of being overweight/obese in late adolescence.

Results are presented in Figure 4. To assess hypothesis three, Bayesian estimation was
again utilized. For this model, maternal supportive parenting and self-esteem were both
added to the model. A direct path was added from maternal supportive parenting in early
adolescence to adolescent obesity in late adolescence. A second direct path was added from
self-esteem in middle adolescence to obesity in late adolescence. Then, an indirect path from
maternal supportive parenting in early adolescence to self-esteem in middle adolescence to
predict obesity in late adolescence was added to the model.

The direct pathway from maternal supportive parenting in early adolescence and obesity
in late adolescence was again not significant. The direct pathway from adolescent self-
esteem in middle adolescence and obesity in late adolescence was also not significant. In examining the indirect effect, the path from parenting to self-esteem was significant, yet the path from self-esteem to obesity was not significant. Therefore, there was not a meditational relationship.

The goodness-of-fit was also evaluated for this model. The overall fit of the model was found to be very good, with a posterior predictive $p$-value, $PP=.50$. While the overall pathways in the model did not prove to be predictive, the overall model did meet the requirements of the goodness-of-fit test.

**Discussion**

The aim of this study was to investigate the influence of parenting style on obesity in late adolescence and to consider the possible mediation effects of self-esteem on this relationship. The results did not confirm the first, second or third hypotheses. Maternal supportive parenting in early adolescence did not have an effect on the target’s obesity in late adolescence. The results also demonstrated that there was not a significant relationship between adolescent self-esteem in middle adolescence and obesity in late adolescence. As a result, there was no mediation between supportive parenting in early adolescence and obesity in late adolescence through self-esteem in middle adolescence.

The results contradict some of the current research on the influence of the parent on adolescent obesity. In previous studies, parenting style was found to be significantly related to childhood and adolescent obesity (Rhee , et al., 2008; Birch et al., 2007); this current study contradicts results from these previous studies. Much of the current literature, while being based on the parenting style, often examine parenting behaviors that related directly to eating habits, such as monitoring a child’s food intake (Rhee, 2008; Berge et al., 2010; Birch et al.,
2007), rather than looking specifically at parenting behaviors as they relate to general parenting practices. In addition, in the current study, the observations were based on the parents’ behavior toward the adolescent during a discussion task as opposed to previous research which examined a meal or eating task. This would suggest the importance of further research into what specific features of parenting style: such as warmth, listening, dominance, etc., influences the adolescent’s development of obesity over time. In addition other research regarding parenting styles and obesity utilize self-report parenting styles (Rhee et al., 2005; Berge et al., 2010) as opposed to observation data, as was used in this current study. By relying on self-reported information, this could lead to parents misrepresenting themselves and their interactions with their children (Bailey et al, 1998).

While previous research demonstrated that there was a relationship between obesity and self-esteem for adolescents (Klaczyński et al., 2004; Friedlander et al., 2003), this study did not find the same results. One reason for the difference could be ages of the adolescents being examined. In previous studies the ages of the participants were younger than the current study (Friedlander et al., 2003; Strauss, 2000) with some studies examining the period of 9-14 years old. With the current study, the youngest participant was 13 years old and self-esteem and obesity were not examined until the individual was at least 17 and 19 years old, respectively.

In addition to the difference in ages, the previous research on self-esteem was able to include other variables (i.e. body satisfaction, binge eating, teasing : Ozman et al., 2007; Friedman et al., 2002; Eisenberg et al., 2003; Puhl & Latner, 2007) that may influence the relationship between self-esteem and obesity. The lack of results from the current study may suggest that other factors, such as the adolescent’s perception of the interactions or how
much teasing an individual experiences (Mendelson, et al. 1996; Ozmen, et al., 2007) may influence the relationship between self-esteem and obesity. This may provide support and considerations for future research into how a person’s perception and teasing influences their self-esteem and how in turn influences obesity.

The differences seen in the current study and previous research could also be impacted by the attrition of the sample. The analysis of the final sample showed a sample that had higher reports of supportive parenting from mothers to the target adolescent. As a result, this meant there was less variance in the current study and may have limited the results. In the future it would be important to include more families that utilize less supportive parenting to increase the variability. Another reason for the differences could be that this study utilized longitudinal data, rather than cross-sectional data (Strauss, 2000; Friedlander et al., 2003). By utilizing longitudinal data, the study was able to examine the changes that occur over the course of adolescence.

In addition, the overall study examined the possible differences between male and female adolescents. While the results did indicate that the adolescent’s gender did significantly influence supportive parenting, self-esteem, and obesity, there was not a significant difference between males and females on the pathways between the variables. While previous research has shown a significant influence of gender on parenting (Raley & Bianchi, 2006), self-esteem (Ata et al., 2007; Mendelson et al. 1996; Oldehinkel et al., 2008) and obesity (Heitmann, 2010), these research studies did not consider the influence of gender on different pathways between variables. As a result, this study supports previous findings that the gender of an adolescent is related to supportive parenting, self-esteem, and obesity,
however the relationship between these variables is unaffected by the gender of the adolescent.

Another reason for the lack of differences between genders of adolescents may be due to the fact that this study only included the mother-adolescent interactions. The study did not include father-adolescent interactions. Research has found that mothers and fathers interact and have different relationships with their adolescents (Lerner and Steinberg, 2009). In addition, the gender of the parent is found to have different influences on the self-esteem of the adolescent (Gecas & Schwalbe, 1986; Allen et al. 1994). The lack of differences expressed in this analysis could also then be due to the sole inclusions of mother-adolescent interactions and in the future it would be important to also consider the possibility of father-adolescent interactions.

Limitations

There were three primary limitations to this study. First, in order to have the largest sample involved in the study, only mother-adolescent interactions were utilized. In the future it would be important to consider the father-adolescent relationship as well. The second limitation was the comparison of the families included in the study. Participants, who remained in the study, were more likely to come from families in which there were higher reports of supportive parenting than the families that did not complete the study. A final limitation to this study was the participant reported height and weight. For some individuals this may mean over-reporting or under-reporting their height and weight (Nawaz, Chan, Abdurlrahman, Larson, Katz, 2001). In future studies it would be important for trained interviewer to personally collect the participants’ height and weight, rather than relying on self-reported height and weight.
Future Research

While the current study did not find any significant results, the study can help shape future research. As previously mentioned, the sample in this study had limited variability in the expression of supportive parenting. Future studies should consider utilizing a more representative sample that includes more families with limited expressions of supportive parenting. In addition, future research should consider the effects of the parent teasing the adolescent and specifically teasing the adolescent about their body. This study was not able to include data on the teasing behavior of the parent. While observational data provides an enriched example of the interactions between a parent and an adolescent, this study did not take into account the parent or the adolescent’s perception of the interaction. Nor did this study consider the participant’s overall thoughts about the parent-adolescent relationship. Future research may want to consider how an adolescent’s perceptions can influence their interpretation and as a result their self-esteem. Finally, this study was limited in only being able to observe parent-adolescent interactions and there was no available data for the interactions between the adolescent and individuals in other environments. While it was beyond the scope of this study, future research may want to consider observing the adolescent in other environments, such as their neighborhood or school to see how interactions with peers and other community members may influence their self-esteem and their likelihood of becoming obese.
References


www.cdc.gov/healthyyouth/obesity/facts.htm


FIGURES

Figure 1a: Maternal supportive parenting on Adolescent Obesity

Figure 1b: Self-esteem on adolescent obesity
Figure 2: Meditational Model

Maternal supportive parenting (1991-1992) 13-17 years old

Positive Mood

Listener Responsiveness

Warmth/Support

Adolescent Self-Esteem (1994) 17-19 year olds

Adolescent Obesity (1997) 20-22 years old
Figure 3a: Maternal supportive parenting on Adolescent Obesity

Figure 3b: Self-esteem on Adolescent Obesity
Figure 4: Meditational Model

Positive Mood

Listener Responsiveness

Warmth/Support

Maternal supportive parenting (1991-1992) 13-17 year old

Adolescent Self-Esteem (1994) 17-19 years old

Adolescent Obesity (1997) 20-22 years old

Notes:
PP $p$-value=.5

*credible interval set at .95 does not include 0.
**TABLES**

Table 1. *Descriptive statistics of study variables (N=462)*

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<th>Minimum</th>
<th>Maximum</th>
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<td>.48</td>
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Table 2. Correlation coefficients amongst variables (N=462)

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Notes.
** are significant at $p < .01$
* are significant at $p < .05$
Table 3. Covariate estimates (standardized beta)

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<td>Target’s Gender</td>
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<td>-.14*</td>
<td>-.32**</td>
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*credible interval set at .95 does not include 0

A paper to be submitted to The Journal of Marriage and Family

Allison E. Flittner, Brenda J. Lohman, and Tricia K. Neppl

Abstract

Currently there is little research on the effects of obesity and self-esteem on family functioning over time, or more specifically, across two generations. Utilizing the Family Transitions Project (FTP), a longitudinal study that examines adolescents and their families over 23 years, this study extends the current literature by examining how maternal supportive parenting during early adolescence influences obesity in late adolescence and ultimately how both of these influence the individual’s parent-child relationships with their own children in adulthood. This study also considers the possible effects of self-esteem on the aforementioned relationships. The results demonstrate that both adolescent self-esteem (in middle adolescence) and obesity (in late adolescence) were influenced by supportive parenting in early adolescence. Results show adolescents who reported higher levels of self-esteem had more supportive parenting with their own children in adulthood. In addition, participants with a healthy weight status in late adolescence were more likely to have more supportive parenting with their own children, even after taking into consideration the influence of the participants own upbringing (e.g., the interaction the participant have with
their parent in adolescence). These results were shown to be consistent for female and male participants.

**Introduction**

With growing rates of obesity (Center for Disease and Control and Prevention, 2011), research has examined the effects of obesity on an individual’s physical health, mental health, and his or her interpersonal relationships (Parson, Powers, Logan, & Summerbell, 1999). However, little research to date has examined how late adolescent obesity influences how an individual interacts with his or her own children in adulthood (Zeller, Boles, & Reiter-Purtill, 2008). To fully understand the influence of obesity on parenting, it is important to consider other aspects of the individual’s own history. Research has shown that an individual’s parenting style is influenced by the parenting style of his or her own parents (Neppl, Conger, Scarmella, & Ontai, 2009). Individuals who experience more positive parenting from their own parents are more likely to express positive parenting towards their own children.

In addition to the influence of parenting, it is also important to consider the role of psychological well-being on parenting behaviors. While there are many psychological aspects that have been found to affect an individual’s life style (Trzesniewski, et al., 2006), this current study focused on the effects of self-esteem in adolescence on parenting in adulthood. An individual’s self-esteem has been shown to be related to how an individual parents their children (Grimm-Thomas & Perry-Jenkins, 1994). While the relationship between self-esteem and parenting and the relationship between obesity and parenting are the primary focus of the study, this study also takes into consideration the relationship that may
exist between self-esteem and obesity. Much of the current research on the relationship between self-esteem and obesity is based on cross-sectional data (Strauss, 2000; Friedlander, Larkin, Rosen, Palermo, & Reline, 2003). This study extends the current research by utilizing longitudinal data and examines the effects of self-esteem and obesity on expressions of supportive parenting for an individual over the course of adolescence into adulthood. In attempting to investigate the influence of obesity on how an individual interacts with their child, this study is the first investigation to consider the influence of an individual’s own upbringing and self-esteem from adolescence on his or her parenting with his or her own child. Currently there is a lack of research examining the relationship between obesity and self-esteem on parenting while controlling for how an individual was parented, this current study fills the void by considering these relationships.

**Theoretical Framework**

To examine the influence of obesity on supportive parenting, this study relies on the Family Systems Theory to guide this work. The Family Systems Theory is about each member within a family being interconnected with each other (White & Klein, 2008). As a result, each family member is influenced by everyone else in the family. In the current study, this will be evaluated by examining how individual characteristics influence the family environment. More specifically, how an individual’s self-esteem and obesity influence the parent-child relationship.

Family System Theory recognizes there are patterns of interactions that emerge from the family context. Families repeat certain interactions (White & Klein, 2008). In this study, the concept of repeated patterns is taken into consideration by examining how an adult’s own
upbringing influences how they interact with their own children. This study examined intergenerational patterns of parenting and how an individual was raised by his or her own parents and how it influences their supportive parenting.

**Literature Review**

*Obesity and Parenting*

Currently, there is little research on how overweight or obese parents interact with their children (Zeller et al., 2008). There is research examining the effects of adult obesity on other areas of interpersonal relationships and life satisfaction, including relationship satisfaction with friends and significant others (Ball, Crawford, & Kenardy, 2004). While these studies examine interpersonal relationships obese individuals have with their friends and spouses, research has not yet investigated how weight status may influence an individual’s relationship with his or her own children.

In the limited research on obesity and parenting styles, researchers found that the mother’s body mass index (BMI) was not a significant predictor of the warmth or psychological control expressed to their children (Zeller et al., 2008); however this study did not classify the women based on their weight status (e.g., healthy weight, overweight, obese). As a result, there may have been differences if these women had been categorized and comparisons between the healthy mothers and the overweight or obese mothers had been made with how they ultimately interacted with their child. In addition, Zeller et al. (2008) did not control for the parent’s own childhood experiences of supportive parenting or the influence of self-esteem on future interacts with their children. Therefore, the current study
examined the influence of the parent’s report of self-esteem in late adolescence (19-21 years old) and how it related to obese parenting interactions with their children in adulthood.

In addition to examining how obesity in late adolescence influences supportive parenting in adulthood, this study also considered the influence of maternal supportive parenting in early adolescence on the development of obesity in late adolescence. Current literature has found that parenting style (authoritative, authoritarian, neglectful, permissive) does influence an adolescent’s obesity (Rhee K., 2008, Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2005; Wake, Nicholson, Hardy, & Smith, 2007; Berge, Wall, Bauer, & Neumark-Sztainer, 2010). Authoritative parents demonstrate a pattern of monitoring food consumption, modeling of healthy eating habits, and encouraging positive eating behaviors. High monitoring and feeding demands is related to authoritarian parenting, while low modeling and monitoring of feeding habits is related to permissive parenting (Hubbs-Tait, Kennedy, Page, Topham, & Harrist, 2008). In previous studies, parenting style was based on a classification of parenting behaviors (authoritative, authoritarian, etc.). Rather than classifying parenting behavior as a particular style, this current study examines the effects of supportive parenting behavior on a continuum. In addition, the classification was based on the participants’ responses to questionnaires; this current study will rely on observational data to classify the parents’ behaviors.

For this current study, obesity and parenting were each examined at two different time points. The study considered the effects of parenting in early adolescence (14-17 years old) on the development of obesity in the adolescence (17-19 years old). Next, the study assessed the influence of obesity in late adolescence (ages 20-22 years old) on the parenting environment in adulthood (20-30 years old). By examining obesity and parenting at two
different time points, it allowed for comparisons to be made across time. Assessing supportive parenting at two different time points allowed for analysis between how an individual was parented and how an individual parents their child, or intergeneration transfer of parenting (this will be discussed in more detail later in the paper). For obesity, it allowed for analysis between obesity over time. Previous research has demonstrated that obesity in adolescence is often a predictor of obesity in adulthood (Bronner, 1996; Kitzman, Dalton III, & Buscemi, 2008). Specifically, individuals who are obese in adolescence are more likely to be obese in adulthood. As was previously stated, in this study there is an expected relationship between supportive parenting in early adolescence and obesity in middle adolescence and there is an expected relationship between obesity in late adolescence and supportive parenting in adulthood. This current study also expects there to be a relationship between obesity in middle adolescence and obesity in late adolescence.

**Self-esteem and Parenting**

In scrutinizing the research on self-esteem and parenting, there is not a clear and conclusive relationship. For example, some research shows that self-esteem influences how an individual parents his or her own child (Mash and Johnston, 1983; Grimm-Thomas & Perry-Jenkins, 1994) while other research shows that perception of lifestyle is more predictive of parenting rather than individual self-esteem (Gecas & Schwalbe, 1986). In one study that found a relationship between self-esteem and parenting, higher self-esteem was related to displaying more warmth and positivity towards their child (Grimm-Thomas & Perry-Jenkins, 1994). While there is mixed research in this area, this study continues to build upon the current literature examining the relationship between self-esteem and parenting.
Unlike previous research that considered self-esteem in adulthood, the current study analyzed the influence of self-esteem in middle adolescence on parenting in adulthood.

The current study considered the influence of supportive maternal parenting on adolescent development of self-esteem. Research has found effects of parenting interactions on the individual’s self-esteem. Young adults who reported more nurturing parent-child relationships in childhood had higher levels of self-esteem in adulthood (DeHart, Pelham, Tennen, 2004). Research has also demonstrated that adolescents who experience an increase in positive parenting report higher levels of self-esteem in adolescence and those adolescents who experience harsher parenting report lower levels of self-esteem (Whitbeck et al., 1991). In addition, maternal authoritative parenting was found to be related to higher reports of adolescent self-esteem than maternal permissive parenting (Milevsky, Schlechter, Netter, Keehn, 2007). Findings from this line of research also found that the gender of the parent is related to the changes in the child’s self-esteem (Gecas & Schwalbe, 1986; Allen, Hauser, Bell, & O’Connor, 1994). There was a stronger relationship between parenting behaviors and the self-esteem of sons, than for daughters (Gecas & Schwalbe, 1986). While it has already been established, this study considered the effects of maternal supportive parenting in early adolescence on self-esteem in middle adolescence, but the present study adds to the current literature by examining how self-esteem in middle adolescence is related to supportive parenting toward his or her own child in adulthood.

Obesity and Self-Esteem

The current study also considered the relationship between self-esteem and obesity. The literature on this relationship shows mixed results (Mendelson, White, & Mendelson, 1996; Swallen, Reither, Haas, & Meier, 2005). Some researchers found a significant relationship
between obesity and self-esteem (Strauss, 2000; Friedlander et al., 2003). Researchers have also demonstrated an inverse correlation between obesity and self-esteem (Klaczynski, Goold, & Mudry, 2004). Finally, some researchers claim there is no direct link between self-esteem and obesity (Swallen, Reither, Haas, & Meier, 2005), rather that there are indirect relationships between self-esteem and obesity (Eisenberg, Neumark-Sxtainer, & Story, 2003; Puhl & Latner, 2007). While it is difficult to determine the type of relationship between self-esteem and obesity, because of the timing of data collection (self-esteem in middle adolescence and obesity in late adolescence), the present study considered the possible effects of self-esteem in middle adolescence on obesity in late adolescence.

There have been some findings that self-esteem and eating behaviors have a causal and reciprocal relationship. For example, individuals with lower self-esteem are more likely to develop an eating disorder (Baumeister, Campbell, Krueger, Vohs, 2003). In addition, research has examined the relationship between binge eating and eating disorders, including obesity. The research found that psychological factors (including low self-esteem) were related to an increased likelihood of binge eating (a risk factor for obesity; Stice, Presnell, & Spangler, 2002). In addition, researchers have found that the relationship between obesity and self-esteem is related to the individual’s own perception of their weight status and the interactions they have with others (Mendelson et al., 1996; Ozmen, et al., 2007). While this study was not able to examine binge-eating, the previous literature supports the idea of continued examination of the relationship between self-esteem and obesity.

**Intergenerational Parenting**

Parent-adolescent interactions have been found to correlate with the type of interactions the adolescent has subsequently as an adult. Previous research has demonstrated that
adolescents who have fewer positive interactions with their parents are more likely to have difficulty having positive interactions and avoid making close and intimate connections with their peers in adulthood (Repetti, Taylor, & Seeman, 2002). Looking more specifically at the influence of parenting from one generation to parenting the next generation, there are a few studies that have investigated the relationship between how an individual was parented in adolescence to how an individual parents their own children in adulthood (Neppl et al., 2009; Friesen, Woodward, Horwood, & Fergusson, 2012; Simons, Whitbeck, Conger, & Chyi-In, 1999). Research found that adolescents from homes with more positive parenting were more likely to have more positive interactions with their own children (Neppl et al., 2009). Likewise, adolescents from homes with more negative parenting interactions were more likely to have more negative interactions with their own children (Simons et al., 1999; Neppl et al., 2009). This former study also showed that that experiencing harsh parenting in adolescence was not predictive of the amount of positive interactions they have with their own children in adulthood (Neppl et al., 2009). Thus, the present study takes into consideration the influence of the adult’s own relationship with his or her own parent in adolescence on the relationship he or she has with their own children.

Other Confounding Factors

There are several demographic factors that have been shown to influence the parent-adolescent relationship. This study assessed four potential confounding factors: child's gender; parent’s gender; education of the parent; and family income. Parental education has been shown to influence how a family interacts (Conger, Williams, Little, Masyn, & Shebloski, 2009). In addition, parents with more formal education are more likely to give their children more independence. Parenting and obesity has also been found to be related to
a family’s income (Kitzman et al., 2008). Research has shown a family’s income may influence the resources available to the family and influence the amount of time a parent is able to implement certain parenting practices (e.g., amount of time they are able to monitor their child; Lee, Harris, & Gordon-Larsen, 2009). Besides parenting, family income has also been shown to be related to obesity in adolescents, with adolescents from poorer families more likely to be obese (Parsons et al., 1999).

Special consideration was given for the gender of the parent. Gender has been shown to influence how an individual was parented (Raley & Bianchi, 2006; Conger & Ge, 1999) and how an individual parents his or her child (Lerner and Steinberg, 2009). For parenting, mothers tend to be more supportive and expressive of praise, approval, and acknowledgement with daughters rather than with sons (Raley & Bianchi, 2006). In addition, mothers are more likely to have conversations with their children about daily interactions and emotions (Lerner and Steinberg, 2009). Fathers are more likely to engage in leisurely activities with their children rather than engage them in teaching activities or emotional conversations (Lerner and Steinberg, 2009).

Gender differences have also been found in the relationship between parenting interactions and self-esteem (Ata, Ludden, & Lally, 2007; Mendelson et al. 1996). For males, self-esteem is mostly related to expressions of control by their parents (Gecas & Schwalbe, 1986). For females self-esteem is mostly tied to the parent’s expression of support and participation (Gecas & Schwalbe, 1986). Additionally, there are gender differences in reports of self-esteem. Females report lower self-esteem and are faced with more teasing and pressure to be thin (Ata et al., 2007).
**Central Aims and Hypotheses**

In understanding the role of obesity on parenting, this study examined how obesity influences the way a parent interacts with his or her child. In addition, this study considered how experiences from the adult’s adolescence (their parent-adolescent interactions and their development of self-esteem) influenced their parenting in adulthood. Three central hypotheses were postulated:

1. Weight status (being obese) during late adolescence would negatively influence the amount of supportive parenting expressed towards their children during adulthood (Figure 1);

2. High self-esteem in middle adolescence would increase the possibility of supportive parenting expressed towards their children during adulthood (Figure 2);

3. Self-esteem and weight status in middle and late adolescence mediates the influence of supportive parenting received during their upbringing and the supportive parenting they express to their own children in adulthood (Figure 3).

**Methods**

**Sample**

Data were taken from the Family Transitions Project (FTP), which includes data from two separate but related data collection efforts: the Iowa Youth and Family Project (IYFP) and the Iowa Single Parent Project (ISPP). The IYFP families were contacted initially in 1989 to be a part of a longitudinal study. In order to qualify for the study families needed to have: (1) an adolescent in seventh grade, referred to as the target; (2) a sibling within four
years of the target; and (3) residing in a two-parent home. The target (also known as Generation 2, G2), the sibling, and the parents (also known as Generation 1, G1) all took part in the interviews and questionnaires. In 1989, 451 families who were all Caucasian and living in small towns or on farms in Iowa participated. The families were all lower-middle to middle-class families (Conger & Elder, 1994).

The families who participate in the ISPP study, were contacted initially in 1991 (Neppl, Conger, Scarmella, & Ontai, 2009; Simons et al, 1996). In order to qualify for this study there needed to be: (1) an adolescent in the ninth grade (once again referred to as the target); (2), a sibling within four years of the target; and (3) they needed to be living in a single parent home. Given that two years had passed since the initial data collection in the IYFP, the ISPP target needed to be in 8th or 9th grade so as to be similar in age to the youth already enrolled in the IYFP. All of the single-parent homes were headed by mothers who had divorced from their husband within 2 years preceding the study. The ISPP target (also known as Generation Two, G2), the sibling, and their single mother (also known as Generation One, G1) were all included in the interviews and questionnaires similar to IYFP.

In the initial ISPP interview there were 108 families with 9th graders selected to be a part of the research study. The families were all lower to middle class (Neppl et al., 2009; Simons et al, 1996). In 1994 the original 9th grade youth (at that time in 12th grade) and their families in the two studies (IYFP and ISPP) were combined to create the Family Transition Project (FTP); (Neppl, Conger, Scarmella, & Ontai, 2009) for a total of 559 families. In 1995 (one year after completing high school), the target was asked to participate in the project with their significant other. In 1997, the target (now an adult) was asked to complete the survey with their partner and their first-born child (also known as Generation 3, G3). The
G3 child began in the study when they were at least 18 months old (beginning in 1997). Non-response analyses was conducted to determine if the final sample differs from the original sample on the major study constructs of supportive parenting (G1-G2 and G2-G3 relationship), self-esteem, or obesity. The results from the non-response analysis are discussed later in the study.

The original sample included in the study was 559 families, with a 90% retention rate (Neppl, Conger, Scarmella, & Ontai, 2009). For this current study, the first wave of data considered for this study is year three of the original study. This was done to allow inclusion by both individuals from the IYFP and the ISPP. By that time 11 families had withdrawn from the study. To be included in the current study, there needed to be a target and a G3 child who participated in the study. At the time of this analysis 282 targets did not have a child who had participated in the study. This resulted in 266 families having a child and willing to participate in the study. Because the focus of this paper is on obesity and the effects of obesity on parenting, any target who did not report their height and weight or was classified as being underweight (to be described later) were removed from the study. This led to 30 additional families being removed (11 were underweight, 19 had missing data). The remaining number of participants was 236 families with parenting data (G1-G2 observed interactions and reported on the G2-G3 observed interactions) and with weight status data (being of healthy or overweight/obese status) remained in this current study. Non-response analyses were conducted to determine if the final sample differs from the original sample on the demographics or any of the major study constructs of G1-G2 interactions, G2 self-esteem, G2 obesity, or G2-G3 interactions.
Procedure

Data collection for both the IYFP and the ISPP projects followed the same general procedures. After it was determined the family met the criteria to be in the study, they were visited twice a year by interviewers for the first three years and then beginning when the G2 was in 12th grade they were visited every other year. In the first meeting with interviewers the family members were asked to complete a set of questionnaires. With the interviewer present, each family member completed their questionnaires independently from other family members. Once the family completed the questionnaires they were sealed and taken by the interviewer. The interviewer would also leave behind additional questionnaires for the family to finish before the second visit (Conger & Elder, 1994).

The second visit occurred two weeks after the first visit. In the second session, interviewers focus on collecting video recordings of family interactions. The family was assigned different tasks to complete including a discussion task and problem solving task (for G1-G2 interactions), or a puzzle and a clean-up task (for the G2-G3 interactions). For this study, only data from the discussion task was used for assessing supportive parenting in G1-G2 relationship and observations from the clean-up task for assessing supportive parenting in the G2-G3 relationship.

The G1-G2 family interaction task involved all four family members (G1 mothers, G1 fathers, G2 target, sibling), discussing a series of questions. The questions were printed on cards that were labeled either parent or teenager to indicate who was to read the question. The questions on the cards related to school activities, family rules, and discipline. The individual who read the card would give their response to the question first. Then the remaining family members would provide their answer to the question. After everyone had
given their response to the question, the family would then discuss the answers that were
given. Once the family felt they had discussed the question thoroughly, they went onto the
next card. This continued for 25 minutes (Neppl et al., 2009).

For the G2-G3 observation, this study analyzed the data from the clean-up task.
Observation scores were based on the first time the G3 was assessed. For the clean-up task, the G3 child was instructed to play with various toys alone for 6 minutes and then for an
additional 5 minutes with an interviewer. At the end of the session, the interviewer would
dump all of the toys onto the ground, thus ensuring a standard number of toys for the clean-
up process. The interviewer told the G2 parent, that the G3 child needed to clean up the toys.
If the G2 parent felt the G3 child needed help, they could assist them, however the task was
meant for the G3 child to complete alone. For the 2 year olds, the clean-up task lasted 5
minutes, for older children (3 years and older) the task lasted for 10 minutes (Scaramella,
Neppl, Ontai, & Conger, 2008). The various tasks were meant to bring forth both positive
and negative interactions between the family members (Conger & Elder, 1994).

Family interactions were recorded by video camera and the observers were not in the
room. After the family completed the session, the interactions were laboratory coded by
trained observers (Conger & Elder, 1994) using the Iowa Family Interaction Rating Scales
(Melby & Conger, 2001; Melby et al., 1998). In the present study, in order to include all of
the targets in the FTP, only the observed mother-child interactions were used when
examining the G1-G2 relationship. When examining the G2-G3 relationship all of the
participants (male and female G2s) who had information were included. Scores for the G2-
G3 relationship were taken only when the G3 child was first assessed.
Measures

Supportive Parenting (G2-G3 in adulthood).

The G2 target’s supportive parenting toward at the G3 child was coded during the clean-up task. Supportive parenting was a latent variable comprised of the following measured variables: positive mood (PM), listener responsiveness (LR), and warmth/support (WM). Each of these measures was based on a 9-point scale; responses ranged from 1- no evidence of the behavior, to 9 -highly characteristic of the parent. Positive mood was characterized by the appearance or demonstration of content, happy, and optimistic positive behavior (Melby et al., 1998). Listener responsiveness was characterized by interactions that included showing an interest in the other family member’s ideas, behaviors, and responses (Melby et al., 1998). Warmth/Support was characterized by interactions that included expressing appreciation, care, praise, concern, or support to the child (Melby et al., 1998). Scores for the observation measures were taken from the first time the G2 parent was assessed with the G3 child (1997-2006), all of the children were between the ages of 2-6 years old. Using IBM SPSS 20.0, a principal component analysis was completed the eigenvalues were 2.34, .54, and .12. Factor loadings showed that each of these variables (positive mood =.88, warmth/support =.68, and listener responsiveness =.58) had factor loadings greater than .40; making it appropriate to create an overall supportive parenting variable. The reliability between these three variables was α=.86. The interclass correlation was found to be positive mood .55-.88, warmth/support .77-.92, and listener responsiveness .50-.86.

Maternal supportive parenting (G1-G2 during adolescence).

Maternal supportive parenting was a latent variable comprised of the following measured variables: positive mood (PM), listener responsiveness (LR), and warmth/support (WM).
Each of these measures was based on a 9-point scale; responses ranged from 1- *no evidence of the behavior*, to 9 - *highly characteristic of the parent*. Positive mood was characterized by the appearance or demonstration of content, happy, and optimistic positive behavior (Melby et al., 1998). Listener responsiveness was characterized by interactions that included showing an interest in the other family member’s ideas, behaviors, and responses (Melby et al., 1998). Warmth/Support was characterized by interactions that included expressing appreciation, care, praise, concern, or support to the child (Melby et al., 1998). Scores for the observation measures were taken from the discussion task. To get a more representative sample of the parenting behavior, the scores on each of the scales were taken at two different years of assessment (1991 and 1992). The scores for each of these scales were then averaged across the two years. Using IBM SPSS 20.0, a principal component analysis was completed the eigenvalues were 2.00, .62, and .37. Factor loadings showed that each of these variables (positive mood = .96, warmth/support = .92, and listener responsiveness = .60) had factor loadings greater than .40; making it appropriate to create an overall maternal supportive parenting variable. The overall reliability was found to be $\alpha = .743$. The interclass correlation was found to be: positive mood .52-.68, warmth/support .43-.77, and listener responsiveness .40-.65.

*Obese/Overweight (G2, Middle and Late Adolescence)*

The G2’s body mass index (BMI) was calculated using adolescent’s self-reported height and weight (lbs/in$^2 \times 703$). BMI scores were compared to the Center for Disease Control and Prevention (CDC, 1999-2002) growth charts, using age and gender of the adolescent as reference values. Adolescents were classified into four categories: underweight (BMI < 5th percentile), healthy weight (BMI 5th to 84th percentile), overweight (BMI 85th to 94th percentile), and obese (BMI > 95th percentile).
percentile) or obese (BMI>95th percentile). Adolescents in the overweight and obese categories were combined to create the variable of interest (value =1). The comparison group was adolescents classified in the healthy BMI group (value=0). Since the focus of this paper is on overweight and obese adolescents, those who were underweight were omitted from the study (n=11). BMI was calculated from the height and weight measures of the G2 in 1994 and 1997 when the adolescent was between the ages of 17-19 and 20-22 years old, respectfully.

*Self-esteem (G2, middle adolescence).*

To assess the adolescent’s self-esteem, the Rosenberg self-esteem scale was utilized (Rosenberg, 1965). The scale is a self-reported questionnaire consisting of 10 questions. The adolescent was asked to respond to each of the questions using a 5-point scale (1-strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree; Rosenberg, 1965). Two of the items were re-coded. A composite mean score was created from this scale, with a higher score indicating more self-esteem. Self-esteem was measured when the target adolescent was between the ages of 17-19 years old (1994). The self-esteem scale for this study has a reliability $\alpha=.90$

*Covariates.*

This study controlled for the child’s (G3) gender (male =1, female=0), G3 age, the number of completed years of education (G1 & G2), G2 gender (male =1, female=0), G2 age and income in dollars (reported by G2). For the G1 control variables, data was taken from 1991. Gender of G2 was taken in 1991. For G2 controls, data (with the exception of gender) was taken from the time of their child’s first assessment starting at age 2 (1997-2006). G3 variables were taken when the G3 child was first assessed (1997-2006).
Analytic Approach

Utilizing IBM SPSS 20.0 software, descriptive statistics were run on each of the variables to assess for averages, ranges and standard deviations. Results are presented in Table 1. Analysis on the missing families was examined to see if the missing families significantly varied from the included families. AMOS (Arbuckle & Wothke, 1999) was utilized to run correlations (see Table 2) and then path analysis using Bayesian estimation. Since the variable obesity is a dichotomous variable, traditional maximum likelihood method of estimation was not appropriate. Maximum likelihood estimations assume that all variables are either ordinal or continuous (Quinn, 2004). While Bayesian estimations have been around for centuries, it has only been recently that there has been more use and acceptance of the Bayesian estimation; much of the observed increase in utilization of Bayesian estimation has been due to the increased availability and improvements in statistical software for computers (Gill, 2004; Arbuckle, 2010).

A key principle with Bayesian estimation is the reliance on probabilities and distribution of estimates, rather than a single point estimates (Arbuckle, 2010). This means that approach can be used with small as well with large samples (Lee & Song, 2004). When a large sample is used, the results reflect a similar format to those presented in maximum likelihood estimations. As such the parameter mean of the posterior distribution \(m\) would be equivalent to a beta coefficient \(\beta\) seen in maximum likelihood estimation. Likewise Bayesian estimation does not report \(p\)-values, instead it reports “credible intervals” \((ci)\) which report the likelihood that an estimate does not contain zero (Arbuckle, 2010). The goodness-of-fit will also be evaluated for the model. Unlike the common model statistics for maximum likelihood estimation, Bayesian estimation in AMOS solely reports the posterior
predictive (PP) \( p \)-value. For these models a good fit is when the PP falls between .3 and .7 (Gelman, Meng, & Stern, 1996; Lee & Song, 2004)

**Results**

In the present study, when the adolescents were first assessed in 1991, 52% of the G2 sample was female with an average age of 14.63 years, and 77% of the G2s came from two parent households. When G3’s were first assessed (1997-2004), the G2s were an average age of 25.5 years old and 83% were married or cohabitating with a partner. The G3 at the time of the first assessment were between the ages of two to five years old and 65% were female. Descriptive statistics for the sample are provided in Table 1. Correlations between the variables are presented in Table 2.

The covariate estimates for each of the variables are shown in Table 3. From the results there is a significant influence of the G2 target’s age on G2-G3 supportive parenting. With older G2 targets demonstrating more supportive parenting towards their child. Other covariates were not significant predictors.

**Bias in the Longitudinal Sample**

With the large number of participants that either did not complete the study or were removed from the study, analyses were examined to see if the remaining sample were significantly different from the original sample. The results of an independent t-test showed there was some difference between the original sample and the final sample used for this analysis. The final sample was comprised of more female participants than the original sample \( t=-2.48 \) \( p<.05 \). The final sample had mothers with higher levels of education than G1 mothers of the original sample \( t=3.50, \) \( p<.05 \). The final sample, however did not vary
based on their rates of obesity, self-esteem, or observed supportive parenting (G2-G3). As a result of these differences this sample is not demographically representative of the initial sample.

Next the path analysis was conducted using Bayesian estimations. For each parameter the mean posterior distribution \( (m) \) are presented. As mentioned previously, with this large sample, these results will be similar to a standardized beta value that is presented in maximum likelihood estimations. In addition, credible intervals \( (ci) \) are presented as a means of measuring the significance of the value. For these estimates, the width of credible interval was set at .95 and .99.

\textit{Hypothesis One}

Weight status (being obese) during late adolescence would negatively influence the amount of supportive parenting expressed towards their children during adulthood.

The results for hypothesis one are displayed in Figure 4. The results demonstrated that overweight or obese G2 parents were less likely to demonstrate supportive parenting to their own G3 children \( m = -.65, ci (.95) = -1.218/-1.09 \).

\textit{Hypothesis Two}

High self-esteem in middle adolescence would increase the possibility of supportive parenting expressed towards their children during adulthood.

The results for analysis on hypothesis two demonstrated there was a significant direct relationship between G2 self-esteem in middle adolescence and G2-G3 supportive parenting in adulthood. G2s who reported higher levels of self-esteem in adolescence were more likely to express supportive parenting towards their own children in adulthood \( m = .73, ci (.99) = .13/1.34 \). The results are displayed in Figure 5.
Hypothesis Three

Self-esteem and weight status in middle and late adolescence mediate the influence of supportive parenting received during G2’s upbringing and the supportive parenting they express to their own children in adulthood.

The results for hypothesis three are shown in Figure 6. For this model, pathways were included from maternal supportive parenting in early adolescence to self-esteem and obesity in middle adolescence. In addition pathways from self-esteem and obesity in adolescence to supportive parenting in adulthood were added. Finally a pathway was added from maternal supportive parenting (G1-G2) in adolescence to supportive parenting (G2-G3) in adulthood were added to the model. The results from the Bayesian estimation showed that there was not a weak relationship between the maternal supportive parenting of the adolescent (G1-G2 relationship) and the target’s supportive parenting of their own child (G2-G3 relationship) \( m = .24, ci (.95) = .00/.49 \).

Next the relationship between supportive parenting in adolescence on self-esteem in middle adolescence was evaluated. The results found an increase in supportive parenting experienced by the adolescent was related to an increase expression of supportive parenting towards their own children in adulthood. The results indicate there is a significant supportive relationship between maternal supportive parenting in early adolescence (G1-G2) on adolescent self-esteem in middle adolescence \( (m = .08, ci (.95) = .01/.16) \). There was a weak relationship from maternal supportive parenting in early adolescence (G1-G2) on adolescent obesity in middle adolescence \( (m = -.05, ci (.95) = -.10/.04) \).

In addition, a pathway was added from obesity in middle adolescence and obesity in late adolescence. There was a strong relationship between being obese in middle adolescence
and being obese in late adolescence. Individuals who were obese in middle adolescence were more likely to be obese in late adolescence \( (m = .59, ci (.99) = .42/ .77) \). A pathway from obesity in late adolescence to supportive parenting in adulthood was also examined. The results show there is a strong relationship between being obese in late adolescence and expressing supportive parenting to their children. G2s who were obese in late adolescence, were less likely to express supportive parenting towards their own children in adulthood \( (m = -.65, ci (.95) = -1.22/ -.09) \).

A pathway from self-esteem in middle adolescence to supportive parenting in adulthood was also examined. The results indicate there is a strong relationship between self-esteem in middle adolescence and supportive parenting expressed towards their own children in adulthood. Targets with higher levels of self-esteem in middle adolescence were more likely to express supportive parenting towards their own children in adulthood \( (m = .732, ci (.99) = .13/ 1.34) \). A final pathway was added between self-esteem in middle adolescence and obesity in late adolescence. This pathway proved to be not significant.

The goodness-of-fit was also evaluated for this model. The overall fit of the model was found to be very good, with a posterior predictive \( p \)-value, \( PP = .50 \). This indicates that in addition to many of the pathways having strong relationships, the overall model did appear to fit the data.

**Discussion**

The purpose of this study was to investigate if supportive parenting in adulthood varies based on an adult’s weight status, self-esteem and an individual’s own experiences with their parents in adolescence. The results from this study demonstrated that there is a relationship
between obesity and parenting and self-esteem and parenting. Each of these findings will be discussed individually.

From the results of this study, it can be shown that overweight and obese parents do interact with their children differently than healthy weight parents. The results indicate that parents who are overweight or obese in adolescence, are less likely to be warm to their children in adulthood. These results contradict previous research on obesity and parenting (Zeller et al., 2008) which found that obesity was not related to parenting style. One reason for these differences could be that the data in this study were classified according to the CDC weight statuses, as opposed to previous studies which just looked at the BMI scores for individuals. By classifying the participants by their CDC weight statuses; this study was able to specifically compare the differences between overweight/obese and healthy weight individuals. This current study also included males (G2) in the analysis; the previous research has solely examined maternal-child relationship (Zeller et al., 2008).

Another finding of this study was that higher levels of self-esteem in adolescence were related to higher expressions of supportive parenting in later adulthood; this is consistent with previous findings that higher self-esteem in adulthood is related to more positive parent-child interactions (Gruber & Halderman, 2009). These findings would support the idea that the better an individual feels about himself or herself, the more positive he or she is towards others. More specifically for this study, the higher self-esteem reported in adolescence is related to more supportive parenting towards his/her child in adulthood. Previous work in this area has demonstrated that parent-adolescent interactions do influence adolescent self-esteem (Whitbeck et al., 1991; DeHart et al., 2004). In addition, previous research has also demonstrated that self-esteem influences parenting (Grimm-Thomas & Perry-Jenkins, 1994);
this, however, is one of the first studies to demonstrate that parenting behaviors experienced in early adolescence influence self-esteem in middle adolescence, and then demonstrates that self-esteem in middle adolescence influence the individual’s interaction with their own children in adulthood.

In examining the influence of self-esteem in middle adolescence on obesity in late adolescence, this study found there was not a significant relationship between these two variables. These results contradicts previous research which found there is a relationship between these two variables (Strauss, 2000; Friedlander et al., 2003). While contradicting some research, this may be an indication that the relationship between self-esteem and obesity is influenced by other contextual variables. For instance, the individual’s perception of his or her weight (Mendelson et al., 1996; Ozmen, et al., 2007), how much he or she is teased, or about how much pressure he or she feels to lose weight (Ata et al., 2007) could be confounding variables that influenced the relationship between self-esteem and obesity.

The findings presented here are even more significant after considering the adult’s own upbringing was taken into consideration. In light of discussions of how an individual upbringing relates to how an individual parents their own children (Friesen et al., 2012; Neppl et al., 2009), the findings suggest there are additional influences (e.g. self-esteem and weight status) that mediate the influence of upbringing on how an individual parents.

The findings from this study demonstrate how interconnected the individual and the family is. There is more than just an individual’s own upbringing that influences how he or she parents his or her child. There are reciprocal relationships occurring and systems are affected by each other. The family system is influenced by the individuals in the family. The family is influenced by their personality, temperament, and as was seen in this study by
their self-esteem and obesity. The family system in turn influences future generation familial systems, but also influences the development of the individual and his or her self-esteem and obesity. This idea supports the principles of the Family Systems Theory, that there are repeated patterns in families (White and Klein, 2008), but also development is based on interactions between different systems (e.g., interactions between the individual and the family).

The study also examined the possible differences between male and female adolescents. The results indicate that the target’s gender was not significantly related to the expression of supportive parenting in adulthood. These findings contradict previous work that found there are significant differences between the mother’s and father’s interactions with children (Lerner and Steinberg, 2009). The lack of results could be due to the limited sample. The sample was comprised of mainly female targets; if there had been a larger number of males include in the sample there may have been more differences.

Limitations

This paper does have some limitations. First, there is the limitation of the bias of the sample. Due to the criterion of the study many families in the initial sample from the Family Transition Project did not qualify in the current study. As a result, the study presented data that was not statistically representative of the original sample. In addition, the sample itself was predominantly Caucasian and from rural Iowa. This may make it difficult to generalize to other populations. Finally, the study relied on participants to report their own height and weight. Research on self-reporting height and weight finds that individuals (obese females in particular) tend to misreport their height and weight. Often obese females tend to under report their weight and over report their height (Nawaz, Chan, Abdurlrahman, Larson, Katz,
2001). This could lead to misleading information if an individual is not aware of how much they weigh or provide an incorrect estimate.

*Future Research*

The findings of this study encourage the continued research into the area of obesity, self-esteem, and supportive parenting. The current study relied on a smaller, homogenous sample, and as a result continued research is needed to examine these findings against a more heterogeneous sample. The scope of this study focused on supportive parenting; continued research should consider the effects of harsh parenting. Future research may want to consider other mediating factors such as individual temperament, the effects of depression, or the role of marital satisfaction. Finally, at the time of this study, the data was limited to individuals who had had their first child by the time they were thirty years old. Future work may want to consider expanding the research to include older parents with young children and examine if the same relationships between self-esteem, obesity, and supportive parenting continue to exist. In addition, for this study the sample was limited to G3 children that were between the ages of 2-6 years old. If the study had included G3 children who were older, there may also have been different results. As such, future research should consider examining the effects of obesity and self-esteem on parenting older children.
References


www.cdc.gov/healthyyouth/obesity/facts.htm


FIGURES

Figure 1: Direct Effect of Obesity in Late adolescence on Supportive Parenting in Adulthood

Obesity (Late Adolescence) Ages 20-22 years old

Supportive Parenting (Adulthood) Ages 20-30 years
Figure 2: Direct Effect of Self-Esteem in Middle Adolescence on Supportive Parenting in Adulthood

Self-Esteem
(Middle Adolescence)
Ages 17-19 years old

Supportive Parenting
(Adulthood)
Ages 20-30 years
Figure 3: Full Model

Self-Esteem
(Middle Adolescence)
Ages 17-19 years old

Supportive Parenting
(Early Adolescence)
Ages 14-17 years old

Supportive Parenting
(Adulthood)
Ages 20-30 years old

Obese/Overweight
(Middle Adolescence)
Ages 17-19 years old

Obese/Overweight
(Late Adolescence)
Ages 20-22 years old
Figure 4: Direct Effect of Obesity in Late adolescence on Supportive Parenting in Adulthood

*credible interval set at .95 does not include 0.
Figure 5: Direct Effect of Self-Esteem in Middle Adolescence on Supportive Parenting in Adulthood

**credible interval set at .99 does not include 0.**
N= 236
Posterior Predictive $p$-value$= .5$
*credible interval set at .95 does not include 0.
**credible interval set at .99 does not include 0.
## TABLES

Table 1. *Descriptive statistics of study variables (N=236)*

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Notes.
** are significant at p < .01
* are significant at p < .05
Table 3. *Covariate Estimates (standardized beta)*

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*credible interval set at .95 does not include 0*
CHAPTER 4: GENERAL CONCLUSIONS

General Discussion

The purpose of this dissertation was to examine the connections between supportive parenting, self-esteem, and obesity over time. These studies utilized a Family Systems Theory to guide the research, a theory based on the idea that patterns exist in family relationships (White & Klein, 2008). Patterns were examined between generations by examining how maternal supportive parenting in early adolescence influenced the individual’s own expression of supportive parenting with his or her own child. Chapter 2 examined the influence of maternal supportive parenting in early adolescence on the development of self-esteem in middle adolescence and obesity in late adolescence. Chapter 2 also looked at the mediating role of self-esteem on the relationship between supportive parenting and obesity. Chapter 3 continued to build on this foundation and added in the effects of maternal supportive parenting (G1) in early adolescence, G2 self-esteem in middle adolescence, and G2 obesity in late adolescence on G2 supportive parenting expressed towards their own child in adulthood.

Chapter 2 demonstrated there was a relationship between maternal supportive parenting in early adolescence and self-esteem in middle adolescence. These findings validate previous research that stated parent-child interactions are related to adolescent self-esteem (Whitbeck et al., 1994; DeHart, Pelham, Tennen, 2004 (Whitbeck, et al., 1991). While there was a significant relationship demonstrated between parenting and self-esteem, the same effects were not seen for the relationship between self-esteem and obesity nor supportive
parenting and obesity. First, I will discuss the lack of relationship between self-esteem in middle adolescence and obesity in late adolescence. This finding is a contradiction to previous work, which found there was a negative correlation between self-esteem and being obese (Klacznyski, Goold, & Mudry, 2004). While there was a contradiction between this study and previous work, this could be an indication that the relationship of obesity and self-esteem are influenced by other conditions. For instance, it may be more about how an adolescent interprets the interaction they have with their parent, rather than solely being about the interactions themselves which influence the relationship between self-esteem and obesity (Friedlander, et al., 2003).

There was also no statistically significant relationship between how an adolescent was parented in early adolescence and the likelihood of the adolescent being obese in late adolescence. These findings contradict previous research that found parenting style did affect obesity in children and adolescence (Berge, Wall, Bauer, & Neumark-Sztainer, 2010; Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2005). Much of the current literature, while being based on the parenting style, often examined parenting behaviors that related directly to eating habits, such as monitoring a child’s food intake (Rhee K., 2008; Berge, et al., 2010; Birch, et al., 2007), rather than looking specifically at parenting behaviors as they relate to general parenting practices. Additionally, in the current study the observations were based on the parent’s behavior towards the adolescent during a discussion task as opposed to previous research which examined a meal or eating task. This would suggest the importance of further research into what general features of parenting style, such as warmth, listening, dominance, etc., influences the adolescent’s development of obesity. In addition, other research regarding parenting styles and obesity utilize self-report parenting styles (Rhee et
al., 2005; Berge et al., 2010) as opposed to observational data, as was used in this current study. By relying on self-reported information, this could lead towards parents misrepresenting themselves and their interactions with their children (Bailey et al, 1998). Since the current study found no relationship between supportive parenting in early adolescence and obesity in late adolescence, there would be no mediation possible by self-esteem in middle adolescence on this previous relationship.

Chapter 3 continued to build on this idea and examined how supportive maternal parenting, self-esteem, and weight status influence the G2-G3 parent-child relationship. In this paper, the findings did contradict some of the work in Chapter 2 (these will be discussed later in this chapter). Again there was a weak negative relationship between maternal supportive parenting in early adolescence and obesity status in middle adolescence. An individual’s obesity status in middle adolescence was strongly related to an individual’s obesity status in late adolescence. Furthermore, the study presented a significant relationship between being obese in late adolescence and expressing less supportive parenting towards his or her own child in adulthood. The relationship between late adolescent obesity and supportive parenting in adulthood contradicted previous findings that BMI is not related to parenting style (Zeller, Boles, & Reiter-Purtill, 2008). One reason for these differences could be that this study was specifically looking at parents who were overweight or obese, rather than looking at an individual’s BMI on a continuum. By classifying individuals’ weight statuses, a comparison was created between healthy weight individuals and overweight individuals.

In light of this discussion of obesity in adolescence being related to supportive parenting in adulthood, the finding of supportive parenting in early adolescence not related to obesity
in late adolescence is not consistent with previous research on parenting styles and obesity (Berge et al., 2010; Rhee et al., 2005), but is consistent with the results from Chapter 2. Previous research has demonstrated how authoritative parenting is related to lower rates of obesity in children and that authoritarian parenting is related to higher rates of obesity in children (Rhee, 2008; Rhee et al., 2005; Berge et al., 2010). Relationships have been established between parenting practices, such as monitoring a child, and obesity. In addition the feeling of being connected to a family and having appositive regard for the family was related to lower likelihood of becoming obese (Mellin, Neumark-Sztainer, Story, Ireland, & Resnick, 2002). While there was not a significant relationship, the credible interval contained zero, there was a trending relationship indicating that is some connection.

One of the consistent findings between Chapter 2 and Chapter 3 was the lack of relationship between obesity and self-esteem. These findings contradict previous work that found there is a significant relationship between obesity and self-esteem (Strauss, 2000; Friedlander, Larkin, Rosen, Palermo, & Reline, 2003; Klaczynski, Goold, & Mudry, 2004). While the finding from this study contradicts the previous work in this area, this may be due to the difference in the study designs. This study utilized longitudinal data as opposed to cross-sectional data (Strauss, 2000; Friedlander, et al., 2003). By utilizing longitudinal data, this current study was able to examine the effects of self-esteem and obesity over time and the course of adolescence. Another reason for these differences could be the age range of the sample. In previous studies the ages of the participants were younger than the current study (Friedlander, et al., 2003; Strauss, 2000) with some studies examining the period of 9-14 years old. With the current study, the youngest participant was 13 years old and self-esteem
and obesity were not examined until the individual was at least 17 years old and 19 years old, respectively.

The findings from Chapter 3 also examine the relationship between supportive parenting and self-esteem. There was a significant relationship between experiencing maternal supportive parenting in early adolescence and higher levels of self-esteem in middle adolescence. These findings are consistent with the findings from Chapter 2 and previous research (Whitbeck et al., 1994; DeHart et al., 2004). The study also found that higher self-esteem in middle adolescence was associated with more supportive parenting being expressed towards his or her own child in adulthood. These findings support previous work on parent-child interactions and self-esteem (Grimm-Thomas & Perry-Jenkins, 1994). Overall, based on the findings from chapter 2 and chapter 3, there appears to be a significant relationship between supportive parenting and self-esteem.

In both chapters, a special consideration was given the effects of the adolescent’s gender. Gender was examined as a covariate on each of the outcome variables. In Chapter 2, gender was found to be related to each of the variables: G1-G2 supportive parenting, self-esteem, and obesity. These findings supported previous literature that also found parenting (Raley & Bianchi, 2006), self-esteem (Ata et al., 2007; Mendelson, White, & Mendelson, 1996; Oldehinkel, Ormel, Veenstra, De Winter, & Verhult, 2008) and obesity (Heitmann, 2010) varied by gender. In Chapter 3, gender was not found to be related to the G2-G3 supportive parenting. This result contradicted previous findings that mothers and fathers interact with their children differently (Lerner and Steinberg, 2009). While it is difficult to determine why there was a lack of results, one reason could be that there were a limited number of male
participants in the study. If the study had included a larger number of male participants there may have been more differences between males and females.

The differences between the results of Chapter 2 and Chapter 3 do need to be addressed. The main difference in the results between Chapter 2 and Chapter 3 demonstrated an inconsistent relationship between supportive parenting and obesity. In Chapter 2 there was no relationship between supportive parenting in early adolescence and obesity in late adolescence. In Chapter 3, there was a trending relationship between supportive parenting in early adolescence and obesity in middle adolescence. There was a slight age difference in the adolescents when obesity was examined; Chapter 2 examined late adolescent obesity as opposed to Chapter 3 which examined middle adolescence. In addition to research that was presented here, analyses were examined in Chapter 2 which included the middle adolescent obesity variable. Even after including this variable in the model there continued to be no relationship between supportive parenting in early adolescence and obesity in middle adolescence, nor obesity in late adolescence. As a result it was dropped from the final model.

While it is not completely known why there are such differences in the results, some of the possible reasons for the differences were considered. The first consideration was the differences in the samples included in Chapter 2 as compared to the samples included in Chapter 3 that may account for the results. The sample for Chapter 2 was about twice as large as the sample for Chapter 3. Chapter 3 had a limited sample because it was necessary for the G2 target to have a child of their own who was at least two years old. In addition, at the time of this study the data was limited to individuals who had had their first child by the time they were thirty years old. As was seen in Chapter 3, older parents were more likely to
be observed having more supportive interactions with their children. Future work may want to consider expanding the research to include older parents with young children and examine if the same relationships between self-esteem, obesity, and supportive parenting continue to exist. Alternatively, if this study was recreated in a couple of years there would be the possibility of more participants qualifying (e.g., have their own child) and thus providing a larger more diverse sample.

**Recommendations for future research**

In continuing to understand the relationship between the family environment and obesity in adolescence, there needs to be continued examination into how different features of parenting are related to the adolescent’s development of obesity. With rates of childhood obesity increasing, there is also cause to consider how patterns of parenting in childhood may also be related to obesity earlier in life. With the desire of having a large sample size, this study excluded the fathers from analysis of the supportive parenting in early adolescence. Future studies should consider the possible influence of fathers on an adolescent’s development of obesity.

While the scope of this study was on the family environment, future studies should also consider the moderation effects of the neighborhood and school environments. This line of research is important in understanding how obesity is influenced by the family and how obesity influences the family. Currently, researchers are working on understanding how the family environment is influencing the adolescent’s development of obesity; however, there is little research examining the effects of obesity on the family environment. The results of this study indicate the importance of considering how obesity changes the interactions an
individual has with their children. In addition, this study was limited in the ages of the participants. Future research may want to examine the influence of childhood experiences on self-esteem and obesity in late childhood and early adolescence. Furthermore, there needs to be continued research into the effects of obesity on the family environment, to see if older parents (over the age of 30 years old) still demonstrate the same relationship between obesity, self-esteem, and parenting with young children, but also with older children and adolescents.

The issue of obesity and individual development is a complex and multi-layer issue. This study begins to examine the reciprocal influence between parenting and obesity and parenting and self-esteem. While the sample itself was limited, there have been some significant findings and support to the idea that obesity is related to the family environment. Continued research is needed to fully understand the many layers of obesity and the family environment.
References


APPENDIX A: IRB APPROVAL

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Iowa Youth and Family Project

Date: 9/28/2011
To: Allison Fittner
4112 Lincoln Swing #104
Ames, IA 50014

From: Office for Responsible Research

Title: Iowa Youth and Family Project

IRB ID: 11-447

CC: Dr. Brenda Lohman
2330 Palmer, Suite 6230

Study Review Date: 9/27/2011

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b).

The determination of exemption means that:

- You do not need to submit an application for annual continuing review.

- You must carry out the research as described in the IRB application. Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

  Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

  Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Humans Form will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. Only the IRB or designees may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or irb@iastate.edu.