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EXAMINING THE INTERSECTION OF RELATIONAL COMPETENCE, FEEDING ATTITUDES, AND CHILDHOOD OBESITY

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ABSTRACT

This study explored one dimension of the complex problem of childhood obesity by investigating the relationship between maternal relational characteristics (indexed by differentiation of self, attachment and effortful control), maternal feeding attitudes and children's propensity toward obesity. The current study investigated whether; (a) maternal differentiation of self, attachment anxiety and avoidance, and effortful control comprised a latent construct of relational competence; (b) mother relational competence accounted for a significant portion of the variance in child BMI; and (c) the relationship between maternal relational competence and child BMI was mediated by maternal feeding attitudes (restriction, pressure to eat and monitoring).

Sixty-five women and their preschool-age children participated. Mothers completed self-report measures and all participants were weighed and measured. Children's BMI scores showed a highly leptokurtic distribution. The first study hypothesis, that maternal Differentiation of Self, Attachment and Effortful Control all comprised one latent factor designated Maternal Relational Competence (MRC) was unsupported by the data. Rather, results indicated that Maternal Relational Competence variables did not load on one factor, as hypothesized, but tapped at least two latent factors.

The second hypothesis, that MRC predicts healthier child BMI was also unsupported by the data. Overall, none of the predictor variables were related to child BMI. Given that the correlation between MRC variables and child BMI was non-significant, the hypothesized test of mediation between MRC, feeding attitudes and child BMI was unwarranted, and post-hoc analyses were conducted. Analyses showed that

MRC variables did not distinguish between the child BMI weight groups and that maternal relational competence is better represented by two factors. Directions for future research, study limitations, and practice implications are discussed.

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Chapters 1 & 2: INTRODUCTION & LITERATURE REVIEW

Maternal Contribution to Children's Obesity

Mothers are the most influential individuals to socialize their children (Miller-Day, 2004) across emotional and behavioral domains. Feeding represents a specific activity that incorporates a mother's ability to regulate her own feelings (emotions) and behaviors and consequently affect her children through positive or negative eating outcomes. While initially toddlers regulate their energy intake based on internal satiety cues, with age children are more vulnerable to social influences (Fomon et al., 1975, Rolls et al., 2000).

Childhood obesity is a growing problem in America (Levy & Petty, 2008). Given that among 2-5 year old children studied between the years 1999-2002, estimates indicated that 20% were at risk for developing obesity (i.e. elevated BMI for age and sex), (Barlow, 2007) or becoming overweight (Hedley et al., 2004), much energy is currently devoted to understanding the problem of childhood obesity prevention. The purpose of this study is two fold: to examine whether mother's relational competence is associated with healthier child weight status (as measured by Body Mass Index *z*-scores) and to learn whether three selected aspects of maternal child feeding attitudes and behaviors serve to mediate this relationship. By studying how mothers' relational characteristics may relate to their child feeding practices and in turn, affect their children's propensity toward obesity, a significant gap in our understanding of possible antecedents of childhood obesity patterns can be clarified.

The central thesis of this paper is that mothers need specific self and relational skills in order to effectively scaffold healthy feeding behaviors (e.g., eating according to

internal hunger cues and controlling portion sizes) in their children. The term maternal relational competence will be used to refer to relationships capacities characterized by emotional maturity and comfort with closeness and autonomy (Marziali, Damianakis & Trocme, 2003). The three specific components of relational competence that are examined in this study are differentiation of self, attachment security, and effortful control. Differentiation of self (DOS), is defined as the capacity to effectively manage one's emotional reactivity, think clearly in the presence of emotion and to maintain connections with others while "holding on to" a clear sense of self in relationships (Kerr & Bowen, 1988, Skowron & Friedlander, 1998, Skowron & Schmitt, 2003). Adult attachment security reflects lower levels of anxiety in one's intimate (i.e., family) relationships and is characteristic of relationships with greater longevity, trust, commitment, and interdependence and is reflected by greater relationship satisfaction (Hazan and Shaver, 1987; Feeney, Noller, & Callan, 1994). Effortful control is the temperamental ability to restrain a dominant response and perform a subdominant response instead (Rothbart & Bates, 1998). The dimensions of differentiation of self, adult attachment and effortful control, which together comprise the construct of relational competence, are expected to influence maternal eating attitudes which in turn, are thought to predict childhood obesity.

There are two main goals of this study. The first goal is to examine the relationship between the set of three maternal relational competence variables and a child's propensity towards obesity. In other words, this study is designed to test the relationship between maternal relational competence, as indexed by level of differentiation, attachment security, and capacity for effortful control on one hand and

children's weight status or potential toward obesity on the other. Obesity is defined as higher levels of fat (adipose) tissue mass which lead to a BMI status of greater than the 95th percentile for age and sex. The second goal of this study is to examine whether maternal feeding strategies (i.e. monitoring, restricting, pressure to eat) mediate the relationship between relational competence on one hand and child weight status on the other. Specifically, greater maternal differentiation of self, lower attachment anxiety and avoidance and greater effortful control of their behavior taken together, are expected to correspond with more adaptive maternal feeding practices and fewer controlling strategies, resulting in children's healthier weight status.

The theoretical structure that informs this study integrates four major research areas and disciplines: nutrition science, child development, attachment and family systems theories. Specifically, it is theorized that maternal relational competence will enable mothers to engage in more adaptive feeding practices with their children, and thereby encourage and facilitate healthy child weight gain and maintenance.

This section will begin with a review of the research on childhood obesity, and focus on the developmental and contextual determinants of eating and weight problems in childhood. The prevention and early intervention programs are reviewed and findings highlighted, followed by a review of maternal factors related to childhood obesity. A review of the literature on maternal socialization of emotion and behavior and regulatory capacity follows. Next, the role of maternal socialization, self and emotion regulation and behavior literature is presented. The construct of parental relationship competence is defined and its three constituent constructs (i.e. maternal differentiation of self, adult attachment, and effortful control) are introduced and defined. Then, the hypothesized

relations between these aspects of maternal relational competence, maternal feeding practices, and child weight outcomes are delineated. Finally, the full conceptual model is presented which illustrates the specific factors that comprise relational competence and outlines the proposed relationships between relational competence and child's weight maintenance as mediated by maternal feeding attitudes.

Childhood Obesity

The dramatic increase in the rate of childhood obesity in America over the past three decades has led to a public health crisis (Kopelman, 2005) and has been shown to predict obesity and eating problems into adulthood (Guo & Chumlea, 1999). Obesity is defined as BMI-for-age greater than or equal to the 95th percentile and overweight status is defined as a BMI-for-age in the 85-94th percentile range. [Body Mass Index (BMI) is the most frequently utilized indicator of one's physical health and obesity status, and represents an index of one's weight-to-height ratio.] According to the Centers for Disease Control and Prevention, in 2003-2004, 17.1% of U.S. children and adolescents were overweight and 32.2% of adults were obese (Ogden et al., 2006). The Centers for Disease Control results were based on the 1999-2002 National Health and Nutrition Examination Survey (NHANES), which analyzed measured heights and weights in a nationally representative data set, and indicate that an estimated 65% of U.S. adults are either overweight or obese.

Early maladaptive eating patterns put children at higher risk of childhood obesity (Hedley et al., 2004). When obesity status (BMI $\geq$ 95th) is detected in childhood the odds of these children going on to become overweight in adulthood is 1.3 to 6.1 times greater

for males and 1.4 to 4.9 times greater for females (Guo & Chumlea, 1999). Research has also implicated childhood eating patterns in the subsequent development of overweight status in adulthood (Brunstrom, Mitchell & Baguley, 2005). Given that maladaptive early eating patterns (e.g., eating according to external cues, overeating) predict weight problems in adulthood, this study was designed to investigate a constellation of variables associated with maternal relational competence in order to better understand whether they represent important determinants of maternal child feeding practices, negative maternal child feeding behavior, and child weight status.

Childhood obesity and weight problems are widespread, and result in deleterious consequences for a child's health and well being. Children who become overweight or obese are at risk for developing a myriad of physical and mental health problems including heart disease, Type 2 diabetes, and depression (Mozlin, 2005). Childhood obesity has been linked with continuing obesity and associated health risks in subsequent generations of the family (Brunstrom, Mitchell, & Baguley, 2005; Guo & Chumlea, 1999). Parental concern about their children's eating has been found to be positively correlated with child's total fat mass (Spruijt-Metz et al., 2002). Further, the cost of childhood obesity is significant in the physical, psychological (Mozlin, 2005) and financial arenas. According to the National Institutes of Health (2005), the annual cost of overweight and obesity is $122.9 billion dollars in the United States alone. While this research focuses on how adult obesity presents a cost to society, obesity in childhood has been directly linked to adult obesity, (Brunstrom, Mitchell, & Baguley, 2005) therefore; early detection and intervention may prevent enormous societal costs later on. Research specifically focused on how parents can contribute to the problem of childhood obesity

through their feeding patterns and attitudes toward eating would provide valuable information to combat the problem.

While the current study focuses on elucidating the role of parenting processes in the development of childhood obesity, children's weight and eating problems in childhood also appear to have genetic (e.g. maternal BMI; Patterson et al., 1986), environmental (e.g. maternal emotional; mental health; Lewinsohn et al., 2005), and individual behavioral (e.g. development of early negative eating patterns; Birch et al., 1987) underpinnings. For example, research has documented measurable links between maternal BMI and child BMI, indicating that children of mothers with high body weight measurements are significantly more likely to have high weight status as well (Patterson et al., 1986). Genetic components clearly play a part in development of childhood obesity (Speakman, 2004, Patterson et al., 1986) and in conjunction with maternal physical characteristics (e.g. BMI, weight status) are highly related to children's weight status and weight maintenance and eating behaviors.

In addition to genetic links between child and parent weight status, parent psychosocial, personality, and behavioral characteristics predict children's eating problems as well. A study of problematic eating in three year olds, (Lewinsohn et al., 2005) found that maternal psychopathology was highly correlated with children's refusal to eat. Higher alcohol dependence in mothers was associated with increased reporting that their children were "picky" eaters. Children of mothers who experienced more conflict and "struggle for control" in their child feeding interactions posted higher BMI's (Lewinsohn et al., 2005).

The "struggle for control" (Lewinsohn et al., 2005) which often occurs between parents and children during feeding may be related to parents pressuring their children to eat or restricting their food intake (Birch et al., 2001). Pressure to eat and food restriction are two sides of the same coin reflecting parental controlling behaviors which, in turn, contribute to negative maternal child feeding interactions. DePalma and Skowron (2007) found that mothers with greater differentiation of self (i.e., less emotional reactivity and better ability to take "I" positions in relationships) and greater effortful control of their behavior used significantly more adaptive child feeding practices (i.e., more monitoring and less restriction), than did less relationally competent mothers. Birch and her colleagues (Birch, Fisher & Davison, 2003; Birch, McPhee, Shoba, Steinberg, & Krehbiel 1987) observed that parents who use more controlling feeding practices (i.e. restriction) with their children tend to have children who are more overweight than their same sex peers. Similarly, children of mothers who control their food intake by pressuring them to eat have a higher total fat mass than children of less controlling or pressuring mothers (Spruijt-Metz et al., 2002). Further, a qualitative and quantitative review of parent-child feeding strategies (and their relationships to child eating and weight status) by Faith and his colleagues (2004) found that parental feeding restriction "was associated with increased child eating and weight status" (p. 1711). Mothers who control their children's eating through pressure to eat or restricting food negatively affect their children's eating patterns and consequent weight status. More relationally competent mothers are expected to maintain adaptive feeding attitudes and behaviors, and in turn, to have children who post healthier weight outcomes. Finally, Lumeng (2006) explains "The common denominator among children who have developed obesity seems

to be dysregulation, whether it is in the form of a mental health disorder, chronic stress caused by poverty or understimulating environments, or any of these factors impacting the parent" (p. 55).

Status of Prevention and Intervention Programs

During the last decade, a series of investigations have focused on developing and evaluating programs designed to prevent and/or treat the problem of childhood obesity (Mozlin, 2005). While a wide variety of intervention and prevention programs have been developed to prevent or reduce obesity in children and adolescents, most have not been very effective at reducing obesity rates and increasing rates of healthy weight status (Stice, Marti, & Shaw, 2006).

In their meta-analysis, Stice et al. (2006) examined 147 articles and identified 64 obesity prevention programs which held a primary or peripheral aim to halt child and adolescent weight gain that exceeded developmentally appropriate goals. A total of 46 studies were included in the review. The authors noted that of the studies reviewed most (79%) did not produce statistically reliable effects in preventing weight gain (Stice et al., 2006). Stice et al., (2006) concluded that the average effect size across all obesity prevention programs reviewed was very small (*ES* = .04) and similar to effect sizes posted for other prevention programs describing other hard-to-treat problems such as smoking cessation and substance abuse.

Yet, while many weight loss intervention programs exist, there may be only short-term goal attainment evidenced by an average of 10% weight reduction for individually-focused strategies (Jeffery et al., 2000). Typically, child participants cannot maintain

their weight loss; and on average most adult patients will regain the lost weight within 2 or 3 years of treatment (Jeffery et al., 2000).

Of all obesity prevention programs, family-based interventions, which use a family systems approach to combating obesity, offer the most encouraging results as child participants in these programs typically kept their weight off longer and more consistently than those in comparable, individually-focused programs (Flodmark, Ohlsson, Ryden & Svegar, 1993). Additionally, behavioral programs aimed at children's weight loss that also involve their parents, typically produced greater gains than programs that specifically target adults only (Stice et al., 2006). This evidence suggests that targeting family relationships in the treatment of eating problems and obesity can produce more sustainable improvement in the member who struggles with their weight and/or eating. Thus, while current individual and group-based interventions appear largely unsuccessful at consistently preventing or reducing child obesity (Stice, Marti, & Shaw, 2006), interventions that involved parents in their children's weight-loss and obesity prevention efforts (Golan, 2006) and those that focus on younger children have produced the best outcomes (Stice et al., 2006).

Yet, while family-based interventions documented effectiveness, little is known about the mechanisms that promote these effects. In other words, little is known about the critical parent characteristics and/or parenting processes that account for such findings. Psychologists must learn more about what parental characteristics facilitate or impede healthy eating patterns (e.g. eating according to internal and satiety cues) in order to more successfully combat the growing trend toward obesity in young children. Given that treatments targeting children and involving parents post better outcomes (Stice et al.,

2006), attention focused on understanding the determinants of early maternal feeding attitudes and behaviors and their contributions to children's eating patterns could significantly add to what is known about development of childhood weight problems and obesity. This study will address a gap in the childhood obesity literature by specifically focusing on whether aspects of mother's relational competence map onto mothers' child feeding attitudes, and the presence of weight problems and obesity in children.

The Feeding Process

Most children enter the world with the healthy developmental capacity to eat when hungry and stop when sated (Satter, 1999). When children are born they initially eat in reaction to physical hunger signals (Formon, 1993) yet this ability may diminish as they grow older. Depending on, among other things, the nature of the interactional process between a mother's feeding approach and her child's eating characteristics (Satter 1990), mothers can affect their children's natural adaptive instincts toward eating by regulating (monitoring) their children's intake and controlling their children's intake through restricting, monitoring or pressuring their children to eat, (e.g., Birch, Zimmerman & Hind, 1980; Johnson & Birch, 1994). In order to regulate their children's intake, mothers may note how much of a particular food her child has eaten and then modulate presentation of other foods accordingly (e.g. if the child ate all of his/her meat but no vegetables at lunch, mother may present vegetables first at dinner in order to increase the likelihood of the child consuming them). According to Birch and colleagues, who developed the Child Feeding Questionnaire, Mothers may use three types of child feeding strategies; monitoring, restriction and pressure to eat (Birch, Zimmerman &

Hind, 1980; Johnson & Birch, 1994). These feeding strategies refer to parental beliefs, attitudes and practices with regard to child feeding (Birch, Fisher, Grimm-Thomas, Markey, Sawyer and Johnson, 2001). Monitoring refers to the extent to which mothers supervise and track their children's intake. Restriction refers to the intentionality with which mothers limit their children's access to desirable foods. Pressure to eat refers to maternal tendency to force children to eat more food (Birch et al., 2001). Thus, Mothers may manage their children's food intake through watching what they eat and then modifying what is offered to their children later (monitoring), or control their access to sugary foods (restriction), or push their children to clean their plate at mealtimes (pressure to eat) (Birch et al., 2001).

Maternal control over children's eating is particularly important in influencing children's development of eating skills and mother's feelings about the feeding experience. Mothers who breastfed their infants and reported use of fewer controlling strategies were more likely to have positive mealtime experiences with their children when they reached one year old (Farrow & Blissett, 2006). Even within the first year of life there exists the propensity for a child to develop (positive or negative) associations with regard to a parent's attitude toward feeding.

As children move past infancy, the reciprocal process that occurs in the context of feeding is evidently critical to adaptive development of eating behaviors. Parents who facilitate their children's listening to their own internal hunger cues, "are responsive and attuned to child's hunger and satisfaction cues and eating capability as well as able to adjust care as the child's developmental needs evolve" (Davies et al., 2006, p. 413). Davies and colleagues suggest that parents who are more able to maneuver their feeding

strategies in flexible ways are better able to assist their children to pay attention to and reinforce their own internal structures around eating behaviors.

Davies presents an ideal model for how parents may scaffold development of adaptive self-feeding behavior in their children. However, optimal flexibility to allow children to eat when hungry and stop when full is a complex, demanding parenting task. This may be partly because the nature of parents' approaches to feeding their children changes dramatically according to children's developmental needs and age. Mothers must be cognizant of their own emotions, food attitudes and their children's feeding needs (e.g. developmental stage, food preferences, nutritional requirements, amount of food and time eaten) and modulate their food provision accordingly. Feeding problems in children are quite common (Lindberg, Bohlin & Hagekull, 1991) and concerns about feeding are the most common issue brought to pediatricians and other primary health care professionals among parents of preschool age children (Linscheid, Budd, & Rasnake, 2003). Parents who can approach the feeding process more flexibly may be more capable of dealing with the inherently stressful job of feeding.

Initially, normally developing infants and toddlers are able to self-regulate the amount of calories they intake (Satter, 1999), but this ability appears to decrease in the preschool years as children become more vulnerable to social influences (Rolls et al., 2000). Studies show that infants and toddlers tend to be better capable of regulating their energy intake for physical reasons (Rolls et al., 2000; Mrdjenovic & Levitsky, 2004). For example, in an infant study, when experimenters manipulated the caloric content of formula and infants received half their typical calories, they were observed to upregulate later calorie intake by consuming significantly more volume (Fomon et al., 1975).

Similarly, three year olds eat more consistent amounts of food according to nutritional requirements, even when presented with double-size portions (Rolls et al., 2000) while 5 year olds tend to eat according to portions given. Likewise, in a study of total daily food intake of 16 children aged 4-6, the most significant predictor of how much food was consumed was the amount served (Mrdjenovic & Levitsky, 2004). Mrdjenovic & Levitsky (2004) found that pre-school age children did not modulate the amount of food they ate according to the energy density in the food.

In their feeding roles, parents may therefore unwittingly act as socializing agents, and decrease their children's ability to self-regulate food intake by cuing their children to attend to environmental and social prompts that exist around eating and mealtime demands. For example, children who were taught to focus on environmental information (e.g., the quantity of food remaining on the child's plate and time of day meal is served), were less able to self-regulate their caloric consumption (Birch, McPhee, Shoba, Steinberg & Krehbiel, 1987).

In sum, while studies suggest that infants up to three year olds are able to take in calories according to their physical needs by ages 4, 5, and 6, children may already be tuning into social signals to eat according to what is on their plate. By age 7 or 8 the trajectory toward development of obesity may have begun (Safer, Agras, Bryson & Hammer, 2001; Stunkard, Berkowitz, Stallings and Cater, 1999). Food intake in the preschool years appears more vulnerable to environmental social influences (including mother's use of particular adaptive or maladaptive feeding strategies). These feeding strategies may take the form of healthy monitoring (through the use of benign control) or through rigid food restriction or pressuring to eat (which both represent overcontrol).

It appears that the process of tuning into social signals instead of pure internal hunger signs begins in early childhood, but the specific processes by which this occurs have not received much attention. This writer theorizes that mother's use of particular (adaptive or maladaptive) feeding strategies, and variations in her underlying capacities to navigate complexities of the feeding relationships/interaction play an important role in children's eating outcomes. In particular, optimal feeding strategies appear to involve a moderate degree of "benign" control, flexibly managed while maladaptive feeding is characterized by over controlling via food restriction on the one hand or pressure to eat on the other. Because of the observed shift in children's focus from internal cues to socially constructed feeding cues at this age, it stands to reason that the preschool years may present an optimal time to study relations among maternal relational competence, type of feeding attitudes and behaviors and children's risk for obesity. As such, this study focuses on testing whether mothers' relational capacities influence their feeding attitudes and their children's BMI status.

There is some evidence that the shift in children's eating from satiety to non-physical needs stabilizes in the post pre-school years and has been linked to the maternal feeding attitude of restricting. Restriction is defined as control of children's eating behavior by limiting access to the amount and frequency with which children can eat preferred foods (Birch, Fisher & Davison, 2003). Fisher and Birch (2000) conducted a study utilizing the Free Access Procedure (Fisher & Birch, 2002) with a group of 191 Caucasian girls aged 5-7 years to examine the impact of parent restriction on eating intake when satiated. Children were interviewed after a typical lunch where their hunger levels and desire for favorite snack foods are measured. Children were then permitted to

eat as much of the snack foods as they want post lunch (i.e. hunger absent). Fisher and Birch (2002) found that eating while satiated was consistent from 5 to 7 years of age (Fisher & Birch, 2002). Further, daughters of parents who restricted their food intake at age 5 were more liable at age 7 to have a high snack intake when not hungry than were girls whose parents did not restrict their food intake (Fisher & Birch, 2002). Girls who consumed large quantities of snacks when full were almost 5 times more likely to be overweight than girls who ate little when satiated (Fisher & Birch, 2002). Thus, as young children age, parental control – in the form of restriction – leads to higher food intake disinhibition in children and may disrupt their ability to tune into internal cues of satiety and hunger (Fisher & Birch, 2002).

Maternal Socialization of Emotion and Behavior

It has been proposed that the relationship between a mother and her child is arguably the most enduring and influential bond the child will have in his or her life (Miller-Day, 2004). At birth, newborns are dependent on their mothers for their every need and mothers influence their children's early development in profound ways (Wenar & Kerig, 2000). In most societies, mothers remain primarily responsible for meeting their children's basic needs, providing security, love, and nurture in the form of food, bonding, protection, and consistency. While fathers are understood to play a critical socializing influence and may be active in feeding their children, the exclusive focus of this review and consequent aims of the hypothesized research study will highlight the role of the mother in her young child's development of healthy or unhealthy weight status.

As infants develop, they utilize their mothers' emotions to make sense of environmental information and develop their own interpretation of events (Feinman, 1982). In this way children organize the world by filtering experiences through their mothers' emotional reactions. Emotions serve as a communication mechanism between a mother and her child before language skills are even developed, as evidenced by the emergence of social referencing (Walden & Ogan, 1988). Social referencing is the use of another's perception of a particular situation to facilitate development of one's own understanding of that situation (Feinman, 1982). Social referencing and emotional communication may have an impact on how children relate to their mothers, other people and food.

Many authors believe that one of a mother's key duties is to socialize her children (Berlin & Cassidy, 2003; Edwards, Shipman & Brown, 2005; Kopp, 1982), that is, to facilitate his or her ability to "understand, experience, express and regulate" their emotions and behaviors (Eisenberg, Cumberland & Spinrad, 1998, p. 242). Children begin to regulate their behaviors across a variety of behavioral domains in the preschool years (Kopp, 1982; Kochanska et al., 1998; Shapiro, Fagen, Prigot, Carroll & Shalen, 1998) and mealtime is one relevant context in which their developing regulatory strategies can be observed (Johnson & Birch, 1994).

Maternal Socialization of Eating

Mealtime is an opportunity for mothers to assist children in eating both independently and adaptively according to internal hunger cues. Mothers may impede this naturally occurring process by alerting their children to aspects of food or mealtime

that have nothing to do with children's own internal cues toward hunger or satiety (e.g. instituting a "clean your plate" rule; labeling foods as "good" or "bad"; modeling poor regulatory behavior). For example, a preverbal child who observes his or her mother fight with her spouse and turn to devour a box of cookies soon afterwards may learn that food can be a comfort mechanism during or after stressful situations. Mothers who communicate dichotomous messages about foods being exclusively "good" or "bad" and exert varying degrees of control over each may lead their children to have difficulty regulating their own intake (e.g. "I'm in a bad mood so I deserve to eat 'bad' food") and eat "bad" foods in an effort to exert some autonomy or eat for other non-nutritive reasons. Mothers who restrict their children's access to "bad" food can serve to focus their children's attention on these items and may unwittingly promote overconsumption (Fisher & Birch, 1999).

As children expand their diets to new foods in late infancy and toddlerhood they rely on their mothers to make decisions on what types of food to eat, how much to offer and when eating is appropriate. Satter (1990) offers that parents become responsible for the "what, when, and where of feeding" while children use the signals they interpret from their mothers to help make autonomous decisions about whether or not to eat and how much to ingest. The dynamic that occurs between mother and her child at mealtime has the potential to increase children's adaptive, healthy eating potential or confuse their natural tendencies to tune into their internal hunger cues (Satter, 1990). The potential problems that can develop from children referencing their mother's signals during mealtimes (e.g. controlling behavior, disgust at certain foods) are powerful. What remains unclear is how the maternal feeding attitudes (conveyed through social

referencing behaviors) may be related to mother's relational capacities grounded in her own self-regulation and comfort with intimacy and autonomy and influence a child's propensity toward unhealthy weight and obesity.

Children's development of their own internal management over eating behavior at mealtimes requires increasing regulatory control and attention to multiple messages which come from external and internal sources. Research indicates that young children regulate their eating from infancy (Satter, 1999), while their capacity to self-regulate their emotions develops in the preschool years (Berlin & Cassidy, 2003). As children grow into preschoolers they are charged with the task of examining parental cues to determine what foods to eat and how much to eat while simultaneously attending to their own physiological signals of hunger and satiety (Birch, 1990). This dynamic can lead to preschoolers becoming neophobic of unfamiliar foods or unenthusiastic about trying new foods (Addessi et. al., 2005; Birch, 1990). Given that their initial response may be to refuse novel nutritious options, children must regulate their apprehension about various foods and eat in order to take in enough calories and ensure their survival. Ultimately, children must learn to regulate their emotions around and about eating in the preschool years.

The thesis guiding this study posits that child dysregulation, specifically with food, can be understood as a function of quality of parent-child relationship and parents' own capacities for self emotion-regulation, and comfort with autonomy and connection. More relationally competent mothers are theoretically capable of assisting their children to regulate their emotions around food and tune into their own internal cues of satiety and hunger. These mothers are thought to be better regulated and as such, better able to

manage the complexities inherent in the feeding relationship. Additionally, mothers who are better regulated will balance moderate amounts of control to facilitate good eating practices. These mothers would be more likely to eat well themselves, monitor their own and their children's food intake in adaptive ways and maintain healthy weight status. On the other hand, less relationally competent mothers may encourage children to turn away from their internal cues through an overreliance on controlling feeding strategies such as restriction and pressure to eat. While preschool age children will inevitably begin to tune into their environment, mothers can shape the quality of this environment to provide balance of support for child's age-appropriate autonomy and watchful management of eating practices which sets the stage for healthy or problematic eating behaviors and consequent weight outcomes.

Literature in the socialization of emotion indicates that mothers play a key role in facilitating children's ability to develop adaptive responses to environmental cues (Eisenberg et al., 1998). There is evidence that parents can distinctly impact their children's responsiveness to environmental cues through encouraging children to eat only at certain times or according to presence of food, and override their internal hunger cues (Birch et al., 1987). The feeding relationship requires that parents walk a delicate line between allowing children control over some aspects to encourage self-efficacy yet also enforcing feeding rules to ensure children's survival (Gralinski & Kopp, 1993). Viewed in this way, mealtimes are an opportunity for children to develop their budding regulatory skills, and assert age-appropriate autonomy or conversely, to battle for control over food. The quality of the parent-child relationship can be expressed through feeding interactions, and feeding, in turn, can impact the parent-child relationship. Given that children require

consistent nourishment, the issue of parental control in feeding pervades parent-child relationships and can impact the quality of relationships between mothers and their children. When parents do not allow children opportunities to manage their own behavior, or assert age-appropriate autonomy over eating, socialization development can be impeded (Berlin & Cassidy, 2003; Johnson & Birch, 1994).

Maternal Control and Feeding Strategies

Research indicates that mothers who display more benign, guiding, monitoring attitudes to encourage child compliance and refrain from use of harsh or overbearing methods of control (e.g. restriction, overt punishment), have children who more successfully assert themselves and comply with rules (Crockenberg & Litman, 1990). Responsive mothers (Rodriguez et al., 2005) who demonstrate warm control, (Sethi et al., 2000) sensitivity and consistent limits (Gralinski & Kopp, 1993) have children who demonstrate self-regulated compliance to their caregivers' rules (Feldman & Klein, 2003). Further, children with the adaptive ability to self-regulate can wait for a desired reward (Kochanska et al., 1998) and internalize rules for application even when they are not monitored by a caregiver (Gralinski & Kopp, 1993). While these findings are from studies of child compliance and did not directly examine food rules, the same mechanisms may be at work when considering how children respond to their parents' limit-setting and how well they can recall and follow rules when their parents are not present.

In research which focused exclusively on feeding behavior, children whose mothers demonstrated warm, sensitive feeding behavior and utilized child-centered

feeding strategies (e.g. reasoning, monitoring, complimenting and helping their child) had children who were better able to internalize and employ healthy food rules even when they were outside of their mother's charge (Hayes et al., 2001; Hughes et al., 2006). Given that eventually, all children must begin to eat independent of their mother's presence, the establishment of healthy food rules early in life will encourage better self-regulation of calories.

Studies have confirmed that mothers' use of non-directive, monitoring strategies (e.g., "there is more meat left") as opposed to controlling strategies (e.g. "eat your meat") enhanced children's ability to make and explain healthy food choices. Both in Mexican-American and European-American families (Hays et al., 2001; Johnson & Birch, 1994) children of mothers who indicated a lower ability to exercise effortful control over their own eating behavior, failed to compensate for caloric density either. Interestingly, in this study (Johnson & Birch, 1994) both children of more controlling and more disinhibited parents appear less capable of self-regulating their caloric intake. Yet, in their review summarizing relations between parent feeding strategies and their relationship to child eating and weight status, Faith et al., (2004) concluded that, "Parental feeding restriction, but no other feeding domain (e.g. pressure to eat, monitoring), was associated with increased child eating and weight status" (Faith et al., 2004 p. 1711).

Children appear to be initially able to regulate their intake and are naturally "cued" into their internal hunger but eating becomes increasingly contextually determined as they grow. Findings from the current study may help to clarify the nature of parental influences (e.g. external or social cues to eat) on the development of

childhood obesity, which may in turn, have implications for refining efforts to combat childhood obesity.

This study aims to evaluate in what ways parent's own capacity for regulation, autonomy, and connection are associated with variations in their use of maladaptive control in feeding and their preschool-age children's propensity toward obesity. Specifically, mothers who are more differentiated, demonstrate secure adult attachment, and are able to exercise effortful control, are hypothesized to use more gentle control strategies characterized by monitoring and rely less on restriction control or pressuring to eat when feeding their children, and thus contribute to their children's healthy weight maintenance. It is hypothesized that parents' greater relational competence will (a) be associated with healthy child BMI and (b) operate through optimal feeding practices with their children to predict healthy child BMI.

Relationship Competence

Relational competence describes "the capacity to engage in relationships with others, and it includes an awareness of a self-identity as being separate from that of others" (Marziali, Damianakis & Trocme, 2003, p. 532). Theoretically, relational competence involves one's capacity to regulate self and emotions and thus enable positive relationships, characterized by personal growth, security and an "ability to reciprocate in providing relational support for others" (Marziali, et al., 2003, p. 532). This author posits that mothers who are more relationally competent enjoy greater differentiation of self in their familial relationships, show greater attachment security, and exert better effortful control of their emotions and behavior (Bowen, 1978; Eisenberg et

al., 1998). More relationally competent mothers can, in theory, more effectively negotiate the dialectic between autonomy and support/connection with their children (Kerr & Bowen, 1988; Bowlby, 1968, 1982, 1988). Theoretically, more relationally competent mothers will not tend to over-manage their children through the use of controlling feeding strategies but instead offer age-appropriate opportunities for their children to make food choices (e.g. "would you like carrots or sweet potatoes with dinner?") and thus progress in defining a clear sense of self. It is proposed here that mothers who are more relationally competent will engage in use of more adaptive child feeding strategies and have children with healthier BMI.

Socialization of children into healthy eaters requires parenting that is warm, supportive, non-intrusive and respectful of children's developing selves. The task of parenting around feeding and eating issues is inherently challenging due to the natural intersection between children's budding autonomy and simultaneous need for support. Parents who can tolerate and support their children's burgeoning autonomy may be less emotionally and behaviorally reactive to their children's age-appropriate food challenges (e.g. neophobia, food refusal, desire for only certain foods) and more likely to utilize positive feeding strategies and contribute to healthy physical outcomes, namely healthy weight maintenance.

Plausibly, mothers who are more relationally competent are poised to do a better job socializing their children. Mothers who can control their instinct to yell at their child to clean their plate when frustrated in favor of a more composed, thoughtful response (e.g. calmly request their child remain at table until meal is over) are likely to minimize the use of food as a battle ground for mother-child conflict and the extent to which

feeding becomes a time for preschoolers to assert their autonomous strivings. Interestingly, the capability to stay calm, self-regulate and make rational parenting decisions may significantly impact a mother's ability to encourage healthy weight in her child (Johnson & Birch, 1994).

Mothers who avoid engaging in a struggle for control with their children over food may also represent other aspects in the dimension of relational competence, namely differentiation of self. Mothers who are able to see their young children as separate, and interested in supporting their autonomy are more likely to recognize this developmental task (Davies et al., 2006) and respond by remaining thoughtful and emotionally non-reactive to children's need for independence. Emotional reactivity, a key component of differentiation of self problems, is the tendency to respond to environmental stimuli with emotion and not logic. Mothers who are less emotionally reactive may be more likely to recognize children's need for independence over some feeding decisions, and relying less on food restriction or pressuring their young children to eat.

Differentiation of Self

According to Bowen, differentiation of self is comprised of the ability to modulate emotional reactivity (respond to environmental cues emotionally versus logically), take an effective I-position (i.e., reflect a clearly defined sense of self in relationships), and refrain from emotional cutoff (sense of excessive or threatening vulnerability in interpersonal relationships) or excessive fusion (emotional overinvolvement with significant others) in relationships. Bowen theorized that more

differentiated parents are better positioned to assist their children to learn how to think, behave and feel as autonomous selves.

He proposed that at lower levels of differentiation, individuals utilize one of two mechanisms to manage their emotional reactivity: fusion and cutoff (Bowen, 1978; Kerr, 1992; Skowron & Schmitt 2003). Individuals who fuse with others tend to become more anxious when faced with genuine and imagined separations from others, while emotional cutoff is more likely among individuals who experience anxiety in response to intimacy, and close contact with others (Kerr & Bowen, 1988). Mothers who become distressed when their children attempt to assert independence over their eating habits may be more reactive, less differentiated, and engage in restrictive feeding practices or pressuring to eat as a means of regulating their own anxiety. As a result their children may be less able to listen to internal cues to eat when hungry and stop when full and be at risk for development of obesity. Mothers who rely on fusion with others may have difficulty allowing their preschool children to make their own food choices and may unwittingly foist their own needs onto their children (e.g. pressure their children to eat or "clean their plate"). Stated another way, mothers may project their own need (e.g. either a literal or figurative "hunger" of their own onto their children and conclude, incorrectly, that their child should eat more though the child is not physically hungry). Alterately, mothers who use emotional cutoff under stress may be less sensitive to their child's distress, ignore their feeding needs and restrict access to foods.

Previous research indicates that differentiation of self problems are highly correlated with chronic anxiety (Haber, 1993; Skowron & Friedlander, 1998; Skowron, Wester & Azen, 2004), psychological distress (Haber, 1993), physical health problems

(Bray, Harvey & Williamson, 1987) and predicts interpersonal problems over time (Skowron, Shapiro & Stanley, 2009). Mothers who are less differentiated are hypothesized to contribute to their children's non-nutritive eating through over-controlling in the feeding process via restriction or pressure to eat and teaching their children to attune more clearly to (relationship demands) and less to their own internal cues of hunger or fullness. Along these lines, one case study explained feeding as a kind of "currency" between mother and children's food and rejection reflected possible refusal of the "toxic" emotions a mother may unintentionally foist upon her child (Winston, 2005). Kerr (1988) proposed that eating problems are a result of familial anxiety, in that parents' concerns with their children's eating behaviors and other health symptoms reflect lower levels of differentiation of self and can serve to bind anxiety in the system.

While research has documented robust relations between differentiation of self, psychological well being, relationship functioning in late adolescence and adulthood, less is known about the role of parent differentiation of self in children's health outcomes. Mother differentiation of self has been linked with better cognitive performance and social-emotional functioning in children (Skowron, 2005) but to date, only unpublished studies (DePalma & Skowron, 2007) have directly examined associations between parent differentiation of self and children's weight status.

Attachment

Another construct central to healthy mother-child bonding is adult attachment (Bowlby, 1969). Bowlby indicated that attachment is a critical human process for it increases survival probability and enhances adaptive character growth across the lifespan

(Bowlby [1969] 1982, 1988). According to Bowlby (1969), mothers function as a secure base from which their children can learn to explore the world. As children grow into toddlers and beyond they are believed by Bowlby (1969) to internalize their early attachment figures as working models and templates for how to experience, express and regulate distressing emotions (Cooper, Shaver & Collins, 1998). Essentially, the early attachment experience has lasting implications in adulthood through the information of internal working models of attachment (Bowlby, 1969, 1982).

Working models of attachment that are developed in childhood persist into adulthood. Attachment theory and research indicate that early attachment security predicts an improved ability to control cognitive and emotional processes in healthy ways (Cooper, Shaver & Collins, 1998; Lopez & Brennan, 2000).

Attachment anxiety and avoidance underlie attachment security and represent key aspects through which the health of adult attachment relationships may be measured (Brennan, Clark & Shaver, 1998). Individuals low in both attachment anxiety and avoidance (i.e., secure individuals) are able to self-soothe in stressful circumstances and enjoy healthy intimacy. Conversely, individuals high in attachment avoidance suppress the attachment system when under stress and avoid intimacy while individuals high in attachment anxiety hyper-activate the attachment system when under stress and become preoccupied when their attachment objects are not available (Lopez & Brennan, 2000).

Securely attached adults who become parents are presumably able to be in good contact with their children, remain a source of support and stay emotionally regulated even in the face of difficult tasks such as feeding a preschool age child. Children of more secure mothers are more capable of expressing and regulating their own emotions

through healthy mechanisms (Cooper, Shaver & Collins, 1998) and more attuned to their own physiological experience. Mothers who are low in attachment anxiety and avoidance are more skilled at regulating their own emotions (Pietromonaco, Barrett & Powers, 2006) and engage in feeding strategies that enhance their children's ability to regulate their own healthy eating.

Because mothers high in attachment avoidance are more likely to attribute negative emotional qualities to ambiguous situations (Collins, 1996), these mothers may perceive their children more negatively in the feeding situation (e.g., not eating or wanting restricted foods). On the other end of the spectrum, mothers high in attachment anxiety may approach feeding by pressuring their children into eating more or restricting their intake, in response to their own anxiety and less due to their child's genuine feeding needs.

Children of mothers who are high in attachment anxiety and avoidance may feel less supported in making their needs known and may compensate by seeking food for comfort and not regulating their own eating in healthy ways. Mothers who are not able to read their children's emotions accurately may not be adept at reading their cues of satiety and hunger effectively either.

Research supports the notion that maternal attachment impacts childhood eating behavior. One study found that presence of eating problems was associated with "insecure parental bonding" (Mangweth et al., 2005). Mangweth and her colleagues (2005) also cited lack of intimacy [what Bowen would call "cut-off" (Kerr & Bowen, 1988)] in the family of origin as a major risk factor for development of an eating disorder. Lewinsohn and her colleagues (2005) found a significant correlation between

parental report of struggle for control with children over food choices/feeding behaviors and parental perception of child pickiness in a sample aged 36 months old.

Effortful Control

Effortful control is identified as the third component of relational competence and is defined as the temperamental ability to restrain a dominant response and perform a subdominant reaction (Rothbart & Bates, 1998) and "the ability to inhibit effortfully a proponent behavioral" response (Kochanska, Murray, & Harlan, 2001, p. 1093). Research has documented that adults with higher levels of differentiation of self and lower levels of attachment anxiety and avoidance show greater ability to engage in effortful control of their behavior (Skowron & Dendy, 2004). Effortful control is evident in the studies reviewed from nutrition literature and it appears to play an important role in children's healthy weight and eating (Birch, Fisher & Davison, 2003; Fisher & Birch, 2000). DePalma and Skowron (2007) found that greater maternal effortful control was associated with more adaptive monitoring and less restricting of children's eating intake. A review of the literature uncovered no other studies conducted to date that have directly examined whether a mother's effortful is important to healthy feeding practices and children's weight outcomes.

In the child development literature, research on effortful control has focused primarily on children's behaviors (Kochanska, et al., 2001; Kochanska, Tjebles, & Forman, 1998) with little attention to the role of parental effortful control on children's development of eating-related regulatory behaviors. Theoretically, mothers who show greater effortful control of their own behavior may be more likely to approach feeding in

a thoughtful, flexible manner. Conversely, mothers with lower effortful control may resort to more rigid feeding strategies like restriction or pressuring to eat, and consequently, have children with more weight problems.

Interrelations between Differentiation of Self, Attachment and Effortful Control

Ultimately, the aspects of differentiation of self proposed by Bowen, most notably emotional reactivity and emotional cutoff, are related to the ability to exercise effortful control and healthy attachment in adulthood (Skowron & Dendy, 2004). Skowron and Dendy (2004) found that the construct of attachment security is related to differentiation of self. Further, results from Skowron and Dendy (2004) revealed that both differentiation of self and attachment security scores predicted greater effortful control. Empirical evidence supports the notion that the construct of attachment security is highly associated with differentiation of self (Skowron & Dendy, 2004), and thus taken together with capacity for effortful control, it was hypothesized that these three constructs together would comprise the construct of relational competence.

Further, relational competence, comprised of maternal differentiation of self, attachment security and effortful control, was hypothesized to predict child weight status. Latzer and her colleagues (2002) examined how quality of adult attachment correlates with parent feeding patterns and child physical correlates, specifically propensity towards obesity in children. Results of this study indicated eating disordered participants were less secure, more avoidant and more anxious than control participants. Likewise, families of those participants with eating disordered were found to be less cohesive and

emotionally expressive and less encouraging of healthy differentiation than control participants.

Conclusion

The main goal of this study was to explore the complex problem of childhood obesity by investigating the relationship between maternal relational characteristics, maternal feeding attitudes and children's propensity toward obesity. Until now, there had been no systematic study to investigate the parental relational characteristics that impact child's potential toward obesity. The first purpose of this study was to test the relationship between maternal relational competence -- characterized by DOS, attachment security, capacity for effortful control -- and children's propensity toward obesity. The second purpose of the study was to test whether maternal feeding practices would mediate the relationship between maternal relational competence and children's propensity toward obesity. Thus, more relationally competent mothers, in other words, those who reported greater differentiation of self, lower anxious and avoidant attachment, and greater capacity for effortful control were hypothesized to employ less controlling feeding strategies and more adaptive monitoring. This study was designed to examine whether maternal relational skills were related to maternal child feeding practices and investigated the problem of childhood obesity through a multidisciplinary lens by testing a model in which a latent construct of maternal relational competence impacts the childhood health outcome of BMI status.

In sum, this study tested two nested models: (a) the relation between maternal relational competence and childhood BMI status, and (b) a mediation model in which the

influence of maternal relational competence on childhood BMI is hypothesized to be mediated by maternal feeding strategies.

Hypotheses

Preliminary Hypothesis. First, a latent construct of maternal relational competence was hypothesized to consist of mother differentiation of self, attachment anxiety and avoidance, and effortful control. A structural equation model was tested to assess loadings on the latent variable of relational competence. Differentiation of self (comprised of Emotional Reactivity, I-Position, Emotional Cutoff and Fusion with Others subscale scores), attachment security (i.e., Attachment Anxiety and Avoidance scale scores), and Effortful Control scores, taken together, were expected to comprise the latent construct of relational competence. See Figure 1.

Hypothesis 1. Maternal relational competence, comprised of greater differentiation of self, lower attachment anxiety and avoidance, and higher effortful control, taken together, was expected to predict healthier child BMI (i.e., BMI of 6th through 85th percentile according to growth charts).

Hypothesis 2. The relationship between maternal relational competence and child BMI would be mediated by the maternal feeding practices of monitoring, restricting and pressure to eat. Specifically, it was predicted that greater use of monitoring feeding practices and less restriction and pressure to eat would partially mediate the relationship between greater maternal relational competence and healthier child BMI. If Hypothesis 1 was supported by data, then Hypothesis 2 would be tested through the use of a mediation model in structural equation modeling. If data did not suggest a relationship between

maternal relational competence variables and the outcome measure of BMI then alternative analyses would be pursued.

Chapter 3: METHODOLOGY

This study investigated relations between maternal relational competence, parent feeding practices, and children's potential for obesity. To this end, the current study investigated whether, in a sample of mothers with preschool-age children, (a) maternal differentiation of self, attachment anxiety and avoidance and effortful control comprised a latent construct of relational competence; whether (b) mother relational competence (i.e., differentiation of self, attachment anxiety and avoidance, and effortful control) accounted for a significant portion of the variance in child BMI; and whether (c) the relationship between maternal relational competence and child BMI was mediated by maternal feeding attitudes. In other words, greater parent relational competence was hypothesized to predict healthier child BMI through the use of a more adaptive feeding strategy (i.e. monitoring) and less use of controlling feeding strategies (i.e. restriction, pressure to eat). Conversely, mothers who were more differentiated, demonstrate lower attachment anxiety and avoidance, and report greater effortful control scores, were expected to have pre-school children with healthier weight status.

Participants

A sample of mothers (n = 65), ages 18+ who had a child ages 3-5, and spoke English participated in the study. The age of mothers ranged from 26 to 46 years (M = 34.76, SD = 4.01) and almost all participants were married (90.8%, n = 59). Most mothers reported their ethnicity was Caucasian (n = 58), followed by Hispanic/Latino (n = 4), Black (n = 1), American-Indian/Alaskan Native (n = 1) and one mother declined to reveal her ethnicity. Mothers in the study were highly educated overall, 88% earned at

least a bachelors degree (24.6%, *n* = 57), and the majority of participants reported family income was in the range of 41,000-50,000 (21.5%, *n* = 16). An income level of greater than 100,000 was the next highest family income group reported in the sample (*n* = 14). Children ranged in age from 3-5 with most falling in the age 3 group (52.3%, *n* = 34), then the age 4 category (40%, *n* = 26) and finally, the 5 year old group (7.7%, *n* = 5). Most mothers reported their children's ethnicity was Caucasian, (87.7%, *n* = 57), followed by Hispanic/Latino, (4.6%, *n* = 3), Multi-racial/Multi-ethnic (3.1%, *n* = 2), Black (1.5%, *n* = 1), American-Indian/Alaskan Native, (1.5%, *n* = 1) and Asian, (1.5%, *n* = 1). Mothers were recruited through the Penn State University Families Interested in Research Studies (FIRSt) database, local daycare centers, classes geared toward preschool-age children, (e.g. mother/child music classes) and community mothers groups.

The sample size was determined on the basis of the number of independent variables present, the statistical analyses to be conducted, and the medium to large effect sizes observed among the variables of interest in a previous pilot study (DePalma & Skowron, 2007). The number of independent variables present in the full conceptual model was 10 (DSI-Emotional Reactivity, DSI-I Position, DSI-Fusion with Others, DSI-Emotional Cutoff, ECR-Anxiety, ECR-Avoidance, ATQ-Effortful Control, CFQ-Restriction, CFQ-Pressure to Eat, and CFQ-Monitoring) and Stevens (2002) and Bentler and Chou (1995) suggest that a good rule of thumb for adequate statistical power is to obtain 15 cases per independent variable in multivariate regression analysis. Since SEM is closely related to multivariate regression in some aspects, 15 cases per independent variable in SEM indicated a plausible sample size (Stevens, 2002). Based on the results of a power analysis, with N = 10 independent variables, $\alpha = .05$, and power set to .80,

125-150 participants were deemed optimal to find a medium effect among the variables of interest (i.e., $f^2 = .15$; Cohen, 1992). Alternately, if a large effect size of $f^2 = .35$ was observed among the study variables (as was found between maternal differentiation of self subscale scores and maternal feeding attitude scores; DePalma & Skowron, 2007), it was determined that N = 60-75 participants would be sufficient to detect this size effect in the population (Cohen, 1992).

Given that the population of Centre County is 90% comprised of individuals who identify as White non-Hispanic, the sample did not include a large number of persons of color. The FIRSt Families Database population is comprised of predominately White individuals who reside in the ethnic and racially homogenous community of Centre County, PA and the surrounding counties.

Instruments

Self-report measures were utilized to assess maternal relational competence. However, given that greater measurement error exists when mothers report their children's height and weight data than when it is obtained by a health professional or researcher, the principal experimenter collected this information directly through physical measurements of children's and mother's height and weight status.

Demographic form. Each mother completed a demographic form, on which she listed her own age, race/ethnicity, level of education, objective SES, marital status, and her child's age, birth order, race/ethnicity. Each mother was asked to report height (in inches), weight (in pounds) and her child's height (in inches) and weight (in pounds), to compare with physical measurements collected. See Appendix C for Demographic Form.

Differentiation of Self Inventory (DSI, Skowron & Schmitt, 2003; Skowron & Friedlander, 1998). The DSI is a 46-item self-report measure that utilizes a 6-point Likert-type scale which ranges from 1 (*not at all true of me*) to 6 (*very true of me*). The DSI is designed for use with adults and assesses level of differentiation in current relationships and family of origin relationships. The four subscales of the DSI include: Emotional Reactivity (ER; e.g., "I'm very sensitive to being hurt by others"), Emotional Cut-off (EC; e.g., "I need to distance myself when people get too close to me"), I Position (IP; e.g., "I usually do not change my behavior simply to please another person), and Fusion with Others (FO; e.g., "It has been said of me that I am still very attached to my parents"). One question's score is reversed on the IP scale. Scores are reversed on all items in the ER, EC scales and all except one item on the FO. Once scores are reversed, item scores on each subscale are added together and divided by the number of items on that scale so that all subscale scores range from 1 to 6 with lower scores indicating lower differentiation of self. Overall, higher scores indicate greater differentiation of self. Higher scores on the ER scale indicate less emotional reactivity, IP scores indicate a greater ability to take an "I-position"; higher EC scores are indicative of less emotional cutoff; and higher scores on the FO scale reflect less fusion with others. In other words, higher scores on all four subscales represent greater differentiation of self.

For the present study, the four DSI subscale scores were utilized to assess maternal differentiation of self. Internal consistency reliabilities of the DSI subscales are good; ER: α = .89, IP: α = .81, EC: α = .82 and FO: α = .85 (Skowron & Schmitt, 2003). Three month test-retest estimates are also high; DSI-total = .78; ER = .76; IP = .80; EC = .77; and FO = .76 (Skowron, Shapiro, & Stanley, 2009). Tuason and Friedlander (2000)

found that DSI scores remain consistent over time even when participants experienced environmental stress. Evidence of the DSI's construct validity was accumulated by correlating the measure with other theoretically similar scales, the Personal Authority in the Family System Questionnaire (PAFS-Q; Bray, Williamson & Malone, 1984), Differentiation of Self Scale (Kears, 1978), the Emotional Cutoff Scale (McCollum, 1991), the Family-of-Origin Scale (Hovestadt, Anderson, Piercy, Cochran, & Fine, 1985). Confirmatory factor analysis demonstrated psychometric support for the four DSI subscales (Skowron & Friedlander, 1998). Finally, there is some evidence to support the cross-cultural validity of the DSI (Skowron, 2004; Tuason & Friedlander, 2000). Reliability estimates for the current sample were good, ER: α = .89, IP: α = .83, EC: α = .87 and FO: α = .80.

Experiences in Close Relationships Scale (ECR; Brennan et. al., 1998). The ECR is a 36-item instrument designed to assess two underlying dimensions of attachment in adult relationships. The Attachment Anxiety subscale assesses a preoccupation with relationships, fear of rejection; (e.g. "I worry that my partner will not want to stay with me") and the Attachment Avoidance subscale consists of items that tap discomfort with closeness and dependency, and compulsive self-reliance; (e.g. "I prefer not to be too close to romantic partners"). The ECR employs a Likert-type scale and participants rate each statement on a scale ranging from 1 (*disagree strongly*) to 7 (*agree strongly*). Scores are calculated by reverse scoring on some items, computing scores for the two dimensions of Anxiety and Avoidance (Bartholomew & Shaver, 1998). Higher scores are indicative of greater Attachment Anxiety or Avoidance respectively. Across a 6-week period, test-retest reliability indices for the ECR Anxiety and Avoidance scales are

in the low .90s (Sibley, Fischer & Liu, 2005, p. 1525) indicating that ECR scale scores are highly stable over a short time. Evidence of the ECR's construct validity was accumulated by correlating the measure with other theoretically similar scales, in that lower attachment anxiety and avoidance corresponded with greater social self-efficacy and emotional awareness (Mallinckrodt & Wei, 2005). Both the Attachment Avoidance and Anxiety scales were used in this study. Reliability estimates for the current study were good, ECR Anxiety: $\alpha = .92$ and ECR Avoidance: $\alpha = .93$.

Adult Temperament Questionnaire-Effortful Control Scale (ATQ-EC, Rothbart et al., 2000). The ATQ-EC is a 35-item subscale that measures "the ability to inhibit a dominant response to perform a subdominant response" (Rothbart & Bates, 1988, p. 137) More specifically, the ATQ-EC scale taps a capacity to focus attention and shift attention when desired (e.g. "It's hard for me to focus my attention when I am distressed"); to suppress inappropriate approach behavior (e.g. "When I'm excited about something, it's usually hard for me to resist jumping right into it before I've considered possible consequences"); and the capacity to perform an action when there is a strong tendency to avoid (e.g. "I can make myself work on a difficult task even when I don't feel like trying"). ATQ-EC items are rated using a Likert-type scale range from 1 (*extremely untrue*) to 7 (*extremely true*) for each question. The ATQ-EC scale is computed by summing the scores for each of the subfactors of the ATQ-EC scale together and then dividing by the number of subfactors, such that higher scores reflect greater effortful control. The full ATQ-EC scale was utilized for the purpose of this study.

The reliability estimate for the effortful control scale was $\alpha = .78$ (Evans & Rothbart, 2007). With respect to construct validity of the ATQ-EC, strong relationships

were found between Effortful Control and the Big Five factors of less neuroticism, greater conscientiousness, and greater openness to experience (Ahadi & Rothbart, 1994). Further evidence for construct validity was collected by Rothbart and her colleagues (2000) predominately through factor analyses. Reliability estimates in the current sample were also good, ATQ-EC: $\alpha = .90$.

Child Feeding Questionnaire (CFQ; Birch et al., 2001). The Child Feeding Questionnaire is a 31-item instrument used to measure maternal feeding attitudes and behaviors and is designed for parents of children who range in age from 2 to 11. Three scales assess parental attitudes and practices regarding the use of managing feeding strategies: Monitoring, Restriction and Pressure to Eat. Monitoring is the extent to which parents oversee their child's eating in benign and adaptive ways. The Monitoring subscale has three items; (e.g., "How much do you keep track of the high-fat foods that your child eats?"). The Restriction scale measures parents' attempts to control child's eating by restricting access to certain foods or food amounts. The Restriction subscale is comprised of eight items; (e.g., "If I did not guide or regulate my child's eating, she would eat too much of her favorite foods"). The Pressure to Eat scale measures the extent to which parents pressure children to consume foods. The Pressure to Eat subscale has four items; (e.g., "My child should always eat all of the food on her plate"). Some of the other subscales on the measure include "Perceived Parent Overweight" and "Responsibility" which measure how overweight the parent completing the measure perceives they are and how responsible they are for feeding their child, respectively. These subscales were not included in the models for the current study because they do not bear directly on the research question of interest.

Birch and her colleagues (2001) examined the psychometric properties of the CFQ in a sample of 394 mothers and fathers, and excluded three questions in the perceived child weight category when using the measure with parents of preschool age children or under. Because the current study focuses also on parents and their preschool-age children, only questions which focus on the age group of interest were included.

Birch et al. reported coefficient alphas of .70 (Pressure to eat), .73 (Restriction), and .92 (Monitoring), for the CFQ subscales. Two additional studies of the psychometric properties of the CFQ were conducted, one with 148 mothers and fathers and one with 126 Hispanic mothers and fathers (Birch et al., 2001). The authors found that four of the seven factors (Restriction, Pressure to Eat, Monitoring and Concern about child weight) were related to an independent measure of children's weight status offering initial support for the construct validity of the CFQ. Reliability estimates in the current study for the Pressure to Eat: $\alpha = .80$ and Monitoring: $\alpha = .87$ scales were good, but internal consistency reliability for the Restriction scale: $\alpha = .65$, was poor. Item analysis showed that deletion of individual items did not significantly increase the reliability of subscale (e.g. no specific individual item was responsible for the poor reliability of the subscale).

Results from a study which examined the cross-cultural validity of the CFQ both confirmed the original attempt to establish validity and also offered additional information regarding use of the CFQ with a diverse sample (Anderson et al., 2005). The authors utilized confirmatory factor analyses, and chi-square statistics, with a sample of 101 Black and 130 Hispanic parents of pre-school children. The authors argued that a 5-factor model was commensurate across race. Results from a covariate analysis indicated that both Hispanic and Black parents in the study tended to underestimate their children's

weight (Birch et al., 2001) with Black parents underreporting more so than Hispanic parents (Anderson, et al., 2005). However, Birch and her colleagues did not find a similar effect of parent systematic underestimation of children's weight in Caucasian samples (Birch et al., 2001).

BMI

Due to potential for systematic bias in parent reporting of child weight status, this study employed direct physical measurements of height and weight in order to calculate BMI.

Digital Floor Scale/Stadiometer. A *Seca* brand detachable stadiometer and *Detecto* digital scale were used to collect height and weight data from each mother who completed the questionnaires and her 3-5 year old. Height was collected in centimeters and converted to meters and weight was collected in kilograms and used to calculate Body Mass Index (BMI).

BMI is expressed as a ratio of weight to height. BMI is calculated by dividing the child's weight in kilograms by height in meters squared:

$$\text{BMI} = \frac{\text{Weight in kilograms}}{(\text{height in meters}) \times (\text{height in meters})}$$

All child BMI scores obtained were converted to age- and gender-specific BMI z-scores and compared with the revised 2000 growth BMI for age charts from the Centers for Disease Control and Prevention (Kuczmarski, Ogden, & Guo, 2002). Overall, very low scores ($<5^{th}$ percentile) are indicative of underweight status which falls in the "unhealthy" category. Scores which fall in the greater than 5^{th} percentile and less than 85^{th} percentile are considered "healthy." Scores which fall in the greater than 85^{th}

percentile but less than the 95th percentile are labeled "overweight" while scores above the 95th percentile are considered "obese." Overweight, obese and underweight scores are considered "unhealthy" for categorization purposes. Based on the 2000 growth charts from the Centers for Disease Control and Prevention (Kuczmarski, Ogden, & Guo, 2002), four separate groups were created using children's age, gender, and standardized BMI scores to depict the body weight status in the population: (1) Underweight (BMI less than 5th percentile), (2) Healthy Weight (BMI 5th to 85th percentile), (3) At Risk For Overweight (BMI between the 85th and 94th percentile), and (4) Overweight (BMI ≥95th percentile). In this study, 5 children were underweight (40% 3 year olds, 60% four year olds), 51 children were normal weight (55% 3 year olds, 37% 4 year olds, 8% 5 year olds), 5 were overweight (40% 3 year olds, 60% 4 year olds), and 4 children were obese (50% 3 year olds, 25% 4 year olds, 25% 5 year olds). For the purposes of this study, continuous BMI scores were used for primary analyses and categorical BMI scores were used for descriptive purposes and post-hoc analyses. Additionally, mother BMI data was collected to explore and describe its relation with both relational competence variables and feeding attitude variables, given its known association with child BMI (Maes, Neale & Eaves, 1997).

Procedure

Participating mothers first completed a survey packet containing five counterbalanced questionnaires. All recruitment procedures and measures used in the study were approved by the Pennsylvania State University Institutional Review Board. English-speaking mothers over the age of 18 with preschool-age children were targeted

for participation in the study. Potential participants were contacted first by letter to indicate that they have been chosen to be recruited for a study. It has been found that pre-notice contact has the most significant impact on response rate (Dillman, 2000; Dillman, Clark & Sinclair, 1995). Mothers with more than one child in this 3-5 age range were requested to choose their eldest child to focus and report on for the study.

Initial recruitment letters explained the general purpose of the study ("I am collecting information on family relationships, child feeding and weight"), and an invitation to participate (See Appendix A). The recruitment letter also explained that the principal experimenter would contact the potential participants within a week to explain the study, answer any questions and arrange to send interested mothers a study packet. Alternatively, interested mothers were encouraged to contact the principal experimenter to obtain a study packet if they chose. N = 717 recruitment letters were sent initially, 45 mothers responded, agreed to participate and completed the study protocol.

The FIRSt database is comprised of families who actively volunteer for inclusion in the database and those that are enrolled from birth announcements in the newspaper. The expected return rate of participants was significantly higher than typical response rate (can range from 20% to 50%; Schulden et al., 2002) to mailings of psychological surveys in the general population since these participants in the FIRSt Database had expressed previous interest in being involved in research. The return rate of mothers who had previously participated in research through the FIRSt database was 16% (19 of 117 mothers participated), while the return rate of mothers who had not previously participated was 2% (10 of 600 mothers participated). The majority of potential participant's names were collected through birth announcements and they had not

expressed previous interest in participation with the FIRSt Families database, therefore the total response rate was considerably lower (6%) than originally anticipated.

Fifteen additional mothers were recruited through their participation in mothers groups and classes (e.g. local chapters of "Mothers and More," "Moms of Preschoolers" [MOP], "Happy Valley Moms," "Music Together Class"). The remaining five mothers agreed to participate after approximately 80 recruitment letters were placed in mailboxes at several local daycare centers, resulting in a total sample of $N = 65$ mothers.

Mothers who agreed to participate were then mailed survey packets containing the Differentiation of Self Inventory (DSI), Experiences in Close Relationships Scale (ECR), Adult Temperament Questionnaire-Effortful Control (ATQ-S-EC), and Child Feeding Questionnaire (CFQ) and the sociodemographic survey. Questionnaires were presented in counterbalanced order to control for order effects. Included in the study packets was a cover letter with the principal experimenter's contact information, an Informed Consent letter for Biomedical Research (Appendix B), the four questionnaires (Appendix D), and demographic survey (Appendix C), a stamped envelope to return completed materials to the author, and a separate contact sheet for mothers to provide an e-mail address or phone number to schedule their home visit for collection of mother and child height and weight information. After receipt of the initial packet the principal experimenter contacted mothers and arranged a time to collect physical measurements in a convenient place (e.g., their home, child's preschool, mother's place of employment). A *Seca* brand detachable stadiometer and *Detecto* digital scale were used by the principal experimenter to collect height and weight data from each dyad. Recipients of questionnaires who did not return materials within two weeks received a reminder phone call or postcard. All participants

who completed questionnaires and the home visit to collect the physiological data were provided with $10 cash as a gift of appreciation for their participation in the study.

Raw data stripped of any identifying information will be securely stored for a period of at least seven years as per Penn State IRB and APA guidelines. Participants were assured that all published or presented results would reflect aggregated data.

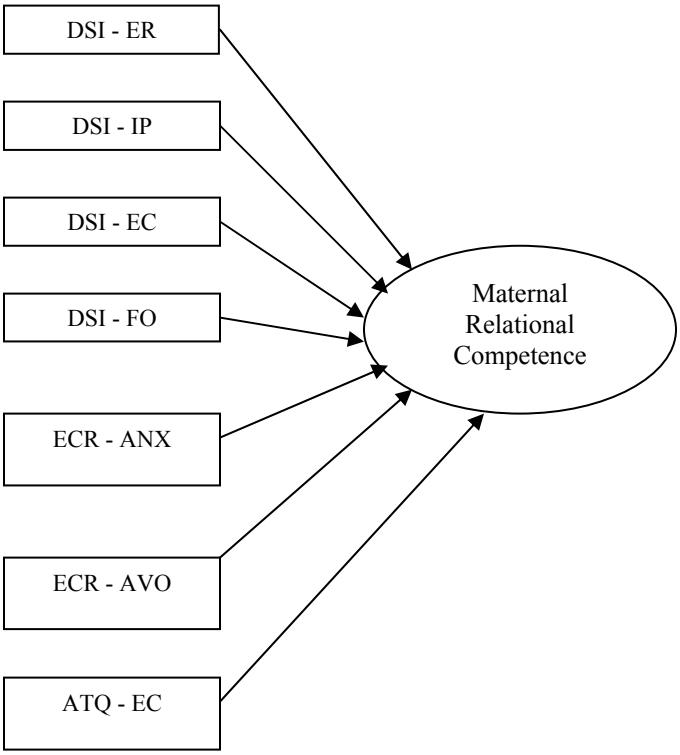
Analytic Plan

Means, standard deviations, range and possible range for each of the study variables were examined for normality. Components of the latent construct Relational Competence were explored for their inclusion in the model. Next, tests of relations between the dependent variable of child BMI and the study variables which comprise Relational Competence were conducted to determine if a relationship did exist between the hypothesized construct and the dependent variable. If a relationship existed between the hypothesized constructs and dependent variable then Structural Equation Modeling would provide the most useful statistics method to examine the data. If no significant relationships were found among the variables of interest and the dependent variable then multiple regression and factor analysis would be most conducive to answer research questions posed.

Hypotheses

Preliminary Hypothesis: The first model tested the hypothesis that the latent construct Relational Competence was represented by DSI, ECR and ATQ-EC scores. See Figure 1.

Figure 1: Maternal relational competence variables model

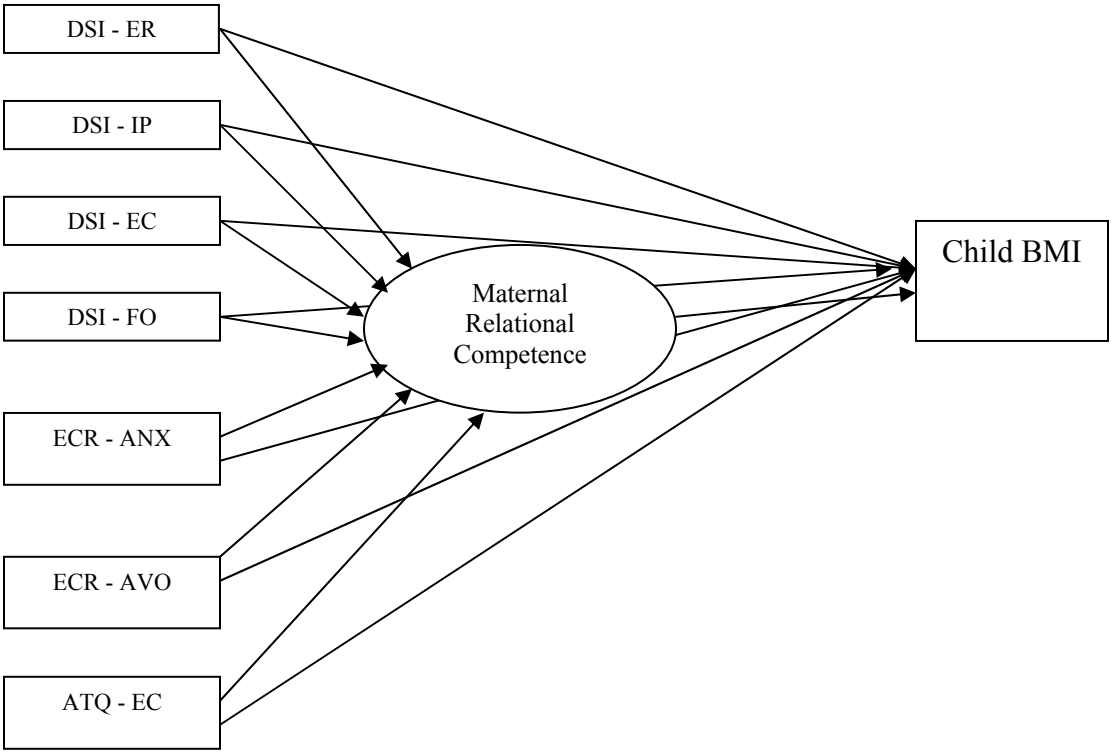


Four DSI subscale scores (DSI-ER, DSI-IP, DSI-EC, DSI-FO), two ECR scale scores (ECR-ANX, ECR-AVO), and the single ATQ-EC score, together were thought to comprise the latent construct of Maternal Relational Competence. Specifically, greater relational competence was indexed by greater differentiation of self (i.e. greater ability to take an I-position in relationships, less emotional reactivity, fusion and emotional cutoff), greater attachment security (i.e. lower attachment anxiety and avoidance), and greater effortful control of behavior (higher effortful control scores).

Hypothesis 1: Greater maternal relational competence would predict healthier BMI scores in their children. Conversely, mothers who were less relationally competent, that is, less differentiated (e.g. lower DSI-ER, DSI-IP, DSI-EC, DSI-FO scores), with greater attachment anxiety and avoidance (higher ECR-ANX and ECR-AVO scores) and

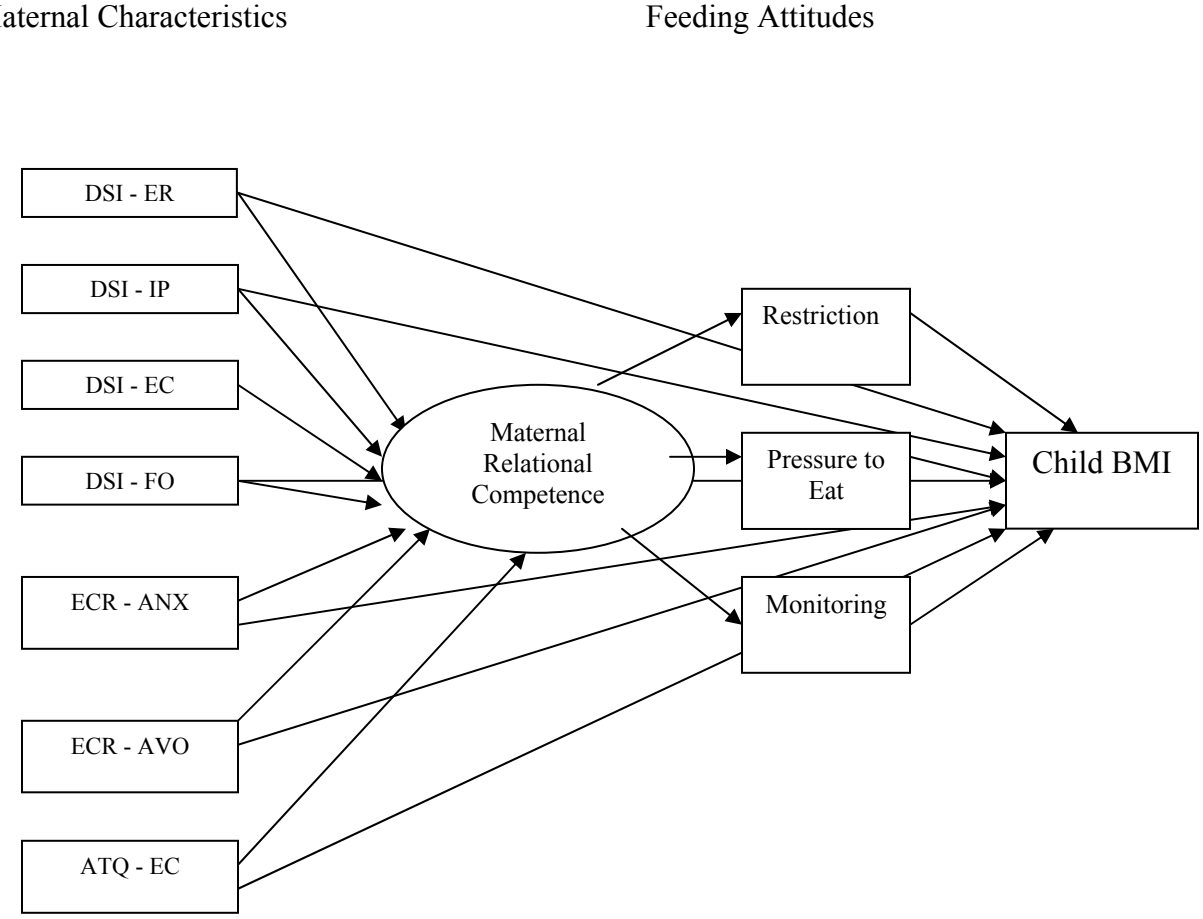
lower effortful control (lower ATQ-EC scores) would have children with higher BMI scores. See Figure 2.

Figure 2: Hypothesized Maternal Relational Competence influence on Child BMI Model



Hypothesis 2: Maternal feeding strategies were hypothesized to mediate the relationship between maternal Relational Competence (DSI, ECR and ATQ-EC) on one hand and child weight status (BMI) on the other. Specifically, it was predicted that greater parent relational competence was associated with healthier child BMI through greater use of monitoring (higher M) and less use of pressure to eat and restricting feeding strategies (lower P and R). See Figure 3.

Figure 3: Mediation model proposed in the current study



Statistical Method

Structural Equation Modeling (SEM) techniques were proposed to test the series of three research hypotheses. SEM is essentially an extension of the general linear model including multiple regression, canonical correlation, discriminant function, factor analysis, and multivariate analysis (Quintana & Maxwell, 1999). The benefit of SEM is that it allows one to evaluate the relationships in a proposed model against the actual relationships in observed data (Quintana & Maxwell, 1999). In this way, SEM is a confirmatory technique rather than a statistical technique to utilize with exploratory models (Ullman, 2001). SEM is also advantageous because it allows the modeling of

indirect effects. Other methods may show that a variable has no effect, when in fact, effect is indirect through another variable in the model (Blalock, 1961).

Chapter 4: RESULTS

This study proposed to test two nested models: (a) the relation between maternal relational competence and childhood BMI status, and (b) a mediation model in which the influence of maternal relational competence on childhood BMI was hypothesized to be mediated by maternal feeding strategies. Implicit in the testing of these two models was support for the latent construct of relational competence, represented by DSI, ECR and ATQ-EC scores.

The following section outlines the preliminary and major analyses that were conducted to test the hypotheses that maternal relational competence would predict children with healthier BMI scores and that maternal feeding strategies would mediate the relationship between maternal relational competence (4 DSI scores, 2 ECR scores and ATQ-EC score) on one hand and child weight status (BMI) on the other.

Subsequently, post-hoc analyses conducted to further explore the data are summarized.

Descriptive Statistics

Information reported on the demographic form was examined to determine the sample composition. Next, scores on the DSI, ECR, ATQ-EC scales were explored. First, the score distribution within each measure was examined for normality and scores were found to be normally distributed on the DSI, ECR, ATQ-EC, and CFQ variables. Kurtosis on the Child BMI variable was 4.196 which differs significantly from zero and indicates the data may be more leptokurtic (i.e., tall) than normally distributed (Tabachnick & Fidell, 1996). This finding is consistent with child BMI scores, as fewer children fell in the underweight category than normal or combined overweight and obese

categories. Means, standard deviations, range and possible range for each of the study variables are reported in Table 1. Results indicate that maternal BMI varied more greatly among participants than child BMI. Possible range for maternal and child BMI can be quite small or large, and therefore is not reported here for these two variables.

Table 1
Descriptive statistics for Differentiation of Self Inventory, Experiences in Close Relationships Questionnaire, Adult Temperament Questionnaire-Effortful Control Scale and Child Feeding Questionnaire

Variables	Mean	*SD*	observed range	possible range
Relational Competence				
DSI-Emotional Reactivity	3.62	.95	1.64 - 5.27	1.00 – 6.00
DSI-I-Position	4.22	.71	2.60 – 5.80	1.00 – 6.00
DSI-Emotional Cutoff	5.00	.81	2.00 – 6.00	1.00 – 6.00
DSI-Fusion with Others	3.66	.78	1.67 – 5.5	1.00 – 6.00
ECR_Anxiety	2.81	1.12	1.00 – 6.06	1.00 – 7.00
ECR_Avoidance	2.09	.94	1.00 - 4.94	1.00 – 7.00
ATQ_Effortful Control	4.92	.71	2.60 – 6.17	1.00 – 7.00
Feeding Attitudes				
Restriction	3.09	.70	1.38 – 4.38	1.00 – 5.00
Pressure to Eat	2.43	1.06	1.00 – 4.75	1.00 – 5.00
Monitoring	3.94	.92	1.33 – 5.00	1.00 – 5.00
Weight Status				
Maternal BMI	24.85	4.53	17.27 – 42.16	
Child BMI	15.63	1.63	10.10 – 21.90	
Child BMI percentile	50.29	29.71	1.00 – 99.00	1.00 - 100

Note: N = 65 in all categories; DSI = Differentiation of Self Inventory; higher scores on all subscales indicate greater differentiation. ECR_Anxiety = Attachment Anxiety, ECR_Avoidance = Attachment Avoidance; scores reflect higher attachment anxiety or avoidance respectively. ATQ_Effortful Control = Effortful Control; higher scores reflect greater effortful control. Restriction = Child Feeding Questionnaire Restriction feeding attitude, Pressure to Eat = Child Feeding Questionnaire Pressure to eat feeding attitude, Monitoring = Child Feeding Questionnaire Monitoring feeding attitude; higher scores reflect more use of the feeding strategy of restriction, pressure to eat or monitoring respectively. M_BMI = Mother BMI; BMI of <18.5 = underweight, BMI of 18.5 - 24.9 = normal weight, BMI of 25 - 29.9 = overweight, BMI >30 = obese, C_BMI = Child BMI; child BMI scores are converted to age and gender specific z-scores and then compared to growth charts, <5th percentile = underweight, between 5th percentile and 85th

percentile = healthy, between 85th percentile and 95th percentile = overweight and > 95th percentile = obese; C_BMI percentile = child BMI percentile rank.

Maternal BMI of participants ranged from 17.27 (underweight) to 42.16 (obese) with a mean status of 24.85 (SD = 4.53), which is located on the upper limit of the normal weight category. Next, demographic variables were explored for descriptive purposed.

Frequencies for each weight category by ethnicity of child are reported in Table 2, and as shown, the majority of child participants fell in the normal weight range, regardless of ethnicity.

Table 2
Child Weight Status by Ethnicity

Ethnicity	Underweight BMI	Normal BMI	Overweight BMI	Obese BMI	Total
White	7% (4)	81% (46)	7% (4)	5% (3)	100% (57)
Black	0% (0)	100% (1)	0% (0)	0% (0)	100% (1)
Hispanic	0% (0)	67% (2)	0% (0)	33% (1)	100% (3)
Am. Indian	0% (0)	0% (0)	100% (1)	0% (0)	100% (1)
Asian	100% (1)	0% (0)	0% (0)	0% (0)	100% (1)
Multi-ethnic	0% (0)	100% (2)	0% (0)	0% (0)	100% (2)
Total	8% (5)	78% (51)	8% (5)	6% (4)	100% (65)

Frequencies for mothers' weight category by mother ethnicity are reported in Table 3 below. While the majority of participating mothers fell in the normal weight range, greater variation was observed in mother's weight status than was the case with children's weight status. Further, though statistical tests were not conducted due to sample size constraints, ethnic minority mothers posted lower percentages of normal

weight status relative to overweight or obese statuses than was the case with white mothers.

Table 3
Mother weight status by ethnicity

Ethnicity	Underweight BMI	Normal BMI	Overweight BMI	Obese BMI	Total
White	0% (0)	59% (34)	36% (21)	5% (3)	100% (58)
Black	0% (0)	0% (0)	0% (0)	100% (1)	100% (1)
Hispanic	25% (1)	25% (1)	25% (1)	25% (1)	100% (4)
Am. Indian	0% (0)	0% (0)	0% (0)	100% (1)	100% (1)
Asian	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
Multi-ethnic	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
Total	2% (1)	55% (35)	34% (22)	9% (6)	100% (64)

Note: One mother declined to respond to the question of her ethnicity.

Tests of relations of group differences were conducted between demographics and study variables. Cross-tabulations between demographics and the weight status of child and mothers BMI status were calculated. A test of gender differences in child BMI status was conducted. Results of cross-tabulations in child gender and BMI status are reported in Table 4. Results from a Pearson chi-square = .614 (p = .893; df = 3) revealed no significant difference in child weight status by gender.

Table 4
Child weight status by gender

Gender	Underweight	Normal	Overweight	Obese	Total
Male	10% (3)	76% (22)	7% (2)	7% (2)	100% (29)
Female	6% (2)	80 % (29)	8% (3)	6% (2)	100% (36)
Total	8% (5)	78% (51)	8% (5)	6% (4)	100% (65)

No correlation was observed between child age and child BMI (r = .029; p = .817). Tables 5 and 6 present weight category by age for both children and their mothers and were reported for descriptive purposes. As shown in Table 5, distribution of the children's BMI status (by age) indicated that over 3/4 of the sample was at "healthy" weight status; while only 12% of 3 year olds, 15% of 4 year olds and 20% of 5 year olds populated the overweight or obese groups. Further, the sample was comprised largely of 3 and 4 year olds (92%); with fewer 5 year olds, (8%), though the proportions of children by age who were overweight or obese stayed roughly consistent across the 3, 4, and 5 year olds.

Table 5
Child weight status by age

Age	Underweight	Normal	Overweight	Obese	Total
3	6% (2)	82% (28)	6% (2)	6% (2)	100% (34)
4	12% (3)	73% (19)	12% (3)	3% (1)	100% (26)
5		80% (4)		20% (1)	100% (5)
Total	8% (5)	78% (51)	8% (5)	6% (4)	100% (65)

Table 6
Mother weight status by age

Age	Underweight	Normal	Overweight	Obese	Total
< 30		57% (4)	43% (3)		100% (7)
30-35	4% (1)	50% (12)	38% (9)	8% (2)	100% (24)
35-40		54% (13)	33% (8)	13% (3)	100% (24)
40-45		67% (6)	22% (2)	11% (1)	100% (9)
> 45		100% (1)			100% (1)
Total	2% (1)	55% (36)	34% (22)	9% (6)	100% (65)

Distribution of the mother's BMI status (by age) shown in Table 6, indicates that a lower proportion of the mothers clustered around the normal or healthy category than their children. As shown in Table 6, almost one half (43%) of mothers in the sample fell in the overweight or obese categories.

The relationship between ethnicity of all mother participants and her feeding attitude scores (Restriction, Pressure to Eat and Monitoring) was of interest; however there was insufficient diversity in the sample to enable an analysis. In sum, no demographic variables were shown to be significantly correlated with study variables therefore, no demographic variables were included in tests of the two study hypotheses.

Bivariate Analysis

For the bivariate analyses, all underweight cases were dropped prior to running zero-order correlations. This decision was made to reduce the variation in the sample from the hypothesized relationship between the maternal relational competence variables and BMI. Given that very low and very high BMI scores are indicative of unhealthy weight status and ideally, it was expected that high maternal relational competence would be associated with moderate BMI scores, while child BMI scores at either the low or high end of the continuum would be associated with lower maternal relational competence and thus could mask a linear relationship between maternal relational competence and BMI. By dropping the few cases on the underweight side of the BMI continuum, the linear relationship between maternal relational competence variables and BMI would be more interpretable.

Zero-order correlations were calculated to examine relations among the study variables. Intercorrelations between the DSI, ECR, ATQ-EC, CFQ – Feeding Attitudes and BMI variables are reported in Table 7. Mother BMI was positively correlated with child BMI ($r = .303$; $p < .05$), greater maternal BMI was associated with greater emotional cutoff ($r = -.34$, $p < .05$), greater attachment avoidance ($r = .35$, $p < .01$), lower effortful control ($r = -.29$, $p < .05$), less use of restriction ($r = -.29$, $p < .05$) and monitoring ($r = -.31$, $p < .05$). Maternal age was negatively correlated with the feeding attitude of monitoring ($r = -.31$, $p < .05$). In other words, older mothers were less likely to monitor their children's food intake.

Intercorrelations were observed between the CFQ variables, the feeding attitude of Monitoring was highly correlated with the feeding attitude Restriction ($r = .42$, $p < .01$) and also related to the feeding attitude Pressure to Eat ($r = .25$). Of all the relational competence variables, only Monitoring was negatively related to DSI-FO scores, indicating that fusion with others was associated with greater use of monitoring ($r = -.26$, $p < .05$). Feeding attitudes (Restriction, Pressure to Eat and Monitoring) were not found to have significant relationships with any of the other relational competence variables.

Maternal BMI was positively related to emotional cutoff ($r = -.34$, $p < .05$), attachment avoidance ($r = .35$, $p < .01$), and negatively related to the feeding attitude monitoring ($r = -.31$, $p < .05$). Specifically, mothers with higher BMI were more likely to emotionally cutoff in their significant relationships, show greater attachment avoidance and were less likely to monitor their children's food intake. Results indicate that no significant relationship existed between any MRC variable and child BMI. A significant relationship did exist between maternal BMI and child BMI.

Table 7:*Intercorrelations among predictor, outcome, and mediator variables with underweight cases dropped (N = 60)*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. ER														
2. IP	.616**													
3. EC	.400**	.151												
4. FO	.711**	.494**	.373**											
5. ANX	-.568**	-.479**	-.393**	-.495**										
6. AVO	-.050	-.045	-.703**	-.077	.171									
7. ATQ	.191	.329*	.249	.285*	-.200	-.219								
8. R	-.119	-.002	.065	-.196	-.009	-.204	-.037							
9. P	.134	.209	-.141	-.168	.101	.008	.225	.180						
10. M	-.086	.125	.109	-.258*	.005	-.183	.105	.418**	.252					
11. CB	-.035	.115	-.120	.057	-.125	.046	.049	-.209	-.237	-.190				
12. MB	.008	.073	-.338*	.012	.110	.346**	-.292*	-.288*	-.090	-.307*	.303*			
13. CA	-.066	-.005	.049	.049	.075	.052	-.014	-.090	-.158	-.005	.080	.319*		
14. MA	.204	.190	.201	.353**	-.110	-.210	.029	-.220	-.190	-.313*	.044	.084	.068	

Note: 1 (ER) = Emotional Reactivity, 2 (IP) = I Position, 3 (EC) = Emotional Cutoff, 4 (FO) = Fusion with Others; higher scores on ER, IP, EC and FO indicate greater differentiation, 5 (ANX) = Attachment Anxiety, 6 (AVO) = Attachment Avoidance; scores reflect higher attachment anxiety or avoidance respectively, 7 (ATQ) = Effortful Control; higher scored reflect greater effortful control, 8 (R) = Restriction, 9 (P) = Pressure to Eat, 10 (M) = Monitoring; higher scores reflect more use of the feeding strategy of restriction, pressure to eat or monitoring respectively, 11 (CB) = Child BMI [continuous], 12 (MB) = Mother BMI, 13 (CA) = Child Age, 14 (MA) = Mother age.

** $p < 0.01$ level (2 – tailed).

* $p < 0.05$ level (2 – tailed).

Test of Maternal Relational Competence Model

Correlations among variables which theoretically comprised the latent variable Relational Competence were examined. As expected, significant relationships were found among the DSI variables of ER, IP, EC, and FO. Significant relationships were also found between the DSI variables and Attachment Anxiety and Avoidance. Greater adult attachment anxiety was associated with greater emotional reactivity, less ability to take an I-Position in relationships, and greater emotional cutoff and fusion in relationships. A significant inverse correlation was found between Attachment Avoidance and Emotional Cutoff indicating that higher maternal scores on the dimension of attachment avoidance were related to an increased tendency to emotionally cutoff in significant relationships. Effortful control was found to be related to I-Position, Emotional Cutoff and Fusion with Others, such that higher effortful control was related to a greater ability to take an I-Position, less Emotional Cutoff and less Fusion with Others in interpersonal relationships. Surprisingly, effortful control was unrelated to attachment anxiety or avoidance scores.

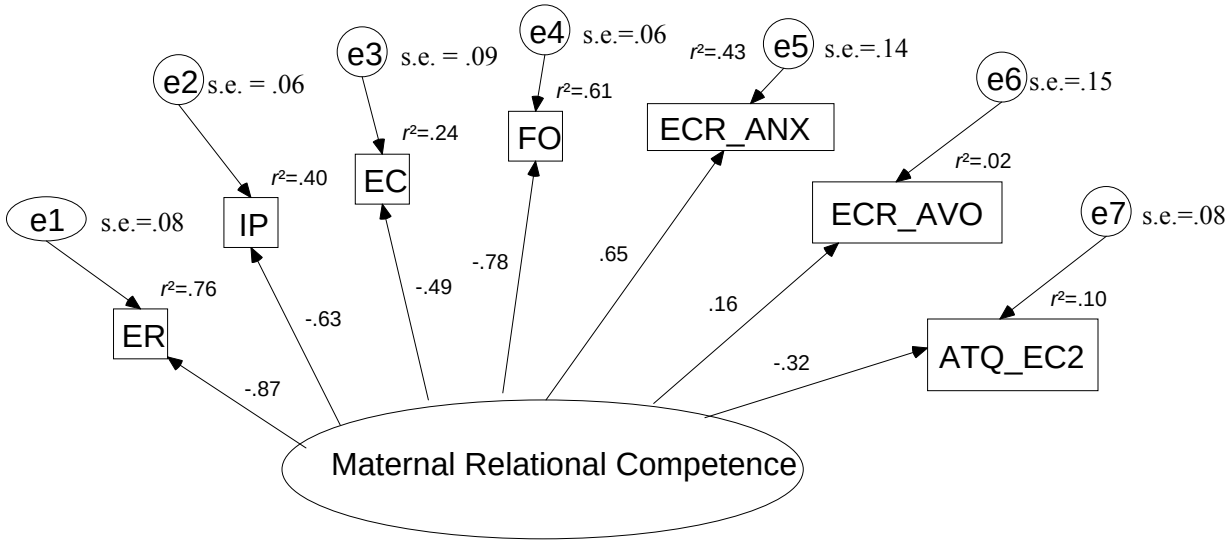
Results of SEM did not support the hypothesized latent construct of maternal relational competence comprised of the DSI variables, ECR variables and effortful control subscale of the ATQ. Figure 4 shows the SEM model of maternal relational competence model, loadings of the individual indicator variables on the latent construct, and r^2. Fit indices are reported in Table 8.

Table 8
Maternal Relational Competence Fit Indices

Model	RMR Root Mean Square Residual	GFI Goodness of Fit Index	AGFI Adjusted Goodness of Fit Index
Default model	.094	.822	.645
Saturated model	.000	1.000	
Independence model	.256	.527	.369

The specifications to indicate an acceptable model fit were not met by the proposed model of Relational Competence. The Root Mean Square Residual (RMR) was .094. An acceptable standardized Root Square Mean Residual is <.05; theoretically, the smaller the RMR, the better the fit of the model; (Schumacker & Lomax, 2004). The Goodness of Fit Index (GFI) was .822 which indicates it can be improved substantially; a value of .9 or above would be sufficient to accept the model (Bentler & Bonett, 1980). The Adjusted Goodness of Fit Index (AGFI) was .645 and should be at least .90 to indicate a well-fitting model (Bentler & Bonett, 1980). In sum, support for a 1-factor model of the latent construct Relational Competence was not found.

Figure 4: SEM model of Relational Competence



The SEM analysis conducted in AMOS, as shown in Figure 4, shows that variables ER and FO are loading most highly onto the construct, as their factor loadings are each above .75. IP and ECR_ANX (the reference variable) are weaker indicators of this same concept, with their loadings above .60. However, EC, ECR_AVO and ATQ_EC2 do not seem to be responding to the same latent variable as all of their loadings are below .50. This suggests that the hypothesis of these seven items being an indicator of the single latent concept of Maternal Relational Competence is not supported.

ANOVA

All child weight groups were included for the next set of analysis which examined group differences in weight status. A series of ANOVAs was conducted to determine if the four distinct child BMI weight groups differed on the number of maternal relational competence variables. Seven ANOVAs were conducted (between 4 DSI subscale scores and child BMI; between 2 ECR scale scores and child BMI, and between ATQ-Effortful

Control scores and child BMI). Results indicate no significant differences between the underweight, normal, overweight and obese groups with regard to any Maternal Relational Competence variables; *F*'s ranged from .04 to 1; *df* = 3 (between groups) and 61 (within groups); *p's* ranged from .40 to 1.00. In other words, no Maternal Relational Competence variables were found to significantly distinguish the 4 child BMI weight groups.

Given that the basic assumption of the study was not met, (i.e., an SEM of Maternal Relational Competence indicated that the hypothesized single latent construct did not exist and examination of the zero-order correlations between the predictor variables and outcome variable of child BMI produced non-significant results), it was unnecessary to examine a mediation model. Therefore, a series of post-hoc analyses were conducted in order to examine the data for alternative explanations of these findings. These findings are discussed in the section that follows.

Multivariate Analysis

Based on the results of the analysis of the structural model of relational competence (See Figure 4), an exploratory factor analysis of the relational competence variables was conducted to examine the data for alternative explanations for the unexpected findings. A principal components factor analysis was employed using varimax rotation with Kaiser normalization and results are shown in Table 9. All 7 Maternal Relational Competence variables were included. Factors with Eigenvalues over 1 (Kaiser, 1960) were interpreted. Positive factor loadings above .40 were interpreted (Tabachnick & Fidell, 1996).

Table 9
Factor analysis of relational competence variables

Variable	Factor 1 Regulation in Relationships	Factor 2 Reactive Distancing
ER	.872	.105
IP	.778	-.002
EC	.295	.860
FO	.813	.133
ECR_ANX	-.706	-.274
ECR_AVO	.073	-.921
ATQ_EC	.356	.343
Eigenvalues	3.12 (44.55 %)	1.43 (20.49%)

Note: Principal component analysis. Varimax rotation with Kaiser normalization.

The variables hypothesized to comprise a single latent factor, Maternal Relational Competence, appear to yield two factors instead. Interpretation of the factor loadings indicated that Factor 1 was characterized by lower emotional reactivity, less fusion with others, greater ability to take an "I" position with others, and lower attachment anxiety and was labeled "Regulation in Relationships." The second factor was comprised of DSI Emotional Cutoff and ECR Attachment Avoidance scores. Interpretation of factor loadings showed that Factor 2, labeled "Reactive Distancing," was comprised of emotional cutoff and loaded highly with higher attachment avoidance. Effortful control scores did not load on either factor.

These findings appear similar to those reported by Skowron, Holmes and Sabatelli (2003), in their study examining the combined factor structure of the DSI and the Personal Authority in the Family System Questionnaire, an alternate measure of family systems functioning. Skowron et al., (2003) also observed a two factor solution which was comprised of Factor 1, a self-regulation factor made up of lower emotional reactivity

and greater ability to take an I-position, while Factor 2 was termed interdependent relating and comprised of less fusion with others, less emotional cutoff and greater personal authority and intergenerational intimacy on the Personal Authority in Family Systems Questionnaire.

Based on the current efforts to operationalize maternal relational competence, it appears that the construct is best characterized by two factors. It was notable that while ATQ Effortful Control scores were significantly correlated with DSI I-Position, (lower) Fusion with Others and Emotional Cutoff scores, Effortful Control did not load on either factor. Interestingly, it showed a significant association with healthier maternal BMI.

This two factor Maternal Relational Competence construct was then employed to answer the question; does greater maternal relational competence (indexed by the factors Regulation in Relationships and Reactive Distancing) predict healthier BMI scores in their children? To answer this question, the two factors were used to create a score for each participant on both factors. Their individual scores were correlated with the outcome of child BMI (utilized as a continuous variable) to determine whether a relationship existed between the two dimensions of Relational Competence and Child BMI. Results were non-significant; Factor 1 (Regulation in Relationships) and child BMI were $r = .12$ ($p = .34$) and between Factor 2 (Reactive Distancing) and child BMI were $r = -.05$ ($p = .72$).

In sum, the Hypothesis that Maternal Relational Competence would predict child BMI status was unsupported by these data. This finding rendered Hypothesis 2--that maternal feeding strategies mediate the relationship between maternal relational competence on one hand and child weight status (BMI) on the other -- moot. Further,

post-hoc analyses showed the Maternal Relational Competence variables did not distinguish between the child BMI weight groups and that maternal relational competence is better represented by two factors (i.e., Regulation in Relationships and Reactive Distancing) than one. Further, little variation was observed in child BMI scores, and few significant associations were observed between parent feeding and child BMI. The implications of these results will be discussed in greater detail in the subsequent chapter.

Chapter 5: DISCUSSION

The main goal of this study was to explore relational correlates of early childhood obesity by investigating the relationship between maternal relational competence, maternal feeding attitudes, and children's propensity toward obesity. This chapter will (1) present the major findings of this study, (2) discuss the limitations of the current study, (3) provide suggestions for additional avenues of research, and (4) discuss implications for practice.

Study Findings

The first study hypothesis, that maternal differentiation of self, attachment and effortful control all comprised one latent factor designated Maternal Relational Competence was unsupported by the data. Consistent with previous research, significant intercorrelations were found among the DSI subscales Emotional Reactivity, (less) "I" Position, Emotional Cutoff, and Fusion with Others (Skowron, Holmes & Sabatelli, 2003), and between the dimensions of differentiation and (lower) attachment anxiety and avoidance scores (e.g., Skowron & Dendy, 2004). Further, effortful control was positively associated with greater differentiation of self, that is, the ability to take an I-Position in relationships, lower Emotional Cutoff, and less Fusion with Others. Yet, results of correlation analyses and the SEM model indicated that maternal relational competence variables did not, as hypothesized, load on a single latent factor.

Given the results of the SEM analysis of maternal relational competence, relationships between individual predictors and child BMI were examined. The hypothesis, that aspects of maternal relational competence predicted healthier child BMI

was also unsupported by the data. Overall, none of the predictor variables were significantly related to child BMI. Given that the correlation between Maternal Relational Competence variables and child BMI was non-significant, the hypothesized test of mediation between the relational predictors (differentiation, attachment and effortful control), feeding attitudes, and child BMI, was unwarranted.

Post-hoc analyses were conducted to explore data for alternative explanations for the null findings. A series of ANOVA tests were conducted between the maternal relational competence variables and child weight groups (i.e., underweight, normal, overweight and obese). Results indicate that predictor variable means did not differ significantly among weight groups. Next, an exploratory factor analysis was conducted among the Maternal Relational Competence variables. It was determined that maternal relational competence in this sample was better represented by two latent factors, as opposed to the single latent construct proposed.

While maternal BMI was not a central focus in this study, collection of maternal height and weight data enabled analysis of relationships between maternal relational competence variables, feeding attitudes and maternal BMI. Higher maternal BMI was associated with mothers' greater emotional cutoff, greater attachment avoidance and less monitoring of children's eating. These findings are generally consistent with literature on the subject of maternal BMI and mental health which indicate that mood disorders are elevated among obese women (McLaren et al., 2008), and that BMI is significantly higher in women with severe psychopathology (i.e. schizophreniza) than those without (Allison et al., 1999).

Study Limitations

Three primary possibilities which could explain the null findings of this study are presented. Major reasons for null findings include; (1) The young age of child participants; (2) lack of socioeconomic, racial, and ethnic diversity among participants and (3) not enough statistical power to detect small effects in the population. Each of these contributing factors shall be discussed in greater detail.

Child Age

Age of children participants in this study likely contributed to the lack of findings in the expected direction. There is documented reason to believe that children begin to stop responding solely to internal hunger cues around the age of 5 and instead tune into social reasons for eating (Rolls et al., 2000); however the child outcome of obesity may not have time to develop fully in the age group of 3-5 years olds sampled in this study. Some nutrition literature suggests that weight differences associated with familial influences may not begin to emerge fully until approximately age 7 or 8 (Safer, Agras, Bryson & Hammer, 2001; Stunkard, Berkowitz, Stallings and Cater, 1999). In other words, while this current study may have appropriately targeted the age at which children begin to eat for non-nutritive reasons, the low variability observed in these preschool children's BMI statuses may indicate that unhealthy BMI has not yet had adequate time to fully develop. See Table 10 below.

Table 10:
Descriptive Statistics for Child BMI by Child Age

Age	Mean	N	Standard Deviation
3	15.71	34	1.27
4	15.35	26	1.66
5	16.56	5	3.17

While overall the 3-5 year olds in this study did not have much variability in BMI status (see standard deviation column in Table 10 above), children in the 5 year old age group showed roughly double the variability in their weights than the 3 and 4 year olds studied. While this greater variability in BMI scores among 5 year olds (relative to 3 – 4 year olds) may be the product of a smaller number of children in the age 5 subsample, the results suggest that (1) replication with a large sample and/or (2) follow-up study focused on an older age group in which BMI problems had more time to emerge would help to clarify the nature of relationships between child age, maternal relational competence and BMI problems.

The modest correlates observed between mother and child BMI status ($r = .30$; $p < .05$) is certainly consistent with a genetic component in the emergence of childhood obesity. Genetics play a part in development of childhood obesity (Speakman, 2004, Patterson et al., 1986) and maternal physical characteristics (e.g. BMI, weight status) have been found to be highly related to children's weight status and weight maintenance and eating behaviors. Given that mothers' BMI scores showed more variability and that mother BMI was significantly and positively related to her children's BMI, (though with a weaker correlation than found by others (e.g., Powers, Chamberlin, Schaick, Sherman & Whitaker, 2006, found mother and child BMI to be highly correlated; $r = 0.18$, $p = 0.002$), it may be that if follow-up study of older children was sampled, the link between mother and child BMI might more closely match the published findings. This finding supports the need to focus efforts on an older child age group with regard to understanding what factors contribute to the outcome of childhood obesity.

SES and Race/Ethnicity

In this study there was an evident lack of variability in the socio-economic status (SES) and race/ethnicity of participants. This study sample was comprised almost exclusively of highly educated, wealthier than average, Caucasian participants. Childhood obesity, on the other hand, has been found in higher percentages among low SES populations (French, Story, & Jeffery, 2001; Andrieu, Darmon, & Drewnowski, 2006) and nonwhite populations (Freedman, Khan, Serdula et al., 2005). The limited SES range and ethnicity in this sample may have constrained the extent of variation observed in child BMI and serve as an additional alternative explanation and may represent the leading explanation for why the hypothesized effects were not observed.

While all attempts were made to obtain a diverse sample, the geographical location where data was collected is comprised of primarily Caucasian, middle to upper-middle class individuals. It seems likely that the homogeneous population sampled did not produce results which are representative of the larger population with regard to child BMI scores.

Given that childhood obesity is increasing at a greater rate across nonwhite populations and that obese black children are more likely to remain obese as adults (Freedman et al., 2005), there is clear need to make concerted efforts in the future to sample a heterogeneous population whenever possible. While the cultural factors which may play a role in development of childhood obesity were acknowledged, the homogenous population sampled, and method of study did not allow for sufficient exploration of the effect of children's cultural context on development of childhood obesity.

One strength of this study was the use of methods to obtain all physical measurements from participants directly. This method of direct measurement served to control for any tendency among parents to underestimate children's weight, a phenomenon observed among ethnic minority parents in particular, with Black parents more so than Hispanic parents (Anderson, et al., 2005; Birch et al., 2001). Future studies can benefit from also collecting BMI data using objective, standardized means whenever possible. Given that it is not possible to achieve total consensus across all cultural groups as to what constitutes "overweight" or "obese" (Jain et al, 2001; Anderson et al., 2005) it is critical to adhere to accepted, uniform, scientific standards.

In addition, qualitative studies may be utilized in the future to allow for further exploration about the complex dynamics that contribute to a greater tendency in Black and Hispanic parents to inaccurately report their children's weight. Some authors contend that minority mothers of overweight children feel powerless over their child's weight status when there was a family legacy of obesity (Jain et al, 2001) and consequently underreport overweight or obese status in their children. Qualitative studies could pose questions that could target mother's feelings about their role in their children's weight status ("how do you feel about your role in your child's weight status"; "how do you communicate your expectations about healthy weight and eating to your child?") and power to exact change in their children's physical health. Addressing these concerns could alert mothers to cues that could allow for early intervention with their overweight and obese children.

Statistical Power

Low statistical power likely also contributed to lack of findings in this study. Based on the results of a power analysis and the medium to large effect sizes observed among the variables of interest in a previous pilot study (DePalma & Skowron, 2007), a sample of 125-150 participants were deemed necessary to find small to medium effects while approximately 50-75 participants were needed to detect a large effect size in the population. Thus, the N = 65 in the current study could only detect large effects in the population sampled and it is possible that small effects were present, yet invisible, upon examination of the data.

One of the requirements of SEM is having a sample size appropriate to the number of parameters in the model and multivariate normality (Ullman, 2001). While all efforts were made to collect a sample size which could detect small to medium effect, the sample collected in this study required recruitment of over 700 eligible mothers to obtain 65 participants and thus, was only able to detect large effects in the population.

There are advantages and drawbacks to a sample size which can only detect large effects in the population. From a clinical intervention perspective, it may be more important to design a study which can detect large effect sizes as observation of large effects can more clearly point to areas where development of new treatments and interventions is most needed. Detection of small effects can more completely describe subtle relationships but may not highlight areas where additional intervention or funding resources would be most advantageous.

In sum, if the sample size was augmented and the child participants were both older (e.g. age 6, 7, & 8) and more diverse (racially, ethnically and/or financially), this

may have maximized the experimental variance and significant relationships may have been observed. However, in the sample studied, only large effects were detectable, and therefore a larger sample size would be required to observe smaller effects. It is possible that a relationship between the maternal relational competence variables, feeding attitudes and child BMI outcome exists but there was insufficient power in the given sample size to detect the effects.

Additional Research

The focus of this study was on parenting processes, feeding attitudes and the child outcome of BMI. There are other contributors to a child's BMI than maternal feeding style; most notably, their physical activity and food intake, for example (Reichert, Menezes, Wells, et al., (2009), physical activity can serve as an additional risk or protective factor in development of obesity and health maintenance (Lee & Paffenberger, 1996). Inclusion of its assessment would provide a more complete description of the predictors of childhood obesity.

Study of food intake has indicated that children have considerably increased their overall energy intake in the last two decades which is a possible contributing factor to the rise in obesity incidence (Kranz et al., 2004), and, in particular, children have significantly increased their carbohydrates (sugar) ingestion (Kranz et al. 2004). Study of food intake could also provide additional information regarding risk for and prevention of childhood obesity. Knowledge of caloric intake can provide information about individual pathway to obesity given that as the availability of low-quality "snack foods" has increased so has children's overweight status (Nicklas et al., 2001). No index of

children's activity level, food intake, or diet quality was collected in this study. Future studies could benefit from also collecting data on child caloric intake and activity level. Knowledge of these health aspects can provide a more complete picture of health than simple physical measurements. Information about activity level can begin to explore the nature of caloric expenditure in young children and the effects on potential toward obesity. Without these factors it is difficult to fully examine the relationship between caloric input and consequent weight status.

This study attempted to tap the latent construct of Maternal Relational Competence and explore how parental feeding attitudes may mediate the effect of maternal relational competence on child BMI. In this study, parent feeding attitudes were measured through the Child Feeding Questionnaire, a self-report measure. While self-report measures are cost-effective and able to tap into internal processes, they may not optimally represent the phenomenon of interest. In the current study, the feeding attitude subscale CFQ-Restriction, which was hypothesized to negatively impact child BMI, was found to have a low reliability (α = .65). This low reliability can perhaps account for the lack of expected relationships with the feeding attitude subscales Pressure to Eat and Monitoring or with other variables in the model. That is, the CFQ-Restriction scale's low reliability likely constrained the size of the correlation observed between it and the other variables of interest.

Additional, observational measures of parent feeding attitudes and behavior could augment information that is obtained through self-report regarding maternal influence on children's food intake and the outcome of childhood obesity. For example, mothers can give complex messages during feeding times, such as requesting their children clean their

plate yet barely touching their own dinner; or model eating for comfort during difficult emotional times. These behaviors are observable to a third party yet may not be reported by a mother on a feeding attitude questionnaire. Additional measures are needed to assess the parent feeding process and more accurately capture the dynamics which lead to over or under-eating. While the CFQ labels the feeding attitude of Monitoring as a form of control, observational study of mothers and their preschoolers over mealtimes has observed that monitoring can be supportive, result in healthier child eating outcomes (Hays et al., 2001) and may even lead to greater eating independence in children. Observational studies can contribute significantly to what is learned about feeding attitudes and behaviors through interpersonal and self-report measures and increase knowledge about the complex factors which contribute to the challenging task of feeding young children.

Practice Implications

Results of the current study not withstanding, research that furthers our understanding of the relational context of children's development of weight problems may be beneficial. Future research is needed that examines the relationship between parent's attitudes toward food; their actual observed feeding behaviors, and communication style with their young children in an effort to untangle the potential familial contributors to childhood eating patterns and possibly, their potential toward obesity. Identification of family contextual variables (e.g. attachment patterns) that play a central role in childhood obesity would allow those designing intervention programs to target the antecedents of weight problems more effectively. While this study did not

succeed in clearly identifying contextual variables associated with unhealthy BMI in pre-school age children; practitioners can benefit from exploration of children's feeding contexts and how they affect food intake and weight outcomes. Given that family-based interventions remain the most successful program in achieving children's weight-loss and obesity prevention (Golan, 2006; Stice et al., 2006) and there is a pressing need for research that clarifies the family contextual determinants of healthier weight status among younger children.

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Appendix A: Invitation to Participate

An Opportunity to Participate in a Research Study

Dear Parent,

As a mother of a child between the ages of 3 to 5 years old, you are eligible to participate in a research study that is being conducted at Penn State. The purpose of this study is to explore how mothers feel about themselves, their relationships and feeding their preschool age children. This study is recruiting mothers like you to complete a few questionnaires, and allow a research assistant to measure and weigh you and your child at your convenience. The time it will take to complete these questionnaires is roughly 40 minutes; the questions asked are about your family relationships, and your attitudes about eating and feeding your child. The questionnaires are completely confidential and your responses will be identified through a code number and cannot be linked to you.

The time it will take to weigh and measure you and your child is between 5 and 10 minutes. The principal investigator will contact you in order to schedule a time to collect your and your child's height and weight information. There will be no consequences to you whatsoever if you choose not to participate or refuse to answer any questions, and your participation in the FIRSt Families database will not be affected by that choice.

If you would be interested in participating in this study, please e-mail the principal researcher at nhd110@psu.edu at your earliest convenience, then a packet of questionnaires will be sent to you for you to fill out and send back. Return postage will be provided. If we do not receive an e-mail from you we will place a reminder phone call to you within a week of your receipt of this letter to check on whether or not you might like to participate. To thank you for your participation in the study, you will be provided $10 cash after your and your child's height and weight information is collected.

Of course, if you have any questions, comments or complaints, please contact me at (412) 916-0690 or *nhd110@psu.edu*. Alternately, you may conduct my advisor, Dr. Elizabeth Skowron with needs with regard to this study at (814) 863-2416.

Sincerely,
Natalie Hernandez DePalma, MA, LPC,
Counseling Psych Doctoral Student

Appendix B: Informed Consent for Biomedical Research

Informed Consent Form for Biomedical Research
The Pennsylvania State University

Title of Project: Maternal Relational Variables and Feeding Attitudes

Principal Investigator: Natalie Hernandez DePalma, MA, LPC, Graduate Student
113 Westminster Court
State College, PA 16803
(412) 916-0690; nhd110@psu.edu

Advisor: Dr. Elizabeth Skowron
327 CEDAR Building
University Park, PA 16802
(814) 863-2416; eas14@psu.edu

1. Purpose of the study: The purpose of this research study is to explore how maternal relationship characteristics may impact feeding attitudes. Also of interest is how feeding attitudes may affect weight status.

2. Procedures to be followed: You will be asked to answer 148 survey questions and provide some brief background information. With your permission and at your convenience, an investigator will also come to your home to measure you and your child's height and weight.

3. Discomforts and risks: There are no risks to you for your participation beyond any minimal discomfort with answering questions of a personal nature and collecting the height and weight information.

4. Benefits: The benefits to society include a greater understanding of the impact of mothers on their children's eating habits.

5. Duration/time of the procedures and study: It will take about 40 minutes to complete the survey and between 5-10 minutes to collect the physical information of you and your child's height and weight.

7. Right to ask questions: Please contact Natalie DePalma at 412-916-0690 with questions, complaints or concerns about the research. You can also call this number if

you feel this study has harmed you. Questions about your rights as a research participant may be directed to Penn State University's Office for Research Protections at (814) 865-1775.

8. **Payment for participation**: You will receive $10 cash for their participation in this study.

9. **Confidentiality**: Your participation in this research is confidential. The data will be stored and secured on a password-protected file at the Child Study Center. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared. Penn State's Office for Research Protections, Biomedical Institutional Review Board, and the Office for Human Research Protections may review records related to this research study.

10. Voluntary Participation: Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

11. Injury Clause: In the unlikely event you become injured as a result of your participation in this study, medical care is available. It is the policy of this institution to provide neither financial compensation nor free medical treatment for research-related injury. By signing this document, you are not waiving any rights that you have against The Pennsylvania State University for injury resulting from negligence of the University or its investigators.

If you agree to take part in this research study and the information outlined above, please sign your name and indicate the date below.

You will be given a copy of this signed and dated consent form for your records.

_____ _____

Participant Signature Date

_____ _____

Person Obtaining Consent Date

Appendix C: Demographic Form

Mother's Age _____

Child's Age _____

Child's Height _____ (in inches)

Child's Weight _____ (in pounds)

Mother's Ethnicity/Racial Background

____ White/Caucasian
____ Black/African-American
____ Hispanic/Latino
Ethnicity _____
____ American Indian/Alaskan Native
____ Asian or Pacific Islander
____ Multi-racial, Multi-ethnic
____ Other _____

Child's Ethnicity/Racial Background

____ White/Caucasian
____ Black/African-American
____ Hispanic/Latino
Ethnicity _____
____ American Indian/Alaskan Native
____ Asian or Pacific Islander
____ Multi-racial, Multi-ethnic
____ Other _____

Highest Level of Education Attained by Mother

____ Did not finish high school
____ High school graduate
____ Some college
____ Bachelor's Degree
____ Some post-graduate work
____ Master's degree
____ Doctoral or other professional degree

Child's Birth Order

_____ out of _____ total children (ex. 1st of 4 children)

Combined Annual Family Income

____ under $10, 000
____ $10,000 to $20,000
____ $21,000 to $30,000
____ $31,000 to $40,000
____ $41,000 to $50,000
____ $51,000 to $60,000
____ $61,000 to $70,000
____ $71,000 to $80,000
____ $81,000 to $90,000
____ $91,000 to $100,000
____ over $100,000

Present Marital Status

____ married
____ divorced
____ separated
____ other _____

VITA

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Adjunct Faculty
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September 2003-December 2004

Research Presentations

DePalma, N. H. & Skowron, E. A. (2007). Maternal Relational Characteristics and Eating Attitudes. *The American Psychological Association Annual Convention, San Francisco, CA.*

Awards

The Pennsylvania State University Alumni Society Research Initiation Grant Award Winner
October 2008

American Psychological Association Division 17 Prevention Section Award Winner
December 2006

The Pennsylvania State University Fellowship Winner
April 2005