

**Maternal Feeding Styles of Overweight and Normal Weight Mothers as Predictors of  
Child Weight Status and Energy Intake**

**By**

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**and approved by**

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## **I. ABSTRACT OF THE THESIS**

### **Maternal Feeding Styles of Overweight and Normal Weight Mothers as Predictors of Child Weight Status and Energy Intake**

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Childhood obesity has become increasingly prevalent in today's society. Children are more likely to participate in sedentary activities than they are to engage in active behaviors. Children are also eating processed or fast foods at younger ages, due to convenience over health considerations. Parents are purchasing less nutrient-dense foods and teaching their children poorer eating habits early in life when their eating behaviors are just developing. Today, 17% of children aged 2-19 years are overweight and almost another 17% are at risk for becoming overweight, according to the Center for Disease Control and Prevention.

The objective of this study was to investigate twenty mother-child pairs to examine if self-reported, as well as observed, maternal feeding styles had any predictive results for the children's energy intake and Body Mass Index (BMI), depending upon the mothers' weight status. Results showed that mothers, regardless of their normal or overweight status, were more like each other than different. On the whole, however, mothers differed significantly in feeding styles and level of weight concern. Overweight mothers were found to have a higher

concern for their own weight status than normal weight mothers. Maternal weight did not play a significant role in child BMI, yet how the mothers fed was more significant relative to a child's weight status. It was also found that observed restriction scores, how much a mother was observed to restrict during feeding, were predictive of the child's energy intake before the laboratory lunch. Overall, a larger sample size may provide different results. Future studies may find it advantageous to look deeper into maternal feeding styles, reported and observed, to better understand the importance of how a mother feeds her child and how his or her eating behavior develops.

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#### **IV. Introduction**

Today, obesity is considered to be “the most prevalent nutritional disease among children and adolescents in the United States (Etelson, Brand, Patrick & Shirali, 2003).” The number of children struggling with this condition is high, and continues to rise. According to the Centers for Disease Control and Prevention, 17% of U.S. children aged two to 19 years are overweight and nearly another 17% are at risk for overweight (Rhee, 2008).

Children are growing up in an obesogenic environment—an environment filled with larger portion sizes, fast food chains on every corner, high-fat and highly palatable snack foods in most supermarket aisles, and more sedentary pursuits that lessen physical activity (Birch, 1998). The lifestyles of children today, as opposed to several years ago, have changed dramatically and even taken a turn for the worse. It is necessary for a positive change to occur so that children can live healthier lifestyles.

There are many factors that contribute to this increase in childhood overweight. Genetically, certain children are at a higher risk for becoming overweight due to the fact that one or both of their parent’s are overweight or obese (Bouchard, 1991; Garn & Clark, 1975). In addition, parents may present a less healthy eating environment for their child, which makes it even harder for the child to live a healthy lifestyle. Parents are at the forefront of their child’s eating behaviors and energy intake. They provide a variety of foods, or lack there of, for their family environment; and, children will consume what is available to them, despite it being healthy.

Every parent “parents” differently, just as every parent feeds their child differently. Research shows that how a parent “parents” is related to how they feed their child (Fisher & Birch, 1999a). Parents who fall under the “more controlling” parenting styles have a

tendency to also be controlling when feeding their children. This control has been shown to cause children to become more introverted, less likely to perform well in school and to have poorer eating habits (Fisher & Birch, 1999b). Controlling parents will use techniques such as restricting access to certain palatable foods and pressuring their children to clean his or her plate. These two techniques have been shown to be detrimental to a child's eating behavior as it causes the child to be unable to regulate his or her own energy intake. This regulation defect can cause over-consumption of calories and has been identified as a possible cause of childhood overweight.

The majority of the research completed on this topic was done using self-reported questionnaires. There have been few studies done in which the subjects not only filled out questionnaires but they were also observed while consuming a meal. The two methods together can provide more valid data than questionnaires alone. It has been found that in some studies, self-reported feeding behaviors did not correlate with observed feeding behaviors, which calls into question the validity of using questionnaire-type data alone. This suggests that further research completed on this topic, using self-reported data in conjunction with observed in order to better understand the connection between parental feeding styles and child energy intake.

In addition, past research has not observed overweight or obese mothers feeding their children or even self-reporting their feeding practices, and few studies have examined normal weight mothers and how they feed their children. There needs to be more information comparing the feeding practices of normal weight to overweight or obese mothers, as well as observations of mothers feeding their children during actual mealtime settings. This investigation will determine how normal weight and overweight mothers feed their children,

and if their feeding practices have an effect on their children's energy intakes. Furthermore, it will determine if there is any correspondence between maternal feeding practices, maternal weight, and the children's weights.

## V. Review of the Literature

### Influences of Childhood Overweight

In the United States, approximately 58 million Americans are overweight, another 40 million are obese and almost 3 million are considered morbidly obese, according to 2008 statistics from the Centers for Disease Control and Prevention (CDC). In addition, eight out of 10 adults over 25 years of age are overweight (CDC, 2008). Americans understand that there is an obesity epidemic currently affecting the adult population; however, most people are unaware that it is affecting our children as well.

Obesity has become an increasingly prevalent health problem in children and adolescents (Troiano, Flegal, Kuczmarski, Campbell & Johnson, 1995). Data from two National Health and Nutrition Examination Surveys (NHANES) show that the prevalence of childhood overweight increased from seven to 12% in U.S. infants and from five to 14% in two- to five-year-olds over the years of 1976-1980 to 2003-2004 (CDC, 2008). NHANES surveys have also revealed that almost one in five children in the United States are overweight, and the prevalence is increasing rapidly (Ogden et al., 2006).

Body Mass Index (BMI) is a practical measure used to determine overweight in individuals and is expressed as weight (kg)/height (m<sup>2</sup>). The CDC reports that BMI is the most widely accepted method used to screen for overweight in children and adolescents. For children and adolescents (aged 2-19 years) as well as infants to 36 months of age, the results are plotted on the CDC growth charts to determine corresponding BMI-for-age percentiles. Children are considered to be “overweight” if their BMIs are at or above the 95th percentile for children of the same age and sex in the United States. Children are “at risk for overweight” if their BMI is at or above the 85<sup>th</sup> percentile (CDC, 2008).

The terms “obesity,” “overweight” and “at risk for overweight” have been used inconsistently by researchers across numerous studies. For the sake of consistency, as well as simplicity, in the present manuscript the term “overweight” will be used in regards to the condition where a child has been measured to weigh at or above the 85<sup>th</sup> percentile for age and sex. Despite the fact that obesity is an accepted word used to describe adults, it is not recommended for use with children for risk of stigmatizing them, and will not be used in the present study.

#### A. Obesigenic Environment

The majority of children are growing up in an “obesigenic environment,” a term coined by Dr. Leann L. Birch. In a 1998 paper, Birch reported that our environment consists of many opportunities to learn to enjoy high-fat, energy-dense foods, and few opportunities to learn to enjoy complex carbohydrates, fruits and vegetables. Children are exposed to fast-food outlets, computer and video games, and numerous varieties of high-fat snack foods. Children have been exposed to increasing varieties of foods; however, the majority of these foods are unhealthy and they lack the basic nutrition they need to grow. Also, their lifestyle has become more sedentary because of technology and media (Faith & Kerns, 2005). Most children have televisions, DVD players and even computers in their own rooms and are spending less time being active. This environment is becoming more and more detrimental to our children’s health and well-being and a change is extremely vital.

Birch has found that a child’s preference for certain foods is shaped by the quality and quantity of experience with the foods, and from a result of many eating occasions in which the foods are associated with the social contexts of eating. With the physiological

consequences of ingestion, a child will come to accept some foods and reject others, which shapes their dietary intake (Birch, 1998). As children grow they learn, and learning “how to eat” is one of the many aspects to their life they have to develop. They will, over time, learn to develop healthy or unhealthy eating habits, based on their exposure to varieties of foods, experiences with foods and the environment in which they are living and learning (Birch, 2006).

## B. Genetic Influence

Childhood overweight is a family disorder, in that parents transmit genes and construct environments that permit some children to gain weight more easily than others (Faith & Kerns, 2005). Genetics plays a large role in whether a child may become overweight later in life. Whether it is parental or maternal, either parent’s genetic background can have a significant effect on the child’s future weight status. For example, it has been found that maternal obesity is a significant factor in predicting the development of overweight during early-middle childhood (Cutting et al., 1999). Garn and Clark (1975) have demonstrated that children whose family members are obese are four times more likely to be overweight themselves than children whose family members are lean. Locard and colleagues have reported a threefold increase in childhood overweight when either parent is overweight (Locard et al., 1992). Furthermore, Whitaker and colleagues researched the risk of becoming overweight in young adulthood, and associated it with overweight, both in childhood and obesity in one or both parents. They reported that parental obesity increased the risk of childhood overweight by twofold to threefold at all ages (Bouchard, 1991; Whitaker, Wright, Pepe, Seidel & Dietz, 1997).

The influence of parental obesity on child overweight may result from a mixture of genetic and environmental influences. For example, obese parents may serve larger portion sizes and model overeating practices more so than parents who are of normal weight. In studies reviewed by Faith and Kerns (2005), it was suggested that “the association between parental restriction of child eating and excess child weight gain depends on the child’s genetic vulnerability to becoming overweight” (p.166). Unfortunately there are many children that are born with this genetic impediment. And many of the children growing up with this condition may not only be faced with a genetic disposition but an environmental one as well. These children are at highest risk for becoming overweight and their current lifestyle needs to change in order for them to begin living a healthy one.

### C. Etiology of Overweight

Many different eating style constructs have been implicated in the etiology of overweight. Overweight people have been found to be under-responsive to internal satiety cues, over-responsive to external food cues such as taste and smell, to overeat in response to emotional arousal, and to eat too fast—thereby outpacing the onset of satiety during the course of the meal (Wardle, Gunthrie, Sanderson & Rapoport, 2001). Thus, their internal and external cues do not function properly, i.e., tell them when they are supposed to be hungry or full. Children from families with obese or overweight parents (high-risk children) have been found to prefer higher fat foods, showed stronger responsiveness to food cues, had lower satiety sensitivity, and preferred more sedentary activities (Wardle et al., 2001). When children grow into an obese lifestyle, following parental footsteps of poor nutritional habits, sedentary lifestyles and, in some cases, genetics, they have a significant chance of acquiring

the same behaviors from their environment. These unhealthy eating and lifestyle habits can send a child into a downward spiral of detrimental health conditions that come with being overweight at an early age.

#### D. Behavioral, Environmental, and Social Factors

There are, however, certain variables and practices that have been exhibited over recent years that have caused individuals, particularly children, to be placed at a higher risk for this overweight condition. Environmental factors such as changes in dietary habits, the availability of high-calorie nutrient-poor foods, increased portion sizes, frequent patronage of fast-food establishments, advertising/media, increased time in front of the TV or computer, and the lack of physical activity at home and school all have contributed to this overall rise in childhood overweight (Rhee, 2008). In point of fact, the increased prevalence of childhood overweight results from the interplay of behavioral, environmental, and social factors. Age, sex, ethnicity, social norms, socioeconomic class, family composition, parents' knowledge, attitudes, and beliefs, and children's knowledge, attitudes, and beliefs have also been found to affect food intake and physical activity (Gray et al., 2007). On the whole, the lifestyle of children has changed dramatically over the years. Children are more inclined to play indoors with video and computer games, and watch TV or DVDs. The convenience of fast-foods, larger portion sizes, increased availability of carbonated beverages, and lack of fruit and vegetables in the child's diet have contributed to children eating more and exercising less which is causing them to grow up in a constant struggle with the risk of becoming overweight.



The behavioral factors that shape a child's experiences with food have been identified in the literature as external hunger and satiety cues, using food as rewards, and "cleaning the plate," also known as pressuring (Gray et al., 2007). Fisher and Birch have found in many of their studies that poor nutritional habits during childhood have been linked to pediatric overweight. Food preferences and especially intake patterns develop early on and continue throughout a child's life (Fisher & Birch, 1999b). Children need to learn how to eat and when to stop so that later in life they will be able to recognize when they are hungry or full. If they do not learn this early on they may not be able to control their own internal cues, therefore creating a struggle with not consuming enough or over-consumption.

#### E. Parental Attitudes and Concerns toward Nutrition

In 2007, Gray and colleagues investigated parental attitudes related to child nutrition within families with children whose BMI placed them at risk for overweight, as well as families with normal weight children. Parents of second grade students filled out surveys to assess their concern about childhood nutrition and overweight issues, at the same time anthropometric measurements of their children were collected. Interestingly, this study found little differences in attitudes about child nutrition and being overweight between parents with children of different weight statuses; however, it did suggest that increased awareness about identification and causes of overweight is necessary (Gray et al., 2007). Researchers as well as Americans understand the severity of this epidemic and how important parental influence and knowledge is in creating a healthier generation.

Family composition and genetics alone cannot explain why a child may have weight issues, however, if both parents are overweight and they are continuing to live in an

obesigenic environment, then the child has to work even harder to keep his/her body healthy. A parent's knowledge and attitudes towards eating has a great impact on a child's eating habits and lifestyle. Attributing childhood overweight to one source is impossible; it is the relationship of many different factors that causes a child to become overweight at an early age.

In their 2001 study, Jain and associates explain that,

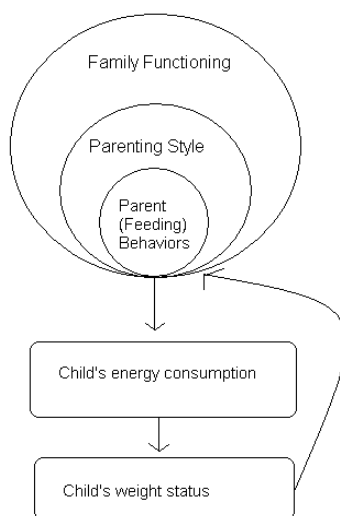
Parents do not typically consult growth charts to determine whether their child is overweight. Instead, they notice when a child becomes inactive or suffers from teasing by other children. Parents may tend to define obesity as a condition accompanied by severe physical impairment, especially compromised mobility. They may also believe that a child's size is inherited and that the child will eventually shed excess weight with age. (Jain et al., 2001, p.1140)

However, Etelson and colleagues confirm that we know that parental participation is vital for successful obesity intervention programs, but that many parents do not know how to recognize when their child's health is in danger (Etelson, Brand, Patrick & Shirali, 2003). Many mothers strongly believe that a "heavy infant is a healthy infant" and is the result of successful feeding and parenting (Baughcum, Burklow, Deeks, Powers & Whitaker, 1998). In order for this obesity trend to begin to decline, we need to provide parents, and even children, with the knowledge necessary to help them become healthier children and young adults. Also obesity prevention programs, to be successful, require parental participation. Such participation, in turn, will depend on the parents' ability to recognize that their child is overweight, to understand that being overweight puts the child at risk for associated short-

term and long-term health problems, and that providing healthy, balanced meals can help their child lose weight (Etelson et al., 2003).

Rhee developed the model (Figure 1) below to further illustrate how parent-level influences can depict the interdependence between specific factors (family functioning, parenting style and parent feeding behaviors) and how, as a whole, they each impact child energy consumption and ultimately overweight status (Rhee, 2008).

Figure 1: Parent-level influence on child energy intake and weight status



Rhee (2008) suggests from the model that,

Global influences of parenting styles and family functioning may provide a context and influence the delivery and impact of specific parent behaviors. These specific behaviors may also impact and reflect on one's parenting style and how the family functions. As a whole, these parent-level factors can influence child energy consumption and ultimately overweight status. (Rhee, 2008, p. 28)

Recognizing that the family environment has an impact on how a parent 'parents' as well as how a parent feeds a child is essential in understanding why a child consumes the quality and quantity of food s/he does and how s/he became overweight. Each of these

factors play a vital role in creating a healthy family environment and lifestyle for a growing child.

### Parenting Styles

Since parents are at the forefront of the development of their child's eating behaviors and habits, the way a parent "parents" can reveal other aspects as to why certain children eat the way they do. Parenting style is thought of as the general pattern of parenting that provides the emotional background in which parent behaviors are expressed and interpreted by the child. Thus, while parenting behaviors or practices have been described as what parents do (i.e., reprimand or praise), parenting styles describe how parents do it (i.e., with warmth or hostility). Maccoby and Martin (1983) reformulated Baumrind's (1971) original definitions of parenting styles into two dimensions—demandingness (expectations for displays of maturity by their children, parental control, and discipline) and responsiveness (parental displays of warmth, sensitivity, affection, and involvement with their children)—to allow for the creation of a four-fold classification of parenting styles. The figure below illustrates how there is an ability to be high or low in either style and the four different parents it creates, namely authoritative, authoritarian, permissive, or neglectful.

Figure 2: Parenting Styles as developed by Maccoby and Martin in 1983

	<b>High Demandingness</b>	<b>Low Demandingness</b>
<b>High Responsiveness</b>	<b>Authoritative:</b> Respectful of child's opinions, but maintains clear boundaries	<b>Permissive:</b> Indulgent, without discipline
<b>Low Responsiveness</b>	<b>Authoritarian:</b> Strict disciplinarian	<b>Neglectful:</b> Emotionally uninvolved and does not set rules

Research shows that parents falling under the more effective parenting style, that is, authoritative, tend to have a child with higher academic achievement, increased self-regulatory ability and fewer depressive symptoms (Aunola, Stattin, & Nurmi, 2000; Glasgow, Dornbusch, Troyer, Steinberg & Ritter, 1997; Radziszewska, Richardson, Dent, & Flay, 1996; Steinberg, Lamborn, Darling, Mounts & Dornbusch, 1994). In contrast, the other parenting styles have been associated with several sub-optimal outcomes like lower academic grades, lower levels of self-control and poorer emotional development (Dornbusch, Ritter, Leiderman, Roberts & Fraleigh, 1987; Lamborn, Mounts, Steinberg & Dornbusch, 1991; Radziszewska, Richardson, Dent, & Flay, 1996). Given these findings, parent behaviors around weight control, delivered within the context of an authoritative parenting style, might be expected to have better outcomes than if delivered within the context of one of the other parenting styles (Rhee, 2008). Indeed, one study demonstrated that authoritarian parents had almost a five-fold increase in the odds of having overweight children in the first grade than

did authoritative parents (Fisher & Birch, 1999a). Allowing a child to have some say, yet still maintaining boundaries, enables him/her to feel empowered and included, especially when it comes to food. Keeping a child interested and involved in mealtimes, food preparation and even what s/he wants for lunch, within reason, will give him/her the freedom of choice in the family unit. This freedom may bring a sense of joy to the child knowing that s/he can be involved and create a more positive outlook toward food.

#### F. Parental Feeding Practices

It is essential to understand the family eating environment, since parents are the primary means by which children learn the sociocultural context of eating (Strauss & Knight, 1999). Promising research in child-feeding practices has shown that mothers' child-feeding practices are directly related to children's food preferences, energy intake, ability to regulate food intake according to the internal cues of hunger and satiety, and body weight (Birch, 1998; Birch & Fisher, 2000). A child is going to eat what is being eaten in the home. If the mother does not like a certain food and therefore does not provide it, the child will not be exposed to that food and may end up not liking that food. The same is true if a mother pushes a child to clean his or her plate. The child's internal satiety cues become imperceptible and the child is forced to consume more calories than may be necessary.

Since parents, do not feed their child in the same ways, is important to be familiar with the different parent feeding styles in order to understand the relationship between parent feeding practices and pediatric overweight. In 2007, Sacco and colleagues developed five different parent feeding styles based on Maccoby and Martin's parenting style framework. They are defined as follows: (1) *Responsive* (in which parents are responsive to the infant's

hunger and satiety cues but control the quality of their infant's diet by providing an array of high-quality foods); (2) *Pressuring* (in which parents are not responsive to their infant's satiety signals and are intent on controlling the amount of food the child gets by increasing the amount consumed); (3) *Restrictive* (in which parents are not responsive to their infant's hunger signals and are intent on controlling the amount and quality of food the child gets by decreasing the amount consumed and/or not allowing the child to eat lower-quality foods); (4) *Indulgent* (in which parents are responsive to hunger and satiety cues but do not control or set limits in terms of the quantity or quality of the food consumed); and (5) *Laissez-Faire* (in which parents are not responsive to hunger and satiety cues and do not control or set limits in terms of the quantity or quality of food consumed). These styles can also be thought of in terms of the general levels of parental control exerted during feeding, ranging from controlling (restrictive or pressuring) to less controlling (indulgent or laissez-faire) (Sacco, Bentley, Carby-Sheilds, Borja & Goldman, 2007).

#### G. Maternal Control: Restrictive Feeding Practices

Not every child is susceptible to becoming overweight and different factors play different roles in a child's proneness to becoming overweight. With an emphasis on control, Costanzo and Woody (1985) developed a model for determining how prone a child is to becoming overweight. The model illustrates that parents will impose greater control over their child's eating if: (1) eating and appearance are particularly valued by or problematic for the parent, or (2) the child is perceived to be at risk for overweight. The model also explains how excessive parental control in feeding can result when: (1) parents are particularly invested in their children's eating; (2) children are perceived as being at risk for developing

eating problems, weight problems, or both; and, (3) parents have trouble controlling their own food intake and assume that their children cannot do so either. Costanzo and Woody's theory was used by Birch and Fisher (2000) in examining the influence of maternal control in feeding on daughters' eating and relative weight. In general, their findings were comparable to other similar studies (Brown & Ogden, 2004; Wardle et al., 2001; Baughcum et al., 1998), showing that stringent feeding controls placed on children, especially daughters, by parents can be detrimental to children's eating behaviors and possibly lead to weight gain due to lack of self-regulation of energy intake (Birch & Fisher, 2000).

Studies by Birch and Fisher have also shown that restricting young children's access to palatable snack foods resulted in increased consumption of these foods when restriction was removed or when parents were absent (Fisher & Birch, 1999b). In addition, the relative weight of preschool children has been found to be greater when parents report more restriction of children's access to these snack foods (Fisher & Birch, 1999a, 1999b). Evidence indicates that the use of stringent controls and restrictive child-feeding practices does not produce the intended effect of helping children to establish adequate self-control of food intake. Rather, parents' use of controlling feeding practices may actually promote patterns of intake that are readily influenced by the presence and availability of palatable foods (Fisher & Birch, 1999b).

Children who are restricted learn to place a higher value on the restricted items, and consequently eat them whenever they are available or unrestricted. External cues of availability may become stronger determinants of food consumption than internal cues of hunger and satiety (Rhee, 2008). Therefore, parents who do not exert excessive control over the food intake of their children seem to produce children with a better ability to self-regulate



food intake (Gray et al., 2007). Creating positive eating experiences is important for a child's development so that s/he understand how to use their natural cues and grow up enjoying all types of foods, whether they are considered healthy or unhealthy. They need to learn what foods can and should be eaten all the time and others that should be eaten sometimes. These mental rules, along with many others, will enable them to control their own food requirements.

Davison and Birch (2001) found in their research that even if the parents had the physical and emotional well-being of their child in mind, if their child was overweight, parents expressed concern by altering the feeding environment. For example, mothers of overweight daughters were found to have a higher level of maternal control and restriction than mothers of non-overweight daughters. In their 2002 study, Spruijt-Metz and colleagues assessed the relation between mothers' child-feeding practices and children's adiposity through the use of DXA (Dual-energy X-ray absorptiometry). With the aid of the Child Feeding Questionnaire (Birch et al., 2001), they measured food restriction, pressure to eat, mother's monitoring of food intake and concerns for child's weight. This was the first study to show that a mother with a high level of concern about her child's weight and even a high pressure score in child feeding was directly related to the increase in the child's adiposity. They also found that specific child-feeding practices are equally related to the child's adiposity in boys and girls. Restrictive practices were not only highly correlated with concern for the child's weight, but significantly correlated with adiposity (Spruijt-Metz, Lindquist, Birch, Fisher & Goran, 2002). Overall, this study supports earlier research (Fisher & Birch, 1999a, 1999b) showing that highly controlling parent feeding strategies may be related to

problems of energy balance interfering with a child's ability to self-regulate their own energy intake (Spruijt-Metz et al., 2002).

#### H. Maternal Control: Pressuring Feeding Practices

Restricting access to certain foods is not the only way parents control their child's food intake. Parents may also exert their control on their child by pressuring them to eat or encouraging them to clean their plate. This type of feeding style may have similar effects as the restrictive control style. Pressuring is commonly used to alter the quality and quantity of a child's intake. However, Klesges and colleagues have found that simply offering more food to a child (i.e., "Do you want more soup?") or directly prompting the child to eat (i.e., "Eat your chicken") has been associated with elevated child weight (Rhee, 2008). As reported by Spruijt-Metz and colleagues (2002), previous studies by Birch and Fisher (2000) have also found relations between BMI and restrictive practices, as well as pressuring to eat. Even if parents are pressuring the child to "Eat all your vegetables," which are healthy food choices, they are still causing them to ignore their satiety cues that are telling them that they may be full. Parents will then use phrases such as "If you finish your vegetables, you can have dessert," which, again, tells the child to ignore internal cues and to eat unwanted foods in order to obtain the desirable food. The child then consumes more calories than necessary for their stomach capacity. Overall, these studies have shown that controlling feeding strategies may be related to problems of energy balance by interfering with children's ability to self-regulate their own energy intake (Spruijt-Metz et al., 2002). Helping children attend to internal cues of hunger and satiety should be promoted as productive child-feeding strategies

and as alternatives to coercive or restrictive practices (Johnson, 2000). Unfortunately, what some parents feel is helping their child, can really be detrimental to them in the long run.

### I. Maternal Control and Child Adiposity

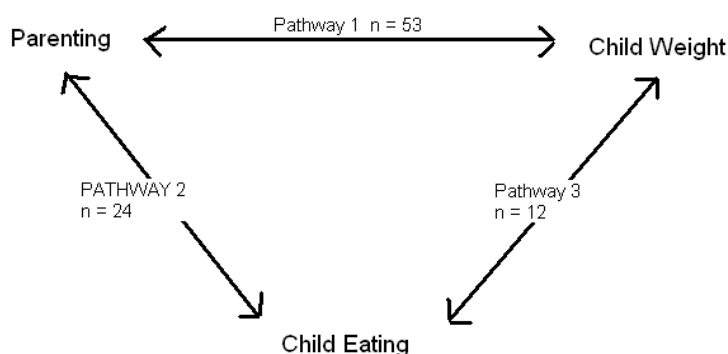
In 2000, Whitaker and associates examined the association between children's adiposity and their parents' eating behaviors and BMI. Parents filled out a questionnaire while their children were assessed for their total fat mass or level of adiposity. They found correlations between parental eating behaviors and parent BMIs as well as with child's adiposity. The study also showed that child fatness tended to be associated with higher maternal control. This outcome, again, supports the findings that parent eating behaviors and feeding styles affect how children eat and how much they eat (Whitaker, Deeks, Baughcum & Specker, 2000). And in their 1995 study, Fisher and Birch found that in children aged 3-5 years, dietary influences may mediate familial patterns of adiposity. Children with the highest level of preference for high-fat foods had an overall higher percentage of fat intakes. In addition, children that preferred the higher fat foods had parents with higher BMI's than children with lower levels of preference. Overall they found that a child's preference for and consumption of dietary fat was related to parental adiposity.

Hood and colleagues (2000) examined the impact of parents' attitudes toward their own eating, and the change in adiposity of their children over a 6 year period, beginning when the children were 3-5 years of age. Their analyses utilized data from the Framingham Children's Study from 1987. They found that the more parents showed their concern and restraint with their own weight and eating habits, the more likely their children were to acquire the same negative eating attitudes and develop a higher risk for overweight (Hood et

al., 2000). Parents are becoming more concerned with controlling their own diets for several health reasons, however, this issue does not need to be passed down to their children. Children, especially girls, are already learning early on about negative body images from the media. Therefore, that negativity should not enter the home through parental eating attitudes mainly because children need to develop their own beliefs about health and eating habits. Even though childhood overweight is rising dramatically, it is essential for parents to engage in healthy food experiences and fun physical activities with their children so as to establish that healthy lifestyle routine early on.

In a 2008 review, Ventura and Birch presented a model depicting pathways of influence among three key constructs: parenting, child eating, and child weight. They proposed the question, “How does parenting influence a child’s weight?” The figure below illustrates the proportion of studies in the review that addressed the specific topic of parenting and child’s weight. The numbers corresponding to the pathway labels indicate how many studies were found that addressed that given pathway.

**Figure 3:** The proportion of studies Ventura and Birch found regarding how parenting influences a child’s weight (2008)



The figure shows that 53 studies discussed the correlation between parenting and child weight. It also shows that 24 studies discussed how parenting is related to child eating behaviors and 12 studies connected child eating to child weight. The majority of the 53 studies discussing parenting and child weight reported that the more controlling parenting styles resulted in a higher child BMI. Similarly, of the 24 parenting and child eating studies, the majority showed that the more controlling parenting styles were significantly associated with higher sugar, fat and total food intakes. This may also be eventually linked to higher child BMI, despite the fact that it is not illustrated in the model. Furthermore, it suggests that not only does parenting affect a child's eating and weight but also that a child's eating and weight affects parenting (Ventura & Birch, 2008).

#### J. Family Mealtime Practices

If parents create a positive mealtime environment by using positive mealtime practices (such as conversation, teaching nutrition, encouraging food tasting, etc.) rather than negative parenting practices (such as hurrying children to eat, forcing them to finish, using foods as rewards, etc.), they may experience more positive child eating behaviors (Gray et al., 2007). When parents discuss with their child how his/her day went and what they did at school or help them understand what nutritive value the dinner contains, the child becomes engaged in learning about basic nutritional facts and can focus on something other than how much and how little s/he is allowed to eat. Allowing children to tell parents when they are done eating or what they want to eat, within reason, will eventually encourage more positive, healthier eating habits. Not only can parents influence the development of eating and activity behaviors through the use of authoritative feeding techniques and the modeling of healthy

dietary and leisure-time activity habits, but they also have direct control over the home environment and what foods or activities are available in the house (Rhee, 2008).

#### K. Reported vs. Observed Eating Behaviors

A few studies have shown that a mother's reports of feeding style and parental restriction were not reflected in their child's responses or in behaviors during actual interactions, raising a concern about the validity of questionnaire-type data. Sacco and colleagues (2007) examined the correspondence between reported and observed feeding styles. The most frequent feeding style identified by both the interviewers and the videotape observations was restrictive. However, over 2/3 of the sample data showed no correspondence between interviewed and observed feeding styles, which raises the question of the validity of previously self-reported feeding style data.

Klesges and associates (1983) investigated the relationship between parent behaviors, child mealtime behaviors and infant weight to determine the validity of observed and reported data. Significant correlations were found between child relative weights and observed feeding practices, such as parental prompts to eat or pressuring, parental food offers and parental encouragement to eat. For example, they found that observed parental prompts, particularly parental encouragements to eat, highly correlated to child relative weight and increased the probability that a child would eat, but overall did not correlate to maternal self-reported assessment of feeding practices.

Klesges, Malott, Boschee and Weber (1986) also found similar results in their later investigation of the relationship between observed child mealtime behavior, self-reported parent behaviors and child weight. That study showed that observed parental encouragements

to eat correlated both with how much time the child spent eating and with the relative weight of the child but not with how the parents reported they feed their child (Klesges et al., 1986). These results indicate the necessity for observed-type data, as well as questionnaire-type data in order to thoroughly obtain valid results when it comes to parent feeding practices, child eating behaviors, and relative child weight.

#### L. Overweight versus Normal Weight Mothers

One of the most interesting and valuable aspects of this investigation is the inclusion not only of normal weight mothers, but, unlike previous research on this issue, that overweight mothers will participate as well. Research has shown that infants with obese mothers have been found to suck more vigorously, suggesting a genetic basis to an infant's eating style (Whitaker, Deeks, Baughcum & Specker, 2000). Having data on normal weight and overweight mothers will allow us to determine if there are differences in maternal feeding practices, children's energy intake, children's BMI, and if they have an impact on each other. This investigation can therefore bring a new outlook to the obesigenic environment and how parents, more importantly mothers, are taking care of their children and how they may be affecting their child's future health.

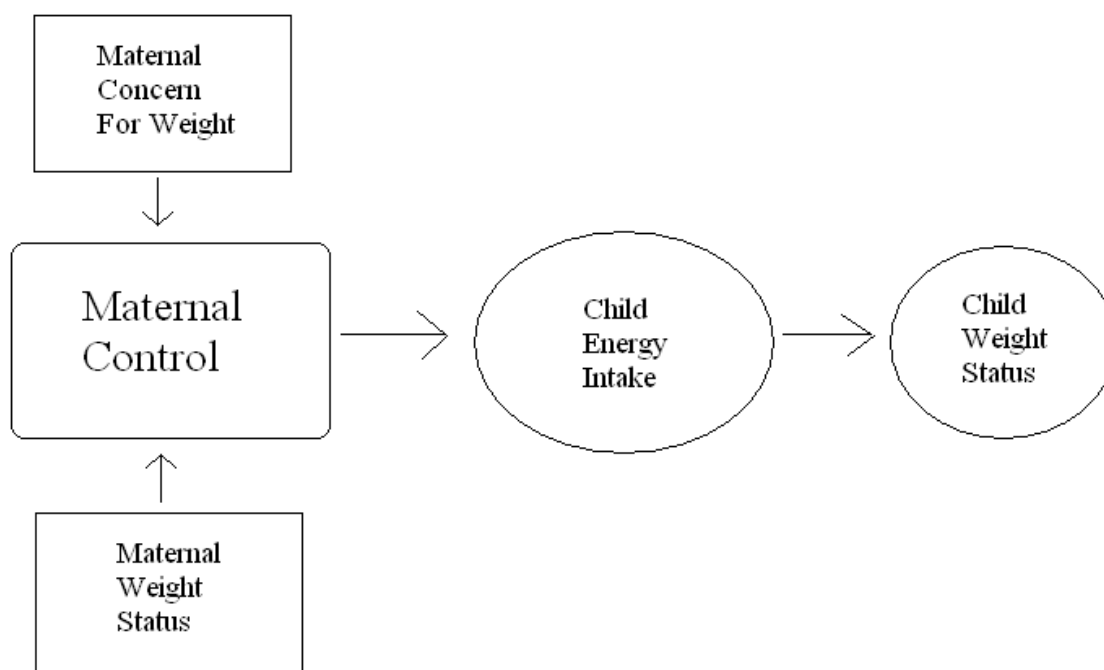
#### Objective of present study

The overall objective of this investigation is to determine the relationship between parental feeding practices and maternal/child BMI during a controlled mealtime experience. The research reviewed suggests that there are relationships between parenting styles, parental feeding practices and child BMI. It has also been shown that the association between self-

reported data and observed data is weak. There is not research on the relationship between overweight mothers and their parenting styles, maternal feeding practices and child BMI. Therefore, further research is necessary in order to determine the association between normal weight and obese mothers and their different feeding styles as predictors of child weight status.

The present investigation is broken down into four sub-objectives. The primary objectives were: (1) to determine if there were any significant differences between the normal weight mothers and the overweight mothers in regards to their demographic and anthropometric characteristics, (2) to compare the associations between maternal energy intake and child energy intake based on maternal weight status, (3) to compare associations between maternal self-reported feeding style (CFQ) and maternal observed feeding style (OBS) based on maternal weight status, and (4) to determine if maternal BMI or feeding styles are predictors of children's BMI or children's energy intake.

**Figure 4:** Hypothesized Relationships: How maternal concern and weight status may relate to child energy intake and weight status





## VI. Methods

This research protocol was reviewed and approved by the University of Medicine and Dentistry of New Jersey/Robert Wood Johnson Medical School Institutional Review Board (IRB) Committee on Studies Involving Human Subjects and informed written consent was obtained from all participants.

### A. Sample

Twenty mother-child pairs agreed to take part in the complete study. Mother-child pairs were recruited from the New Brunswick, NJ, community, and surrounding areas, using flyers placed in pediatricians' offices, local day care centers and preschools (Appendix A). Families, who expressed interest by telephone, email or returned the flyer, were screened by an investigator on the telephone (Appendix B).

During the telephone screening mothers were told that they would be participating in a study of children's eating habits, and that the investigators were interested in seeing children eat with a family member as they would at home. Mothers were asked their age, height and weight in order to determine weight status, as well as the age of their child. The child had to be between 20-36 months of age. The screener calculated the mother's Body Mass Index (BMI:  $\text{kg/m}^2$ ) to determine her weight status. If the child did not fit the age range or had allergies to foods, they were not included in the study.

Recruiting needs were checked frequently to determine whether the study needed more participation fitting specific individual profiles. Once there were 10 mothers in each group, normal weight and overweight, recruitment ceased. Ten mothers were considered

overweight or obese and 10 mothers were of normal weight. The study was conducted at the Institute for the Study of Child Development of the Robert Wood Johnson Medical School in New Brunswick, NJ.

Ethnicity was based on participants' self-reports of heritage. Eleven mothers considered themselves White/Non-Hispanic and nine considered themselves to be Latina or Black. Individuals of descent from European nations were considered European-American. The area has a large Latino population, and children's programs serving the Latino community were also recruited. Mothers of descent from Latin-America (all of the Americas south of the United States) or Puerto Rico were considered Latina, regardless of their racial group (e.g., White or Black) of native language. However, only Spanish or English speakers were allowed to be enrolled in the study, because only English and Spanish translations of materials were available.

### B. Procedure

Mother-child pairs arrived at The Institute of the Study of Child Development during the child's typical "lunch-hour." A standardized buffet containing a variety of foods was assembled (Appendix C). All foods were pre-weighed and measured and nutrient content was pre-calculated. The foods presented at the luncheon were identical for all participants. Mothers were told that they and the child could eat freely from the buffet during the following hour. Mother-child pairs were videotaped throughout the meal through a one-way mirror. The investigators watched and documented what the mother versus the child ate during the lunch, so as to accurately determine who ate what foods. Following the meal, all foods were re-weighed and re-measured to determine the amounts consumed.

## C. Measures

### 1. Questionnaire measures.

*a. Child Feeding Questionnaire (CFQ)* (Birch et al, 2001) was used to assess maternal attitudes, beliefs, and practices about child feeding, food, nutrition, and desirable weights for adults and children. The CFQ is a self-report questionnaire comprised of 31 items that assess parental child feeding attitudes and practices on seven dimensions including parental restriction and pressuring to eat (Appendix D). All items are measured using a five-point Likert-type scale. As measured by the CFQ, restriction and pressuring refer to the caregiver's efforts to control or limit the child's food choices or how much s/he eats. Sample questions are "I have to be sure that my child does not eat too many high-fat foods" (restricting) and "If my child says 'I'm not hungry' I try to get him/her to eat anyway" (pressuring). A high score of restricting or pressuring indicates a high level of maternal control (Birch et al, 2001).

*b. Weight Concerns Scale* (Killen et al, 1994) was used to assess mothers' concern with weight and eating-related issues. Its items are designed to ascertain subjects' fear of weight gain, worry over weight and body shape, importance of weight, diet history, and perceived fatness. It is composed of five-items discussing the mother's overall feelings and emotions about being overweight and dieting (Appendix E). A sample question is "Compared to other things in life, how important is your weight to you". The Weight Concerns scale has been demonstrated in previous research to be an optimally efficient measure of high risk status for weight problems (Killen, Markey & Birch, 2000).

*c. Food Record* was completed by the mothers on food consumption for mother and child before the laboratory lunch, i.e. breakfast and morning snack, and nutrient content was calculated (Appendix F). The Food Record listed food quality, quantity and time consumed.

## 2. Video Coding.

Video Coding was used to observe food consumption of both mothers and children and coding of video tapes.

*a. Eating Behavior:* Types of foods chosen by the mother and child were recorded during the actual mealtime as well as by weighing the foods on their plates and in the serving dishes before and after the meal so as to accurately determine how much the child and mother each ate (Appendix G).

*b. Observed Behavior:* A behavioral coding scheme was developed and tested for its utility in the investigation. Drawing on published reports that have used live observations, as well as examples of maternal behaviors provided in available questionnaires (Klesges et al., 1983; Birch et al., 2001; Sacco et al., 2007) a list was made of adult-exhibited feeding-directed behaviors, including both verbal and physical prompts. Using this list, caregivers at a university preschool were also observed interacting with 3-year-olds during lunch to determine which behaviors were most likely to be displayed by adults, as well as to identify additional behaviors that had not been listed. This exercise resulted in generating a variety of behavioral examples that were classified as either restrictive or pressuring in nature, as well as verbally or physically delivered (Appendix H). A code sheet was next designed for use in noting these behaviors as they might be observed on the videotapes (Appendix I).

Prior to any analysis of the videotapes for data analytic purposes, two of the videotapes were randomly chosen for practice purposes. The investigator and a research collaborator watched the first tape, and independently recorded instances of maternal restriction and pressuring, by placing hash marks under the subheading of verbal or physical. Inter-rater agreement (determined by dividing agreements by agreements + disagreements) was 75%. The two raters then watched the tape again, and discussed any instances where one saw something that the other did not until they agreed as to whether or not it should be counted. One week later they watched the same tape using a new code sheet, and independently scored the tape as before. The agreement on this occasion was 93%. Two months later the same procedure was followed using the second videotape. Their initial agreement was 93%, and the tape was rewound and discussed. One week later, the tape was again coded, with an agreement of 100%. With this highly convergent level of agreement, the investigator was instructed by her advisor to code the entire set of 20 videotapes as her schedule permitted. Each video taped observed feeding episode was 30 minutes long.

3. Weight and Height. Mothers and children were weighed and measured in stocking feet in the laboratory, following the ad lib eating procedure to reduce the likelihood that self-consciousness about weight would impact mothers' behavior during the eating phase. Weights and heights were converted into Body Mass Index for use in subsequent analyses.

4. Nutritional Analysis Data. All food consumed was entered into Nutribase™ Software (Iancu, Bondor & Tigan, 2000) and a detailed analysis was calculated (Appendix J). Nutribase™ is a nutrient analysis software program that provides the energy density of the selected food items, as well as the macro- and micronutrient breakdown of each item. Food selections within the Nutribase™ database were identified by brand name, where possible, or

by a standardized list of items used to control for ambiguities and interpretation in the analysis of the children's diet recalls.

5. Statistical Analysis. Standard T-tests were performed in Table 1 to determine differences in age, weight, ethnicity and other demographic and anthropometric measurements categorized by maternal weight status. Analysis of covariance was also performed in Table 2 to determine differences in self-reported and observed feeding style variables dependant on maternal weight status. A frequency distribution was performed for Tables 3 a and b to further illustrate the possible differences in predominant maternal feeding styles dependant on maternal weight status and the correspondence between the self-reported and observed feeding style. In Table 4 a Pearson correlation analysis was conducted to determine the relationship between maternal BMI, child BMI, self-reported restriction and pressuring and observed restriction and pressuring. Due to the fact that none of the correlation coefficients attained statistical significance a linear regression (Table 5) was used to determine if maternal BMI or any of the restriction or pressuring variables had any influence on child BMI. With the  $R^2 = 0.692$ , the reported and observed restriction variables were significantly and positively correlated as well as reported pressure being significantly and negatively correlated to child BMI. These statistics show that 70% of the variance in a child's BMI was explained by the variables included. To further investigate if any of the restriction or pressuring variables had any influence on the child's energy intake during the laboratory lunch, a second linear regression (Table 6) was used with an  $R^2 = 0.245$ . This model explained that there were no predictors for the calories consumed by the child during the laboratory lunch. These results produced another regression analysis which eliminated all other variables except observed restriction and observed pressure during the laboratory lunch,

and showed no tendency towards significance. Finally, a third regression (Table 7) was completed with  $R^2 = 0.283$  which analyzed all reported and observed feeding style variables to predict the child's energy consumption before the laboratory lunch. This analysis showed significance in that observed restriction predicted energy intake for the children before the laboratory lunch. Statistical significance was set at  $p < 0.05$ , and all statistical tests were performed using SPSS 17.0 for Windows (SPSS, Inc., Chicago, IL).

## VII. Results

### A. Maternal demographic & anthropometric characteristics by weight status

BMI was calculated for each subject the day of their visit to the laboratory. Participant characteristics were considered according to maternal weight status, namely normal weight (BMI 18.9-24.9) versus overweight (BMI  $\geq$  25). Demographic and anthropometric characteristics of participants are shown in Table 1.

There were no significant differences in mothers' ages depending upon their weight status (Table 1). Nearly equivalent numbers of boys and girls comprised the two groups. There were no significant differences in the child's age and BMI depending upon their mothers' weight status or in the average child's percentile for age/sex. However, there was a larger number of children ( $n = 6$ ) at or above the 85<sup>th</sup> percentile for the group of overweight mothers than the normal weight mothers ( $n = 3$ ). Maternal weight concern scores are also shown in Table 1, indicating that overweight mothers (11.5) had a significantly higher concern for weight than did the normal weight mothers (8.4).



**Table 1:** Descriptive statistics based on mother's weight status for mother and child variables, mean (SD)

	Normal Weight n = 10	Overweight n = 10	t-value	p-value
Mother Age (in years)	36.50 (5.46)	40.10 (6.23)	-1.37	0.19
Mother BMI	22.63 (2.26)	31.83 (3.70)	-6.70	0.01
Mother Ethnicity				
White	6	5		
Latina	3	3		
Bi-racial	1	0		
Black	0	2		
Maternal Weight Concern	8.40	11.50	-2.13	0.05
Child Gender				
Female	4	6		
Male	6	4		
Child Age (in months)	24.9 (2.40)	25.0 (3.80)	-0.07	0.95
Child BMI	17.28 (2.26)	16.93 (2.13)	0.36	0.73
Average Child Percentile (BMI/age/sex)	63.30 (29.28)	68.10 (36.03)	-0.33	0.75
Number of children $\geq$ 85 <sup>th</sup> percentile	3	6		
Maternal Energy Intake (kcal)	578.30	508.80	0.68	0.50
Maternal Fat Intake (g)	24.70	23.40	0.26	0.80
Child Energy Intake (kcal)	296.80	255.60	0.74	0.47
Child Fat Intake (g)	13.7	9.2	1.165	0.259

Table 1 illustrates that total calorie and fat intake of normal weight mothers was slightly higher than that of the overweight mothers, though not significantly so. This is also true for the children; the children of normal weight mothers consumed slightly more overall than those of overweight mothers.

Descriptive statistics of the self-reported data from the Child Feeding Questionnaire and observed data from the video-coding process are shown in Table 2.

**Table 2:** CFQ and Observed scores by mother's weight status, mean (SD)

	Normal Weight n = 10	Overweight n = 10	T value
CFQ Pressure	2.05 (.96)	2.30 (.93)	-0.59
CFQ Restriction	3.34 (.66)	3.00 (.70)	1.12
CFQ Concern for Weight	1.60 (.73)	1.80 (1.11)	-0.47
CFQ Monitoring	4.00 (1.10)	4.07 (.95)	-0.14
OBS Verbal Pressure	15.80 (14.87)	13.70 (12.67)	-0.33
OBS Physical Pressure	4.50 (3.63)	4.70 (6.02)	-1.01
Pressure Total	20.30 (16.22)	18.40 (14.41)	-0.71
OBS Verbal Restriction	7.10 (7.98)	3.20 (2.30)	0.99
OBS Physical Restriction	3.10 (3.25)	1.00 (1.89)	1.06
Restriction Total	10.20 (10.27)	4.20 (3.05)	1.12

Note: None of the t values attained statistical significance.

CFQ is used to represent the Child Feeding Questionnaire.

OBS is used to represent Observed feeding behaviors.

### B. Agreement between Maternal Self-Reported and Observed Eating Behavior

Tables 3a and 3b show reported versus observed predominant feeding style and the correspondence between the two. Table 3a depicts restrictive feeding style. Placement in the style categories was determined by compiling a frequency distribution of the CFQ scores and observed behaviors. For observed behaviors, a median-split was obtained. When self-reporting, four mother's scores, two in each weight class, fell in between high and low, categorizing them as medium restrictive. The subject's code number and BMI are also shown in these tables, splitting the subjects by normal weight and overweight.

**Table 3a:** Self-reported and observed restrictive style based on mother's weight status (CFQ score = 1-5 with 5 meaning high pressure; OBS score = number of times pressuring was observed)

<b>Normal Weight Mothers</b>						
<b>Subject code</b>	<b>BMI</b>	<b>Self-Reported</b>		<b>Observed</b>		
		<b>CFQ Score</b>	<b>PFS Tertile</b>	<b>OBS Score</b>	<b>PFS Split</b>	
116	18.6	3.38	High	13	High	√
113	19.5	3.25	Medium	2	Low	~
109	20.6	3.13	Low	5	Low	√
117	22.8	5	High	1	Low	X
114	23.1	3.25	Medium	9	High	~
110	23.8	3	Low	21	High	X
112	23.9	2.38	Low	0	Low	√
103	24.2	3.5	High	12	High	√
107	24.9	3.13	Low	6	Low	√
111	24.9	3.38	High	33	High	√
<b>Overweight Mothers</b>						
<b>Subject code</b>	<b>BMI</b>	<b>Self-Reported</b>		<b>Observed</b>		
		<b>CFQ Score</b>	<b>PFS Tertile</b>	<b>OBS Score</b>	<b>PFS Split</b>	
105	26.8	3.75	High	19	High	√
120	27.8	3	Medium	3	Low	~
119	28.8	1.63	Low	2	Low	√
121	29.9	2.5	Low	2	Low	√
108	31.2	3.5	High	3	Low	X
102	31.4	3.38	High	4	High	√
115	33.8	2.5	Low	8	High	X
118	34.4	3	Medium	9	High	~
106	36	2.75	Low	8	High	X
104	38.2	4	High	3	Low	X

√ – agreement between self-reported and observed styles

X – non-agreement between self-reported and observed styles

~ – near agreement between self-reported and observed styles

PFS – Predominant Feeding Style

CFQ – Child Feeding Questionnaire

OBS – Observed Behavior

Table 3a shows that six of the ten normal weight mothers who reported that they were restrictive were also classified as restrictive by observation. Among the overweight mothers, on the other hand, only four of the ten had self-ratings of restrictiveness that corresponded to the observed classification.

Table 3b depicts pressuring feeding style. As with restriction, placement in the style categories was determined by compiling a frequency distribution of the CFQ scores and observed behaviors. For observed behaviors, once again a median-split allowed half to be

considered high and the other half considered low. And also as before, when self-reporting, four mother's scores, two in each weight class, fell in between high and low, categorizing them as medium pressuring. With respect to maternal pressuring, four of the ten normal weight and four of the ten overweight mothers had reported scores that corresponded to their observed scores, either being both high or both low.

**Table 3b:** Self-reported and observed pressuring style based on mother's weight status (CFQ score = 1-5 with 5 meaning high pressure; OBS score = number of times pressuring was observed)

<b>Normal Weight Mothers</b>						
<b>Subject code</b>	<b>BMI</b>	<b>Self-Reported</b>		<b>Observed</b>		
		<b>CFQ Score</b>	<b>PFS Tertile</b>	<b>OBS Score</b>	<b>PFS Split</b>	
116	18.6	2	Medium	43	High	~
113	19.5	1	Low	27	High	X
109	20.6	3	High	12	Low	X
117	22.8	1	Low	18	High	X
114	23.1	1	Low	4	Low	√
110	23.8	3	High	50	High	√
112	23.9	1.25	Low	1	Low	√
103	24.2	2.75	High	9	Low	X
107	24.9	2	Medium	13	Low	~
111	24.9	3.5	High	26	High	√
<b>Overweight Mothers</b>						
	<b>BMI</b>	<b>Self-Reported</b>		<b>Observed</b>		
		<b>CFQ Score</b>	<b>PFS Tertile</b>	<b>OBS Score</b>	<b>PFS Split</b>	
105	26.8	1.5	Low	84	High	X
120	27.8	1.25	Low	18	Low	√
119	28.8	3.75	High	21	High	√
121	29.9	1.5	Low	2	Low	√
108	31.2	2.75	High	7	Low	X
102	31.4	2	Medium	13	Low	~
115	33.8	3.5	High	16	Low	X
118	34.4	1.5	Low	29	High	X
106	36	2	Medium	47	High	~
104	38.2	3.25	High	31	High	√

√ – agreement between self-reported and observed styles

X – non-agreement between self-reported and observed styles

~ – near agreement between self-reported and observed styles

PFS – Predominant Feeding Style

CFQ – Child Feeding Questionnaire

OBS – Observed Behavior

### C. Associations between maternal BMI or feeding styles and child BMI

Because there were no significant differences between the subgroups in average CFQ or OBS scores based on weight status of the mother, the two subgroups were combined for subsequent analyses. A Pearson correlation analysis was conducted that included maternal BMI, child BMI, self-reported restriction and pressuring and observed restriction and pressuring. None of the correlation coefficients achieved statistical significance.

A linear regression was used to determine if maternal BMI or any of the restriction or pressuring variables had any influence on child BMI. As shown in Table 4, maternal BMI as well as the maternal scores for the CFQ and observed variables were regressed into child BMI.

It was found that the mother's reported and observed behavior was associated with the child's BMI. Namely, the more the mothers restricted her child's feeding (both reported and observed), the higher the child's BMI. However, the more the mothers pressured (reported only), the lower the child's BMI. Maternal BMI was not predictive of the child's BMI.

**Table 4:** Regression results for predictors of child BMI

Multiple R<sup>2</sup> = 0.692

Variables	$\beta$ -Coefficient	T	p-value
(Constant)		5.19	0.0001
Mother BMI	0.27	1.62	0.13
CFQ Restriction	0.41	2.59	0.02
CFQ Pressure	-0.69	-3.83	0.002
OBS Restriction	0.53	2.61	0.02
OBS Pressure	-0.15	-0.8	0.44

To determine if maternal BMI or any of the restriction or pressuring variables predicted child energy intake (kcal), a second linear regression was conducted. Table 5 shows that there were no predictors for the calories consumed by the child during the laboratory lunch.

**Table 5:** Regression results for predictors of child energy intake during laboratory lunch  
Multiple R<sup>2</sup> = 0.245

Variables	$\beta$ - Coefficient	T	p- value
(Constant)		0.9	0.38
Mother BMI	-0.01	-0.05	0.96
CFQ Restriction	0.17	0.69	0.51
CFQ Pressure	-0.16	-0.55	0.59
OBS Restriction	0.55	1.73	0.11
OBS Pressure	-0.25	-0.86	0.4

A follow-up regression (not shown) was conducted after removing all other variables except observed restriction and observed pressure, and showed that observed restriction had a tendency towards significance ( $p = 0.07$ ). A regression analysis was performed on all CFQ and OBS variables to predict the child's calories consumed before the laboratory lunch, where observed restriction showed statistical significance (Table 6).

**Table 6:** Regression results for predictors of child energy intake before laboratory lunch  
Multiple  $R^2 = 0.283$

Variables	$\beta$ – Coefficient	t	p- value
(Constant)		1.24	0.24
Mother BMI	0.12	0.46	0.65
CFQ Restriction	0.04	0.17	0.87
CFQ Pressure	-0.2	-0.72	0.49
OBS Restriction	0.69	2.19	0.05
OBS Pressure	-0.35	-1.2	0.25

## VIII. Discussion

This investigation sought out to determine if there were any differences between the 20 mothers dependant upon their weight status, as well as to determine the differences between the mother and child's energy intake based on the mother's weight status. It also tried to compare the associations between the CFQ and OBS results based on the weight status of the mother. And finally, to determine if the mother's BMI or feeding style were predictors of the child's BMI or energy intake. The results found are discussed in further detail below.

Unlike previous research, the data collected in this investigation compares overweight and normal weight mothers and the correspondence between reported versus observed styles. When looking at the results from the present study, mothers who participated in this investigation were around the same age, overweight mothers being slightly older, and both groups had children who were between 20 to 26 months of age. There were more white mothers who participated than those claiming other ethnicities. Results showed that normal weight mothers had children with higher average BMIs than overweight mothers. Yet overweight mothers had a greater number of children in the 85<sup>th</sup> percentile or higher than did normal weight mothers. This suggests that even though normal weight mothers had children with slightly higher average BMI scores for age and sex, the overweight mothers overall had more children who are either at risk for overweight or are actually overweight. Despite the differences between the groups, overall the weight status of the mother did not matter as much as her feeding style in regards to her child's energy intake and subsequent BMI.

When reviewing the energy intake from the laboratory lunch for mothers and their children, the results were not expected. Without hypothesizing, it was thought that normal



weight mothers would ingest fewer calories and fat than the overweight mothers, simply because they are trying to maintain their normal weight. In contrast, the overweight mothers weigh more and therefore were expected to consume more. Even though not significant, normal weight mothers consumed slightly more calories and fat than the overweight mothers. This is also true for their respective children. It is possible that normal weight mothers eat less and restrict themselves in order to stay at their weight and therefore impart those same restrictions onto their children.

Though not significantly different, overweight mothers reported pressuring, concern for weight and monitoring at slightly higher levels than normal weight mothers. As with many of the findings in this paper, this may have possibly shown significance with a larger sample size. This suggests that overweight mothers may be more concerned about how much their child weighs and how they eat because they may have similar weight issues, as opposed to mothers of normal weight. The overweight mothers, in fact, did report more concern with their own weight. Yet some normal weight mothers were observed to verbally pressure and restrict more than overweight mothers.

In order to find an explanation for these results, the maternal subscale scores from the Weight Concerns Questionnaire were reexamined. Overweight and normal weight mothers differed significantly in “feeling fat” and “total weight concerns.” In addition, maternal energy intake at lunch was negatively correlated with certain subscale components and total weight concerns. This means that mothers who were more concerned (and apparently overweight), ate less. This may explain the slight, although not statistically significant, differences in energy intake between the maternal groups. When it came to the children, again results were not significant with this particularly small sample size, however, normal

weight mothers had children who consumed slightly more energy in the laboratory setting than did the children of the overweight mothers.

With respect to the agreement between maternal self-reports and observed feeding styles, a look at Table 3a indicates that six of the 20 mothers (30% of the sample) showed no correspondence (the X-ed pairs) between reported and observed restriction styles. Likewise, eight of the 20 mothers (40% of the sample) showed no correspondence between their reported and observed pressuring styles (Table 3b). A possible cause of non-agreement may be that normal weight mothers believe they have to control their child's food consumption because if they did not the child may wind up eating a meal of calorically dense, unhealthy foods. Normal weight mothers may also believe they need to exert more self-control in regards to eating because they may also have calorie controlling issues themselves. In contrast, overweight mothers may be less controlling of their child's intake because they do not want to be controlled or cannot control their own food choices.

As portrayed above, the immediate assessment might be that overall mothers were not accurately reporting their feeding styles when compared to the investigator's observations. It is tempting to conclude that when self-reporting, mothers may not realize what their predominant feeding style is, which may only be revealed when they are being directly observed. Relevant to this explanation, the work of Sacco and colleagues is worth reconsidering. Sacco et al. (2007) looked at reported versus observed feeding styles of 20 mothers with their three–20-month-old infants, and reported that over 2/3 of their sample data showed no correspondence between interviewed and observed feeding styles. Thus it may be the case that mothers may think they do not restrict as much as they do or even think

that they pressure too much, since in both investigations an appreciable number of observed scores did not correspond to their self-reports.

On the other hand, 10 of the 20 mothers in the present investigation (50% of the sample) did show agreement in regards to restriction (the  $\surd$ -ed pairs), with eight of the 20 (40%) showing agreement for pressuring style. Coincidentally, the medium self-report scores of Tables 3a and 3b that were tied to the observed scores ( $\sim$  pairs) would have aligned with two more high and two more low observed scores if they differed by a mere one-hundredth of a point. Thus agreement could have been as high as 60% and 50% for restriction and pressuring, respectively. Relative to Sacco et al.'s poorer convergence, it is possible that the instruments used in the present investigation (e.g., CFQ) possessed greater validity in measuring maternal feeding style, but the younger age of their infant sample may also have influenced our results. The mothers of this study may have benefited from the longer period of raising their toddlers and monitoring their own feeding styles. With a larger sample a future investigation might see more agreement between reported and observed feeding style, although numerous factors are likely at work.

When analyzing to see if there were any relationships between maternal BMI, feeding styles (reported and observed), and child's BMI, maternal weight was found to not significantly play a role in child BMI; how a mother feeds her child is more important in predicting a child's weight status. This is why it is necessary to look deeper into how maternal feeding styles significantly affect or how they can predict a child's BMI.

We found that the mothers' behaviors had significant effects on the children's BMI in regards to reported restriction, pressuring and observed restriction. This suggests that how a mother feeds her child does affect how her child eats, and possibly their BMI. However,

there was no significance of the mother's BMI in predicting to the child's BMI, meaning that if the mother is overweight, it does not mean the child is overweight or even will be overweight. Maternal BMI or any feeding style variable did not predict what the child ate during the laboratory lunch. This indicates that the mother's weight had little to do with how much the child ate at lunch, nor how the mother feeds in terms of style. It is possible that the mothers may have held back from how they normally feed because they were being observed. Also it is possible that the child knew something was different about his or her lunchtime routine and therefore did not eat how s/he normally eats or behaves during lunch, skewing the results. It is suggested that a mother's actual (observed) restrictive style may have an impact on how a child eats during their lunch.

To further understand if there is any impact of a mother's feeding style on the child's energy intake and therefore BMI, a regression was done looking at all of the same variables in regards to the child's intake before the laboratory lunch. Our data suggests that observed restriction scores are predictive of the child's energy intake before the laboratory lunch. This means that the mother's restrictive behaviors do have an impact on how the child eats and possibly his or her BMI in the future. This finding supports several research results by Birch and Fisher (Birch, 1998; Birch & Fisher, 2000; Fisher & Birch, 1999a, 1999b) that restricting child's access to foods or restricting alone can have a negative effect on their development of eating habits and eventually BMI. Despite the fact that the mother's weight was not as predictive of the child's energy intake and BMI as expected, there still is some impact on the child's eating patterns and BMI in regards to the mother's feeding style.

When referring to today's obesogenic society and unhealthy family environments we must discuss the children that are growing up in this society and how detrimental it can be to

their health. Today's children are born into families that provide larger portions at all three meals, purchase unhealthy snacks to take to school, and live inactive lifestyles (Birch, 2006). All of these factors and more are creating a more overweight generation. Children are more at risk for diseases such as heart disease, diabetes, infertility and even early death (CDC, 2008). Overall, we found that a mother's feeding style has more of an impact on the child's weight status and energy intake than the mother's weight status.

#### A. Study Strengths and Limitations

Inherent to this investigation are strengths and weaknesses that can be further addressed in future studies. Self-report data can sometimes be extremely biased and inaccurate, therefore, a notable strength of this study is that two methods, self-report and observation, were triangulated to confirm the findings. Although two methods were used, it is possible that during the observations, mothers may have held back from eating what they normally would or may not have restricted as severely as they would at home, creating a small amount of inaccuracy. Overall, the laboratory lunch may not have accurately represented the child or mother's regular energy intake.

Another limitation is that the observation instrument employed was designed and used for the first time in this study. Finally, these results are limited by the use of a small sample size.

#### B. Conclusion

Most Americans today are in a downward spiral of unhealthy living and it is becoming even more prevalent among American children. This impending issue of maternal

feeding practices and its significant impact on a child's weight status has only been touched upon. Feeding style and parenting style, as seen in this investigation, can cause children to eat a certain way and develop possibly poor eating habits. It is imperative that parents, especially mothers, avoid extreme restriction or pressure in order for their children to develop their own healthy ideas of food. Allowing children to make their own decisions when it comes to food may enable them to listen to their own hunger and satiety cues and foster healthy eating behaviors. Mothers, rather parents, need to understand that their children's health is extremely important, and how they feed their children can influence how they grow, their future weight status, and therefore their overall health.

Further research may positively support change in child feeding behaviors. Since there have not been many investigations done using these two methods or the observational measurement tool, additional information is needed. Further research is also necessary on a larger sample in order to better determine how much a mother's feeding style is predictive of her child's energy intake and BMI.

Given the limitations of the present investigation, the use of reported as well as observed eating and feeding practices to better understand how normal weight and overweight maternal feeding practices influences a child's energy intake and overall weight status has been a useful contribution to the literature on child weight issues.

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## X. Appendix

### Appendix A: Recruitment Flyer



## INSTITUTE FOR THE STUDY OF CHILD DEVELOPMENT

### Do you have a child ages 20 – 27 months?

Well...

Here's an opportunity to participate in a great project!

#### WHAT, WHERE AND WHEN:

Researchers from the University of Medicine and Dentistry of New Jersey are currently studying the development of eating, food preferences and emotions in young children. We are looking for participants for this study. You and your child would be come to our offices in New Brunswick for a free buffet luncheon. We are interested in what and how young children eat when they are with their mothers at a typical mealtime. After the luncheon you would complete some questionnaires about yourself and your child. There is no charge to participate. All collected information is confidential.

Mothers and children participate together. You and your child will have one hour to have lunch together at our offices. The entire study should take about 2 hours to complete.

#### ARE YOU INTERESTED???

Sign and return the attached for to let us know. We will contact you either over the phone or through the mail with more information and to answer any questions. OR call us. You can call Dr. Gia Rosenblum, or Dr. Michael Lewis, at (732) 235-7700.

Institute for the Study of Child Development  
University of Medicine and Dentistry of New Jersey  
97 Paterson Street  
New Brunswick, NJ 09803

## PERMISSION FOR FURTHER CONTACT

I have received information about the research project on children's eating. I am interested in receiving further information.

I would like a project staff member to contact me to explain the project in detail and to schedule an appointment if I decide to participate.

I give my permission for the researchers to contact me further.

Please call me [ ]

My telephone number is: \_\_\_\_\_

The best time to call me is: \_\_\_\_\_

I cannot be reached my phone, the best way to contact me is:

\_\_\_\_\_

I am the parent of:

Child's name \_\_\_\_\_

Child's date of birth: \_\_\_\_\_

Signature of Parent or guardian: \_\_\_\_\_

Today's Date: \_\_\_\_\_

If you have questions about participation, or if you wish to sign up by phone, you can call Dr. Gia Rosenblum, or Dr. Michael Lewis, at (732) 235-7700.

For information on UMDNJ policy regarding human participants in research, contact the IRB director at (732) 235-4055

*Appendix B: Telephone Screening Information*

**Telephone Script for contacting and screening potential participants:**

**PRIOR TO CALLING:**

After an initial contact form has been returned contact must be made with the interested parent. Check the child's birth date indicated on the form. Everyone who returned a form will receive a call regardless of age. Determine where the flyer was turned in.

**IF CHILD IS NOT IN AGE RANGE**

Ask to speak to Name of parent/guardian on flyer.

Hello my name is \_\_\_\_\_ (give your name). I'm calling from the research project at Robert Wood Johnson. We had posted a flyer \_\_\_\_\_ (state location, e.g., in Dr. XXXX's office). You had returned the \_\_\_\_\_ (color of form) form indicating that you might be interested in our research project.

**IF CHILD IS TOO YOUNG:**

I understand that your child is \_\_\_\_\_ months. That is too young for our study. If we are still looking for participants, when your child is 20 months old I'd like to call you back. Would that be all right?

**IF CHILD IS TOO OLD:**

I understand that your child is \_\_\_\_\_ months. That is too old for our study. Our study is looking for children between 20 and 27 months old. Thank you very much for your interest.

**IF CHILD IS CORRECT AGE - BETWEEN 20 & 27 MONTHS:**

Ask to speak to Name of parent/guardian on flyer.

Hello my name is \_\_\_\_\_ (give your name). I'm calling from the UMDNJ research project. We had posted a flyer \_\_\_\_\_ (state location, e.g., in Dr. XXXX's office). You had returned the \_\_\_\_\_ (color of form) form indicating that you might be interested in our research project. Is now a good time to talk about it?

If yes, continue.

If no, request a good alternative time to call.

We are studying the way young children eat, and the ways young children feel and express themselves when they are eating or around food. Since mothers often help young children learn about food and eating, mothers and children participate in the study together. You and your child would come to our office in New Brunswick at lunchtime. When you arrive, we would explain a consent form to you, tell you more about our work, and answer any questions you have. Then we will provide lunch for you and your child. You and your child will have one hour to have lunch together. After lunch, you would complete five questionnaires about yourself and your child. All collected information is confidential. We will not use your name, your child's name, or your family's name in any way. The entire study should take between 2 and 3 hours to complete. Participation in the study is voluntary, and you can withdraw from the study at any time. Do you think you and your child would like to participate?

**IF NOT INTERESTED**

Inquire why. Determine if we can help overcome the obstacle (e.g., needs transportation to New Brunswick, needs a weekend appointment).

If we cannot help overcome the obstacle, or person is reluctant to explain, thank them for their time and interest, and let them know that if they change their minds they are welcome to contact us at (732) 235-7700.

**IF INTERESTED - COMPLETE SCREENING FORM – FOLLOWING THE TEMPLATE BELOW:**

Continue: Before we continue, I need to ask a few questions about you and your child to determine if the two of you are eligible for the study. You are free to refuse to answer any questions or withdraw from this screening process. Your answers will be kept confidential whether or not you are eligible for the study. Do I have your permission to proceed?

Verify parent's name & spelling. Verify child's first name and date of birth. Ask if child is a boy or a girl (names can be ambiguous).

		RESPONSE (Eligibility)	
		YES (Eligible)	NO (Ineligible )
1. Are you (child's name) birth mother?		YES (Eligible)	NO (Ineligible )
2. Do you and (child's name) live together in the same home?		YES (Eligible)	NO (Ineligible )
3. Has a doctor or health professional ever told you to restrict your child's diet in anyway – I mean were there ever any foods that s/he was not allowed or not able to eat? If so why?*		YES (Ineligible )	NO (Eligible)
4. Has a doctor or health professional ever told you to restrict your diet in any way; are there now or were there ever any foods that you are not allowed or not able to eat? If so, why?*		YES (Ineligible )	NO (Eligible)
5. Are you allergic to any foods?		YES (Ineligible )	NO (Eligible)
6. Is your child allergic to any foods?		YES (Ineligible )	NO (Eligible)
7. What is your child's height?			
8. What is your child's weight?			
9. What is your height? <sup>+</sup>			
10. What is your weight? <sup>+</sup>		Enter Parent BMI	Obese Non-Obese

*[\* If YES to Questions 3 OR 4: Ask the nature of the medically-related dietary restriction. Determine whether the restriction was medically necessary, (i.e., due to diabetes, food allergy, lactose intolerance, swallowing problem etc) or if it was a recommendation for general health reasons, or to manage weight (e.g., doctor/dentist recommended that child not drink juice because of cavities; doctor recommended parent not eat sweets to lose weight). Participants with restrictions based on weight or general health concerns ARE ELIGIBLE]*

*<sup>+</sup> [Questions 9 & 10: Calculate parent's BMI using BMI chart. Determine whether parent fits criteria for obesity (above 85<sup>th</sup> percentile BMI). Check current recruiting needs to determine whether study is currently recruiting for participants fitting individual's profile]*

**IF NOT ELIGIBLE:**

Thank you very much for your time and interest. Unfortunately, my files indicate that we are not currently enrolling mothers and children fitting your and your child's profile into the study. Would you be willing to allow me to keep your name on file? That way if we need to enroll mothers and children fitting your profile in the future, we would call you back to see if you are still interested.

**If ELIGIBLE:**

Thank you – you and your child are eligible for the study. I'd like to schedule an appointment for you and your child to come in. What days are best for you? What is the time that you and your child typically eat lunch? (Offer appointment date and time).

**SCHEDULING APPOINTMENTS:**

*If possible, schedule the appointment during the initial phone contact. It is preferable to make a tentative appointment and call back to confirm than to make no appointment at all.*

***You must verify that the mother will be the one accompanying the child on the day of the study & that she is the LEGAL GUARDIAN OF THE CHILD.***

*If father or other individual wants to accompany in addition to the mother, explain that they may wait in our reception area during the lunch and during the questionnaires administration. If another child will be present, you may explain that toys are available in the reception area, and the non-participating child may play there as long as an adult has come along to supervise the non-participating child.*

**OFFER DIRECTIONS**

Our office is on the corner of Joyce Kilmer Avenue and Paterson Street in New Brunswick. I would like to mail you directions and parking information. May I have your address or email address?

If you have any questions or need to change your appointment time for any reason, please contact me. My name is \_\_\_\_\_ (give your name & spell it if needed). You can reach me at (732) 235-7700.

Thank you very much. We are looking forward to seeing you and your child on \_\_\_\_\_ (DATE) at \_\_\_\_\_ (TIME).



**TELEPHONE SCREENING FORM - COMPLETE FOR EACH CHILD SCREENED**

PARENT'S NAME \_\_\_\_\_ Verify parent's name & spelling

CHILD'S NAME \_\_\_\_\_ Verify child's full name and date of birth

CHILD'S DATE OF BIRTH \_\_\_\_\_ GENDER Boy Girl Ask if child is a boy or girl (names can be ambiguous).

	RESPONSE (Eligibility)	
1. Are you (child's name) birth mother?	YES (Eligible)	NO (Ineligible)
2. Do you and (child's name) live together in the same home?	YES (Eligible)	NO (Ineligible)
3. Has a doctor or health professional ever told you to restrict your child's diet in anyway – I mean were there ever any foods that s/he was not allowed or not able to eat? If so why?*	YES (Ineligible)	NO (Eligible)
4. Has a doctor or health professional ever told you to restrict your diet in any way; are there now or were there ever any foods that you are not allowed or not able to eat? If so, why?*	YES (Ineligible)	NO (Eligible)
5. Are you allergic to any foods?	YES (Ineligible)	NO (Eligible)
6. Is your child allergic to any foods?	YES (Ineligible)	NO (Eligible)
7. What is your child's height?		
8. What is your child's weight?		
9. What is your height?+		
10. What is your weight?+	Enter Parent BMI	Obese Non-Obese

*[\* If YES to Questions 3 & 4: Ask the nature of the medically-related dietary restriction. Determine whether the restriction was medically necessary, (i.e., due to diabetes, food allergy, lactose intolerance, swallowing problem etc) or if it was a recommendation for general health reasons, or to manage weight (e.g., doctor/dentist recommended that child not drink juice because of cavities; doctor recommended parent not eat sweets to lose weight). Participants with restrictions based on weight or general health concerns ARE ELIGIBLE]*

*[+ Questions 9 & 10: Calculate parent's BMI using BMI chart. Determine whether parent fits criteria for obesity (above 85<sup>th</sup> percentile BMI). Check current recruiting needs to determine whether study is currently recruiting for participants fitting individual's profile]*

DETERMINATION:            ELIGIBLE            NOT ELIGIBLE

GROUP:                    OBESE PARENT    NON-OBESE PARENT

Address/ email for directions: \_\_\_\_\_

Appointment date and time: \_\_\_\_\_

Preferred Phone#: \_\_\_\_\_

*Appendix C: Lunch Buffet Food Items and Preparation*

**FOOD FOR VIDEOTAPE LUNCH**

**Weaver Brand...**Chicken Nuggets: 4 nuggets. Nuke in glass measuring cup for 45 seconds on one side, then turn over and nuke for 45 seconds on other side. Place on small plate, weigh, record weight, and serve.

**“Oscar Meyer Brand, Beef”** Bologna Sandwiches (white **“Wonder”** and wheat **“Homepride”**): 2 slices bologna.

**“Hillshire Farm Oven Roasted Turkey Breast”** Turkey Sandwiches (white and wheat): 4 slices turkey.

**“Del-Monte” brand sweet peas—fresh cut** Green Peas: peas and container weight 100 grams +/- 3 grams.

**“Del-Monte” brand golden sweet whole kernel corn—fresh cut** Corn: corn and container weight 100 grams +/- 3 grams.

**“Foxy” fresh baby peeled** Carrots: 10 carrots in plastic baggie.

**“Ritz” brand ritz bits**Cheese Crackers: 15 crackers in plastic baggie.

**“Polly-O” brand string cheese--**String Cheese: 1 stick

**“Light n’ Lively” brand low-fat strawberry** Yogurt: 1 container

**“Sunmaid”** Raisins: 1 box

**“Motts”** Apple Sauce: 1 container

**“Lays” brand** Potato Chips: 1 bag

**“Hershey’s”** Chocolate Milk, Apple Juice, Fruit Punch, Orange Juice: 1 box

**“Tuscan or Farmland whole “**Milk: 1 pint

**“Coke, Caffeine free”** Soda: 1 can

Condiments (ketchup, mustard, mayonnaise): 2 packets each

**“Dole”** Banana: ½ banana in plastic baggie

**“Nabisco brand Honey Maid”** Graham Crackers: 1 ½ crackers in plastic baggie

**“Nabisco brand”** Oreo Cookies: 3 cookies in plastic baggie

**Hershey Kisses:** 10 kisses in plastic baggie

**“Del-Monte” brand Lite Fruit Cup--Fruit Cocktail:** 1 can

**“Jello Brand, strawberry flavored”** Jello: 1 container

**“Swiss Miss brand”** Chocolate Pudding: 1 container

**“Betty Crocker Brand” –Crazy Colors** Fruit Roll-Up: 1 package

**“Quaker brand, Chewy Chocolate Chip” --Granola Bar:** 1 package

Green Seedless Grapes

## FOODS TO BE SERVED FOR MOTHER-CHILD BUFFET LUNCHEON

### I. Main Meal Selections

- Chicken Nuggets
- Bologna on whole-wheat & white bread
- Turkey on whole-wheat & white bread
- Muenster cheese on whole wheat & white bread
- Peanut Butter & Jelly on whole-wheat & white bread
- 

### Sides

- Lettuce
- Tomato
- Green Peas
- Corn
- Carrots
- Apple Sauce
- Potato Chips

### Fruits

- Banana
- Grapes
- Fruit Cocktail

### Miscellaneous

- String Cheese
- Yogurt
- Raisins
- Goldfish
- Cheerios

### Drinks

- Water
- Chocolate Milk
- Whole Milk
- Apple Juice
- Fruit Punch
- Coke

### Condiments

- Catsup Packets
- Mustard Packets
- Mayonnaise Packets

### • Dessert Selections

- Graham Crackers
- Oreo Cookies
- Jello-Gelatin
- Chocolate Pudding
- Fruit Roll-up

## **DETAILED PROCEDURES FOR PREPARATION, STORAGE, SERVICE, POST-WEIGHING AND CLEAN-UP OF VIDEO BUFFET LUNCH MENU**

### **Chicken Nuggets**

- I. Item Specifics
  - . “Weaver” brand chicken nuggets. “Premium breaded chicken breast formed with rib meat – fully cooked – frozen” Package size: Net wt. 9oz. (255 g).
- II. Storage
  - . Chicken nuggets will be stored in their original packaging in the freezer. Each serving will be removed immediately prior to preparation.
- III. Preparation & Pre-weighing
  - . Preparation will take place shortly before service. Each portion will consist of 4 individual chicken nuggets (approx. 70g).
  - . Weigh container & record on the “video pre- and post-weight record”
  - . Place 4 frozen chicken nuggets into a 11.8 oz. Rubbermaid “servin’ saver” container.
- IV. Service
  - . Place nuggets uncovered into the microwave and heat on high power for approximately one minute (check heating time and record here).
  - . Remove from microwave and place container with chicken nuggets onto scale (without lid) and record weight on the “video pre- and post-weight record” form.
  - . Place lid loosely onto container and place on table according to “Video Buffet Table Set-Up” form.
- V. Post-Weighing
  - . Place the leftover chicken nuggets in the container without the lid onto scale.
  - . Subtract weight of container
  - . Record weight on the “video pre-and post-weight record” form.
- VI. Clean-up
  - . Discard any leftover nuggets.
  - . Clean and sanitize all containers and lids.

## Cold Cuts & White/Wheat bread

### I. Item Specifics

- a. Bologna: "Oscar Mayer" brand Beef Bologna.
  - . Package size: Net wt. 8oz.
- b. Turkey: "Hillshire Farm" brand "Oven Roasted Turkey Breast." "Deli Select-thin sliced-premium meat-99% fat-free.
  - . Package size: Net wt. 6oz. (170 g).
- c. "Wonder" brand enriched white bread (small package). Package size: Net wt: 12oz. (340 g).
- d. "Home Pride" brand wheat bread. "Butter top." Package size: Net wt. 1lb. 4oz. (567 g).

### II. Pre-Weighing (& storage if necessary)

- a. BOLOGNA, TURKEY, CHEESE
  - . PLACE ALL SLICES OF BOLOGNA ON A PIECE OF PLASTIC WRAP ON THE SCALE.
  - . Record weight onto "Video pre- and post-weight record" form.
  - . Move Bologna to service plate
  - . Tightly cover all plates with Plastic Wrap & store or serve
  - . REPEAT FOR TURKEY & CHEESE
- b. PEANUT BUTTER & JELLY
  - . Weigh container containing jelly without lid
  - . Record weight onto "Video pre- and post-weight record" form.
  - . Cover with lid & store or serve.

### III. Preparation

All sandwich meats may be prepared on the **day of the visit** or **one day prior** to the visit (depending on scheduling). Tightly cover prepared plates with Saran Wrap.

- a. BOLOGNA: Four (4) Slices of Bologna will be presented Two sandwiches will be prepared (one on white/one on wheat).
  - . Roll each slice of Bologna into a tube and place them side-by-side on the plate.
- b. TURKEY: Eight (8) slices of turkey will be presented
  - . Roll each slice of Turkey into a tube and place them on the plate side-by-side, next to the Bologna
  - . Fold in half four slices of turkey breast and place between two slices of bread, cut in half diagonal.
- c. CHEESE:
  - . Two (2) slices of cheese will be presented.
  - . Roll each slice of cheese into a tube and place them on the plate next to the Turkey.
- d. PEANUT BUTTER & JELLY:
  - . 2 Tablespoons of Peanut Butter will be placed into a small disposable plastic container with lid
  - . 2 Tablespoon of Jelly will be placed into a small disposable plastic container with lid
- e. BREADS
  - . Four Slices of White, and Four Slices of Wheat bread will be placed on a plate. Tightly cover with Saran Wrap until Service.

### IV. Service

- a. Weigh and record the weights onto the appropriate subjects' "Video pre- and post-weight record" form,
- b. Plate 1 (Meats & Cheese): Make up a plate with the rolled Bologna, Turkey & Cheese slices placed side-by-side in a pinwheel form on the plate
- c. Plate 2 (Breads) Place the 4 slices of White, and 4 Slices of Wheat on a plate.

- d. PB&J: Place the container of PB & container of Jelly on the table according to the “Video Buffet Table Set-Up” form.
- e. Place the plates of meats and Cheese on the table according to the “Video Buffet Table Set-Up” form.

#### V. Post-Weighing

##### a. MEATS

- . Remove any unused bologna from the plate/S, place on PLASTIC WRAP ON THE SCALE. IF A SANDWICH WAS MADE AND THERE IS REMAINDER SEPARATE ANY REMAINING BOLOGNA FROM OTHER INGREDIENTS, AND ADD TO SCALE – WEIGH ALL. RECORD WEIGHT ON THE Video pre- and post-weight record” FORM
- . REPEAT FOR TURKEY AND CHEESE

##### b. PEANUT BUTTER & JELLY –

- . weight any remaining Peanut Butter in the Container (w/o lid)
- . weight any remaining Jelly in the Container (w/o lid)
- . If the PB & J has been used to make a sandwich, use the quantity of bread used and the quantity of PB & J missing from the containers to create a sandwich recipe. Enter the sandwich recipe onto the pre-post weight record form. Then record the amount of that sandwich (e.g., ½, ¼) onto the form

##### c. BREAD

- . Record the amount of bread consumed (e.g., ½ slice, 2 slices, etc.) on the “Pre-post weight record form”

#### VI. Clean-up

- a. Discard any leftover sandwiches, meats, cheese
- b. If the Peanut Butter or Jelly in the containers was untouched, the containers can be returned to storage for later use. If any PB, or J was used, discard the remainder.
- c. Clean & sanitize serving plates and containers. Discard Plastic Wrap

### Green Peas and Corn

#### I. Item Specifics

- . “Del Monte” brand Sweet Peas – fresh cut. Package size: Net wt. 15.25oz. (432 g).
- . “Del Monte” brand golden sweet Whole Kernel Corn – fresh cut. Package size: Net wt: 15.25oz. (432 g).

#### II. Preparation & Weighing

- . Both peas and corn preparation can take place **up to four days prior** to service.
- . Place an empty storage container on the scale and portion the peas and corn. Each portion will weigh 100 +/- 3g. Do not tare the container?
- . Cover each container and label with appropriate weight.

#### III. Storage

- . The portioned containers of peas and corn must remain refrigerated until service.

#### IV. Service

- . Record weight of peas and corn onto subjects’ “video pre- and post-weight record” form.
- . Heating will take place immediately prior to feeding.
- . Remove lid from container and place loosely back on top of the container. Microwave on high for 30 sec. (depending on microwave).
- . Remove from microwave and firmly replace lid, shake to distribute heat evenly.
- . Place on table according to the “Video Buffet Table Set-Up” form.

#### V. Post-Weighing

- . Place remaining peas/corn in the container (without lid) onto scale. Record post weight onto the “video pre- and post-record” form.



## VI. Clean-up

- . Discard any leftover peas/corn.
- . Clean and sanitize all containers.

## **Carrots, Raisins, Grapes, Cheerios, Graham Crackers**

### I. Item Specifics

- . Carrots “Foxy” brand fresh baby peeled carrots. Package size: Net wt. 16oz. (453 g).
- . Raisins:
- . Grapes:
- . Cheerios:
- . Graham Crackers: “Nabisco” brand Honey Maid Honey Grahams. Package size: Net wt. 1 lb. (454 g).
- . Oreos: “Nabisco” brand Oreo Chocolate Sandwich Cookies. Package size: Net wt. 1 lb. (454g).

### II. “Preparation

- . Preparation can take place **up to 4 days prior** to service.
- . Place items into Ziploc bags in quantities as follows
  - . Carrots: 10 carrots
  - . Raisins: Net wt. 0.5 oz. (14.1 g)
  - . Grapes: Net wt. ????? (14.1 g)
  - . Cheerios: Net wt. 0.5 oz. (14.1 g)
  - . Graham Crackers: 2 crackers
  - . Oreo cookies: 5 cookies
- . Place filled bags onto scale and mark each bag with an Avery label indicating weight.

### III. Storage

- . Store bags of carrots & grapes in the refrigerator.
- . Store bags of raisins & Cheerios, graham crackers, Oreo cookies in dry storage area

### IV. Service

- . Immediately prior to service record weights onto the subjects “Pre- and post-weight record” form.
- . Place carrots, raisins, grapes, cheerios, graham crackers and Oreos onto the buffet table according to the “Buffet Table Set-Up” form.

### V. Post-Weighing

- . Place bags onto scale and record weight on the “video pre- and post-weight record” form. (If all is eaten, weight of bag must still be obtained and recorded).

### VI. Clean-Up

- . Discard all bags & food items that were presented on the buffet table.

## **String Cheese, Yogurt, Apple Sauce, Potato Chips, Goldfish, Fruit Cocktail, Jello Gelatin, Chocolate Pudding, Fruit Roll up**

### I. Item Specifics

- . String Cheese “Polly-O” brand string cheese-All natural-Low-moisture part skim mozzarella cheese. Package size: Net wt. 1 oz. (28.35 g)
- . Yogurt “Dannon” brand low-fat strawberry yogurt-99% fat free-Grade A - 1% milk fat. Package size: Six, 4 oz. (113 g) containers. Serving size: one container.
- . Apple Sauce “Motts” brand applesauce. Package size: Six, 4oz. (113 g) containers. Serving size: one container.
- . Potato Chips: “Lays” brand classic potato chips. Package size: Net wt. 1.75oz. (49.6 g).
- . “Goldfish”

- . Fruit Cocktail: “Del Monte” brand Lite Fruit Cup-Mixed fruit in extra light syrup-Peaches, Pears and Pineapple.
  - . Package size: 4-4oz. Cans-Net wt. 1 lb. (453 g).
  - . Jello: “Jell-o” brand Gelatin Snacks-Strawberry Artificial Flavor. Package size: Net wt. 1 lb. 5 oz. (595 g).
  - . Chocolate Pudding: “Swiss Miss” brand Chocolate Pudding. Package size: 4-3.5 oz. Cups.-Net wt. 14 oz. (397 g).
  - . Fruit Roll-Up: “Betty Crocker” brand Fruit Roll-ups Fruit Snacks-Crazy Colors. Package size: 10-0.5 oz Rolls-Net wt. 5 oz. (141g).
- II. Preparation & Weighing
- . Preparation may be done up to **4 days prior**
  - . **Check all expiration dates for freshness, discard any old items.**
  - . Place each previously mentioned menu item individually onto scale. Weigh the item with all of its original packaging. (For instance, the straw of a box drink, lid of yogurt must be weighed as well)
  - . Using an Avery label mark each object with its appropriate weight.
- III. Storage
- . String Cheese, Yogurt, must be stored in refridgerator
  - . All other items will be stored in the dry storage area.
- IV. Service
- . Record the weight of each menu item on the “video pre- and post- weight” form.
  - . Place each item onto the table according to the “Buffet Table Set-Up” form.
- V. Post-Weighing
- . All items will be post-weighed with all packaging that was originally attached to the item returned or intact. For example, lids will be replaced and straws will remain in containers.
  - . Place each menu item onto scale and record post-weight onto the “pre- and post-weight record” form.
- VI. Clean-Up
- . Any item that was opened must be discarded.
  - . Applesauce, Potato Chips, and Goldfish that were not opened/used may be returned and stored for future use in its appropriate storage area.
  - . Yogurt & String Cheese that have not been opened may be returned to refrigerator for use **one additional time ONLY**

## Banana

- I. Item Specifics
- II. “Dole” brand banana.
- III. Preparation & Weighing
- . Preparation will take place immediately before service.
  - . Weigh banana, intact & record weigh on “pre- and post-weight record” form
- IV. Storage
- . Bananas should be stored in dry storage area – not in the refrigerator
- V. Service
- . Place the banana on the buffet table according to the :Buffet table set-up form”.
- VI. Post-Weighing
- . Banana will be post-weighed with all peel
  - . Place banana onto scale and record post-weight onto the “pre- and post-weight record” form.
- VII. Clean-Up
- . Any banana that was opened must be discarded.
  - . Intact bananas maybe returned to the dry storage area

## Drinks: Water, Chocolate Milk, Whole Milk, Apple Juice, Fruit Punch & Coke

- I. Item Specifics
  - . Water:
  - . Chocolate Milk: “Hershey’s” brand chocolate drink. 99% fat free – 99.9% caffeine free. Package size: Three, 8 fluid oz. (236 ml) per pack. Serving size: one box.
  - . Whole Milk: “Tuscan” brand whole milk. Package size: one pint (473 ml).
  - . Apple Juice: “Motts” brand apple juice. 100% apple juice – from concentrate. Package size: Three, 8 fl. oz. (237ml) cartons. Serving size: one box.
  - . Fruit Punch: “Motts” brand fruit punch 100% juice. Package size: Three, 8 fl. oz. (237 ml) cartons. Serving size: one box.
  - . Cola: Coca Cola
- II. Preparation & Weighing
  - . **ONE DAY prior to service** drinks must be placed in refrigerator for **chilling**
  - . Weighing may take place at any time
  - . Place the drink item on the scale & record all weights (VOLUMES???) of drinks in their **complete packaging on the** “pre- and post-weight record” form
  - . Place an Avery label on drink indicating its weight
- III. Service
  - . Place drinks on the buffet table according to the “buffet table set-up” form
- IV. Post Weighing
  - . Weigh all remaining drink items with their packaging.
  - . If any drink has been decanted into a cup, weigh the drink with cup, discard the drink, then weigh the cup & subtract the weight of the cup.
  - . Record all weights onto the “pre- and post-weight record” form
- V. Clean-up
  - . Any intact drink containers may be returned to dry storage area
  - . Any opened drinks must be discarded

## Condiments: Ketchup, Mustard, Mayonnaise packets

- I. Item Specifics
  - . Ketchup:
  - . Mustard:
  - . Mayonnaise:
- II. Preparation & Weighing
  - . Record item’s listed contents from label???? onto the “pre- and post-weight record”
- III. Service
  - . Place on buffet table according to the “buffet table set-up” form
- IV. Post Weighing
  - . ??? Record whether item was consumed on the “pre- and post-weight record” by listing the contents as completely consumed on the

*Appendix D: Child Feeding Questionnaire*

ID# \_\_\_\_\_

Date of Testing: \_\_\_\_\_

Child Feeding Questionnaire

1. When your child is at home how often are you responsible for feeding him or her

Never       Seldom       Half the time       Most of the time       Always

2. How often are you responsible for deciding what your child's portion sizes are?

Never       Seldom       Half the time       Most of the time       Always

3. How often are you responsible for deciding if your child has eaten the right kind of foods.

Never       Seldom       Half the time       Most of the time       Always

Please describe yourself:

4. During your childhood (check one)

Markedly Underweight       Underweight       Normal       Overweight       Markedly Overweight

5. During your adolescence (check one)

Markedly Underweight       Underweight       Normal       Overweight       Markedly Overweight

6. During your 20s (check one)

Markedly Underweight       Underweight       Normal       Overweight       Markedly Overweight

7. At present (check one)

Markedly Underweight       Underweight       Normal       Overweight       Markedly Overweight

Please describe your child:

8. Your child during the first year of life

Markedly Underweight     
 Underweight     
 Normal     
 Overweight     
 Markedly Overweight

9. Your child as a toddler

Markedly Underweight     
 Underweight     
 Normal     
 Overweight     
 Markedly Overweight

10. Your child as a preschooler

Markedly Underweight     
 Underweight     
 Normal     
 Overweight     
 Markedly Overweight

11. Your child kindergarten through 2<sup>nd</sup> grade

Markedly Underweight     
 Underweight     
 Normal     
 Overweight     
 Markedly Overweight

12. Your child from 3<sup>rd</sup> through 5<sup>th</sup> grade

Markedly Underweight     
 Underweight     
 Normal     
 Overweight     
 Markedly Overweight

13. Your child from 6<sup>th</sup> through 8<sup>th</sup> grade

Markedly Underweight     
 Underweight     
 Normal     
 Overweight     
 Markedly Overweight

14. How concerned are you about your child eating too much when you are not around him or her?

Unconcerned     
 A Little Concerned     
 Concerned     
 Fairly Concerned     
 Very Concerned

15. How concerned are you about your child having to diet to maintain a desirable weight?

Unconcerned     
 A Little Concerned     
 Concerned     
 Fairly Concerned     
 Very Concerned

16. How concerned are you about your child becoming over weight?

Unconcerned     
 A Little Concerned     
 Concerned     
 Fairly Concerned     
 Very Concerned

17. I have to be sure that my child does not eat too many sweets (candy, ice cream, cake or pastries).

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

18. I have to be sure that my child does not eat too many high-fat foods.

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

19. I have to be sure that my child does not eat too much of her favorite foods.

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

20. I intentionally keep some foods out of my child's reach.

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

21. I offer sweets (candy, ice cream, cake pastries) to my child as rewards for good behavior.

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

22. I offer my child her favorite foods in exchange for good behavior.

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

23. If I did not regulate my child's eating she would eat too many junk foods.

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

24. If I did not regulate my child's eating she would eat too much of her favorite foods.

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

25. My child should always eat all of the food on her plate.

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

26. I have to be especially sure that my child eats enough.

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

27. If my child says "I'm not hungry" I try to get him/her to eat anyway.

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

28. If I did not regulate my child's eating, she would eat much less than she should.

Disagree       Slightly Disagree       Neutral       Slightly Agree       Agree

29. How much do you keep track of the sweets (candy, ice cream, cake, pastries) that your child eats?

Never       Rarely       Sometimes       Mostly       Always

30. How much do you keep track of the snack food (potato chips, Doritos, cheese puffs etc.) that your child eats?

Never       Rarely       Sometimes       Mostly       Always

31. How much do you keep track of the high fat foods your child eats?

Never       Rarely       Sometimes       Mostly       Always

32. When your child is at home how often are you responsible for feeding him or her

Never       Rarely       Sometimes       Mostly       Always

33. When your child is at home how often are you responsible for feeding him or her

Never       Rarely       Sometimes       Mostly       Always

*Appendix E: Weight Concerns Questionnaire*

ID# \_\_\_\_\_

Date of Testing: \_\_\_\_\_

## Weight Concerns

34. How much more or less do you feel you worry about your weight and body shape than other women your age?

1. I worry a lot less than other women
2. I worry a little less than other women
3. I worry about the same as other women
4. I worry a little more than other women
5. I worry a lot more than other women

35. How afraid are you of gaining 3lbs?

1. Not afraid of gaining
2. Slightly afraid of gaining
3. Moderately afraid of gaining
4. Very afraid of gaining
5. Terrified of gaining

36. When was the last time you went on a diet?

1. I've never been on a diet
2. I was on a diet about 1 year ago
3. I was on a diet about 6 months ago
4. I was on a diet about 3 months ago
5. I was on a diet less than 1 month ago
6. I was on a diet less than 1 month ago
7. I'm now on a diet

37. Compared to others things in your life, how important is your weight to you?

1. My weight is not important compared to other things in my life
2. My weight is a little more important than some other things
3. My weight is more important than most, but not all, things in my life
4. My weight is the most important thing in my life

38. Do you ever feel fat?

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always



Appendix F: Food record (before laboratory lunch)

**Eating and Emotion: Food Diary**

“We need to record everything that you and your child have eaten today prior to coming in to see us. So I’ll ask you some questions to help you retrace your steps this morning to help us get an accurate picture of your morning and your eating today.”

*The following questions are meant to be used if necessary for the examiner to prompt the mother:*

1. What time did you wake up this morning?
2. What did you do after that? Get dressed? Shower? Eat breakfast? Wake kids up?
3. What time did your child(ren) wake up this morning? Did you wake them up?
4. When did you eat breakfast?
5. What did you prepare? How many people were you preparing food for?
6. Do you and your kids sit down together? Did you cook something or eat a cold breakfast?
7. What did you eat? How much of each item?
8. What did your baby eat? How much?
9. What did you do after breakfast? Take the kids to school? Run errands?
10. Where did you go?
11. Did you and/ or your child have a midmorning snack? Did you stop to pick up food? Did you prepare it at home?
12. What food was it (from where)?
13. How much did you have? How much did your child have?
14. What else did you do after that before you arrived at 97 Paterson St?
15. How full or hungry are you feeling right now? On a scale of 1-10 with 10 being very full and 1 being very hungry, how do you feel right now?

16. How hungry or full do you think your child is right now? Where do you think your child’s hunger falls on the same 1-10 scale?

**Breakfast:**

Mom: waffles, coffee, v8 splash

Child: waffle, 1/2 banana, milk

**Snack:**

Mom: water

Child: ☐

## Hunger Rating:

Mother: 1 2 3 4 5 6 7 8 9 10  
 Child: 1 2 3 4 5 6 7 8 9 10

## Current Physical Activity Level:

Mother: A B C 0 1 2 3 4 5  
 Child: A B C 0 1 2 3 4 5

A. Sedentary job: at desk, at computer
--

B. Moderately active job: on feet, some moving things, light lifting
--

C. Manual or labor job daily: construction
--

0: I avoid walking or exertion, for example, always use elevator, drive whenever possible instead of walking.
---

1: I walk for pleasure, routinely use the stairs, occasionally exercise sufficiently to cause heavy breathing or perspiration.
--

2: I spend less than 30 min per week in physical activity or run less than 1 mile per week
--

3: I spend 30-60 min per week in physical activity or run 1-5 miles per week
--

4: I spend 1-3 hours per week in physical activity or run 5-10 miles per week
---

5: I spend over 3 hours per week in physical activity or run over 10 miles per week
---

Appendix G: Food record (during laboratory lunch)

Participant ID# 104 Mother / Child \_\_\_\_\_ Date 4/28/05

	PRE-BUFFET WEIGHT IN GRAMS 5	POST-BUFFET WEIGHT IN GRAMS 2	GRAMS CONSUMED (PRE WEIGHT - POST WEIGHT) 3
<b>Example</b>			
<b>Main Meal Selections</b>			
Chicken Nuggets	101.1	58.4 <sup>container</sup> - 251g	17.3 <sup>C:12.3</sup> <sup>M:4.7</sup>
Bologna	113.5	_____	_____
Turkey	220.8	104.1	56.7
Meunster Cheese	83.2	28.6 <sup>M 1 slice</sup> <sup>C 1 slice - 1 slice = 8g</sup>	54.6
Peanut Butter	56.9	_____	_____
Jelly	63.6	_____	_____
white bread	111.3	_____	_____
whole-wheat	101.7	76.8	74.9
<b>Sides</b>			
Lettuce	23.3	_____	_____
Tomato	77.0	38.5	38.5
Green Peas (frozen)	137.3	_____	_____
Corn (frozen)	140.6	_____	_____
Carrots	83.4	75.6	78
Apple Sauce	121.6	_____	_____
Potato Chitos	30.4	_____	_____
<b>Fruits</b>			
Banana	167.0	111.5	52.5
Grapes	98.8	10.5	88.3
Fruit Cocktail	187.9	_____	_____
<b>Miscellaneous</b>			
String Cheese	32.4	_____	_____
Yogurt	180.6	_____	_____
Raisins	<del>19.5</del> 19.5	19.5	_____
Goldfish	63.3	_____	_____
Cheerios	<del>19.5</del> 24.6	17.2	74
<b>Drinks</b>			
Water	<del>255.4</del> 255.4	15.8, 255.4	239.9
Chocolate Milk	261.7	_____	_____
Whole Milk	1pt	_____	_____
Apple Juice	218.2	_____	_____
Fruit Punch	218.3	_____	_____
Coke	387.5	_____	_____
<b>Condiments</b>			
Catsup Packets	66.5	_____	_____
Mustard Packets	60.3	_____	_____
Mayonnaise Packets	52.5	41.4	11.1
<b>Dessert Selections</b>			
Graham Crackers	35.3	_____	_____
Oreo Cookies	<del>66.5</del> 66.5	_____	_____
Jello Gelatin	167.1	_____	_____
Chocolate Pudding	123.3	_____	_____
Fruit Roll up	15.6	_____	_____

*Appendix H: Observed Data – Instructions*

**Observed Video Coding Instructions**

**Restrict**: A mother is coded for restricting or being restrictive with food/drink when she either physically withholds food/drinks from her child or expresses to her child that a particular food/drink is not allowed to be consumed.

**Verbal Examples:**

- (1) “you can have milk or water” (when there is an option of milk, water, juice and soda.)
- (2) “you have had enough”
- (3) “that is enough chips”
- (4) “you can only have one (more) cookie”
- (5) “no more juice, you can have water now.”
- (6) “you don’t like pudding or cake, you don’t want to eat that.”

**Physical Examples:**

- (1) physically moving a bag of chips out of the child’s sight or reach.
- (2) removing a cookie from the child’s hand.
- (3) placing soda or chocolate milk behind other food so child cannot see it.

**Pressure**: A mother is coded for pressuring a child when she forces the child to eat more of a certain food because the child has not eaten much or in order to get a reward/palatable food. The mother is also coded for forcing the child to clean his/her plate so that nothing is wasted or to make sure the child gets all the nutrients he/she can.

**Verbal Examples:**

- (1) “take one more bite.”
- (2) “finish your sandwich.”
- (3) “eat more banana.”
- (4) “let me see you eat some more on your plate.”
- (5) “take a couple more bites of your chicken and then you can have the cookies.”
- (6) “if you finish your sandwich you can have the jello.”
- (7) “you can get down and play with the toys if you eat all your banana.”

**Physical Examples:**

- (1) physically placing certain foods into the child’s hands so that they will consume it.
- (2) pushing the plate closer to the child so they eat it.
- (3) pointing to a piece of food on the plate so that the child will focus on it and consume it.
- (4) parent following child around room and feeding him/her bites of food.

## Appendix I: Observed Data – Coding Tables

**VIDEO CODING #104**

Coding #104

<b><u>Restrict:</u></b> Start Time <u>0: 02</u> min End Time <u>0: 32</u> min	<b><u>Verbal:</u></b> 	<b><u>Physical:</u></b>	<b><u>TOTAL:</u></b> 3
<b><u>Pressure:</u></b>	 	 	<b>31</b>
<b><u>TOTAL</u></b>	<b><u>Maternal</u></b>	<b><u>Control</u></b>	<b>34</b>

Appendix J: Nutribase print out Example Subject

**Detailed Intake Report for Child 104**

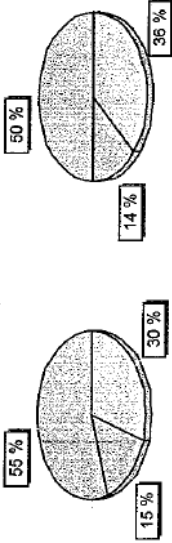
Date: ~~April 28, 2005~~

**Client Information**

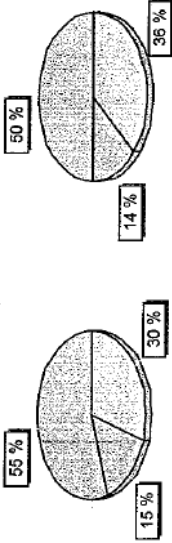
Start Date: 08/02/2005 Starting Weight: 38 pounds  
 Goal Date: 08/02/2005 Desired Weight: 38 pounds  
 Gender: Male Maintain Weight: N/A  
 Age: 33 Starting Body Fat: N/A  
 Build: Large Desired Body Fat: N/A  
 Height: 39 in. Starting BMI: 17.4  
 Activity Level: Very Active Desired BMI: 17.4

Actual Calories 569 Actual PCF Ratio: 14-50-36  
 Daily Calorie Goal: 1904 Desired PCF Ratio: 15-55-30

**Desired PCF Ratio**



**Actual PCF Ratio**



Carbs  Protein  Fat

Breakfast	Description	Serving	Gram Wt.	Calories (kcal)	Protein (g)	Carbs (g)	Fat (g)	Sat fat (g)	Cholest (mg)	Sugars (g)	Dietary Fiber (g)
WAFFLE, GOLDEN OAT	"Kellogg's"	1 waffles	50	99	3	19	2	0	1	2	2
BANANA, RAW	7" to 7-7/8" long	1/2 medium	59	54	1	14	0	0	0	11	1
whole milk		4 fl oz	0	75	4	6	4	3	18	6	0
<b>Meal Total:</b>				109	228	8	39	6	3	19	3

**Lunch**

Muenster Cheese, Deli Style		34 grams	34	130	8	0	10	6	32	0	0
chicken nuggets		12.3 grams	12	34	2	1	2	1	6	0	0
BANANA, RAW	7" to 7-7/8" long	52.5 grams	53	48	1	12	0	0	0	10	1
CHEERIOS, RTE	ready-to-eat (1 NLEA serving)	7.4 grams	7	27	1	6	0	0	0	0	1
Water, Spring		2 fl oz	60	0	0	0	0	0	0	0	0
<b>Meal Total:</b>				165	239	11	13	7	38	10	2

**Afternoon Snack**

COOKIE, OREO	chocolate sandwich	1 cookies	11	53	1	8	2	1	0	4	0
COOKIE, TEDDY		1.1 grams	1	5	0	1	0	0	0	0	0
GRAHAMS, HONEY											
M&Ms, plain		8.7 grams	9	44	0	6	2	1	1	6	0
<b>Meal Total:</b>				21	102	1	15	4	2	1	10

Detailed Intake Report for Child 104 (continued)

1904  
686

296	569	20	73	23	12	57	6
1,904	1,904	71	262	63	21	190	0
30 %	29 %	28 %	36 %	56 %	30 %	31 %	19

Daily Total:  
Daily Goal:  
% of Daily Goal:

		Sodium (mg)	
<b>Breakfast</b>			
WAFFLE, GOLDEN OAT	193		
BANANA, RAW	1		
whole milk	65		
<b>Meal Total:</b>	<b>258</b>		

<b>Lunch</b>			
Muenster Cheese, Deli Style	219		
chicken nuggets	58		
BANANA, RAW	1		
CHEERIOS, RTE	70		
Water, Spring	0		
<b>Meal Total:</b>	<b>347</b>		

<b>Afternoon Snack</b>			
COOKIE, OREO	70		
COOKIE, TEDDY	6		
GRAHAMS, HONEY			
M&Ms, plain	5		
<b>Meal Total:</b>	<b>81</b>		
<b>Daily Total:</b>	<b>686</b>		
<b>Daily Goal:</b>	<b>1,904</b>		
<b>% of Daily Goal:</b>	<b>36 %</b>		



# Detailed Intake Report for Mom 104

Date: April 28, 2005

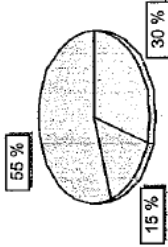
## Client Information

Start Date: 07/13/2005 Starting Weight: 233 pounds  
 Goal Date: 07/13/2005 Desired Weight: 233 pounds  
 Gender: ~~Female~~ Maintain Weight: N/A  
 Age: 35 Starting Body Fat: N/A  
 Build: Large Desired Body Fat: N/A  
 Height: 56 in. Starting BMI: 38.2  
 Activity Level: Moderately Active Desired BMI: 38.2

Actual Calories 826 Actual PCF Ratio: 14-56-30

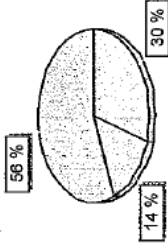
Daily Calorie Goal: 2978 Desired PCF Ratio: 15-55-30

### Desired PCF Ratio



Carbs  Protein  Fat

### Actual PCF Ratio



Carbs  Protein  Fat

Breakfast	Description	Serving Size	Gram Wt.	Calories (kcal)	Protein (g)	Carbs (g)	Fat (g)	Sat fat (g)	Cholest (mg)	Sugars (g)	Dietary Fiber (g)	Sodium (grams)
WAFFLE, GOLDEN OAT	"Kellogg's"	2 waffles	100	198	7	38	3	1	1	3	4	385
COFFEE, BREWED, PREPARED	prep w/tap water	8 fl oz	237	5	0	1	0	0	0	0	0	5
FRUIT-MEDLEY DRINK	240 ml, 25% juice	6 fl oz	180	83	0	21	0	0	0	20	0	30
Meal Total:				517	285	7	59	3	1	24	4	410

## Lunch

whole wheat bread		2 slices	76	180	8	36	2	0	0	6	6	360
MAYONNAISE, REAL		11.1 grams	11	79	0	0	9	1	4	0	0	59
TOMATO, RED, RIPE, RAW	June thru October average (2-3/5" dia)	38.5 grams	39	8	0	2	0	0	0	1	0	3
lean white turkey		56.7 grams	57	101	8	4	6	2	30	0	0	608
Muenster Cheese, Deli Style		1 slice	21	80	5	0	6	4	20	0	0	135
Baby Cut Carrots		7.8 grams	8	3	0	1	0	0	0	1	0	3
GRAPE, AMERICAN-TYPE, RAW	slip skin	88.3 grams	88	59	1	15	0	0	0	15	1	2
Water, Spring		239.9 grams	240	0	0	0	0	0	0	0	0	0
chicken nuggets		4.7 grams	5	13	1	1	1	0	2	0	0	22



Detailed Intake Report for Mom 104 (continued)

Lunch	Description	Serving Size	Gram Wt.	Calories (kcal)	Protein (g)	Carbs (g)	Fat (g)	Sat fat (g)	Cholest (mg)	Sugars (g)	Dietary Fiber (g)	Sodium (grams)
Afternoon Snack	M&Ms, plain	3.4 grams	3	17	0	2	1	0	0	2	0	2
<b>Meal Total:</b>			544	524	23	58	24	8	57	22	8	1192

<b>Daily Total:</b>	826	30	120	28	9	58	48	11
<b>Daily Goal:</b>	2,978	112	409	99	33	298	0	30
<b>% of Daily Goal:</b>	28 %	27 %	29 %	28 %	26 %	19 %		37 %

Breakfast	Sodium (mg)
WAFFLE, GOLDEN OAT	385
COFFEE, BREWED, PREPARED	5
FRUIT MEDLEY DRINK	30
<b>Meal Total:</b>	<b>420</b>

Lunch	Sodium (mg)
whole wheat bread	360
MAYONNAISE, REAL	59
TOMATO, RED, RIPE, RAW	3
lean white turkey	608
Muenster Cheese, Deli Style	135
Baby Cut Carrots	3
GRAPE, AMERICAN-TYPE, RAW	2
Water, Spring	0
chicken nuggets	22
<b>Meal Total:</b>	<b>1,192</b>

Afternoon Snack	M&Ms, plain	2
<b>Meal Total:</b>	<b>2</b>	
<b>Daily Total:</b>	<b>1,614</b>	
<b>Daily Goal:</b>	<b>2,400</b>	
<b>% of Daily Goal:</b>	<b>67 %</b>	