THE RELATIONS BETWEEN FEEDING PRACTICES, BODY MASS INDEX, DEPRESSION, AND AGGRESSION IN A LOW-INCOME SAMPLE OF MOTHERS AND CHILDREN

By

Heather Whitty

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

Human Development and Family Studies

2011

ABSTRACT

THE RELATIONS BETWEEN FEEDING PRACTICES, BODY MASS INDEX, DEPRESSION, AND AGGRESSION IN A LOW-INCOME SAMPLE OF MOTHERS AND CHILDREN

By

Heather Whitty

A controlling feeding style is associated with difficulty in children's food regulation, which is linked to later weight gain (Johnson & Birch, 1994). Survey data from Early Head Start (n = 119) families of 36-month old children was used to investigate the relations between maternal feeding practices, maternal depressive symptoms, and child aggression and BMI. Bivariate correlations revealed a negative correlation between maternal depressive symptoms and meal patterns, and a positive correlation between maternal depressive symptoms and child aggression. This is the first known study to report an association between symptoms of depression and meal patterns, which is suggestive of depressed mothers' difficulty in healthy meal planning for themselves and their children. Future work should confirm this association with older children and identify whether or not it is linked to child overweight.

AKNOWLEDGEMENTS

I would like to formally acknowledge and thank all who assisted in making this thesis possible; my advisor, Hope Gerde, my committee members, Holly-Brophy Herb and Robert Griffore, and the researcher who headed the project from which this data came, Rachel Schiffman. My husband, friends and family also provided me with invaluable emotional support during this process. Thank you all!!!

TABLE OF CONTENTS

LIST OF TABLES vi

LIST OF FIGURES vii

INTRODUCTION 1
Current Study 1
Theory 2
Hypothesis 3
Research Question 4

CHAPTER 1
LITERATURE REVIEW 5
Child Obesity Overview 5
Health Consequences of Obesity 5
Economic Consequences of Obesity 6
Need for Obesity Prevention 7
Family Influences on Food 8
Family Impact on Young Children's Eating 8
Foods Consumed 10
Food Preferences 14
Feeding Styles and Practices 16
BMI 21
Measurement of Body Weight 21
Relation of Child and Maternal BMI 22
Depression 23
Depression Overview in Adult Females 23
Depression and Obesity in Adult Females 24
Aggression 25
Child Aggression Overview 25
Child Aggression and Maternal Depressive Symptoms 26
Child Aggression, Body Weight, and Parental Feeding 28
Summary 30

CHAPTER 2
METHODS 31
Early Head Start Research and Evaluation Project Data Set 31
Participants 32
Procedures 32
Measures 33
Food Control 33
Meal Patterns 33
Child Aggression 34

Maternal Depressive Symptoms 34
Child BMI 35
Maternal BMI 35
Analysis 35

CHAPTER 3
RESULTS 37
Descriptive Statistics 37
Bivariate Correlations 37
Regression 37

CHAPTER 4
DISCUSSION 39
Maternal Depressive Symptoms and Child Aggression 39
Maternal Depressive Symptoms and Meal Patterns 40
Sample versus National Composition 44
Limitations 46
Controlling Feeding Practices and BMI 46
Mother and Child BMI 48
Future Research 49
Implications 51
Conclusion 53

APPENDICES 55
Theoretical Model 56
Health Section of Pathways Project Survey 57
Fruits and Veggies Section of Pathways Project Survey 59
Factor Analysis 60
Subscale of Child Behavior Checklist for Ages 1 ½ - 5 61
Center for Epidemiologic Studies Depression Scale 62
Frequencies of Continuous Variables 63
Crosstabulation of BMI and Depression for Mothers 64
Crosstabulation of BMI and Aggression for Children 65
Bivariate Correlations 66

REFERENCES 67

LIST OF TABLES

TABLE 1
Factor Analysis 60

TABLE 2
Frequencies of Continuous Variables 63

TABLE 3
Crosstabulation of BMI and Depressive Symptoms for Mothers 64

TABLE 4
Crosstabulation of BMI and Aggression for Children 65

TABLE 5
Bivariate Correlations 66

LIST OF FIGURES

FIGURE 1
Theoretical Model 56

THE RELATIONS BETWEEN FEEDING PRACTICES, BODY MASS IMDEX, DEPRESSION, AND AGGRESSION IN A LOW-INCOME SAMPLE OF MOTHERS AND CHILDREN

INTRODUCTION

Early childhood is a crucial period of growth for physical, cognitive and psychosocial development, during which food preferences are formed (Koivisto Hursti, 1999). Dietary patterns, including daily intakes of energy, fat and calcium, tend to track longitudinally from early childhood and have implications for long-term health (Boulton, Magarey, & Cockington, 1995; Klesges, Stein, Eck, Isbell, & Klesges, 1991). Thus, an affinity for unhealthy, energy-dense foods during childhood would will likely yield similar long-term preferences in adulthood (Wardle, 1995). Current evidence supports the claim that obese children tend to become obese adults (Butte, 2009; Freedman et al., 2005; Magarey, Daniels, Boulton, & Cockington, 2003; Serdula et al., 1993; Whitaker, Wright, Pepe, Seidel, & Dietz, 1997). Therefore, it is a commonly held view that the early childhood period is an opportune time during which healthy food preferences and behaviors can develop (Wardle, 1995). To study obesity prevention, many investigators have explored maternal feeding practices and whether they influence the type and amount of food children eat, and ultimately, a child's adiposity (Baughcum, Burklow, Deeks, Powers, & Whitaker, 1998; Birch & Fisher, 2000; Faith, Scanlon, Birch, Francis, & Sherry, 2004; Lumeng & Burke, 2006).

Current Study

While child obesity has not been ignored in research, there is much yet to unpack about the ways in which obesogenic behaviors develop during childhood. The ways in which a mother feeds her young child impacts her child's ability to regulate food

consumption (Costanzo & Woody, 1985; Satter, 1990). In particular, the degree of control a mother exercises when feeding her child is of interest due to the speculative role that external cues have in limiting the child's ability to self-regulate his own food intake (Birch & Fisher, 1998; Johnson & Birch, 1994). In addition, maternal depressive symptoms has been linked to feeding practices (Francis, Hofer, & Birch, 2001) and overweight (Surkan, Kawachi, & Peterson, 2008), and child overweight is related to child behavior (Lewinsohn et al., 2005; Young Hyman, Schlundt, Herman-Wenderoth, & Bozylinski, 2003); therefore, the mental health status of mothers and children are important dimensions to consider in feeding practice studies. The present study measured maternal control of child feeding and maternal depressive symptoms with child body mass index and child aggression in a sample of low-income mothers and children.

A low SES sample was used is this study given the association of low cost, nutritionally comprised diets and obesity in low-income families (Drewnowski, 2004; Wigg Dammann & Smith, 2009). The present study aimed to add to the body of knowledge regarding low-income status and controlling feeding practices. Evidence suggests that the degree of control a mother exerts in the feeding scenario will affect her child's body weight differently in low-income samples versus middle- to high-income samples (Hoerr et al., 2009; Robinson, Kiernan, Matheson, & Haydel, 2001).

Theory

Based upon the interest in the interaction between mothers and children in general, and their interactions in food-related contexts, Bronfenbrenners's (1994) human ecological theory is an appropriate theory by which to consider these relationships. This theory prompts one to view an individual in context. One could posit that child and mother risk

factors for obesity or emotional problems stem in part from the interactions of the five levels of the environment (microsystem, mesosystem, exosystem, macrosystem, chronosystem). These levels can influence each other bidirectionally to produce an environment that indirectly or directly promotes obesity or healthy lifestyle, and mental illness or mental health. Typically, the majority of a young child's interactions will be with family members, and thus he will learn about what foods to eat and how to eat them from these people that comprise his microsystem. While the microsystem is the emphasis of the current study, children are also influenced by their parents' interactions with other systems and their society's emphasis on lifestyle factors.

Hypothesis

Based on the literature of maternal feeding practices, maternal control was hypothesized to be positively associated with child BMI. That is, the more controlling a mother, as indicated by her practice of limiting her child's ability to make his own food decisions, the higher the child's BMI would be at 36 months. Echoing the work of Birch and Fisher (2000, 2003), Fisher and Birch (1999a, 1999b, 2002), and Johnson and Birch (1994), maternal control in child feeding is negatively related to a child's sensitivity to internal cues of hunger and satiety, which is linked to a child's ability to regulate his energy intake. If a child's ability to monitor his own hunger and decide how much to eat is replaced by an external source (in this case, the mother), a child may learn to pay less attention to internal cues to regulate his energy intake and be at a greater risk of elevated weight status (Johnson & Birch, 1994). However, due to the fact that these general findings have not been frequently explored in a low-income sample and in this young age group, the outcomes may not generalize across these populations.

Additionally, maternal BMI and maternal depressive symptoms was hypothesized to be significantly associated with child BMI and child aggression. Mothers who are overweight or depressed are speculated to have poorer child outcomes; that is, their child will have elevated body weight and/or child behavior problems. This hypothesis targets Bronfenbrenner's (1994) assertion that a child's development is affected by what is present in his microsystem; in this study, a mother's physical and mental health status is hypothesized to be linked to her child's physical and mental health.

Research Question

The principal research question for the present study is, "What is the relation between a controlling feeding style, maternal depressive symptoms, maternal BMI, child aggression and child BMI?" The hypothesized relations between these variables are depicted using a theoretical model (Appendix A).

LITERATURE REVIEW

Child Obesity Overview

The prevalence rates of obesity in childhood in the United States have risen dramatically in the past several decades (Ogden, Carroll, & Flegal, 2008). Data from the National Health and Nutrition Examination Survey (NHANES) reveal that from 1976–1980 to 2007–2008, the prevalence rates of obesity in children aged two to five years grew from 5% to 10.4%; rates of obesity in children from the ages of six to eleven years, similarly, increased from 6.5% to 19.6%, over triple the percentage of children (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010; Ogden et al., 2008).

Additionally, this trend of increasing body fat has been documented in many countries in the world, with 10% of school aged children in the world meeting international criteria for overweight or obese (Lobstein, Baur, & Uauy, 2004). Economically developed countries in the Americas, Europe and the Middle East lead the way in obesity rates, but urbanized areas in developing countries have also reported rising incidence rates of obesity (Prentice, 2006). To illustrate its global significance, the World Health Organization has recently recognized obesity and overweight as a condition of epidemic proportion affecting all ages and socioeconomic groups (World Health Organization, 2003).

Health Consequences of Obesity

Obesity is a major concern due to its impact on health. Physical ailments attributed to an overweight health status in adults are type 2 diabetes, hypertension, atherosclerosis, sleep disorders, nonalcoholic steatohepatitis, arthritis, depression and certain types of cancer (Cossrow & Falkner, 2004). Formerly, chronic conditions resulting from obesity were thought to be reserved for adults, yet this notion is becoming increasingly challenged.

Type 2 diabetes, for instance, is being more commonly diagnosed in the pediatric population, comprising as many as 50% of newly diagnosed diabetes cases (Rosenbloom, 2002). Another example that challenges the preconception that obesity-related physical ailments apply only to adults arose from a population based sample of children and adolescents, which revealed that obesity accounted for the highest rate of nonalcoholic steatohepatitis diagnoses amongst those surveyed (Schwimmer et al., 2006). Therefore, when considering these medical complications, it is prudent to say that overweight and obesity could affect individuals across the lifespan.

Economic Consequences of Obesity

The many health complications of obesity related conditions pose economic consequences on the health care system. Based on data from the 1998 Medical Expenditure Panel Survey and the 1996 and 1997 National Health Interview Surveys, estimates of medical spending attributable to obesity and overweight related conditions in 1998 arrive at the sum of 78.5 billion, or 9.1% of total annual medical expenditures (Finkelstein, Fiebelkorn, & Wang, 2003). Though the current costs of obesity are not trifling, future projections of health care costs are even more staggering. If existing prevalence rates of obesity and overweight remain unchecked, spending would be expected to double every 10 years until 2030, reaching as high as 860.7 to 956.9 billion dollars, or 16% to 18% of total health care costs (Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008).

Beyond the realm of systemized health care, there are additional costs that burden those with obesity. In reference to diabetes and obesity, Yach, Stuckler and Brownell (2006) claim that the microeconomic costs to sick individuals, families and communities could be more taxing than the costs of the actual conditions. Indirect costs include lower

returns on education, decreased income, earlier retirement and unemployment, and greater dependency on the welfare system (Yach et al., 2006). In short, obesity imposes immediate and long-term economic consequences that affect the individual with obesity at a societal and personal level.

Need for Obesity Prevention

The health and economic issues remain central to obesity in childhood due to the finding that obese children have a statistically greater risk of becoming obese adults than do normal weight children (Butte, 2009; Freedman et al., 2005; Magarey et al., 2003; Serdula et al., 1993; Whitaker et al., 1997). In addition, obesity is difficult to treat once it is present (Flodmark, Marcus, & Britton, 2006). Some predictors of obesity at the age of seven years are based on child characteristics before the age of three; these include birth weight, parental obesity, more than eight hours of watching television per week, rapid weight gain in the first 12 months, and short sleep duration (Reilly, et al., 2005; Butte, 2009). The majority of these factors remain significant in predicting adult adiposity from child factors, along with the addition of low socioeconomic status during middle childhood (Parsons, Power, Logan, & Summerbell, 1999). Whitaker et al. (1997) found that for children under three years of age, the strongest predictor of obesity during adulthood was parental obesity. All of these factors support the idea that the environment of a child's early years can influence the risk of obesity later in life (Butte, 2009).

Taking into consideration the health and economic effects of obesity, efforts to prevent the onset of overweight have gained momentum (Kranz, Hartman, Siega-Riz, & Herring, 2006; Hill & Peters, 1998). These efforts exist in part to prevent harm to the person at the level of the individual, but also to limit the negative societal impacts of

obesity (Flodmark et al., 2006). In some industrialized nations with high rates of obesity, national policies have been enacted which specify primary healthcare providers as the sentry for identification and counseling for childhood overweight (Wake, Gold, McCallum, Gerner, & Waters, 2008). However, some experts suggest that the most logical places to begin prevention efforts are the home and school environments (Lobstein et al., 2004). Support for school-based prevention efforts is reflected in the results of a recent survey of parents in the USA, who report the conviction that schools should have more responsibility in preventing childhood obesity than health care providers or the government (Evans, Finkelstein, Kamerow, & Renaud, 2005). Evaluators of school obesity prevention programs have traced numerous peer-reviewed studies with BMI as a chief measure of the health of children and youth from as early as 1985 (Budd & Volpe, 2006). Systematic reviews have yielded vastly mixed results regarding the effectiveness of obesity prevention programs, with only several studies producing modest statistically significant findings (Budd & Volpe, 2006; Kropski, Keckley, & Jensen, 2008; Thomas, 2006). The conflicted findings and lack of a strong consensus surrounding 'what works' in schools to prevent obesity leads one to the conclusion that prevention efforts might best be targeted to a child's initial social environment; in most cases, this would be the family.

Family Influences on Food

Family Impact on Young Children's Eating: Childhood obesity is a complex disease arising from the interaction of a genetic predisposition toward obesity and an unregulated environment (Butte, 2009). However, given the rising accounts of obesity within a relatively stable gene pool, the main source of the increase in body mass likely stems from changing factors within the environment, such as food availability and portion size

(Prentice, 1997; Hill & Peters, 1998). How decisions are made regarding these food considerations, including what food is suitable for consumption and methods of preparation, is founded on one's culture (Birch & Fisher, 1995; Rozin & Vollmecke, 1986; Nestle et al., 1998). The media, peers and family are constituent parts of culture, and therefore, have an influence on what and how a child eats (Nestle et al., 1998). This environmental influence is also shaped by the media's messages regarding ideal body size, with thinness for females and musculature for males typically considered the pinnacle of attractiveness (Agliata & Tantleff-Dunn, 2004; Brownell, 2001; Grabe, Ward, & Hyde, 2008). These body stereotypes are readily evident in some forms of children's media (Herbozo, Tantleff-Dunn, Gokee-Larose, & Thompson, 2004).

Though children's food consumption is influenced by the food decisions of their peers, the strongest influence for a young child is said to be the family (Lau, Quadrel, & Hartman, 1990; Birch & Fisher, 1998). Generally speaking, parents exert influence on their child's behavior, and weight-related behaviors such as physical activity and eating style are impacted accordingly (Carnell & Wardle, 2007). This is related to the results of a representative survey of American adults, which revealed that approximately 91% of respondents believed that parents played the strongest role in reducing child overweight (Evans et al., 2005). The strength of a parent's influence is especially significant when one considers the multiple roles that parents fulfill. McCaffree (2003) conceptualized parents as providers, enforcers, role models, protectors and advocates with respect to a child's eating and physical activity and thus, weight. The ubiquitous influence of parents in the lives of their children has lead researchers to the assumption that parental behaviors are a

modifiable element of a child's environment for the purposes of preventing or reducing child obesity (Carnell & Wardle, 2007).

However, research suggests that mothers exert particular influence on the determinants of children's food intake, such as how, when and why children are fed (Baughcum, et al., 2001). Mothers more typically feed their children, purchase food, prepare meals and are concerned about the foods they feed their families (Baranowski, 1997; Brown & Miller, 2002; Devine, Connors, & Sobal, 2003). Indeed, a mothers' diet has been found to be the strongest predictor of her child's diet (Horodynski, Stommel, Brophy-Herb, Xie, Weatherspoon, 2010). As a result, most studies investigating the familial influence on children's eating have focused on the dyadic relationship of the mother and child. Yet despite the developmental importance of early childhood, Lee, Hoerr and Schiffmann (2005) state that there have been infrequent investigations of the feeding practices of mothers of young children, with most studies focusing on older children. The present study fills a gap in the literature as it focuses on mothers' feeding practices of their 36-month-old children.

Foods Consumed: As previously stated, an overweight or obese weight status can arise due to genetics and environmental influences (Butte, 2009). Of the environmental influences, lifestyle choices such as physical inactivity and poor diet are regarded as the most important contributors to an overweight status (US Department of Health and Human Services and US Department of Agriculture, 2005). Interestingly, some researchers have recently re-evaluated the benefit of physical activity to reduce the energy gap, as some experts consider food intake to be a more significant variable in determining body weight (Sonneville & Gortmaker, 2008). Yet however much weight is assigned to each factor, it is

generally agreed that an overweight or obese status arises from "long-term net energy imbalances" (Faith et al., 2004, p. 1719).

Assessment of dietary quality is not known for its use of ease in measurement (Kranz, Hartman, Siega-Riz, & Herring, 2006). Analysis of dietary quality has undergone revision in how it's measured over the past several decades, with a shift from time-intensive nutrient adequacy towards a food measurement approach (Hoerr, Horodynski, Lee, & Henry, 2006). Consumption of food is typically assessed according to the guidelines recommended in MyPyramid, the USDA food guide (Dixon, Cronin, & Krebs-Smith, 2001), the Dietary Reference Intakes of the National Academy of Science, the American Dietetic Association, and/or in the case of preschoolers, the American Academy of Pediatrics (Kranz et al., 2006; Kranz, Siega-Riz, & Herring, 2004). Typical recommendations of a healthy diet include an emphasis on eating a variety of fruits and vegetables, whole grains and low-fat dairy products, including a variety of lean protein products, and limiting saturated and trans fats, sodium, and added sugars (US Department of Health and Human Services and US Department of Agriculture, 2005).

This is pertinent information, as tracking the food consumption of individuals in high-risk groups, such as those in low SES populations, can help identify those in danger of developing health problems (Hoerr et al., 2006). The health benefits of a high-quality diet are typically related to chronic disease prevention (US Department of Health and Human Services and US Department of Agriculture, 2005). For instance, epidemiological evidence has revealed that a diet high in fruits and vegetables can be considered a protective mechanism against certain cancers, heart disease and stroke, in addition to emerging evidence for the prevention of cataracts, chronic obstructive pulmonary disease,

diverticulosis and hypertension (Van Duyn & Pivonka, 2000). Since fruits and vegetables are a significant source of fiber, many of the health benefits of this food group extend to those who consume optimal quantities of fiber, in addition to a reduced risk of developing type 2 diabetes and the management of gastrointestinal disorders (Anderson, Smith, & Gustafson, 1994; Van Duyn & Pivonka, 2000). Fiber can also be consumed through whole grains, with greater intakes of whole grains being linked to reduced incidence of cardiovascular disease (Mellen, Walsh, & Herrington, 2008). Those who consume the recommended amounts of calcium, commonly consumed through dairy products in the USA, have the benefit of increasing bone mass and reducing the risk of developing osteoporosis later in life (Weaver, 2000). Additionally, adhering to these eating recommendations is said to be beneficial for weight loss or weight maintenance based on the healthy properties of these foods (Anderson et al., 1994).

Relevant to the current discussion is the assertion that diet is a key part in the etiology of childhood overweight and obesity (Fisher & Birch, 2001). Kranz et al., (2004) compared the diet quality of preschool children between 1978 and 1998 and found that dietary quality had small but significant improvements over time. Yet the authors pointed out that, "Children consuming more food, and thus more energy, are more likely to meet the intake recommendations for food groups and nutrients compared with children who eat less" (Kranz et al., 2006, p. 1596). Thus, a higher dietary quality, which included an increase in the consumption of fruit juices and sugar, yielded an overall energy increase. This change was suggested as a partial explanation for the increased prevalence rates of child obesity (Kranz et al., 2004). The finding that children currently consume surplus energy was echoed by Wang, Gortmaker, Sobol, and Kuntz (2006). These authors cited the

energy difference gap of 110-167 extra calories a day in children aged 2-7 over a ten year period as a contributor to the increase in overall body weight among US children.

As previously established, mothers typically provide what is available for children to consume (Barankowski, 1997). Low-income mothers tend to have less knowledge of the nutritional content of foods as compared to their middle-income and high-income counterparts, and some purportedly lack the knowledge that diet is a contributor in the development of some chronic diseases (Barankowski, 1997; Wiig Dammann & Smith, 2009). By analyzing compliance with the recommended daily consumption guideline of at least one serving of the five foods groups from MyPyramid, Lee et al. (2005) found high agreement between poor quality diets of low-income mothers and their children. This general finding was consistent in a study of beverage intake in low-income families with children aged 2-3 years, which revealed a high concordance between sweetened beverages and soft drinks in mother-child dyads (Hoerr, Lee, Schiffman, Horodynski & McKelvey, 2006). Focus groups of low-income mothers, of which over 75% were either overweight or obese, revealed that these women wanted to feed their families more nutritious foods but cited the expense of healthy foods as the main deterrent from doing so; some also espoused quantity of food over quality of food (Wiig Dammann & Smith, 2009). This revelation can be implicated in the development of an energy imbalance, as many low-cost food items consumed by low-income families tend to be high in calories and composed of refined grains, added sugars, and added fat (Drewnowski, 2004). Therefore, children of low-income mothers could be more at risk of inadequate nutrient consumption and excessive energy intake and less likely to receive the preventative benefits of good nutrition than children in other income categories.

Food Preferences: Food preferences are largely based on familiarity and taste of foods (Birch, 1992). Food preferences are relevant to consider in what children eat due to the finding that food preferences predict consumption (Birch & Fisher, 1998; Skinner, Carruth, Bounds, & Zeigler, 2002) and these preferences develop through repeated exposure to new foods when infants transition away from a milk-based diet (Birch, 1998). Studies have shown that early exposure to fruits and vegetables, and to energy dense, sugary and fatty foods play a part in establishing a hierarchy of food preferences (Hearn, Baranowski, & Baranowski, 1998). However, children generally learn to prefer energy dense foods versus energy dilute foods (Birch, 1992; Birch, 1999). An evolutionary perspective could help explain why this is; it could be considered an adaptation to prefer foods that contain higher concentrations of energy during times when food is scarce (Birch, 1998) or to maintain the energy requirements of growing children (Birch, 1999).

Some innate preferences are present at birth, such as an affinity for sweet foods and an aversion for bitter and sour foods; others, such as salty foods, arise early in the infant's life (Birch, 1999). Food preferences are also learned through associative conditioning, wherein foods offered in positive conditions may increase affinity, while foods offered in negative contexts may decrease affinity (Birch, 1998). Associative learning also occurs via the physiological responses to food. Aversion can be learned through negative physiological responses, such as gastrointestinal illness (Garcia, Hankins, & Rusinak, 1974), while preference can be established through the association of particular flavors with "the pleasant postingestive signals generated by normal satiety" (Birch, 1999, p. 54). These signals involve the activation of such neurotransmitter systems as dopamine, opioid and benzodiazepine/GABA (Gibson, 2006).

Children eat what they like and what is familiar to them; typically, this is what is available and normative in their every day environments (Birch & Fisher, 1998; Cooke, 2007). Mothers tend to stock their homes with food that they like and eat, and this food environment shapes children's preferences (Birch & Fisher, 1998; Wardle, 1995). Mothers with limited economic resources have fewer options regarding food they provide for their families, and report choosing food that ultimately contributes to unhealthy diets due to their low cost (Wiig Dammann & Smith, 2009), proximity (Cummins & Macintyre, 2006) or fast and convenient preparation (Engler-Stringer, 2010). Low-income mothers are also likely to prepare meals that are of less complexity than middle-income mothers, which is accounted for by either a reduced selection from which to choose foods to cook or reduced food preparation skills (McLaughlin, Tarasuk, & Kreiger, 2003). Low-income women also report consuming unhealthy foods due to their convenience and ease of preparation, as well a lack of their own personal time and feelings of stress (Chang, Nitzke, Guilford, Adair, & Hazard, 2008).

Regardless of the varying degrees of food availability, the food preferences of children are demonstrated to be associated with the food preferences of their mothers (Horodynski et al., 2010). In a longitudinal analysis, Skinner et al. (2002) found significant correlations between foods liked, disliked and never tried between mothers and their children. Brown and Ogden (2004) examined snack food consumption and found that parents and children ate many unhealthy snack foods, and that there was a strong association between these groups for snacks in general and in the foods consumed during the last 24 hours. Even though there are some physiological components involved in food

preferences, children's learned food preferences are largely shaped through what foods are present in the environment and mothers' own food preferences.

Feeding Styles and Practices: Another way in which a mother influences her child's eating is the method or pattern of behavior by which she feeds her child (Moore, Tapper & Murphy, 2007). Two paradigms in the study of mothers' behaviors in relation to child eating and weight have emerged (Hoerr et al., 2009). Some researchers align an overall parenting style with a feeding style, while others focus on a prescribed set of feeding practices. Unfortunately, these different approaches have created some confusion in the research community (Hoerr et al., 2009), as researchers themselves often fail to make distinctions about which lens they are using to study the general theme of how mothers affect the weight of their child (Ventura & Birch, 2008).

Parenting styles are understood as the general type of attitudes and behaviors parents have that characterize their interactions with their child across domains (Darling & Steinberg, 1993). In general it is understood that, "Parenting styles have an indirect effect on children's outcomes: parenting styles moderate the effect of parenting practices because they influence the effectiveness of specific parenting practices" (Ventura & Birch, 2008, p. 3). Using Baumrind's (1966) parenting styles, several investigators have related these profiles to feeding styles and have used these classifications in their studies (Hughes, Power, Fisher, Mueller, & Nicklas, 2005; Patrick & Nicklas, 2005; Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2006). Authoritarian feeding (high demandingness/low responsiveness) is characterized by forcing a child to eat certain foods and to restrict other foods; this controlling style of feeding does not take into account a child's ability to choose or their specific preferences. A permissive feeding style (low demandingness/high

responsiveness) is distinguished by an unstructured feeding setting in which a child is allowed to eat whatever they desire while parents maintain sensitivity to the child. The authoritative style of feeding (high demandingness/high responsiveness) is typified as a compromise between parent boundaries and child choice, wherein a child is given choice to select foods from a variety of foods made available by parents (Birch & Fisher, 1995). Some have also included an uninvolved or neglectful feeding style (low demandingness/low responsiveness), which is characterized by a lack of control in the feeding scenario and limited involvement with the child (Birch & Fisher, 1995; Hughes et al., 2005; Rhee et al., 2006).

While studies exploring feeding styles are generally limited (Hoerr et al., 2009; Hughes et al., 2005), some results, albeit slightly inconsistent, have been obtained. As would be expected, Rhee et al. (2006) found that children of authoritarian mothers had the highest risk of overweight compared to children whose parents had different parenting styles. However, children of permissive and neglectful mothers were also at risk of being overweight, as it was found that these children were twice as likely to be overweight as children from authoritative mothers (Rhee et al., 2006). Contrary to what was expected, Hughes et al. (2005) found that children had significantly higher ratings of BMI when their parents were permissive in their feeding styles rather than authoritarian. Similarly at odds with what is typically found, Hoerr et al. (2009) found that children from a low-income population had better eating behaviors when their mothers demonstrated an authoritarian feeding style rather than an authoritative feeding style; also found was that children with the highest BMI scores tended to have parents who were permissive in style and children with the lowest BMI scores had parents who were authoritarian in style. Recent work by

Topham et al. (2009) included an examination of the moderating effects of maternal depressive symptoms and SES on the association of authoritarian and permissive feeding styles and child overweight. This cross-sectional examination of mothers of first-grade children found maternal depressive symptoms and income status moderated a permissive, but not authoritative, parenting style on child obesity. These differences could be due in part to the diversity of income and racial backgrounds in the families who participated in these studies. This sample of feeding style studies serves to indicate that highly controlling feeding styles are not always linked to higher child weight status.

In addition, there has been challenge in merely linking the four parenting styles to child weight status given the insignificant results found by some researchers. Blisset and Haycraft (2008) found no association between authoritarian parenting style and controlling feeding practices, but did find that permissive mothers tended to use a restrictive strategy and permissive fathers pressured their children to eat. Interestingly, they also found that parenting styles were not associated with child BMI. As further support to the idea that feeding styles do not always map onto Baumrind's (1966) taxonomy of parenting styles, Hughes et al. (2005) reported many inconsistencies when applying these categories to African American and Hispanic samples.

The more common way that researchers have studied how mothers influence their child's eating is through an examination of feeding practices (Hughes et al., 2005). Whereas feeding styles are more consistent, feeding practices are less apt to be characterized and can change depending on the context; this includes potential change according to different children in the same family, as well as a child's gender, age, weight status and eating behavior (Ventura & Birch, 2008). Parenting practices are regarded as behaviors parents

use to get their child to do something specific; in the context of the feeding scenario, feeding practices are used to encourage or restrict food consumption (Ventura & Birch, 2008). Specific practices to aid in these endeavors include modeling, repeating a child's exposure to a food, offering rewards, monitoring, pressure to eat, and food restriction (Baughcum et al., 2001; Birch & Fisher, 1998; Hoerr et al., 2009; Moore et al., 2007).

Restricting access to certain foods and pressuring children to finish their food (i.e. "clean your plate"), have been linked to eating in the absence of hunger, disinhibited eating, and overweight (Birch & Fisher, 2000; Birch, Fisher, & Davison, 2003; Faith et al., 2004; Fisher & Birch, 1999a; Fisher & Birch, 1999b; Fisher & Birch, 2002; Johnson & Birch, 1994). Some researchers speculate that the strongest link to weight gain in childhood is through the practice of dietary restraint (Fisher & Birch, 1999a; Faith et al., 2004). This practice involves restricting a child's access to a highly desirable food, which tends to increase consumption of the food after the restraint is removed. In relation to this is the idea that a high degree of maternal control during feeding translates to a child learning to pay attention to the amount of food on their plate and to disregard internal cues of hunger and satiety; a child's responsiveness to the caloric density of food is disrupted and can result in energy imbalances (Costanzo & Woody, 1985; Johnson & Birch, 1994; Birch & Fisher, 1998). This theory was explored in an intervention study by Johnson (2000), wherein children who had greater adiposity struggled with being able to improve in the regulation of their energy intake. However, the field is complicated by the differences in measurement, as some researchers tend to investigate feeding practices by focusing on specific domains (e.g. restraint) or through a general conceptualization of feeding control (eating all food on plate, eating only at mealtimes, encouraging child to eat foods good for

him/her, not allowing child to play with food, pushing the child to eat more, letting child control feeding interaction, etc.; Baughcum et al., 2001; Faith et al., 2004, Robinson et al., 2001).

As previously mentioned, there has been some disagreement regarding the finding that highly controlling feeding practices have detrimental outcomes on a child's weight status. The studies upon which the basic assumption that a mother's highly controlling feeding practices leads to a child's inability to regulate his energy intake and subsequent increase in adiposity has been concluded based on samples of mostly middle- to high-income Caucasian mothers (Birch & Fisher, 2000; Johnson & Birch, 1994). Therefore, there has been some speculation about the generalizability of these findings to other income or racial groups (Clarke et al., 2007; Faith et al., 2004; Hoerr et al., 2009; Robinson et al., 2001). For instance, Baughcum et al. (2001) utilized a sample of low-income and middle-income normal weight and overweight mothers and found that no particular feeding practice was associated with overweight in young children. Robinson et al. (2001) explored ethnicity and income by utilizing a diverse sample of third grade children and found no evidence to support the finding that controlling feeding practices were positively related to child BMI. Similarly, high levels of maternal control in feeding practices were not found to relate to child adiposity in several low-income samples of Hispanic children (Contento, Zybert, & Williams, 2005; Melgar-Quinonez & Kaiser, 2004). In a sample containing Caucasian and American Indian families, Topham et al. (2009) found permissive but not authoritarian parenting moderated child obesity among high SES mothers. Hughes et al. (2005) reported significant findings in their low-income sample of African American and Hispanic families, but it was the opposite of what had been found previously; a high degree

of feeding control resulted in children with lower BMI scores. Yet despite these exceptions, the predominance of the extant literature remains largely based on middle-class Caucasian samples and the consensus of several literature reviews is that of support for the association of maternal food restriction with higher caloric food intake and body weight in children (Clark et al., 2007; Faith et al., 2004). Nevertheless, more work is still needed to explore the connection between a controlling feeding practices and child obesity in economically and racially diverse samples.

BMI

Measurement of Body Weight: The measurement of adiposity, or body fat, can be assessed through several different methods. These methods vary in their complexity, accuracy and ease of administration. Direct measurement methods of body fat include underwater weighing, magnetic resonance imaging, computed tomography, and dual energy x-ray absorptiometry (DXA), bioelectrical impedus analysis and air displacement plethysmography. These methods are regarded as highly accurate estimates of body fat and are typically performed in laboratory settings (Lobstein, Baur, & Uauy, 2004). However, these methods are costly, complicated and potentially unsafe to children (Pietrobelli et al., 1998). Anthropometric data provide an indirect assessment of body fat. These methods include weight and weight for height, waist circumference and waist-to-hip ratio, skinfold thickness and BMI (Lobstein et al., 2004).

Of the anthropometric methods, the most commonly used way to approximate one's body fat in non-laboratory settings is through BMI (Whitaker et al., 1997). This is a ratio of weight in kilograms to the square of height in meters, and correlates with other measures of adiposity (Krebs, et al., 2003). For children, growth charts available through the Centers

for Disease Control and Prevention (CDC; 2009a) indicate that BMI between the 85th and 95th percentile for age and sex is considered overweight, and BMI at or above the 95th percentile is considered obese. Some advantages of using BMI to approximate body fatness are that it is affordable, safe, easy to obtain, and suitable for field studies (Pietrobelli et al., 1998). However, these methods are not a precise measure of fatness because they do not incorporate other component of a person's weight, such as muscle mass and bone weight, into the calculation (Krebs, et al., 2003). Despite this limitation, BMI has been validated as a fatness measure in children and adolescents through its strong association with DXA, the more stringent adiposity measure (Pietrobelli et al., 1998).

Relation of Child and Maternal BMI: Based on the shared food environment and genetics, one might suppose that the weight status of mothers and their offspring would be associated with one another. Studies investigating the association between the weight status of mothers and young children have been infrequent thus far, but of the studies that have been conducted, some inconsistencies have been found (Stunkard, Berkowitz, Stallings, & Cater, 1999). Stunkard et al. (1999) conducted a brief review of the literature and reported that nine out of 12 studies found a positive association between the body weights of newborns and mothers, yet during the first two years of life this became less clear as only three studies supported this association and five found no such association. Other investigators have also reported only insignificant to weak relations between a mother's weight and her young child's weight (Danielzik, Langnäse, Mast, Spethmann, & Müller, 2002; Stunkard, Burkowitz, Schoeller, Maislin, & Stallings, 2004; Whitaker, Deeks, Baughcum, & Specker, 2000).

Stunkard et al. (1999) noted that many colleagues were surprised by their finding that there was no association between the BMIs of parents and their two-year-old children, as the influence of genetic factors on obesity is hypothesized to be present throughout the life cycle. One explanation is that the genetic influences on the body weight of young children are different from the genetic influences on adult body weight; or, that the genes for obesity are expressed at different periods of human development (Stunkard et al., 1999). Lake, Power, and Cole (1997) found evidence that this weak relationship in early childhood regains strength in children above the age seven, though Cardon (1995) has suggested that the heritabilities of body fat becomes evident beginning at the age of three and stabilizes at the age of four.

Depression

Depression Overview in Adult Females: Similar to the etiology of obesity, depression is thought to arise from both environmental and genetic factors (Chazan-Cohen et al., 2007). Epidemiological studies define depression as a cluster of symptoms such as sadness, irritability, loss of interest in normal activities, difficulty concentrating, and changes in appetite, sleep, and energy levels in any two week period that cause impairment in functioning; national prevalence rates of depression for the US population in 2005-2006 are cited at 5.4%, with 6.7% of adult women reporting symptoms of depression (Pratt & Brody, 2008). Also reported was the finding that those who met the federal poverty level had higher rates of depression than high-income persons; the total rate of depression was 13.1% for people living in poverty versus 4.4% for people living at or above the poverty line (Pratt & Brody, 2008). Indeed, low-income mothers have been found to be at greater risk for depression than their middle- to high-income counterparts due to the stressors

associated with living in poverty (Petterson & Friel, 2001), and mothers eligible for EHS services may be more prone to dysfunction due to the challenges of raising young children in poverty (Aber, Jones, & Cohen, 2000). Chazan-Cohen et al. (2007) examined 17 geographically distributed EHS programs and found that 32% of mothers scored above the clinical cutoff for depression on the short form of the Center for Epidemiologic Studies Depression Scale (CES-D) when the target child was 36 months.

Maternal Depressive Symptoms and Food-Related Child Outcomes: Research associating depression and obesity in adults is ongoing (Heo, Pietrobelli, Fontaine, Sirey, & Faith, 2006; Simon et al., 2006; Strine et al., 2008). A population-based study revealed that young, overweight women were 44-80% more likely to have experienced depressed mood in the preceding two weeks than those who were not obese (Heo et al., 2006). Obese women also report additional kinds of distress. Overweight Caucasian women, but not African American women, reported feeling stigmatized and self-conscious on account of their weight and as a consequence, indicated some impairments in their social relationships in the workplace and in their personal lives (Blixen, Singh, & Thacker, 2006). These feelings seem to be ubiquitous in low-income samples, as overweight and obese low-income Caucasian and African American mothers also reported feelings of unhappiness, self-consciousness, anger, and depression when considering their body and weight (Chang et al., 2008).

Studies linking maternal depressive symptoms and child overweight have been relatively infrequent thus far (Surkan et al., 2008). In one of the few studies to date on this combined topic, Surkan et al. (2008) found in their low-income sample of mother-child dyads that depressed mothers were more likely to have 6-24 month old children who were

overweight. Ertel, Koenen, Rich-Edwards, and Gillman (2010) revealed that mothers who experienced postpartum depression had children with higher levels of adiposity when there children were three years of age.

Maternal depressive symptoms and feeding style has also been examined. Francis, Hofer and Birch (2001) found that mothers who reported higher levels of depression were associated with using higher levels of pressure in feeding their daughters and conveyed a more authoritarian parenting style. However, Topham et al. (2009) found that it was permissive, not authoritative, parenting that was a predictor of child obesity when mothers were depressed. Haycraft and Blisset (2008) explicated the role of depression in feeding such that for some parents, "Depression may relate to hostility in responding to children's signals and interference, such as overt pressure to eat, while for others it may be characterized by a withdrawal from interactions, characterized by parents' reduced involvement in feeding situation" (p. 485).

Aggression

Child Aggression Overview: Aggression in early childhood is of particular concern because it has been found to be stable throughout childhood and rarely arises spontaneously (Tremblay et al., 2004; Zahn-Waxler et al., 1990). High levels of physical aggression during infancy and toddlerhood track throughout childhood and can be linked to a number of problems in adolescence and adulthood (Tremblay et al., 2004). In general, there is support for purporting early aggression as an antecedent to antisocial disorders, drug abuse, violent crimes, depression, suicidal behavior, spousal abuse, neglectful and abusive parenting later in life (Elgar et al., 2004; Fergusson & Horwood, 1998; Hofstra et al., 2000; Loeber & Hay, 1997; Nagin & Tremblay, 1999).

Evidence of the stability of aggression has been found in early childhood. For instance, maladaptive aggression in two year olds was found to later predict externalizing problems when the child was five and six; interestingly, this pattern was more frequent and stronger in children of depressed than nondepressed mothers (Zahn-Waxler et al., 1990). Tremblay et al. (2004) tracked aggression in 17-month infants to 42-month children, with those most at risk of not learning to regulate their aggression from homes in which mothers had a history of antisocial behavior during their school years, became pregnant early, smoked during pregnancy, and came from low-income families.

Child Aggression and Maternal Depressive Symptoms: Maternal depressive symptoms and child emotional and behavioral problems commonly co-occur and, as such, these associations have been frequently investigated (Goodman & Gotlib, 1999; Elgar, McGrath, Waschbusch, Stewart, & Curtis, 2004). There are numerous detrimental effects upon the offspring of mothers who have depression (Goodman & Gotlib, 1999). Dickstein et al. (1998) found that depressed mothers had poorer quality of interactions with their children, and families with maternal mental illness were distinguished by overall unhealthy family-unit functioning. Additionally, children of depressed mothers were found to be more likely to suffer from an affective disorder than other children, and be at greater risk of cognitive and language difficulties, insecure attachments, problems with emotional regulation, low self-esteem, social skills, and behavioral problems (Gladstone & Beardslee, 2002; Goodman & Gotlib, 1999; Pilowsky et al., 2006; Zahn-Waxler, Iannotti, Cummings, & Denham, 1990). Many of these psychiatric problems persist into adulthood; the risks for psychopathology such as anxiety disorder, major depression, and substance abuse were

greater for children of depressed parents than children of nondepressed parents (Hofstra, Van der Ende, & Verhulst, 2000; Weissman et al., 2006).

Using the CBCL, Black et al. (2002) found that maternal depressive symptoms was significantly correlated with child externalizing (r = 0.38) and internalizing problems (r = 0.32) in a sample of young, low-income mothers with preschool children. According to Elgar et al., (2004) depressed mothers are thought to engage in "Parenting behavior that is too intrusive or withdrawn, which may trigger a disruptive outburst in the child, which the depressed mothers have difficulty managing, thereby exacerbating the child's behavior, and so on" (p. 445). Some investigators found that maternal depressive symptoms preceded the onset of child adjustment problems (Forehand & McCombs, 1988; Elgar, Curtis, McGrath, Waschbusch, & Stewart, 2003), which can include child aggression, but others speculate whether or not maternal depressive symptoms and child aggression are bidirectionally related and what, if any, other mediating influences exist (Elgar et al., 2004; Malik et al., 2007). Malik et al. (2007) investigated this issue and conducted a path analysis of maternal depressive symptoms, child aggression, and other ecological factors among EHS families; their models were found to be an adequate fit to the data and thus supported both direct and indirect pathways linking these variables bidirectionally. Regardless of the directionality of these variables, Elgar et al. (2004) suggested in their review of the literature that higher rates of maternal depressive symptoms and child aggression in low-income samples result in stronger associations of these symptoms in these families.

One plausible explanation for the relation between impaired maternal mental health and child behavior problems arises from the study of food insecurity. Findings from non-human primate studies suggest that food insecurity in humans leads to maternal emotional

distress, such as symptoms of anxiety and depression (Andrews & Rosenblum, 1994). This stress impairs mother-child interactions and contributes to behavior problems (Andrews & Rosenblum, 1994; Lindberg, Bohlin, Hagekull, & Palmerus, 1996; Rosenblum & Paully, 1984). One such examination of food security in which maternal mental health and child mental health was investigated revealed a prevalence of behavior problems among three-year-old children. These behavior problems increased with the level of maternal food insecurity, as did the prevalence of depression and anxiety in mothers after one year (Whitaker, Phillips, & Orzol, 2006). Thus, mental health problems in both women and children seem to be more common when food is insecure.

Child Aggression, Body Weight and Parental Feeding: Limited information is available investigating the relation between weight status and aggression in children. Bradley et al. (2008) conducted one of the few studies that included data on young children and found that from age two to grade six, there was no association between BMI and externalizing problems as measured by the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000). However, in another examination using the CBCL problem scales, 5-10 year old overweight African American children were reported by their parents to be increasingly more aggressive; that is, aggression scores increased between the overweight, obese, and super obese groups (Young-Hyman, Schlundt, Herman-Wenderoth, & Bozylinski, 2003). Utilizing an even older sample of overweight and normal weight 10-15 year olds, parents and teachers reported more problem behaviors in overweight children, but no information regarding the CBCL problem scales was communicated (Stradmeijer, Bosch, Koops, & Seidell, 1999). Similarly, an examination of 9-12 year old clinical obese, nonclinical obese, and normal weight children found that only the clinically obese children had significantly

higher scores than the other two groups on the total and externalizing scores of the CBCL (Braet et al., 1997). One interesting finding revealed through a longitudinal research design was the finding that large body size at age three, in addition to stimulation-seeking and fearlessness, was significant in the prediction of parent-rated aggression at eleven years. In this sample, aggressive children at age three were found to be significantly taller, heavier, and bulkier than nonaggressive children, but this finding was not replicated when these children were eleven years old (Raine, Reynolds, Venables, Mednick, & Farrington, 1998).

There is some evidence linking aggression to issues pertaining to child feeding. In a 2005 study, Lewinsohn et al. linked problematic child behaviors to feeding and eating problems. It was found that the struggle for control factor in feeding was significantly associated with the externalizing behavior problems described in the CBCL, with children who had higher BMI being associated with increased conflict. One of the few studies in which child behavior and diet were examined revealed some evidence linking 4 ½ year old children who ate more junk food per week as being at greater risk for behavioral problems at seven years. Unfortunately, the authors did not include measures of child adiposity (Wiles, Northstone, Emmett, & Lewis, 2009). A study comprised of low-income mothers depicted a link between food and child problem behavior as a result of mothers' use of food to shape children's behavior (Baughcum et al., 1998). In this study, mothers tended to use food to quiet crying babies or to calm a child's temper tantrum, not to satisfy hunger. These mothers also tended to set few behavioral limits for their children; one of the results of this was that children were able to eat what, as much and whenever they wanted. These authors did not gather data pertaining to adiposity or child behavior, which could have allowed for statistical inference about the relations between these factors. Lewinsohn et al.

(2005) recognized this gap in the literature and surmised that it was important to determine whether or not the symptoms of children with problematic eating behaviors was embedded in the context of other concurrent psychopathology.

Summary

When considering a mother's influence on her child's eating, most obesity prevention programs tend to focus on what children are being fed instead of how they are being fed. In addition, experts focus on feeding problem behaviors as risk factors for eating and weight disorders (Lewinsohn et al., 2005). Targeting mothers' feeding practices directly is a less common approach (Clark et al., 2007). Given the various links between controlling feeding practices, maternal depressive symptoms, overweight, and child aggression (Birch & Fisher, 2000; Birch et al., 2003; Fisher & Birch, 1999a; Fisher & Birch, 1999b; Fisher & Birch, 2002; Goodman & Gotlib, 1999; Elgar et al., 2004; Johnson & Birch, 1994; Surkan et al., 2008; Young-Hyman et al., 2003), these variables warrant examination when considering the context of a child's home food environment. The study presented here examined the relation between maternal feeding practices, maternal depressive symptoms, child aggression, and adiposity in a low-income sample. I hypothesized that controlling feeding practices were linked to child overweight and aggression in low-income families. This study expanded on previous literature by including measures of child aggression, maternal depressive symptoms, and maternal weight status to a model of maternal feeding practices and child BMI (Appendix A). These findings may be applicable to the goal of forestalling escalating rates of obesity and inform treatment programs for a low-income population.

METHODS

Early Head Start Research and Evaluation Project Data Set

The data used for the present study was a subset of the local component of the Early Head Start Research and Evaluation Project, a large, evaluation of a nationally representative sample of EHS centers throughout the United States (Schiffman et al., 1996). This national undertaking was funded in three phases. The Birth to Three Phase (1996-2001), included three components: an evaluation of the impacts of EHS on specific child and family outcomes, a measurement of how EHS centers implemented program standards, and various research initiatives administered by university-based investigators. The Pre-Kindergarten Follow-Up Phase (2001-2005) was designed to answer questions raised by participation in EHS; the same university researchers built on their earlier research and tracked children and families from the time they left EHS until they entered kindergarten. The Elementary School Follow-Up (2005-2010) was administered by the testing organizations from the first phase and measured children, families and teachers on various measures as the former EHS participants entered their fifth or sixth year of elementary school (Schiffman et al., 1996). The data presented in this study are from the first phase of the project when children were birth to three years.

Michigan State University partnered with the Early Head Start Program of the Community Action Agency in Jackson, Michigan, resulting in the longitudinal studies Pathways Project: Research into Directions for Family Health and Service Use (1996-2001) and Pathways Project II: Research into Directions for Family Health (2001-2005; Schiffman et al., 1996). The data from which the current analysis was based upon was drawn from the initial investigation. The project was designed to examine family health status and program

and service utilization, which was measured using qualitative and quantitative instruments assessing various aspects of family health (Schiffman et al., 1996).

Participants

Families in contact with local family health centers and other community agencies, and who were eligible for EHS services, were recruited for participation in the study (Schiffman et al., 1996). Complete data was available for 119 participants.

At enrollment, mothers (n = 119) were an average age of 22.2 ± 4.7 years (15.2-36.9 years) and at 36 months children were an average age of 38.4 ± 2.1 months (35.2-45.4 months). There were slightly more male children in the sample (52.9%). Mothers reported their child's ethnicity as Caucasian (67.5%), African American (15%) or other ethnicity (17.5%). Mothers reported that they were Caucasian (75.2%), African American (15.6%), or other ethnicity (9.2%). For education, 44.9% of mothers reported having less than a high school education, 33.6% were high school graduates, and 21.5% had some college education. Most mothers were single and never married (47.2%); the remainder was married (14.8%), cohabiting (20.4%), or separated, divorced or widowed (17.6%). As previously stated, participants were required to be eligible for Head Start services, and were therefore all low-income. All participants were included in the present study.

Procedures

Data was collected through parent interviews and reviews of medical records of both parent and child. The survey was conducted when the target child was 36 months of age. Interviews were conducted by trained data collectors in the homes of the participating families, which was an appropriate methodology for gathering such data (Love et al., 2005).

Measures

To measure mothers' behaviors about food delivery, appropriate questions from the Health (Appendix B) and the Are You Ready For Fruits and Veggies? (Appendix C) sections of the Pathways Project survey were analyzed. A confirmatory factor analysis was conducted with the goal of identifying factors in this survey that summarized the questions about mothers' feeding practices. A maximum likelihood extraction method and a promax with Kaiser normalization rotation method was utilized. Results of the factor analysis indicated that two components should be extracted: Food Control and Meal Patterns (both with Eigenvalues above 1.5). The correlations of variables with each of the components are presented in Table 1 (Appendix D).

Food Control: This factor was derived from several questions from the Health section of the Pathways Project survey. These questions were based on the different types of decisions mothers make regarding their child's food intake, which included serving size, allowing for hunger based eating, trying all foods at least once, having a child eat all their food, and allowing a child to decide on the quantity of food consumed. Responses were scored on a five point Likert-type scale, with responses ranging from never to always.

Meal Patterns: This variable was derived from several questions from the Health and Are you Ready for Fruits & Veggies? section of the Pathways Project survey. These questions tapped the various types of practices mothers could use to structure meals, which included the time meals take place, variety of food available, seating requirements, and the mother's own eating practices. Some responses were scored on a five point Likert-type scale, with responses ranging from never to always, while questions having to do with frequency of intake were scored either 0-5+ or 0-7.

Child Aggression: Child aggression was measured using the aggression subscale from the CBCL for ages 1 ½ to 5 years (Achenbach & Rescorla, 2000) (Appendix E). This subscale contained 19 questions and included such items as, "Has temper tantrums", "Easily frustrated", and, "Wants a lot of attention." These and the other questions pertinent to aggression are integrated into the larger 100-item instrument, which is intended to measure a child's behavior and emotional problems (Achenbach & Ruffle, 2000). This measure is completed by a child's caregiver and is based on their child's behavior during the preceding two months. Respondents are prompted to assign a number from 0-2 for each item based on how accurately the item describes their child's behavior. The sum of each of the syndrome scales is interpreted alongside the percentiles based on the national normative sample. Scores below the 95th percentile are in the normal range, scores above the 98th percentile are in the clinical range, and scores in between this range are regarded as an area of concern (Achenbach & Rescorla, 2000). Reliability for the CBCL 1 ½ - 5 is high, with a reported mean *r* of .85 across all scales, and the construct validity of the problem scales is well established (Achenbach & Rescorla, 2000).

Maternal Depressive Symptoms: Maternal depressive symptoms was measured using the CES-D (Appendix F). The CES-D is a self-report scale that measures the degree of depressive symptoms experienced over the past two weeks (Radloff, 1977). The scale focuses on affective components like depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite and sleep disorders. Answers to 20 questions are provided along a five point Likert-type scale, with responses ranging from none of the time to most of the time (Radloff, 1977). The CES-D is reported to have high internal consistency in the general population with Cronbach's

alpha coefficient of .85, while concurrent validity with other self-report measures of depressive symptoms has been adequately demonstrated (Radloff, 1977).

Child BMI: This variable was calculated using child height and weight data available in the Pathways Project dataset; this data was obtained through parent report or through medical record examinations when parents did not provide these figures. Additional information needed to calculate BMIs for children included the child's birth date, the date of measurement, and the child's gender. This information was inputted into the CDC's Child BMI Tool for Schools, which is an excel spreadsheet that generates the corresponding BMI and BMI percentiles (Centers for Disease Control and Prevention, 2009a). Child BMI percentiles were used in the current analysis.

Maternal BMI: This variable was pre-calculated and directly available in the Pathways Project dataset. Information that is necessary to compute scores for adults over 20 years includes height, weight, age, and gender; the current project utilized self-reported figures of height and weight. BMI can be easily calculated through specific computer programs, such as the CDC sanctioned Epi Info program, or by using the Adult BMI Calculator on the CDC website (Centers for Disease Control and Prevention, 2008).

Analysis

Out of 198 participants, cases were excluded if there were data missing from the food control and meal patterns variables. Cases were further reduced if they contained missing data from the BMI variables (maternal BMI = 12 missing; child BMI = 18 missing). Accurate data imputation was not possible given the confines of the data set (i.e., no previous or similar data to base an imputation), and thus, cases missing these key variables were not included in the final analyses. No data was missing from the depressive symptoms

and aggression variables. The total number of cases that contained complete data for all of the variables was 119.

The research question in the present study was examined using archival data from the Pathways Project. A power analysis using NIESEM software was conducted to examine the appropriateness of the theoretical model (Appendix A) linking mother's controlling feeding practices and meal patterns, maternal depressive symptoms, maternal BMI, child BMI, and child aggression for path analysis. Based on 119 participants, the estimated power was 0.1363. Thus, even for a small effect size (0.20) the model was underpowered for utilizing this analytical technique. Indeed, the low number of participants in the current study was implicated in the relative lack of power in this model. For a small effect size of 0.2 the required number of participants would have been 192. Thus, the theoretical model of the relations between maternal feeding practices, maternal depressive symptoms, maternal BMI, child BMI and child aggression were investigated using bivariate correlations and regression.

Given the sample size, the relations between the variables of interest were investigated using bivariate correlations and regression. Descriptive statistics were calculated for all variables and were examined for skewness and kurtosis. A distribution was considered nonnormal if the ratio of skewness or kurtosis to its standard error was less than -2.00 or greater than 2.00 (Tabachnick & Fidell, 1996). All analyses were conducted using SPSS version 17.0

RESULTS

Descriptive Statistics

Descriptive statistics of all the variables were tabulated and are presented in Table 2 (Appendix G).

To gain greater clarity of the sample composition, the crosstabs function was used to obtain counts and percentages for each level of the variable for mother and child data. The information pertaining to mothers, BMI, and depression are presented in Table 3 (Appendix H). The information pertaining to children, BMI, and aggression are presented in Table 4 (Appendix I). Percentages were calculated based on the total sample size of 119.

Bivariate Correlations

The associations between each variable were obtained using Zero-order Pearson's correlation analyses. The results of these calculations are presented in Table 5 (Appendix J). The variables that were significantly correlated with one another were maternal depressive symptoms and child aggression (r = .21, p = .025) and maternal depressive symptoms and meal patterns (r = -.21, p = .020).

Regression

Regression analysis was used to test the relation between several maternal variables on child health outcomes. Maternal depressive symptoms were a significant predictor of child aggression ($t(1)$ = 2.28, p = .03, R^2 = .04,) and maternal depressive symptoms significantly predicted meal patterns ($t(1)$ = -2.36, p = .02, R^2 = .05). However, the low R^2 values indicated that these models only accounted for 4% and 5% of the variability in the outcome variables; a very small amount. Multiple regression models were tested including maternal depressive symptoms, food control, and meal patterns as

independent variables to predict child BMI and child aggression separately; neither model was significant (.77(3) =2.31, p = .51, R^2 = .02; 2.25(3) = 6.75, p = .09, R^2 = .06). Maternal BMI was not a significant predictor of child BMI or child aggression.

DISCUSSION

Results of the present study replicated previous work by identifying a significant relation between maternal depressive symptoms and child aggression and provided an important new addition to previous work by identifying a significant relation between maternal depression and maternal meal planning filling an important gap in the literature. A comparison between the present sample and a national sample on BMI, maternal depression and child aggression is provided to highlight the frequencies of this sample of low-income mothers and children against national prevalence rates.

Maternal Depressive Symptoms and Child Aggression risk

This study provides a replication of previous work by identifying a positive relation between maternal depressive symptoms and child aggression among low-income mothers and their three year olds (Black et al., 2002; Elgar et al., 204; Goodman & Gotlib, 1999; Malik et al., 2007; Zahn-Waxler et al., 1990). In the current study maternal depression predicted children's aggression indicating an important influence from maternal mental health to child mental health. As previous work has noted, this is important because aggression tends to extend into adulthood (Tremblay et al., 2004) and is associated with numerous negative outcomes, like violent crimes, substance abuse, and psychological and social impairments (Elgar et al., 2004; Fergusson & Horwood, 1998; Hofstra et al., 2000; Loeber & Hay, 1997; Nagin & Tremblay, 1999). It is important to note that in the current study, this relation was found in a non-clinical sample of low-income mothers and children which reinforces a smaller body of work (e.g., Black et al., 2002; Malik et al., 2007).

Maternal Depressive Symptoms and Meal Patterns

To our knowledge this is the first study to investigate the relation between maternal depression and meal patterns. According to our data, maternal depressive symptoms predicted the ways in which mothers prepare and organize meals for themselves and for their young children. Specifically, as maternal depressive symptoms increased, a mother's ability to organize and structure meals for herself and her child decreased. Behaviors included in the meal patterns measure involved meal planning for both the mother herself (e.g. servings of vegetables consumed per day, consistent time at which food is eaten) and for her child (e.g. offering child a variety of healthy foods to eat). Therefore, according to these data depressive symptoms inhibited how mothers engaged in the feeding of their young children, both directly (by how they fed their child) and indirectly (by how they fed themselves and modeled eating behaviors). Based on these data, it is clear that maternal depressive symptoms has important implications for children's development of appropriate mealtime habits. Indeed, maternal modeling of food consumed is a strong predictor of children's own food consumption (Cooke et al., 2008; Horodynski et al., 2010), as foods consumed by parents and children tend to be correlated (Brown & Ogden, 2004; Skinner et al., 2002) and mothers tend to purchase foods and prepare meals that they find appealing (Birch & Fisher, 1998; Wardle, 1995). Therefore, when mothers are depressed they are less likely to model the consumption of healthy foods or plan and prepare organized family meals. Further, as depression increased, a mother's capacity to engage in appropriate meal pattern activities decreased. For example, when mothers are depressed, they are less likely to prepare healthy meals with multiple food choices for their children or

follow generally accepted healthy food guidelines (e.g. eating breakfast, eating fruits and vegetables, sitting while eating).

Previous work has identified several negative consequences of maternal depressive symptoms on a child's psychological development (Gladstone & Beardslee, 2002; Goodman & Gotlib, 1999; Pilowsky et al., 2006; Zahn-Waxler et al., 1990). Certainly, depression also impacts a parent's ability to fulfill other parenting responsibilities, including general household management. For instance, depressed parents have been found to be less likely than nondepressed parents to optimally interact with their child, which included such activities as reading, playing, teaching, and setting behavioral limits (LaRosa, Glascoe, & Macias, 2009). Taking into account children's medical management, it was found that depressed mothers were more likely to report less diligence in adhering to their child's asthma therapy and difficulties communicating with their doctor more than nondepressed mothers (Bartlett, Krishnan, Riekert, & Butz, 2004). Depressed parents also have difficulty managing the development of their child's extended social networks, as these parents may not lend support to their child's involvement with events or others beyond the immediate family (Zahn-Waxler et al., 1990). In a study assessing quality of life in depressed adults, those who were depressed reported lower levels of quality of life than nondepressed adults, and reported that they were more likely to have daily periods in which they did nothing and be less engaged in their work activities (Barge-Schaapveld, Nicolson, Berkhof, & deVries, 1999). Considered all together, these findings suggest that mothers with depression tend to be less engaged in their daily activities. Findings from the present study add to this wealth of knowledge regarding family and household management by indicating that mothers with depression are less proficient than nondepressed mothers at family food

management, an essential component of children's health and wellbeing. This important finding extends our knowledge of the impact of maternal depressive symptoms beyond influencing children's socioemotional and cognitive development to inhibiting children's physical development as well.

In the current study, maternal depressive symptoms was negatively associated with meal patterns. Therefore, mothers who were depressed were less likely to eat at the same time every day, less likely to offer a child a variety of foods to eat such as fruits, vegetables, cereals and dairy, less likely to be seated at a table when they ate meals, and less likely to consume recommended intakes of fruit or fruit juice, vegetables and breakfast provisions. This finding has important implications for children's development because low scores on meal patterns resembles a neglectful feeding style. A neglectful feeding style is characterized by unstructured feeding sessions and limited involvement with the child (Hughes et al., 2005; Rhee et al., 2006). A mother's neglectful feeding style may result in the maintenance or development of poor eating habits for herself and her children, such as frequent snacking, eating and serving quick pre-processed meals, and permitting children to prepare or retrieve these convenience foods themselves (e.g., Easy Mac, Lunchables, etc.). This finding is of great concern because children of neglectful or permissive mothers are at risk of overweight (Rhee et al., 2006) or lower intakes of nutrient dense foods (Hoerr et al., 2009). Although the results from this study found no association between maternal depressive symptoms and child obesity at age three, previous work has established this connection with slightly older samples of children. Topham et al. (2009) found that first grade children whose mothers were depressed and employed a permissive feeding style were more likely to be obese than children from non-depressed mothers. Therefore, one

could hypothesize that having a depressed mother could be a risk factor for obesity in middle childhood (Topham et al., 2009). The optimum age at which to intervene in a depressed mother's food management system, with the goal of preventing child obesity and the complications that arise from living overweight, is at least during early childhood, if not earlier.

The findings of this study are even more concerning due to the low-income status of the mothers and children who participated in this study. Low-income mothers, already at greater risk of depression than their middle- to high-income counterparts (Chazan-Cohen et al., 2007; Petterson & Friel, 2001; Pratt & Brody, 2008) may be in further peril of developing poor self and child feeding strategies given their increased likelihood of depression. It is important to note, that although these mothers were of low-income status, they were not a clinically depressed sample. So even small variations in depression within a non-clinical sample impeded mothers' ability to provide planned meals for themselves and their child.

Previous work has identified a relation between maternal mental health and compromised feeding processes. For example, Bronte-Tinkew, Zaslow, Capps, Horowitz, and McNamara (2007) found that food insecurity influenced parents' depression, which in turn negatively affected parenting practices and decisions regarding infant feeding. Cooper, Whelan, Woolgar, Morrell, and Murray (2004) conducted a study composed of mothers with eating disorders and their approximately 4 ½ year old children and found that mealtime disorganization was strongly associated with child feeding problems. In an investigation of mother, child and family factors in childhood obesity, De Sousa (2009) compared obese and normal weight boys and found that in the obese group, mothers were

more depressed and anxious, scored higher on the laxness and verbosity in parenting style scale, and allowed their children to eat more meals per day, eat more meals away from home, watch more television and consume more soft drinks. Clearly many differences exist in the design of these studies, but in all of these instances the common factor appears to be that mothers with poorer mental health have compromised family feeding management systems.

Sample versus National Composition

National prevalence rates of obesity, depression and aggression were compared to the prevalence rates of the participants from the present study. The composition of this sample was examined through the crosstabs function in SPSS, which produced a breakdown of the frequencies and percentages of mothers and children according to their weight status and respective measure of mental health. These figures are presented in Table 3 and Table 4.

The percentage of obese children in this sample was greater than the latest national estimate of children with a BMI greater than the 95th percentile, but the percentage of overweight children was lower than the national estimate of children with a BMI between the 85th and 95th percentile (Ogden et al., 2010). These figures were 30.3% versus 10.4%, and 15.1% versus 21.2%. The finding that there were more obese but fewer overweight children than the national averages may be explained by the fact that the figures for the current study were based on the BMI percentiles for three years olds, unlike the national estimates which were based on data for two to five year olds. The discrepancy in ages limits comparison between these two groups.

The percentage of obese mothers in the current sample was slightly below the national average (Flegal, Carroll, Ogden, & Curtin, 2010). The national average of obesity (BMI equal or greater to 30) in 2007-2008 for women over the age of twenty was reported to be 35.5%; for this sample, this rate was 31.1%. Rates of overweight adults were reported in combination with rates of obesity; national estimates of the percentage of adults with a BMI greater than 25 and less than 30 was not individually reported (Flegal et al., 2010), which prevented comparison with the current study's estimate of overweight women.

National rates of clinical scores of aggression in young children were not located to facilitate comparison with the findings from the current analysis. The most analogous statistics available were from archival data including over 30,000 children visiting pediatricians from 1979-1996; final estimates of psychosocial problems revealed that 7.5% of four to fifteen year old children were reported to have behavioral/conduct problems when presenting to a physician (Kelleher, McInerny, Gardner, Childs, & Wasserman, 2000). In the current study, 1.5% of children were reported to have clinical scores of aggression; this was well below the rate of 7.5%, yet a few key issues prevent these rates from being truly comparable. One such issue is that children in the Kelleher et al. (2000) study were older and the age range was much wider than the three year olds in the current study. In addition, the use of a different assessment tool to measure child internalizing and externalizing problems was different than what used in the present study.

Consistent with the literature (Petterson & Friel, 2001), the low-income women in this study were similarly depressed compared to the national estimates of women who were depressed. Approximately 8.4% of mothers in the current sample scored in the upper range of the CES-D, while the latest NHANES data available involving depression found

6.7% of women reported symptoms of depression when measured by the Patient Health Questionnaire (PHQ-9; Pratt & Brody, 2008). However, this figure of 8.4% is well below the rate of 32% found by Chazan-Cohen et al. (2007) for EHS mothers.

Limitations

There are several reasons as to why the expected associations between certain variables were not found. These possibilities are discussed in variable specific sections.

Controlling Feeding Practices and BMI: One of the main goals of this study was to shed light on the issue of whether or not mothers' controlling feeding practices were linked to higher BMI in children in a low-income sample. In general, there was no support for this association through the results of the bivariate correlation analysis or regression analysis.

However, despite the absence of significant findings, it would be remiss to say that controlling feeding practices were unequivocally unrelated to adiposity in this low-income sample of mothers and their three-year-old children. Though controlling feeding practices and child adiposity could simply be unassociated in low-income samples in general, the association might only become evident as a child increases in age, which the current study would be unable to assess given its 36-month time point. Children might be affected by controlling feeding practices at three years of age, but because decreased sensitivity to internal signs of hunger and satiety is proposed to occur over time (Johnson & Birch, 1994; Birch & Ventura, 2009) disinhibited eating and overweight may only be evident in the later years of childhood. Though children from the age of three years have been found to have an increased desire to consume a food that had been restricted or if they had mothers who were restrictive in their feeding practices (Fisher & Birch, 1999a; Fisher & Birch, 1999b; Johnson & Birch, 1994), previous work has confirmed the link between controlling feeding

practices (which include restriction) and overeating and overweight when children are five through nine years of age (Birch & Fisher, 2000; Birch, Fisher, & Davison, 2003; Fisher & Birch, 2002).

Food control did not yield any significant findings in the bivariate correlation analysis or the regression analyses. This lack of significance may be in part due to issues surrounding the measurement of controlling feeding practices. The current study measured a generalized conceptualization of controlling feeding practices, which included such questions as "How often does your child decide how much to eat at meals?" and, "How often do you give your child the same amounts of food you give yourself?" The survey questions from which food control was based seemed to tap the concept of feeding practices identifying high face validity however, evidence of content validity and reliability was unavailable for the measure. Further, this measure was a general measure of feeding practices. A meta-analysis of feeding behaviors and weight by Faith et al. (2004) found that studies that employed a general measure of controlling feeding practices were significantly less likely to be positively associated with child adiposity or energy intake than studies that tapped the specific practice of feeding restriction. Previous work has linked the measurement of restriction of access to palatable foods to elevated levels of BMI (Birch & Fisher, 2000; Birch et al., 2003; Fisher & Birch, 2002); the lack of questions pertaining to restriction thus may have been part of the reason why there was no association between food control and BMI. If the dimension of food restriction had been included, preliminary findings could have laid the groundwork for further longitudinal study of the predictive effect of restrictive feeding practices when these low-income children matured in age. Frequently employed in the study of feeding style and feeding practice is the Child Feeding

Questionnaire (CFQ; Birch et al., 2001), which contains questions that measure restriction, including "I have to be sure that my child does not eat too many sweets" and, "I intentionally keep some foods out of my child's reach." None of the questions in the Pathways Project survey resembled these kinds of questions, which may have accounted for the lack of association of control with child BMI.

Maternal and Child BMI: There was no significant association between maternal and child BMI in the bivariate correlational analysis. This finding supported the assertion by Stunkard et al. (1999) that mother and child BMI are unrelated when a child is two years and extends this finding by one year to three years. This finding is contrary to the suggestion by Cardon (1995), who held that these variables should be significantly linked beginning at the age of three years. As previously stated, this claim has not been found to be corroborated by others, and Lake et al. (1997) found this connection beginning when children were seven years old. However, the low-income status of mothers and their children might provide some rationale as to why no relation was found. Given that this sample contained fewer overweight and obese mothers and greater obese children than is reported in the national estimates (Ogden et al., 2010; Pratt & Brody, 2008), it might be plausible that mothers ensured that their children were sufficiently fed before feeding themselves, thus creating a wider than expected disparity between their measures of adiposity. Perhaps children's participation in EHS, a program which targets children's health and nutrition, provided them with additional calories that were unavailable to mothers.

Secondly, the height and weight figures used to tabulate BMI of mothers and children were based on self-report, and thus, presented concern regarding validity. While

self-report of height and weight is deemed acceptable for use in epidemiological studies, it remains that height tends to be overestimated and weight tends to be underestimated in adults (Engstrom, Paterson, Doherty, Trabulsi, & Speer, 2003; Gorber, Tremblay, & Moher, 2007). This schism impacts BMI calculations; in one study using self-report data, 22.4% of men and 18% of women were grouped into the wrong BMI categories (Spencer, Appleby, Davey, & Key, 2001), which may be why the frequencies in the current study did not reflect the national data set. Mothers might underreport their weight either due to lack of accurate knowledge or because of the social desirability for women to be thin in America (Gorber et al., 2007; Grabe, Ward, & Hyde, 2008). The anthropometric data obtained for children was also provided by mothers on an ad hoc basis. In the cases where these figures were unattained from mothers, researchers gathered this data from medical records. This strategy improved the completion and accuracy of the BMI variable, yet those whose anthropometric data were provided from medical records were not differentiated in the dataset. Therefore, it was not possible to sort child BMI by the source of the height and weight figures. These concerns call to question the veracity of the findings in which the BMI measure was used.

Future Research

Previous work on feeding practices and adiposity has infrequently included mental health variables like maternal depression. However, as the results of the present study suggest, these seem to be important variables related to maternal feeding practices. The few feeding practice studies that have measured maternal depressive symptoms (Blissett et al., 2007; Haycraft & Blissett, 2008) have not included child internalizing and externalizing symptoms in their analyses. Findings of the study presented here provide

new evidence that maternal mental health status is an important variable to consider in studies of feeding practices, particularly in light of the previously established link between maternal feeding practices and later weight gain in children (Birch & Fisher, 2000; Birch et al., 2003; Fisher & Birch, 2002). Due to the complex interworkings of the multiple variables implicated in children's physical health outcomes future work should investigate the relations among these variables using an analytical strategy capable of assessing the relation between multiple variables simultaneously. These strategies (e.g., Structural Equation Modeling) remain uncommon statistical approaches used in feeding practice studies.

Future research should build on the theoretical model proposed here and include more than one standardized measure for each of the variables of interest. Adiposity could be additionally measured through the inclusion of skinfold tests or exclusively through the more sophisticated methods such as DXA or via the direct measurement (vs. self-report) of weight and height. Feeding practices could be better evaluated by employing the frequently used CFQ (Birch et al., 2001) and observational tools of actual mealtime practices, such as Bob and Tom's Method of Assessing Nutrition (BATMAN; Klesges et al., 1983) or the Mealtime Family Interactions Coding System (MICS; Dickstein, Hayden, Schiller, Seifer, & San Antonio, 1994). As noted before, measurement of controlling feeding practices should include survey items related to restriction of palatable foods because of the significance of this practice to body weight findings (Fisher & Birch, 1999a; Faith et al., 2004). In addition, observational tools could note the presence or absence of particular feeding behaviors in real time. Future work should broaden the scope of maternal mental health and include measurement of anxiety, such as the Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, &

Steer, 1988) and eating disorders, such as the Eating Disorders Inventory-2 (EDI-2; Garner, 1991); child outcome variables could be expanded to include measurement of temperament and self-regulation to be included as mediators between maternal feeding practices and child BMI. Theoretically, it may be that self-regulatory skills are influenced by maternal feeding practices or that high self-regulation might act as a protective factor against overeating.

Additional concern stems from the cross-sectional nature of the majority of studies that have investigated feeding practices, with few investigators exploring the topic through other methodologies (Moens, Braet, & Soetens, 2007; Ventura & Birch, 2008). Some researchers have questioned the generalizability of the finding that excessive maternal control in child feeding is linked to greater adiposity when employing low-income or racially diverse samples (Clarke et al., 2007; Faith et al., 2004; Hoerr et al., 2009; Hughes et al., 2005; Robinson et al., 2001). While the findings of this study do not allow one to conclude that there is no association between controlling feeding practices and weight status in low-income samples, long-term follow up is nevertheless needed to investigate this link when these low-income children are older. Such a study would wisely utilize standardized medical devices to measure height and weight to derive adult and child BMI, such as the commonly accepted wall stadiometer and balance beam scale (Malina, 1995).

Implications

One of the most compelling findings of the study was the association between maternal depressive symptoms and meal planning. Programs linked to positive nutrition outcomes are well established, but few include considerations for mother and child mental health in their curriculum. An example of an existing well-known intervention program

involving nutrition education is the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). WIC is a federal initiative implemented by state agencies aimed at providing low-income mothers of young children with supplemental nutritious food, health education, and high-risk nutrition counseling (Food & Nutrition Service, 2010). While WIC is also mandated to provide referrals to other health and social services, what is unknown is if and how frequently participants are referred onwards for mental health services and if participants follow-up with these services. Conversely, there is no known federal initiative that seeks to prevent the onset of depression; a rationale for doing so would be well-founded given the high percentages of depression in low-income mothers (Chazan-Cohen et al., 2007; Petterson & Friel, 2001; Pratt & Brody, 2008).

Therefore, future intervention programs might employ a holistic model in which both physical and mental facets of health in mothers and children are targeted. To achieve positive outcomes for mothers and their families, nutrition education could combine traditional content (e.g. nutrient properties of foods, healthy meals, mealtime planning strategies) with content specifically related to child feeding. Such content could include guidance to parents on how to continue or instill children's ability to listen to internal cues of hunger and satiety to guide eating (Birch et al., 2003) and to limit the use of food as a way of managing difficult behaviors unrelated to hunger (Baughcum et al., 1998). Empowering mothers who are depressed with the knowledge and skills to manage healthy child feeding could serve to support their own healthy eating, as well as increase their self-efficacy and confidence.

Moreover, the positive correlation between maternal depressive symptoms and child aggression supports the need for intervention efforts before the child is three years

old. To assist with early detection and treatment, screenings for mothers and their children for internalizing and externalizing problems could occur during regularly scheduled well-baby and well-child visits and involvement with community service agencies, such as WIC. Again, this would be especially important for low-income mothers, given previous evidence confirming that they have higher incidence rates of depression than their middle- and high-income counterparts (Chazan-Cohen et al., 2007; Petterson & Friel, 2001; Pratt & Brody, 2008). Attending to psychological facets of health could forestall the suffering of the mother and the many negative impacts on the child attributable at least in part to their mother's depression (Gladstone & Beardslee, 2002; Goodman & Gotlib, 1999; Pilowsky et al., 2006; Zahn-Waxler et al., 1990). Based on some researchers' assertion that maternal depressive symptoms leads to child aggression (Forehand & McCombs, 1988; Elgar et al., 2003), treatment of maternal depressive symptoms could theoretically help to ward off the development of child aggression, other psychosocial problem behaviors (Black et al., 2002; Elgar et al., 2004; Hofstra et al., 2002; Weissman et al., 2006) and elevated weight status (Surkan et al., 2008). Therefore, prevention and treatment of maternal depressive symptoms is key.

Conclusion

The assertion that the way in which a mother feeds her young child affects her child's own relation to food has been largely supported in the literature (Costanzo & Woody, 1985; Satter, 1990). Prior work has linked controlling maternal feeding practices to a child's inability to regulate their intake of food, which is related to increased body weight in later childhood (Birch & Fisher, 2000; Birch et al., 2003; Fisher & Birch, 2002) however, there was no association found between food control and BMI in the present study. What

was revealed in the current study were associations between maternal depressive symptoms, child aggression, and meal planning, which provides empirical evidence implicating maternal depressive symptoms as one variable which influences the mental health of her young child and her ability to plan meals for herself and her child. This finding attests to the powerful effect that depression has in parenting duties. A mother's depression may confer a more potent influence over her young child's development than feeding practices do because it impedes a mother's ability to plan and prepare healthy meals for her family. Chronic poor meal planning could theoretically limit the development of healthy eating patterns, which in turn could foster deregulated eating and later weight gain. The ubiquitous presence depression exerts in a mother's life extends beyond her own mental health to impact her child's behavior and her food planning for herself and her child, thereby rendering her offspring at risk for the myriad of psychological and physical complications linked to aggression and overweight.

APPENDICES

APPENDIX A: Theoretical Model

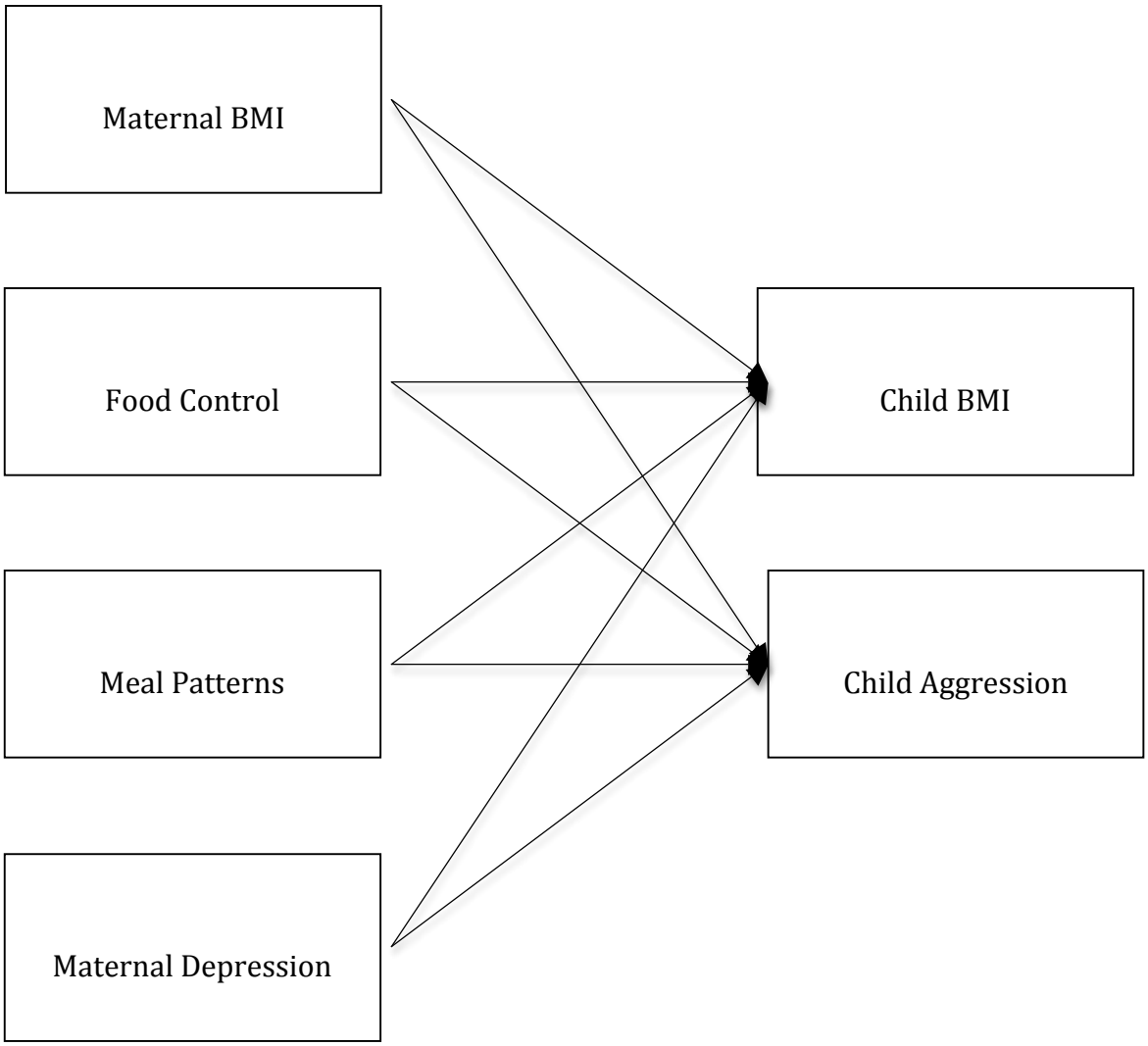

Figure 1: Theoretical model at 36 months

APPENDIX B: Health Section of Pathways Project Survey

8.5 Is (CHILD) currently covered by any kind of health insurance, such as Medicaid or private insurance plan, or by a Health Maintenance Organization (HMO) that covers hospital or doctor bills?

YES……..01
NO……..00
DON'T KNOW……-1
REFUSED……-3

For each question I read, please answer whether you (or FOCUS CHILD) never, hardly ever, sometimes, most times or always do the task in question.

(READ STATEMENT). Do you do this never, hardly ever, sometimes, most times, or always do the following?

	Never	Hardly Ever	Sometimes	Most Times	Always
1. How often do you serve new foods to your child?	1	2	3	4	5
2. How often does your child decide how much to eat at meals? (parent does not decide)	1	2	3	4	5
3. How often do you give your child the same amounts of food you give yourself?	1	2	3	4	5
4. How often is your child seated when eating?	1	2	3	4	5
5. How often does your child decide if he/she is hungry at meals?	1	2	3	4	5
6. How often do you have your child taste everything on the plate?	1	2	3	4	5

Next I am going to read some statements and thoughts on feeding children. Tell me whether you strongly agree, agree, disagree, or strongly disagree with each of the statements as they apply to <u>your</u> thoughts about feeding children.

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1. It is important for my child to eat or taste vegetables every day.	1	2	3	4	5
2. It is important for my child to eat or taste fruit every day.	1	2	3	4	5
3. It is important for my child to eat or taste meat every day.	1	2	3	4	5
4. It is important for my child to eat or taste cereal every day.	1	2	3	4	5
5. It is important for my child to finish food on his/her plate.	1	2	3	4	5
6. When my child refuses a new food, I don't offer it again.	1	2	3	4	5

7. How many times a day <u>should</u> your child drink a glass of milk? Would you say…
a. 0
b. 1
c. 2
d. 3
e. 4
f. 5+

8. To help children develop a liking for a new food, over a period of time, parents should offer the new food:
a. Once or twice
b. Several times
c. Many times, up to 20

APPENDIX C: Fruits and Veggies Section of Pathways Project Survey

1. Usually how many servings a day of fruit or fruit juice do you eat? (1 serving = ½ cup, 1 piece, ¾ cup juice; Not juice drinks, Kool-aid, pop, Hi-C, Sunny Delight, or Tropical Breeze)

0	1	2	3	4	5+

2. Usually, how many servings of vegetables a day do you eat? (1 serving = ½ cup cooked, 1 cup lettuce; Include potatoes, fries, tomatoes, and tomato sauce in pizza and spaghetti)

0	1	2	3	4	5+

3. About how long have you eaten this many servings of fruits & veggies?
a. Less than 1 month
b. About 1-5 months
c. About 6 or more

4. How important do you think eating fruits & veggies is to your health?
a. Very
b. Somewhat
c. Not very

5. During the last six (6) months, do you plan to eat fruits & veggies?
a. No
b. Yes, I have

6. In the next six (6) months, do you plan to plan to eat fruits & veggies?
a. No
b. Probably not
c. Yes, I plan to
d. I already have enough

7. How many times a week do you usually eat breakfast?

0	1	2	3	4	5	6	7

8. How many times a week do you eat fast food or eat out? (Include pizza, subs, Wendys, McDonalds, etc.)

_____

9. Have you participated in Project FRESH?
a. No
b. Yes, this summer
c. Yes, in _____ [year(s)]

APPENDIX D: Factor Analysis

Table 1

Pathways Project Survey Factor Analysis

	Food Control	Meal Patterns
Do you plan to eat at the same time every day?	-.01	.43
Do you offer a child a variety of foods to eat such as fruits, vegetables, cereals and dairy?	-.15	.43
Are you seated at a table when you eat?	.07	.45
Usually, how many servings a day of fruit or fruit juice do you eat?	-.05	.46
Usually, how many servings a day of vegetables do you eat?	-.04	.51
How many times a week do you usually eat breakfast?	.02	.25
Do you give a child the same amounts of food you give yourself?	.39	.03
Do you let a child decide if he/she is hungry at meals?	-.19	.07
Do you have a child at least taste everything on the plate?	.32	.29
Do you have a child eat everything on the plate?	.99	.07
Does a child decide how much he/she eats at meals?	-.51	.25

APPENDIX E: Subscale of Child Behavior Checklist for Ages 1 ½ - 5

Aggressive Behavior Subscale

0 = Not True (as far as you know) 1 = Somewhat or Sometimes True 2 = Very True or Often True

___ 8. Can't stand waiting; wants everything now

___ 15. Defiant

___ 16. Demands must be met immediately

___ 18. Destroys property belonging to others

___ 20. Disobedient

___ 27. Doesn't seem to feel guilty after misbehaving

___ 29. Easily frustrated

___ 35. Gets in many fights

___ 40. Hits others

___ 42. Hurts animals or people without meaning to

___ 44. Angry moods

___ 53. Physically attacks people

___ 58. Punishment doesn't change his/her behavior

___ 66. Screams a lot

___ 69. Selfish or won't share

___ 81. Stubborn, sullen, or irritable

___ 85. Temper tantrums or hot temper

___ 88. Uncooperative

___ 96. Wants a lot of attention

APPENDIX F: Center for Epidemiologic Studies Depression Scale

How often during the paste week have you felt (READ STATEMENT)—would you say: rarely or never, some or a little of the time, occasionally or a moderate amount of time, or most or all of the time?

	Rarely or never (less than 1 day)	Some or a little (1-2 days)	Occasionally or moderate (3-4 days)	Most or all (5-7 days)
A. Bothered by things that usually don't bother you	0	1	2	3
B. You did not feel like eating; your appetite was poor	0	1	2	3
C. That you could not shake off the blues, even with help from family and friends	0	1	2	3
D. That you were as good as other people	0	1	2	3
E. You had trouble keeping your mind on what you were doing	0	1	2	3
F. Depressed	0	1	2	3
G. That everything you did was an effort	0	1	2	3
H. Hopeful about the future	0	1	2	3
I. Your life has been a failure	0	1	2	3
J. Fearful	0	1	2	3
K. Your sleep was restless	0	1	2	3
L. You were happy	0	1	2	3
M. You talked less than usual	0	1	2	3
N. You felt lonely	0	1	2	3
O. People were unfriendly	0	1	2	3
P. You enjoyed life	0	1	2	3
Q. You had crying spells	0	1	2	3
R. You felt sad	0	1	2	3
S. You felt that people dislike you	0	1	2	3
T. You could not get "going"	0	1	2	3

APPENDIX G: Frequencies of Continuous Variables

Table 2

Frequencies of Continuous Variables

		Depression	Maternal BMI	Aggression	Child BMI percentile	Food Control	Meal Patterns
N	Valid	119	119	119	119	119	119
	Missing	0	0	0	0	0	0
Mean		10.60	27.17	11.9	65.06	19.31	19.71
Median		9	26.61	11	79.9	20	20
Mode		11	31.89	8	99.90	19	21
Std. Deviation		7.94	6.54	6.23	35.1	2.96	4.84
Variance		63.08	42.8	39.1	1231.86	8.76	23.27
Range		34	39.30	32	99.90	15	23
Minimum		.00	16.46	.00	.00	10	7
Maximum		34	55.77	32	99.90	25	30
Skewness		.99	.92	.52	-.62	-.47	.01
Kurtosis		.65	1.92	.03	-1.17	.46	-.36

APPENDIX H: Crosstabulation of BMI and Depressive Symptoms for Mothers

Table 3

Crosstabulation of BMI and Depressive Symptoms for Mothers

	Not Depressed		Possibly Depressed		Probably Depressed		Total	
	N	Percent	*N*	Percent	*N*	Percent	*N*	Percent
Underweight	6	5%	-	-	-	-	6	5%
Normal weight	35	29.4%	8	6.7%	3	2.5%	46	38.7%
Overweight	25	21%	3	2.5%	2	1.7%	30	25.2%
Obese	26	21.8%	6	5%	5	4.2%	37	31.1%
Total	92	77.3%	17	14.3%	10	8.4%	119	100%

APPENDIX I: Crosstabulation of BMI and Aggression for Children

Table 4

Crosstabulation of BMI and Aggression for Children

	Aggression - Normal		Aggression - At Risk		Aggression - Clinical		Total	
	N	Percent	*N*	Percent	*N*	Percent	*N*	Percent
Underweight	8	6.7%	-	-	-	-	8	6.7%
Normal weight	52	43.7%	4	3.4%	1	0.8%	57	47.9%
Overweight	14	11.8%	4	3.4%	-	-	18	15.1%
Obese	33	27.7%	2	1.7%	1	0.8%	36	30.3%
Total	107	89.9%	10	8.4%	2	1.7%	119	100%

APPENDIX J: Bivariate Correlations

Table 5

Bivariate Correlations

	1	2	3	4	5	6
1. Maternal BMI	--	.15	-.01	-.10	.06	.00
2. Maternal depressive symptoms		--	-.08	.21*	.00	-.21*
3. Child BMI			--	.09	-.11	.06
4. Child Aggression				--	-.11	-.06
5. Food Control					--	.05
6. Meal Patterns						--

* Correlation is significant at the 0.01 level (2-tailed).

REFERENCES

REFERENCES

Aber, J. L., Jones, S., & Cohen, J. (2000). The impact of poverty on the mental health and development of very young children. In C. Zeanah (Ed.), *Handbook of infant mental health* (2nd ed., pp. 113-128). New York: Guilford Press.

Achenbach, T., & Rescorla, L. (2000). *Manual for the ASEBA preschool forms & profiles.* Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.

Achenbach, T. M., & Ruffle, T. M. (2000). The child behavior checklist and related forms for assessing behavioral/emotional problems and competencies. *Pediatrics in Review, 21*, 265-271.

Agliata, D., & Tantleff-Dunn, S. (2004). The impact of media exposure on males' body image. *Journal of Social and Clinical Psychology, 23*, 7-22.

Anderson, J. W., Smith, B. M., & Gustafson, N. J. (1994). Health benefits and practical aspects of high-fiber diets. *American Journal of Clinical Nutrition, 59*, S1242-S1247.

Andrews, M. W., & Rosenblum, L. A. (1994). The development of affiliative and agonistic social patterns in differentially reared monkeys. *Child Development, 65*, 1398-1404.

Baranowski, T. (1997). Families and health factors: Personal and social determinants. In D. S. Gochmen (Ed.), *Handbook of Health Behavior Research I* (pp. 179-206). New York: Kluwer U. S.

Barge-Schaapveld, D., Nicolson, N., Berkhof, J., & deVries, M. (1999). Quality of life in depression: Daily life determinants and variability. *Psychiatry Research, 88,* 173-189.

Bartlett, S., Krishnan, J., Riekert, K., & Butz, A. (2004). Children with asthma maternal depressive symptoms and adherence to therapy in inner-city. *Pediatrics, 113,* 229-237.

Baughcum, A. E., Burklow, K. A., Deeks, C. M., Powers, S. W., & Whitaker, R. C. (1998). Maternal feeding practices and childhood obesity: A focus group study of low-income mothers. *Archives of Pediatrics & Adolescent Medicine, 152*, 1010-1014.

Baughcum, A. E., Powers, S. W., Johnson, S. B., Chamberlin, L. A., Deeks, C. M., Jain, A., et al. (2001). Maternal feeding practices and beliefs and their relationships to overweight in early childhood. *Journal of Developmental and Behavioral Pediatrics, 22*, 391-408.

Baumrind, D. (1966). Effects of authoritative parental control on child behavior. *Child Development, 37*, 887-907.

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology, 56,* 893-897.

Birch, L. L. (1992). Children's preferences for high-fat foods. *Nutrition Reviews, 50*, 249-255.

Birch, L. L. (1999). Development of food preferences. *Annual Review of Nutrition, 19*, 41-62.

Birch, L. L., & Fisher, J. O. (1995). Appetite and eating behavior in children. *Pediatric Clinics of North America, 42*, 931-953.

Birch, L. L., & Fisher, J. O. (1998). Development of eating behaviors among children and adolescents. *Pediatrics, 101*, 539-549.

Birch, L. L., & Fisher, J. O. (2000). Mothers' child-feeding practices influence daughters' eating and weight. *American Journal of Clinical Nutrition, 71,* 1054-1061.

Birch, L., Fisher, J., & Davison, K. (2003). Learning to overeat: Maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *American Journal of Clinical Nutrition, 78*, 215-220.

Birch, L., Fisher, J., Grimm-Thomas, K., Markey, C., Sawyer, R., & Johnson, S. (2001). Confirmatory factory analysis of the Child Feeding Questionnaire: A measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite, 36*, 201-210.

Birch, L., & Ventura, A., (2009). Preventing child obesity: What works? *International Journal of Obesity, 33*, S74-S81.

Black, M., Papas, M., Hussey, J., Dubowitz, H., Kotch, J., & Starr, R. (2002). Behavior problems among preschool children born to adolescent mothers: Effects of maternal depressive symptoms and perceptions of partner relationships. *Journal of Clinical Child and Adolescent Psychology, 31*, 16-26.

Blissett, J., & Haycraft, E. (2008). Are parenting style and controlling feeding practices related? *Appetite, 50*, 477-485.

Blixen, C. E., Singh, A., & Thacker, H. (2006). Values and beliefs about obesity and weight reduction among African American and Caucasian women. *Journal of Transcultural Nursing, 17*, 290-297.

Boulton, T. J., Magarey, A. M., & Cockington, R. A. (1995). Tracking of serum lipids and dietary energy, fat and calcium intake from 1 to 15 years. *Acta Paediatrica, 84*, 1050-1055.

Bradley, R., Houts, R., Nader, P., O'Brien, M., Belsky, J., & Crosnoe, R., (2008). The relationship of body mass index and behavior in children. *The Journal of Pediatrics, 153*, 629-634.

Braet, C., Mervielde, I., & Vandereycken, W. (1997). Psychological aspects of childhood obesity: A controlled study in a clinical and nonclinical sample. *Journal of Pediatric Psychology, 22*, 59-71.

Bronfenbrenner, U. (1994). Ecological models of human development. In T. Husen, & T. N. Postlethwaite (Eds.), *The international encyclopedia of education* (2nd ed.). New York: Elsevier Science.

Bronte-Tinkew, J., Zaslow, M., Capps, R., Horowitz, A., & McNamara, M. (2007). Food insecurity works through depression, parenting, and infant feeding to influence overweight and health in toddlers. *The Journal of Nutrition, 137*, 2160-2165.

Brown, J. L., & Miller, D. (2002). Gender role preference and family food chores. *Journal of Nutrition Education and Behavior, 34*, 100-108.

Brown, R., & Ogden, J. (2004). Children's eating attitudes and behaviour: A study of the modelling and control theories of parental influence. *Health Education Research, 19*, 261-271.

Budd, G. M., & Volpe, S. L. (2006). School-based obesity prevention: Research, challenges, and recommendations. *Journal of School Health, 76*, 485-495.

Butte, N. F. (2009). Impact of feeding practices on childhood obesity. *Journal of Nutrition, 139*, 412S-416S.

Cardon, L. (1995). Genetic influences on body mass index in early childhood. In Turner, J., Cardon, L., & Hewitt, J (Eds.), *Behavior Genetic Approaches in Behavioral Medicine* (pp. 133-143). New York: Plenum Press.

Carnell, S., & Wardle, J. (2007). Associations between mulitple measures of parental feeding and children's adiposity in United Kingdom preschoolers. *Obesity, 15*, 137-144.

Centers for Disease Control and Prevention. (2008). *Adult BMI calculator: English*. Retrieved January 7, 2010 from Healthy weight: It's not a diet, it's a lifestyle!: http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/english_bmi_calculator/bmi_calculator.html

Centers for Disease Control and Prevention. (2009a). *About BMI for children and teens.* Retrieved January 7, 2010 from Healthy weight: It's not a diet, it's a lifestyle!: http://www.cdc.gov/healthyweight/assessing/bmi/childrens_BMI /about_childrens_BMI.html

Centers for Disease Control and Prevention. (2009b). Children's BMI tool for schools. Retrieved March 10, 2010 from Healthy weight: It's not a diet, it's a lifestyle!: http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi /tool_for_schools.html

Chang, M., Nitzke, S., Guilford, E., Adair, C. H., & Hazard, D. L. (2008). Motivators and barriers to healthful eating and physical activity among low-income overweight and obese mothers. *Journal of the American Dietetic Association, 108*, 1023-1028.

Chazan-Cohen, R., Ayoub, C., Alexander Pan, A., Roggman, L., Raikes, H., McKelvey, L., Whiteside-Mansell, L., & Hart, A., (2007). It takes time: Impacts of early head start that lead to reductions in maternal depressive symptoms two years later. *Infant Mental Health Journal, 28*, 151-170.

Clarke, H. R., Goyder, E., Bissell, P., Blank, L., & Peters, J. (2007). How do parents' child-feeding behaviours influence child weight? Implications for childhood obesity policy. *Journal of Public Health, 29*, 132-141.

Contento, I. R., Zybert, P., & Williams, S. S. (2005). Relationship of cognitive restraint of eating and disinhibition to the quality of food choices of Latina women and their young children. *Preventative Medicine, 40*, 326-336.

Cooke, L. (2007). The importance of exposure for healthy eating in childhood: A review. *Journal of Human Nutrition and Dietetics, 20*, 294-301.

Cooper, P., Whelan, E., Woolgar, M., Morrell, J., & Murray, L. (2004). Association between childhood feeding problems and maternal eating disorder; role of the family environment. *British Journal of Psychiatry, 184*, 210-215.

Cossrow, N., & Falkner, B. (2004). Race/ethnic issues in obesity and obesity-related comorbidities. *The Journal of Clinical Endocrinology & Metabolism, 89*, 2590-2594.

Costanzo, P. R., & Woody, E. Z. (1985). Domain-specific parenting styles and their impact on the child's development of particular deviance: The example of obesity proneness. *Journal of Social & Clinical Psychology, 3*, 425-430.

Cummins, S., & Macintyre, S. (2006). Food environments and obesity: Neighbourhood or nation? *International Journal of Epidemiology, 35*, 100-104.

Danielzik, S., Langnäse, K., Mast, M., & Spethmann, C., & Müller, M. (2002). Impact of parental BMI on the manifestation of overweight 5–7 year old children. *European Journal of Nutrition, 41,* 132-138.

Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin, 113*, 487-496.

De Sousa, A. (2009). Maternal, child and family factors in childhood obesity. *International Journal of Diabetes & Metabolism, 17,* 111-114.

Devine, C. M., Connors, M. M., & Sobal, J. (2003). Sandwiching it in: Spillover of work onto food choices and family roles in low- and moderate-income urban households. *Social Sciences & Medicine, 56*, 617-630.

Dickstein, S., Hayden, L., Schiller, M., Seifer, R., & San Antonio, W. (1994). *The Family Mealtime Interaction Coding System*. Unpublished coding manual. Brown University School of Medicine: Bradley Hospital.

Dickstein, S., Seifer, R., Hayden, L., Schiller, M., Sameroff, A., Keitner, G., Miller, I., Rasmussen, S., Matzko, M., & Magee, K. (1998). Levels of family assesment: II. Impact of maternal psychopathology on family functioning. *Journal of Family Psychology, 12*, 23-40.

Dixon, L. B., Cronin, F. J., & Krebs-Smith, S. M. (2001). Let the pyramid guide your food choices: Capturing the total diet concept. *Journal of Nutrition, 131*, S461-S472.

Drewnowski, A. (2004). Obesity and the food environmnet: Dietary energy density and diet costs. *American Journal of Preventive Medicine, 27*, 154-162.

Elgar, F. J., Curtis, L. J., MGrath, P. J., Waschbusch, D. A., & Stewart, S. H. (2003). Antecedent – consequence conditions in maternal mood and child adjustment: A four-year cross-lagged study. *Journal of Clinical Child and Adolescent Psychology, 32*, 362-374.

Elgar, F. J., McGrath, P. J., Waschbusch, D. A., Stewart, S. H., & Curtis, L. J. (2004). Mutual influences on maternal depressive symptoms and child adjustment problems. *Clinical Psychology Review, 24*, 441-459.

Engler-Stringer, R. (2010). The domestic foodscapes of young low-Income women in Montreal: Cooking practices in the context of an increasingly processed food supply. *Health Education & Behavior, 37,* 211-226.

Engstrom, J., Paterson, S., Doherty, A., Trabulsi, M., & Speer, K. (2003). Accuracy of self-reported height and weight in women: An integrative review of the literature. *Journal of Midwifery & Women's Health, 48*, 338-345.

Ertel, K., Koenen, K., Rich-Edwards, J., & Gillman, M. (2010). Antenatal and postpartum depressive symptoms are differentially associated with early childhood weight and adiposity. *Paediatric and Perinatal Epidemiology, 24*, 179-189.

Evans, W. D., Finkelstein, E. A., Kamerow, D. B., & Renaud, J. M. (2005). Public perceptions of childhood obesity. *American Journal of Preventive Medicine, 28*, 26-32.

Faith, W. D., Scanlon, K. S., Birch, L. L., Francis, L. A., & Sherry, B. (2004). Parent-child feeding strategies and their relationships to child eating and weight status. *Obesity Research, 12*, 1711-1722.

Fergusson D. M., & Horwood L. J. (1998). Early conduct problems and later life opportunities. *Journal of Child Psychology and Psychiatry, 39*, 1097-1108.

Finkelstein, E. A., Fiebelkorn, I. C., & Wang, G. (2003). National medical spending attributable to overweight and obesity: How much, and who's paying? *Health Affairs,* W3, 219-226.

Fisher, J. O., & Birch, L. L. (2001). Early experience with food and eating: Implications for the development of eating problems. In J. K. Thompson, & L. Smolak (Eds.), *Body image, eating disorders, and obesity in children and adolescents: Theory, assessment, treatment, and prevention.* Washington, DC: American Psychological Association.

Fisher, J. O., & Birch, L. L. (2002). Eating in the absence of hunger and overweight in girls from 5 to 7 y of age. *American Journal of Clinical Nutrition, 76*, 226-231.

Fisher, J. O., & Birch, L. L. (1999a). Restricting access to foods and children's eating. *Appetite, 32*, 405-419.

Fisher, J. O., & Birch, L. L. (1999b). Restricting access to palatable foods affects children's behavioral response, food selection, and intake. *American Journal of Clinical Nutrition, 69*, 1264-1272.

Flegal, K., Carroll, M., Ogden, C., & Curtin, L. (2010). Prevalence and trends in obesity among US adults, 1999-2008. *Journal of the American Medical Association, 303*, 235-241.

Flodmark, C. E., Marcus, C., & Britton, M. (2006). Interventions to prevent obesity in children and adolescents: A systematics literature review. *International Journal of Obesity, 30*, 579-589.

Food & Nutrition Service. (2010). *WIC at a glance.* Retrieved from About WIC on May 18th, 2010 from: http://www.fns.usda.gov/wic/aboutwic/wicataglance.htm

Freedman, D. S., Kettle Khan, L., Serdula, M. K., Dietz, W. H., Srinivasan, S. R., & Berenson, G. S. (2005). The relation of childhood BMI to adult adiposity: The bogalusa heart study. *Pediatrics, 115*, 22-27.

Garcia, J., Hankins, W. G., & Rusinak, K. W. (1974). Behavioral regulation of the milieu interne in man and rat. *Science, 185*, 824-831.

Garner, D. M. (1991). Eating disorder inventory-2 professional manual. Odessa, Florida: Psychological Assessment Resources.

Gibson, E. L. (2006). Emotional influences on food choice: Sensory, physiological and psychological pathways. *Physiology and Behavior, 89*, 53-61.

Gladstone, T. R. G., & Beardslee, W. R. (2002). Treatment, intervention, and prevention with children of depressed parents: A developmental perspective. In S.H. Goodman & I. H. Gotlib (Eds.), *Children of depressed parents: Mechanisms of risk and implications for treatment* (pp. 277–305). Washington, DC: American Psychological Association.

Goodman, S. J., & Gotlib, I. H. (1999). Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review, 106*, 458-490.

Gorber, S., Tremblay, M., & Moher, D. (2007). A comparison of direct vs. self-report measures for assessing height, weight and body mass index: A systematic review. *Obesity Reviews, 8,* 307-326.

Grabe, S., Ward, L., & Hyde, J. (2008). The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. *Psychological Bulletin, 134*, 460-476.

Haycraft, E. & Blissett, J. (2008). Controlling feeding practices and psychopathology in a non-clinical sample of mothers and fathers. *Eating Behaviors, 9,* 484-492.

Hearn, M. D., Baranowski, T., & Baranowski, J. (1998). Environmental influences on dietary behavior among children: Availability and accessibility of fruits and vegetables enable consumption. *Journal of Health Education, 29*, 26-32.

Herbozo, S., Tantleff-Dunn, S., Gokee-Larose, J., Thompson, J. (2004). Beauty and thinness messages in children's media: A content analysis. *Eating Disorders, 12*, 21-34.

Heo, M., Pietrobelli, A., Fontaine, K. R., Sirey, J. A., & Faith, M. S. (2006). Depressive mood and obesity in US adults: Comparison and moderation by sex, age, and race. *International Journal of Obesity, 30*, 513-519.

Hill, J. O., & Peters, J. C. (1998). Environmental contributions to the obesity epidemic. *Science, 280*, 1371-1374.

Hoerr, S. L., Horodynski, M. A., Lee, S. Y., & Henry, M. (2006). Predictors of nutritional adequacy in mother-toddler dyads from rural families with limited incomes. *Journal of American Dietetic Association, 106*, 1766-1773.

Hoerr, S. L., Hughes, S. O., Fisher, J. O., Nicklas, T. A., Liu, Y., & Shewchuk, R. M. (2009). Associations among parental feeding styles and children's food intake in families with limited incomes. *International Journal of Behavioral Nutrition and Physical Activity, 6*, 55-61.

Hoerr, S. L., Lee, S., Schiffman, R. F., Horodynski, M., & McKelvey, L. (2006). Beverage consumption of mother-toddler dyads in families with limited incomes. *Journal of Pediatric Nursing , 21*, 403-411.

Hofstra, M. B., Van der Ende, J., & Verhulst, F. C. (2000). Continuity and change of psychopathology from childhood into adulthood: A 14-year follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry, 39*, 850-858.

Horodynski, M., Stommel, M., Brophy-Herb, H., Xie, Y., & Weatherspoon, L. (2010). Low-income African American and Non-Hispanic White mothers' self efficacy, "picky eater" perception, and toddler fruit and vegetable intake. *Public Health Nursing, 27*, 408-417.

Hughes, S. O., Power, T. G., Fisher, J. O., Mueller, S., & Nicklas, T. A. (2005). Revisiting a neglected construct: Parenting styles in a child-feeding context. *Appetite, 44*, 83-92.

Johnson, S. L. (2000). Improving preschoolers' self-regulation of energy intake. *Pediatrics, 106*, 1429-1435.

Johnson, S. L., & Birch, L. L. (1994). Parents' and children's adiposity and eating style. *Pediatrics, 94*, 653-661.

Kelleher, K., McInerny, T., Gardner, W., Childs, G., & Wasserman, R. (2000). Increasing identification of psychosocial problems: 1979-1996. *Pediatrics, 105*, 1313-1321.

Klesges, R., Coates, T., Guendoline, B., Sturgeon-Tillisch, J., Moldenhauer-Klesges, L., Holizer, B., Woolfrey, J., & Vollmer, J. (1983). Parental influences on children's eating behavior and relative weight. *Journal of Applied Behavior Analysis, 16*, 371-378.

Klesges, R. C., Stein, R. J., Eck, L. H., Isbell, T. R., & Klesges, L. M. (1991). Parental influence on food selection in young children and its relationships to chidhood obesity. *American Journal of Clinical Nutrition, 53*, 859-864.

Koivisto Hursti, U. K. (1999). Factors influencing children's food choice. *Annals of Medicine, 31*, 26-32.

Kranz, S., Hartman, T., Siega-Riz, A. M., & Herring, A. H. (2006). A diet quality index for American preschoolers based on current dietary intake recommendations and an indicator of energy balance. *Journal of the American Dietetic Association, 106*, 1594-1604.

Kranz, S., Siega-Riz, A. M., & Herring, A. H. (2004). Changes in diet quality of American preschoolers between 1977 and 1998. *American Journal of Public Health, 94*, 1525-1530.

Krebs, N. F., Baker, R. D., Greer, F. R., Heyman, M. B., Jaksic, T., Lifshitz, F., et al. (2003). Prevention of pediatric overweight and obesity. *Pediatrics, 112*, 424-430.

Kropski, J. A., Keckley, P. H., & Jensen, G. L. (2008). School-based obesity prevention programs? An evidence-based review. *Obesity, 16*, 1009-1018.

Lake, J., Power, C., & Cole, T. (1997). Child to adult body mass index in the 1958 British birth cohort: Associations with parental obesity. *Archives of Diseases in Childhood, 77*, 376-380.

LaRosa, A., Glascoe, F., & Macias, M. (2009). Parental depressive symptoms: Relationship to child development, parenting, health, and results on parent-reported screening tools. *The Journal of Pediatrics, 155,* 124-128.

Lau, R. R., Quadrel, M. J., & Hartman, K. A. (1990). Development and change of young adults' preventative health beliefs and behavior: Influence from parents and peers. *Journal of Health and Social Behavior, 31*, 240-259.

Lee, S., Hoerr, S. L., & Schiffman, R. F. (2005). Screening for infants' and toddlers' dietary quality through maternal diet. *The American Journal of Maternal Child Nursing, 30*, 60-66.

Lobstein, T., Baur, L., & Uauy, R. (2004). Obesity in children and young people: A crisis in public health. *Obesity Reviews, 5*, S4-S85.

Loeber, R., & Hay, D. (1997). Key issues in the development of aggression and violence from childhood to adulthood. *Annual Reviews of Psychology, 48*, 371-410.

Love, J. M., Kisker, E. E., Ross, C., Raikes, H., , Constantine, J., Boller, K., Brooks-Gunn, J., et al. (2005). The effectiveness of Early Head Start for 3 year old children and their parents: Lessons for policy and programs. *Developmental Psychology, 41*, 885-901.

Lumeng, J. C., & Burke, L. B. (2006). Maternal prompts to eat, child compliance, and mother and child weight status. *The Journal of Pediatrics, 149*, 330-335.

Magarey, A. M., Daniels, L. A., Boulton, T. J., & Cockington, R. A. (2003). Predicting obesity in early adulthood from childhood and parental obesity. *International Journal of Obesity, 27*, 505-513.

Malik, N. M., Boris, N. W., Heller, S. S., Harden, B. J., Squires, J., Chazan-Cohen, R., Beeber, L, S., & Kaczynski, K. J. (2007). Risk for maternal depressive symptoms and child aggression in early head start families: A test of ecological models. *Infant Mental Health Journal, 28*, 171-191.

Malina, R. (1995). Anthropometry. In P. Maud, & C. Foster (Eds.), *Physiological assessment of human fitness* (pp. 205-219). Champaign, IL: Human Kinetics.

McLaughlin, C., Tarasuk, V., & Kreiger, N. (2003). An examination of at-home food preparation activity among low-income, food-insecure women. *Journal of the American Dietetic Association, 103*, 1506-1512.

Melgar-Quinonez, H. R., & Kaiser, L. L. (2004). Relationship of child-feeding practices to overweight in low-income Mexican-American preschool-aged children. *Journal of the American Dietetic Association, 104*, 1110-1119.

Mellen, P. B., Walsh, T. F., & Herrington, D. M. (2008). Whole grain intake and cardiovascular disease: A meta-analysis. *Nutrition, Metabolism & Cardiovascular Diseases, 18*, 283-290.

Moore, S. N., Tapper, K., & Murphy, S. (2007). Feeding strategies used by mothers of 35 year old children. *Appetite, 49*, 704-707.

Nagin, D., & Tremblay R. E. (1999). Trajectories of boys' physical aggression, opposition, and hyperactivity on the path to physically violent and nonviolent juvenile delinquency. *Child Development, 70,* 1181-1196.

Nestle, M., Wing, R., Birch, L. L., DiSogra, L., Drewnowski, A., & Middleton, S. (1998). Behavioral and social influences on food choices. *Nutrition Reviews, 56*, S50-S74.

Ogden, C., Carroll, M., Curtin, L., Lamb, M., & Flegal, K. (2010). Prevalence of high body mass index in US children and adolescents, 2007-2008. *Journal of the American Medical Association, 303*, 242-249.

Ogden, C. L., Carroll, M. D., & Flegal, K. M. (2008). High body mass index for age among US children and adolescents, 2003-2006. *Journal of the American Medical Association, 299*, 2401-2405.

Parsons, T. J., Power, C., Logan, S., & Summerbell, C. D. (1999). Childhood predictors of adult obesity: A systematic review. *International Journal of Obesity, 23*, S1-S107.

Patrick, H., & Nicklas, T. A. (2005). A review of family and social determinants of children's eating patterns and diet quality. *Journal of the American College of Nutrition, 24*, 83-92.

Petterson, S. M., & Friel, L. V. (2001). Psychological distress, hopelessness and welfare. *Women and Health, 32*, 79-99.

Pietrobelli, A., Faith, M. S., Allison, D. B., Gallagher, D., Chiumello, G., & Heymsfield, S. B. (1998). Body mass index as a measure of adiposity among children and adolescents: A validation study. *The Journal of Pediatrics, 132*, 204-210.

Pilowsky, D. J., Wickramaratne, P., Rush, A. J., Hughes, C, W., Garger, J., Malloy, E., King, C. A., Cerdda, G., Sood, A. B., Alpert, J. E., Wisniewski, S. R., Trivedi, M. H., Talati, A., Carlson, M. M., Liu, H. H., Fava, M., & Weissman, M. M. (2006). Children of currently depressed mothers: A STAR*D ancillary study. *Journal of Clinical Psychiatry, 67*, 126-136.

Pratt, L. A., & Brody, D. J. (2008). Depression in the United States Household Population, 2005-2006. Retrieved April 28, 2010 from NCHS Data Brief: http://www.cdc.gov/nchs/data/databriefs/db07.htm.

Prentice, A. M. (1997). Obesity-the inevitable penalty of civilization? *British Medical Bulletin, 53*, 229-237.

Prentice, A. M. (2006). The emerging epidemic of obesity in developing countries. *International Journal of Epidemiology, 35*, 93-99.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measures, 1*, 385-401.

Raine, A., Reynolds, C., Venables, P, Mednick, S., & Farrington, D. (1998). Fearlessness, stimulation-seeking, and large body size at age 3 years as early predispositions to childhood aggression at age 11 years. *Archives of General Psychiatry, 55*, 745-751.

Reilly, J. J., Armstrong, J., Dorosty, A. R., Emmett, P., Ness, A., Rogers, I., et al. (2005). Early life risk factors for obesity in childhood: Cohort study. *British Medical Journal, 330*, 1357-1363.

Rhee, K. E., Lumeng, J. C., Appugliese, D. P., Kaciroti, N., & Bradley, R. H. (2006). Parenting styles and overweight status in first grade. *Pediatrics, 117*, 2047-2054.

Robinson, T. N., Kiernan, M., Matheson, D. M., & Haydel, K. F. (2001). Is parental control over children's eating associated with childhood obesity? Results from a population-based sample of third graders. *Obesity, 9*, 306-312.

Rosenbloom, A. L. (2002). Increasing incidence of type 2 diabetes in children and adolescents: Treatment considerations. *Pediatric Drugs, 4*, 209-221.

Rosenblum, L. A., & Paully, G. S. (1984). The effects of varying environmental demands on maternal and infant behavior. *Child Development, 55*, 305-314.

Rozin, P., & Vollmecke, T. A. (1986). Food likes and dislikes. *Annual Review of Nutrition, 6*, 433-456.

Satter, E. (1990). The feeding relationship: Problems and interventions. *The Journal of Pediatrics, 117*, S181-S189.

Schiffman, R., Gibbons, C., Fitzgerald, H., Omar (Horodynski), M., Keefe, D., Reischl, T., et al. (1996). MSU Pathways Project: Research into Directions for Family Health and Service Use: Administration on Children, Youth and Families.

Schwimmer, J. B., Deutsch, R., Kahen, T., Lavine, J. E., Stanley, C., & Behling, C. (2006). Prevalence of fatty liver in children and adolescents. *Pediatrics, 118*, 1388-1393.

Serdula, M. K., Ivery, D., Coates, R. J., Freedman, D. S., Williamson, D. F., & Byers, T. (1993). Do obese children become obese adults? A review of the literature. *Preventative Medicine, 22*, 167-177.

Simon, G. E., Von Korff, M., Saunders, K., Miglioretti, D. L., Krane, P. K., van Belle, G., et al. (2006). Association between obesity and psychiatric disorders in the US adult population. *Archives of General Psychiatry, 63*, 824-830.

Skinner, J. D., Carruth, B. R., Bounds, W., & Zeigler, P. J. (2002). Do food-related experiences in the first two years of life predict dietary variety in school-aged children? *Journal of Nutrition Education Behavior, 34*, 310-315.

Sonneville, K. R., & Gortmaker, S. L. (2008). Total energy intake, adolescent discretionary behaviors and the energy gap. *International Journal of Obesity, 32*, S19-S27.

Spencer, E., Appleby, P., Davey, G., Key, T. (2002). Validity of self-reported height and weight in 4808 EPIC-Oxford participants. *Public Health Nutrition, 5,* 561-565.

Stradmeijer, M., Bosch, J., Koops, W., & Seidell, J. (1999). Family functioning and psychosocial adjustment in overweight youngsters. *International Journal of Eating Disorders, 27*, 110-114.

Strine, T. W., Mokdad, A. H., Dube, S. R., Balluz, L. S., Gonzalez, O., Berry, J. T., et al. (2008). The association of depression and anxiety with obesity and unhealthy behaviors among community-dwelling US adults. *General Hospital Psychiatry, 30*, 127-137.

Stunkard, A., Berkowitz, R., Schoeller, D., Maislin, G., & Stallings, V. (2004). Predictors of body size in the first 2 y of life: A high-risk study of human obesity *International Journal of Obesity, 28,* 503-513.

Stunkard, A., Berkowitz, R., Stallings, V., & Cater, J. (1999). Weights of parents and infants: Is there a relationship? *International Journal of Obesity Related Metabolic Disorders, 23*, 159-162.

Surkan, P. J., Kawachi, I., & Peterson, K. E. (2008). Childhood overweight and maternal depressive symptoms. *Journal of Epidemiology and Community Health, 62*, e11.

Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics* (3rd ed.). New York: Harper Collins.

Thomas, H. (2006). Obesity prevention programs for children and youth: Why are their results so modest? *Health Education Research, 21*, 783-795.

Topham, G. L., Page, M. C., Hubbs-Tait, L., Rutledge, J. M., Kennedy, T. S., Shriver, L., & Harris, A. W. (2009). Maternal depressive symptoms and socio-economic status moderate the parenting style/child obesity association. *Public Health Nutrition, 13,* 1237-1244.

US Department of Health and Human Services and US Department of Agriculture. (2005). *Dietary guildelines for Americans, 2005*. (6th Edition). Washington, DC: US Government Printing Office.

Van Duyn, M. S., & Pivonka, E. (2000). Overview of health benefits of fruits and vegetable consumption for the dietetics. *Journal of the American Dietetic Association, 100*, 1511-1521.

Ventura, A. K., & Birch, L. L. (2008). Does parenting affect children's eating and weight status? *International Journal of Behavioral Nutrition and Physical Activity, 5*:15.

Wake, M., Gold, L., McCallum, Z., Gerner, B., & Waters, E. (2008). Economic evaluation of a primary care trial to reduce weight gain in overweight/obese children: The LEAP trial. *Ambulatory Pediatrics, 8*, 336-341.

Wang, Y. C., Gortmaker, S. L., Sobol, A. M., & Kuntz, K. M. (2006). Estimating the energy gap among US children: A counterfactual approach. *Pediatrics, 118*, 1721-1733.

Wang, Y., Beydoun, M. A., Liang, L., Caballero, B., & Kumanyika, S. K. (2008). Will all Americans become overweight or obese? Estimating the progression and cost of the US obesity epidemic. *Obesity, 16*, 2323-2330.

Wardle, J. (1995). Parental influences on children's diets. *Proceedings of the Nutrition Society, 54*, 747-758.

Weaver, C. M. (2000). The growing years and prevention of osteoporosis in later life. *Proceedings of the Nutrition Society, 59*, 303-306.

Weissman, M. M., Wickramaratne, P., Nomura, Y., Warner, V., Pilowsky, D., & Verdeli, H. (2006). Offspring of depressed parents: 20 years later. *American Journal of Psychiatry, 163*, 1001-1008.

Whitaker, R. C., Phillips, S. M., & Orzol, S. M. (2006). Food insecurity and the risks of depression and anxiety in mothers and behavior problems in their pre-school aged children. *Pediatrics, 118*, 859-868.

Whitaker, R. C., Wright, J. A., Pepe, M. S., Seidel, K. D., & Dietz, W. H. (1997). Prediting obesity in young adulthood from childhood and parental obesity. *The New England Journal of Medicine, 337*, 869-873.

Whitaker, R., Deeks, C., Baughcum, A., & Specker, B. (2000). The relationship of childhood adiposity to parent body mass index and eating behaviour. *Obesity Research, 8*, 234-240.

Wiig Dammann, K., & Smith, C. (2009). Factors affecting low-income women's food choices and the perceived impact of dietary intake and socioeconomic status on their health and weight. *Journal of Nutrition Education and Behavior, 41*, 242-253.

Wiles, N., Northstone, K., Emmett, P., & Lewis, G. (2009). 'Junk food' diet and childhood behavioral problems: Results from the ALSPAC cohort. *European Journal of Clinical Nutrition, 63*, 491-498.

World Health Organization. (2003). *Obesity and overweight*. Retrieved August 12, 2009 from http://www.who.int/dietphysicalactivity/publications/facts/obesity/en/

Yach, D., Stuckler, D., & Brownell, K. D. (2006). Epidemiologic and economic consequences of the global epidemics of obesity and diabetes. *Nature Medicine, 12*, 65-66.

Young-Hyman, D., Schlundt, D., Herman-Wenderoth, L., & Bozylinski, K. (2003). Obesity, appearance, and psychosocial adaptation in young African American children. *Journal of Pediatric Psychology, 28*, 463-472.

Zahn-Waxler, C., Iannotti, R. J., Cummings, E. M., & Denham, S. (1990). Antecedents of problem behaviors in children of depressed mothers. *Development and Psychopathology, 2*, 271-291.