Associations between food-related parenting practices and adolescent weight status and disordered eating behaviors: Findings from a population-based study

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Dedication

For my boys, Matt, Charlie, and Emmett, may your lives always be filled with the energy, curiosity, and determination to seek answers to all that you question.

Abstract

Objectives and Aims: The objective of this dissertation is to explore the types of food-related parenting practices utilized by a racially/ethnically and socioeconomically diverse population of parent-adolescent pairs and to assess the relationship between food-related parenting practices and adolescent weight status and disordered eating behaviors.

Background: There is a growing body of evidence that the family environment plays an integral role in contributing to child weight status and disordered eating behaviors, including dieting, unhealthy and extreme weight control behaviors, and binge eating. Specifically, food-related parenting practices have been identified as a potentially significant correlate of weight status and weight-related behaviors among young children. However, unaddressed questions and inconsistencies in the literature both limit the generalizability of preliminary research findings and call into question exactly what food-related parenting practices parents should employ to best support a healthy weight and healthful weight-related behaviors in their adolescent children who are in the process of becoming more independent in making choices related to food and eating. This dissertation fills an important gap in the current literature by broadening the fields understanding of the association between food-related parenting practices and child weight-related outcomes to include an understanding of the nature of this relationship within an adolescent population and among racially/ethnically and socioeconomically diverse parent-adolescent dyads of different genders. The types of feeding strategies utilized within certain population-level subgroups were also examined.

Methods: Data for this dissertation were drawn from two coordinated, population-based studies. EAT 2010 (Eating and Activity in Teens) was a population-based study of 2,793 [14.4 years old (SD= 2.0)] adolescents from 20 urban public schools in Minnesota designed to examine dietary intake, weight status and associated factors. Surveys and anthropometric measures were completed by adolescents during 2009-2010. Project F-EAT (Families and Eating and Activity Among Teens) was designed to examine factors within the family environment of potential relevance to adolescent weight-related behaviors. Survey data were collected via mail or phone from up to two parents (n=3,709) of the adolescents in EAT 2010; all parents in Project EAT 2010 were invited to participate in Project F-EAT and a response rate of 77.6% was achieved.

Separate linear regression models were fit to estimate the associations between parental report of pressure-to-eat and food restriction and 1) parental demographic characteristics; and 2) adolescent weight status. Adjusted means, difference in means, and 95% confidence intervals were calculated. Poisson regression models were fit to estimate the association between parental pressure-to-eat and food restriction and adolescent disordered eating behaviors (e.g., dieting, unhealthy and extreme weight control behaviors, and binge eating). Prevalence ratios (PRs) and 95% confidence intervals were calculated. To assess potential effect measure modification of the relationship between food-related parenting practices and adolescent weight and disordered eating behaviors by race/ethnicity or income, interaction terms were included in the models. Further, because of our interest in examining the role of gender in the association between food-related parenting practices and adolescent disordered eating behaviors, all analyses were

stratified by parent and adolescent gender; potential effect modification by parent and adolescent gender was also examined. In order to account for potential clustering of parent responses when two parents of the same child responded to the survey, a robust variance estimator was used to correct for within cluster variance in all models.

Results:

Associations with demographic characteristics. The mean level of overall parental food restriction was 2.51 [(scale range: 1 (low control) to 4 (high control)] indicating that, on average, parents within the sample reported engaging in a moderate level of overall food restriction with their adolescent children. Level of restrictive feeding was found to differ significantly by both race/ethnicity and household income, after adjustment for other sociodemographic characteristics, with parents in racial/ethnic minority subgroups and parents with a low household income utilizing the highest levels of food restriction. No significant differences were seen in parent self-report of restrictive feeding practices by parent gender, education level or employment status. The mean level of overall pressure-to-eat reported by parents was 2.21 indicating that on average, parents within the sample reported using a low-to-moderate level of pressure-to-eat with their adolescent child. Parental report of pressure-to-eat feeding strategies varied significantly by parent gender, race/ethnicity, education level and employment status and household income. Fathers reported significantly higher levels of pressure-to-eat than mothers. Non-white parents utilized significantly higher levels of pressure-to-eat compared to white parents. A significant decreasing trend was found between level of parental education and use of pressure-to-eat strategies with parents reporting at least some college education reporting

the lowest use of this strategy. No significant differences were seen in parent self-report of pressure-to-eat feeding practices by employment status.

Associations with adolescent weight status. Mean food restriction levels were significantly higher among parents of overweight and obese adolescents as compared to non-overweight adolescents. On the other hand, levels of pressure-to-eat were significantly higher among parents of non-overweight adolescents. Fathers were more likely than mothers to engage in pressure-to-eat behaviors and boys were more likely than girls to be on the receiving end of parental pressure-to-eat. Parental report of restriction did not differ significantly by parent or adolescent gender. No significant interactions by race/ethnicity or socioeconomic status were seen in the relationship between restriction or pressure-to-eat and adolescent weight status. This finding suggests that while the extent to which parents adopt a controlling approach to child feeding is known to differ across families,[1–4] specifically with regard to race/ethnicity or SES, the associations between food-related parenting practices and child weight status in the current population did not differ based on the race/ethnicity or SES of the parent.

Associations with adolescent disordered eating behaviors. Adolescent boys exposed to higher levels of pressure-to-eat or food restriction were significantly more likely to report engaging in dieting and disordered eating behaviors compared to boys exposed to lower levels of pressure-to-eat or food restriction. For example, for every one unit increase in food restriction reported by mothers, boys were two times more likely to engage in extreme weight control behaviors. Examination of the association between food-related parenting practices and dieting and disordered eating behaviors among girls

yielded primarily null findings. However, analyses did reveal that for every one unit increase in food restriction reported by mothers, girls were at 1.34 times more likely to engage in extreme weight control behaviors. No significant interactions by race/ethnicity or socioeconomic status were seen in the relationship between food restriction and pressure-to-eat and adolescent disordered eating behaviors.

Conclusions: This dissertation added depth to a growing body of scientific literature by being the first research study to explore the specific types of food-related parenting practices utilized by parents of adolescents, as well as the first study to explore associations between food-related parenting practices and adolescent weight status and endorsement of disordered eating behaviors. Findings indicate that use of controlling food-related parenting practices, such as pressuring children to eat and restricting children's intake, is common among parents of adolescents, particularly among parents in racial/ethnic minority subgroups, parents with less than a high school education, and parents with a low household income. Further, findings suggest that use of controlling practices is associated with higher weight status among adolescent girls and boys and greater risk of disordered eating behaviors among adolescent boys.

Replication studies are needed to confirm these in other adolescent populations. Nonetheless, dietitians, physicians and other health care providers should take time to explore the types of food-related parenting practices utilized within the home and should educate parents on the role that their feeding practices may have in their adolescent's weight status and attitude toward food and eating. Clinicians should empower parents to promote a healthy weight and a healthy relationship with food for their teen by making

nutritious food items readily available within their home, modeling healthy food choices, and encouraging adolescent's autonomy in self-regulation of food intake. Additional qualitative and pilot studies are needed to better understand how to best conduct public health interventions aimed at changing food-related parenting practices. More research is also required to understand parental motivation for use of particular food-related parenting practices and to establish temporality of the observed associations.

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Chapter 1

Introduction and background

There is a growing body of evidence that the family environment plays an integral role in child and adolescent weight status and disordered eating behaviors, including dieting, unhealthy and extreme weight control behaviors, and binge eating.[1,5–20] Specifically, food-related parenting practices have been identified as a potentially significant correlate of weight status and weight-related behaviors in young children.[21] However, unaddressed questions and inconsistencies in the literature both limit the generalizability of preliminary research findings and call into question exactly what food-related parenting practices parents should employ to best support a healthy weight and appropriate weight-related behaviors for their adolescent children. The vast majority of studies examining the

use and impact of different types of food-related parenting practices have been conducted on parents of toddlers and young children, leaving a gap in our understanding of what feeding strategies are most common among parents of adolescents and what strategies parents should utilize to best support a healthy weight-related outcomes for their adolescent child.[21] Additionally, little is known about what role, if any, child and parent gender play in the relationship between food-related parenting practices and child weight-related outcomes.[22–25] Finally, despite the higher incidence of overweight and obesity among youth of racial minority and low income subgroups, there is a dearth of information about the extent to which parents of different demographic backgrounds adopt particular food-related parenting practices and, moreover, the role that specific types of food-related parenting practices play in child weight status and the development of disordered eating behaviors within families of diverse backgrounds.[21]

This dissertation fills an important gap in the current literature by broadening the fields understanding of the association between food-related parenting practices and child weight-related outcomes to include an understanding of the nature of this relationship within an adolescent population and among racially/ethnically and socioeconomically diverse parent-adolescent dyads of different genders. The types of feeding strategies utilized within certain population-level subgroups (e.g., racial/ethnic groups, household income levels) will also be highlighted. Results from this dissertation set the stage for future longitudinal studies and provide a strong foundation from which to develop public health interventions and messages for families to promote healthy weight and appropriate weight-related behaviors among adolescents.

The literature review (Chapter 1) illuminates the need for this dissertation based on the existing body of science. The methods and analysis plan (Chapter 2) describes the study design, the creation of the food-related parenting practice scales, and how analyses were conducted. Chapters 3 and 4 are manuscripts that have been published within peer-reviewed journals (Appetite and Pediatrics) and Chapter 5 is a manuscript that has been submitted to a peer-reviewed journal (International Journal of Eating Disorders). The final chapter (Chapter 6) synthesizes findings from the research questions, providing implications for clinical practices and public health intervention, as well as recommendations for future research directions. Because the manuscripts are a product of the dissertation process and synthesis, there is some redundancy throughout this document.

1.1 Literature review

This section reviews the scientific literature on adolescent weight-related outcomes, including overweight, obesity, and disordered eating behaviors (e.g., dieting, unhealthy and extreme weight control behaviors, and binge eating). The first part will elucidate the negative consequences of obesity, dieting, unhealthy and extreme weight control behaviors and binge eating; touch on gaps in the literature; and illustrate why it is important to understand the role that food-related parenting practices have on these weight-related outcomes. As compared to the bulk of previous studies on food-related parenting practices,[21] this dissertation was conducted within an older and dramatically larger and more diverse sample. The EAT (Eating and Activity in Teens)-2010 and

Project F-EAT (Families and Eating and Activity in Teens) sample drew from communities of color, immigrant/refugee populations, and youth from low socioeconomic groups. Thus, disparities in these adolescent weight-related behaviors and weight status across sociodemographic characteristics will be briefly discussed to demonstrate the need to study associations between food-related parenting practices and adolescent weight-related outcomes within this racially/ethnically and socioeconomically diverse sample. Finally, relevant literature exploring associations between food-related parenting practices and weight status and weight-related behaviors will be discussed and gaps that remain within this body of literature will be identified.

1.1.1 Overweight and obesity among adolescents

The prevalence of overweight and obesity in American adolescents has reached a concerning plateau in the past three decades, with overweight or obesity impacting approximately one-third of youth aged 13-19.[26–29] Further, overweight and obesity are unequally distributed among adolescents by gender, family income, and race; the rate of overweight that exists within certain subgroups approaches fifty percent.[26,27,29–32] Boys aged 6-19 years have a greater prevalence of overweight and obesity than girls of the same age.[28] Children from lower socioeconomic status (SES) families and neighborhoods have a higher prevalence of overweight than youth from higher SES families and neighborhoods. [30,33,34] By race/ethnicity and gender, the prevalence of overweight remains the highest for Hispanic boys, but the prevalence is higher in non-Hispanic black girls than Hispanic girls.[28] When controlling for income by including only children in the highest SES group, black children continued to have twice the odds of being obese

compared to white children.[35] These disparities in overweight and obesity indicate that the long-term consequences of this trend will be unevenly distributed to those from a low SES backgrounds, minorities, and males.

Significant health consequences exist for adolescents who are obese.[36,37] Physical co-morbidities of obesity during adolescence include metabolic syndrome,[38–40] Type 2 diabetes,[41] hypertension,[38,42,43] hyperlipidemia,[44] sleep disorders,[45] and among girls, polycystic ovarian syndrome.[46] Adolescents who are overweight or obese have also reported psychosocial difficulties. Psychological and psychosocial problems, such as depression, [47–49] lower self-esteem, [50] lower quality of life, [51] and less perceived social acceptance [52] have also been associated with being overweight or obese as an adolescent. Both the physical and emotional consequences of overweight have the potential to place a significant burden on the adolescent, family, healthcare system and society in general when the prevalence of overweight and obesity is so high.

Further, some of these adverse health conditions may persist into adulthood. Longitudinal studies have shown that obese children have an increased risk of becoming overweight or obese adults. [53–56] Obesity during childhood has been linked to an increased likelihood of hypertension in adulthood. [53] Metabolic syndrome in childhood has been linked to metabolic syndrome and type 2 diabetes in adulthood. [40] High blood pressure and cholesterol in childhood have also been associated with poor cardiovascular outcomes in adulthood. [36,54,55] These few longitudinal studies indicate that there are significant long-term consequences of childhood obesity, many of which may not be fully

understood at this point as the rate of obesity has rapidly increased over the past few decades.

1.1.2 Dieting, unhealthy and extreme weight control behaviors, and binge eating among adolescents

Disordered eating behaviors, including dieting, unhealthy and extreme weight control practices and binge eating, are also a great public health concern for adolescents within the United States given both their high prevalence and harmful consequences. The high prevalence of these disordered eating behaviors among youth has been well documented throughout the literature[57–61] and research also suggests that as youth progress throughout adolescence to young adulthood their use of disordered eating behaviors persists[62] or even increases.[63–65] While disordered eating behaviors are most prevalent among adolescent girls, adolescent boys are also affected in significant numbers.[59,65,66]

Dieting, unhealthy and extreme weight control behaviors, and binge eating have also been found to predict a number of problematic health outcomes including weight gain,[67–72] obesity, [69–71] and eating disorders in adolescence and adulthood. [63,66,73–79] For example, a 10-year longitudinal study by Neumark-Sztainer and colleagues[80] found that adolescents engaging in dieting and those reporting unhealthy weight control behaviors had significantly greater increases in body mass index from adolescence to young adulthood as compared to adolescents who did not engage in these behaviors. The use of disordered eating behaviors has also been found to be associated with poorer dietary intake,[81–83] which is of particular concern given the high level of nutrients required to

support proper growth and development during adolescence. Disordered eating behaviors have also been associated with poorer psychosocial outcomes for adolescents, including lower levels of body image and self-esteem and increased depressive symptoms. [60,84–87] Youth who engage in disordered eating behaviors are also more likely to report using drugs, alcohol and cigarettes.[88,89] Overall, the ineffectiveness of dieting for weight gain prevention during adolescence, as well as the harmful consequences associated with the use of unhealthy and extreme weight control behaviors and binge eating, and the high prevalence of these behaviors during adolescence demonstrate the need to identify possible prevention strategies or modes for intervention.

1.1.3 The role of families in adolescent weight status and disordered eating behaviors

There is a growing body of evidence that many parental behaviors and other factors within the family environment are significant predictors of adolescent weight status and disordered eating behaviors, such as dieting, weight control behaviors, and binge eating. Research demonstrates that parents have the opportunity to influence their child's weight status through modeling of eating and physical activity behaviors, [1,5,6] choices regarding the foods and portion sizes provided within the home,[7–9] as well as though the establishment of family norms around appropriate food choices and eating behaviors. [6,7,9–12] Similarly, parental weight-related attitudes and behaviors,[13–16] specific family traditions (e.g., family meals),[16–18,90] family norms around weight-based teasing and weight and body talk,[16,19,20,91] have been shown to be associated with an adolescents engagement in dieting, unhealthy and extreme weight control behaviors and binge eating.

Although familial factors clearly contribute to adolescent weight status and the development of disordered eating behaviors in adolescents, questions remain with regard to the identification of specific familial factors that can have an impact on youth and are potentially amenable to change via brief interventions. Food-related parenting practices have been identified as a potentially significant correlate of child weight and disordered eating behaviors and thus have become a focus of scientific exploration.

1.1.4 Food-related parenting practices

Food-related parenting practices, or the techniques that parents use to influence children's eating, have been identified as a potentially significant correlate of child weight and dietary intake patterns.[21] Food-related parenting practices (often referred to as parental feeding practices within research conducted on infants and toddlers) consist of a wide range of behaviors including encouraging children to eat, or not eat, specific foods; requiring children to clean their plate at mealtimes; rewarding behaviors with favorite foods; and restricting the intake of particular foods (both healthy and unhealthy).[92] The most widely accepted and validated scale to measure food-related parenting practices is the Child Feeding Questionnaire (CFQ). [93] The CFQ has been adapted for use to study food-related parenting practices among parents of children from infancy to adolescence [94–97, 98] and across a wide variety of racial/ethnic subgroups.[93,99–103] This scale includes four subscales to assess parental beliefs about a child's feeding and weight (perceived responsibility, perceived weight of the parent, perceived weight of the child, concern about the child's weight) and three subscales that assess the parental use of specific

feeding strategies (restriction, monitoring, and pressure-to-eat) to maintain control over a child's eating.

The three types of control as measured by the CFQ are food restriction, pressure-to-eat, and monitoring. Food restriction occurs when parents limit or restrict their child's intake of certain foods or use a highly desired food item as a reward for consuming a less desirable food item. For example, parents might only allow their child to eat dessert after the child consumes a full serving of vegetables, thereby restricting the child's access to the dessert item until a particular requirement is met. The second strategy, pressure-to-eat, occurs when parents prompt or pressure their child to consume a certain amount of food or more of a particular type of food. One common example of a pressure technique would be parents' that require their child to eat all of the food on their plate prior to completing a meal. Finally, monitoring refers to the amount of watchfulness a parent exhibits over the child's intake of certain foods, such as sweets and high fat foods. Parents who report a high level of monitoring likely keeps a very close watch over the types and amounts of the different types of foods the child eats, whereas parents who report a low level of monitoring might be less sure of their child's consumption of particular food items.

To date, research findings have not shown significant associations[2,3,103–106] between parental monitoring and child weight or other weight-related outcomes and thus, to reduce participant burden and promote a good response rate, only the pressure-to-eat and restriction subscales were included in the Project F-EAT survey. Therefore, the focus

of this literature review will be to describe what is known about how food restriction and pressure-to-eat are associated with adolescent weight and weight-related behaviors.

1.1.4.1 Food-related parenting practices and sociodemographic characteristics

The vast majority of research examining the use of food-related parenting practices has been conducted within ethnically/racially or socioeconomically homogeneous populations.[21] Therefore, associations between parental feeding strategies and demographic (e.g., SES, race/ethnicity, child and parent gender, child age) have been examined less frequently within the literature. However, preliminary findings suggest that both the extent to which parents adopt controlling food-related parenting practices and the role that level of control plays in child weight and weight-related behaviors may differ across families, specifically with regard to race/ethnicity, parental education, or socioeconomic differences.[2,94,107–109]

Ethnic differences in food-related parenting practices have been reported between African American and non-Hispanic white parents,[109,110] Hispanic and African America parents,[111] and between Chinese American and non-Hispanic white parents,[112] suggesting that cultural values may influence food-related parenting practices. For example, a small study that included both non-Hispanic white (n=74) and African American (n=46) children with an average age of 11, found that African American mothers reported higher levels of food restriction and pressure-to-eat as compared to non-Hispanic white mothers after adjustment for child's total lean body mass and overall energy intake.[110] These findings were consistent with another study conducted within a sample of both African American and non-Hispanic white pre-adolescents (n=120).[2,109] Huang and colleagues

examined the use of food-related parenting practices within a sample of Chinese American and non-Hispanic white parents (n=168) and found that Chinese American parents had higher mean scores of restriction and pressure-to-eat.[112] Interestingly though, higher mean scores of restriction and pressure-to-eat were not found to be associated with increased child weight status among the Chinese American participants, whereas this positive association existed among the non-Hispanic white parent-child dyads.[112] Overall, research exploring the use of food-related parenting practices within socioeconomically diverse populations is limited, but preliminary evidence from studies conducted with relatively small samples (n range = 91-219) suggests that levels of food restriction are higher among parents with greater access to economic resources (e.g., higher SES and education level).[113–115] In contrast, greater access to economic resources has been negatively associated with the use of pressure-to-eat parenting practices.[3,115]

The inconsistencies seen in the literature examining the role of sociodemographic characteristics in the use of specific food-related parenting practices is likely due to wide variability in the diversity of samples, the use of convenience sampling techniques, and the use of different measures of food-related parenting practices. Further, because research to date has often explored the role of race/ethnicity or SES, and not both, on the association between food-related parenting practices and weight-related outcomes, studies have lacked the ability to mutually control for the correlation that often exists between race/ethnicity and SES.[21] Without the ability to mutually control these variables, one cannot separately assess the independent association between race/ethnicity and SES and food-related parenting practices. These limitations, in combination with the unequal

distribution of overweight and other weight-related behaviors by race/ethnicity and SES support the need for further exploration of how food-related parenting practices might differ across these important demographic characteristics in more complex ways.

Few studies of food-related parenting practices have included separate assessments of these behaviors by mothers and fathers limiting the ability to explore potential associations between parent gender and use of specific food-related parenting practices. Thus far, results have been inconclusive.[22–24] A study by Brann (n=49, Age 8-10 years old) concluded that fathers utilized more controlling feeding strategies than mothers, but noted no difference in the association between the use of these behaviors and children's outcomes.[23] In contrast, Johannson (n=211) found no difference between the levels of control utilized by mothers and fathers, but found that father's use of control was more strongly associated with girls BMI as compared to mother's report of controlling strategies.[24] A study by Blissett (n=188) also found no notable differences in level of food restriction or pressure-to-eat reported by mothers and fathers, but did find association between use of controlling food-related parenting practices and adolescent weight-related outcomes was strongest among mother-daughter and father-son pairs.[22] Each of these studies were limited to very small, convenience-based samples suggesting that differences in the use and impact of feeding strategies utilized by mothers and fathers is an area that requires further exploration.

The role of child gender has been explored more frequently, although findings are inconsistent.[107,109,116–118] Initial studies reported that greater use of controlling strategies was positively associated with weight-related outcomes, including weight status, body

fat, and calorie consumption, in girls but not in boys.[107,117–119] However, a study by Spruijt-Metz [109], conducted within a sample of 120 children (74 white, 26 African American), concluded that the impact of feeding strategies on child outcomes is similar for both boys and girls. Overall, because the bulk of work examining the relationship between food-related parenting practices and child outcomes has been conducted within samples of girls, the role of child gender in this association is not yet clear.

Finally, because the bulk of research examining parental feeding strategies has been conducted within populations of toddlers and young children our understanding of the role of food-related parenting practices on weight-related outcomes is limited to children within these two age groups.[21] On one hand, young children are an appropriate target population for initial exploration of food-related parenting practices given that children at this age are primed for learning new behaviors and are primarily influenced by their parents. However, parents do influence adolescent dietary intake patterns and dietary behaviors established during adolescence often become lifelong in nature.[120] Given the high prevalence of weight-related problems in adolescents [28] and the difficulty parents can encounter in providing a balance of structure and autonomy for their adolescent children, additional research is needed to explore what specific types of food-related parenting practices are being utilized by parents of adolescents.

1.1.5 The role of food-related parenting practices in adolescent weight status and -weight-related behaviors

1.1.5.1 Food-related parenting practices and weight status

Past cross-sectional studies conducted in samples of white, high-income, mother-daughter dyads revealed that food restriction is significantly and positively associated with child weight status.[97,116,118,121,122] Two separate longitudinal studies conducted within comparable samples revealed similar associations.[123,124] However, results from more recent longitudinal studies challenge the simplicity of this association revealing inconsistent and sometimes opposite findings. A two-cohort study reported that higher parental restriction at baseline was associated with lower child Body Mass Index z-score (BMI-z) at follow-up within the younger cohort (5-6 year-olds); no association was found within the cohort of pre-adolescents (10-12 year-olds).[95] This null finding is consistent with the only other study conducted within a sample of pre-adolescents.[2] A study conducted within a younger population (1-2 year-olds) found that high levels of food restriction at baseline were protective against unhealthy weight gain at follow-up.[125] Thus, although the use of less-controlling food-related parenting practices is increasingly supported as a method to promote a healthy weight for children[126], evidence of the association between food-related parenting practices and child weight remains equivocal.[2,21,95,124,127–129]

Findings from research examining the association between parental pressure-to-eat and child weight-related outcomes are similarly inconsistent. A small number of cross-sectional studies have found parental pressure-to-eat to be negatively associated with Body Mass Index (BMI) [105,115,129–131] and fat mass in toddlers and young children.[97,98] A possible explanation for this association is that parents who have children who have a lower weight status may pressure them to eat more than parents of children

who are overweight. Parents of normal- or underweight children report using more pressure-to-eat than parents of children who are overweight.[115,130,132,133] Similarly, parents of overweight children are less likely to pressure their children to eat.[23,134] However, some findings contradict the inverse relationship between pressure-to-eat and BMI. Pressure-to-eat has been positively associated with percent body fat in girls.[24] Other studies have found no association between pressure-to-eat and children's BMI. [25,103,106,135]

The inconsistencies seen in the literature examining the associations between food-related parenting practices (food restriction and pressure-to-eat) and child weight status, may be due to wide variability in the racial/ethnic and socioeconomic diversity of samples, vast differences in the age of children included in samples (toddlers to pre-adolescents), and the use of different measures of food-related parenting practices. Further, reliance on a large number of findings gathered from cross-sectional studies prevent the assessment of temporality, making it difficult to draw accurate conclusions about direction of observed associations.

1.1.5.2 Food-related parenting practices and weight-related behaviors

Controlling food-related parenting practices, including food restriction and pressure-to-eat, have been cross-sectionally associated with negative dietary patterns and cognitions related to food and eating in children. For example, high levels of food restriction and pressure-to-eat have been associated with increased levels of dietary restraint,[96] disinhibited eating,[96,97,136] emotional eating,[96,122,136] eating in the absence of hunger,[123,132] and negative self-evaluation of food and eating in young children.[137] A longitudinal cohort of young girls (5 years old) followed by Birch and colleagues provide

the bulk of the information we have on associations between food-related parenting practices and dietary patterns and cognitions.[96,121,123,138] Pressure-to-eat was associated with girls' emotional disinhibition, reports of dietary restraint, and overall disregulation of innate self-regulation mechanisms.[96,121,136] Food restriction by parents was associated with disinhibition in the presence of palatable food, increased eating in the absence of hunger, as well as girls' reports of negative emotions (e.g., shame, guilt) in response to eating restricted foods.[123,132,137] The associations between parental food restriction and pressure-to-eat and these negative dietary patterns and cognitions among young people is of particular concern given that these patterns and cognitions have been identified as precursors to the development of more serious behaviors such as dieting, disordered eating, and binge eating in adolescent and adult populations.[138–140]

1.1.5.3 Relevant laboratory and observational findings

Observational methods, including meal video-taping in homes and laboratory-based meals have also been utilized to assess food-related parenting practices.[10,21,113,116,117,121,141–146] These types of studies provide the benefit of allowing researchers to observe first-hand how children react to different types of food-related parenting practices, without needing to rely on report from parent or child. However, while well-validated observation-based instruments do exist,[10,119,123,124,145] findings from studies that utilize caregiver-report methods have been shown to both better capture habitual feeding strategies and to be more generalizable to real-world settings.[141] Nonetheless, it is important to consider, although with some caution, what researchers have learned through observation-based studies.

When both boys and girls (varied weight status) were restricted from eating a particular food in a laboratory setting, their interest in, and consumption of, this food item was increased once the restriction was removed.[121,147] There may also be gender differences in this behavior since another study found that parental food restriction in the laboratory setting was related to increased consumption by girls, but not by boys.[119] Children who were not pressured-to-eat in the laboratory setting consumed significantly more of a food and made fewer negative comments about the food than the children who were pressured to eat it. [142] Children of mothers who reported using more of all three controlling practices at home, exhibited less ability to regulate what they ate in the laboratory environment than children whose mothers reported using less control at home. [117] Another study examined the influence of pressure through the frequency of prompts to eat by the mothers of the children and assessed differences by mothers' weight status. Although the frequency of prompting was the same for both mothers who were obese and not obese, children of obese mothers ate significantly more in response to pressure-to-eat than children with normal weight mothers.[146] In the home, most parents were observed to pressure their child to eat during dinner and the majority of children ate more in response to prompting 2007).[113,145]

Overall, findings from laboratory studies suggest that children respond to both restriction and pressure-to-eat techniques from their parents by altering their food preferences and intake patterns; they show an increased interest in and consumption of restricted food items once they become available to them and tend to eat less of and talk more negatively about food items they are pressured-to-eat. Further, it seems that

children who are exposed to an overall higher level of control (i.e. higher levels of all feeding strategies) tend to have less of an ability to regulate their food intake. These findings, while preliminary, serve as excellent tools for the generation of hypotheses surrounding how the use of food-related parenting practices might impact weight-related outcomes.

1.2 Research aims and hypotheses

This dissertation built upon two existing cross-sectional studies, Project F-EAT (Families and Eating and Activity Among Teens) (PI: Neumark-Sztainer) and EAT (Eating and Activity Among Teens) 2010 (PI: Neumark-Sztainer), to assess the association between parent report of food-related parenting practices and adolescent report of weight status and weight-related behaviors. By directly linking data collected from individual middle and high school students (n=2,793) and at least one of their parents (n=3,709), this dissertation greatly expands the field's current understanding of the relationship between food-related parenting practices and weight-related outcomes in adolescents.

Specifically, the objectives of this study were to explore the types of food-related parenting practices utilized by a racially/ethnically and socioeconomically diverse population of parent-adolescent pairs and to assess the relationship between food-related parenting practices and adolescent weight status and disordered eating behaviors. To achieve these objectives, I defined the following three aims.

- Specific Aim 1: Examine cross-sectional associations between food-related parenting practices (pressure-to-eat and food restriction) and socio-demographic

characteristics (parent gender, race/ethnicity, education level, employment status, and household income) within the diverse, population-based, sample of parents who participated in Project F-EAT.

  - *Hypotheses for Specific Aim 1*: Parents with greater access to socioeconomic resources (high income level, high educational attainment, and full/part-time employment) will report less use of both food restriction and pressure-to-eat as compared to parents with less access to socioeconomic resources (low income level, low educational attainment, and unemployment). The strongest negative association will be seen between income level and use of food restriction and pressure-to-eat behaviors. Ethnically/ racially-diverse parents will demonstrate higher levels of both food restriction and pressure-to-eat as compared to white parents. No associations will be seen between parent gender and use of food restriction or pressure-to-eat.

- Specific Aim 2: Examine cross-sectional associations between food-related parenting practices (pressure-to-eat and food restriction) and adolescent weight status among all parent-adolescent dyads who participated in Project F-EAT and EAT 2010. Associations will be examined separately for mothers and fathers as well as boys and girls to allow for a full examination of the role of gender in these associations and interactions by race/ethnicity and household income level will be explored.

- *Hypotheses for Specific Aim 2*: Higher mean levels of parental food restriction and lower mean levels of parental pressure-to-eat will be associated with greater adolescent weight status.

- Specific Aim 3: Examine cross-sectional associations between food-related parenting practices (pressure-to-eat and food restriction) and adolescent disordered eating behaviors, including dieting, unhealthy and extreme weight control behaviors, and binge eating, among all parent-adolescent dyads who participated in Project F-EAT and EAT 2010. Associations will be examined separately for mothers and fathers as well as boys and girls to allow for a full examination of the role of gender in these associations and interactions by adolescent weight status will be explored.
    - *Hypotheses for Specific Aim 3*: Higher levels of pressure-to-eat and food restriction would be associated with an increased prevalence of engaging in dieting, unhealthy and extreme weight control behaviors, and binge eating among both male and female adolescents.

1.3 Theoretical framework for study

As expressed within the previous sections, there is a growing body of evidence that many parental behaviors and factors within the family environment are significant predictors of adolescent weight status and disordered eating behaviors, including dieting, weight control behaviors and binge eating. However, it is also widely acknowledged that to develop a more complete understanding of the many factors that play a role in the development adolescent weight status and disordered eating behaviors, levels of

influence beyond the family and home must also be considered. Thus, the theoretical model guiding this dissertation research is composed of components of both the Social Ecological Model, as well as a more focused contextual model for child weight and weight-related behaviors proposed by Davison and Birch.[148]

The Social Ecological Model developed by McLeroy and colleagues[149] provides a framework to better understand the many levels of influence associated with adolescent weight and weight-related behaviors and was this model used to guide the development of the EAT 2010 and Project F-EAT research studies. The Social Ecological model emphasizes the notion that a particular health outcome or health behavior cannot be effectively explained without considering the context in which the individual of interest is embedded. The Social Ecological Model states that health outcomes and behaviors are affected by multiple levels of influence: intrapersonal (e.g., individual child characteristics), interpersonal (e.g., peer relationships), institutional (e.g., school-level variables), community and societal factors (e.g., neighborhood characteristics, public policy). These five levels of influence interact through reciprocal determinism, which argues that personal, behavioral, and environmental influences do not function independently, but rather in a dynamic interrelationship of behavioral influences and health outcomes.

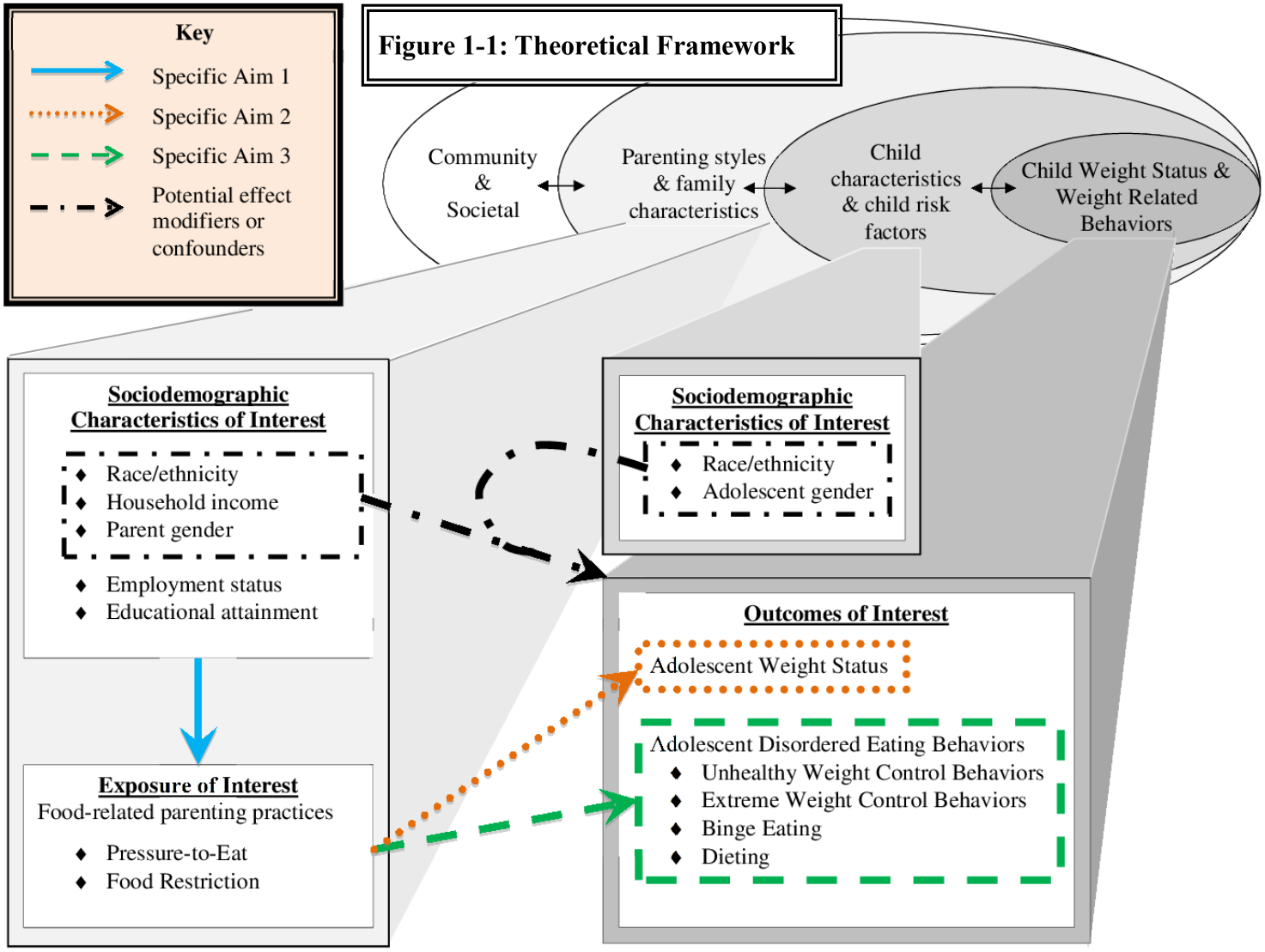
Guided by the Social Ecological Model, Davison and Birch created a contextual model which highlights specific proximal and distal influences on children's weight and weight-related behaviors, with a particular focus on the strong influence that parenting styles and family characteristics have on a child's weight status and weight-related

behaviors.[148] In the development of their contextual model, Davison and Birch noted that research has suggested that parents mold children's behavioral patterns by their own behaviors (i.e. modeling) and by specific food-related parenting practices, such as the types and quantities of food parents present to children. They also state that food-related parenting practices may be influenced by characteristics of the child and the child's family, such as a child's age, gender, and weight status or a families' racial/ethnic background or SES. Birch and Davison theorize that the bi-directional interactions that exist between parent and child highlight the importance of considering the association between food-related parenting practices and child weight and weight-related behaviors within a theoretical framework that considers the process and impact of reciprocal determinism. Both the general Social Ecological Model[149] and the more specific conceptual framework proposed by Davison and Birch[148] allow for this consideration and thus, were used to guide the development of the study aims for this dissertation.

Figure 1-1 illustrates how the study aims are integrated within the Social Ecological Framework, with input from the contextual model developed by Davison and Birch.[148] Because the association between food-related parenting practices and adolescent weight and weight-related outcomes are the primary focus of this dissertation, the "Parenting Styles and Family Characteristics" and the "Child Weight Status and Weight-Related Behaviors" sections of the model have been magnified to better illustrate the hypothesized relationships. Distinct arrows are utilized to highlight hypothesized associations for each of three Specific Aims addressed in this dissertation, as well as to identify potential effect modifiers or confounders. The role of specific child

characteristics and child risk factors (e.g., taste preferences, body satisfaction) and community/societal factors (e.g., availability/pricing of foods, media images) in adolescent weight status and weight-related behaviors, have been and are being studied elsewhere. This dissertation focused on the gap in the literature regarding food-related parenting practices and their relationships with adolescent weight and disordered eating outcomes.

It is important to note that this dissertation exists within the larger context of both Project F-EAT [150–153] and EAT 2010:[154–158] the primary aims of these umbrella studies assessed other levels within the socio-ecological model. For example, data were collected at the community/societal level using Geographic Information Systems and surveys of the school nutrition and physical activity environment were collected for each school. While collecting data from the community/societal level is key to gaining a comprehensive understanding of factors related to adolescent health and nutrition, this dissertation focused on the parenting styles and family characteristics level of the above model


Key
Specific Aim 1
Specific Aim 2
Specific Aim 3
Potential effect modifiers or confounders
Figure 1-1: Theoretical Framework
Community & Societal
Parenting styles & family characteristics
Child characteristics & child risk factors
Child Weight Status & Weight Related Behaviors
Sociodemographic Characteristics of Interest
Race/ethnicity
Household income
Parent gender
Employment status
Educational attainment
Exposure of Interest
Food-related parenting practices
Pressure-to-Eat
Food Restriction
Sociodemographic Characteristics of Interest
Race/ethnicity
Adolescent gender
Outcomes of Interest
Adolescent Weight Status
Adolescent Disordered Eating Behaviors
Unhealthy Weight Control Behaviors
Extreme Weight Control Behaviors
Binge Eating
Dieting

1.4 Summary and rationale

This dissertation assessed, for the first time in a large, population-based sample of mothers, fathers, and adolescents, the association between food-related parenting practices and weight-related outcomes in adolescents. To date, most studies investigating the influence of food-related parenting practices on weight-related outcomes have been conducted within racially/ethnically and socioeconomically homogenous samples of toddlers and young children and have been limited to report of food-related parenting practices from mothers only. This study filled these important gaps in the literature, while providing insights for family-based interventions and public health messages aimed at parents of adolescents.

The unique datasets in which this dissertation was conducted allowed for examination of how several food-related parenting practices were associated with a variety of weight-related outcomes in adolescents depending on the gender of the parent utilizing the strategy or the gender of the adolescent on the receiving end of the strategy. By collecting information on food-related parenting practices from mothers and fathers, as well as weight-related outcomes from both male and female adolescents we were able to conduct an in-depth examination of the role of gender in these associations. Finally, the diverse population from which the data were collected allowed for an in-depth examination of what subgroups of the population (e.g., race, SES, parent gender) were most likely to utilize different food-related parenting practices with their adolescent children and also allowed for increased confidence in the generalizability of study findings to other similarly diverse populations.

Chapter 2

Study design and analytic methods

The purpose of this chapter is to outline the measures and analysis approaches that were used to examine the study aims for this dissertation. A brief overview of the larger Project F-EAT and EAT 2010 study designs and measurement tools are provided, followed by detailed descriptions of the specific measures, models and analysis methods utilized for each specific aim.

2.1 Study design and participants

Data for this dissertation were drawn from two coordinated, population-based studies: 1) Project F-EAT, a study of parents that was designed to examine influences

within the family and home environment on eating, physical activity, and weight-related behaviors of adolescents,[150–153,159,160] and 2) EAT 2010, a study of adolescents in the Minneapolis/St Paul metropolitan area that was designed to examine dietary intake, physical activity, weight control behaviors, weight status and factors associated with these outcomes in adolescents.[154–158] Project F-EAT surveys were completed by a sample of 3,709 parents or guardians of the adolescents enrolled in the EAT 2010 study. Along with completing survey instruments and anthropometric measurements, adolescent participants in the EAT 2010 study (n=2,793) were asked to identify up to two parents or guardians; 30% provided contact information for one parent/guardian and 70% provided information for two parents/guardians. The Project F-EAT study sample was comprised of the parents and guardians for whom adequate contact information was provided.

2.1.1 Project F-EAT overview

Parents were initially mailed an invitation letter describing the Project F-EAT study; this letter included a phone number to call if they preferred to complete the survey over the telephone. A follow-up mailing included the Project F-EAT survey, a consent form, a two dollar bill and a postage-paid return envelope. To enhance participant response, parents were mailed a reminder postcard after two weeks and a second copy of the survey if they did not respond within one month. Additionally, up to eight attempts were made by trained interview staff to contact non-responders so they might complete the survey by phone. To meet the needs of this culturally-diverse group of parents, both the mailed and telephone survey were available in English, Spanish, Hmong, and Somali and the telephone survey was additionally offered in Oromo, Amharic and Karen.

Participants who completed the mailed or telephone survey were sent a $25 gift card. Data collection ran from October 2009 to October 2010 and was conducted by Wilder Research in St. Paul, Minnesota (http://www.wilderresearch.org).

Surveys were mailed to a total of 4,777 parents/guardians of adolescents and 3,709 (77.6%) parents responded (67% of adolescents had two parents respond). The majority of respondents (77.8%) completed a paper survey by mail. Parental response rates did not differ by adolescent gender, age, socio-economic status, or language spoken at home; but rates did differ by race/ethnicity with the highest response rates among the parents of white adolescents. Response rates were 92.4% for parents of white adolescents, 85.8% for Hispanic adolescents, 85.8% for parents of Asian American adolescents, 82.8% for parents of mixed/other adolescents, 82.4% for parents of African American adolescents, and 74.5% for parents of Native American adolescents. Details on the demographics of parent participants can be found in Table 2-1.

2.1.2 EAT 2010 overview

For EAT 2010, surveys and anthropometric measures were completed by 2,793 adolescents during the 2009-2010 academic year. The study population included adolescents from 20 public middle schools and high schools in the Minneapolis/St. Paul metropolitan area of Minnesota, which serves socioeconomically and racially/ethnically diverse communities. The mean age of the study population was 14.4 years (SD = 2.0); 46.1% were in middle school (6^{th}-8^{th} grades) and 53.9% were in high school (9^{th}-12^{th} grades). Adolescent participants were equally divided by gender (46.8% boys, 53.2% girls). The racial/ethnic backgrounds of participants were as follows: 20.1% white, 27.4% African American or Black, 20.4% Asian American, 17.6% Hispanic, and 15.6 mixed

race or other. Most of the Asian American population was from Southeast Asia; approximately 82.7% of this group were Hmong. Additional details on adolescent participants can be found in Table 2-1.

Trained research staff measured adolescents' height and weight using standardized procedures[161] and administered surveys during select health, physical education and science classes. Measurements were completed in a private area and surveys were administered during two class periods that were typically 45-50 minutes. Following survey completion, participants were given a $10 gift card. Adolescents were given the opportunity to assent only if their parent/guardian did not return a signed consent form indicating their refusal to have their child participate. Among adolescents who were at school on the days of survey administration, 96.3% had parental consent and chose to participate.

Table 2-1. Characteristics of the EAT 2010 and Project F-EAT Samples		
	EAT 2010 Adolescents (N=2231)	**Project F-EAT Parents/Caregivers (N=3431)**
	N (%)	**N (%)**
Gender		
Male	1045 (46.8)	1282 (37.4)
Female	1186 (53.2)	2149 (62.6)
Race		
White	448 (20.0)	979 (29.8)
African American	611 (27.3)	823 (25.1)
Hispanic	392 (17.5)	595 (18.1)
Asian American	455 (20.2)	717 (21.8)
Mixed race/other	325 (15.0)	169 (5.2)
Completed Education		
Did not finish high school	--	1070 (29.3)
High school/GED	--	800 (21.9)
Some college/training	--	967 (26.4)
Completed college	--	573 (15.7)
Advanced degree	--	248 (6.8)
Employment Status		
Working full-time	--	1891 (51.0)
Working part-time	--	553 (15.2)
Stay-at-home caregiver	--	374 (10.3)
Currently unemployed	--	406 (11.2)
Not working for pay	--	417 (11.5)
Household Income	--	
Less than $20,000	--	1041 (31.3)
$20,000 – $34,999	--	726 (21.6)
$35,000 – $49,999	--	522 (15.6)
$50,000 – $74,999	--	413 (12.4)
$75,000 +	--	641(19.1)
Weight Status		
Underweight	130 (6.4)	223 (6.5)
Non-Overweight	1102 (54.1)	966 (28.0)
Overweight	359 (17.6)	1191 (34.6)
Obese	446 (21.9)	1066 (30.9)

2.2 Survey development

2.2.1 Project F-EAT parent survey

The Project F-EAT survey is a 129-item, self-report instrument designed to gather information on adolescents' family and home environments with relevance to dietary intake, physical activity, and weight-related health. Survey items were drawn from several sources, including a previous Project EAT parent survey,[162,163] corresponding measures from the EAT 2010 student survey, and existing surveys from the scientific literature. Several new questions were also developed by the research team to address the study aims.

After a draft of the Project F-EAT survey was prepared, several steps were undertaken to ensure the questions were appropriate for the intended population and to inform decisions about reducing the overall length of the survey. Initially, content area experts reviewed the survey to ensure that key constructs of relevance to adolescent weight-related behaviors and outcomes were included. Further, survey appropriateness for the major cultural subgroups participating in the study (i.e. Native American, Hmong, Latino, Somali, and African American groups) was addressed by having bi-cultural staff from the Wilder Research Foundation review the survey and provide feedback on the appropriateness and relevance of the survey items. Next, three focus groups were conducted to pre-test an initial draft of the Project F-EAT survey. Feedback from the 28 socioeconomically and ethnically/racially diverse parent participants was used to reword or eliminate problematic survey items and expand on topic areas of perceived importance (e.g.,, family meals, conversations about weight at home) prior to additional pilot testing.

Recommendations from each of these sources were carefully considered and a revised survey was pilot tested with a sample of 76 parent participants to examine test-retest reliability and the internal consistency of the scales. These results were used to further refine the wording of items and to inform decisions about reducing the overall length of the survey.

Once a final draft of the Project F-EAT survey was developed in English, the written survey was professionally translated into Spanish, Somali, and Hmong. Following translation, bilingual staff members at Wilder Research Foundation reviewed the translated survey, adjustments to translation were made when appropriate and the updated surveys were returned to the original translators for final review and approval. During fielding of the Project F-EAT survey a sample of 102 parents completed the survey twice in a two-week time period to examine the test re-test reliability of all items included in the final survey. Finally, scale psychometric properties were examined within the full Project F-EAT sample.

2.2.2 EAT 2010 adolescent survey

The EAT 2010 survey is a 235-item self-report instrument assessing a range of factors of potential relevance to weight status and weight-related behaviors among adolescents. Survey development was initially guided by a review of previous Project EAT surveys to identify the most salient items [164,165] and a theoretical framework, which integrates an ecological perspective with Social Cognitive Theory.[166,167] When a draft of the EAT 2010 survey was complete, the measures were subsequently pre-tested by 56 adolescents with diverse backgrounds to examine their understandability and relevance.

This draft survey was additionally reviewed by a team of experts in the domains of nutrition, physical activity, adolescent development, body image, family relations, and urban design. Following revisions based on initial pretesting and feedback from the expert reviewers, the survey was further pilot tested with a different sample of 129 middle school and high school students to examine the test-retest reliability of measures over a one-week period and the internal consistency of scales. The results were used to further refine the wording of measures and to inform decisions about reducing the overall length of the survey.

2.2.3 EAT 2010 anthropometric measurements

Adolescent weight and weight measurements were assessed in a private area at school by a trained research assistant, using standardized equipment and procedures.[161] Adolescents' weight was measured, in street clothes, twice and both measurements were recorded to the nearest 0.1 kg. If there was a discrepancy of greater than 0.5 kg between the two measurements, a third measurement was taken. Similarly, height without shoes was measured twice according to the Frankfort Plane technique and both measurements were recorded to the nearest 0.1 cm. If there was a discrepancy >0.5 cm, a third measurement was taken. The multiple measurements were then averaged to produce a single height and weight for each subject. Height was assessed using a portable stadiometer and weight was assessed with a portable digital scale, which was calibrated daily with a certified 5 kilogram weight.

2.3 Contributions of the author

Katie Loth has been a member of the EAT 2010 and Project F-EAT study teams since September of 2008. Katie served as the Project Director of Project F-EAT and began her work with the project during the initial stages of grant writing for Project F-EAT, allowing her to be heavily involved with initial grant writing and resubmission. In her role as Project Director, Katie led the study team through the development and pilot testing of all study measures; developed data collection protocols; oversaw data collection; completed all necessary IRB applications and follow-up documents; and contributed to data management, analysis, and publication development. Further, her involvement with Project F-EAT from the beginning allowed her to be intentional about the inclusion of particular survey questions within the Project F-EAT parent survey, including the questions assessing food-related parenting practices that serve as the basis for this dissertation research.

2.4 Description of specific measures

Specific food-related parenting practices were self-reported by parents on the Project F-EAT survey using ten questions drawn from the CFQ developed by Birch and colleagues[93] which was designed to assess what is often referred to within the extant literature as parental feeding practices. The term food-related parenting practices was developed for, and utilized throughout this dissertation, in an effort to better reflect the relationship between parent and adolescent with regard to food and feeding, whereby the parent does not actually engage in "feeding" as they might with a toddler or young child.

The CFQ has demonstrated excellent reliability and validity in number of ethnically and socioeconomically diverse samples.[94–98,168] Further, a validation study conducted by Kaur and colleagues[98] confirmed that the CFP is appropriate for use within an adolescent population with some small modifications.

2.4.1 Food-related parenting practices

Food Restriction: Restrictive food-related parenting practices were measured using six items from the eight-item Restriction Subscale of the CFQ, a subscale designed to measure a caregiver's attempts to control their child's eating by restricting access to palatable foods. It addresses restriction of both the amount and types of foods. Two items from the subscale were dropped based on recommendations from the validation study conducted by Kaur and colleagues (i.e. favorite food/sweets offered as reward).[98] The six self-report items included: 1) "I have to be that sure that my child does not eat too many high fat foods," 2)"I have to be sure that my child does not eat too many sweets (candy, ice cream, cake or pastries)," 3) "I have to be sure that my child does not eat too much of his/her favorite foods,"4) "If I did not guide or regulate my child's eating, he/she would eat too much of his/her favorite foods," 5) "I intentionally keep some foods out of my child's reach," and 6) "If I did not guide or regulate my child's eating, he/she would eat too many junk foods." Response options were modified slightly from the original CFQ and included 'disagree', 'slightly disagree', 'slightly agree', and 'agree' (the 'neutral' response option was dropped). For analysis of individual items, parental agreement with a particular statement was defined as a response of slightly agree or agree. An overall food restriction scale was created by averaged responses to each of these six questions to

assign an overall food restriction score ranging from 1 (low restriction) to 4 (high restriction). (Test-retest agreement = 0.72, Cronbach's alpha = 0.86).

The decision to drop the 'neutral' response option was made during Project F-EAT survey development in response to a review of the survey development literature. Survey development research emphasized that survey writers should carefully consider including a neutral response category within a Likert scale. Research indicates that participant selection of the neutral response can be indicative of a wide variety of unique things, including: 1) the participant preferred not to respond to this particular question, 2) the participant would like to provide the most socially desirable response, but is unsure of what response is most desirable, 3) the participant is overwhelmed by available response options and selects 'neutral' to allow themselves to more quickly move on to the next question, and 4) because the respondent honestly feels neutral with regard to the question being asked. Because one cannot determine why an individual selects the response option they do, the survey development literature concludes that 'neutral' responses options be avoided within Likert scales, unless it is likely that the individual respondent would truly have a truly neutral response to the question at hand. Because it was determined by the Project F-EAT research team that parents within our sample were likely have some opinion (i.e. not neutral) related to their use of specific food-related parenting practices with their adolescent child, we decided that including a neutral response category within our Likert response options would be unnecessary, and potentially detrimental to our correct interpretation of participant responses.

Pressure-to-eat: Pressure-to-eat food-related parenting practices were measured using the full four item Pressure-to-Eat Subscale of the CFQ. The pressure-to-eat subscale was designed to measure a caregiver's tendency to pressure their child to eat more food, typically at mealtimes. The four items that compose this subscale are: "My child should always eat all the food on his/her plate," "I have to be especially careful to make sure my child eats enough," "If my child says, 'I'm not hungry,' I try to get him/her to eat anyway," and "If I did not guide or regulate my child's eating, my child would eat much less than he/she should." As with the Restriction Subscale, individual items were measured using a 4-point Likert scale, with each point on the scale represented by a word anchor (disagree, slightly disagree, slightly agree, and agree). For analysis of individual items, parental agreement with a particular statement was defined as a response of slightly agree or agree. An overall pressure-to-eat scale was created by averaged responses to each of these six questions to assign an overall pressure-to-eat score ranging from 1 (low pressure-to-eat) to 4 (high pressure-to-eat). (Test-retest agreement = 0.73, Cronbach's alpha = 0.70).

2.4.2 Adolescent weight status and disordered eating behaviors

Adolescent Weight Status: BMI was calculated using the formula weight in kilograms divided by height in meters squared. Age- and gender-specific cut-points for non-overweight, overweight and obesity were based on the 2000 CDC Growth Charts.[169,170] These growth charts take into account the participants' gender and age in months to calculate a BMI-for-age percentile relative to US children from data between the years of 1963 to 1980.[169–171] Due to concern that adolescents with a BMI in the underweight range

(<15% BMI; n=48) might differ significantly from other adolescents in our population in a number of important and potentially unmeasured ways (i.e. chronic health problems, severe food allergies, etc.), these individuals were not included when examining associations between food-related parenting practices and adolescent weight status (Specific Aim 2, Chapter 4), but were included in all other analyses.

Unhealthy and Extreme Weight Control Behaviors: Participants were asked to self-report engaging in unhealthy and extreme weight control behaviors by responding to this question: "Have you done any of the following things in order to lose weight or keep from gaining weight during the past year?" (yes/no for each method). Respondents who reported using one or more of the following behaviors will be coded as using unhealthy weight control behaviors: fasted, ate very little food, used a food substitute (powder or a special drink), skipped meals, and smoked more cigarettes. Behaviors categorized as extreme included the following: took diet pills, made myself vomit, used laxatives, and used diuretics. Those reporting the use of one or more of these behaviors were coded as using extreme weight control behaviors. (Test-retest agreement = 85% [unhealthy behaviors] and 96% [extreme behaviors]).[72]

Binge Eating: Participants self-reported binge eating by responded to two questions, "In the past year, have you ever eaten so much food in a short period of time that you would be embarrassed if others saw you (binge eating)" (yes/no). If participants responded yes, they were asked, "During the times when you ate this way, did you feel you couldn't stop eating or control what or how much you were eating" (yes/no). (Test-retest agreement = 90% [first question] and 75% [second question]).[82,140]

Dieting: Participants self-reported their dieting frequency by responding to this question: "How often have you gone on a diet during the last year? By 'diet' we mean changing the way you eat so you can lose weight." Response options included "never," "1-4 times," "5-10 times," "more than 10 times," and "I am always dieting." In alignment with previous research conducted on adolescent dieting behaviors,[172] responses were dichotomized into non-dieters (responded never) and dieters (all other responses) (Test-retest agreement [non-dieter versus dieter] = 82%).

2.4.3 Parent weight status and parental sociodemographic characteristics

Parental weight status: Height and weight were assessed by self-report. Adult participants were asked to provide their height to the nearest feet and inches and their weight to the nearest pound on the survey. Self-reported height and weight has been shown to be highly correlated with objectively measured values in adults.[173] BMI was calculated using the formula weight in kilograms divided by height in meters squared. (Test-retest agreement = 97%).

Race/ethnicity: Parent race/ethnicity was assessed by the following item: "Do you think of yourself as: 1) White; 2) Black or African American; 3) Hispanic or Latino; 4) Asian American; 5) Hawaiian or Pacific Islander; 6) American Indian or Native American; and 7) Other." [72,165] If a parent selected "Other" there was a space to fill in the racial/ethnic category with which they identified. Parents were given the option to choose more than one category, and those with multiple responses were coded as "mixed/other" for analyses. (Test-retest agreement = 99%).

Parent employment status: Parent employment status was assessed with one item: "Which of the following best describes your current work situation?".[174] Five response options were available: working full-time, working part-time, stay-at-home caregiver, currently unemployed but actively seeking work, and not working for pay. Due to small sample size, "currently unemployed but actively seeking work" and "not working for pay" were collapsed for analysis. (Test-retest agreement = 82%).

Parental educational attainment: Educational attainment was assessed with the question: "What is the highest grade or year of school that you have completed?".[174] Response options included "Did not finish high school", "Finished high school or got GED", "Some college or training after high school", "Finished college" and "Advanced degree". Due to small sample size, "finished college" and "advanced degree" categories were collapsed for analysis. (Test-retest agreement = 84%).

Household income: Household income was assessed with one item: "What was the total income of your household before taxes in the past year?' Six response option categories were offered: "less than $20,000", "$20,000 to $34,999", $35,000-$49,000", "50,000 to $74,999", '$75,000 - $99,999", and "$100,000 or more". (Test-retest agreement = 74%)

2.5 Statistical analyses

Simple frequencies and descriptive statistics were calculated for each variable. Descriptive statistics were calculated for each of the independent variables (adolescent weight status, dieting, unhealthy weight control behaviors, and binge eating). Differences in each dependent variable (pressure-to-eat and restriction) across gender (parent and child), race/ethnicity, and household income were examined using chi-square statistics, t-

test, and analysis of variance (ANOVA). Appropriate summary statistics including the mean, median, and standard errors were calculated. Data were also examined for irregularities and missing data patterns.

2.5.1 Analysis plan - Specific Aim 1

Examine cross-sectional associations between food-related parenting practices (pressure-to-eat and food restriction) and socio-demographic characteristics (parent gender, race/ethnicity, education level, employment status, and household income) within the diverse, population-based, sample of parents who participated in Project F-EAT.

First, simple frequencies for each of the ten specific food-related parenting practices were calculated across parent sociodemographic characteristics. Chi-square tests were used to examine whether the proportion of parents who slightly agreed/agreed with each statement varied by sociodemographic subgroups. Next, separate general linear regression models were fit to estimate the association between parent demographic characteristics (the independent variable) and parental report of overall level of restriction and pressure-to-eat (the dependent variables). Regression models were estimated for each of the outcomes: models included all socio-demographic characteristics simultaneously entered into each model to obtain the independent association between the sociodemographic variables of interest and food restriction and pressure-to-eat. Models also included adjustment for parent and adolescent BMI as well as adolescent gender. In order to account for potential clustering of parent responses when two parents of the same child responded to the survey, we used a robust variance estimator to correct for within

cluster variance.[175] Adjusted means, difference in means, and 95% confidence intervals were calculated for each level of the demographic characteristics. If the overall F-statistic was found to be significant, post-hoc pairwise contrast tests were used to highlight sources of differences between adjusted means. Results for Specific Aim 1 can be found in Chapter 3.

2.5.2 Analysis plan - Specific Aim 2

Examine cross-sectional associations between food-related parenting practices (pressure-to-eat and food restriction) and adolescent weight status among all parent-adolescent dyads who participated in Project F-EAT and EAT 2010. Associations will be examined separately for mothers and fathers as well as boys and girls to allow for a full examination of the role of gender in these associations and interactions by race/ethnicity, household income level and school level will be explored.

First, simple frequencies for each of the ten specific food-related parenting practices were calculated across adolescent weight status. Chi-square tests were used to examine whether the proportion of parents who slightly agreed/agreed with each statement varied by adolescent weight status. Separate general linear regression models were fit to estimate the association between adolescent weight status (the independent variable) and parental report of overall level of restriction and pressure-to-eat (the dependent variables). To assess potential effect measure modification of the relationship between food-related parenting practices and adolescent weight status by race/ethnicity or income, interaction terms were included in the models. Separate models were fit for each

interaction term. No significant interactions were found; thus, subsequent models were adjusted for confounders including parental BMI, race/ethnicity, and household income. Parental BMI, race/ethnicity, and household income were included in the models as confounders because each have been shown to be associated with food-related parenting practices [122,136,160] as well as adolescent weight status,[176,177] and are not believed to lie in the causal pathway. All models were estimated separately by parent gender (mothers/fathers) and adolescent gender (girls/boys). In order to account for potential clustering of parent responses when two parents of the same child responded to the survey, we used a robust variance estimator to correct for within cluster variance.[175] Adjusted means, difference in means, and 95% confidence intervals were calculated for each level of the demographic characteristics. If the overall F-statistic was found to be significant, post-hoc pairwise contrast tests were used to highlight sources of differences between adjusted means. Results for Specific Aim 2 can be found in Chapter 4.

2.5.3 Analysis plan - Specific Aim 3

> *Examine cross-sectional associations between food-related parenting practices (pressure-to-eat and food restriction) and adolescent weight-related behaviors, including dieting, unhealthy and extreme weight control behaviors, and binge eating, among all parent-adolescent dyads who participated in Project F-EAT and EAT 2010. Associations will be examined separately for mothers and fathers as well as boys and girls to allow for a full examination of the role of gender in these associations and interactions by adolescent weight status will be explored.*

Poisson regression models with robust variance estimates[178] were fit to estimate the association between each continuous predictor (e.g., pressure-to-eat or restriction) and categorical outcome variable (e.g., dieting, unhealthy and extreme weight control behaviors, and binge eating). Separate Poisson regression models were run for each outcome and exposure combination. Because of our interest in examining the role of gender in the association between food-related parenting practices and adolescent disordered eating behaviors, all analyses were stratified by parent and adolescent gender; potential effect modification by parent and adolescent gender was also examined. Further, all models were examined with two different levels of adjustment. The first set of Poisson models included adjustment only for parent race/ethnicity and household level income. Next, because adolescent and parent weight status is known to be significantly associated with food-related parenting practices[160,176,177] as well as with adolescent use of disordered eating behaviors[72,179,180], the second set of Poisson models included additional adjustment for adolescent and parent weight status. Risk ratios (RRs) and 95% confidence intervals were calculated for all models. Risk ratios (RRs) and 95% confidence intervals adjusted for sociodemographic characteristics (i.e. age, race/ethnicity, family income) and parent and adolescent BMI were obtained from the Poisson regression.

To determine whether there was effect modification of the relationship between food-related parenting practices and adolescent disordered eating behaviors by adolescent weight status, an interaction term was included in the model. Of the 64 possible interactions we examined (two potential effect modifiers × two parent genders × two

adolescent genders × two food-related parenting practices × four disordered eating outcomes), only two were statistically significant (p=0.05), which is approximately the number expected by chance alone under the null; therefore, interaction terms were dropped from the models and results presented are from models that were instead adjusted for the confounders discussed above. In order to account for potential clustering of parent responses when two parents of the same child responded to the survey, we used a robust variance estimator to correct for within cluster variance.[175] Results for Specific Aim 3 can be found in Chapter 5.

2.5.4 Concerns due to multiple tests

As numerous independent tests were conducted to examine the relationships between food-related parenting practices and each of the individual adolescent weight-related outcomes (weight status, dieting, unhealthy and extreme weight control behaviors and binge eating), there is an increased likelihood of Type I error occurring. Using the customary α level of 0.05 to determine statistical significance, one would expect 5% of statistically significant relationships to occur by chance. Because of this, caution should be used in the interpretation of statistically significant findings.

Chapter 3

Eat this, not that! Parental demographic correlates of food-related parenting practices*

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Objective: To understand how parents of adolescents attempt to regulate their children's eating behaviors, the prevalence of specific food-related parenting practices (restriction, pressure-to-eat) by sociodemographic characteristics (parent gender, race/ethnicity, education level, employment status, and household income) were examined within a population-based sample of parents (n=3,709) of adolescents.

Methods: Linear regression models were fit to estimate the association between parent sociodemographic characteristics and parental report of food restriction and pressure-to-eat.

Results: Overall, findings suggest that use of controlling food-related parenting practices, such as pressuring children to eat and restricting children's intake, is common among parents of adolescents, particularly among parents in racial/ethnic minority subgroups, parents with less than a high school education, and parents with a low household income.

Conclusion: Results indicate that that social or cultural traditions, as well as parental access to economic resources, may contribute to a parent's decision to utilize specific food-related parenting practices. Given that previous research has found that restriction and pressure-to-eat food-related parenting practices can negatively impact children's current and future dietary intake, differences in use of these practices by sociodemographic characteristics may contribute, in part, to the disparities that exist in the prevalence of overweight and obesity among adolescents by their race/ethnicity and SES.

3.1 Introduction

Food-related parenting practices, or the techniques that parents use to influence children's eating, have been identified as a potentially significant correlate of child weight and dietary intake patterns [21]. Food-related parenting practices (often referred to as parental feeding practices within research conducted on infants and toddlers) consist of a wide range of behaviors including encouraging children to eat, or not eat, specific

foods; requiring children to clean their plate at mealtimes; rewarding behaviors with favorite foods; and restricting the intake of particular foods (both healthy and unhealthy).[92] Use of food-related parenting practices such as pressuring children to eat and restricting children's intake is believed to have a harmful impact on children's current and future dietary intake in that this encouragement overrides children's innate, internal hunger and satiety cues. Instead, these food-related parenting practices encourage children to eat in response to external cues including factors in the social environment (e.g., eating at specific times) and the size of food portions offered to them (e.g., cleaning one's plate).[9,21,121,138,142] Alternatively, an "appropriate division of responsibility" is often proposed as a more appropriate approach to food-related parenting. [138,181–183] In this approach the parent controls which foods are made available and offered to the child, who in turn decides whether and how much to eat.

Although the use of appropriate food-related parenting practices is increasingly supported as a method to promote healthful dietary intake and weight among young people,[9,126] evidence of the association between food-related parenting practices and child eating and weight status remains equivocal with a number of studies reporting no association. [25,95,129] Further, the bulk of research examining these practices has been conducted with parents of toddlers and young children limiting the scope of our understanding to parents of the very young. [21] On one hand, young children are an appropriate target population for initial exploration of food-related parenting practices given that children at this age are primed for learning new behaviors and are primarily influenced by their parents. However, parents *do* influence adolescent dietary intake

patterns and dietary behaviors established during adolescence often become lifelong in nature. [120] Given the high prevalence of weight-related problems in adolescents [28] and the difficulty parents can encounter in providing a balance of structure and autonomy for their adolescent children, additional research is needed to explore what specific types of food-related parenting practices are being utilized by parents of adolescents.

Additionally, few studies of food-related parenting practices have been conducted with diverse samples of children and adolescents. [21] Preliminary research suggests that both the extent to which parents adopt a controlling approach to child feeding and the role that level of control within feeding strategies plays in child dietary patterns and weight status may differ across families, specifically with regard to race/ethnicity, parental education, or socioeconomic differences. [1,2,4,106,129] A small study, which included both white and African American children with an average age of 11, found that African American mothers reported higher levels of restriction, pressure-to-eat, and monitoring of their child's food intake compared to white mothers.[2] Interestingly though, controlling feeding practices were not found to be associated with higher BMI for African-American children whereas they were for white children. Higher education level and SES have also been positively associated with the use of restrictive food-related parenting practices and negatively associated with the use of pressure-to-eat practices within samples of young children.[3,114–116,121] These findings suggest that social (e.g., race, sex) and economic (e.g., education, income) influences may be associated with the types of food-related parenting practices utilized by parents as well as the impact of these feeding practices on child dietary patterns and weight status. However, research

exploring these associations is limited and has yielded inconsistent findings suggesting that this is an area of research that requires continued exploration. [21]

Moreover, few studies of food-related parenting practices have included separate assessments of these behaviors by mothers and fathers limiting the ability to explore potential associations between parent gender and use of specific food-related parenting practices. Thus far, results have been inconclusive.[22–24] For example, Brann and colleagues concluded that fathers used higher levels of restriction and pressure-to-eat techniques than mothers. [23] On the other hand, two other studies, one by Johannson and colleagues and the other by Blissett and colleagues, found no notable differences in strategies utilized by parent gender.[22,24] Clarification of the association between gender and food-related parenting practices with their children is needed in order to gain a clearer picture of the home food environment and how parental gender may play a role in adolescent eating patterns.

The current study aims to address the question: How do food-related parenting practices, specifically restriction and pressure-to-eat among parents of adolescents, differ across sociodemographic characteristics, including parent gender, race/ethnicity, education level, employment status, and household income? This study will fill an important gap in the literature by being the first study, to our knowledge, to examine specific food-related parenting practices utilized by parents of adolescents and differences across sociodemographic characteristics.

3.2 Methods

3.2.1 Study Population and Design

Data for the current study were drawn from Project F-EAT (Families and Eating and Activity Among Teens), a population-based study of parents of adolescents. Project F-EAT surveys were completed by a sample of 3,709 parents or guardians of the adolescents enrolled in EAT 2010 (Eating and Activity in Teens). The EAT 2010 study population included 2,793 adolescents from 20 public middle and high schools in the Minneapolis/St Paul metropolitan area of Minnesota. Adolescent participants completed surveys during the 2009-2010 school year and as a part of this survey process, each participant was asked to provide contact information for up to two parents or guardians whom they perceived to be their main caregivers. Approximately 30% of the adolescents provided contact information for one parent/guardian and 70% provided information for two parents/guardians. The response rate among parents was high; 85% of the adolescents had at least one parent respond and 68% of the adolescents who provided information on two parents had both parents respond. The vast majority (95.1%) of respondents (henceforth referred to as parents) were parents or stepparents of the adolescent, with the remaining participants (4.9%) reporting they were "other female or male guardians".

Parent respondents had a mean age of 42.3 years (SD=8.6) and approximately 62% were mothers or other female guardians. The Project F-EAT parent sample is ethnically and socioeconomically diverse. Specifically, the sample was 29.7% white, 26.1% African American, 21.4% Asian American (primarily Hmong), 17.4% Hispanic, and 5.4% mixed or other race/ethnicity. The sample was well distributed across categories of household income: 32% of households earning less than $20,000 annually,

22% earning between $20,000 – $34,999, 17% earning between $35,000 - $49,000, 14% earning between $50,000 - $74,000, and 15% earning $75,000 or more. Additional details on the parent sample can be found in Table 3-1.

3.2.2 Data collection

Parents were initially mailed an invitation letter describing the Project F-EAT study and a phone number to call if they preferred to complete the survey over the telephone. A follow-up mailing included the Project F-EAT survey, a consent form, and a postage-paid return envelope. To enhance participant response, parents were mailed a reminder postcard after two weeks and a second copy of the survey if they did not respond within one month. Additionally, up to eight attempts were made by trained interview staff to contact non-responders so they might complete the survey by phone. To meet the needs of the diverse sample, both mailed surveys and phone interviews were available in English, Spanish, Hmong, and Somali, and the phone interview was additionally offered in Oromo, Amharic, and Karen. The majority of parent surveys were completed by mail (78%) and in English (84%). Data collection ran from October 2009- October 2010 and was conducted by the Wilder Research Foundation in St. Paul, Minnesota (www.wilderresearch.org). The University of Minnesota Institutional Review Board approved all study procedures.

3.2.3 Survey development

The Project F-EAT survey was designed to gather information on adolescents' family and home environments with relevance to dietary intake, physical activity, and weight-related health. Survey items were drawn from several sources, including a previous Project EAT

parent survey,[184] corresponding measures from the EAT 2010 student survey (Dianne Neumark-Sztainer et al., 2012), and existing surveys from the scientific literature. New questions were also developed by the research team as needed to address the study aims.

After a draft of the Project F-EAT survey was prepared, several steps were undertaken to ensure the questions were appropriate for the intended audience and to minimize participant burden. Initially, content area experts reviewed the survey to ensure that key constructs relevant to adolescent weight-related behaviors and outcomes were included. Further, survey appropriateness for the major cultural groups participating in the study (i.e., Native American, Hmong, Latino, Somali and African American groups) was addressed by having bi-cultural staff from the Wilder Research Foundation review the survey and provide feedback on the appropriateness and relevance of the survey items. Next, three focus groups were conducted to pre-test an initial draft of the Project F-EAT survey. Feedback from 28 socioeconomically and ethnically/racially diverse parent participants was used to reword or eliminate problematic survey items and expand on topic areas of perceived importance (e.g.,, family meals, conversations about weight at home). An additional sample of 102 parents completed the Project F-EAT survey twice in a two-week time period to examine test-retest reliability of survey questions. Finally, scale psychometric properties were examined within the full Project F-EAT sample.

Once a final version of the survey was developed in English, the written survey was professionally translated into Spanish, Somali and Hmong. Following translation, bilingual staff members from the Wilder Research Foundation reviewed the translated

survey, adjustments to translation were made when appropriate, and the updated surveys were returned to the original translators for final review and approval.

3.2.4 Measures

Specific food-related parenting practices were self-reported by parents using ten questions drawn from CFQ developed by Birch and colleagues[93] which was designed to assess what is often referred to within the extant literature as parental feeding practices. The term food-related parenting practices was developed for, and utilized throughout, this manuscript in an effort to better reflect the relationship between parent and adolescent with regard to food and feeding, whereby the parent does not actually engage in "feeding" as they might with a toddler or young child.

3.2.4.1Restrictive food-related parenting practices

Restrictive food-related parenting practices were measured using six items from the eight-item Restriction Subscale of the CFQ, a subscale designed to measure a parent's attempt to control a child's eating by restricting access to palatable foods. Two items from the subscale were dropped based on recommendations from a validation study conducted within a diverse adolescent population.[98] The six self-report items included:1) "I have to be sure that my child does not eat too many high fat foods," 2)"I have to be sure that my child does not eat too many sweets (candy, ice cream, cake or pastries)," 3) "I have to be sure that my child does not eat too much of his/her favorite foods,"4) "If I did not guide or regulate my child's eating, he/she would eat too much of his/her favorite foods," 5) "I intentionally keep some foods out of my child's reach," and 6) "If I did not guide or regulate my child's eating, he/she would eat too many junk foods." Individual

items were measured using a 4-point Likert scale, with each point on the scale represented by a word anchor (disagree, slightly disagree, slightly agree, and agree). For the current analyses, parent agreement with a particular statement was defined as a response of slightly agree or agree. An overall parental restriction scale was created by averaging responses to each of these six questions to assign an overall restriction score ranging from 1 (low restriction) to 4 (high restriction). (Test-retest r= 0.72, Cronbach's alpha = 0.86).

3.2.4.2 Pressure-to-eat food-related parenting practices

Pressure-to-eat food-related parenting practices were measured using all four items from the Pressure-to-Eat Subscale of the CFQ, a subscale designed to measure the degree to which the parent encourages their child to eat more food, typically at mealtimes.[93] Self-report items included: 1) "My child should always eat all the food on his/her plate," 2)"I have to be especially careful to make sure my child eats enough," 3)"If my child says, 'I'm not hungry,' I try to get him/her to eat anyway," and 4) "If I did not guide or regulate my child's eating, my child would eat much less than he/she should." Individual items were measured using a 4-point Likert scale, with each point on the scale represented by a word anchor (disagree, slightly disagree, slightly agree, and agree). For the current analyses, parent agreement with a particular statement was defined as a response of slightly agree or agree. An overall parental pressure-to-eat scale was created by averaging responses to each of these four questions to assign an overall pressure score ranging from 1 (low pressure) to 4 (high pressure). (Test-retest r= 0.73, Cronbach's alpha = 0.70).

3.2.4.3 Sociodemographic characteristics

Sociodemographic characteristics were assessed by self-report. *Educational attainment* was assessed with the question: "What is the highest grade or year of school that you have completed?" (Test-retest r = 0.84). Response options included 'Did not finish high school', 'Finished high school or got GED', 'Some college or training after high school', 'Finished college', and 'Advanced degree'. Due to small sample size, 'finished college' and 'advanced degree' categories were collapsed for analysis. *Household income level* was assessed with the question: "What was the total income of your household before taxes in the past year?" (Test-retest r= 0.94). Six response option categories were offered: 'less than $20,000', '$20,000 to $34,999', '$35,000-$49,000', '50,000 to $74,999', '$75,000 - $99,999', and '$100,000 or more'. Due to small sample size, the top two income response options were collapsed for analysis. *Race/ethnicity* was assessed with the question: "Do you think of yourself as 1) white, 2) black or African-American, 3) Hispanic or Latino, 4) Asian-American, 5) Hawaiian or Pacific Islander, 6) American Indian or Native American and 7) Mixed or Other Race" and respondents were asked to check all that apply (Test-retest percent agreement= 92%). Hawaiian/Pacific Islander and American Indian/Native American were also categorized as 'mixed/other race,' due to small numbers. *Employment status* was assessed with the question: "Which of the following best describes your current work situation?" (Test retest r=0.82). Response options included: 'working full-time'; 'working part-time'; 'stay-at-home caregiver'; 'currently unemployed but actively seeking work'; and 'not working for pay'. For the

current analyses the final two categories were collapsed to form an "unemployed" category.

3.2.4.4 Other covariates.

To assess *adolescent weight status* students' heights and weights were measured by trained research staff using standardized equipment and procedures. *Parent weight status* was calculated from self-reported height and weight. Body Mass Index (BMI) was calculated using the formula weight in kilograms divided by height in meters squared. *Parent and child gender* were self-reported.

3.3 Statistical Analysis

Simple frequencies for each of the ten specific food-related parenting practices were calculated across parent sociodemographic characteristics. Chi-square tests were used to examine whether the proportion of parents who slightly agreed/agreed with each statement varied by sociodemographic subgroups. Separate general linear regression models were fit to estimate the association between parent demographic characteristics (the independent variable) and parental report of overall level of restriction and pressure-to-eat (the dependent variables). Regression models were estimated for each of the outcomes: models included all socio-demographic characteristics simultaneously entered into each model to obtain the independent association between the demographic variable of interest and parent feeding practice component. Further, this second regression model included adjustment for parent and adolescent body mass index as well as adolescent gender. In order to account for potential clustering of parent responses when two parents

of the same child responded to the survey, we used a robust variance estimator to correct for within cluster variance.[175] In the mutually adjusted model, adjusted means and difference in means were calculated for each level of the demographic characteristics. If the overall F-statistic was found to be significant, post-hoc pairwise contrast tests were used to highlight sources of differences between adjusted means; superscripts are utilized to identify groups that differ significantly. Analyses were conducted using SAS 9.2 (Cary, NC).

3.4 Results

3.4.1 Specific food-related parenting practices by sociodemographic characteristics

Findings suggest that many parents report exercising some level of control over their adolescent with regard to how much food to eat, as well as what types of foods the adolescent should avoid (Tables 3-1 and 3-2). However, the percentage of parents self-reporting agreement (full or slight) with particular food-related parenting practices varied considerably by parent sociodemographic characteristics. For example, parental agreement with the statement that "My child should always eat all food on his/her plate", differed significantly by parent gender, race/ethnicity, education, employment status and household income. Specifically, 70.0% of Hispanic/Latino and Asian American parents reported agreement regarding requiring children to eat all the food on their plate at mealtimes, whereas 58.2% of African American parents, 55.2% of mixed race parents, and 34.5% of white parents agreed that children should eat all the food on their plates. Parental agreement with the statement, "I intentionally keep some foods out of my child's

reach," differed significantly by race/ethnicity, education, employment status and household income. For example, 37.5% of parents in the lowest household income bracket reported agreeing that they kept some foods out of reach of their adolescent, as compared to 35.7% of parents in the low-middle income bracket, 33.9% of parents in the middle income bracket, 28.3% in the mid-high income bracket and 24.7% of parents in the high income bracket.

3.4.2 Parent report of restriction and pressure-to-eat: Associations with sociodemographic characteristics

The mean level of *overall parental restriction* reported by parents was 2.51 [(scale range: 1 (strongly disagree) to 4 (strongly agree)] indicating that, on average, parents within the sample reported engaging in a moderate level of overall restriction with their adolescent children. Level of restrictive feeding was found to differ significantly by both race/ethnicity and household income after adjustment for other sociodemographic characteristics (Table 3-3). Non-white parents utilized significantly higher levels of restriction compared to white parents. Specifically, post-hoc pairwise contrast tests revealed that Asian American parents reported the highest level of restriction, followed by African American and Hispanic/Latino parents. A significant decreasing trend was found between household income and parent report of restrictive feeding practices with parents who reported household earnings of more than $50,000 per year reporting the lowest use of restriction. No significant differences were seen in parent self-report of restrictive feeding practices by parent gender, education level or employment status.

The mean level of *overall pressure-to-eat* reported by parents was 2.21 [(scale range: 1 (strongly disagree) to 4 (strongly agree)] indicating that on average, parents within the sample reported using a low-to-moderate level of pressure-to-eat with their adolescent child. Parental report of pressure-to-eat feeding strategies varied significantly by parent gender, race/ethnicity, parental education level and employment status and household income after adjustment for other sociodemographic characteristics (Table 3-3). Fathers reported significantly higher levels of pressure-to-eat than mothers. Non-white parents utilized significantly higher levels of pressure-to-eat compared to white parents. Post-hoc pairwise contrast tests revealed that Asian American parents utilized the highest level of pressure-to-eat followed by Hispanic/Latino parents and African American parents. A significant decreasing trend was found between level of parental education and use of pressure-to-eat strategies with parents reporting at least some college education reporting the lowest use of this strategy. Employment status was significantly associated with mean parent report of pressure-to-eat with parents that reported full-time employment reporting the lowest level of pressure-to-eat behaviors compared to parents who worked part-time, worked as stay- at-home caregivers, or were unemployed. Household income was also negatively associated with level of pressure-to-eat with parents earning more than $50,000 per year reporting the lowest use of pressure-to-eat behaviors. No significant differences were seen in parent self-report of pressured feeding practices by employment status.

3.5 Discussion

This study examined the prevalence of several food-related parenting practices across sociodemographic characteristics of parents of adolescents. Findings suggest that use of controlling food-related parenting practices, such as pressuring children to eat and restricting children's intake, is common among parents of adolescents, particularly among parents in racial/ethnic minority subgroups, parents with less than a high school education, and parents with a low household income. Results indicate that that social or cultural traditions, as well as parental access to economic resources, may contribute to a parent's decision to utilize specific feeding practices. Further, given that previous research has found that the use of controlling food-related parenting practices can negatively impact children's current and future dietary intake[21] differences in use of these practices by sociodemographic characteristics may contribute, in part, to the disparities that exist in the prevalence of overweight and obesity among adolescents by their race/ethnicity and SES.[28]

To our knowledge, this is the first research study to explore the specific types of food-related parenting practices utilized by parents to influence the dietary patterns of their adolescent children. Given the high prevalence of overweight in adolescents and the delicate balance parents of adolescents often encounter in providing structure versus freedom for their adolescent children as their children deal with issues of personal growth and autonomy, it is important to explore the food-related parenting practices within this population. A particularly interesting finding is that higher levels of both overall parental restriction and pressure-to-eat coexist within certain population subgroups. For example,

non-white parents were found to have the highest levels of both overall restriction and pressure-to-eat. High levels of both pressure-to-eat and restriction were also reported by parents with the lowest household income and the lowest educational attainment. While at first it might seem counterintuitive that parents would engage in high levels of both of these seemingly conflicting feeding practices, a closer look at the individual items that compose the restriction and pressure-to-eat scale can provide clarity to what food-related parenting might look like in a home where high levels of both practices coexist. Parents in these homes appear to exhibit a great deal of overall control with regard to their adolescents' eating behaviors, both by pressuring them to eat at certain times (e.g., cleaning their plate at a meal, asking them to eat after they have said they are full) and by restricting their access to, or consumption of, particular foods at other times (e.g., keeping certain foods out of reach, regulating the consumption of particular foods). While these food-related parenting practices may represent well-intentioned efforts to help adolescents achieve and maintain health stemming from parental concern about a child's weight,[134] previous research conducted with young children suggests that the use of controlling food-related parenting practices may have unintended adverse effects.[21,96,116,133,138] In particular, it may diminish the extent children rely on their own hunger and satiety cues to initiate and terminate eating, resulting in the overconsumption of calories throughout the day.[21,116,121,132,185] This type of dietary disinhibition is particularly concerning given that the prevalence of these pressure-to-eat behaviors was highest among sub-groups of parents whose adolescents are most vulnerable to weight-related problems, including adolescents in racial/ethnic minority and low income subgroups. The

current findings suggest that future research should seek to understand the impact of controlling food-related parenting practices during adolescence, particularly within populations who report the highest use of these behaviors.

Results of the present study suggest that parental access to socio-economic resources (e.g., income, education, employment status) plays a role in a parent's decision to utilize specific food-related parenting practices. Specifically, parents with greater access to economic resources (higher income, more education, full-time employment) reported less controlling food-related parenting practices compared to parents of lower socio-economic status. While the mechanisms underlying the influence of particular economic resources on food-related parenting practices were not examined within the present study, a close examination of the individual food-related parenting practices endorsed by parents helps to shed light on why a parent's SES might motivate the use of particular feeding strategies. For example, a surprising number of parents reported concern about their adolescent child not eating enough food. This concern was most prevalent among parents in racial/ethnic minority subgroups and those parents with less access to economic resources. Parents' actions may reflect their concern about their adolescent not eating enough in that it was also common for parents to report requiring their child to eat all of the food on their plate at mealtimes or encouraging their child to keep eating even when they were not hungry. A small qualitative study of parents conducted by Sherry and colleagues revealed similar concerns and feeding behaviors among low income mothers lending support to the idea that exposure to economic hardship, and possibly food insecurity, may alter food-related parenting practices such that parents who face these

struggles are more likely to utilize pressure-to-eat and restriction techniques.[110] Researchers posit that in families where low income results in constant or periodic food insecurity, parents feel added pressure to encourage food consumption when food is readily available and simultaneously may restrict access to certain "unhealthy" desired foods to ensure that their child is sufficiently hungry to eat food of higher nutritional quality. [186–192] Future research aimed at clarifying the association between SES, and specifically exposure to food insecurity, and food-related parenting practices within a population-based sample of parents of adolescents is warranted.

We found that parents from ethnic/racial minority groups reported significantly higher levels of both restriction and pressure-to-eat relative to white parents. Specifically, Asian American parents (primarily Hmong in this sample) reported the highest level of both behaviors. This finding is novel, and may reflect cultural experiences unique to this ethnic group. Parenting practices are thought to reflect, in part, parents' responses to perceived environmental threats to goals they have for their children.[9,185,193] While many parental goals for children are universal (e.g., health and wellbeing) perceived threats can differ by racial/ethnic background and circumstances.[9] For example, many of the Asian American parents in our sample are first or second generation immigrants to the country and therefore the increased level of control they aim to exert over their adolescents' eating patterns might stem from a real or perceived threat (e.g., food scarcity) related to their immigration experience, or the immigration experience of their parents or grandparents.[194] Because food-related parenting practices are a part of culture and tradition, they do not easily change and parents tend to continue to use traditional feeding

practices routinely and automatically even in the face of dramatic changes to their food environment.[9,185] Levels of overall pressure-to-eat and restriction were also high among African American, Hispanic, and mixed race parents compared to white parents, even after adjustment for other sociodemographic characteristics, indicating that more research on the use of specific food-related parenting practices across different ethnic groups would be of interest and should include an in-depth exploration of parents' motivation for use of specific food-related parenting practices.

Study strengths and limitations should be taken into account when interpreting our study findings. Our use of a large and diverse sample from a large metropolitan area is a study strength. Minneapolis – St Paul has large communities of Hmong and Somali immigrants, who were included in the sample, providing an opportunity to learn about these population groups. An additional study strength was the use a widely accepted and well-validated measurement tool to assess food-related parenting practices, the CFQ.[93] Other strengths include: the high response rate of participating parents and the inclusion of data from fathers in addition to mothers. The current study also has several limitations and findings should be interpreted with these limitations in mind. First, because of the observational study design, we cannot exclude residual confounding by imperfectly measured or unmeasured confounders. For example, while mutually adjusted analyses allowed us to reduce issues of confounding due to the correlation that often exists between race/ethnicity and SES within the United States, this issue may not have been entirely eliminated and residual confounding may still exist. Further, measurement limitations include the potential for differential self-report bias by sociodemographic

characteristics (e.g.,, one group may over-report behaviors that they perceive to be desirable compared to another group.) Furthermore, the study utilized an incomplete assessment of parental feeding strategies. The CFQ includes three subscales (monitoring, pressure-to-eat, and restriction) which measure parental use of specific feeding strategies to maintain control over a child's eating. However, to date, research has not revealed significant associations between parental monitoring and child weight or other weight-related outcomes and thus, to reduce participant burden and promote a good response rate, only the pressure-to-eat and restriction subscales were included in the Project F-EAT survey given to parents.

3.6 Conclusions

Findings from the current study suggest that use of controlling food-related parenting practices, such as pressuring children to eat and restricting children's intake, is common among parents of adolescents, particularly among parents in racial/ethnic minority subgroups, parents with less than a high school education, and parents with a low household income. Given that previous research has found that the use of controlling food-related parenting practices can negatively impact children's current and future dietary intake[21] differences in use of these practices by sociodemographic characteristics may contribute, in part, to the disparities that exist in the prevalence of overweight and obesity among adolescents by their race/ethnicity and SES. [28] Future research aimed at exploring the association between food-related parenting practices and adolescent weight-related outcomes within population-based samples is needed and should include

an exploration of potential interactions by sociodemographic characteristics. Dietitians, physicians, and other health care providers working with parents of adolescents should take time to explore the types of food-related parenting practices utilized within the home as well as the motivation behind the feeding practices prior to making clinical recommendations. For example, it might be important for practitioners working with adolescents and their parents to ask about the level of food security within the home and the role that the availability of food has on a parent's decision to exert control over their adolescents eating behaviors.

Table 3-1. Pressure-to-eat: Parent endorsement (%) of specific food-related parenting practices by parental demographic characteristics

Demographic Characteristics	N	Parent Agree*, %			
		My child should always eat all of the food on his/her plate.	I have to be especially careful to make sure my child eats enough.	If my child says, "I am not hungry," I try to get him/her to eat anyway.	If I did not guide or regulate my child's eating, my child would eat much less than he/she should.
Parent gender					
Male	1210	61.0	47.0	40.3	29.2
Female	1915	51.0	43.3	40.7	25.7
p-value		**<0.01**	**0.04**	0.85	**0.03**
Race/ethnicity					
White	991	34.5	18.5	31.6	13.9
African American	806	58.2	63.8	42.4	21.5
Hispanic/Latino	526	70.0	51.0	43.0	34.8
Asian American	656	69.4	77.1	49.2	49.1
Mixed/other	146	55.5	35.6	43.2	19.9
p-value		**<0.01**	**<0.01**	**<0.01**	**<0.01**
Education					
No high school	872	70.0	66.1	50.1	42.1
High school	687	57.9	51.1	40.0	29.0
Some college	834	51.0	34.2	39.1	20.4
Finished college	732	38.4	25.4	31.3	14.9
p-value		**<0.01**	**<0.01**	**<0.01**	**<0.01**
Employment status					
Full-time	1676	50.4	38.2	36.9	23.7
Part-time	465	56.1	44.1	43.0	26.5
At-home caregiver	306	65.0	58.8	43.5	31.7
Unemployed	678	60.6	55.0	46.5	33.5
p-value		**<0.01**	**<0.01**	**<0.01**	**<0.01**
Household income					
< $20,000	1010	66.1	60.4	46.5	33.8
$20,000 – $34,999	684	58.9	49.1	45.2	31.6
$35,000 – $49,999	525	54.5	41.7	39.8	28.2
$50,000 – $74,999	424	46.0	29.5	32.1	20.3
$75,000 or more	482	33.8	22.4	29.7	11.2
p-value		**<0.01**	**<0.01**	**<0.01**	**<0.01**

* Parent agreement with a particular statement was defined as a response of slightly agree or agree.

Table 3-2. Food Restriction: Parent endorsement (%) of specific food-related parenting practices by parental demographic characteristics

Demographic Characteristics	N	Parent Agree*, % I have to be sure that my child does not eat too many high fat foods.	I have to be sure that my child does not eat too many sweets.	I have to be sure that my child does not eat too many of his/her favorite foods.	If I did not guide or regulate my child's eating he/she would eat too much of his/her favorite foods.	If I did not guide or regulate my child's eating he/she would eat too many junk foods.	I intentionally keep some foods out of my child's reach.
Parent gender							
Male	1210	61.1	71.5	49.8	51.2	58.1	32.7
Female	1915	60.3	71.0	48.3	50.5	57.3	33.6
p-value		0.65	0.78	0.43	0.74	0.65	0.60
Race/ethnicity							
White	991	46.2	59.4	35.8	41.8	54.8	27.0
Afr. American	806	61.4	76.6	49.1	50.5	58.3	37.7
Hispanic	526	49.1	70.0	51.5	54.0	55.1	17.9
Asian Amer.	656	79.1	83.5	68.0	63.9	63.3	36.6
Mixed/other	146	61.0	70.5	40.4	43.2	56.2	37.0
p-value		**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.02**	**<0.01**
Education							
No high sch.	872	69.5	77.4	58.3	61.0	59.6	36.5
High school	687	62.6	73.2	49.5	48.8	57.4	33.8
Some college	834	56.7	69.8	46.3	50.1	60.2	34.2
College grad.	732	52.5	63.5	40.0	41.3	52.5	28.0
p-value		**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.02**	**<0.01**

Table 3-2. Continued

Demographic Characteristics	N	Parent Agree*, %					
		I have to be sure that my child does not eat too many high fat foods.	I have to be sure that my child does not eat too many sweets.	I have to be sure that my child does not eat too many of his/her favorite foods.	If I did not guide or regulate my child's eating he/she would eat too much of his/her favorite foods.	If I did not guide or regulate my child's eating he/she would eat too many junk foods.	I intentionally keep some foods out of my child's reach.
Employment status							
Full-time	1676	57.5	68.3	47.0	49.2	56.1	31.1
Part-time	465	63.0	72.9	49.9	49.9	55.1	34.2
At-home care.	306	62.1	71.2	52.0	52.3	62.4	37.6
Unemployed	678	65.9	77.1	51.5	54.7	60.9	36.0
		<0.01	**<0.01**	**0.02**	**0.01**	**0.01**	**<0.01**
Household income							
< $20,000	1010	66.1	77.4	54.5	54.9	58.7	37.5
$20,000 –$34,999	684	65.1	74.3	55.8	55.8	61.8	35.7
$35,000 – $49,999	525	62.7	71.2	51.2	51.2	59.4	33.9
$50,000 – $74,999	424	51.7	63.9	42.2	42.2	52.3	28.3
$75,000 or more	482	48.1	60.2	42.1	42.1	51.9	24.7
		<0.01	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**

***** Parent agreement with a particular statement was defined as a response of slightly agree or agree.

Table 3-3 Overall pressure-to-eat and restriction by parent demographic characteristics					
		Parental Pressure-to-eat Score Scale range: 1(low) to 4 (high)		**Parental Restriction Score** Scale range: 1(low) to 4 (high)	
Demographic Characteristics	**N**	**Mutually Adj. Means[1]**	**Difference in Means**	**Mutually Adj. Means[1]**	**Difference in Means**
Parent gender					
Male	1254	2.30[a] (2.25, 2.34)	Referent	2.53(2.49, 2.58)	Referent
Female	2018	2.16[b] (2.12, 2.20)	0.14 (0.09, 0.18)	2.51 (2.47, 2.55)	0.02 (-0.02, 0.07)
p-value			**<0.01**		0.38
Race/ethnicity					
White	1007	1.88[a] (1.82, 1.94)	Referent	2.33[a] (2.26, 2.40)	Referent
African American	852	2.20[b] (2.14, 2.27)	-0.33 (-0.41,-0.24)	2.55[b] (2.47, 2.62)	-0.22 (-0.31,-0.12)
Hispanic/Latino	575	2.32[c] (2.24, 2.40)	-0.44 (-0.54, -0.34)	2.45[b] (2.36, 2.55)	-0.12 (-0.23, -0.01)
Asian American	685	2.61[d] (2.54, 2.68)	-0.73 (-0.82, -0.64)	2.84[c] (2.75, 2.91)	-0.51(-0.61, -0.40)
Mixed/other	153	2.13[b] (2.01, 2.26)	-0.26 (-0.39, -0.13)	2.41[ab] (2.26, 2.56)	-0.08 (-0.24,0.08)
p-value			**<0.01**		**<0.01**
Education					
No high school	946	2.38[a] (2.32, 2.45)	Referent	2.54(2.47, 2.61)	Referent
High school	717	2.26[b] (2.19, 2.33)	0.12 (0.05, 0.20)	2.51 (2.43, 2.58)	0.03 (-0.05, 0.12)
Some college	859	2.17[c] (2.11, 2.24)	0.21 (0.13, 0.29)	2.53 (2.46, 2.60)	0.01 (-0.07, 0.10)
Finished college	750	2.09[d] (2.03, 2.16)	0.29 (0.20, 0.38)	2.49(2.40, 2.56)	0.06 (-0.04, 0.15)
p-value			**<0.01**		0.26

Table 3-3. Continued

Demographic Characteristics	N	Parental Pressure-to-eat Score (Scale range: 1(low) to 4 (high)) Mutually Adj. Means[1]	Parental Pressure-to-eat Score Difference in Means	Parental Restriction Score (Scale range: 1(low) to 4 (high)) Mutually Adj. Means[1]	Parental Restriction Score Difference in Means
Employment Status					
Full-time	1742	2.17[a] (2.13, 2.22)	Referent	2.49 (2.43, 2.54)	Referent
Part-time	490	2.21[b] (2.14, 2.28)	-0.04 (-0.11, 0.03)	2.55 (2.47, 2.63)	-0.06 (-0.15, 0.02)
At-home caregiver	324	2.26[b] (2.17, 2.34)	-0.09 (-0.19, -0.00)	2.50 (2.40, 2.60)	-0.01 (-0.12, 0.09)
Unemployed	716	2.24[b] (2.18, 2.31)	-0.07 (-0.15, -0.00)	2.52 (2.44, 2.59)	-0.03 (-0.11, 0.05)
p-value			**0.04**		0.45
Household income					
< $20,000	1077	2.39[a] (2.33, 2.44)	Referent	2.58[a] (2.51, 2.65)	Referent
$20,000 – $34,999	725	2.3[a] (2.25, 2.38)	0.08 (-0.00, 0.15)	2.59[a] (2.51, 2.66)	-0.01 (-0.10, 0.09)
$35,000 – $49,999	547	2.22[b] (2.15, 2.30)	0.17 (0.05, 0.23)	2.55[a] (2.46, 2.64)	0.03 (-0.08, 0.13)
$50,000 – $74,999	434	2.13[c] (2.04, 2.22)	0.26 (0.16, 0.36)	2.41[b] (2.32, 2.51)	0.16 (0.05, 0.28)
$75,000 or more	489	2.09[d] (2.00, 2.19)	0.29 (0.15, 0.37)	2.45[b] (2.34, 2.56)	0.13 (0.00, 0.26)
p-value			**<0.01**		**0.03**

[1] Means and *P*-values are mutually adjusted for demographic characteristics (gender, race/ethnicity, education, employment status, household income).
[2] Means with different alphabetical superscripts are statistically different at an alpha level of $p<0.05$.

Chapter 4

Food-related parenting practices and adolescent weight status: A population-based study*

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Objective: To examine food-related parenting practices (pressure-to-eat and food restriction) among mothers and fathers of adolescents and associations with adolescent weight status within a large population-based sample of racially/ethnically and socioeconomically diverse parent-adolescent pairs.

Methods: Adolescents [N=2,231; 14.4 years old (SD= 2.0)] and their parents (N=3,431) participated in two coordinated, population-based studies designed to examine factors associated with weight status and weight-related behaviors in adolescents. Adolescents completed anthropometric measurements and surveys at school. Parents (or other caregivers) completed questionnaires via mail or phone.

Results: Findings suggest that use of controlling food-related parenting practices, including pressure-to-eat and restriction, are common among parents of adolescents. Mean restriction levels were significantly higher among parents of overweight and obese adolescents as compared to non-overweight adolescents. On the other hand, levels of pressure-to-eat were significantly higher among non-overweight adolescents. Results indicate that fathers are more likely than mothers to engage in pressure-to-eat behaviors and boys are more likely than girls to be on the receiving end of parental pressure-to-eat. Parental report of restriction did not differ significantly by parent or adolescent gender. No significant interactions by race/ethnicity or SES were seen in the relationship between restriction or pressure-to-eat and adolescent weight status.

Conclusions: Given that there is accumulating evidence for the detrimental effects of controlling feeding practices on children's ability to self-regulate energy intake, these findings suggest that parents should be educated and empowered through anticipatory guidance to encourage moderation rather than overconsumption and emphasize healthful food choices rather than restrictive eating patterns.

4.1 Introduction

The identification of modifiable determinants of adolescent obesity has become a public health priority. Food-related parenting practices, including encouraging children to eat and restricting intake of palatable foods, have been identified as potentially significant determinants of weight status in children.[21] Research has shown that parents often adopt controlling feeding practices (e.g., food restriction and pressure-to-eat) in response to

concern about their child's weight.[21,122,136] Unfortunately, several studies have suggested that use of controlling food-related parenting practices is counterproductive, causing a disruption in children's innate self-regulation mechanisms, leading to eating in the absence of hunger and weight gain.[21,92,122,132,138]

Initial cross-sectional studies conducted in samples of white, high-income, mother-daughter dyads revealed that controlling food-related parenting practices were significantly and positively associated with child weight status.[97,116,118,121,122] Two separate longitudinal studies conducted within comparable samples revealed similar associations.[123,124] However, results from more recent longitudinal studies challenge the simplicity of this association revealing inconsistent and sometimes opposite findings. A two-cohort study reported that higher parental restriction at baseline was associated with lower child BMI-z at follow-up within the younger cohort (5-6 year-olds); no association was found within the cohort of pre-adolescents (10-12 year-olds).[95] This null finding is consistent with the only other study conducted within a sample of pre-adolescents.[2] A study conducted within a younger population (1-2 year-olds) found that high levels of control at baseline were protective against unhealthy weight gain at follow-up.[127]

Thus, although the use of less-controlling food-related parenting practices is increasingly supported as a method to promote a healthy weight for children[126], evidence of the association between food-related parenting practices and child weight remains equivocal.[2,21,95,124,127–129] Further, limitations in study population curb the scope of our understanding of this association. Most studies investigating this relationship have been conducted within ethnically or socioeconomically homogenous samples of young

children and have limited the report of food-related parenting practices to mothers only.[21] While these studies have provided the basis for our understanding of this association, findings across ethnicity and SES have been inconsistent.[94,102,107,129] Research has also suggested that the positive association between food-related parenting practices and child weight seen in initial studies with younger children, may not generalize to adolescents.[2,95,109] Finally, studies of food-related parenting practices that have included separate assessments of these parenting behaviors by mothers and fathers are limited in number and results have been inconclusive.[22–25,128] Additional research is needed to clarify the role of parent gender in this association and findings will allow for clearer picture of the home food environment.

To address these research gaps, the current study examined relationships between food-related parenting practices and adolescent weight status within a large and diverse population-based sample of parent-adolescent pairs. Cross-sectional associations were examined separately for fathers and mothers as well as boys and girls and interactions by race/ethnicity and household income, were examined. On the basis of prior studies, we predicted that increased parental restriction of child eating and reduced parental pressure-to-eat would be associated with higher adolescent weight status.[2,21,93,124] Results will add to the growing body of literature examining this important association and may be used to inform the anticipatory guidance provided by health-care providers who work with parents of adolescents.

4.2 Methods

4.2.1 Study Design and Population

Data for this analysis were drawn from two coordinated, population-based studies. EAT 2010 (Eating and Activity in Teens) was a population-based study of 2,793 adolescents from 20 urban public schools in Minnesota designed to examine dietary intake, weight status and associated factors. Surveys and anthropometric measures were completed by adolescents during 2009-2010. Project F-EAT (Families and Eating and Activity Among Teens) was designed to examine factors within the family environment of potential relevance to adolescent weight-related behaviors. Survey data were collected via mail or phone from up to two parents (n=3,709) of the adolescents in EAT 2010; all parents in EAT 2010 were invited to participate in Project F-EAT and a response rate of 77.6% was achieved. Additional details on study design, data collection methods, and survey development can be found elsewhere.[150,151] All study procedures were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee and participating school districts.

The current analytic sample includes EAT 2010 participants who had at least one parent that they lived with at least 50% of the time respond to the Project F-EAT questionnaire. The final sample consisted of 2231 adolescents and 3431 parents, with 67% of the adolescent sample having two parents included (Table 4-1).

4.2.2 Measures

Both the EAT 2010 student survey and Project F-EAT parent survey underwent extensive pilot testing and test-retest reliability testing by both parents and adolescents and were reviewed by an interdisciplinary team of experts

Two constructs of *food-related parenting practices (e.g., food restriction and pressure-to-eat)* were assessed by asking parents ten items drawn from CFQ.[93] *Food restriction* was measured using six items from the eight-item Restriction Subscale, a subscale designed to measure a parent's attempt to control a child's eating by restricting access to palatable foods. Two items from the subscale (i.e. favorite food/sweets offered as reward) were dropped based on recommendations from a validation study conducted within a diverse adolescent population.[98] *Pressure-to-eat* was assessed using the Pressure-to-Eat Subscale, a four-item subscale designed to measure the degree to which the parent encourages their child to eat more food. See Table 4-2 and 4-3 for full list of items. Response options were modified slightly from the original CFQ and included 'disagree', 'slightly disagree', 'slightly agree', and 'agree' (the 'neutral' response option was dropped). For analyses of individual questions, parent agreement was defined as a response of slightly agree or agree. *Food restriction and pressure-to-eat scale scores* were created by averaging responses across each construct (6-item and 4-item, respectively). (Scores ranged from 1 (low) to 4 (high); Restriction: test-retest r= 0.72, α= 0.86; Pressure-to-eat: test-retest r= 0.73, α= 0.70)

Race/ethnicity was assessed with the item, "Do you think of yourself as 1) white, 2) black or African-American, 3) Hispanic or Latino, 4) Asian-American, 5) Hawaiian or Pacific Islander, or 6) American Indian or Native American?." *Household income* was assessed on the parent survey with the question: "What was the total income of your household before taxes in the past year?". *Parent BMI* was calculated from self-reported height and weight.

Adolescent BMI was calculated by using anthropometric data measured by trained research staff in a private space located at the school using standardized equipment and procedures. Age- and gender-specific cut-points for non-overweight, overweight and obesity were based on the 2000 CDC Growth Charts.[169] Due to concern that adolescents with a BMI in the underweight range (<15% BMI; n=48) might differ significantly from other adolescents in our population, these individuals were not included in the current analysis.

4.2.3 Statistical Analysis

The prevalence of parents who agreed (i.e. agreed or slightly agreed) with each of the ten specific food-related parenting practices were calculated across adolescent weight status. Chi-square tests were used to examine whether the proportion of parents endorsing agreement with each statement varied by adolescent weight status. Separate linear regression models were fit to estimate the association between parental report of restriction and pressure-to-eat scale scores and adolescent weight status. Adjusted means and difference in means were calculated for restriction and pressure-to-eat at each level of adolescent weight status. If the overall F-statistic was found to be significant, post-hoc pairwise contrast tests were used to highlight sources of differences; superscripts identify groups that differ significantly. To assess potential effect measure modification of the relationship between food-related parenting practices and adolescent weight status by race/ethnicity or income, interaction terms were included in the models. Separate models were fit for each interaction term, but no significant interactions were found so subsequent models were adjusted for confounders including parental BMI, race/ethnicity,

and household income. All models were estimated separately by parent gender (mothers/fathers) and adolescent gender (girls/boys). Reported p-values were not adjusted for multiple testing. Analyses were conducted using SAS 9.2 (Cary, NC).[195]

4.3 Results

Findings suggest that many parents report exercising some control over their adolescent with regard to the type or amount of food the adolescent consumes (Table 4-2 and 4-3). The percentage of parents reporting agreement with specific food-related parenting practices varied by adolescent weight status. For example, significantly more mothers of non-overweight adolescent girls indicated agreement with the statement that "My child should always eat all food on his/her plate", as compared to mothers of overweight and obese adolescent girls respectively ($p=0.05$). Parents of obese adolescents were significantly more likely than parents of overweight and normal weight adolescents to report that they had to be sure their child did not eat too many high fat foods or sweets, with between 73% and 81% of parents of obese adolescents responding affirmatively to these statements compared to only between 54% and 71% of parents of non-overweight adolescents ($p<0.01$). Additionally, significantly more fathers of overweight and obese adolescent boys indicated agreement with the statement that "If I did not guide or regulate my child's eating he/she would eat too many junk foods," as compared to fathers of non-overweight boys ($p<0.01$).

Mean *pressure-to-eat and restriction scale scores* reported by parents was 2.21 and 2.51, respectively, indicating that on average, parents within the sample reported using a low-to-moderate level of pressure-to-eat and a moderate level of food restriction

with their adolescent child. However, for both boys and girls the mean levels of *pressure-to-eat* and *food restriction* differed significantly across adolescent weight status. Post-hoc comparisons revealed that pressure-to-eat was highest for adolescents of non-overweight as compared to overweight and obese adolescents (all $p<0.01$) (Table 4-3). For example, mothers of non-overweight girls reported a mean pressure-to-eat score of 2.21 as compared to 2.01 among overweight girls, and 1.86 among obese girls. In contrast, mean food restriction was found to be highest among obese adolescents (all $p<0.01$) (Table 4-4). For example, mothers of non-overweight girls reported a mean restriction score of 2.41 compared to 2.55 and 2.81 among overweight and obese girls, respectively.

Fathers of both girls and boys reported significantly higher levels of pressure-to-eat as compared to mothers (Girls: $p=0.02$; Boys: $p<0.01$). For example, fathers reported mean levels of 2.41, 2.25, and 2.18 for normal, overweight, and obese boys, whereas mothers reported mean levels of 2.33, 2.26 and 2.12 for the same boys in each of the respective weight categories. Pressure-to-eat scores reported by both mothers and fathers were significantly higher for boys as compared to girls (mothers $p=0.03$, fathers $p=0.02$). Food restriction did not differ significantly by parent or adolescent gender. Finally, no significant interactions by race/ethnicity or household income were found in the relationship between pressure-to-eat or restriction and adolescent weight status.

4.4 Discussion

The present study addressed important research gaps by examining the relationship between food-related parenting practices and weight status within a racially/ethnically and socioeconomically diverse sample of parent-adolescent pairs.

Further, this study included an examination of the role of parent and adolescent gender in this relationship. Results indicate that mean food restriction was significantly higher among parents of overweight and obese adolescents as compared to non-overweight adolescents, whereas mean pressure-to-eat was significantly higher among non-overweight adolescents. Further, results suggest that fathers were more likely than mothers to engage in pressure-to-eat behaviors with their adolescents, and that boys were more likely than girls to be on the receiving end of pressure-to-eat behaviors. Food restriction did not differ significantly by parent or adolescent gender. Finally, the relationship between food-related parenting practices and adolescent weight status did not differ by race/ethnicity or SES.

Although the modifications made to the response options in the current study prohibit direct comparison of mean pressure-to-eat (2.21) and food restriction (2.51) scale scores, it is noteworthy that the scores found within the current study align closely with the range of reported means (Pressure-to-eat: 2.10-2.20; Restriction: 2.50-3.00) found elsewhere in the literature. The overall body of literature suggests that, on average, parents utilize pressure-to-eat at low-to-moderate levels and food restriction at moderate-to-high levels.[2,22,95,109,123,132] To our knowledge, the current study is the first study that reports mean scale scores by child weight status, making it impossible to know if the differences in reported mean levels by adolescent weight status are comparable to other study populations.

Consistent with previous research,[21,107,123,124] the current study found that mean level of parental restriction was highest among parents of overweight and obese adolescents;

the temporal direction of this relationship, however, is not entirely clear. The relationship between parental restriction and child weight status is likely to be bidirectional; that is, while high levels of food restriction have been shown to lead to an increase in child weight status, parents of overweight and obese adolescents are also more likely to adopt restrictive parenting practices in an effort to help curb their child's food intake.[21,116,118,130,196] Results from a small number of studies indicate that parental restriction often precedes excess weight in young children, suggesting the bidirectional path begins with parental use of controlling feeding practices; this exposure then leads to weight gain over time for the child and creates a feedback cycle in which both food-related parenting practices and the child's excess weight gain persist across time.[9,116,121,138]

While more research is necessary to establish with certainty that it is parental restriction that initiates what is likely a complex lifelong interaction between food-related parenting practices and child weight status, it is recommended that parents of adolescents engage in behaviors known to protect against weight gain, including eating regular family meals, making nutritious food items readily available within the home, modeling healthy food choices, and encouraging their adolescent's autonomy in self-regulation of food intake.[126,182] Along these lines, a recent study by Ogden et al proposed that parental use of covert control (limiting availability of palatable snacks within the home) as opposed to overt control (placing restrictions or invoking rules on the intake of available food) could aid in making healthy food choices the default for a child while still allowing the child independence regarding choices about food and eating.[114] Health-care provider directed

anticipatory guidance for parents of adolescents should include discussion of the important role parents play in creating a healthful home food environment for their teen.

Although pressure-to-eat is less often examined within the literature as compared to food restriction,[21,95,122,132] several notable findings related to this construct emerged within the current study that warrant further discussion. Findings suggest that fathers are significantly more likely than mothers to engage in pressure-to-eat behaviors with their adolescents. While the magnitude of the mean difference in pressure-to-eat by parent gender found in the current study was small, the consistency of this finding with a previously conducted research study by Brann and colleagues,[23] which also found father's use of pressure-to-eat to be significantly higher than mothers, indicates that future research should continue to explore parental gender differences in the use of food-related parenting practices. The current study also revealed that boys are more likely than girls to be on the receiving end of parental pressure-to-eat behaviors. While the current study did not explore parental reasons for use of pressure-to-eat feeding practices, previous research is instructive citing economic strain (e.g., "Don't waste food"), desire to promote intake of healthy foods (e.g., "Finish your veggies"), as well as parental belief that food consumption and ample weight status is a sign of future health and well-being (e.g., "Eat plenty to grow big and strong!") as reasons parents pressure their children to eat.[9,110,134,136,138] The gender differences seen in pressure-to-eat reported within this study might reflect gender-specific parental motivations; for example given that a higher overall body weight is more socially acceptable, and often desirable, for boys as compared to girls,[197,198] parents might be more motivated to help boys achieve this

preferred stature through use of pressure-to-eat techniques as compared to with girls for whom a slender build is generally preferred.[197,198] Future research is needed to confirm these rather novel findings. Further, given the overall prevalence of pressure-to-eat behaviors in the present study, future research aimed at understanding parental motivation for use of pressure-to-eat techniques is warranted.

Finally, it is of interest to note that no significant interactions by race/ethnicity or household income were found in the relationship between pressure-to-eat or restriction and adolescent weight status. This finding suggests that while the extent to which parents adopt a controlling approach to child feeding is known to differ across families,[1–4] specifically with regard to race/ethnicity or SES, the associations between food-related parenting practices and child weight status in the current population did not differ based on the race/ethnicity or SES of the parent. The lack of significant effect modification by race/ethnicity is consistent with two previously conducted studies. [107,109]

Study strengths and limitations should be taken into account when interpreting our study findings. Study strengths include: use of a large racially/ethnically and socioeconomically diverse sample; the high response rate of parents; and the inclusion of data from fathers in addition to mothers. A widely used and well-validated tool was used to measure food-related parenting practices,[93] although this tool was adapted slightly (two items removed, response options modified) for this study. The current study also has several limitations. Foremost is the cross-sectional design, which limits our ability to understand the direction of the associations found here between food-related parenting practices and adolescent weight status. Additionally, as with any research study, we

cannot exclude residual confounding by imperfectly measured or unmeasured confounders. Finally, measurement limitations include the potential for differential self-report bias by sociodemographic characteristics (i.e., one group may over report behaviors that they perceive to be desirable compared to another group.)

4.5 Conclusion

Our study findings suggest that use of controlling food-related parenting practices are common among parents of adolescents and are associated with adolescent weight status: food restriction levels are highest among parents of overweight and obese adolescents, whereas pressure-to-eat behaviors were more frequently reported by parents of non-overweight adolescents. Unfortunately, there is accumulating evidence for the detrimental effects of controlling food-related parenting practices on children's ability to self-regulate energy intake. This information may be counterintuitive for some parents making it necessary that physicians and other health care providers educate and empower parents thought anticipatory guidance to promote healthy eating by making nutritious food items readily available within their home, modeling healthy food choices, and encouraging adolescent's autonomy in self-regulation of food intake.

Table 4-1. Characteristics of the EAT 2010 and Project F-EAT Samples		
Demographic Characteristics	**EAT 2010 Adolescents N=2,231**	**Project F-EAT Parents/Caregivers N=3,431**
	Mean (SD)	**Mean (SD)**
Age	14.4 (2.0)	42.3 (8.6)
	N (%)	**N (%)**
Gender		
Male	1045 (46.8)	1282 (37.4)
Female	1186 (53.2)	2149 (62.6)
Race		
White	448 (20.1)	979 (29.8)
African American	611 (27.4)	823 (25.1)
Hispanic	392 (17.6)	595 (18.1)
Asian American	455 (20.4)	717 (21.8)
Mixed race/other	325 (15.6)	169 (5.2)
Household Income		
Less than $20,000	--	1041 (31.3)
$20,000 – $34,999	--	726 (21.6)
$35,000 – $49,999	--	522 (15.6)
$50,000 – $74,999	--	413 (12.4
$75,000 +	--	641(19.1)

Table 4-2. Pressure-to-eat: Parent endorsement (%) of specific food-related parenting practices of mothers and fathers by adolescent weight status

		Pressure-to-eat behaviors			
		My child should always eat all of the food on his/her plate;	I have to be especially careful to make sure my child eats enough.	If my child says, "I am not hungry," I try to get him/her to eat anyway.	If I did not guide or regulate my child's eating, my child would eat much less than he/she should.
Adolescent Weight Status	**N**	**Parent Agree, %**			
		Moms (n=1915)			
Adolescent Boys					
Non-overweight	609	**57.0**	25.9	**43.4**	28.3
Overweight	166	**50.0**	31.0	**39.4**	23.3
Obese	279	**50.8**	26.6	**33.9**	28.4
p-value		**0.05**	0.37	**0.01**	0.61
Adolescent Girls					
Non-overweight	762	**52.5**	27.3	**47.2**	**29.6**
Overweight	240	**45.2**	27.3	**41.9**	**24.6**
Obese	237	**40.4**	19.8	**30.8**	**17.5**
p-value		**0.05**	0.06	**<0.01**	**<0.01**
		Dads (n=1210)			
Adolescent Boys					
Non-overweight	609	64.4	48.0	42.1	29.9
Overweight	166	66.7	42.9	35.5	24.2
Obese	279	65.6	52.1	31.9	27.7
p-value		0.84	0.62	0.09	0.42
Adolescent Girls					
Non-overweight	762	57.9	48.5	40.3	**33.0**
Overweight	240	61.5	40.7	40.0	**24.2**
Obese	237	57.5	40.7	32.2	**23.8**
p-value		0.41	0.07	0.12	**0.03**

* Parent agreement with a particular statement was defined as a response of slightly agree or agree.

Table 4-3. Restriction: Parent endorsement (%) of specific food-related parenting practices of mothers and fathers by adolescent weight status

		Restriction behaviors					
		I have to be sure that my child does not eat too many high fat foods.	I have to be sure that my child does not eat too many sweets.	I have to be sure that my child does not eat too many of his/her favorite foods.	If I did not guide or regulate my child's eating he/she would eat too much of his/her favorite foods.	If I did not guide or regulate my child's eating he/she would eat too many junk foods.	I intentionally keep some foods out of my child's reach.
Adolescent Weight Status	**N**	**Parent Agree, %**					
		Moms (n=1915)					
Adolescent Boys							
Non-overweight	609	**54.6**	**63.2**	**40.9**	**44.3**	**55.4**	**25.3**
Overweight	166	**63.8**	**71.2**	**50.0**	**46.2**	**60.6**	**39.2**
Obese	279	**76.6**	**80.7**	**59.9**	**64.2**	**67.9**	**49.0**
p-value		**<0.01**	**<0.01**	**<0.01**	**<0.01**	**0.02**	**<0.01**
Adolescent Girls							
Non-overweight	762	**54.3**	**71.3**	**41.9**	**42.2**	**51.4**	**26.9**
Overweight	240	**63.5**	**77.4**	**55.4**	**55.1**	**59.5**	**39.5**
Obese	237	**79.4**	**81.3**	**67.7**	**66.9**	**65.2**	**51.3**
p-value		**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.01**
		Dads (n=1210)					
Adolescent Boys							
Non-overweight	609	**54.0**	**65.5**	**45.6**	48.4	**53.6**	**32.5**
Overweight	166	**58.7**	**71.4**	**47.6**	66.7	**63.5**	**28.6**
Obese	279	**79.8**	**78.2**	**57.1**	60.0	**70.3**	**38.1**
p-value		**<0.01**	**0.01**	**<0.01**	0.46	**<0.01**	**0.05**
Adolescent Girls							
Non-overweight	762	59.1	69.9	**47.0**	**34.2**	53.6	**26.6**
Overweight	240	62.8	74.4	**58.2**	**80.0**	60.0	**40.0**
Obese	237	69.9	82.4	**65.1**	**80.0**	60.9	**36.8**
p-value		0.14	0.17	**0.02**	**0.05**	0.93	**0.04**

***** Parent agreement with a particular statement was defined as a response of slightly agree or agree.

Table 4-4: Adjusted means and differences of adjusted means of parental pressure-to-eat and restriction by adolescent weight status

Adolescent Weight Status	Parental Pressure-to-eat Score [Scale range: 1 (low) to 4 (high)]			
	Mothers report		*Fathers report*	
	Adjusted Means	**Difference of Adjusted Means**	**Adjusted Means**	**Difference of Adjusted Means**
Girls				
Non-overweight	2.21 (2.13, 2.28) [a]	Referent	2.21 (2.11, 2.30) [a]	Referent
Overweight	2.01 (1.90, 2.13) [b]	-0.19 (-0.32, -0.07)	2.05 (1.89, 2.22) [b]	-0.15 (-0.33, 0.02)
Obese	1.86 (1.73, 1.98) [b]	-0.35 (-0.49, -0.21)	2.02 (1.87, 2.18) [b]	-0.18 (-0.35, -0.01)
p-value	<0.01		<0.01	
Boys				
Non-overweight	2.33(2.24, 2.42) [a]	Referent	2.41 (2.29, 2.52) [a]	Referent
Overweight	2.26(2.11, 2.41) [ab]	-0.07 (-0.23, 0.09)	2.25 (2.10, 2.41) [b]	-0.15 (-0.33, 0.03)
Obese	2.12 (2.00, 2.23) [b]	-0.22 (-0.35, -0.08)	2.18 (2.03, 2.32) [b]	-0.23 (-0.39, -0.06)
p-value	<0.01		<0.01	
	Parental Restriction Score [Scale range: 1(low) to 4 (high)]			
Girls				
Non-overweight	2.41 (2.31, 2.51) [a]	Referent	2.33 (2.22, 2.44) [a]	Referent
Overweight	2.55 (2.36, 2.73) [a]	0.14 (-0.07, 0.34)	2.53 (2.34, 2.72) [ab]	0.20 (-0.01, 0.40)
Obese	2.81 (2.67, 2.96) [b]	0.40 (0.24, 0.56)	2.66 (2.48, 2.85) [b]	0.33 (0.12, 0.54)
p-value	<0.01		<0.01	
Boys				
Non-overweight	2.32 (2.23, 2.41) [a]	Referent	2.47 (2.34, 2.60) [a]	Referent
Overweight	2.58 (2.44, 2.72) [b]	0.26 (0.11, 0.42)	2.56 (2.34, 2.79) [ab]	0.09 (-0.15, 0.34)
Obese	2.86 (2.69, 3.02) [c]	0.54 (0.36, 0.72)	2.78 (2.63, 2.94) [b]	0.31 (0.12, 0.51)
p-value	<0.01		<0.01	

Note: Parent BMI, race/ethnicity and household income are included as covariates. Means with different alphabetical superscripts are statistically different at an alpha level of $p<0.05$.

Chapter 5

Are food-related parenting practices associated with adolescent disordered eating behaviors? A population-based study

Objective: To examine associations between food-related parenting practices (pressure-to-eat and restriction) and adolescent dieting and disordered eating behaviors, within a large population-based sample of parent-adolescent pairs.

Method: Adolescents [N=2,231; 14.4 years old (SD= 2.0)] and their parents (N=3,431) participated in two coordinated, population-based studies designed to examine factors associated with weight status and weight-related behaviors in adolescents. Adolescents completed anthropometric measurements and surveys at school. Up to two parents per

adolescent (mothers, fathers, and/or other caregivers) completed questionnaires via mail or phone.

Results: Findings indicate that adolescent boys exposed to higher levels of pressure-to-eat or food restriction were significantly more likely to report engaging in dieting and disordered eating behaviors compared to boys exposed to lower levels of pressure-to-eat or food restriction. For example, for every one unit increase in food restriction reported by mothers, boys were two times as likely to engage in extreme weight control behaviors ($p=<0.01$).For girls, the majority of findings were null in the examination of the association between food-related parenting practices and disordered eating behaviors. However, analyses did reveal that for every one unit increase in food restriction reported by mothers, girls were at 1.34 times more likely to engage in extreme weight control behaviors ($p=0.04$).

Discussion: Study findings provide preliminary evidence of a link between parental use of controlling food-related parenting practices and endorsement of dieting and disordered eating behaviors in adolescent boys.

5.1 Introduction

Dieting and disordered eating behaviors, such as self-induced vomiting, laxative use, and binge eating, are of great concern for adolescent health given their high prevalence and harmful consequences. [65,199,200] The high prevalence of these weight-related behaviors among youth has been well documented in the literature[57–61] and research also suggests that as youth progress throughout adolescence to young adulthood these behaviors persist[62] or even increase.[63,64,80] Dieting and disordered eating behaviors have also been found to predict a number of adverse psychosocial and physical outcomes including depressive symptoms,[201] poor nutritional intake,[202] onset of obesity,[65,71,203] and development of clinical eating disorders. [74,75,204–207] The high prevalence of disordered eating behaviors during adolescence and their harmful consequences indicate a need to identify potentially modifiable factors that contribute to the development of disordered eating in adolescents.

In recent years, food-related parenting practices have emerged as a topic of interest within the child and adolescent nutrition literature and have been identified as a potentially significant determinants of weight status and weight-related behaviors, including harmful or disordered eating patterns, in children.[21] Food-related parenting practices consist of a wide range of behaviors including encouraging or discouraging children to eat in a particular manner, requiring children to clean their plate at mealtimes, rewarding behaviors with favorite foods, and restricting children's intake of specific foods [93]. Parental use of controlling feeding practices has been shown to be related to

children's inability to regulate their own food intake, [96,116,121,123,132,138] children's weight status, [21,107,109,123,124,208] as well as the development of harmful eating patterns and cognitions (e.g., eating in the absence of hunger, dietary restraint, emotional disinhibition) in young children. [96,96,97,123,132,137,209]

A longitudinal cohort of young girls (5 years old at baseline) followed by Birch and colleagues has provided the bulk of the evidence supporting associations between food-related parenting practices and harmful eating patterns and cognitions. [96,121,123,138] Specifically, these investigators found that parental pressure-to-eat was associated with girls' emotional disinhibition, reports of dietary restraint, and disruption of innate self-regulation mechanisms.[96,121,136] Food restriction was associated with disinhibition in the presence of palatable food, increased eating in the absence of hunger, or consumption of food after a full meal, as well as girls' reports of negative emotions (e.g., shame, guilt) in response to eating restricted foods. [96,97,123,132,136,137]

While research to date has tended to focus on the food-related parenting practices utilized with young children, research suggests that parents/caregivers still maintain a high degree of responsibility for feeding their children as they progress throughout adolescence. [9,120,138,210] Chapters 3 and 4 of this dissertation describe two recently published studies that explored what food-related parenting practices are utilized by parents of adolescents [159] and how these feeding practices are associated with adolescent weight.[160] Findings from these two studies indicate that pressure-to-eat and food restriction are common among parents of adolescents [159] and support a positive association between food restriction and adolescent weight status. [160] Because the use of

controlling food-related parenting practices is common among parents of adolescents and these parenting practices are associated with the development of harmful eating patterns in young children, it is of interest to examine associations between food-related parenting practices and disordered eating behaviors in adolescents.

Therefore, the current study aims to examine associations between food-related parenting practices and adolescent disordered eating behaviors, including dieting, unhealthy and extreme weight controls behaviors and binge eating, within a large population-based sample of parent-adolescent pairs. Analyses will be stratified by parent and child gender to illuminate the potential role of gender in observed associations. In alignment with previous research, [96,97,132,136,137] we hypothesized that higher levels of pressure-to-eat and food restriction would be associated with an increased prevalence of engaging in disordered eating behaviors among adolescents. Findings will add breadth to the growing body of literature by examining associations between food-restriction and pressure-to-eat parenting practices and disordered eating behaviors in adolescents and may be used to inform the anticipatory guidance provided by health-care providers who work with parents of adolescents.

5.2 Methods

5.2.1 Study design and population

Data for this analysis were drawn from two coordinated, population-based studies. EAT 2010 (Eating and Activity in Teens) was a population-based study of 2,793 adolescents from 20 Urban public schools in Minnesota designed to examine dietary

intake, weight control behaviors, weight status and factors associated with these outcomes. Surveys and anthropometric measures were completed by adolescents during 2009-2010. Project F-EAT (Families and Eating and Activity Among Teens) was designed to examine factors within the family and home environment of potential relevance to adolescent weight-related behaviors. Survey data were collected via mail or phone from up to two parents (n=3,709) of the adolescents in EAT 2010; all parents in EAT 2010 were invited to participate in Project F-EAT and a response rate of 77.6% was achieved. Additional details on study design, data collection methods, and survey development can be found elsewhere. [150,152,159,211] All study procedures were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee and participating school district research boards.

The final analytic sample includes EAT 2010 participants who had at least one parent that they lived with 50% of the time or more respond to the Project F-EAT questionnaire; this sample consists of 2,231 adolescents and 3431 parents, with 67% of the adolescent sample having two parents included. The racial/ethnic breakdown of the sample is as follows: white (20.1% adolescents, 29.8% parents); African American (27.4% adolescents, 25.1% parents); Asian American (20.4% adolescents, 21.8% parents); Hispanic (17.6% adolescents, 18.1% parents); and mixed race/other (15.6% adolescents, 5.2% parents). The sample is also very socioeconomically diverse according to parent reprts on their household income: less than $20,000 (31.1%); $20,000-$34,999(21.6%); $35,000 - $49,000 (15.6%); $50,000 - $74,999 (12.4); $75,000 or more

(19.1%). Additional sample characteristics, including the weight status of parent and adolescent participants, are included in Table 5-1.

5.2.2 Measures

The EAT 2010 student survey and Project F-EAT parent survey were designed to assess a range of factors of potential relevance to BMI and weight-related behaviors among adolescents and parents. Both surveys underwent extensive pilot testing and test-retest reliability testing (two week interval) by both parents and adolescents and were reviewed by an interdisciplinary team of experts. [150,152,159,211]

Two separate constructs of *food-related parenting practices (e.g., food restriction and pressure-to-eat)* were assessed with a total of ten items drawn from CFQ developed by Birch and colleagues.[93] *Food restriction* was measured using six items from the eight-item Restriction Subscale of the CFQ, a subscale designed to measure a parent's attempt to control a child's eating by restricting access to palatable foods. Two items from the subscale (i.e. favorite food/sweets offered as reward) were dropped based on recommendations from a validation study conducted within a diverse adolescent population. [98] The resulting six self-report items included:1) "I have to be sure that my child does not eat too many high fat foods," 2)"I have to be sure that my child does not eat too many sweets (candy, ice cream, cake or pastries)," 3) "I have to be sure that my child does not eat too much of his/her favorite foods,"4) "If I did not guide or regulate my child's eating, he/she would eat too much of his/her favorite foods," 5) "I intentionally keep some foods out of my child's reach," and 6) "If I did not guide or regulate my child's eating, he/she would eat too many junk foods." *Pressure-to-eat* was assessed

using all four items from the Pressure-to-Eat Subscale of the CFQ, a subscale designed to measure the degree to which the parent encourages their child to eat more food, typically at mealtimes. Self-report items included: 1) "My child should always eat all the food on his/her plate," 2)"I have to be especially careful to make sure my child eats enough," 3)"If my child says, 'I'm not hungry,' I try to get him/her to eat anyway," and 4) "If I did not guide or regulate my child's eating, my child would eat much less than he/she should." For both scales, response options were modified slightly from the original CFQ and included 'disagree', 'slightly disagree', 'slightly agree', and 'agree' (the 'neutral' response option was dropped). *Food restriction and pressure-to-eat scale scores* were created by averaging responses across each construct (6-item and 4-item, respectively). (Scores ranged from 1 (low) to 4 (high); Restriction: $r= 0.72$, $\alpha= 0.86$; Pressure-to-eat: $r= 0.73$, $\alpha= 0.70$).

To assess *unhealthy and extreme weight control behaviors* participants were asked to respond to this question: "Have you done any of the following things in order to lose weight or keep from gaining weight during the past year?" (yes/no for each method). Respondents who reported using one or more of the following behaviors will be coded as using unhealthy weight control behaviors: fasted, ate very little food, used a food substitute (powder or a special drink), skipped meals, and smoked more cigarettes. Behaviors categorized as extreme included the following: took diet pills, made myself vomit, used laxatives, and used diuretics. Those reporting the use of one or more of these behaviors will be coded as using extreme weight control behaviors (Test-retest agreement = 85% [unhealthy behaviors] and 96% [extreme behaviors]).[72] Participants self-reported

binge eating by responding to two questions, "In the past year, have you ever eaten so much food in a short period of time that you would be embarrassed if others saw you (binge eating)" (yes/no). If participants responded yes, they were asked, "During the times when you ate this way, did you feel you couldn't stop eating or control what or how much you were eating" (yes/no)[140] (Test-retest agreement = 90% [first question] and 75% [second question]). Participants self-reported their *dieting* frequency by responding to this question: "How often have you gone on a diet during the last year? By 'diet' we mean changing the way you eat so you can lose weight." Response options included "never," "1-4 times," "5-10 times," "more than 10 times," and "I am always dieting." As in previous analyses, responses were dichotomized into non-dieters (responded never) and dieters (other responses) (Test-retest agreement [non-dieter versus dieter] = 82%). [212].

Race/ethnicity was assessed with the item, "Do you think of yourself as 1) white, 2) black or African-American, 3) Hispanic or Latino, 4) Asian-American, 5) Hawaiian or Pacific Islander, or 6) American Indian or Native American?," and respondents were asked to check all that apply. *Household income level* was assessed on the parent survey with the question: "What was the total income of your household before taxes in the past year?" (Test-retest r= 0.94). Response options included '<$20,000,' '$20,000-34,999,' '$35,000-49,999,' '$50,000-74,999,' '$75,000-99,999,' '$100,000 or more.' In addition, *parent BMI* was calculated from self-reported height and weight. *Adolescent weight status* was calculated by using anthropometric data measured by trained research staff in a private space located at the school using standardized equipment and procedures [161].

Body Mass Index (BMI) was calculated using the formula weight in kilograms divided by height in meters squared. Age- and gender-specific cut-points for non-overweight, overweight and obesity were based on the 2000 CDC Growth Charts. [169]

5.2.3 Statistical Analysis

Poisson regression models with robust variance estimates[178] were fit to estimate the prevalence ratios (and 95% confidence intervals) of the outcomes (e.g., dieting, unhealthy and extreme weight control behaviors, and binge eating) associated with each continuous predictor (e.g., pressure-to-eat or restriction). Separate Poisson regression models were run for each outcome (e.g., dieting, weight control behaviors, binge eating) and exposure combination (e.g., food restriction, pressure-to-eat). Because of our interest in examining the role of gender in the association between food-related parenting practices and adolescent disordered eating behaviors, all analyses were stratified by parent and adolescent gender; potential effect modification by parent and adolescent gender was also examined. Further, all models were examined with two different levels of adjustment. The first set of Poisson models included adjustment only for parent race/ethnicity and household level income. Next, because adolescent and parent weight status is known to be associated with food-related parenting practices [122,160] as well as with adolescent use of disordered eating behaviors,[72,179,207] the second set of Poisson models included additional adjustment for adolescent and parent weight status. In general, findings from both sets of models were similar with slightly attenuated associations in the more fully adjusted models. As a result, the results and discussion

sections below focuses on the findings from models adjusted for race/ethnicity and household income level, as well as adolescent and parent BMI.

To determine whether there was effect measure modification of the relationship between food-related parenting practices and adolescent disordered eating behaviors by adolescent weight status, an interaction term was included in the model. Of the 64 possible interactions we examined (two potential effect modifiers × two parent genders × two adolescent genders × two food-related parenting practices × four disordered eating outcomes), only two were statistically significant (p=0.05), which is approximately the number expected by chance alone under the null; therefore, interaction terms were dropped and results presented are from models that were instead adjusted for the confounders discussed above. In order to account for potential clustering of parent responses when two parents of the same child responded to the survey, we used a robust variance estimator to correct for within cluster variance.[175] Analyses were conducted using SAS 9.2 (Cary, NC).

5.3 Results

5.3.1 Boys: Associations between parental food restriction and pressure-to-eat and adolescent dieting and disordered eating behaviors

Overall, regression analyses controlling for household income and parent race/ethnicity, as well as adolescent and parent weight status, indicated that adolescent boys exposed to higher levels of pressure-to-eat or food restriction were significantly more likely to engage in disordered eating behaviors, including dieting, unhealthy and

extreme weight control behaviors, compared to boys exposed to lower levels of pressure-to-eat or food restriction (Table 5-2). For example, for every one unit *increase* in food restriction reported by mothers, boys were 1.16 (CI = 1.04, 1.29) and 2.07 (CI=1.27, 3.39) times more likely to engage in unhealthy and extreme weight control behaviors, respectively (Both $p<0.01$). Exposure to pressure-to-eat by both mothers and fathers was also found to be significantly and positively associated with use of unhealthy and extreme weight control behaviors among boys (all $p<0.05$).

5.3.2 Girls: Associations between parental food restriction and pressure-to-eat and adolescent dieting and disordered eating behaviors

Regression analyses controlling for household income and parent race/ethnicity as well as adolescent and parent weight status, indicated only one statistically significant associations between food-related parenting practices and disordered eating behaviors among adolescent girls (Table 5-3). Findings revealed that for every one unit increase in food restriction reported by mothers, girls were at 1.33 (CI=1.02, 1.74) times more likely to engage in extreme weight control behaviors ($p=0.04$).

5.3.3 Role of gender in the association between parental food restriction and pressure-to-eat and adolescent dieting and disordered eating behaviors.

Finally, results indicate that adolescent gender significantly modifies the relationship between food-related parenting practices and adolescent report of dieting and disordered eating behaviors. Specifically, the relative risk of engaging in dieting and unhealthy and extreme weight control behaviors was significantly greater for boys exposed to higher levels of restriction or pressure-to-eat as compared to girls who were

exposed to similarly high levels (all $p \leq 0.05$). Adolescent gender was not found to significantly modify the association between food-related parenting practices and adolescent binge eating. Finally, parent gender did not significantly modify the relationship between food-related parenting practices and any of the adolescent disordered eating outcomes.

5.4 Discussion

To our knowledge, this is the first research study to examine the relationship between food-related parenting practices (i.e. food restriction and pressure-to-eat) and adolescent disordered eating behaviors, including dieting, unhealthy and extreme weight control behaviors, and binge eating, within a large population-based sample of parent-adolescent pairs. Overall, findings indicate that adolescent boys exposed to higher levels of pressure-to-eat or food restriction were significantly more likely to report engaging in disordered eating behaviors compared to boys exposed to lower levels of pressure-to-eat or food restriction. Examination of the association between food-related parenting practices and disordered eating behaviors among girls yielded primarily null findings. However, analyses did reveal that girls exposed to higher levels of food restriction were significantly more likely to engage in extreme weight control behaviors. Further, results indicate that adolescent gender modifies the relationship between food-related parenting practices and adolescent disordered eating behaviors; the risk of engaging in dieting and unhealthy and extreme weight control behaviors was significantly greater for boys exposed to higher levels of restriction or pressure-to-eat as compared to girls who were exposed to similarly high levels. These study findings provide preliminary evidence of a

link between parental use of highly controlling food-related parenting practices and use of disordered eating behaviors among adolescent boys.

A particularly interesting finding is that boys exposed to both higher levels of parental food restriction and pressure-to-eat were at a significantly increased risk of endorsing dieting and unhealthy and extreme weight control behaviors. These findings align with the seminal work of Birch and colleagues who found parental use of highly controlling food-related parenting practices (pressure-to-eat and food restriction) to be longitudinally associated with dietary disinhibition, negative self-evaluation of food and eating and the disruption of innate self-regulation mechanisms within a sample of young, primarily white, high income girls.[132,137] Birch theorized that exposure to a highly controlled food environment resulted in children losing the ability to self-regulate their food intake and also internalizing feelings regarding the "goodness" and "badness" of foods consumed, resulting in feelings of guilt or shame if they strayed from parental control.[132,137] Although cross-sectional, the findings from the current study lend preliminary support to an extension of Birch's theory to include adolescent boys from racially/ethnically and socioeconomically diverse backgrounds.

It is noteworthy, however, that examination of associations between food-related parenting practices and disordered eating behaviors among adolescent girls yielded few statistically significant findings. Further, a significant interaction by adolescent gender was found in the relationship between food-related parenting practices and adolescent disordered eating behaviors; taken together, these findings suggestion that adolescent gender may play an important role in this relationship. For example, it might be that

while highly controlling food-related parenting practices are associated with use of harmful eating patterns and related cognitions among young girls,[132,137] the influence of these parenting practices on eating related behaviors dissipates as girls become adolescents and additional external influences (e.g., media, peers) become more prominent.

The potential bidirectional nature of the association between food-related parenting practices and adolescent disordered eating outcomes cannot be overlooked when interpreting these study results. While previous longitudinal work by Birch suggests that highly controlling food-related parenting practices contribute to the development of harmful eating patterns and cognitions, temporality of the associations revealed cannot be established within the current cross-sectional study. For example, it might be exposure to parental pressure-to-eat leads to the development of disordered eating behaviors among young men, or it might be the parents who suspect their son is engaging in disordered eating behaviors react by increasing their use of pressure-to-eat feeding practices. It is also important to consider strengths of the current study, including the use of a large, racially/ethnically and socioeconomically diverse population, a high response rate among parents and adolescents; the inclusion of data from both adolescent boys and girls, and direct data collection from fathers in addition to mothers. Further, a widely used and well-validated tool was used to measure food-related parenting practices,[93] although this tool was adapted slightly (two items removed, response options modified) to better meet the needs of the adolescent sample in the current study. [98]

5.5 Conclusion

In conclusion, these study findings provide preliminary evidence of a link between parental use of controlling food-related parenting practices and use of disordered eating behaviors among adolescents. Clinicians and other health care professionals working with adolescents and their families should take time to explore the types of food-related parenting practices utilized within the home and should educate parents on the role that their feeding practices may have in their adolescent's attitude toward food and eating. As an alternative to utilizing controlling food-related parenting practices, parents of adolescents should be advised to make nutritious food items readily available within their home, model healthy food choices, and encourage adolescent's autonomy in self-regulation of food intake.

Table 5-1. Characteristics of the EAT 2010 and Project F-EAT Samples		
	EAT 2010 Adolescents (N=2231) N (%)	**Project F-EAT Parents/Caregivers (N=3431) N (%)**
Gender		
Male	1045 (46.8)	1282 (37.4)
Female	1186 (53.2)	2149 (62.6)
Race		
White	448 (20.1)	979 (29.8)
African American	611 (27.4)	823 (25.1)
Hispanic	392 (17.6)	595 (18.1)
Asian American	455 (20.4)	717 (21.8)
Mixed race/other	325 (15.6)	169 (5.2)
Household Income		
Less than $20,000	--	1041 (31.3)
$20,000 – $34,999	--	726 (21.6)
$35,000 – $49,999	--	522 (15.6)
$50,000 – $74,999	--	413 (12.4)
$75,000 +	--	641(19.1)
Weight Status		
Underweight	130 (6.4)	223 (6.5)
Normal Weight	1102 (54.1)	966 (28.0)
Overweight	359 (17.6)	1191 (34.6)
Obese	446 (21.9)	1066 (30.9)

Table 5-2. Boys – Disordered eating in adolescent boys by parental report of pressure-to-eat and food restriction

	Model A*											
	Dieting			Unhealthy weight control behaviors			Extreme weight control behaviors			Binge eating		
Pressure-to-eat	RR	CI	P	RR	CI	P	RR	CI	P	RR	CI	P
Moms	1.13	0.99,1.28	0.07	**1.14**	**1.02, 1.27**	**0.03**	1.64	1.00, 2.69	0.05	0.98	0.69, 1.40	0.92
Dads	0.94	0.81, 1.10	0.46	1.07	0.93,1.23	0.37	**1.78**	**1.13, 2.78**	**0.01**	1.24	0.83,1.86	0.30
Food Restriction												
Moms	**1.31**	**1.16,1.47**	**<0.01**	**1.24**	**1.11, 1.37**	**<0.01**	**1.96**	**1.34, 2.88**	**<0.01**	**1.50**	**1.05,2.11**	**0.02**
Dads	1.13	0.97,1.31	0.13	**1.21**	**1.04,1.40**	**0.01**	1.34	0.83,2.16	0.24	1.60	0.91,2.81	0.10
	Model B*											
Pressure-to-eat	RR	CI	P	RR	CI	P	RR	CI	P	RR	CI	P
Moms	**1.24**	**1.09,1.41**	**<0.01**	**1.23**	**1.10,1.38**	**<0.01**	**1.76**	**1.03, 3.00**	**0.04**	1.09	0.74,1.61	0.66
Dads	1.05	0.90, 1.23	0.54	**1.19**	**1.03,1.37**	**0.02**	**2.16**	**1.46,3.22**	**<0.01**	1.43	0.93,2.19	0.10
Food Restriction												
Moms	**1.16**	**1.03,1.30**	**0.01**	**1.16**	**1.04,1.29**	**<0.01**	**2.07**	**1.27,3.39**	**<0.01**	1.43	0.98,2.08	0.06
Dads	1.05	0.90,1.22	0.56	1.15	0.99,1.33	0.06	**1.67**	**1.05,2.65**	**0.03**	1.38	0.79, 2.42	0.26

*Model A includes adjustment for parent race/ethnicity and household income; Model B includes additional adjustment for adolescent and parent BMI. N's may be different because of missing data among self-reported behaviors.

Table 5-3. Girls - Disordered eating in adolescent girls by parental report of pressure-to-eat and food restriction

	Model A*											
	Dieting			Unhealthy weight control behaviors			Extreme weight control behaviors			Binge eating		
Pressure-to-eat	RR	CI	P	RR	CI	P	RR	CI	P	RR	CI	P
Moms	**0.87**	**0.80,0.95**	**<0.01**	0.98	0.91,1.07	0.74	0.75	0.53,1.06	0.11	0.92	0.71,1.19	0.52
Dads	0.96	0.85,1.08	0.07	0.99	0.91,1.07	0.74	0.93	0.58,1.48	0.75	1.02	0.76,1.37	0.90
Food Restriction												
Moms	**1.15**	**1.06,1.25**	**<0.01**	**1.10**	**1.02,1.18**	**0.01**	**1.42**	**1.09,1.86**	**0.01**	1.02	0.82,1.27	0.86
Dads	1.10	0.99, 1.22	0.08	1.08	0.98,1.19	0.18	0.93	0.71,1.22	0.60	0.80	0.61,1.05	0.11
	Model B*											
Pressure-to-eat	RR	CI	P	RR	CI	P	RR	CI	P	RR	CI	P
Moms	0.96	0.87,1.05	0.36	1.03	0.95,1.13	0.46	0.84	0.59,1.19	0.33	0.89	0.29,1.18	0.41
Dads	1.04	0.93,1.16	0.52	1.07	0.96,1.19	0.24	1.04	0.62,1.73	0.89	1.12	0.81,1.53	0.49
Food Restriction												
Moms	1.06	0.98,1.15	0.14	1.03	0.96,1.12	0.37	**1.33**	**1.02,1.74**	**0.04**	0.91	0.72,1.15	0.43
Dads	1.05	0.95, 1.17	0.31	1.06	0.97,1.17	0.27	0.88	0.66,1.16	0.36	0.81	0.79,1.08	0.16

*Model A includes adjustment for parent race/ethnicity and household income; Model B includes additional adjustment for adolescent and parent BMI. N's may be different because of missing data among self-reported behaviors.

Chapter 6

Discussion and Implications

Obesity and disordered eating behaviors (e.g., dieting, unhealthy and extreme weight control behaviors, and binge eating) are major public health problems among adolescents; they are both highly prevalent and have potentially serious physical and psychosocial consequences. To properly address these critical hazards to adolescents, the factors associated with weight and disordered eating behaviors must be better understood, and promising preventative strategies must be identified and developed. Findings from this dissertation contribute to a growing body of evidence which indicates that the family environment plays an integral role in youths' weight status and weight-related behaviors. Specifically, this thesis adds depth to our understanding of the association between food-

related parenting practices and adolescent weight status and disordered eating behaviors and provides insight as to how parents may best be able to support a healthy weight status and appropriate weight-related behaviors in their adolescent children. Findings should be utilized to inform the anticipatory guidance provided by health-care providers who work with parents of adolescents. Further, these findings provide a strong foundation from which to develop public health interventions and messages for families to promote healthy weight and weight-related behaviors among adolescents.

This dissertation addressed the following specific aims:

Specific Aim 1: Examine cross-sectional associations between food-related parenting practices (pressure-to-eat and food restriction) and socio-demographic characteristics (parent gender, race/ethnicity, education level, employment status, and household income) within the diverse, population-based, sample of parents who participated in Project F-EAT.

Specific Aim 2: Examine cross-sectional associations between food-related parenting practices (pressure-to-eat and food restriction) and adolescent weight status among all parent-adolescent dyads who participated in Project F-EAT and EAT 2010. Associations were examined separately for mothers and fathers as well as boys and girls to allow for a full examination of the role of gender in these associations and interactions by race/ethnicity and household income level were explored.

Specific Aim 3: Examine cross-sectional associations between food-related parenting practices (pressure-to-eat and food restriction) and adolescent weight-related behaviors, including dieting, unhealthy and extreme weight control behaviors, and binge eating,

among all parent-adolescent dyads who participated in Project F-EAT and EAT 2010. Associations were examined separately for mothers and fathers as well as boys and girls to allow for a full examination of the role of gender in these associations and interactions by adolescent weight status were explored.

6.1 Summary of findings

6.1.1 Specific Aim 1: Associations between food-related parenting practices and parental demographic variables

This research question examined the prevalence of several food-related parenting practices across sociodemographic characteristics of parents of adolescents. Findings indicate that use of controlling food-related parenting practices, such as pressuring children to eat and restricting children's intake, is common among parents of adolescents; mean pressure-to-eat and restriction scale scores reported by parents were 2.21 and 2.51 [Scale score range 1 (low) to 4 (high)], respectively. On average, parents within the sample reported using a low-to-moderate level of pressure-to-eat and a moderate level of food restriction with their adolescent child. When examining associations between food-related parenting practices and parental socio-demographic variables, mean levels of both food restriction and pressure-to-eat were found to differ significantly by both race/ethnicity and household income. Overall, non-white parents and parents of lower income status were found to utilize the highest levels of both restriction and pressure-to-eat as compared to white parents and parents of higher income status, respectively. Further, mean level of pressure-to-eat was found to differ significantly by parent gender

and parental educational attainment; pressure-to-eat was higher among fathers, than mothers, and among parents with lower education levels, than parents who had higher educational attainment. No significant associations were found between pressure-to-eat or food restriction and parental employment status.

Study findings aligned with study hypotheses that: 1) parents with greater access to socioeconomic resources (high household income level, high educational attainment, and full/part-time employment) would report less use of both restriction and pressure-to-eat as compared to parents with less access to socioeconomic resources (low household income level, low educational attainment, and unemployment) and 2) ethnically/ racially diverse parents would demonstrate higher levels of both restriction and pressure-to-eat as compared to white parents.

Specifically, we found that Asian American (primarily Hmong) parents reported significantly higher mean levels of both pressure-to-eat and restriction as compared to all other ethnic groups suggesting that high levels of parental control with regard to the home food environment are common among this population sub-group. This finding is novel, and may reflect cultural experiences unique to this ethnic group. Parenting practices are thought to reflect, in part, parents' responses to perceived environmental threats to goals they have for their children.[9,185,193] While many parental goals for children are universal (e.g., health and wellbeing) perceived threats (e.g., overweight, hunger) can differ by racial/ethnic background and circumstances[9] and these differences may help to explain the differences in use of food restriction and pressure-to-eat by racial/ethnic background found within this population. For example, cultural beliefs

about a healthy body size and the perception of risk associated with overweight among Asian American families may differ from the perspective of parents from other racial/ethnic backgrounds. Levels of overall pressure-to-eat and restriction were also found to be higher among African American, Hispanic, and mixed race parents compared to white parents, even after adjustment for other sociodemographic characteristics.

A significant linear relationship was found between both pressure-to-eat and restriction and household income levels suggesting that with greater economic strain, comes greater use of controlling food-related parenting practices. While the mechanisms underlying the influence of particular economic resources on food-related parenting practices were not examined within this dissertation, previously conducted research supports the theory that parents exposed to economic hardship, and possible food insecurity, are more likely to utilize both pressure-to-eat and restriction techniques.[186–192] Researchers theorize that in low-income families who experience constant or periodic food insecurity, parents feel added pressure to encourage food consumption when food is readily available and simultaneously may restrict access to certain "unhealthy" desired foods to ensure that their child is sufficiently hungry to eat food of higher nutritional quality.[187]

In contrast to our study hypothesis for Specific Aim 1, a significant difference was found in the level of pressure-to-eat reported by parent gender; fathers reported a significantly higher level pressure-to-eat as compared to mothers. This difference aligned with findings from one small, previously conducted study which also found father's use of pressure-to-eat to be significantly higher than mothers.[23] However, the limited number

of other small studies that have examined use of food-related parenting practices in both mothers and fathers have found no significant differences by parent gender suggesting that, at this point, the role of parental gender in the use of food-related parenting practices is unclear.[22,24,128] A summary of findings related to Specific Aim 1 can be found in Table 6-1a.

6.1.2 Specific Aim 2: Associations between food-related parenting practices and adolescent weight status

Results indicate that mean food restriction was significantly higher among parents of overweight and obese adolescents as compared to non-overweight adolescents, whereas mean pressure-to-eat was significantly higher among non-overweight adolescents. The relationship between food-related parenting practices and adolescent weight status did not differ by race/ethnicity or SES. With regard to gender, results suggest that fathers were more likely than mothers to engage in pressure-to-eat with their adolescents and boys were more likely than girls to be on the receiving end of pressure-to-eat behaviors. Finally, food restriction did not differ significantly by parent or adolescent gender.

Consistent with previous research,[21,107,123,124] and in alignment with the hypothesis for Specific Aim 2, the current study found that mean level of parental restriction was highest among parents of overweight and obese adolescents. However, as discussed within Chapter 4, the cross-sectional design of this dissertation work prohibits an understanding of the temporal direction of this relationship. While the relationship between parental restriction and child weight status is thought to be bidirectional,[21,118,121,130,196] results from a small number of prospective studies indicate

that parental restriction often precedes excess weight in young children, suggesting the bidirectional path begins with parental use of controlling feeding practices.[9,119,121,138] The current study finding that mean pressure-to-eat was highest among parents of normal weight adolescents as compared to parents of overweight and obese adolescents was also in alignment with the a priori hypothesis for Specific Aim 2.

Several additional and notable findings related to the pressure-to-eat construct emerged as a part of this research aim. Findings suggest that fathers are significantly more likely than mothers to engage in pressure-to-eat behaviors with their adolescents. While the magnitude of the mean difference in pressure-to-eat by parent gender found in the current study was small, the consistency of this finding with a small, previously conducted research study by Brann and colleagues (n=49),[23] provides evidence to suggest that parental gender might influence the relationship seen between pressure-to-eat and adolescent weight status. Findings also revealed that boys are more likely than girls to be on the receiving end of parental pressure-to-eat behaviors. While the current study did not explore parental reasons for use of pressure-to-eat feeding practices, previous research is instructive in citing economic strain, desire to promote intake of healthy foods, as well as parental belief that food consumption and ample weight status is a sign of future health and well-being as reasons parents pressure their children to eat.[9,134,136,138] The gender differences seen in pressure-to-eat reported within this study might reflect gender-specific parental motivations.[197,198]

Finally, it is of interest to note that no significant interactions by race/ethnicity or household income were found in the relationship between pressure-to-eat or restriction

and adolescent weight status. This finding suggests that while the extent to which parents adopt a controlling approach to child feeding is known to differ across families, specifically with regard to race/ethnicity or SES, the associations between food-related parenting practices and child weight status in the current population did not differ based on the race/ethnicity or SES of the parent. The lack of significant effect modification by race/ethnicity found in the current study is consistent with two previously conducted cross-sectional studies.[107,109] However, the lack of significant effect modification by race/ethnicity contradicts results from a longitudinal study by Spruij-Metz and colleagues conducted within a sample of pre-adolescents (n = 120, age=11).[208] To date, this study by Spruij-Metz is the only longitudinal study of food-related parenting practices to examine race/ethnicity as a potential effect measure modifier in the relationship between food-related parenting practices and child weight status. At baseline, African American mothers within the study by Spruij-Metz reported higher levels of both pressure-to-eat and food restriction as compared to non-Hispanic white mothers after adjustment for child's total lean body mass and overall energy intake. Interestingly though, controlling food-related parenting practices were not found to be longitudinally associated with higher BMI for African-American children whereas they were for white children.

In sum, the limited and inconsistent nature of research examining race/ethnicity as a potential modifier indicates that future longitudinal research aimed at understanding the role of race/ethnicity in the longitudinal relationship between food-related parenting practices and adolescent weight status is warranted. A summary of findings related to Specific Aim 2 can be found in Table 6-1b.

6.1.3 Specific aim 3: Associations between food-related parenting practices and adolescent weight-related behaviors

Findings indicated that adolescent boys exposed to higher levels of pressure-to-eat or food restriction were significantly more likely to report engaging in disordered eating behaviors compared to boys exposed to lower levels of pressure-to-eat or food restriction. For example, for every one unit increase in food restriction reported by mothers, boys were 1.16 and 2.07 times more likely to engage in unhealthy and extreme weight control behaviors respectively. For girls, the majority of findings were null in the examination of the association between food-related parenting practices and disordered eating behaviors. However, analyses did reveal that for every one unit increase in food restriction reported by mothers, girls were at 1.33 times more likely to engage in extreme weight control behaviors. Further, results indicate that adolescent gender modifies the relationship between food-related parenting practices and adolescent disordered eating behaviors; the risk of engaging in dieting and unhealthy and extreme weight control behaviors was significantly greater for boys exposed to higher levels of restriction or pressure-to-eat as compared to girls who were exposed to similarly high levels.

Findings for adolescent boys were in alignment with the a priori hypothesis for Specific Aim 3. It was hypothesized that boys exposed to both higher levels of parental food restriction and pressure-to-eat would be at increased risk for endorsing dieting, unhealthy and extreme weight control behaviors, and binge eating. These findings also align with previous research conducted by Birch and colleagues who found parental use of highly controlling food-related parenting practices to be longitudinally associated with

dietary disinhibition, negative self-evaluation of food and eating and the disruption of innate self-regulation mechanisms within a sample of young, primarily white, high income girls.[132,137] Birch theorized that exposure to a highly controlled food environment resulted in children losing the ability to self-regulate their food intake and also internalizing feelings regarding the "goodness" and "badness" of foods consumed, resulting in feelings of guilt or shame if they strayed from parental control.[132,137]

In contrast to the a priori hypothesis for Specific Aim 3, the majority of findings were null in the examination of the associations between food-related parenting practices and disordered eating behaviors among adolescent girls. The overall trend of null findings was surprising and stands in contrast to the seminal work of Birch and colleagues who first explored associations between food-related parenting practices and harmful eating patterns and related cognitions (e.g., disinhibited eating, restrained eating, negative self-evaluation of eating and food) among samples of young girls.[132,137] Birch and colleagues found that parental pressure-to-eat was associated with girls' emotional disinhibition, reports of dietary restraint, and disruption of innate self-regulation mechanisms.[96,121,136] Food restriction was associated with disinhibition in the presence of palatable food, increased eating in the absence of hunger, or consumption of food after a full meal, as well as girls' reports of negative emotions (e.g., shame, guilt) in response to eating restricted foods.[96,97,123,132,136,137] The sample of girls in which Birch conducted the bulk of her research exploring the association between food-related parenting practices and harmful eating patterns and related cognitions was significantly younger (5-6 years old).

The apparent discrepancy between Birch's findings and the current study is an important subject for future research to clarify. It might be that while highly controlling food-related parenting practices are associated with use of harmful eating patterns and related cognitions among young girls,[132,137] the influence of these parenting practices on eating related behaviors dissipates as girls become adolescents and additional external influences (e.g., media, peers) become more prominent. Alternatively the racial/ethnic and socioeconomic diversity in the current sample, as compared to Birch's homogenous sample (99% Caucasian, majority mid-high income), may have played a role in the disparate outcomes. Clearly the complexity of the issues involved require further study of the association between food restriction and use of disordered eating behaviors among adolescent girls. A summary of findings related to Specific Aim 3 can be found in Table 6-1c.

Table 6-1a Summary of key findings for Specific Aim #1

Specific Aim #1: Associations between food-related parenting practices and parental demographic variables.
Pressure-to-eat
• Highest among non-white parents, parents of lower educational and income status, and parents without full-time employment (part-time, at-home, unemployed) • Fathers reported higher levels of mean pressure-to-eat as compared to mothers.
Food restriction
• Mean restriction was highest among non-white parents and parents of lower income status. • No significant associations were seen between parental gender, education status or employment status and mean level of food restriction.

Table 6-1b Summary of key findings for Specific Aim #2:

Specific Aim #2: Association between food-related parenting practices and adolescent weight status
Pressure-to-eat
• Mean pressure-to-eat was significantly higher among non-overweight adolescents as compared to overweight and obese adolescents. • Fathers were more likely than mothers to engage in pressure-to-eat parenting practices. • Boys were more likely than girls to be on the receiving end of pressure-to-eat parenting practices.
Food restriction
• Mean food restriction was significantly higher among parents of overweight and obese adolescents as compared to non-overweight adolescents. • Mean food restriction did not differ significantly by parent or adolescent gender within weight status categories.
Effect modification
• The relationship between food-related parenting practice and adolescent weight did not differ significantly by race/ethnicity or socioeconomic status.

Table 6-1c Summary of key findings for Specific Aim #3

Specific Aim #3: Association between food-related parenting practices and adolescent disordered eating behaviors
Pressure-to-eat
• Boys exposed to higher levels of pressure-to-eat were significantly more likely to engage in dieting, and unhealthy and extreme weight control behaviors as compared to boys exposed to lower levels of pressure-to-eat. • No statistically significant associations were found between use of pressure-to-eat parenting practices and adolescent girls disordered eating behaviors.
Food restriction
• Boys exposed to higher levels of food restriction were significantly more likely to engage in dieting, and unhealthy and extreme weight control behaviors as compared to boys exposed to lower levels of food restriction. • Girls exposed to higher levels of food restriction were significantly more likely to engage in extreme weight control behaviors as compared to girls exposed to lower levels of food restriction.
Effect modification
• Adolescent gender modifies the relationship between food-related parenting practices and adolescent disordered eating behaviors. • For example, exposure to high levels of food restriction was associated with an increased risk of engaging in extreme weight control behaviors for both boys and girls, but the increased risk was significantly greater for boys as compared to girls.

6.2 Contributions to the field

This study is the first to explore the specific types of food-related parenting practices utilized by parents of adolescents and to examine associations between food-related parenting practices and weight status and disordered eating behaviors within a large, population-based sample of mothers, fathers, and adolescents. Research to date on food-related parenting practices has been conducted primarily within populations of toddlers and young children. Findings from this dissertation indicate that parents continue to exercise control over their child's food choices and eating patterns beyond early childhood and into adolescence. The associations that were found between food-related parenting practices and adolescent weight status and disordered eating behaviors lend preliminary support to an extension of Birch's original theory developed within a sample of young, primarily white, high income girls, to include adolescents from racially/ethnically and socioeconomically diverse backgrounds.

In addition to examining food-related parenting practices within an age group not previously assessed, this dissertation also addressed the role of gender in the association between food-related parenting practices and weight status and disordered eating behaviors. This was accomplished by including reports on food-related parenting practices from both mothers and fathers, as well as weight-related outcomes from both male and female adolescents. Findings indicate that fathers are more likely than mothers to engage in pressure-to-eat food-related parenting practices suggesting that researchers and public health professionals need to consider both parents (mothers and fathers) when designing and implementing public health interventions aimed at modifying food-related

parenting practices. Findings also indicate that adolescent boys are more likely than adolescent girls to be on the receiving end of pressure-to-eat food-related parenting practices and that boys exposed to controlling food-related parenting practices are significantly more likely to report engaging in disordered eating behaviors compared to boys exposed to lower levels of control. Together, these findings emphasize the importance of designing interventions to target parents of adolescent boys as well as parents of adolescent girls.

Finally, by examining food-related parenting practices within a large and racially/ethnically and socioeconomically diverse population, this dissertation was able to explore associations between parental demographic characteristics (e.g., race, SES, parent gender) and use of specific food-related parenting practices. The use of this large and diverse study sample also allows for increased confidence in the generalizability of study findings to other similarly diverse populations. Overall, this dissertation sets the stage for future longitudinal studies examining the use and impact of food-related parenting practices among diverse adolescent populations and provides an excellent foundation from which to develop public health interventions and messages for families to promote healthy weight and weight-related behaviors among adolescents.

6.3 Study strengths and limitations

6.3.2 Study strengths

The aims of this dissertation were to explore what food-related parenting practices are utilized by the mothers and fathers of a racially and socioeconomically diverse

population of adolescents and to examine the association between the food-related parenting practices utilized and adolescents' weight status and weight-related behaviors. To achieve these objectives, this dissertation utilized two existing cross-sectional, population-based studies, Project F-EAT and EAT 2010. By linking data collected from individual middle and high school students and their parents, this dissertation added greatly to the field's current understanding of food-related parenting practices and their relationship weight-related outcomes in adolescents.

Strengths of this dissertation research include the following:

Inclusion of two parents. Whenever possible, survey data for Project F-EAT were collected from two parents (mother and father) for each adolescent. The overall sample size, coupled with an outstanding response rate, provided the opportunity for analyses to bestratified by both parent and child gender. This analysis allowed for a unique, in-depth examination of the role of gender in the association between food-related parenting practices and adolescent weight-related outcomes. Clarification of the association between parental gender and food-related parenting practices is needed in order to gain a clearer picture of the home environment and how parental gender may play a role in adolescent weight status and disordered eating behaviors.

Data from both parent and adolescent. Previous studies examining associations between parental feeding strategies and weight-related outcomes have often relied solely on parent report of both the food-related parenting practices used and child weight-related outcomes.[21] While this approach was likely appropriate within the bulk of studies examining this association among toddlers and other young children, a strength of our

design is in our decision to collect data from both parents and adolescents. Due to the autonomy associated with adolescents as well as the private nature of some of the behaviors being inquired about (e.g., extreme weight control behaviors), these young people are likely to be much more accurate in reporting their own behaviors, than if their parents had been asked to report on their adolescent's behaviors.

Reliable measures. A widely used and well-validated tool was used to measure food-related parenting practices,[93] although this tool was adapted slightly (two items removed, response options modified) to better meet the needs of the adolescent sample in the current study.[98] Further, each of the parent and adolescent measures (food-related parenting practices, dieting, unhealthy and extreme weight control behaviors, binge eating) included in the study were pilot tested to examine test-retest reliability and internal consistency of scales. Finally, each of the adolescent outcome measures (dieting unhealthy and extreme weight control behaviors and binge eating) have been previously found reliable by Project EAT investigators.[72,172]

Large socio-economically and racially/ethnically diverse sample. The sample itself was socio-economically and racially/ethnically (80%) diverse. Because of this, findings may be more generalizable to other diverse populations in the United States. Further, while not a primary study aim, the large sample size, in combination with the socioeconomic- and ethnic/racial-diversity represented within the dataset, allowed for exploratory analysis aimed at understanding if racial/ethnic or socioeconomic interactions exist within the association between food-related parenting practices and adolescent weight-related outcomes.

In sum, results from this dissertation will set the stage for future longitudinal studies and will provide a strong foundation from which to develop home-based interventions and public health messages for families to promote healthy weight and weight-related behaviors among adolescents.

6.3.1 Study limitations

However, in addition to these strengths, the study design and analytical methods employed have several limitations, as described below, and study findings should be interpreted with these limitations in mind.

Temporality. As a cross-sectional, observational study, the results of the study are not be able to conclusively establish whether the use of specific food-related parenting practices influences adolescent weight-related outcomes, or whether the weight status and weight-related behaviors of adolescents influenced the type of food-related parenting practices utilized by parents. The limitation of temporality is particularly problematic for Specific Aim 2 as the directionality for associations seen between food-related parenting practices and child weight status has been debated frequently within the literature to date. Findings described are preliminary, limited to associations and cannot address temporality or causality.

Self-report. With the exception of the anthropometric measures of adolescent participants, each of the predictor and outcome variables are based on participant self-report. As a result, the introduction of social desirability bias into study results is inevitable, with both parents and adolescents likely to over report behaviors that they perceive to be healthy (e.g., parental restriction of unhealthful foods) and underreport

unhealthy behaviors (e.g., adolescent unhealthy weight control behaviors). Misclassification due to differences in perceived social desirability by sociodemographic characteristics is also possible. For example, parents with lower household income may see restriction of unhealthful foods as desirable and over report this behavior, whereas parents with higher household income may see restriction of unhealthful foods as undesirable and underreport this behavior.

Incomplete assessment of food-related parenting practices. The most widely accepted and validated measurement tool for assessing food-related parenting practices is the CFQ, developed by Birch and colleages[93] which includes three subscales (monitoring, pressure-to-eat, and restriction) that assess the parental use of specific feeding strategies to maintain control over a child's eating. However, to reduce participant burden and promote a good response rate, only the pressure-to-eat and restriction subscales were included in the Project F-EAT survey given to parents. The decision to not include the monitoring subscale within the Project F-EAT survey was supported by the knowledge that previous research has not revealed any significant associations between parental monitoring and child weight or other weight-related outcomes.[3,103–106,134,208]

Unmeasured confounders and residual confounding. The models utilized in the study were designed to explain as much variance as possible. However, it is possible that unmeasured confounders were not included in the models. For example, we do not know the level of food restriction or pressure-to-eat utilized by the parents in our sample when their adolescent was a child or the weight-status of the adolescent in our sample prior to our measurement. Further, because of the observational study design, we cannot exclude

the possibility of residual confounding by imperfectly measured confounders. For example, with regard to Specific Aim 1, while mutually adjusted analyses allowed us to reduce issues of confounding due to the correlation that often exists between race/ethnicity and SES within the United States, this studies imperfect assessment of the complex construct of socioeconomic status, likely means that residual confounding may still exist. The existence of unmeasured or residual confounding could bias study results both away and/or towards the null.

Table 6-2 Summary of study strengths and limitations

Strengths	Limitations
• Inclusion of two parents • Data collected directly from both parent and adolescent • Reliable measures • Large socioeconomically, racially/ethnically diverse sample • Examined potential effect measure modification by race/ethnicity and SES • Measured adolescent heights and weights	• Cross-sectional study design • Parents' self-reported food-related parenting practices and adolescents' self-reported disordered eating behaviors. • Incomplete assessment of food-related parenting practices • Residual and unmeasured confounding

6.4 Directions for future research

This study added depth to the growing body of scientific literature examining associations between food-related parenting practices and adolescent weight status and disordered behaviors. However, unanswered questions remain for which additional research is required. A summary of potential future research directions can be found in Table 6-3.

6.4.1 Future directions for research on food-related parenting practices

As this dissertation was the first to examine associations between food-related parenting practices and parental socio-demographic characteristics, adolescent weight status and disordered eating behaviors within a population-based sample of parent-adolescent pairs, these findings should be replicated in other studies of parent-adolescent pairs, with convergence on findings needed. The importance of replication studies is illustrated by the fact that a number of studies conducted within samples of young children have shown controlling food-related parenting practices to be positively associated with a child's weight status,[97,116,118,121,209] while other studies, including two conducted within samples of pre-adolescent children,[95,208] have found null results. These null findings within small homogenous samples of preadolescent children, in combination with knowledge about child development,[138] might lead some researchers to conclude that the association between food-related parenting practices and weight-related outcomes dissipates as children age and become more independent in their choices about food and eating. In contrast, findings from this study demonstrate that despite the

growing independence of adolescents with regard to choices about food and eating, their parents still report using controlling food-related parenting practices. Further, the use of these controlling practices was found, overall, to be associated with higher weight status among male and female adolescents and increased prevalence of disordered eating behaviors among adolescent males. A consistent pattern of findings from different adolescent samples is needed to truly understand these relationships. Additional observational and qualitative studies are needed to understand the mechanisms of the observed relationships between food-related parenting practices and weight and weight-related outcomes and to help explain the motivation for some groups of parents (e.g., fathers, Asian American parents, low income parents) to utilize more controlling food-related parenting practices as compared to others.

Second, more research is required to help tease out what initiates the complex lifelong interaction between food-related parenting practices and child weight status and weight-related outcomes. While the relationship between parental restriction and child weight status and weight-related behaviors is recognized to be bidirectional, it is unclear if this bidirectional relationship is initiated first by a parent's choice to use particular food-related parenting practices or, alternatively, if it is initiated first by a child's weight status or weight-related behaviors which then evoke a response from parents in the form of utilization of particular food-related parenting practices (e.g., a parent is more controlling because their child is overweight). Additional qualitative research aimed at understanding parental motivation for use of particular food-related parenting practices in conjunction with longitudinal research is needed to help understand both temporality and

causation and to shed light on appropriate next steps in the development of public health interventions aimed at the interruption of this bidirectional relationship.

It would be of interest to conduct a longitudinal mixed-methods research study within a racially/ethnically and socioeconomically diverse sample of parent-child pairs, consisting of both in-depth interviews of parents as well as survey and anthropometric data-collection from both parents and children. Interviews of parents, particularly dads, of adolescents could inquire about 1) the food-related parenting practices used with the adolescent child, 2) what rules, if any, exist about food and eating within their home, 3) the motivation or reasoning behind the food-related parenting practices they utilize and the food rules they have established, and 4) the overall level of concern and worry they have about their child's weight, stature or health status as well as their own weight, stature or health status. Along with these in-depth interviews, longitudinal survey and anthropometric data collection on this same population would allow for a better understanding of the impact of food-related parenting practices on child weight and disordered eating behaviors over time. Information gleaned from this type of mixed-methods study would allow for a deeper understanding of the broad range of food-related parenting practices utilized by parents of children as well as the longitudinal impact of these parenting practices on a child's weight-related outcomes. Ideally, this type of longitudinal mixed-methods research would be initiated within parent-child pairs when the child is still young (toddler or early elementary school-aged), with long term, frequent, follow-up into adolescence. This life-course approach would allow for a better understanding of the bi-directional nature of the relationship between food-related

parenting practices and weight-related outcomes in children by shedding light on how this relationship changes overtime.

This dissertation added depth to our understanding of the relationship between food-related parenting practices and weight status and weight related behaviors by exploring potential effect measure modification by race/ethnicity and SES. We found the association between food-related parenting practices and weight status and weight-related behaviors to be consistent across different racial/ethnic and socioeconomic groups suggesting that while a parents' decision to utilize particular food-related parenting practices may be influenced by their racial/ethnic background or economic circumstances, the association between their use of these behaviors and their adolescent's weight-related outcomes is the same despite differences in background. However, it continues to be important for researchers in this field to explore additional potential effect modifiers that will provide further depth to our understanding of the association between food-related parenting practices and weight-related outcomes. For example, future research should examine the role of food insecurity as a potential effect modifier. Researchers have proposed that in families where low income results in constant or periodic food insecurity, parents may feel added pressure to encourage food consumption when food is readily available and simultaneously may restrict access to certain "unhealthy" desired foods to ensure that their child is sufficiently hungry to eat food of higher nutritional quality.[186–192] It might be that for children exposed to controlling food-related parenting practices within a food insecure home that these parenting practices help them to navigate the uncertainty of food availability within their home environment

so that they are able to maintain a healthy weight and healthy weight-related behaviors despite the challenge of food insecurity. For children exposed to controlling food-related parenting practices within a food secure home, this level of control might simply interrupt their ability to self-regulate their own food intake within an environment of abundant food options, leading to weight gain over time. Future research should aim to clarify the role of food insecurity in the association between food-related parenting practices and weight-related outcomes as this clarity could impact the design and implementation of interventions and public health messages. Other potentially important effect measure modifiers that warrant future investigation include home food environment variables (e.g., home food availability, family meal frequency, etc.), parental weight status and weight concerns, and adolescent psychosocial variables (e.g., depression, self-esteem).

It is also important that research exploring the degree to which food-related parenting practices can be modified through intervention be pursued. While food-related parenting practices are often described within the extant literature as a modifiable factor of the home-food environment, research aimed at intervening on and changing these parenting practices is limited.[213,214] A home-based intervention study conducted by Haire-Joshu and colleagues which included 1,300 parent-child pairs (children age 1-6 years) was successful at decreasing parental use of controlling food-related parenting practices. This intervention focused on providing education to parents with the overall goal of increasing fruit and vegetable consumption within pre-school children. Home educators delivered a total of four in-home lessons which addressed the core program areas (parent knowledge, parental modeling of fruit and vegetable intake, non-coercive feeding practices and fruit

and vegetable availability).[213] A separate, but significantly smaller study by Gribble and colleagues (n=9 parent-child pairs, children aged 10-12 years) was also successful in modifying food-related parenting practices through intervention.[214] Together these studies provide limited, but promising, evidence of the modifiable nature of food-related parenting practices. Additional research is needed to corroborate these initial findings and to explore the effectiveness of interventions aimed at the modification of food-related parenting practices within a broader range of samples, including interventions that focus on fathers, parents of adolescent children, as well as parents from diverse racial/ethnic and socioeconomic backgrounds.

Along these lines, it is also important that public health researchers pursue research to test the effectiveness of different types of parent feeding approaches aimed at promoting a healthy weight and healthy weight-related behaviors among children and adolescents. For example, while Ellyn Satter's Division of Responsibility approach to child feeding is often proposed as a more appropriate method than controlling food-related parenting practices, research exploring the effectiveness of this approach is limited.[182] The Division of Responsibility approach suggests that the parent control which foods are made available and offered to the child, who in turn decides whether and how much to eat. Given the high prevalence of overweight and use of disordered eating behaviors among adolescents, it is important that researchers begin to explore, and rigorously test, parent-led approaches to promoting a healthful weight and healthful eating behaviors among children. This type of rigor will afford clinicians the opportunity to provide parents with

research-based recommendations regarding how to best approach feeding with their adolescent child.

6.4.2 Methodological considerations for future research on food-related parenting practices

Another important area for future research includes the development, testing and dissemination of a more comprehensive measure of food-related parenting practices. Currently, the gold standard approach to measuring food-related parenting practices includes use of the CFQ, which was designed to capture parent's perceptions and concerns regarding child obesity as well as their child-feeding attitudes and practices. The CFQ was designed based on theory that emerged from a small cross-sectional study conducted by Costanzo and Woody in 1985 that aimed to measure parental restraints over their children's eating behavior Costanzo and Woody's theorized that the level of control a parent used with regard to their food-related parenting practices stemmed from their perceptions of and concerns about their child's weight status.[118] Rooted in this theory, the CFQ was developed by Birch and colleagues and designed specifically to measure different food-related parenting practices utilized by parents as well as parental perceptions of and concerns about their child's weight.[93] Birch et al. tested three different versions of the questionnaire and after extensive pilot studies and analysis the third version finally became the CFQ.[93] While information gleaned from the use of the well-validated and widely used CFQ has provided the basis for our understanding of food-related parenting practices, some more recent research studies indicate that the

development and testing of a more comprehensive measure of food-related parenting practices is an important next step in moving the field forward.

A recently published article by Ogden et al. suggests that possibility that parental control related to food might be a more complex construct than acknowledged by any existing measures, including the CFQ.[114] The concern raised within the paper by Ogden and colleagues is that the CFP focuses solely on overt forms of parental control (i.e. direct restriction or monitoring of a child's intake of particular foods) and lacks examination of covert forms of control (i.e. controlling what types of foods are purchased and brought into the home or avoidance of places which sell unhealthy food).[114] By broadening the conceptualization of food-related parenting practices to include both assessments of overt control, through the use of current CFQ, as well as covert control, through the addition of standardized questions on the more broad food environment of the child, researchers would be able to provide a more comprehensive view of the ways parents seek to control the dietary intake of their child. For example, it would be interesting to include questions about the in-home availability of highly-palatable snacks (i.e. chips/crackers, desserts, favorite foods), as well as nutritionally-dense snacks (i.e. fruits and vegetables, low-fat cheese, yogurt). A full list of the five questions utilized by Ogden and colleagues to assess covert control, as well as additional recommendations for questions to assess this construct can be found in Table 6-4.

The widespread use of a more comprehensive scale would assist researchers in being able to better understand how different forms of control (covert versus overt) are

similarly or differentially associated with weight and weight-related outcomes in children and might serve to explain some of the inconsistencies in study findings to date. For example, it might be that exposure to high levels of overt restriction and/or pressure-to-eat food-related parenting practices has a different impact on the weight status of children who live within an food environment filled with highly-palatable foods (low covert control) as compared to children who live within a food environment comprised of mostly nutritionally-dense food items (high covert control). A more comprehensive assessment of the wide range of ways parents can control and manipulate their child's exposure to different food items will allow researchers and public health professionals to make more specific recommendations for parents on best practices with regard to food-related parenting practices and the home food environment.

Relatedly, the initial development of the CFQ dates back to research completed by Costanzo and Woody in 1985.[118] The final edits to the scale were made prior to publication of a paper by on CFQ scale development and testing in 2001.[93] While this scale has continued to be well validated in a wide variety of populations since this initial development,[21] the dramatic changes to the food and weight environment within the United States since 1985 suggest that revisiting this scale to determine if it the questions included continue to be a pertinent, appropriate, and comprehensive assessment of food-related parenting practices within our current environment is warranted. For example, it is possible that, given the increased focus on childhood overweight in the last decade, parents of young people are engaging in new and different types of food restriction than those that are included this assessment. It is also possible that with the focus in the media

on encouraging the consumption of particular foods for health outcomes that parents are engaging in more specific pressure-to-eat practices than are covered by the statements that were included in the original CFQ assessment. Finally, food-related parenting practices utilized within the food environment outside of the home, including restaurants and vending machines, were not assessed within the original CFQ. Given the ubiquitous nature of food and eating opportunities within the current environment, it is necessary that the CFQ be updated to reflect these environmental changes. While many researchers might be tempted to make their own modifications to the CFQ to reflect their own opinions of the current food environment, research aimed at developing, testing, and disseminating a modified CFQ that reflects our new knowledge-base as well as the current food and weight environment would better insure the field moves forward in a united way allowing for ease in comparison of study findings across research teams. Recommendations for questions to include in an updated measure of food-related parenting practices that reflect the current food environment are included in Table 6-4.

In working to develop and test an updated and more comprehensive measure of food-related parenting practices, findings from this dissertation as well as previous research indicate that it will be important to consider the appropriateness of the developed scale for a variety of age groups (infants to adolescents), race/ethnicities, as well as different socio-demographic groups. It is possible that the availability of different versions of the same scale is an approach that should be considered.

Table 6-3 Summary of suggestions for future research

Future directions for research on food-related parenting practices

• Replication studies including:
  o Socioeconomically, racially/ethnically diverse samples of parent-adolescent pairs
  o Samples that include mothers and fathers as well as daughters and sons
• Observational and qualitative studies designed to better understand parental motivation for use of specific food-related parenting practices
• Longitudinal studies to help better understand both temporality and causation
• Exploration of potential effect modifiers to provide further depth to our understanding of the association between food-related parenting practices and weight-related outcomes
• Intervention studies aimed at understanding the relative modifiability of food-related parenting practices through intervention
• Research to test the effectiveness of different types of parent feeding approaches (e.g., Division of Responsibility feeding approach) at promoting a healthy weight and healthy weight-related behaviors among children and adolescents

Methodological issues in the study of food-related parenting practices

• Work to develop, test and disseminate an updated and more comprehensive measure of food-related parenting practices
  o Include measurement of both covert and overt forms of parental control
  o Changes that have occurred within the broad food environment since the initial development of the Child Feeding Questionnaire should be considered
• Appropriateness of the developed scale for a variety of age groups (infants to adolescents), race/ethnicities, as well as different socio-demographic groups should be considered and modified versions should be created as needed

Table 6-4 Summary of suggestions for the development of an updated measure of food-related parenting practices

Recommendations for questions to measure covert control

• How often do you…(5 Point Likert – never to always)
  o …avoid going to restaurants with your children which sell unhealthy foods?*
  o …avoid buying sweets and chips and bringing them into the house?*
  o …not buy foods that you would like to because you don't want your children to have them?*
  o …try not to eat unhealthy foods when your children are around?*
  o …avoid buying biscuits and cakes and bringing them into the house?*
  o …avoid grocery shopping with your child so that you can limit their requests for foods you would not prefer to purchase.†
 	
• "[THESE FOODS] are available in my home." (4 Point Likert - never to always)
  o Fruits and vegetables†
  o Milk, cheese or yogurt†
  o Chips†
  o Desserts (cookies, pastries, ice cream, candy) †
  o My child's favorite foods†
 	
*Questions developed by Ogden and colleagues.[114]
†Questions developed by the author (Loth).

Recommendations for questions to better reflect the current food environment
• I require my child to eat all of the food served to them when dining out at restaurants. (4 Point Likert – disagree to agree) † • When dining out, I encourage my child to keep eating even after they have told me that they feel full. (4 Point Likert – disagree to agree) † • I help my adolescent decide what to order when we eat out at restaurants. † • I have to be sure that my adolescent does not purchase too many snacks or drinks from vending machines. (4 Point Likert – disagree to agree) † • If I did not guide or regulate my adolescent, he/she would select unhealthy food options when dining out. (4 Point Likert – disagree to agree) † • If I did not guide or regulate my adolescent, he/she would select unhealthy food options for their school lunch. (4 Point Likert – disagree to agree) † †Questions developed by the author (Loth).

6.5 Study implications for clinical practice and public health interventions

This dissertation identified differences in the use of food-related parenting practices by parental sociodemographic characteristics, as well as associations between food-related parenting practices and adolescent weight and weight-related behaviors. Findings from this progression of analyses suggests that a parent's social or cultural tradition, as well as their access to economic resources, may contribute to their decision to utilize specific food-related parenting practices; their use of particular food-related parenting practices is, in turn, associated with the weight status and weight-related behaviors of their adolescent children. This dissertation is the first research study to examine specific types of food-related parenting practices utilized by parents to influence the dietary patterns of their adolescent children. Additionally, it is also the first study to explore associations between food-related parenting practices and weight status and endorsement of disordered eating behaviors within an adolescent population.

The knowledge gained by exploring food-related parenting practices within this unique population has important implications for both clinical practice as well as the development of public health interventions. The development and dissemination of research-based recommendations is particularly important given the high prevalence of overweight and disordered eating among adolescents and the complexity parents of adolescents encounter when making food-related parenting decisions. Many parents may welcome recommendations that help guide decisions about balancing structure versus independence while adolescents are dealing with the issues of personal growth and autonomy. The recommendations to follow are possibilities that stem from this

dissertation research, synthesized with what is known from a thorough review of the literature; of course, further research will be needed to evaluate these ideas. Table 6-3 summarizes implications for clinical practice and public health intervention.

6.5.1 Implications for clinical practice

Dietitians, physicians, and other health care providers working with adolescents and their families would benefit from a greater awareness of the role that food-related parenting practices may have on their adolescent's weight and use of disordered eating behaviors. This increased awareness could assist clinicians in engaging parents in anticipatory guidance related to how they might best create a home food environment that is conducive to their adolescent child maintaining a healthy weight and a healthy relationship with food and eating. Currently, within Bright Futures, a book published by the American Academy of Pediatrics that teaches physicians the anticipatory guidance topics to be covered during routine well-child visits with youth and their families, there is no mention of engaging parents in discussion about appropriate food-related parenting practices.[215] Instead, the guidelines focus on instructing physicians to talk with parents about what specific foods should be consumed (e.g., fruits and vegetables, whole grains) or avoided (e.g., chips, candy, soda) by children and adolescents.[215] It is important for physicians to discuss, with parents, an age-appropriate diet for their children and adolescents; however, findings from this dissertation would suggest that a discussion of appropriate food-related parenting practices is also a necessary part of helping young people achieve a healthy weight and appropriate weight-related behaviors.

It is important that clinicians take time to explore the types of food-related parenting practices currently utilized within the home of their patients, as well as the motivation behind the feeding practices, prior to making clinical recommendations. Previous research has demonstrated that parents often utilize food restriction and pressure-to-eat feeding practices in response to feeling concerned about their child's weight status. If parents are concerned that their child is overweight, or is at risk for becoming overweight, they are more likely to report utilizing food restriction techniques. On the other hand, if parents are concerned that their child has a small stature or is underweight, they are more likely to engage in pressure-to-eat. Unfortunately, there is accumulating evidence for the detrimental effects of controlling food-related parenting practices on children's ability to self-regulate energy intake, resulting in unhealthy weight gain overtime and the development of unhealthful eating patterns and behaviors.[21] This information may be counterintuitive for some parents making it necessary that physicians and other health care providers understand and acknowledge the parent's motivation to help promote health in their child through the use of particular food-related parenting practices prior to providing education on a more appropriate approach to child feeding.

It may also be important for practitioners working with adolescents and their parents to ask about the level of food security within the home and the role that the availability of food has on a parent's decision to exert control over their adolescents eating behaviors. Understanding the potentially widely varied parental motivations behind the use of specific food-related parenting practices will allow clinicians the best opportunity to engage parents in an open conversation about how their current feeding

practices might be influencing their adolescent. Clinicians should seek to empower parents through anticipatory guidance to promote healthy eating by making nutritious food items readily available within their home,[1,5,6,162,216–220] modeling healthy food choices,[1,9,11,24,138,138,162,177,219] and encouraging adolescent's autonomy in self-regulation of food intake.[21,121,122,132,136,137,137,138,143,148,185,209] Parents should be encouraged to utilize covert control (limiting the availability of palatable snacks within the home) as opposed to overt control (placing restrictions or invoking rules on the intake of available food) to help make healthy food choices the default for their adolescent child, while still allowing their child independence regarding choices about food and eating.[114] Specific recommendations regarding appropriate ways for parents to help adolescents achieve a healthy weight and healthy weight-related behaviors can be found in Table 6-6. Because this dissertation focused on only aspect of the influence parents and the home environment has on the weight and weight-related behaviors of young people, the recommendations included in this table extend beyond the implications of this dissertation work to include recommendations developed from a synthesis of the scientific literature to-date.

Additionally, parents have been found to be more likely to use controlling food-related parenting practices when they have their own eating or weight concerns,[118] symptoms of psychopathology,[221] or are overweight themselves.[25] Thus, in families of adolescents where health professionals identify a risk of parents using controlling food-related parenting practices (e.g., in obese parents or parents with eating disorders), it may be particularly beneficial to recommend the avoidance of controlling practices and to

provide parents with specific guidance regarding alternative ways to guide their adolescent's decisions about food and eating. See table 6-3 for a summary of implications for clinical practice.

6.5.2 Implications for public health intervention

Public health professionals designing interventions and messages aimed at the helping adolescents achieve a healthy weight and a healthy relationship with food and eating may consider parent-education interventions focused teaching parents about the importance of utilizing appropriate food-related parenting practices (see Table 6-6 for specific recommendations for parents of adolescents) with their adolescent child. It is important to consider that educating parents on appropriate food-related parenting practices may take place within clinical settings or as a part of public health interventions that take place in other settings (e.g. parent groups or classes, WIC or Head Start education sessions, or other intervention programs). This study found that the use of controlling food-related parenting practices, including restriction and pressure-to-eat, are common among parents of adolescents. We also found that parental use of controlling food-related parenting practices was associated with greater adolescent weight status and use of disordered eating behaviors. Together, these findings suggest that parents of adolescents could benefit from guidance regarding what actions they could take to promote a healthy weight and weight-related behaviors for their adolescent child.

We propose that the next step is to find ways of successfully communicating messages about appropriate food-related parenting practices to parents. Findings from

this dissertation indicate that food-related parenting practices differ across race/ethnicity as well as access to economic resources, including household income and parental education. Specifically, use of food restriction and pressure-to-eat behaviors were highest among parents from racial minority and low income subgroups. The significant differences seen in the mean use of food restriction and pressure-to-eat suggest the importance of tailoring public health messages and intervention programs to populations known to utilize these controlling food-related parenting practices most frequently. For example, these dissertation findings indicate that it might be particularly important to target Asian American parents and parents of low socioeconomic status with messages about appropriate food-related parenting practices. However, while parents from these subgroups (e.g., racial minority and low income) reported higher levels of food restriction and pressure-to-eat than did white parents or parents with a higher household income, no significant effect modification by race/ethnicity and household income level was found in the relationship between food-related parenting practices and adolescent weight status or use of disordered eating behaviors. Taken together, these findings are important because they suggest that a similar mechanism could be at work across families from different racial/ethnic or socioeconomic backgrounds. Therefore, while intervention studies are needed to identify specific approaches that are effective across socio-economic and ethnic groups or indeed different approaches for different groups, our findings suggest that the same overall theoretical framework can be used to guide the development of interventions across families from different racial/ethnic or socioeconomic backgrounds.

The use of this similar framework will facilitate the comparison of the efficacy and effectiveness of interventions across parents of different backgrounds.

Study findings indicate that parent and adolescent gender play a role in the type of food-related parenting practices that are utilized and these findings have important implications for the development of public health interventions. This study found that fathers are more likely than mothers to engage in pressure-to-eat, and boys are more likely than girls to be on the receiving end of pressure-to-eat feeding practices. Therefore, it is important that fathers be included as a part of public health interventions aimed to decrease the use of controlling food-related parenting practices. Special care will need to be taken to engage fathers in interventions housed within clinical settings as they are less likely than mothers to accompany their adolescent to well-child visits.[206]

A recently published paper by the American Academy of Pediatrics highlighted unique ways to engage fathers in the anticipatory guidance provided by clinicians at routine well-child visits, even if fathers are unable to attend these appointments in person.[222] Recommendations within this article included: 1) Providing relevant and helpful information regarding physician recommendations in the form of written handouts to the parent in attendance and encouraging them to share these handouts with the parent not present, 3) Asking fathers to submit questions or concerns via handwritten note or e-mail when they are unable to attend appointments, 4) Being thoughtful in the language utilized when providing anticipatory guidance or other information (verbal or written), making sure to indicate the relevance of recommendations to both mothers and fathers, 5) Considering use technology (e.g., cell phones, e-mail) to improve information

exchange and encourage involvement from fathers. In sum, the American Academy of Pediatrics recognizes the importance of engaging both mothers and fathers in all clinic-based education for parents and encourages physicians to be diligent in their attempts to provide education to both parents of their patients whenever possible.[222] Findings from this dissertation would indicate that engaging fathers in physician-led anticipatory guidance regarding food-related parenting practices is particularly important.

It might also be appropriate to engage fathers in public health interventions outside of a clinical setting. A recently published article on a Australian community-based healthy lifestyle program targeting fathers of school-aged children reported success in recruiting and maintaining fathers as participants in their nutrition education program by holding group education sessions for fathers in the early evenings.[223] The timing of these early evening sessions was convenient for fathers in that it did not require the majority of fathers to miss out on work obligations and also allowed them to find someone to assist with childcare as needed during this time. A similar intervention approach utilizing early evening education sessions could be considered for interventions aimed reaching fathers with messages about appropriate food-related parenting practices.

Moving forward, it is also important for public health professionals to consider other caregivers that may play an integral role in the transmission of food-related parenting practices to parents. Research has demonstrated that choices parents make about how to feed their children is influenced by the thoughts and opinions of their parents. For example, studies focused on understanding the choices parents make with regard to the early feeding of infants (e.g., breast feeding versus bottle feeding) have

found grandparents to be particularly influential in these choices.[224–229] Interventions aimed at educating and supporting women to make healthful choices with regard to infant feeding have found success in working to educate soon-to-be grandparents on the benefits and drawbacks of different feeding methods. [226–229] Grandparents are then less likely to pass along misinformation to their children, and are able to support them in the feeding decisions that they choose to make. Similarly, it is thought that food-related parenting practices are passed down intergenerationally,[196] making grandparents a potentially important target for interventions aimed at changing the types of food-related parenting practices utilized by parents. See table 6-3 for a summary of implications for public health intervention.

Table 6-5 Summary of implications for clinical practice and public health intervention

Implications for clinical practice
• Clinicians could benefit from increased awareness of the important role that food-related parenting practices may have on adolescent's weight and use of disordered eating behaviors. • Discussion of appropriate food-related parenting practices* and anticipatory guidance regarding how to implement suggested practices into daily living should be included as a regular part of well-child visits. • Clinicians should consider parental motivation for use of food-related parenting practices prior to making clinical recommendations. • Clinicians should also be aware of how to identify parents that are more at risk for using controlling food-related parenting practices (e.g. in obese parents or parents with eating disorders)[118,128,221]. *Table 6-6 contains specific recommendations for parents to help adolescents achieve a healthy weight and healthy weight-related behaviors. These recommendations can be utilized as a guideline for the development of clinic-based recommendations.
Implications for public health intervention
• Public health professionals should identify ways to successfully communicate messages about appropriate food-related parenting practices* to parents of adolescents through home- or clinic-based intervention. o Targeted messages for parents from different racial/ethnic and socioeconomic backgrounds should be considered. o Parents of both boys and girls should be targeted. o Fathers should be included, in addition to mothers. o The potential role of other caregivers (e.g., grandparents) in the transmission of food-related parenting practices to parents should not be overlooked. *Table 6-6 contains specific recommendations for parents to help adolescents achieve a healthy weight and healthy weight-related behaviors. These can be utilized as a guideline for the development of public health interventions.

Table 6-6: Recommendations for families to help adolescents achieve a healthy weight and healthy weight-related behaviors: A synthesis of the literature to date.

Recommendation	Specific steps for parents/families	Supportive research
Create a home food environment conducive to making healthy food choices	• Make nutritious foods easily accessible within your home. • Do not completely eliminate desserts, snack foods, or other favorite foods from your home – instead make these items available on occasion.	• Home food availability is one of the strongest correlates of fruit, vegetable, and low-fat dairy intakes.[163,230] • Research shows that complete restriction of desserts and snack foods prompts overconsumption when these foods become available. [182,185,193,231,232]
Provide consistent structure, while encouraging autonomy	• Encourage your teen to eat three meals and regular snacks daily. • Parents should be responsible for choosing when meals will be served and what foods will be served or made available for meals and snacks. • Teens should be responsible for choosing how much food they eat for each meal and snack • Do not actively restrict your teen's consumption of food items; do not pressure your teen to eat if they are not interested.	• Consumption of regular meals is associated with healthier dietary intake patterns and fewer disordered eating behaviors. [138,182,233,234] • Food restriction is associated with dietary disinhibition, increased eating in the absence of hunger, and * increased prevalence of disordered eating among adolescent girls and boys.[96,97,132,136,209] • *Higher levels of food restriction have also been associated with higher BMI in some studies.[123,124,209] • Pressure-to-eat can result in dislike of target food items, emotional disinhibition, reports of dietary restraint, and disruption of innate self-regulation mechanisms [96,136,136]

Table 6-6. Continued

Model healthy food choices, healthy eating patterns, and a healthy relationship with food	• Eat three meals and regular snacks daily. Whenever possible, eat these meals as a family. • Avoid dieting, instead focus on behavior changes. • Avoid making weight-related comments or engaging in weight-based teasing. • Model healthy food choices and eating patterns, including consumption of desserts, snack foods, and other favorite foods in moderation.	• Family meals are strongly correlated with better dietary intake and lower risk of engagement in disordered eating behaviors.[17] • Dieting for weight loss is associated with weight gain over time and the onset of disordered eating/eating disorders.[68,70,71] • Although not consistent across studies, correlations are often seen between parental and adolescent eating, activity, and dieting behaviors.[163,235]
Provide a supportive environment that focuses on healthful behaviors, not on weight	• Encourage your teen to adopt healthy behaviors without focusing on weight loss. • Focus your conversations on making food choices for overall health, not weight loss. • Do not allow weight teasing within your home.	• Dieting for weight loss is associated with weight gain over time and the onset of disordered eating/eating disorders, suggesting the importance of focusing on moderate, but effective, lifestyle changes.[80] • Parent weight talk, including conversations that focus on weight loss, is associated with an increase in disordered eating behaviors.[236] • Exposure to weight-teasing within the home environment is associated with decreases in self-esteem, increased in depression and an increased risk in disordered eating behaviors.[19,91,237,238]
Note: The recommendations presented in this table extend beyond findings from this dissertation and to include recommendations that stem from a synthesis of the scientific literature to date. This table also builds on recommendations suggested within the book, "I am, like, so fat".[239] Recommendations that stem directly from this dissertation work are denoted with an *.		

6.6 Conclusions

This dissertation added depth to a growing body of scientific literature by being the first research study to explore the specific types of food-related parenting practices utilized by parents as well as the first study to explore associations between food-related parenting practices and adolescent weight status and endorsement of disordered eating behaviors. Study findings indicate that use of controlling food-related parenting practices, such as pressuring children to eat and restricting children's intake, is common among parents of adolescents, particularly among parents in racial/ethnic minority subgroups, parents with less than a high school education, and parents with a low household income. Further, findings indicate that that use of controlling practices is associated with higher weight status among adolescent girls and boys and greater risk of disordered eating behaviors among adolescent boys. We found that fathers are more likely than mothers to engage in pressure-to-eat behaviors and boys are more likely than girls to be on the receiving end of parental pressure-to-eat. Parental report of restriction did not differ significantly by parent or adolescent gender. Race/ethnicity or SES did not modify any of the observed relationships. Replication studies are needed to confirm these in other adolescent populations. Nonetheless, dietitians, physicians and other health care providers should consider engaging parents in anticipatory guidance around the importance of avoiding the use of controlling food-related parenting practices with their adolescent. Clinicians should empower parents to promote a healthy weight and a healthy relationship with food for their teen by making nutritious food items readily available within their home, modeling healthy food choices, and encouraging adolescent's

autonomy in self-regulation of food intake. Additional qualitative and pilot studies are needed to better understand how to best conduct public health interventions and messages aimed at changing food-related parenting practices. More research is also required to understand parental motivation for use of particular food-related parenting practices and to establish temporality of the observed associations.

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Appendix A

Human Subjects Approval

UNIVERSITY OF MINNESOTA

Twin Cities Campus

Research Subjects' Protection Programs (RSPP)

Office of the Vice President for Research

D-528 Mayo Memorial Building
420 Delaware Street S.E.
Minneapolis, MN 55455

Office: 612-626-5654
Fax: 612-626-6061
www.research.umn.edu/subjects
Email: irb@umn.edu or
iacuc@umn.edu or ibc@umn.edu

07/02/2009

Dianne R Neumark-Sztainer
West Bank Office building
1300 S. 2nd Street
Suite 300
Minneapolis, MN 55454

RE: "Project F-EAT: Families and Eating and Activity in Teens"
IRB Code Number: **0711S20681**

Dear Dr. Neumark-Sztainer

The Institutional Review Board (IRB) received your response to its stipulations. Since this information satisfies the federal criteria for approval at 45CFR46.111 and the requirements set by the IRB, final approval for the project is noted in our files. Upon receipt of this letter, you may begin your research.

IRB approval of this study includes the consent form received June 30, 2009 and recruitment material received July 2, 2009.

The IRB would like to stress that subjects who go through the consent process are considered enrolled participants and are counted toward the total number of subjects, even if they have no further participation in the study. Please keep this in mind when calculating the number of subjects you request. This study is currently approved for 4800 subjects. If you desire an increase in the number of approved subjects, you will need to make a formal request to the IRB.

For your records and for grant certification purposes, the approval date for the referenced project is September 2, 2008 and the Assurance of Compliance number is FWA00000312 (Fairview Health Systems Research FWA00000325, Gillette Children's Specialty Healthcare FWA00004003). Research projects are subject to continuing review and renewal; approval will expire one year from that date. You will receive a report form two months before the expiration date. If you would like us to send certification of approval to a funding agency, please tell us the name and address of your contact person at the agency.

As Principal Investigator of this project, you are required by federal regulations to inform the IRB of any proposed changes in your research that will affect human subjects. Changes should not be initiated until written IRB approval is received. Unanticipated problems or serious unexpected adverse events should be reported to the IRB as they occur. The IRB wishes you success with this research. If you have questions, please call the IRB office at 612-626-5654.

Sincerely,

Felicia Mroczkowski, CIP
Research Compliance Supervisor
FM/cgk
CC: Jerica Berge, Marla Eisenberg, Jayne Fulkerson, Peter Hannan, Annabel Kornblum, Nicole Larson, Katie Loth, John Sirard, Mary Story, Melanie Wall

UNIVERSITY OF MINNESOTA

Twin Cities Campus

Project EAT
Division of Epidemiology
School of Public Health

Suite 300
1300 South Second Street
Minneapolis, MN 55454-1015
612-626-8566
Fax: 612-626-7103

Jeffery P. Perkey
Research Compliance Supervisor
Research Subjects' Protection Programs
MMC 820
420 Delaware St. SE
Minneapolis, MN 55455-0392

October 9, 2008

Dear Mr. Perkey,

I am writing to notify the IRB of personnel changes and school district approvals for the portion of the Project EAT-III study (IRB Code Number: 0508S72388) involving middle and senior high school students. I would like to request approval for the personnel changes; the attached survey that was revised for further pilot testing; and final approval for the portion of the Project EAT-III study involving students in St. Paul and Minneapolis Public Schools.

- Katie Loth, Sara Harris, and Meg Bruening are joining the study as research assistants. All three new research assistants have completed training and education in the protection of human subjects. Contact information for these staff members is attached to this letter. OK PM 10/10/08

- Enclosed please find letters of approval from the Research Committees for St. Paul and Minneapolis Public Schools. The approvals satisfy the only remaining stipulation to conduct the portion of the Project EAT-III study involving middle and senior high school students. We will also request permission from school principals in each district before starting data collection for the main study in the fall of 2009. OK

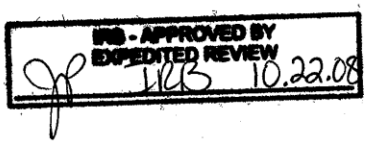
- The enclosed Project EAT-III survey has been updated for pilot testing with middle and senior high school students in St. Paul Public Schools. The University of Minnesota IRB previously reviewed consent and assent forms for pilot testing and provided final approval for pilot testing of the survey (see letter dated March 28, 2008). OK

Please contact me with any questions or concerns via phone at 612.625.5881, at the address above, or via e-mail (larsonn@umn.edu). The principal investigator for the study, Dr. Dianne Neumark-Sztainer, has approved all enclosed materials. She may be reached via e-mail (neumark@epi.umn.edu) or phone at 612.624.0880.

Sincerely,

Nicole Larson

Nicole Larson, PhD, MPH, RD
Project Director, Project EAT-III



Appendix B

EAT 2010 Adolescent Survey

Project EAT 2010 Survey

UNIVERSITY OF MINNESOTA

THANKS

For agreeing to fill out this survey!

- **The survey you are about to complete is very important. The information you share with us will be used to develop health and nutrition programs for teens. Please answer every question carefully.**

- **Do not spend too much time on any one question. If something is not clear, please ask for an explanation.**

- **This is NOT a test. There are not right or wrong answers to the questions.**

- **Your name will be kept separate from your answers to the questions, so please be as honest as you can in your responses.**

MARKING DIRECTIONS:

1) Mark your answers with a pencil.
2) Place a check in the box for your answer or completely fill in the box.
3) Please completely erase any answer you want to change.

PROJECT EAT

Let's START with some GENERAL QUESTIONS about you

1. Are you …?

1 ☐ Male

2 ☐ Female

30

2. What is your birthdate? |___|___| / |___|___| / 19|___|___|

Month *Day* *Year*

31-36

3. What grade are you in?

1 ☐ 6th

2 ☐ 7th

3 ☐ 8th

4 ☐ 9th

5 ☐ 10th

6 ☐ 11th

7 ☐ 12th

37

4. Do you think of yourself as…? (You may choose more than one)

1 ☐ White

2 ☐ Black or African American

3 ☐ Hispanic or Latino

4 ☐ Asian American

5 ☐ Native Hawaiian or other Pacific Islander

6 ☐ American Indian or Native American

7 ☐ Other: _____

38

39

40

41

42

43

44

5. Is your background any of the following?

1 ☐ Hmong

2 ☐ Cambodian

3 ☐ Vietnamese

4 ☐ Laotian

5 Somali

45

46

47

48

49

☐ 6 Ethiopian 50

☐ 7 Other: _____ 51

☐ 8 None of the above 52

6. Were you born in the United States?

☐ 1 Yes 53-54

☐ 2 No: In what country? _____

7. About how long have you been in the United States?

☐ 1 Less than 1 year

☐ 2 1 to less than 5 years 55

☐ 3 5 to less than 10 years

☐ 4 10 years or more

☐ 5 Always

8. What language is usually spoken in your home?

☐ 1 English

☐ 2 A language other than English: What other language? 56-57
_____

☐ 3 English and another language about equally: What other language?
_____

Your EATING HABITS… when, why, how, and what?

9. During the <u>past week</u>, how many days did you eat *breakfast?*

☐ 1 Never

☐ 2 1-2 days 58

☐ 3 3-4 days

☐ 4 5-6 days

☐ 5 Every day

10. During the <u>past week</u>, how many days did you eat *lunch?*

1 ☐ Never

2 ☐ 1-2 days

3 ☐ 3-4 days

4 ☐ 5-6 days

5 ☐ Every day

59

11. During the <u>past week</u>, how many days did you eat *dinner?*

1 ☐ Never

2 ☐ 1-2 days

3 ☐ 3-4 days

4 ☐ 5-6 days

5 ☐ Every day

60

12. In the <u>past week</u>, how often did you eat something from a fast food restaurant (like McDonald's, Burger King, Hardee's, etc.)?

1 ☐ Never

2 ☐ 1-2 times

3 ☐ 3-4 times

4 ☐ 5-6 times

5 ☐ 7 times

6 ☐ More than 7 times

61

13. Are you a vegetarian?

1 ☐ Yes

2 ☐ No **(If no, then go to question #15 on the next page)**

62

14. As a vegetarian, do you eat any of the following?

		Yes	*No*	
a.	Eggs	1 ☐	2 ☐	63
b.	Dairy food (such as milk, cheese)	1 ☐	2 ☐	64
c.	Chicken	1 ☐	2 ☐	65
d.	Fish	1 ☐	2 ☐	66

15. In the <u>past year</u>, how many times did you usually drink ….

		Never or less than once per month	*1-3 per month*	*1 per week*	*2-4 per week*	*5-6 per week*	*1 per day*	*2 or more per day*	
a.	**an energy drink (such as Red Bull, Full Throttle, Rockstar, etc)?**	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐	67
b.	**a sports drink (such as Gatorade, Powerade, etc)?**	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐	68

16. How strongly do you agree with the following statements?

		Strongly disagree	*Somewhat disagree*	*Somewhat agree*	*Strongly agree*	
a.	Milk tastes good to me	1 ☐	2 ☐	3 ☐	4 ☐	69
b.	I like the taste of most fruits	1 ☐	2 ☐	3 ☐	4 ☐	70
c.	I like the taste of whole wheat bread	1 ☐	2 ☐	3 ☐	4 ☐	71
d.	Most vegetables taste bad	1 ☐	2 ☐	3 ☐	4 ☐	72
e.	Most healthy foods just don't taste that great	1 ☐	2 ☐	3 ☐	4 ☐	73
f.	Eating healthy just costs too much	1 ☐	2 ☐	3 ☐	4 ☐	74
g.	I am a picky eater	1 ☐	2 ☐	3 ☐	4 ☐	75
h.	I like to cook	1 ☐	2 ☐	3 ☐	4 ☐	76
i.	I am worried about gaining weight	1 ☐	2 ☐	3 ☐	4 ☐	77
j.	I think a lot about being thinner	1 ☐	2 ☐	3 ☐	4 ☐	78
k.	I weigh myself often	1 ☐	2 ☐	3 ☐	4 ☐	79

17. Which of the following best describes your eating behavior?

		Hardly ever	*Sometimes*	*Much of the time*	*Almost always*	
a.	I stop eating when I feel full	1 ☐	2 ☐	3 ☐	4 ☐	80
b.	I eat everything that is on my plate, even if I'm not that hungry	1 ☐	2 ☐	3 ☐	4 ☐	81
c.	I trust my body to tell me how much to eat	1 ☐	2 ☐	3 ☐	4 ☐	82

18. How often are the following true?

		Never	*Sometimes*	*Usually*	*Always*	
a.	Fruits and vegetables are available in my home	1 ☐	2 ☐	3 ☐	4 ☐	83
b.	Vegetables are served at dinner in my home	1 ☐	2 ☐	3 ☐	4 ☐	84
c.	I have 'junk food' in my home	1 ☐	2 ☐	3 ☐	4 ☐	85
d.	I have fruit juice in my home	1 ☐	2 ☐	3 ☐	4 ☐	86
e.	Milk is served at meals in my home	1 ☐	2 ☐	3 ☐	4 ☐	87
f.	Potato chips or other salty snack foods are available in my home	1 ☐	2 ☐	3 ☐	4 ☐	88
g.	In my home, there is fresh fruit on the counter, table or somewhere where I can easily get it	1 ☐	2 ☐	3 ☐	4 ☐	89
h.	Chocolate or other candy is available in my home	1 ☐	2 ☐	3 ☐	4 ☐	90
i.	Soda pop is available in my home	1 ☐	2 ☐	3 ☐	4 ☐	91
j.	In my home, there are cut-up vegetables in the fridge for me to eat	1 ☐	2 ☐	3 ☐	4 ☐	92
k.	Whole wheat bread is available in my home	1 ☐	2 ☐	3 ☐	4 ☐	93

19. In the <u>past month</u>, how often did you eat something from the following types of restaurants (include take-out and delivery)?

		Never/ rarely	*1-3 times per month*	*1-2 times per week*	*3-4 times per week*	*5-6 times per week*	*1+ times per day*	
a.	Traditional "burger-and-fries" fast food restaurant (such as McDonalds, Burger King, Wendy's, or Culvers)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	94
b.	Mexican fast food restaurant (such as Taco Bell, Taco Johns, or Chipotle)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	95
c.	Fried chicken (such as KFC)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	96
d.	Sandwich or sub shop (such as Subway, Panera, or Quiznos)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	97
e.	Pizza place	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	98
f.	Sit-down restaurant (where wait-staff brings food to your table)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	99

Now some questions about weight….

20. Are you <u>currently</u> trying to:

1 ☐ Lose weight
2 ☐ Stay the same weight 100
3 ☐ Gain weight
4 ☐ I am not trying to do anything about my weight

21. How often do you weigh yourself?

1 ☐ Less than once a month
2 ☐ Every month 101
3 ☐ A few times per month
4 ☐ Every week
5 ☐ A few times per week
6 ☐ Every day
7 ☐ More than once a day

22. How often have you gone on a diet during the last year? By "diet" we mean changing the way you eat so you can lose weight.

1 ☐ Never
2 ☐ 1-4 times 102
3 ☐ 5-10 times
4 ☐ More than 10 times
5 ☐ I am always dieting

23. Have you done any of the following things in order to lose weight or keep from gaining weight during the past year?

		Yes	*No*	
a.	Fasted	1 ☐	2 ☐	103
b.	Ate very little food	1 ☐	2 ☐	104
c.	Took diet pills	1 ☐	2 ☐	105
d.	Made myself vomit (throw up)	1 ☐	2 ☐	106
e.	Used laxatives	1 ☐	2 ☐	107
f.	Used diuretics (water pills)	1 ☐	2 ☐	108
g.	Used food substitute (powder/special drink)	1 ☐	2 ☐	109
h.	Skipped meals	1 ☐	2 ☐	110
i.	Smoked more cigarettes	1 ☐	2 ☐	111
j.	Followed a high protein/low carbohydrate diet (e.g., Atkins or other)	1 ☐	2 ☐	112

24. How often have you done each of the following things in order to lose weight or keep from gaining weight during the past year?

		Never	*Rarely*	*Sometimes*	*On a regular basis*	
a.	Exercise	1 ☐	2 ☐	3 ☐	4 ☐	113
b.	Ate more fruits and vegetables	1 ☐	2 ☐	3 ☐	4 ☐	114
c.	Ate less high-fat foods	1 ☐	2 ☐	3 ☐	4 ☐	115
d.	Ate less sweets	1 ☐	2 ☐	3 ☐	4 ☐	116
e.	Drank less soda pop (not including diet pop)	1 ☐	2 ☐	3 ☐	4 ☐	117
f.	Watched my portion sizes (serving sizes)	1 ☐	2 ☐	3 ☐	4 ☐	118

25. How often have you done each of the following things in order to increase your muscle size or tone during the past year?

		Never	*Rarely*	*Sometimes*	*Often*	
a.	Changed my eating	1 ☐	2 ☐	3 ☐	4 ☐	119
b.	Exercised more	1 ☐	2 ☐	3 ☐	4 ☐	120
c.	Used protein powder or shakes	1 ☐	2 ☐	3 ☐	4 ☐	121
d.	Used steroids	1 ☐	2 ☐	3 ☐	4 ☐	122
e.	Used another muscle-building substance (such as creatine, amino acids, hydroxyl methylbutyrate [HMB], DHEA, or growth hormone)	1 ☐	2 ☐	3 ☐	4 ☐	123

26. In the past year, have you ever eaten so much food in a short period of time that you would be embarrassed if others saw you (binge-eating)?

1 ☐ Yes 124

2 ☐ No **(If no, then go to question #30 on the next page)**

27. During the times when you ate this way, did you feel you couldn't stop eating or control what or how much you were eating?

1 ☐ Yes 125

2 ☐ No

28. How often, on average, did you have times when you ate this way – that is, large amounts of food plus the feeling that your eating was out of control?

1 ☐ Nearly every day

2 ☐ A few times a week 126

3 ☐ A few times a month

4 ☐ Less than once a month

29. In general, how upset were you by overeating (eating more than you think is best for you)?

1 ☐ Not at all
2 ☐ A little 127
3 ☐ Some
4 ☐ A lot

Your PHYSICAL ACTIVITY habits and other things you like to do…

In a usual <u>week</u>, how many hours do you spend doing the following activities:

30. Strenuous exercise (heart beats rapidly)

Examples: biking fast, aerobic dancing, running, jogging, swimming laps, rollerblading, skating, lacrosse, tennis, cross-country skiing, soccer, basketball, football

☐ None
☐ Less than ½ hour a week 128
☐ ½ -2 hours a week
☐ 2 ½ -4 hours a week
☐ 4 ½ -6 hours a week
☐ 6+ hours a week

31. Moderate exercise (not exhausting)

Examples: walking quickly, baseball, gymnastics, easy bicycling, volleyball, skiing, dancing, skateboarding, snowboarding

☐ None
☐ Less than ½ hour a week 129
☐ ½ -2 hours a week
☐ 2 ½ -4 hours a week
☐ 4 ½ -6 hours a week
☐ 6+ hours a week

32. Mild exercise (little effort)

Examples: walking slowly (to school, to friend's house, etc.), bowling, golf, fishing, snowmobiling, yoga

- ☐ None
- ☐ Less than ½ hour a week 130
- ☐ ½ -2 hours a week
- ☐ 2 ½ -4 hours a week
- ☐ 4 ½ -6 hours a week
- ☐ 6+ hours a week

33. In your free time <u>on an average weekday</u> (Monday-Friday), how many hours do you spend doing the following activities?

		0 hr	*½ hr*	*1 hr*	*2 hr*	*3 hr*	*4* hr	*5+ hr*	
a.	Watching TV/DVDs/videos	☐	☐	☐	☐	☐	☐	☐	131
b.	Using a computer (not for homework)	☐	☐	☐	☐	☐	☐	☐	132
c.	Xbox/Play-station/other electronic games that you play when sitting	☐	☐	☐	☐	☐	☐	☐	133
d.	Interactive video games such as Wii Sport, Wii Fit, and Dance Dance Revolution	☐	☐	☐	☐	☐	☐	☐	134

34. In your free time <u>on an average weekend day</u> (Saturday or Sunday), how many hours do you spend doing the following activities?

		0 hr	*½ hr*	*1 hr*	*2 hr*	*3 hr*	*4* hr	*5+ hr*	
a.	Watching TV/DVDs/videos	☐	☐	☐	☐	☐	☐	☐	135
b.	Using a computer (not for homework)	☐	☐	☐	☐	☐	☐	☐	136
c.	Xbox/Play-station/other electronic games that you play when sitting	☐	☐	☐	☐	☐	☐	☐	137
d.	Interactive video games such as Wii Sport, Wii Fit, and Dance Dance Revolution	☐	☐	☐	☐	☐	☐	☐	138

35. How often do you snack while watching TV?

1 ☐ Always
2 ☐ Usually 139
3 ☐ Sometimes
4 ☐ Rarely
5 ☐ Never

36. Thinking about the TV shows you've watched in the past year, please list up to 3 of your favorite shows.

_____ 140
_____ 141
_____ 142

If you don't regularly watch TV, please check here ☐ 143

37. How often do you read magazine articles in which dieting or weight loss are discussed?

1 ☐ Never
2 ☐ Hardly ever 144
3 ☐ Sometimes
4 ☐ Often

38. What is the name of the magazine that you read most often? _____ 145

If you don't regularly read any magazine, please check here ☐ 146

39. How often do you read this magazine?

1 ☐ Don't regularly read magazines
2 ☐ Less than once a month 147
3 ☐ 1 to 3 times a month
4 ☐ At least once a week

40. How often was each of these things true for you in the LAST MONTH?

		Never	*Rarely*	*Sometimes*	*Often*	*Very often*	
a.	When I get off track with my physical activity plans, I tell myself I can start again and get right back on track	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	148
b.	I set goals to do physical activity	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	149
c.	I make backup plans to be sure I get my physical activity	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	150

41. How often do these things keep you from being physically active?

		Never	*Rarely*	*Sometimes*	*Often*	*Very often*	
a.	The weather is bad	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	151
b.	I don't have time to do physical activity	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	152
c.	It would take time away from my school work	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	153
d.	I'm embarrassed about how I look when I'm active	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	154

42. I can be physically active during my free time on most days...

		Disagree a lot	*Disagree a little*	*Agree a little*	*Agree a lot*	
a.	no matter how busy my day is	1 ☐	2 ☐	3 ☐	4 ☐	155
b.	even if it is very hot or cold outside	1 ☐	2 ☐	3 ☐	4 ☐	156
c.	even if I have to stay at home	1 ☐	2 ☐	3 ☐	4 ☐	157

43. Please choose the answer that best applies to you and the neighborhood where you lived for the majority of the past year.

		Strongly disagree	*Somewhat disagree*	*Somewhat agree*	*Strongly agree*	
a.	The crime rate in my neighborhood makes it unsafe to go on walks <u>during the day</u>	1 ☐	2 ☐	3 ☐	4 ☐	158
b.	The crime rate in my neighborhood makes it unsafe to go on walks <u>at night</u>	1 ☐	2 ☐	3 ☐	4 ☐	159

44. When I am physically active…

		Disagree a lot	*Disagree a little*	*Agree a little*	*Agree a lot*	
a.	I feel bored	1 ☐	2 ☐	3 ☐	4 ☐	160
b.	I dislike it	1 ☐	2 ☐	3 ☐	4 ☐	161
c.	it frustrates me	1 ☐	2 ☐	3 ☐	4 ☐	162

45. Listed below are statements about people's exercise habits. How often are the following true?

		Never	*Sometimes*	*Usually*	*Always*	
a.	When I miss my scheduled exercise, I may feel tense, irritable, or depressed	1 ☐	2 ☐	3 ☐	4 ☐	163
b.	If I feel I have overeaten I will try to make up for it by increasing the amount I exercise	1 ☐	2 ☐	3 ☐	4 ☐	164
c.	When I don't exercise, I feel guilty	1 ☐	2 ☐	3 ☐	4 ☐	165

You're doing great!

Your responses are important so please keep on going...

We'd like to know more about your HEALTH & WEIGHT

46. **How tall are you?** |___| feet |___|___| inches 166-168

47. **How much do you weigh?** |___|___|___| pounds 169-171

48. **At this time, do you feel that you are:**

1 ☐ very underweight
2 ☐ somewhat underweight 172
3 ☐ about the right weight
4 ☐ somewhat overweight
5 ☐ very overweight

49. **How satisfied are you with your:**

		Very dissatisfied				*Very satisfied*	
a.	height	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	173
b.	weight	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	174
c.	body shape	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	175
d.	waist	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	176
e.	hips	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	177
f.	thighs	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	178
g.	stomach	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	179
h.	face	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	180
i.	body build	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	181
j.	shoulders	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	182
k.	muscles	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	183
l.	chest	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	184
m.	overall body fat	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	185

50. Please indicate if you have <u>ever</u> been diagnosed with the following conditions:

		No	*Yes*	
a.	Anorexia Nervosa	1 ☐	2 ☐	186
b.	Asthma	1 ☐	2 ☐	187
c.	Binge Eating Disorder	1 ☐	2 ☐	188
d.	Bulimia Nervosa	1 ☐	2 ☐	189
e.	Depression	1 ☐	2 ☐	190
f.	Diabetes (Type 1)	1 ☐	2 ☐	191
g.	Diabetes (Type 2)	1 ☐	2 ☐	192
h.	Other (please specify): _____	1 ☐	2 ☐	193

FRIENDS and FAMILY may affect your eating & activity habits, so we'd like to know more about them……

51. Many of my friends…

		Not at all	*A little*	*Somewhat*	*Very much*	*I don't know*	
a.	think it is important to eat healthy foods like fruits and vegetables	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	194
b.	diet to lose weight or keep from gaining weight	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	195

52. How strongly do you agree with the following statements?

		Strongly disagree	*Somewhat disagree*	*Somewhat agree*	*Strongly agree*	
a.	My friends often play sports or do something active	1 ☐	2 ☐	3 ☐	4 ☐	196
b.	My friends think it is important to be physically active	1 ☐	2 ☐	3 ☐	4 ☐	197
c.	My friends and I like to do active things together	1 ☐	2 ☐	3 ☐	4 ☐	198

53. Do you have one or more close friends who you can talk to about your problems?

1 ☐ Yes, always
2 ☐ Yes, sometimes 199
3 ☐ No

54. Which adults do you live with? (Mark all that apply)

1 ☐ my mother 200
2 ☐ my father 201
3 ☐ sometimes with my mother, sometimes with my father (they have separate homes) 202
4 ☐ stepmother 203
5 ☐ stepfather 204
6 ☐ my grandparent(s) 205
7 ☐ other relative(s) 206
8 ☐ an adult or adults I am not related to (other than stepparents) 207
9 ☐ other: _____ 208-209

55. How strongly do you agree with the following statements? For these questions, think about your family in general (including your parents and your brothers and sisters).

		Strongly disagree	*Somewhat disagree*	*Somewhat agree*	*Strongly agree*	
a.	Family members are accepted for who they are	1 ☐	2 ☐	3 ☐	4 ☐	210
b.	Making decisions is a problem for the family	1 ☐	2 ☐	3 ☐	4 ☐	211
c.	We don't get along well together	1 ☐	2 ☐	3 ☐	4 ☐	212
d.	We can express feelings to each other	1 ☐	2 ☐	3 ☐	4 ☐	213
e.	Planning family activities is difficult because we misunderstand each other	1 ☐	2 ☐	3 ☐	4 ☐	214
f.	We confide in each other (By 'confide' we mean to trust your family members enough to tell them something that is important to you.)	1 ☐	2 ☐	3 ☐	4 ☐	215

56. How strongly do you agree with the following statements? For these questions, think about your family in general (including your parents and your brothers and sisters).

		Strongly disagree	*Somewhat disagree*	*Somewhat agree*	*Strongly agree*	
a.	My family and I do active things together (for example, going on bike rides or walks)	1 ☐	2 ☐	3 ☐	4 ☐	216
b.	My family supports me in being physically active (for example, enrolling me in sports, watching me perform, providing transportation to places to be active)	1 ☐	2 ☐	3 ☐	4 ☐	217

EATING TOGETHER with your FAMILY and FOOD in your HOME

57. During the <u>past seven days</u>, how many times did all, or most, of your family living in your house eat a meal together?

1 ☐ Never
2 ☐ 1-2 times 218
3 ☐ 3-4 times
4 ☐ 5-6 times
5 ☐ 7 times
6 ☐ More than 7 times

58. During the <u>past seven days</u>, how many times did all, or most, of your family living in your house eat…

		0 days	*1-2 days*	*3-4 days*	*5-6 days*	*7 days*	
a.	breakfast together?	☐	☐	☐	☐	☐	219
b.	lunch together?	☐	☐	☐	☐	☐	220
c.	dinner or supper together?	☐	☐	☐	☐	☐	221

59. How strongly do you agree with the following statements?

		Strongly disagree	*Somewhat disagree*	*Somewhat agree*	*Strongly agree*	
a.	I enjoy eating meals with my family	1 ☐	2 ☐	3 ☐	4 ☐	222
b.	In my family, we often watch TV while eating dinner	1 ☐	2 ☐	3 ☐	4 ☐	223

60. In the <u>past week</u>, how many times did all, or most, of your family living in your household eat out together at a restaurant?

1 ☐ Never
2 ☐ 1 time 224
3 ☐ 2 times
4 ☐ 3 or more times

61. In the <u>past week</u>, how many times did you help make <u>dinner or supper</u> for your family?

1 ☐ None
2 ☐ 1-2 times 225
3 ☐ 3-4 times
4 ☐ 5-6 times
5 ☐ 7 times

62. Does your family get public assistance (like food support/stamps, EBT, WIC, TANF, SSI or MFIP)?

1 ☐ No
2 ☐ Yes 226
3 ☐ I don't know

63. Do you qualify for free or reduced-price school lunch?

1 ☐ No
2 ☐ Yes 227
3 ☐ I don't know

64. How often during the last 12 months have you been hungry because your family couldn't afford more food?

1 ☐ Almost every month
2 ☐ Some months but not every month 228
3 ☐ Only one or two months
4 ☐ I have not been hungry for this reason

65. Which of these statements best describes the food eaten in your home in the last 12 months:

1 ☐ Often we don't have enough to eat
2 ☐ Sometimes we don't have enough to eat 229
3 ☐ We have enough to eat but not always the kinds of food we want
4 ☐ We always have enough to eat and the kinds of food we want

The next few pages ask about your mother and father. It's okay to leave some items blank if you do not have a mother or father involved in your life.

YOUR MOTHER….

66. How far in school did your mother go? (Mark the highest level)

1 ☐ Did not finish high school
2 ☐ Finished high school or got GED 230
3 ☐ Did some college or training after high school
4 ☐ Finished college
5 ☐ Advanced degree (e.g., Master's degree, PhD, MD)
6 ☐ I don't know

67. Does your mother…

1 ☐ Work full-time for pay
2 ☐ Work part-time for pay 231
3 ☐ Not work for pay
4 ☐ I don't know

68. How much do you feel you can talk to your mother about your problems?

1 ☐ Not at all
2 ☐ A little 232
3 ☐ Somewhat
4 ☐ Quite a bit
5 ☐ Very much

69. How much do you feel your mother cares about you?

1 ☐ Not at all
2 ☐ A little 233
3 ☐ Somewhat
4 ☐ Quite a bit
5 ☐ Very much

70. How much does your mother REALLY know…

		Doesn't know	*Knows a little*	*Knows a lot*	
a.	who your friends are?	1 ☐	2 ☐	3 ☐	234
b.	where you go at night?	1 ☐	2 ☐	3 ☐	235
c.	where you are most afternoons after school?	1 ☐	2 ☐	3 ☐	236

71. My mother is a person who…

		Not like her	*Somewhat like her*	*A lot like her*	
a.	is always trying to change how I feel or think about things.	1 ☐	2 ☐	3 ☐	237
b.	brings up past mistakes when she criticizes me.	1 ☐	2 ☐	3 ☐	238
c.	is less friendly with me if I do not see things her way.	1 ☐	2 ☐	3 ☐	239

72. My mother…

		Not at all	*A little bit*	*Somewhat*	*Very Much*	
a.	diets to lose weight or keep from gaining weight.	1 ☐	2 ☐	3 ☐	4 ☐	240
b.	encourages me to eat healthy foods.	1 ☐	2 ☐	3 ☐	4 ☐	241
c.	encourages me to diet to control my weight.	1 ☐	2 ☐	3 ☐	4 ☐	242
d.	talks about her weight	1 ☐	2 ☐	3 ☐	4 ☐	243
e.	makes comments about other people's weight.	1 ☐	2 ☐	3 ☐	4 ☐	244

73. My mother…

		Never	*Rarely*	*Sometimes*	*On a regular basis*	
a.	eats a lot of fruit.	1 ☐	2 ☐	3 ☐	4 ☐	245
b.	eats vegetables at dinner.	1 ☐	2 ☐	3 ☐	4 ☐	246
c.	drinks milk at dinner.	1 ☐	2 ☐	3 ☐	4 ☐	247
d.	is physically active in her free time.	1 ☐	2 ☐	3 ☐	4 ☐	248

YOUR FATHER….

74. How far in school did your father go? (Mark the highest level)

1 ☐ Did not finish high school
2 ☐ Finished high school or got GED 249
3 ☐ Did some college or training after high school
4 ☐ Finished college
5 ☐ Advanced degree (e.g., Master's degree, PhD, MD)
6 ☐ I don't know

75. Does your father…

1 ☐ Work full-time for pay
2 ☐ Work part-time for pay 250
3 ☐ Not work for pay
4 ☐ I don't know

76. How much do you feel you can talk to your father about your problems?

1 ☐ Not at all
2 ☐ A little 251
3 ☐ Somewhat
4 ☐ Quite a bit
5 ☐ Very much

77. How much do you feel your father cares about you?

1 ☐ Not at all
2 ☐ A little 252
3 ☐ Somewhat
4 ☐ Quite a bit
5 ☐ Very much

78. How much does your father REALLY know…

		Doesn't know	*Knows a little*	*Knows a lot*	
a.	who your friends are?	1 ☐	2 ☐	3 ☐	253
b.	where you go at night?	1 ☐	2 ☐	3 ☐	254
c.	where you are most afternoons after school?	1 ☐	2 ☐	3 ☐	255

79. My father is a person who…

		Not like him	*Somewhat like him*	*A lot like him*	
a.	is always trying to change how I feel or think about things.	1 ☐	2 ☐	3 ☐	256
b.	brings up past mistakes when he criticizes me.	1 ☐	2 ☐	3 ☐	257
c.	is less friendly with me if I do not see things his way.	1 ☐	2 ☐	3 ☐	258

80. My father…

		Not at all	*A little bit*	*Somewhat*	*Very Much*	
a.	diets to lose weight or keep from gaining weight.	1 ☐	2 ☐	3 ☐	4 ☐	259
b.	encourages me to eat healthy foods.	1 ☐	2 ☐	3 ☐	4 ☐	260
c.	encourages me to diet to control my weight.	1 ☐	2 ☐	3 ☐	4 ☐	261
d.	talks about his weight	1 ☐	2 ☐	3 ☐	4 ☐	262
e.	makes comments about other people's weight.	1 ☐	2 ☐	3 ☐	4 ☐	263

81. My father…

		Never	*Rarely*	*Sometimes*	*On a regular basis*	
a.	eats a lot of fruit.	1 ☐	2 ☐	3 ☐	4 ☐	264
b.	eats vegetables at dinner.	1 ☐	2 ☐	3 ☐	4 ☐	265
c.	drinks milk at dinner.	1 ☐	2 ☐	3 ☐	4 ☐	266
d.	is physically active in his free time.	1 ☐	2 ☐	3 ☐	4 ☐	267

Almost there...you're nearly done!

SOMETIMES, other THINGS GOING ON IN YOUR LIFE can affect your eating and activity.
Remember, your responses will be kept CONFIDENTIAL, so please answer as honestly as possible.

82. Mark the two grades you get most often.

1 ☐ A
2 ☐ B
3 ☐ C
4 ☐ D
5 ☐ F or incomplete

268-269

83. On an <u>average weekday</u> (Monday-Friday): *Please check A.M. or P.M. (Midnight is 12:00 A.M.)*

a. What time do you **go to bed** (to go to sleep)? |___|___|:|___|___| *Hour Minutes* ☐ A.M. ☐ P.M. 270-274

b. What time do you **get out of bed** (to start your day)? |___|___|:|___|___| *Hour Minutes* ☐ A.M. ☐ P.M. 275-278

84. On an <u>average weekend day</u> (Saturday or Sunday): *Please check A.M. or P.M. (Midnight is 12:00 A.M.)*

a. What time do you **go to bed** (to go to sleep)? |___|___|:|___|___| *Hour Minutes* ☐ A.M. ☐ P.M. 279-282

b. What time do you **get out of bed** (to start your day)? |___|___|:|___|___| *Hour Minutes* ☐ A.M. ☐ P.M. 283-286

85. In the room where you sleep, do you have a…

		Yes	*No*	
a.	electronic game console (for example, Playstation, XBOX)?	1 ☐	2 ☐	287
b.	television?	1 ☐	2 ☐	288

86. During the past 12 months, how often have you been bothered or troubled by…

		Not at all	*Somewhat*	*Very much*	
a.	feeling too tired to do things	1 ☐	2 ☐	3 ☐	289
b.	having trouble going to sleep or staying asleep	1 ☐	2 ☐	3 ☐	290
c.	feeling unhappy, sad, or depressed	1 ☐	2 ☐	3 ☐	291
d.	feeling hopeless about the future	1 ☐	2 ☐	3 ☐	292
e.	feeling nervous or tense	1 ☐	2 ☐	3 ☐	293
f.	worrying too much about things	1 ☐	2 ☐	3 ☐	294

87. How strongly do you agree with the following statements?

		Strongly disagree	*Disagree*	*Agree*	*Strongly agree*	
a.	On the whole, I am satisfied with myself	1 ☐	2 ☐	3 ☐	4 ☐	295
b.	I feel that I have a number of good qualities	1 ☐	2 ☐	3 ☐	4 ☐	296
c.	At times I think I am no good at all	1 ☐	2 ☐	3 ☐	4 ☐	297
d.	I am able to do things as well as most other people	1 ☐	2 ☐	3 ☐	4 ☐	298
e.	I wish I could have more respect for myself	1 ☐	2 ☐	3 ☐	4 ☐	299
f.	I certainly feel useless at times	1 ☐	2 ☐	3 ☐	4 ☐	300

88. How often do any of the following things happen?

		Never	*Less than once a year*	*A few times a year*	*A few times a month*	*At least once a week*	
a.	You are teased or harassed about your race	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	301
b.	You are teased or harassed about your family's financial situation	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	302
c.	You are teased or harassed in a sexual way (e.g., grabbing/pinching, sexual comments, unwanted touching, etc…)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	303
d.	You are teased about your weight	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	304
e.	You are teased about your appearance	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	305

89. Have you ever been teased or made fun of by other kids because of your weight?

1 ☐ Yes 306

2 ☐ No

90. Have you ever been teased or made fun of by family members because of your weight?

1 ☐ Yes 307

2 ☐ No

91. How often do family members make comments to you about your weight or your eating that make you feel bad?

1 ☐ Never

2 ☐ Less than once a year 308

3 ☐ A few times a year

4 ☐ A few times a month

5 ☐ A few times a week

92. Have you ever deliberately hurt yourself, such as by cutting, scratching or burning, but not with the goal of ending your life?

1 ☐ Yes, during the past year

2 ☐ Yes, more than a year ago 309

3 ☐ No

93. How often have you used the following during the <u>past year</u> (12 months)?

		Never	*A few times*	*Monthly*	*Weekly*	*Daily*	
a.	Cigarettes	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	310
b.	Beer, wine, hard liquors	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	311
c.	Marijuana	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	312

The final questions are about changes that may be happening to your body. These changes happen to different people at different ages.

***If YOU are FEMALE**, answer question 94 (skip the question if you are male):*

94. Have you begun to menstruate (started to have your period)?

1 ☐ No 313-315

2 ☐ Yes → If yes, how old were you when you started to menstruate? _____

***If YOU are MALE**, answer questions 95 and 96 (skip them if you are female):*

95. Have you noticed a deepening of your voice?

1 ☐ No 316-318

2 ☐ Yes → If yes, how old were you when you noticed your voice deepening? _____

96. Have you begun to grow hair on your face?

1 ☐ No 319-321

2 ☐ Yes → If yes, how old were you when you begun to grow hair on your face? _____

THANK YOU for completing the Project EAT survey!

Appendix C

Project F-EAT Survey

THANKS

for agreeing to participate in this Project F-EAT Survey!

With your consent, your child recently participated in our Project EAT survey at school. Project EAT is a large survey of teens in the metro area that aims to learn more about the kinds of things that impact the eating habits and physical activity patterns of young people.

Now we have some questions we would like to ask you as the caregiver for this child.

- In this survey we will be asking you questions about yourself, your family and also about your child who recently participated in Project EAT. Please keep this child in mind when responding.

- Your name is not on this survey and all of your answers will be kept private, so please answer honestly. There are no right or wrong answers.

- Parents get a lot of mixed messages about food and weight and it can be hard to know what to do. The information that you and other parents provide in this survey will teach us about the challenges that families are facing. Your input will guide the development of programs for children and their families across the nation. Your input WILL make a difference.

Upon completion of the survey, please send it back in the enclosed return envelope and we will send you a $25 Target gift card right away in appreciation of your time.

1. What is your relationship with the child who participated in Project EAT?

1 ☐ Mother
2 ☐ Stepmother
3 ☐ Other female guardian
4 ☐ Father
5 ☐ Stepfather
6 ☐ Other male guardian
7 ☐ Other: _____

2. Where does your child who participated in Project EAT live?

1 ☐ My child lives only in my home
2 ☐ My child lives mostly in my home
3 ☐ My child lives equally in my home and in another home
4 ☐ My child lives mostly in another home
5 ☐ My child does not live in my home

Let's start with some questions about YOUR eating habits…

3. During the past week, on how many days did you eat breakfast?

1 ☐ Never
2 ☐ 1-2 days
3 ☐ 3-4 days
4 ☐ 5-6 days
5 ☐ Every day

4. Thinking back over the past week, how many servings of fruit did you usually eat on a typical day? (A serving is a half cup of fruit or 100% fruit juice, or a medium piece of fruit.)

1 ☐ Zero servings per day
2 ☐ Less than 1 serving per day
3 ☐ 1 serving per day
4 ☐ 2 servings per day
5 ☐ 3 servings per day
6 ☐ 4 servings per day
7 ☐ 5 or more servings per day

5. Thinking back over the past week, how many servings of vegetables did <u>you</u> usually eat on a typical day? (A serving is a half cup of cooked vegetables or one cup of raw vegetables.)

1 ☐ Zero servings per day
2 ☐ Less than 1 serving per day
3 ☐ 1 serving per day
4 ☐ 2 servings per day
5 ☐ 3 servings per day
6 ☐ 4 servings per day
7 ☐ 5 or more servings per day

6. Thinking back over the <u>past week</u>, how often did <u>you</u> drink sugar-sweetened beverages (regular soda pop, Kool-Aid)?

1 ☐ Less than once per week
2 ☐ 1 drink per week
3 ☐ 2-4 drinks per week
4 ☐ 5-6 drinks per week
5 ☐ 1 per day
6 ☐ 2 or more per day

7. In the <u>past week</u>, how often did <u>you</u> eat something from a fast food restaurant, such as McDonald's, Burger King, Domino's, or similar places? (pizza counts)

1 ☐ Never
2 ☐ 1-2 times
3 ☐ 3-4 times
4 ☐ 5-6 times
5 ☐ 7 times
6 ☐ More than 7 times

8. In the <u>past month</u>, how often did <u>you</u> eat something from the following types of restaurants (include take-out and delivery)?

		Never/ rarely	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1+ times per day
a.	Traditional "burger-and-fries" fast food restaurant (such as McDonald's, Burger King, Wendy's, or Culver's)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐
b.	Mexican fast food restaurant (such as Taco Bell, Taco John's, or Chipotle)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐
c.	Fried chicken (such as KFC)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐
d.	Sandwich or sub shop (such as Subway, Panera, or Quiznos)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐
e.	Pizza place	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐
f.	Sit-down restaurant (where wait-staff brings food to your table)	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐

The next questions are about your <u>FAMILY'S</u> eating habits…

9. During the <u>past week</u>, how many times did all, or most, of your <u>family</u> living in your household eat a meal together?

1 ☐ Never
2 ☐ 1-2 times
3 ☐ 3-4 times
4 ☐ 5-6 times
5 ☐ 7 times
6 ☐ More than 7 times

10. During the <u>past week</u>, how many times was a family meal purchased from a fast food restaurant and eaten together either at the restaurant or at home? (pizza counts)

1 ☐ Never
2 ☐ 1 time
3 ☐ 2 times
4 ☐ 3 or more times

11. How much do you agree with the following statements?

		Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
a.	It is important that our family eat at least one meal a day together	1 ☐	2 ☐	3 ☐	4 ☐
b.	Different schedules make it hard to eat meals together on a regular basis	1 ☐	2 ☐	3 ☐	4 ☐
c.	In our family, it is often difficult to find a time when family members can sit down to a meal together	1 ☐	2 ☐	3 ☐	4 ☐
d.	In our family, children are expected to be home for dinner	1 ☐	2 ☐	3 ☐	4 ☐

12. Think about a typical family dinner at your home…

☐ We never eat family dinners (If true, check the box to the left and skip to Question 16)

		Never or Rarely	Sometimes	Usually	Always
a.	Is a green salad served?	1 ☐	2 ☐	3 ☐	4 ☐
b.	Are vegetables other than potatoes served?	1 ☐	2 ☐	3 ☐	4 ☐
c.	Is 100% fruit juice served?	1 ☐	2 ☐	3 ☐	4 ☐
d.	Is fruit (not including juice) served?	1 ☐	2 ☐	3 ☐	4 ☐
e.	Is milk served?	1 ☐	2 ☐	3 ☐	4 ☐
f.	Are sugar-sweetened beverages (soda pop, Kool-aid, etc.) served?	1 ☐	2 ☐	3 ☐	4 ☐

13. How is food served at a typical family dinner in your home?

1 ☐ Food is served "family style" where everyone can help themselves from food on the table

2 ☐ Family members serve themselves from the counter or stove top

3 ☐ Food is put on family members' plates/bowls by whoever cooked it and then served

4 ☐ Some combination of all these ways

5 ☐ Other serving style (please describe): _____

14. How often does <u>your child</u> do the following at family meals?

		Never or Rarely	Sometimes	Usually	Always
a.	Watch television or movies	1 ☐	2 ☐	3 ☐	4 ☐
b.	Play with hand-held games (e.g., DS, PSP, Game Boy, etc.)	1 ☐	2 ☐	3 ☐	4 ☐
c.	Talk on the phone (cell or other)	1 ☐	2 ☐	3 ☐	4 ☐
d.	Text message	1 ☐	2 ☐	3 ☐	4 ☐
e.	Listen to music with headphones (e.g., with iPod, MP3 player, or other devices)	1 ☐	2 ☐	3 ☐	4 ☐

15. Do you set limits (have rules, including no use) on <u>your child's</u> media use (TV, cell phone, texting, etc.) at family meals?

1 ☐ No
2 ☐ Yes

16. Who does the majority of food shopping for your family? (Choose more than one person if the task is split evenly.)

1 ☐ Me
2 ☐ Spouse/partner
3 ☐ Child/children
4 ☐ Other adult in the home
5 ☐ Other (please describe) _____

17. Who usually prepares food for your family? (Choose more than one if the task is split evenly.)

1 ☐ Me
2 ☐ Spouse/partner
3 ☐ Child/children
4 ☐ Other adult in the home
5 ☐ Other (please describe) _____

18. How many <u>hours per week</u> do <u>you</u> normally spend preparing food for your family?

_____ hours per week

19. How many <u>hours per week</u> does your <u>spouse, partner, or another adult</u> in your household spend preparing food for your family?

_____hours per week

20. How much do you agree with the following statements?

		Strongly Disagree	Disagree	Agree	Strongly Agree
a.	I usually know or plan in the morning what we will eat for dinner that night	1 ☐	2 ☐	3 ☐	4 ☐
b.	I find cooking to be a real chore	1 ☐	2 ☐	3 ☐	4 ☐
c.	I usually decide at night what we will eat for dinner that night	1 ☐	2 ☐	3 ☐	4 ☐
d.	I like trying new recipes and cooking new things	1 ☐	2 ☐	3 ☐	4 ☐
e.	I don't buy many fruits because they cost too much	1 ☐	2 ☐	3 ☐	4 ☐
f.	I don't buy many vegetables because they cost too much	1 ☐	2 ☐	3 ☐	4 ☐
g.	At the store where I buy my groceries, the variety of fresh fruits and vegetables is limited	1 ☐	2 ☐	3 ☐	4 ☐
h.	At the store where I buy my groceries, the condition of fruits and vegetables is poor	1 ☐	2 ☐	3 ☐	4 ☐

21. How strongly do you agree with the following statements? For these questions, think about your family in general.

		Strongly Disagree	Disagree	Agree	Strongly Agree
a.	Family members are accepted for who they are	1 ☐	2 ☐	3 ☐	4 ☐
b.	Making decisions is a problem for the family	1 ☐	2 ☐	3 ☐	4 ☐
c.	We don't get along well together	1 ☐	2 ☐	3 ☐	4 ☐
d.	We can express feelings to each other	1 ☐	2 ☐	3 ☐	4 ☐
e.	Planning family activities is difficult because we misunderstand each other	1 ☐	2 ☐	3 ☐	4 ☐
f.	We confide in each other (By 'confide' we mean to trust your family members enough to tell them something that is important to you)	1 ☐	2 ☐	3 ☐	4 ☐

22. How much do <u>you</u> agree with the following statements?

		Strongly Disagree	Disagree	Agree	Strongly Agree	Not Employed
a.	Because of the requirements of my job, I miss out on home or family activities that I would prefer to participate in	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
b.	Because of the requirements of my job, my family time is less enjoyable or more pressured	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
c.	Working leaves me with too little time or energy to be the kind of parent I want to be	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

Now, a few questions about YOUR CHILD who recently participated in Project EAT…

23. How would you describe your child's weight?

1 ☐ Very underweight
2 ☐ Somewhat underweight
3 ☐ About right
4 ☐ Somewhat overweight
5 ☐ Very overweight

24. How concerned are you about your child's weight?

1 ☐ Not at all concerned
2 ☐ A little concerned
3 ☐ Quite concerned
4 ☐ Very concerned

25. To what extent do you encourage your child to diet to control his/her weight?

1 ☐ Not at all
2 ☐ A little bit
3 ☐ Somewhat
4 ☐ Very much

26. How often in the <u>past year</u>….

		Never or Rarely	A few times a year	A few times a month	A few times a week	Almost every day
a.	Have you had a conversation with your child about healthy eating habits?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
b.	Have you had a conversation with your child about being physically active?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
c.	Have you had a conversation with your child about his/her weight or size?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
d.	Have you mentioned to your child that he/she weighs too much?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
e.	Have you mentioned to your child that he/she should eat differently in order to lose weight or keep from gaining weight?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
f.	Have you mentioned to your child that he/she should exercise to lose weight or keep from gaining weight?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

27. How much do you agree with the following statements?

		Disagree	Slightly Disagree	Slightly Agree	Agree
a.	My child should always eat all of the food on his/her plate	1 ☐	2 ☐	3 ☐	4 ☐
b.	I have to be especially careful to make sure my child eats enough	1 ☐	2 ☐	3 ☐	4 ☐
c.	If my child says "I'm not hungry," I try to get him/her to eat anyway	1 ☐	2 ☐	3 ☐	4 ☐
d.	If I did not guide or regulate my child's eating, my child would eat much less than he/she should	1 ☐	2 ☐	3 ☐	4 ☐
e.	I have to be sure that my child does not eat too many high fat foods	1 ☐	2 ☐	3 ☐	4 ☐
f.	I have to be sure that my child does not eat too many sweets (candy, ice cream, cake, or pastries)	1 ☐	2 ☐	3 ☐	4 ☐
g.	I have to be sure that my child does not eat too much of his/her favorite foods	1 ☐	2 ☐	3 ☐	4 ☐
h.	If I did not guide or regulate my child's eating, he/she would eat too much of his/her favorite foods	1 ☐	2 ☐	3 ☐	4 ☐
i.	I intentionally keep some foods out of my child's reach	1 ☐	2 ☐	3 ☐	4 ☐
j.	If I did not guide or regulate my child's eating, he/she would eat too many junk foods	1 ☐	2 ☐	3 ☐	4 ☐

These next questions deal with how YOU spend your time…

In a usual week, how many hours do you spend doing the following activities?

28. Strenuous exercise (heart beats rapidly)
Examples: biking fast, aerobic dancing, running, jogging, swimming laps, rollerblading, skating, lacrosse, tennis, cross-country skiing, soccer, basketball, football

- ☐ None
- ☐ Less than ½ hour a week
- ☐ ½ – 2 hours a week
- ☐ 2 ½ - 4 hours a week
- ☐ 4 ½ - 6 hours a week
- ☐ 6+ hours a week

29. Moderate exercise (not exhausting)
Examples: walking quickly, dancing, baseball/softball, easy bicycling, volleyball, strength training, skiing, snowboarding

- ☐ None
- ☐ Less than ½ hour a week
- ☐ ½ – 2 hours a week
- ☐ 2 ½ - 4 hours a week
- ☐ 4 ½ - 6 hours a week
- ☐ 6+ hours a week

30. Mild Exercise (little effort)
Examples: walking slowly, bowling, golf, fishing, snowmobiling, yoga

- ☐ None
- ☐ Less than ½ hour a week
- ☐ ½ – 2 hours a week
- ☐ 2 ½ - 4 hours a week
- ☐ 4½ - 6 hours a week
- ☐ 6 + hours a week

31. In a typical week, how many hours do you spend doing the following:

		None	Less than ½ hr	½ - 2 hrs	2 ½ - 4 hrs	4 ½ - 6 hrs	6 + hrs
a.	Being physically active with your child (e.g., throwing a ball around, taking a walk or bike ride together)?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐
b.	Helping your child to be physically active (e.g., driving them to the gym or sport practice, watching them play a sport)?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐
c.	Watching TV/movies together with your child?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐

32. On an average day, how many hours do you spend watching TV, DVDs, or videos?

- ☐ None
- ☐ ½ hour per day
- ☐ 1 hour per day
- ☐ 2 hours per day
- ☐ 3 hours per day
- ☐ 4 hours per day
- ☐ 5 or more hours per day

33. In your home, how many of the following items do you have? (Please do not include items that are in storage)

		0	1	2	3	4 or more
a.	TV	☐	☐	☐	☐	☐
b.	VCR or DVD player	☐	☐	☐	☐	☐
c.	TiVo or Digital Video Recorder (DVR)	☐	☐	☐	☐	☐
d.	Computer or laptop	☐	☐	☐	☐	☐
e.	Video game system (Xbox, Playstation, etc.)	☐	☐	☐	☐	☐

34. Do you have the following items in your home, yard, or apartment complex that would be available to your child?

		No	Yes
a.	Stationary aerobic equipment (bicycle, treadmill, etc.)	1 ☐	2 ☐
b.	Bicycle, skateboard, scooter, rollerskates/blades	1 ☐	2 ☐
c.	Basketball hoop	1 ☐	2 ☐
d.	Weight lifting equipment (free weights, Nautilus, Universal, etc.)	1 ☐	2 ☐
e.	Interactive video games such as Wii Sport, Wii Fit and Dance Dance Revolution	1 ☐	2 ☐

Now we have some questions about YOUR health and weight…

35. How tall are you? |____| feet |____|____| inches

36. How much do you weigh? |____|____|____| pounds

37. During the past year, have you done anything to try to lose weight or keep from gaining weight?

1 ☐ No
2 ☐ Yes

38. How often have you gone on a diet during the last year? By "diet" we mean changing the way you eat so you can lose weight.

1 ☐ Never
2 ☐ 1-4 times
3 ☐ 5-10 times
4 ☐ More than 10 times
5 ☐ I am always dieting

39. How often do you weigh yourself?

1 ☐ Less than once a month
2 ☐ Every month
3 ☐ A few times per month
4 ☐ Every week
5 ☐ A few times per week
6 ☐ Every day
7 ☐ More than once a day

40. How satisfied are you with your:

		Very Dissatisfied				Very Satisfied
a.	Weight	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
b.	Body shape	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
c.	Body build	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

41. Please indicate if <u>you</u> have <u>ever</u> been told by your doctor that you have the following conditions:

		No	Yes
a.	Anorexia Nervosa	1 ☐	2 ☐
b.	Asthma	1 ☐	2 ☐
c.	Binge Eating Disorder	1 ☐	2 ☐
d.	Bulimia Nervosa	1 ☐	2 ☐
e.	Depression	1 ☐	2 ☐
f.	Diabetes (Type 1)	1 ☐	2 ☐
g.	Diabetes (Type 2)	1 ☐	2 ☐
h.	High Blood Pressure	1 ☐	2 ☐
i.	High Cholesterol	1 ☐	2 ☐
j.	Other (Please specify):_____	1 ☐	2 ☐

42. In the <u>past year,</u> have you ever eaten so much food in a short period of time that you would be embarrassed if others saw you (binge-eating)?

1 ☐ Yes

2 ☐ No (If no, then go to question #44)

43. During the times when you ate this way, did you feel you couldn't stop eating or control what or how much you were eating?

1 ☐ Yes

2 ☐ No

44. Below is a list of ways <u>you</u> may have felt or behaved. Please indicate how often you have felt these during the <u>past week</u>:

		Rarely or none of the time (less than one day)	Some or a little of the time (1-2 days)	Occasionally/ moderate amount of the time (3-4 days)	Most or all of the time (5-7 days)
a.	I felt depressed	1 ☐	2 ☐	3 ☐	4 ☐
b.	My sleep was restless	1 ☐	2 ☐	3 ☐	4 ☐
c.	I felt lonely	1 ☐	2 ☐	3 ☐	4 ☐
d.	I had crying spells	1 ☐	2 ☐	3 ☐	4 ☐
e.	I could not get going	1 ☐	2 ☐	3 ☐	4 ☐

45. Do you think of yourself as…? (You may choose more than one)

1 ☐ White
2 ☐ Black or African American
3 ☐ Hispanic or Latino
4 ☐ Asian American
5 ☐ Native Hawaiian or other Pacific Islander
6 ☐ American Indian or Native American
7 ☐ Other: _____

46. Is your background any of the following?

1 ☐ Hmong
2 ☐ Cambodian
3 ☐ Vietnamese
4 ☐ Laotian
5 ☐ Somali
6 ☐ Ethiopian
7 ☐ Other: _____
8 ☐ None of the above

47. What is your current marital status?

1 ☐ Married or in a committed relationship
2 ☐ Divorced/Separated
3 ☐ Single
4 ☐ Widowed
5 ☐ Other (please specify): _____

48. How many children (under the age of 18 years) live in your household?_____

49. What is the highest grade or year of school that <u>you</u> have completed?

1 ☐ Did not finish high school
2 ☐ Finished high school or got GED
3 ☐ Some college or training after high school
4 ☐ Finished college
5 ☐ Advanced degree (e.g., Master's Degree, PhD, MD)

50. What is the highest grade or year of school <u>your spouse or partner</u> has completed?

1 ☐ Not applicable (No spouse/partner)
2 ☐ Did not finish high school
3 ☐ Finished high school or got GED
4 ☐ Some college or training after high school
5 ☐ Finished college
6 ☐ Advanced degree (e.g., Master's Degree, PhD, MD)
7 ☐ I don't know

51. Which of the following best describes <u>your</u> current work situation?

1 ☐ Working full-time
2 ☐ Working part-time
3 ☐ Stay at home caregiver
4 ☐ Currently unemployed, but actively seeking work
5 ☐ Not working for pay (unable to work, retired, student)

52. Does your household receive public assistance (like food support/stamps, EBT, WIC, TANF, SSI or MFIP)?

1 ☐ No
2 ☐ Yes
3 ☐ I don't know

53. Please indicate how often each statement was true for your household in the last 12 months:

		Often true	Sometimes true	Never true
a.	The food that we bought just didn't last, and we didn't have money to get more	1 ☐	2 ☐	3 ☐
b.	We couldn't afford to eat balanced meals	1 ☐	2 ☐	3 ☐

54. In the last 12 months, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?

1 ☐ No
2 ☐ Yes, only 1 or 2 months
3 ☐ Yes, some months but not every month
4 ☐ Yes, almost every month

55. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?

1 ☐ No
2 ☐ Yes
3 ☐ Don't know

56. In the last 12 months, were you ever hungry but didn't eat because there was not enough money for food?

1 ☐ No
2 ☐ Yes
3 ☐ Don't know

57. What was the total income of your household before taxes in the past year?

1 ☐ Less than $20,000
2 ☐ $20,000 – $34,999
4 ☐ $35,000 – $49,999
5 ☐ $50,000 – $74,999
6 ☐ $75,000 – $99,999
7 ☐ $100,000 or more

58. What is your birth date? |___|___| |___|___| |___|___|
Month Day Year

Thank You!

Please return this survey in the envelope provided (no need to add postage).