



# HHS Public Access

Author manuscript

*Clin Pract (Lond)*. Author manuscript; available in PMC 2015 September 23.

Published in final edited form as:

*Clin Pract (Lond)*. 2014 March 1; 11(2): 207–220. doi:10.2217/cpr.14.5.

## Food-related parenting practices and child and adolescent weight and weight-related behaviors

K Loth<sup>a</sup>, JA Fulkerson<sup>b</sup>, and D Neumark-Sztainer<sup>a</sup>

<sup>a</sup>Division of Epidemiology and Community Health, School of Public Health, University of Minnesota

<sup>b</sup>School of Nursing, University of Minnesota

### Summary

The prevalence of overweight and obesity in children has reached a concerning plateau in the past three decades, with overweight or obesity impacting approximately one-third of youth. Unhealthy weight-related behaviors, including dieting, unhealthy weight control practices and binge eating, are also a great public health concern for young people given both their high prevalence and harmful consequences. Food-related parenting practices, including food restriction and pressure-to-eat, have been associated with higher weight status, as well as the use of unhealthy weight-related behaviors, in children and adolescents. Physicians and other health care providers who work with families should discourage parents from using food restriction and pressure-to-eat parenting practices with their child or adolescent. Alternatively, parents should be empowered to promote healthy eating by focusing on making nutritious food items readily available within their home and modeling healthy food choices for their child or adolescent.

### Keywords

Child feeding practices; food-related parenting practices; pressure-to-eat; food restriction; overweight; obesity; disordered eating; adolescents; children; parenting

### Introduction

Both obesity and engagement in unhealthy weight-related behaviors, including meal skipping, fasting, or purging, are major public health problems among children and adolescents because of their high prevalence and potentially serious physical and psychosocial consequences.[1] Research suggests that obesity and unhealthy weight-related behaviors can occur simultaneously [2–5], increase in severity over time, and lead to the onset of severe health conditions (e.g. high blood pressure, diabetes, or clinically significant eating disorders). These observations suggest a need for developing interventions, clinical approaches, and clinical messages aimed to simultaneously prevent obesity and a spectrum of weight-related problems. Such an integrated approach could have advantages in terms of cost effectiveness, practicality, and consistency of clinical health messages. Understanding

---

**BOLD:** Definitions and examples for terms that are **BOLD** the first time they appear in the text of the paper are provided in Table 1.

shared risk factors for obesity and unhealthy weight-related behaviors and identifying effective prevention strategies are critical for health promotion. A growing body of evidence indicates that the family environment plays an integral role in child and adolescent weight status and unhealthy weight-related behaviors, including dieting, unhealthy weight control practices, and binge eating. Specifically, food-related parenting practices have been identified as potentially significant correlates of weight status and unhealthy weight-related behaviors in children and adolescents.[6]

This review article focuses on discussing what is currently known within the scientific literature about associations between food restriction and pressure-to-eat food-related parenting practices and youth weight status and weight-related behaviors, including dietary intake patterns and disordered eating behaviors. Further, this review explores observed inconsistencies within the literature, highlights gaps within the current literature and suggests areas for future research. Finally, evidence-based recommendations for physicians and other health care providers who work with parents of young people are discussed. Studies described within this review of the literature were obtained via searches on both PubMed and Google Scholar using keywords including: food-related parenting practices, parent feeding practices, child feeding practices, food restriction, pressure-to-eat, Child Feeding Questionnaire.

### **Overweight and obesity among children and adolescents**

The prevalence of overweight and obesity in American children and adolescents has reached a concerning plateau after a dramatic rise throughout the past three decades; overweight or obesity affect approximately one-third of youth.[1] Overweight and obesity are widely accepted terms utilized to describe ranges of body mass index (BMI) that are greater than what is generally considered healthy for a given height.[1] Childhood obesity is defined as a BMI at or above the 95<sup>th</sup> percentile for children of the same age and sex; childhood overweight is defined as a BMI at or above the 85<sup>th</sup> percentile and lower than the 95<sup>th</sup> percentile for children of the same age and sex.[1]

Overweight and obesity are unequally distributed among adolescents by family income and race; the prevalence of overweight within certain subgroups approaches fifty percent.[1] Children from lower socioeconomic status (SES) families and neighborhoods have higher prevalence rates of obesity than youth from higher SES families and neighborhoods.[1] Within race/ethnicity, the prevalence of obesity remains the highest among children and adolescents from ethnic minority groups, including African American, Native American, and Hispanic young people.[1] These disparities in weight status suggest that the long-term consequences of this trend will disproportionately affect those youth from low SES backgrounds and minorities.

Significant health consequences exist for children and adolescents whose weight-to-height ratio, or Body Mass Index (BMI), identifies them as obese or overweight. Physical comorbidities of overweight/obesity during childhood include metabolic syndrome, Type 2 diabetes, hypertension, hyperlipidemia, sleep disorders, and among adolescent girls, polycystic ovary syndrome.[7] Research has demonstrated that children and adolescents who are overweight/obese experience psychosocial difficulties. Psychological and psychosocial

problems, such as depression, lower self-esteem, lower quality of life, and less perceived social acceptance have also been associated with being overweight during childhood.[8] These psychological and psychosocial challenges are thought to be a result of the weight bias that overweight children experience, not the weight status itself. Both the physical and emotional consequences of being overweight/obese 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 children who are overweight or obese have an increased risk of becoming overweight or obese adults.[9] Overweight or obesity during childhood has been linked to an increased likelihood of hypertension in adulthood.[10] Metabolic syndrome in childhood has been linked to metabolic syndrome and type 2 diabetes in adulthood.[11] High blood pressure and cholesterol in childhood have also been associated with poor cardiovascular outcomes in adulthood.[7] These few longitudinal studies indicate that there are significant long-term consequences of childhood overweight and obesity, many of which currently may not yet be fully understood as the rate of overweight and obesity has rapidly increased over the past few decades.

### **Unhealthy weight-related behaviors among children and adolescents**

Unhealthy weight-related 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.[12] The high prevalence of unhealthy weight control practices among youth has been well documented throughout the literature [12] and research also suggests that, as youth progress throughout adolescence to young adulthood, their use of these behaviors persists or even increases.[13] Although unhealthy weight-related behaviors are most prevalent among adolescent girls, adolescent boys are also affected in significant numbers[12,14]. For example, a recently conducted population-based study found that approximately 50% of adolescent girls and 30% of adolescent boys had engaged in these unhealthy weight-control behaviors within the past year.[13]

Dieting, unhealthy and extreme weight-control behaviors, and binge eating have also been found to predict several problematic health outcomes including weight gain, obesity, and eating disorders in adolescence and adulthood.[2,3] For example, a 10-year longitudinal study found that adolescents engaging in dieting and those reporting unhealthy weight control practices had significantly greater increases in body mass index from adolescence to young adulthood compared with adolescents who did not engage in these behaviors.[3] For example, young women who engaged in unhealthy weight control practices showed an increase of 4.6 BMI units over a 10-year period compared to an increase of 2.3 BMI units among young women who did not engage in unhealthy weight control practices. The use of unhealthy weight control practices has also been found to be associated with poorer dietary intake, which is of particular concern given the high level of nutrients required to support proper growth and development during adolescence.[15] For example, youth who engage in unhealthy weight control practices consume fewer dairy products compared to youth who do

not engage in disordered eating behaviors.[16] This places them at higher risk for calcium deficiency, which can lead to inadequate bone density and increase risk of bone fractures. Unhealthy weight-control behaviors have also been associated with poorer psychosocial outcomes for adolescents, including lower levels of body image and self-esteem and increased depressive symptoms. [17,18] Youth who engage in unhealthy weight control practices are also more likely to report using drugs, alcohol and cigarettes.[19] Overall, the harmful consequences associated with the use of unhealthy weight-related behaviors, and the high prevalence of these behaviors during adolescence, demonstrate the need to identify possible prevention strategies or modes for intervention.

### **The role of families in child and adolescent weight and weight-related behaviors**

A strong body of empirical evidence has demonstrated that parental behaviors and other factors within the family environment are significant predictors of child and adolescent weight status and unhealthy weight-related behaviors.[20–28] Research evidence indicates that family-related factors are the strongest correlates of weight-related outcomes in children and adolescents.[24] Parents have the opportunity to positively influence their child's weight status through role modeling of healthful eating and physical activity behaviors[29], provision of healthful food choices within the home environment[29,30], and establishment of family norms around consistent meal and snack patterns[31–34], including regular and frequent consumption of family meals.[35] Research studies have also demonstrated that parental weight-related attitudes and behaviors, such as weight-based teasing[36–39], weight and body talk,[40] and parental modeling of dieting and unhealthy weight control behaviors[41–44] are predictive of an increased risk of adolescent's engagement in dieting, unhealthy and extreme weight-control behaviors and binge eating.[45] In addition to the strong body of evidence that exists indicating the important role that parental behaviors and the family environment plays in the development of the weight status and weight-related behaviors of young people, parents have also been identified within research studies as having an integral role in the successful treatment of pediatric obesity[46] as well as clinical eating disorders in young people.[47,48]

Food-related parenting practices, or the techniques that parents use to influence children's eating, are also frequently discussed within the scientific literature as another potentially important correlate of child weight and weight-related behaviors.[49] Although the seminal work of Birch and colleagues first examined the relationship between food-related parenting practices and child weight status and weight-related behaviors and cognitions nearly 20 years ago within her research laboratory at Penn State, more recent research examining the use of food-related parenting practices within larger, population-based samples has caused a resurgence of interest within the field on impact of food-related parenting practices on child and adolescent outcomes. The next section of this review article will focus exclusively on discussing what is currently known within the scientific literature about associations between food-related parenting practices and youth weight status and weight-related behaviors, as well as exploring observed inconsistencies and gaps that exists within the literature to date. The recommendations for health care providers and parents, which are presented at the end of this review, are based on the best available evidence from research studies that have examined the impact of factors within the broad family environment on

child and adolescent weight and weight-related outcomes, including those research studies that have specifically examined the impact of food-related parenting practices.

### Food-related parenting practices

Food-related parenting practices 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).[49]The two most well-researched types of food-related parenting practices are food restriction and pressure-to-eat.[49] 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.[49] 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. 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.[49] One common example of a pressure technique would be parents requiring their child to eat all of the food on their plate prior to being excused from a meal. Decisions about what types of foods to feed their children and what types of food-related parenting practices to utilize are challenging choices to make for many parents of young people. Parents want their children to maintain healthy body weights as well as healthy relationships with food and eating, and research has shown that parents often adopt controlling food-related parenting practices (e.g., restriction and pressure-to-eat) in response to concerns they have about their children's weight or weight-related behaviors. Unfortunately, evidence to date suggests that use of controlling food-related parenting practices might have unexpected consequences, including children's weight gain and their use of unhealthy weight-related behaviors. [6]

**Food-related parenting practices and child 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 increased weight status in toddler and early school aged girls.[50–54] In these studies, compared to mothers who reported lower levels of food restriction, mothers who reported higher levels of food restriction had daughters with a higher weight status. Two separate longitudinal studies conducted within comparable samples revealed similar associations; both longitudinal studies found that five-year-old girls exposed to higher levels of food restriction at baseline, experienced a greater increase in body weight by follow-up two years later, compared to girls exposed to lower levels of food restriction.[55,56] However, results from more recent studies challenge the simplicity of this association revealing inconsistent and sometimes opposite findings. A longitudinal, two-cohort study reported that higher parental restriction at baseline was associated with lower child BMI z-score 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).[57] This null finding is consistent with another study conducted within a sample of pre-adolescents,[58] but stands in contrast to a recent cross-sectional, population-based study of older adolescents (16–18 year-olds) which found parental use of food restriction to be associated with higher weight status among both male and female adolescents.[59] Finally, 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. [60]

Research has also explored the association between parental pressure-to-eat and child weight-related outcomes. A small number of cross-sectional studies have found parental pressure-to-eat to be associated with a lower BMI and fat mass in toddlers and young children.[50,61–66] A possible explanation for this association is that parents who have children with a lower weight status, who are likely thin children, 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. [62,64,67,68] However, some findings contradict the inverse relationship between pressure-to-eat and BMI. Pressure-to-eat has been positively associated with higher weight status in a large, population-based sample of adolescents,[59] as well as positively associated with percent body fat in a separate sample of young girls.[69] Other studies have found no association between pressure-to-eat and children's BMI.[70–73]

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 and vast differences in the age of children included in samples (toddlers to adolescents). Additionally, it is possible that that parents from different backgrounds (race/ethnicity, SES) might interpret questions on food restriction and pressure-to-eat differently, adding complexity to our ability to correctly interpret and compare participant responses both within and across diverse samples. Finally, because the bulk of research studies examining this association have been cross-sectional, the temporal direction of the association between food-related parenting practices and child weight status is unclear. For example, the relationship between food restriction and child weight status is recognized 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 children are also more likely to adopt restrictive parenting practices in an effort to curb their child's food intake. Results from a small number of laboratory studies indicate that parental restriction precedes increased behavioral responses to restricted food items [74,75] and excess weight gain in young children, suggesting that the bidirectional path begins with parental use of controlling feeding practices; this exposure then leads to overconsumption of palatable foods and 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.[51,53,76,77]

Also of note is a recent longitudinal research study conducted by Rollins and colleagues which found that the association between parental food restriction and change in child BMI over time was modified by the child's level of inhibitory control.[74] In this study, girls with low levels of inhibitory control that were exposed to high levels of parental restriction were found to have the greatest increases in BMI from age 5 to 7. This same relationship between high levels of parental restriction and BMI was not found among girls who had higher levels of inhibitory control, suggesting that for some girls exposure to high levels of parental control does not result in excess weight gain. These study findings, while novel, suggest that

some of the inconsistencies seen within the literature to date could be the result of unmeasured confounders or effect measure modifiers.

Despite the observed inconsistencies in the literature examining the association between food-related parenting practices and child and adolescent weight status, the potential for controlling behaviors to lead to excess weight gain over time among young people, coupled with minimal evidence suggesting these parenting behaviors are helpful, indicate that food restriction and pressure-to-eat should be avoided when possible. The strength of the evidence supporting the benefits of parental modeling of healthy eating and the provision of a healthful home food environment indicate these are appropriate alternative methods for parents aiming to have a positive impact on their child's dietary intake and weight status.

**Food-related parenting practices and child and adolescent weight-related behaviors**—Controlling food-related parenting practices, including food restriction and pressure-to-eat, have been 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,[78] disinhibited eating, [50,78,79] eating in the absence of hunger,[55,67] and negative self-evaluation of food and eating [80] in young children. A longitudinal cohort of young girls (5 years old) followed by Birch and colleagues provide the bulk of the information available on associations between food-related parenting practices and dietary patterns and cognitions.[53,55,77,78] Pressure-to-eat was associated with girls' emotional disinhibition, reports of dietary restraint, and disruption of innate self-regulation mechanisms.[53,78,79] 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.[55,67,80] It has been theorized that exposure to a highly controlled food environment results 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 guilt or shame if they strayed from parental control. The associations between parental food restriction and pressure-to-eat and these negative dietary patterns and cognitions among young children 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. [31,81,82]

To date, to the best of the authors' knowledge, only one study has examined cross-sectional associations between food-related parenting practices and adolescent use of unhealthy weight control practices. Loth and colleagues found that overall higher levels of pressure-to-eat or food restriction was significantly and positively associated with use of unhealthy weight control practices among adolescent boys. Examination of the association between food-related parenting practices and unhealthy weight control practices among adolescent girls within this same sample revealed fewer consistently significant associations; however, a significant association was found between food restriction reported by mothers and adolescent girls' use of extreme weight-control behaviors. [83] These study findings provide preliminary evidence of an association between controlling food-related parenting practices

and adolescent unhealthy weight control practices, particularly in boys, and suggest the importance of continued research in this older population.

### **Food-related parenting practices and parental sociodemographic characteristics**

—The vast majority of research examining the use of food-related parenting practices has been conducted within white, high income populations.[6] Therefore, discussion about how the use of food-related parenting practices is influenced by demographic characteristics (e.g. SES, race/ethnicity, child and parent gender, child age) is limited. However, a small number of studies 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.[58,84–87]

Ethnic differences in food-related parenting practices have been reported between African American and non-Hispanic white parents,[87,88] Hispanic and African American parents, [86] and between Chinese American and non-Hispanic white parents,[89] 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 compared to non-Hispanic white mothers.[88] These findings were consistent with another study conducted within a sample of both African American and non-Hispanic white pre-adolescents (n=120) which also found that African American mothers were more likely to engage in high levels of food restriction and pressure-to-eat [58,87] Huang and colleagues also 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.[89] Interestingly, higher mean scores of restriction and pressure-to-eat were not found to be associated with higher child weight status among the Chinese American participants, whereas this positive association existed among the non-Hispanic white parent-child dyads. [89] Finally, in a racially/ethnically diverse, population-based sample of parent-adolescent pairs, Loth et al found that parents of minority racial/ethnic backgrounds were significantly more likely to report both pressure-to-eat and food restriction compared to white parents. [90] Overall, research findings indicate that a parent's racial/ethnic background may influence the types of food-related parenting practices they engage in; parents of minority racial/ethnic background are more likely to engage in food restriction and pressure-to-eat compared to their white counterparts.

Research exploring the use of food-related parenting practices within socioeconomically diverse populations is also limited and existing results are inconsistent. Preliminary evidence from a handful of studies conducted with relatively small samples suggest that levels of food restriction are higher among parents with greater access to economic resources (e.g., higher SES and education level), whereas levels recently, in a large (n=3741) population-based study of parents and adolescents, Loth et al found that both food restriction and pressure-to-eat were highest among parents with the lowest socioeconomic status.[90]



The inconsistencies seen in the literature examining the role of sociodemographic characteristics in the use of specific food-related parenting practices are likely due to wide variability in the diversity of samples and the use of convenience sampling techniques. 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 completely separate out the potential role of race/ethnicity from the potential role of SES in the use of food-related parenting practices. Because race/ethnicity and SES are highly correlated among families within the United States, it is important for research studies to examine and understand the separate influences of both of these variables on food-related parenting practices. These limitations, in combination with the unequal distribution of overweight and other weight-related behaviors by race/ethnicity and SES, underscore the importance of future research aimed at understanding how food-related parenting practices might differ across these important demographic characteristics in more complex ways.

## Conclusion

Overweight, obesity, and unhealthy weight-related behaviors are major public health problems among children and adolescents; they are both prevalent and have potentially serious physical and psychosocial consequences. Understanding factors influencing the weight and weight-related behaviors of young people is imperative to the development of effective strategies aimed at helping young people achieve a healthy weight and associated healthy weight-related behaviors and, thus, has become a focus of scientific exploration in recent years.

As discussed in this review, food-related parenting practices have been identified as a potentially significant correlate of both child weight and weight-related behaviors. The development and dissemination of research-based recommendations for health care providers is particularly important given the high prevalence of overweight and unhealthy weight-related behaviors among children and adolescents and the complexity parents of young people encounter when making food-related parenting decisions. Many parents may welcome recommendations from health care providers to help them guide decisions about how to help their children maintain a healthy weight and a healthy relationship with food. The recommendations to follow stem from a synthesis of the current literature on food-related parenting practices; of course, further research in this area is encouraged.

**Implications for clinical practice**—Dietitians, physicians, and other health care providers working with children, adolescents, and their families could benefit from increased awareness of the important role that food-related parenting practices may have on young people's weight and weight-related behaviors. Decisions about what types of foods to feed their children and what types of food-related parenting practices to utilize are challenging choices to make for many parents of young people. Parents want their children to maintain a healthy body weight and a healthy relationship with food and eating, and it can be difficult for them to sift through all of the information available to make the best choices for their children and families. This makes it critical for dietitians, physicians and other health care providers working with children and families to have an informed understanding

of what the research concludes about the relationship between food-related parenting practices and young people's weight and weight-related behaviors. This understanding will allow clinicians to offer parents up-to-date information on research-based best practices and recommendations with regard to appropriate food-related parenting practices. Health care providers should be aware that, overall, current evidence does not support parental use of food restriction or pressure-to-eat food-related parenting practices as appropriate methods of parental influence over child or adolescent food intake. The potential for controlling behaviors (e.g. pressure-to-eat or food restriction) to lead to excess weight gain or the development of disordered eating behaviors over time among young people, coupled with minimal evidence suggesting these parenting behaviors are helpful for weight maintenance, indicate that food restriction and pressure-to-eat should be avoided when possible. The strength of the evidence supporting the benefits of parental modeling of healthy eating and the provision of a healthful home food environment indicate that these are appropriate alternative methods for parents aiming to have a positive impact on their child's dietary intake and weight status and health care providers should be encouraged to discuss the benefits of these alternative methods of influence with parents.

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 all well-child visits. Bright Futures is a book published by the American Academy of Pediatrics that aims to teach pediatric and family medicine physicians about the anticipatory guidance topics to be covered during routine well-child visits with youth and their families; anticipatory guidance involves discussions between physicians and their patients aimed at preparing a patient or parent for something that is to come. For example, a physician might have a discussion with a parent about ways to create a safe home environment for their baby in preparation for that baby becoming more mobile, making more in-home safety precautions (i.e., baby gates, outlet plugs) necessary. The goal of anticipatory guidance is to help a patient or parent anticipate an event that is to come, and to provide them with guidance for how they might best navigate this event safely. Unfortunately, currently within Bright Futures, there is no mention of engaging parents in anticipatory guidance about appropriate food-related parenting practices. 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. It is important for physicians to discuss, with parents, age-appropriate dietary intake for their children; however, this review of the current scientific literature 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. Clinicians should be encouraged to engage parents in discussions related to how they might best create a home food environment that is conducive to their child's maintenance of a healthy weight and a healthy relationship with food and eating. Clinicians should seek to empower parents through 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. 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 child, while still allowing their child independence regarding choices about food and eating.

Clinicians should 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 (e.g. concerns regarding child's current weight status, food security) prior to engaging in a conversation about food-related parenting practices with parents. 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 obese or at risk for either, 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 behaviors. 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 over time and the development of unhealthful eating patterns and behaviors. This information may be counterintuitive for some parents, making it necessary for physicians and other health care providers to 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 engaging parents in a conversation about more appropriate approach to child feeding.

It may also be important for practitioners working with young people and their parents to ask about the level of food security within the home and the role that the availability of food and overall household income has on a parent's decision to exert control over their adolescents eating behaviors. Understanding the potentially wide variation in 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 also be aware of how to identify parents that are more at risk for using controlling food-related parenting practices (e.g. parents with obesity or parents with eating disorders). Parents have been found to be more likely to use controlling food-related parenting practices when they have their own eating or weight concerns, symptoms of psychopathology, or are overweight themselves. Thus, it may be particularly important for physicians to have open discussions about food-related parenting practices and make recommendations for parents to avoid the use of controlling food-related parenting practices in families where the parents are at a higher risk for use of controlling food-related parenting practices (e.g. parents with obesity or parents with eating disorders). Physicians should be thoughtful about providing parents with specific guidance regarding alternative ways to guide their children's decisions about food and eating while remaining aware and sensitive to the parents own weight-related struggles.

A summary of these implications for clinical practice can be found in Table 2. Finally, specific research-based recommendations regarding appropriate ways for parents to help children and adolescents achieve a healthy weight and healthy weight-related behaviors can be found in Table 3. The recommendations for parents of young people are based on the

best available evidence from research studies that have examined the impact of factors within the broad family environment on child and adolescent weight and weight-related outcomes, including those research studies that have specifically examined the impact of food-related parenting practices.

### Future perspective

Future research on food-related parenting practices should focus on teasing out what initiates the complex lifelong interaction between food-related parenting practices and child weight status and weight-related outcomes. The relationship between parental restriction and child weight status and weight-related behaviors is recognized to be bidirectional. However, 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 and clinical interventions aimed at the interruption of this bidirectional relationship.

The development of 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 would be an appropriate next step. 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.

It is also important that research be pursued exploring the degree to which food-related parenting practices can be modified through intervention. 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. 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. Given the high prevalence of overweight and use of unhealthy weight control practices among children and 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 children and adolescents.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgments

K. Loth's time was funded by Grant T32 MH082761-01 from the National Institute of Mental Health. The contents of this presentation are solely the responsibility of the authors and do not necessarily represent the official views of the National Institute of Mental Health.

## References

For articles mark with one or two asterisks, please see a short summary of article content below.

\*Article of interest

\*\*Article of considerable interest

1. Ogden CL, Carroll MD, Curtin LR, Lamb MM, Flegal KM. Prevalence of High Body Mass Index in US Children and Adolescents, 2007–2008. *JAMA J Am Med Assoc.* 2010; 303(3):242–249.
2. Heatherton TF, Mahamedi F, Striepe M, Field AE, Keel P. A 10-year longitudinal study of body weight, dieting, and eating disorder symptoms. *J Abnorm Psychol.* 1997; 106(1):117. [PubMed: 9103723]
3. Neumark-Sztainer D, Wall M, Story M, Standish AR. Dieting and Unhealthy Weight Control Behaviors During Adolescence: Associations With 10-Year Changes in Body Mass Index. *J Adolesc Health.* 2011
4. Neumark-Sztainer D, Wall M, Guo J, Story M, Haines J, Eisenberg M. Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: how do dieters fare 5 years later? *J Am Diet Assoc.* 2006; 106(4):559–568. [PubMed: 16567152]
5. Neumark-Sztainer D, Hannan PJ, Story M, Perry CL. Weight-control behaviors among adolescent girls and boys: implications for dietary intake. *J Am Diet Assoc.* 2004; 104(6):913–920. [PubMed: 15175589]
- 6\*\*. Faith MS, Scanlon KS, Birch LL, Francis LA, Sherry B. Parent-Child Feeding Strategies and Their Relationships to Child Eating and Weight Status. *Obesity.* 2004; 12(11):1711–1722. This is a comprehensive literature review that summarizes the associations between parental feeding styles and child eating and weight status within a total of twenty-two studies were identified and discussed.
7. Lee WW. An overview of pediatric obesity. *Pediatr Diabetes.* 2007; 8:76–87. [PubMed: 17991136]
8. Loth KA, Mond J, Wall M, Neumark-Sztainer D. Weight Status and Emotional Well-Being: Longitudinal Findings from Project EAT. *J Pediatr Psychol.* 2011; 36(2):216. [PubMed: 20378686]
9. Serdula MK, Ivery D, Coates RJ, Freedman DS, Williamson DF, Byers T. Do obese children become obese adults? A review of the literature. *Prev Med.* 1993; 22(2):167–177. [PubMed: 8483856]
10. Field AE, Cook NR, Gillman MW. Weight Status in Childhood as a Predictor of Becoming Overweight or Hypertensive in Early Adulthood\*\*. *Obesity.* 2005; 13(1):163–169.
11. Morrison JA, Friedman LA, Wang P, Glueck CJ. Metabolic syndrome in childhood predicts adult metabolic syndrome and type 2 diabetes mellitus 25 to 30 years later. *J Pediatr.* 2008; 152(2):201–206. [PubMed: 18206689]
12. Eaton DK, Kann L, Kinchen S, et al. Youth risk behavior surveillance - United States, 2011. *Morb Mortal Wkly Rep Surveill Summ Wash DC* 2002. 2012; 61(4):1–162.

13. Neumark-Sztainer D, Wall M, Larson NI, Eisenberg ME, Loth K. Dieting and disordered eating behaviors from adolescence to young adulthood: Findings from a 10-year longitudinal study. *J Am Diet Assoc.* 2011; 111(7):1004–1011. [PubMed: 21703378]
14. Hoek HW, Van Hoeken D. Review of the prevalence and incidence of eating disorders. *Int J Eat Disord.* 2003; 34(4):383–396. [PubMed: 14566926]
15. Woodruff SJ, Hanning RM, Lambraki I, Storey KE, McCargar L. Healthy Eating Index-C is compromised among adolescents with body weight concerns, weight loss dieting, and meal skipping. *Body Image.* 2008; 5(4):404–408. [PubMed: 18640883]
16. Larson NI, Neumark-Sztainer D, Story M. Weight Control Behaviors and Dietary Intake among Adolescents and Young Adults: Longitudinal Findings from Project EAT. *J Am Diet Assoc.* 2009; 109(11):1869–1877. [PubMed: 19857628]
17. Stice E, Hayward C, Cameron RP, Killen JD, Taylor CB. Body-image and eating disturbances predict onset of depression among female adolescents: A longitudinal study. *J Abnorm Psychol.* 2000; 109(3):438–444. [PubMed: 11016113]
18. Pastore DR, Fisher M, Friedman SB. Abnormalities in weight status, eating attitudes, and eating behaviors among urban high school students:: Correlations with self-esteem and anxiety. *J Adolesc Health.* 1996; 18(5):312–319. [PubMed: 9156542]
19. Pisetsky EM, May Chao Y, Dierker LC, May AM, Striegel-Moore RH. Disordered eating and substance use in high-school students: Results from the Youth Risk Behavior Surveillance System. *Int J Eat Disord.* 2008; 41(5):464–470. [PubMed: 18348283]
20. Miller DP. Associations between the home and school environments and child body mass index. *Soc Sci Med.* 2011; 72(5):677–684. [PubMed: 21227558]
21. Birch LL, Davison KK. Family environmental factors influencing the developing behavioral controls of food intake and childhood overweight. *Pediatr Clin North Am.* 2001; 48(4):893–907. [PubMed: 11494642]
22. Gable S, Lutz S. Household, Parent, and Child Contributions to Childhood Obesity\*. *Fam Relat.* 2000; 49(3):293–300.
23. Kitzman-Ulrich H, Wilson DK, StGeorge SM, Lawman H, Segal M, Fairchild A. The integration of a family systems approach for understanding youth obesity, physical activity, and dietary programs. *Clin Child Fam Psychol Rev.* 2010; 13(3):231–253. [PubMed: 20689989]
24. Larson, NI.; Wall, MM.; Story, MT.; Neumark-Sztainer, DR. Home/family, peer, school, and neighborhood correlates of obesity in adolescents. *Obesity* [Internet]. 2013. Available from: <http://onlinelibrary.wiley.com.ezp1.lib.umn.edu/doi/10.1002/oby.20360/full>
25. Patrick H, Nicklas TA. A review of family and social determinants of children's eating patterns and diet quality. *J Am Coll Nutr.* 2005; 24(2):83–92. [PubMed: 15798074]
26. Rhee K. Childhood overweight and the relationship between parent behaviors, parenting style, and family functioning. *Ann Am Acad Pol Soc Sci.* 2008; 615(1):11.
27. Ritchie LD, Welk G, Styne D, Gerstein DE, Crawford PB. Family environment and pediatric overweight: what is a parent to do? *J Am Diet Assoc.* 2005; 105(5):70–79.
28. Zeller MH, Reiter-Purtill J, Modi AC, Gutzwiller J, Vannatta K, Davies WH. Controlled Study of Critical Parent and Family Factors in the Obesigenic Environment\*. *Obesity.* 2007; 15(1):126–126. [PubMed: 17228040]
29. Hanson NI, Neumark-Sztainer D, Eisenberg ME, Story M, Wall M, et al. Associations between parental report of the home food environment and adolescent intakes of fruits, vegetables and dairy foods. *Public Health Nutr.* 2005; 8(1):77–85. [PubMed: 15705248]
30. Larson NI, Story M, Wall M, Neumark-Sztainer D. Calcium and dairy intakes of adolescents are associated with their home environment, taste preferences, personal health beliefs, and meal patterns. *J Am Diet Assoc.* 2006; 106(11):1816–1824. [PubMed: 17081833]
- 31\*\*. Birch LL, Fisher JO. Development of eating behaviors among children and adolescents. *Pediatrics.* 1998; 101(3):539. This review discusses the role of families in the development of eating behaviors and weight status, with a focus on both genetic contributions and environmental cues. [PubMed: 12224660]
32. Satter E. The feeding relationship: problems and interventions. *J Pediatr.* 1990; 117(2):S181–S189. [PubMed: 2199651]

33. Rampersaud GC, Pereira MA, Girard BL, Adams J, Metz J. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *J Am Diet Assoc.* 2005; 105(5):743–760. [PubMed: 15883552]
34. Fairburn, CG.; Wilson, GT. Binge eating: Nature, assessment, and treatment [Internet]. Guilford Press; New York: Available from: <http://www.fordham.edu/images/undergraduate/psychology/all%20overheads/tryon/eating%20disorders.pdf>
35. Neumark-Sztainer D, Eisenberg ME, Fulkerson JA, Story M, Larson NI. Family meals and disordered eating in adolescents: longitudinal findings from project EAT. *Arch Pediatr Adolesc Med.* 2008; 162(1):17. [PubMed: 18180407]
36. Rosenberger PH, Henderson KE, Bell RL, Grilo CM. Associations of weight-based teasing history and current eating disorder features and psychological functioning in bariatric surgery patients. *Obes Surg.* 2007; 17(4):470–477. [PubMed: 17608259]
37. Libbey HP, Story MT, Neumark-Sztainer D, Boutelle KN. Teasing, disordered eating behaviors, and psychological morbidities among overweight adolescents. *Obesity.* 2008; 16:S24–S29. [PubMed: 18978759]
38. Eisenberg ME, Neumark-Sztainer D, Story M. Associations of weight-based teasing and emotional well-being among adolescents. *Arch Pediatr Adolesc Med.* 2003; 157(8):733. [PubMed: 12912777]
39. Keery H, Boutelle K, van den Berg P, Thompson JK. The impact of appearance-related teasing by family members. *J Adolesc Health.* 2005; 37(2):120–127. [PubMed: 16026721]
40. Neumark-Sztainer D, Bauer KW, Friend S, Hannan PJ, Story M, Berge JM. Family weight talk and dieting: how much do they matter for body dissatisfaction and disordered eating behaviors in adolescent girls? *J Adolesc Health.* 2010; 47(3):270–276. [PubMed: 20708566]
41. Byely L, Archibald AB, Graber J, Brooks-Gunn J. A prospective study of familial and social influences on girls' body image and dieting. *Int J Eat Disord.* 2000; 28(2):155–164. [PubMed: 10897077]
42. Field AE, Camargo CA, Taylor CB, Berkey CS, Roberts SB, Colditz GA. Peer, parent, and media influences on the development of weight concerns and frequent dieting among preadolescent and adolescent girls and boys. *Pediatrics.* 2001; 107(1):54–60. [PubMed: 11134434]
43. Keel PK, Heatherton TF, Harnden JL, Hornig CD. Mothers, fathers, and daughters: Dieting and disordered eating. *Eat Disord.* 1997; 5(3):216–228.
44. Paxton SJ, Wertheim EH, Gibbons K, Szmukler GI, Hillier L, Petrovich JL. Body image satisfaction, dieting beliefs, and weight loss behaviors in adolescent girls and boys. *J Youth Adolesc.* 1991; 20(3):361–379. [PubMed: 24265063]
45. Haines J, Neumark-Sztainer D, Hannan P, Robinson-O'Brien R. Child versus parent report of parental influences on children's weight-related attitudes and behaviors. *J Pediatr Psychol.* 2008; 33(7):783. [PubMed: 18304997]
46. Epstein LH, Myers MD, Raynor HA, Saelens BE. Treatment of pediatric obesity. *Pediatrics.* 1998; 101(Supplement 2):554–570. [PubMed: 12224662]
47. Le Grange D, Lock J, Loeb K, Nicholls D. Academy for eating disorders position paper: The role of the family in eating disorders. *Int J Eat Disord.* 2010; 43(1):1–5. [PubMed: 19728372]
48. Lock J, Gowers S. Effective interventions for adolescents with anorexia nervosa. *J Ment Health.* 2005; 14(6):599–610.
49. Birch LL, Fisher JO, Grimm-Thomas K, Markey CN, Sawyer R, Johnson SL. Confirmatory factor analysis of the Child Feeding Questionnaire: a measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite.* 2001; 36(3):201–210. [PubMed: 11358344]
50. Joyce JL, Zimmer-Gembeck MJ. Parent feeding restriction and child weight The mediating role of child disinhibited eating and the moderating role of the parenting context. *Appetite.* 2009; 52(3): 726–734. [PubMed: 19501772]
51. Fisher JO, Birch LL. Restricting Access to Foods and Children's Eating. *Appetite.* 1999; 32(3): 405–419. [PubMed: 10336797]
52. Costanzo PR, Woody EZ. Domain-specific parenting styles and their impact on the child's development of particular deviance: the example of obesity proneness. *J Soc Clin Psychol.* 1985; 3(4):425–445.

53. Fisher JO, Birch LL. Restricting access to palatable foods affects children's behavioral response, food selection, and intake. *Am J Clin Nutr.* 1999; 69(6):1264. [PubMed: 10357749]
54. Birch LL, Fisher JO. Mothers' child-feeding practices influence daughters' eating and weight. *Am J Clin Nutr.* 2000; 71(5):1054–1061. [PubMed: 10799366]
55. Fisher JO, Birch LL. Eating in the absence of hunger and overweight in girls from 5 to 7 y of age. *Am J Clin Nutr.* 2002; 76(1):226–231. [PubMed: 12081839]
56. Faith MS, Berkowitz RI, Stallings VA, Kerns J, Storey M, Stunkard AJ. Parental feeding attitudes and styles and child body mass index: prospective analysis of a gene-environment interaction. *Pediatrics.* 2004; 114(4):e429. [PubMed: 15466068]
- 57\*. Campbell K, Andrianopoulos N, Hesketh K, et al. Parental use of restrictive feeding practices and child BMI z-score. A 3-year prospective cohort study. *Appetite.* 2010; 55(1):84–88. This original research article examined the longitudinal impact of restrictive feeding practices on child BMI z-score. The study took place over three years and was conducted in a population-based sample of young children. Restrictive feeding practices were found to predict lower BMI z-score over time. [PubMed: 20420869]
- 58\*. Spruijt-Metz D, Li C, Cohen E, Birch LL, Goran M. Longitudinal influence of mother's child-feeding practices on adiposity in children. *J Pediatr.* 2006; 148(3):314–320. This study examined the longitudinal influences of child-feeding practices with time on total fat mass in white and African American boys and girls. Results indicate that pressure-to-eat and concern for the child's weight in white participants and restriction and concern for the child's weight in African American participants were significantly related to total fat mass at baseline. Concern for the child's weight was negatively related to the change of total fat mass with time in white participants. No longitudinal effects of child feeding practices on the change of total fat mass were found in African American participants. [PubMed: 16615957]
- 59\*. Loth KA, MacLehose RF, Fulkerson JA, Crow S, Neumark-Sztainer D. Food-Related Parenting Practices and Adolescent Weight Status: A Population-Based Study. *Pediatrics.* 2013; 131(5):e1443–e1450. This study was conducted within a population-based sample of adolescents and their parents and examined cross-sectional associations between food restriction/pressure-to-eat and adolescent weight status. Results indicate that parental food restriction was associated with higher adolescent weight status, whereas parental pressure-to-eat was associated with lower adolescent weight status. [PubMed: 23610202]
60. Farrow CV, Blissett J. Controlling Feeding Practices: Cause or Consequence of Early Child Weight? *Pediatrics.* 2008; 121(1):e164–e169. [PubMed: 18166535]
61. Hennessy E, Hughes SO, Goldberg JP, Hyatt RR, Economos CD. Parent behavior and child weight status among a diverse group of underserved rural families. *Appetite.* 2010; 54(2):369–377. [PubMed: 20079785]
62. Kröller K, Warschburger P. Associations between maternal feeding style and food intake of children with a higher risk for overweight. *Appetite.* 2008; 51(1):166–172. [PubMed: 18342396]
63. Powers SW, Chamberlin LA, van Schaick KB, Sherman SN, Whitaker RC. Maternal Feeding Strategies, Child Eating Behaviors, and Child BMI in Low-Income African-American Preschoolers\*. *Obesity.* 2006; 14(11):2026–2033. [PubMed: 17135620]
64. Wardle J, Carnell S. Parental feeding practices and children's weight. *Acta Paediatr.* 2007; 96:5–11.
65. Costa FS, Pino DLD, Friedman R. Caregivers' attitudes and practices: influence on childhood body weight. *J Biosoc Sci.* 2011; 43(3):369–378. [PubMed: 21306663]
66. Kaur H, Li C, Nazir N, et al. Confirmatory factor analysis of the child-feeding questionnaire among parents of adolescents. *Appetite.* 2006; 47(1):36–45. [PubMed: 16624444]
67. Birch LL, Fisher JO, Davison KK. Learning to overeat: maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *Am J Clin Nutr.* 2003; 78(2):215–220. [PubMed: 12885700]
68. Gregory JE, Paxton SJ, Brozovic AM. Pressure to eat and restriction are associated with child eating behaviours and maternal concern about child weight, but not child body mass index, in 2-to 4-year-old children. *Appetite.* 2010; 54(3):550–556. [PubMed: 20219609]



69. Johannsen DL, Johannsen NM, Specker BL. Influence of Parents' Eating Behaviors and Child Feeding Practices on Children's Weight Status\*. *Obesity*. 2006; 14(3):431–439. [PubMed: 16648614]
70. Haycraft E, Blissett J. Predictors of Paternal and Maternal Controlling Feeding Practices with 2-to 5-year-old Children. *J Nutr Educ Behav*. 2011
71. Montgomery C, Jackson DM, Kelly LA, Reilly JJ. Parental feeding style, energy intake and weight status in young Scottish children. *Br J Nutr*. 2006; 96(6):1149–1153. [PubMed: 17181891]
72. Kasemsup R, Reicks M. The relationship between maternal child-feeding practices and overweight in Hmong preschool children. *Ethn Dis*. 2006; 16(1):187. [PubMed: 16599369]
73. Webber L, Cooke L, Hill C, Wardle J. Child adiposity and maternal feeding practices: a longitudinal analysis. *Am J Clin Nutr*. 2010; 92(6):1423. [PubMed: 20881070]
74. Rollins BY, Loken E, Savage JS, Birch LL. Maternal controlling feeding practices and girls' inhibitory control interact to predict changes in BMI and eating in the absence of hunger from 5 to 7 y. *Am J Clin Nutr*. 2014 ajcn–063545.
75. Rollins BY, Loken E, Savage JS, Birch LL. Effects of restriction on children's intake differ by child temperament, food reinforcement, and parent's chronic use of restriction. *Appetite*. 2014; 73:31–39. [PubMed: 24511616]
76. Savage JS, Fisher JO, Birch LL. Parental influence on eating behavior: conception to adolescence. *J Law Med Ethics*. 2007; 35(1):22–34. [PubMed: 17341215]
77. Birch LL. Development of food acceptance patterns in the first years of life. *Proc Nutr Soc*. 1998; 57(04):617–624. [PubMed: 10096125]
- 78\*. Carper JL, Orlet Fisher JO, Birch LL. Young girls' emerging dietary restraint and disinhibition are related to parental control in child feeding. *Appetite*. 2000; 35(2):121–129. This research investigated the origins of dietary restraint and disinhibition in young girls by considering how parents' control in child feeding and their daughters' perceptions of these practices relate to girls' dietary restraint and disinhibition. The results indicated that girls' dietary restraint and emotional disinhibition were related to their perceptions of parental pressure to eat more, while their external disinhibition was related to their perceptions of having restrictions placed on their eating. [PubMed: 10986105]
79. Cutting TM, Fisher JO, Grimm-Thomas K, Birch LL. Like mother, like daughter: familial patterns of overweight are mediated by mothers' dietary disinhibition. *Am J Clin Nutr*. 1999; 69(4):608–613. [PubMed: 10197561]
80. Fisher JO, Birch LL. Parents' restrictive feeding practices are associated with young girls' negative self-evaluation of eating. *J Am Diet Assoc*. 2000; 100(11):1341–1346. [PubMed: 11103656]
81. Mussell MP, Mitchell JE, De Zwaan M, et al. Clinical characteristics associated with binge eating in obese females: a descriptive study. *Int J Obes Relat Metab Disord J Int Assoc Study Obes*. 1996; 20(4):324.
82. Yanovski SZ. Binge eating disorder: current knowledge and future directions. *Obes Res*. 1993; 1(4):306. [PubMed: 16350580]
- 83\*. Loth K, MacLehose R, Fulkerson JA, Crow S, Neumark-Stzainer DR. Are food-related parenting practices associated with adolescent disordered eating behaviors? A population-based study. *Int J Eat Disord*. In Press. This study was conducted within a population-based sample of adolescents and their parents and examined cross-sectional associations between food restriction/pressure-to-eat and adolescent disordered eating behaviors. Results indicate the adolescent boys exposed to high levels of food restriction and pressure-to-eat were more likely to engage in disordered eating behaviors compared to boys exposed to lower levels of these food-related parenting practices. Results among girls were less consistent.
84. Baughcum AE, Powers SW, Johnson SB, et al. Maternal feeding practices and beliefs and their relationships to overweight in early childhood. *J Dev Behav Pediatr*. 2001; 22(6):391. [PubMed: 11773804]
85. Robinson TN, Kiernan M, Matheson DM, Haydel KF. Is parental control over children's eating associated with childhood obesity? Results from a population-based sample of third graders. *Obesity*. 2001; 9(5):306–312.

86. Hughes SO, Power TG, Orlet Fisher J, Mueller S, Nicklas TA. Revisiting a neglected construct: parenting styles in a child-feeding context. *Appetite*. 2005; 44(1):83–92. [PubMed: 15604035]
87. Spruijt-Metz D, Lindquist CH, Birch LL, Fisher JO, Goran MI. Relation between mothers' child-feeding practices and children's adiposity. *Am J Clin Nutr*. 2002; 75(3):581. [PubMed: 11864866]
88. Sherry B, McDivitt J, Birch LL, et al. Attitudes, practices, and concerns about child feeding and child weight status among socioeconomically diverse white, Hispanic, and African-American mothers. *J Am Diet Assoc*. 2004; 104(2):215–221. [PubMed: 14760569]
89. Huang SH, Parks EP, Kumanyika SK, et al. Child-feeding practices among Chinese-American and non-Hispanic white caregivers. *Appetite*. 2012; 58(3):922–927. [PubMed: 22343192]
- 90\*. Loth KA, MacLehose RF, Fulkerson JA, Crow S, Neumark-Sztainer D. Eat this, not that! Parental demographic correlates of food-related parenting practices. *Appetite*. 2013; 60:140–147. This study explore the use of food restriction and pressure-to-eat within a racially/ethnically and socioeconomically diverse population of parents of adolescents. Results indicate the parents of racial/ethnic minority and those with low access to economic resources (income, education, employment) were more likely to engage in food restriction and pressure-to-eat compared to white parents and parents with greater access to economic resources. [PubMed: 23022556]
- 91\*\*. Birch LL. Development of food preferences. *Nutrition*. 1999; 19 Using a developmental systems perspective, this review focuses on how genetic predispositions interact with aspects of the eating environment to produce pheno-typic food preferences.
92. Davison KK, Birch LL. Childhood overweight: a contextual model and recommendations for future research. *Obes Rev*. 2001; 2(3):159–171. [PubMed: 12120101]
93. Berge JM, MacLehose R, Loth KA, Eisenberg M, Bucchianeri MM, Neumark-Sztainer D. Parent conversations about healthful eating and weight: Associations with adolescent disordered eating behaviors. *JAMA Pediatr*. 2013; 167(8):746–753. [PubMed: 23797808]

Table 1

Terms utilized within review article: Definitions and examples\*

Term	Definition	Example(s)
<b>Unhealthy weight-related behaviors</b>	A broad category of behaviors reported by children and young people that stand in contrast the development of a healthy body weight and a healthy relationship with food.	Dieting, unhealthy weight control practices, eating in the absence of hunger, emotional eating, dietary restraint, emotional disinhibition, and binge eating.
<b>Unhealthy weight control practices</b>	Unhealthy behaviors an individual engages in with the goal of weight loss or preventing healthy weight gain.	Fasting, skipping meals, smoking more cigarettes, taking diet pills or laxatives, or purging.
<b>Food-related parenting practices</b>	The techniques that parents use to influence children's eating, food choices, or food intake patterns.	Parents 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).
<b>Food restriction</b>	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.	Parents only allowing their child to eat dessert after the child has consumed a full serving of vegetables. This results in restriction of child's access to the dessert item until a particular requirement is met.
<b>Pressure-to-eat</b>	When parents prompt or pressure their child to consume a certain amount of food or more of a particular type of food.	Parents requiring their child to eat all of the food on their plate prior to completing a meal.
<b>Dietary restraint</b>	Cognitive restriction of food intake.	Actively avoiding food despite feeling hungry and enjoyment of the food available.
<b>Eating in the absence of hunger</b>	Consumption of food despite feeling physically satiated.	Feeling satiated after consumption of a meal, but continuing to seek out food and/or eat food as it is made available.
<b>Disinhibited eating</b>	Loss of inhibition and self-regulation resulting in eating in response to external cues, including emotional stressors, or the sight or odor of foods.	Feeling satiated after consumption of a meal, but continuing to seek out food and/or eat food as it is made available, because you enjoy the way it smells or tastes or in response to a stressful event in your life.
<b>Negative self-evaluation of food and eating</b>	Negative judgment of and internalization of associated negative feelings about choices made with regard to food or eating.	Feeling guilty or shameful after eating a particular food item or a certain amount of a food item.
<b>Emotional disinhibition</b>	Eating in response to emotions such as boredom, anger, or sadness.	Experiencing a fight with a friend and eating ice cream or another palatable food in an effort to sooth hurt feelings.
<b>Disregulation of innate self-regulation mechanisms</b>	Disruption of an individual's ability to respond to physical hunger and satiety cues in a way that results in overconsumption of the amount of calories needed to maintain a healthy weight or promote appropriate weight gain.	An individual regularly eating more food than needed to feel satiated so that they can no longer sense physical hunger and satiety cues.

\* Terms included in this table have been denoted with a \* the first time they appear in the text of the paper.

**Table 2**

## Summary of implications for clinical practice

<ul style="list-style-type: none"><li>• Clinicians could benefit from increased awareness of the important role that food restriction and pressure-to-eat may have on young people's weight and weight-related behaviors.</li><li>• 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 all well-child visits as well as other doctor's appointments addressing non-life threatening health issues.</li><li>• Clinicians should consider parental motivation (e.g., food security, concerns regarding child's current weight status) for use of food-related parenting practices prior to making clinical recommendations.</li><li>• Clinicians should also be aware of how to identify parents that are more at risk for using controlling food-related parenting practices (e.g. parents with obesity or parents with eating disorders).</li></ul>
---

\* Table 3 contains specific recommendations for parents to help children and 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.

**Table 3**

Evidence-based recommendations for families: Using what we know about food-related parenting practices to improve the weight and weight-related behaviors of young people

Food-related parenting practices to avoid	Recommended alternative	Supportive research
<p>Avoid actively restricting your child's consumption of food you have available in your home.  <i>"No eating those cookies—you can have one if you eat enough dinner."</i></p>	<p>Create a home food environment conducive to making healthy choices:</p> <ul style="list-style-type: none"> <li>• Make nutritious foods easily accessible within your home (e.g., put fruit and vegetables at eye level in the refrigerator and put healthy snacks in easy to access locations such as on the countertop or table).</li> <li>• Make desserts, snack foods, or other favorite foods available on occasion, allowing your child to choose them when they are made available.</li> </ul>	<ul style="list-style-type: none"> <li>• Home food availability is one of the strongest correlates of fruit, vegetable, and low-fat dairy intakes. [29,30]</li> <li>• Research shows that complete restriction of desserts and snack foods prompts overconsumption when these foods become available. [32,77,91]</li> <li>• Exposure to food restriction has been associated with excess weight gain over time.[55,56]</li> </ul>
<p>Avoid using food restriction and pressure-to-eat to control what your child eats at mealtimes.  <i>"This meal is healthy for you, you have to eat everything on your plate before you can be done."</i></p>	<p>Provide consistent structure to your meals, while encouraging your child's autonomy over eating choices during mealtime:</p> <ul style="list-style-type: none"> <li>• Eat three meals daily. Whenever possible, eat these meals as a family.</li> <li>• Parents should be responsible for choosing when meals will be served and what foods will be served at meals. (Parents can involve children to teach them about meal planning and how to make healthy choices.)</li> <li>• Children and teens should be responsible for choosing how much food they eat for each meal given a range of healthy options without verbal restriction or pressure-to-eat from parents.</li> </ul>	<ul style="list-style-type: none"> <li>• Consumption of regular meals is associated with healthier dietary intake patterns and fewer unhealthy weight control practices.[31–34]</li> <li>• Family meals are strongly correlated with better dietary intake and lower risk of engagement in unhealthy weight-control practices.[35]</li> <li>• Food restriction is associated with dietary disinhibition, increased eating in the absence of hunger, and increased prevalence of unhealthy weight control practices among adolescent girls and boys. [50,54,67,78,79]</li> <li>• Higher levels of food restriction has been associated with higher BMI. [54–56,59]</li> <li>• Pressure-to-eat can result in dislike of target food items, emotional disinhibition, reports of dietary restraint, and disruption of innate self-regulation mechanisms. [78,79]</li> </ul>
<p>Avoid using food restriction or pressure-to-eat in an effort to teach your child about healthy eating or healthy weight maintenance.  <i>"No more chips for you today—you've been gaining too much weight lately."</i></p>	<p>Provide a supportive environment with in which you model a focus on healthy behaviors, not on weight or shape:</p> <ul style="list-style-type: none"> <li>• Model healthy and balanced food choices and eating patterns, including consumption of desserts, snack foods, and other favorite foods in moderation.</li> <li>• Focus conversations with your child on making food choices for overall health, not weight or shape.</li> <li>• Do not allow weight teasing within your home.</li> </ul>	<ul style="list-style-type: none"> <li>• Parental modeling of eating, activity, and diet-related behaviors have been shown to be significantly associated with child and adolescent behaviors [22,29,92].</li> <li>• Parent conversations focused on weight/size are associated with increased risk for adolescent disordered eating behaviors, whereas conversations focused on healthy eating are protective against disordered eating behaviors.[93]</li> <li>• Exposure to weight-teasing within the home environment is associated with decreases in self-esteem, increased in depression and an increased risk in unhealthy weight control practices.[36–39]</li> </ul>