

UC San Diego

UC San Diego Previously Published Works

Title

The relationship between parent feeding styles and general parenting with loss of control eating in treatment-seeking overweight and obese children

Permalink

<https://escholarship.org/uc/item/4841j9fj>

Journal

International Journal of Eating Disorders, 48(7)

ISSN

0276-3478

Authors

Matheson, Brittany E
Camacho, Casandra
Peterson, Carol B
[et al.](#)

Publication Date

2015-11-01

DOI

10.1002/eat.22440

Peer reviewed

The Relationship between Parent Feeding Styles and General Parenting with Loss of Control Eating in Treatment-Seeking Overweight and Obese Children

Brittany E. Matheson, MS^{1*}
 Casandra Camacho, PhD²
 Carol B. Peterson, PhD³
 Kyung E. Rhee, MD, MSc, MA²
 Sarah A. Rydell, MPH⁴
 Nancy L. Zucker, PhD^{5,6}
 Kerri N. Boutelle, PhD^{2,3,7}

ABSTRACT

Objective: To examine differences in parent feeding behaviors and general parenting of overweight children with and without loss of control (LOC) eating.

Method: One-hundred-and-eighteen overweight and obese children (10.40 ± 1.35 years; 53% female; 52% Caucasian; BMI-z: 2.06 ± 0.39) and their parents (42.42 ± 6.20 years; 91% female; 70% Caucasian; BMI: 31.74 ± 6.96 kg/m²) were seen at a baseline assessment visit for a behavioral intervention that targeted overeating. The Eating Disorder Examination, adapted for children (ChEDE) was administered to assess for LOC eating. Parents completed the Parental Feeding Styles Questionnaire (PFSQ) and the Child Feeding Questionnaire (CFQ) to assess parent feeding styles and behaviors. Children also completed a self-report measure of general parenting (Child Report of Parent Behavior Inventory, CRPBI-30).

Results: Forty-three children (36.40%) reported at least one LOC eating episode in the month prior to assessment.

Parents who reported greater restriction and higher levels of pressure to eat were more likely to have children that reported LOC eating ($p < 0.05$). Parents who utilized more instrumental feeding and prompting/encouragement to eat techniques were less likely to have children that reported LOC eating ($p < 0.05$). Child-reported parenting behaviors were unrelated to child LOC eating ($p > 0.05$).

Discussion: Parent feeding styles and behaviors appear to be differentially and uniquely related to LOC eating in treatment-seeking overweight and obese children. Future research is needed to determine if implementing interventions that target parent feeding behaviors may reduce LOC eating, prevent full-syndrome eating disorders, and reduce weight gain in youth. © 2015 Wiley Periodicals, Inc.

Keywords: parenting styles; LOC eating; overweight children; parent feeding behaviors

(*Int J Eat Disord* 2015; 00:000–000)

Accepted 19 June 2015

Disclosures: The authors have no disclosures, financial or otherwise, to report.

Supported by Faculty Development Grant at the University of Minnesota (Kerri Boutelle).

*Correspondence to: Brittany Matheson, University of California, San Diego, 8950 Villa La Jolla Dr. Suite C-203, San Diego, CA, 92037. E-mail: bmatheson@ucsd.edu

¹ San Diego State University/University of California, San Diego, Joint Doctoral Program in Clinical Psychology, San Diego, California

² Department of Pediatrics, University of California, San Diego, La Jolla, California

³ Department of Psychiatry, University of Minnesota, Minneapolis, Minnesota

⁴ Division of Epidemiology, School of Public Health, University of Minnesota, Minneapolis, Minnesota

⁵ Department of Psychiatry and Behavioral Science, Duke University School of Medicine, Durham, North Carolina

⁶ Department of Psychology and Neuroscience, Duke University, Durham, North Carolina

⁷ Department of Psychiatry, University of California, San Diego, La Jolla, California

Published online 00 Month 2015 in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/eat.22440

© 2015 Wiley Periodicals, Inc.

Introduction

Prevalence rates of childhood overweight and obesity in the United States are alarmingly high.¹ While the etiology of obesity is multidetermined,² loss of control (LOC) eating has been linked to weight gain over time in youth.³ LOC eating refers to eating episodes during which there is a subjective sense that one cannot control what or how much one is eating, regardless of the size and amount of food actually consumed.⁴ Prevalence rates of LOC eating, typically defined as at least one episode in the month prior to assessment, range from 9% to 29.50% in non-treatment-seeking community samples of children and adolescents across the weight spectrum, with higher rates of 20–36.50% observed among overweight treatment-seeking children (ages, 6–12 years old) and youth (ages, 10–17 years old).^{4–6} LOC eating is associated with disordered eating attitudes and behaviors, symptoms of depression and anxiety, parent-reported problem

behaviors, and poorer psychosocial functioning.⁴ Elucidating the associations between LOC eating and psychosocial factors is essential to inform intervention strategies to effectively reduce the associated risk of obesity and development of full-syndrome eating disorders in youth.

An important category of factors that can influence a child's eating is that of parent-related factors, including general parenting style and food-specific feeding behaviors. While many parent feeding domains, including providing food in response to the child's emotions,⁷ using food as a reward,⁷ and providing structure during feeding times,⁸ have not demonstrated strong associations with child eating patterns, parent restriction of child eating has been most consistently related to child eating behaviors and weight outcomes.⁹ Parent restriction of child eating is defined as the degree to which a parent restricts their child's access to foods, both unhealthy foods as well as overall food consumption.¹⁰ Previous studies indicate that restrictive feeding behaviors may inhibit a child's ability to self-regulate,¹¹ which then may be linked to increased food intake¹¹ and increased childhood weight.^{11–13} Higher levels of parental pressure are associated with higher levels of pickiness and emotional disinhibition.¹⁴ However, the results with food consumption have been mixed, as observational studies show a positive relationship between parental pressure to eat and energy consumption, whereas self-report studies show the opposite relationship (lower child intake and lower child weight).¹⁴ Interestingly, more recent studies suggest that parent restriction of child eating may be driven in part, if not fully, by child weight and eating behaviors.^{15–17} Children of parents who engage in greater restrictive feeding practices, compared with children whose parents do not restrict feeding, engage in more disinhibited eating behaviors, such as consuming a greater number of calories during an eating in the absence of hunger (EAH) laboratory food paradigm.^{12,18} However, studies have yet to investigate what relationship, if any, parent feeding practices may have with child LOC eating behaviors.

In addition to parent feeding practices, overall general parenting behaviors are also associated with child eating behaviors and weight.¹⁴ While no studies have examined the association among general parenting behaviors and LOC eating in children, several recent studies indicate that parenting behaviors may impact child eating in significant ways. Studies report that authoritarian parents (i.e., parents with high demands but low levels of sensitivity, emotional warmth, and involvement) have

fewer fruits and vegetables available within the home as well as children who ate less of these foods compared to children of parents with authoritative parenting styles (i.e., parents with high demands and high levels of sensitivity, emotional warmth, and involvement).^{19,20} It is possible that parenting style could influence child LOC eating by similar processes, given that children with LOC consume more desserts and snack foods in laboratory meals and gain more weight over time compared to children without LOC eating behaviors.^{3,4,21} However, the relationship between general parenting factors and child LOC eating has not been directly assessed.

Only a few studies to date have examined the relationship between parenting factors and LOC eating, two of which involve specific meal-time episodes, and the results are mixed. During a laboratory test meal, parents of children who reported LOC eating made more critical comments about their child's weight, shape, and/or eating compared with parents of children without LOC eating.²² In another study examining meal-time interactions, researchers observed that families of children with LOC eating had less interpersonal involvement, less healthy patterns of communication, and more maladaptive overall family functioning compared to their counterparts without LOC eating.²³ Another study using questionnaire methods with 8- to 11-year-old children found no relationship between parent feeding practices and LOC eating over a 6-month time period.²⁴ Although these studies included samples of children with increased rates of overweight and obesity, none of the current studies have evaluated the relationship between parent-related factors in a clinical population of treatment-seeking children. This limitation is important because parents may differentially engage in feeding practices based on the severity of child weight, clinical presentation, and disordered eating behaviors.^{18,19}

Previous findings suggest that parent-related factors may differ in families with overweight and obese children, compared to their normal weight counterparts. Parenting styles that rely on pressuring a child to eat are associated with a child's inability to regulate their energy intake¹³ by disrupting a child's innate ability to respond to internal hunger and satiety cues,²⁵ often resulting in increased food intake,¹¹ increased childhood weight,^{11–13} and negative self-evaluation.²⁶ Restrictive types of parenting styles are also linked to disinhibited eating behaviors, such as increased snack intake for girls during an EAH laboratory food paradigm.^{12,18,26} It is important to understand the

relationships between parenting factors and LOC eating in children, not only because of the negative outcomes, but also because LOC eating is an internal experience, whereas the majority of research to date focuses on external eating behaviors. Understanding how parenting factors can influence child perceptions of control over eating has significant implications for the prevention and intervention development for eating and weight disorders.

Therefore, this study aims to investigate the relationship between parent feeding behaviors as well as general parenting behaviors and LOC eating in treatment-seeking overweight and obese children. Given the parallel findings that both parent feeding practices and LOC eating behaviors are associated with excess weight gain and disinhibited eating, we hypothesize that there will be a significant positive relationship between parent feeding behaviors that limit access to foods (restriction) and those that encourage the consumption of greater quantities of food (pressure to eat) with LOC eating in treatment-seeking overweight and obese children. In addition to parent feeding practices, we also hypothesize that general parenting styles lower in responsiveness and involvement (acceptance) and rule setting and control (firm control), but higher in using psychological methods to control behaviors (psychological control), will be associated with LOC eating in treatment-seeking overweight and obese children.

Methods

Participants

Participants were 118 children between the ages of 7 and 13 years old with a BMI-percentile above the 85th percentile and an accompanying parent. Media announcements, advertisements, direct mailing, and physician referrals in Minneapolis were used to recruit families for two treatment studies focused on reducing overeating (NCT01442142).²⁷ Detailed information about recruitment procedures and participant flow for both studies has been previously published.^{27,28} Families were excluded if either parent or child was involved in weight-loss treatment or taking medications that affected weight or appetite. Individuals were also excluded for having psychiatric (e.g., psychosis, bulimia nervosa) or medical conditions (e.g., cancer, fatty liver disease) that could interfere with participation, as determined by the initial phone screen questions asked by the study's research assistant, as well as self-reported responses to study-generated survey questions at the assessment visit. Eating disorders were assessed for child participants using a semi-structured interview (the Eating Disorder Examina-

tion, adapted for children)²⁹ and for adult participants using a self-report questionnaire (the Eating Disorder Examination Questionnaire).³⁰ Binge eating disorder was not an exclusionary condition. The study received approval by the University of Minnesota Institutional Review Board. Parents provided written informed consent and children provided written assent. The data included in this study were from all children evaluated at baseline; not all children were enrolled in the treatment studies.

Children were either overweight or obese (BMI: 27.22 ± 4.56 kg/m²; BMI-*z*: 2.06 ± 0.39) with a nearly even distribution of males and females (53.40% female) and varied ethnicities (53.50% non-Hispanic Caucasian). Participating parents were mostly female (90.70%) and represented a wide range of age (42.42 ± 6.20 years; range, 25 – 58 years) and BMI scores (31.74 ± 6.96 kg/m²; range, 19.07 – 51.84 kg/m²), as parent age and weight were not exclusionary criteria for this study. Most parents identified themselves as non-Hispanic Caucasian (69.49%) and married (68.60%) with at least a 4-year college degree (57.60%). Almost half (54.20%) of the sample reported a household yearly income greater than \$75,000.

Procedures

Interested children and their parents completed baseline screening assessments as part of recruitment for a behavioral intervention focused on reducing overeating.²⁷ Parents and children independently completed assessment measures and tasks in separate rooms on the same day.

Measures

Anthropometry. All participants were weighed on a calibrated scale in duplicate, and height was measured using a standard stadiometer also in duplicate. An average weight and height were calculated from these two measurements. Body mass index (BMI, kg/m²) was calculated by dividing weight (kg) by the square of height (m), and both BMI-for-age percentile scores as well as BMI-*z* scores were calculated using the Center for Disease Control and Prevention 2000 growth charts.³¹

Eating Disorder Examination, Adapted for Children (ChEDE; Child Interview). LOC eating in the past month was assessed using the Eating Disorder Examination, adapted for children (ChEDE).²⁹ LOC eating was categorized as a dichotomous variable (presence or absence) as opposed to a frequency variable (number of episodes), in line with recent research.⁶ Children who reported objective binge episodes, subjective binge episodes, or a combination of objective and subjective binge episodes were categorized as engaging in LOC eating. Children who only reported objective overeating or no episodes were

classified as not endorsing LOC eating. The ChEDE has demonstrated strong discriminant validity for objective binge episodes, subjective binge episodes, and objective overeating episodes in overweight and normal weight youth, ages 6 – 13 years old.³²

Parental Feeding Style Questionnaire (PFSQ; Parent Report). The Parental Feeding Style Questionnaire (PFSQ) is a 27-item measure developed to capture parent feeding behaviors on four subscales—emotional feeding (five questions; “I give my child something to eat if s/he is feeling bored”), instrumental feeding (four questions; “I reward my child with something to eat when s/he is well-behaved”), prompting and encouragement to eat (eight questions; “I encourage my child to taste each of the foods I serve at mealtimes”), and control over eating (10 questions; “I decide what my child eats between meals”).⁷ Parents rate their responses on a 5-point scale, with responses ranging from “I never do” (score of 1) to “I always do” (score of 5). Sums for each subscale were computed. The PFSQ has reported both good internal and test–retest reliability.⁷ In this study, each subscale showed good internal consistency (Cronbach’s alphas: emotional feeding: $\alpha = 0.85$; instrumental feeding: $\alpha = 0.75$; prompting and encouragement to eat: $\alpha = 0.77$; control over eating: $\alpha = 0.82$).

Child Feeding Questionnaire (CFQ; Parent Report). The Child Feeding Questionnaire (CFQ) includes 31 items that assess parent-reported behaviors and beliefs concerning their child’s feeding.¹⁰ The CFQ has seven factors: four factors that assess parental attitudes toward child’s proneness to weight gain and obesity, and three factors that assess parental control and feeding practices. Only the parental control and feeding practices subscales were included in this study. The restriction subscale examines the degree to which a parent limits their child’s access to foods, such as “If I did not guide or regulate my child’s eating, she would eat too much of her favorite foods”. The pressure to eat subscale captures a parent’s tendency to encourage greater overall food consumption, as in “My child should always eat all of the food on her plate”. The monitoring subscale assesses a parent’s level of involvement in and knowledge about their child’s eating, for example “How much do you keep track of the high-fat foods that your child eats?” Response options range from one to five, with one = “never” and five = “always”, and means were computed for each subscale. Previous studies have found good validity and fit in confirmatory factor analyses for this measure among samples of children and adolescents from a variety of ethnic, economical, and cultural backgrounds.^{10,33} In this study, internal consistency for the restriction subscale was acceptable (Cronbach’s $\alpha = 0.70$) and for the monitoring subscale was excellent (Cronbach’s $\alpha = 0.91$). However, the internal consistency for the pressure to eat

subscale, which is comprised of only four questions, was poor (Cronbach’s $\alpha = 0.56$) in our study sample. This low internal consistency is comparable to the reliability reported in other studies for this subscale.²⁴

Child Report of Parent Behavior Inventory (CRPBI-30; Child Report). The Child Report of Parent Behavior Inventory (CRPBI-30)³⁴ is a 30-item self-report scale adapted from the 108-item original measure in which children rate their parent’s behavior across three dimensions. The first subscale—psychological control versus psychological autonomy—measures the degree that a parent implements guilt, love withdrawal, avoidance, and other psychological methods with the intent to control behaviors. Items on this subscale include “My mom (dad) will avoid looking at me when I have disappointed her (him)” and “My mom (dad) would like to be able to tell me what to do all of the time”. The parental acceptance versus rejection subscale focuses on the perceptions of the parent-child relationship along those domains. Questions on this subscale include “My mom (dad) smiles at me very often” and “My mom (dad) gives me a lot of care and attention”. The third subscale, firm versus lax control, measures the degree to which a parent sets rules and is involved in their child’s life, such as “My mom (dad) insists that I must do exactly as I am told” and “My mom (dad) is very strict with me.” Responses range on a three-point scale from “not like” (score of one) to “a lot like” (score of three) to describe how closely the statement matches the behavior described. This measure has demonstrated strong reliability and predictive validity in children and adolescents.³⁴ In this sample, the internal consistency for each of the three subscales was good (Cronbach’s α ’s = 0.74 – 0.88). Children completed the questions as they applied to their mother, then as they applied to their father. Responses were matched based on the sex of the participating parent, so that if their mother was participating in the research study, then the child-report on their mother was used, and vice-versa for fathers who participated in the study. Thus, responses on this measure aligned with the sex of the parent who completed the PFSQ and CFQ. Averages were computed for each child-reported subscale.

Statistical Analysis

All participants who completed the baseline evaluation were included in this study. Analyses were conducted using SPSS version 18.0. Analyses that yielded p -values less than 0.05 were considered significant in this sample. Analyses in this study were adequately powered ($p < 0.05$) to detect significance with an effect size of 0.20. We evaluated a number of demographic and psychological covariates, including child and parent age, child BMI- z , parent BMI, parent income, child and

TABLE 1. Participant demographics comparing children with and without reported loss of control (LOC) eating

	Total Sample N = 118	Loss of Control Group		Statistics
		LOC (n = 43)	No LOC (n = 75)	
Child				
Age (years)	10.40 ± 1.35	10.53 ± 1.21	10.33 ± 1.43	t = -0.28 (df = 116)
Race (n, % White)	61 (53.50%)	20 (46.51%)	41 (54.67%)	χ ² = 0.63 (df = 1)
Sex (n, % female)	63 (53.40%)	24 (55.81%)	39 (52.00%)	χ ² = -0.21 (df = 1)
BMI, kg/m ²	27.22 ± 4.56	28.06 ± 4.41	26.74 ± 4.60	t = -0.61 (df = 116)
BMI-z	2.06 ± 0.39	2.21 ± 0.40	2.03 ± 0.39	t = -0.73 (df = 116)
Parent:				
Age (years)	42.42 ± 6.20	41.97 ± 6.93	42.68 ± 5.78	t = 0.10 (df = 116)
Race (n, % White)	82 (69.49%)	25 (58.14%)	57 (76.00%)	χ ² = 1.56 (df = 1)
Sex (n, % female)	107 (90.70%)	36 (83.72%)	71 (94.67%)	χ ² = 1.32 (df = 1)
BMI, kg/m ²	31.74 ± 6.96	33.72 ± 6.63	30.61 ± 6.93	t = -2.38* (df = 116)

*p < 0.05.

Notes: BMI, Body Mass Index; BMI-z, Body Mass Index z scores; df, degrees of freedom.

TABLE 2. Descriptive data for the parent feeding measures (Parental Feeding Style Questionnaire and the Child Feeding Questionnaire) and general parenting measure (Child Report of Parent Behavior Inventory, thirty-item version) among children with and without reported loss of control (LOC) eating in this sample

	Total Sample (M ± SD) N = 118	Loss of Control n = 43	No Loss of Control n = 75
Parental Feeding Style Questionnaire (PFSQ)			
Instrumental feeding	6.58 ± 2.48	6.09 ± 2.38	6.85 ± 2.51
Prompting and encouragement to eat	27.15 ± 4.84	25.58 ± 5.66	28.05 ± 4.07
Control over eating	34.14 ± 5.34	34.58 ± 5.99	33.88 ± 4.96
Child Feeding Questionnaire (CFQ)			
Restriction	3.80 ± 0.60	3.89 ± 0.57	3.75 ± 0.62
Pressure to eat	1.61 ± 0.74	1.80 ± 0.93	1.50 ± 0.58
Monitoring	3.44 ± 0.86	3.47 ± 0.93	3.42 ± 0.83
Child Report of Parent Behavior Inventory (CRPBI-30)			
Acceptance vs. Rejection	1.29 ± 0.35	1.34 ± 0.47	1.26 ± 0.25
Psychological control vs. Autonomy	2.23 ± 0.46	2.07 ± 0.49	2.32 ± 0.41
Firm vs. Lax control	1.92 ± 0.33	1.99 ± 0.33	1.88 ± 0.32

parent sex, child and parent race, and child and parent depression using independent samples *t*-tests to assess for group differences among children who reported LOC eating and those who did not. Only parent BMI was significantly associated with child LOC eating ($t = -2.38$; $df = 116$; $p < 0.02$), and was included as a covariate in all analyses. Eight participants had missing data that exceeded 20% of the CRPBI-30 subscale items. Therefore, data imputation using mean scores was employed to account for missing data on this measure. All independent variables were assessed for collinearity. Logistic regressions were conducted to assess the impact of parenting factors on child LOC eating behavior. The first model evaluated the impact of parent feeding behaviors (restriction, pressure to eat, monitoring, instrumental feeding, prompting/encouragement to eat, control over eating) on child LOC eating. We removed the emotional feeding subscale from the parent feeding behaviors model due to a high level of collinearity with the instrumental feeding subscale ($r = 0.74$). The second model evaluated the impact of general parenting behaviors as reported by the child (psychological control versus

autonomy, parental acceptance versus rejection, firm versus lax control). Follow-up analyses examined interaction terms for significant variables (i.e., parent BMI).

Results

Table 1 displays the demographic results for the sample. Forty-three children (36.40%) in the sample reported at least one episode of LOC eating in the month prior to assessment (M ± SD: 1.66 ± 4.55 episodes; range, 0–26 episodes). **Table 1** also includes the participant characteristics comparing children with LOC eating to those without LOC eating. Children with LOC eating did not differ significantly from children without LOC eating on any demographic variables, except parent BMI scores, which were higher among children who reported LOC eating ($p < 0.02$). Descriptive data for the parenting measures can be found in **Table 2**.

TABLE 3. Logistic regression model evaluating the relationship between child loss of control (LOC) eating and parent feeding behaviors (parent-reported) in the same model, controlling for parent Body Mass Index

Predictor Variables	Beta (Standard Error)	Adjusted Odds Ratio	95% Confidence Interval
Parental Feeding Style Questionnaire (PFSQ)			
Instrumental feeding	−0.34 (0.12)	0.71**	0.57–0.90
Prompting and encouragement to eat	−0.10 (0.05)	0.91*	0.83–0.99
Control over eating	0.02 (0.05)	1.02	0.93–1.11
Child Feeding Questionnaire (CFQ)			
Restriction	1.09 (0.46)	2.99*	1.21–7.39
Pressure to eat	0.67 (0.33)	1.95*	1.02–3.74
Monitoring	−0.20 (0.28)	0.82	0.47–1.42
Parent Body Mass Index	0.06 (0.03)	1.07	1.00–1.14

* $p < 0.05$, ** $p < 0.01$.

TABLE 4. Logistic regression model examining the relationship between child loss of control (LOC) eating and general parenting behaviors (child-reported) in the same model, controlling for parent Body Mass Index

Predictor Variables	Beta (Standard Error)	Adjusted Odds Ratio	95% Confidence Interval
Child Report of Parent Behavior Inventory (CRPBI-30)			
Acceptance vs. Rejection	−0.52 (0.46)	0.60	0.25–1.46
Psychological control vs. Autonomy	−0.43 (0.47)	0.65	0.26–1.67
Firm vs. Lax control	−0.64 (0.63)	0.53	0.15–1.83
Parent Body Mass Index	0.07 (0.03)	1.07*	1.01–1.13

* $p < 0.05$, ** $p < 0.01$.

Parent Feeding Behaviors and LOC Eating

The full model containing all predictors was statistically significant, $\chi^2 (7, N = 118) = 25.67, p < 0.002$ (see **Table 3**). The model as a whole explained 26.80% (Nagelkerke R^2) of the variance in LOC eating status. Specifically, four of the variables were responsible for unique, significant contributions to the overall model—instrumental feeding, prompting/encouragement to eat, pressure to eat, and restriction. Parents who used instrumental feeding and prompting/encouragement to eat were less likely to have children with LOC eating ($p < 0.005$ and $p < 0.05$, respectively), while parents who utilized pressure to eat techniques were two times more likely to have a child who reported LOC eating ($p < 0.05$). Children of parents who reported using restriction were three times more likely to report LOC eating ($p < 0.02$). Parental monitoring and control were not related to child-reports of LOC eating ($ps > 0.05$). Parent BMI was not significantly related to child LOC eating in this model ($p < 0.07$).

General Parenting and LOC Eating

The overall model of the association between general parenting and LOC eating was significant, $\chi^2 (4, N = 118) = 9.54, p < 0.05$ (see **Table 4**). The overall model explained 10.90% (Nagelkerke R^2) of the variance in LOC eating. Child ratings on all three subscales (parental acceptance versus rejection, psychological control versus autonomy, and

firm versus lax control) were unrelated to LOC eating in this sample ($ps = 0.26–0.37$). Parent BMI was significantly related to child LOC eating ($p < 0.03$), such that parents with higher BMI were more likely to have a child report LOC eating.

Parent Feeding Behaviors, Parent BMI, and LOC Eating

Parent BMI was investigated as an interaction term between all parent feeding behavior subscales and child LOC eating. The overall models investigating parent BMI as an interaction term were all significant ($ps < 0.05$). However, parent BMI was not found to moderate the relationship between any parent feeding variable and child LOC eating ($ps > 0.05$; data not shown).

Discussion

This study examined the relationship among parent feeding behaviors and general parenting with child-reported LOC eating in a sample of treatment-seeking overweight and obese children. Parents’ reports of their own feeding behaviors were associated with child-reported LOC eating. When parents reported greater use of pressuring their child to eat or restricting their child’s eating, children were more likely to report LOC eating in this sample. Moreover, parents who endorsed greater instrumental feeding (i.e., using food as a

reward) and prompting/encouragement to eat had children that were less likely to report LOC eating. To our knowledge, this is the first study to demonstrate a relationship between parenting feeding behaviors and LOC eating in overweight, treatment-seeking children.

Although the causes of LOC eating are likely multidetermined,³⁵ parent feeding behaviors could be one contributing factor to the development and maintenance of this aberrant eating behavior. To better understand the relationship between parenting and a child's eating and weight, Costanzo and Woody proposed a bi-directional model in which parents' exerted greater control over their child's eating when the parents perceived their child to be at risk for eating or weight problems, were heavily invested in health concerns, or questioned their child's ability to control their own eating.³⁶ In turn, they posited that high levels of parental control over feeding might hinder a child's ability to develop appropriate self-regulation responses to internal cues of hunger and satiety.³⁶ Thus, parental restriction of child eating may seem like a logical parenting strategy to help regulate a child's eating. However, this approach may be associated with the child having a lower level of reliance on interoceptive and satiety cues, as well as increased overeating, which ultimately could lead to feelings of being out of control. Perhaps establishing structured guidelines around eating (i.e., control and monitoring parent feeding behaviors) allows children to develop healthy eating patterns, whereas restriction techniques may feel too harsh and inflexible, which could in turn promote less control over one's eating, as seen with dieting attempts and restraint theory.³⁷ Alternatively, it might be that parents use more restriction feeding techniques with children who display more disinhibited eating behaviors, such as LOC eating, which may contribute to the association observed in this study. Given the cross-sectional data presented in this study, all results should be viewed from a bidirectional perspective, such that the impact of parental influences on child eating cannot be interpreted without also considering the impact that child eating behaviors may have on parenting.

Interestingly, our data showed that parents who used more instrumental feeding and prompting/encouragement to eat techniques had children who were less likely to report LOC eating episodes. Our finding may seem counterintuitive, given that instrumental feeding has been associated with greater food responsiveness³⁸ and overeating tendencies in young children across the weight-spectrum.³⁹ However, using food as a reward may not

inherently make food itself more rewarding for all children at all ages and weights. Alternatively, it could be that parents use more instrumental feeding techniques with children who require extra motivation to eat or who are pickier eaters, and thus may be less likely to report LOC eating. Moreover, children who report LOC eating may find food more rewarding overall, and thus parents may not need to use instrumental feeding or prompting/encouragement techniques in order to motivate them to eat. While prompting/encouragement to eat techniques were associated with a decreased likelihood of child LOC eating, pressure to eat was associated with greater odds of reporting child LOC eating. It may be that pressure to eat represents a more overt parent feeding behavior which could impact child LOC eating behaviors differentially compared to prompting/encouragement to eat techniques. Given that both pressure to eat and child LOC eating have been independently associated with disinhibited eating behaviors and greater intake of calorically dense snack and dessert-type foods,^{14,21} pressure to eat feeding behaviors may have a stronger association with the child's experience of loss of control or the propensity to engage in overeating episodes than other parent feeding behaviors. Research should continue to investigate these bidirectional associations in order to identify what factors may be influencing the relationship between these specific parent feeding behaviors and child LOC eating.

In contrast to parent feeding behaviors, no relationships emerged between general parenting behaviors and child LOC eating in this sample. It may be that parent feeding styles are more strongly linked to child eating behaviors than general parenting strategies, given that feeding styles directly impact the child during times in which food is present or consumed.⁴⁰ Furthermore, general parenting behaviors were assessed using a child self-report measure. Thus, children may not be able to accurately report on parenting behaviors, or it may be that children's perceptions of parenting behaviors are not related to child LOC eating. Additional studies examining general parenting behaviors from the parents' perspective, as well as studies that assess parenting styles (such as authoritative, authoritarian, permissive, and so forth), should be conducted to determine what, if any, relationship general parenting behaviors may have with child LOC eating.

Parent BMI was the only demographic that was associated with LOC eating in children, such that heavier parents were more likely to have a child report LOC eating, independent of the child's BMI

and weight status. Moreover, parent BMI was not a significant interaction term when investigating the relationship between parent feeding behaviors and child LOC eating, suggesting that parent BMI does not moderate the relationship between parent feeding and child LOC eating, but rather is uniquely related to child LOC eating. Importantly, it should be noted that all children were either overweight or obese in this sample, suggesting that the relationship between parent BMI and child LOC eating may only hold true within this subset of individuals. This finding adds a new dimension to our understanding of familial factors that influence childhood disinhibited eating behaviors, providing a familial, possibly genetic, connection between a parent's weight and their child's LOC eating. If parent weight status is also found to longitudinally predict child LOC eating, then interventions designed to target child LOC eating may benefit by directly including and intervening with the parent. More research is needed to delineate the mechanisms contributing to the relationship between parent weight status and child LOC eating.

There are several strengths as well as limitations of this study that should be noted. Strengths of the study include assessing LOC eating through use of the ChEDE semistructured interview, which was administered by trained clinical interviewers. Additionally, this pediatric sample was relatively large and ethnically diverse. Furthermore, parent and child responses were matched on the CRPBI-30, such that the child completed the measure about the participating parent, to avoid response discrepancies resulting from a child's relationship with another parent or family member.

Limitations include using a treatment-seeking sample of overweight and obese children and their parents, and thus our results may not generalize to families in nonclinical or normal-weight populations. In line with other studies examining parenting and child eating behaviors,²⁴ the pressure to eat subscale of the CFQ in our sample also had poor internal consistency, which limits the conclusions that can be drawn from these questions. More importantly, this perhaps highlights the need to develop additional parenting measures with stronger psychometric properties in order to more reliably capture this feeding behavior. Moreover, due to the cross-sectional design of this study, no causal conclusions regarding parenting and LOC eating in children can be ascertained and the findings need to be replicated in experimental and longitudinal designs. Actions by parents, including pressuring children to eat, that were once neces-

sary to protect offspring from illness, malnutrition, and death may now be maladaptive strategies contributing to weight gain and internal dysregulation.⁴¹ Although previous research has primarily focused on the influence parents exerted over their children's behaviors, recent data have suggested that parent-child interactions are a dynamic process, and that parent feeding behaviors may be elicited at least in part by child factors, such as weight status and disordered eating behaviors.^{11,36}

This study is the first study to explore parent feeding behaviors along with general parenting behaviors in relation to LOC eating in treatment-seeking overweight and obese children. Given these findings, it may be important to assess parental feeding behaviors prior to initiation in intervention and treatment programs. Studies suggest that parent feeding behaviors predict parenting styles, and that dietary change and obesity interventions should also assess parenting styles in order to be successful.⁴² Psychoeducation and diagnostic information about parent feeding behaviors and general parenting behaviors may be beneficial therapeutic components when added to programs aimed at reducing weight gain or LOC eating among children. Specifically, discouraging restriction and pressure to eat parent feeding behaviors may decrease child LOC eating. More research is needed to determine whether incorporating education about parent feeding behaviors into interventions can reduce LOC eating episodes and prevent full-syndrome eating disorders in youth. Future studies should continue to investigate the complex interplay between parent feeding and child eating and weight gain to better understand the mechanisms that influence these factors.

References

- Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA* 2014;311:806-814.
- Kipping RR, Jago R, Lawlor DA. Obesity in children. I. Epidemiology, measurement, risk factors, and screening. *Br Med J* 2008;337:a1824.
- Tanofsky-Kraff M, Yanovski SZ, Schvey NA, Olsen CH, Gustafson J, Yanovski JA. A prospective study of loss of control eating for body weight gain in children at high risk for adult obesity. *Int J Eat Disord* 2009;42:26-30.
- Tanofsky-Kraff M. Binge eating among children and adolescents. In: Jelalian ES, editor. *Handbook of Child and Adolescent Obesity*. New York, NY: Springer, 2008.
- Yael L, Tzischinsky O, Givon M. Sleep-wake cycles in obese children with and without binge eating episodes. *Int J Obes* 2007;31:S111-S111.
- Tanofsky-Kraff M, Marcus MD, Yanovski SZ, Yanovski JA. Loss of control eating disorder in children age 12 years and younger: Proposed research criteria. *Eat Behav* 2008;9:360-365.
- Wardle J, Sanderson S, Guthrie CA, Rapoport L, Plomin R. Parental feeding style and the inter-generational transmission of obesity risk. *Obes Res* 2002; 10:453-462.

8. Baughcum AE, Powers SW, Johnson SB, Chamberlin LA, Deeks, CM, Jain A, et al. Maternal feeding practices and beliefs and their relationships to overweight in early childhood. *J Dev Behav Pediatr* 2001;22:391–408.
9. Faith MS, Scanlon KS, Birch LL, Francis LA, Sherry B. Parent-child feeding strategies and their relationships to child eating and weight status. *Obes Res* 2004;12:1711–1722.
10. 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;36:201–210.
11. Birch LL, Fisher JO. Mothers' child-feeding practices influence daughters' eating and weight. *Am J Clin Nutr* 2000;71:1054–1061.
12. Fisher JO, Birch LL. Restricting access to palatable foods affects children's behavioral response, food selection, and intake. *Am J Clin Nutr* 1999;69:1264–1272.
13. Johnson SL, Birch LL. Parents' and children's adiposity and eating style. *Pediatrics* 1994;94:653–661.
14. Ventura AK, Birch LL. Does parenting affect children's eating and weight status? *Int J Behav Nutr Phys Act* 2008;5:15
15. Rhee KE, Coleman SM, Appugliese DP, Kaciroti NA, Corwyn RF, Davidson NS, et al. Maternal feeding practices become more controlling after and not before excessive rates of weight gain. *Obesity (Silver Spring)* 2009;17:1724–1729.
16. Webber L, Hill C, Cooke L, Carnell S, Wardle J. Associations between child weight and maternal feeding styles are mediated by maternal perceptions and concerns. *Eur J Clin Nutr* 2010;64:259–265.
17. Webber L, Cooke L, Hill C, Wardle J. Child adiposity and maternal feeding practices: A longitudinal analysis. *Am J Clin Nutr* 2010;92:1423–1428.
18. 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;76:226–231.
19. Patrick H, Nicklas TA, Hughes SO, Morales M. The benefits of authoritative feeding style: Caregiver feeding styles and children's food consumption patterns. *Appetite* 2005;44:243–249.
20. Cullen KW, Baranowski T, Owens E, Marsh T, Rittenberry L, de Moor C. Availability, accessibility, and preferences for fruit, 100% fruit juice, and vegetables influence children's dietary behavior. *Health Educ Behav* 2003;30:615–626.
21. Tanofsky-Kraff M, McDuffie JR, Yanovski SZ, Kozlosky M, Schvey, NA, Shomaker LB, et al. Laboratory assessment of the food intake of children and adolescents with loss of control eating. *Am J Clin Nutr* 2009;89:738–745.
22. Hilbert A, Tuschen-Caffier B, Czaja J. Eating behavior and familial interactions of children with loss of control eating: A laboratory test meal study. *Am J Clin Nutr* 2010;91:510–518.
23. Czaja J, Hartmann AS, Rief W, Hilbert A. Mealtime family interactions in home environments of children with loss of control eating. *Appetite* 2011;56:587–593.
24. Matton A, Goossens L, Braet C, Van Durme K. Continuity in primary school children's eating problems and the influence of parental feeding strategies. *J Youth Adolesc* 2013;42:52–66.
25. Scaglioni S, Salvioni M, Galimberti C. Influence of parental attitudes in the development of children eating behaviour. *Br J Nutr* 2008;99 (Suppl 1):S22–S25.
26. Fisher JO, Birch LL. Parents' restrictive feeding practices are associated with young girls' negative self-evaluation of eating. *J Am Diet Assoc* 2000;100:1341–1346.
27. Boutelle KN, Zucker NL, Peterson CB, Rydell SA, Cafri G, Harnack L. Two novel treatments to reduce overeating in overweight children: A randomized controlled trial. *J Consult Clin Psychol* 2011;79:759–771.
28. Boutelle KN, Zucker N, Peterson CB, Rydell S, Carlson J, Harnack LJ. An intervention based on Schachter's externality theory for overweight children: The regulation of cues pilot. *J Pediatr Psychol* 2014;39:405–417.
29. Bryant-Waugh RJ, Cooper PJ, Taylor CL, Lask BD. The use of the eating disorder examination with children: A pilot study. *Int J Eat Disord* 1996;19:391–397.
30. Fairburn CG, Beglin SJ. Assessment of eating disorders—Interview or self-report questionnaire. *Int J Eat Disord* 1994;16:363–370.
31. Kuczumski RJ, Ogden CL, Grummer-Strawn LM, Flegal KM, Guo, SS, Wei R, et al. CDC growth charts: United States. *Adv Data* 2000;314:1–27.
32. Tanofsky-Kraff M, Yanovski SZ, Wilfley DE, Marmarosh C, Morgan CM, Yanovski JA. Eating-disordered behaviors, body fat, and psychopathology in overweight and normal-weight children. *J Consult Clin Psychol* 2004;72:53–61.
33. Anderson CB, Hughes SO, Fisher JO, Nicklas TA. Cross-cultural equivalence of feeding beliefs and practices: The psychometric properties of the child feeding questionnaire among Blacks and Hispanics. *Prev Med* 2005;41:521–531.
34. Schludermann EH, Schludermann SM. Children's Report on Parent Behavior (CRPBI-108, CRPBI-30) for older children and adolescents. Winnipeg, MB, Canada: University of Manitoba, Department of Psychology 1988.
35. Tanofsky-Kraff M, Engel S, Yanovski JA, Pine DS, Nelson EE. Pediatric disinhibited eating: Toward a research domain criteria framework. *Int J Eat Disord* 2013;46:451–455.
36. 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;3:425–445.
37. Polivy J, Herman CP. Dieting and bingeing—A causal-analysis. *Am Psychol* 1985;40:193–201.
38. Carnell S, Benson L, Driggin E, Kolbe L. Parent feeding behavior and child appetite: Associations depend on feeding style. *Int J Eat Disord* 2014;47:705–709.
39. Rodgers RF, Paxton SJ, Massey R, Campbell KJ, Wertheim, EH, Skouteris H, et al. Maternal feeding practices predict weight gain and obesogenic eating behaviors in young children: a prospective study. *Int J Behav Nutr Phys Act* 2013;10:24.
40. Vereecken C, Legiest E, De Bourdeaudhuij I, Maes L. Associations between general parenting styles and specific food-related parenting practices and children's food consumption. *Am J Health Promot* 2009;23:233–240.
41. Savage JS, Fisher JO, Birch LL. Parental influence on eating behavior: Conception to adolescence. *J Law Med Ethics* 2007;35:22–34.
42. Hubbs-Tait L, Kennedy TS, Page MC, Topham GL, Harrist AW. Parental feeding practices predict authoritative, authoritarian, and permissive parenting styles. *J Am Diet Assoc* 2008;108:1154–1161.