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Observed restrictive feeding practices among low-income mothers of pre-adolescents

Katherine W. Bauer[1,2] | Heidi M. Weeks[1] | Kinari Shah[1] |
Elizabeth Ludwig-Borycz[1] | Hurley Riley[2,3] | Julie C. Lumeng[1,2,4] |
Alison L. Miller[2,3]

[1]Department of Nutritional Sciences, University of Michigan School of Public Health, Ann Arbor, Michigan

[2]Center for Human Growth and Development, University of Michigan, Ann Arbor, Michigan

[3]Department of Health Behavior and Health Education, University of Michigan School of Public Health, Ann Arbor, Michigan

[4]Department of Pediatrics, University of Michigan Medical School, Ann Arbor, Michigan

Correspondence
Katherine W. Bauer, Department of Nutritional Sciences, University of Michigan School of Public Health, 3854 SPH I, 1415 Washington Heights, Ann Arbor, MI 48109-2029.
Email: kwbauer@umich.edu

Summary

Objectives: To describe verbal and non-verbal restrictive feeding practices used by low-income mothers with their pre-adolescent children during a laboratory-based protocol, and examine associations between mother/child anthropometrics, child appetitive traits and mothers' restrictive practices.

Methods: Mothers and children (dyad n = 108, mean child age = 11.0 years [SD = 1.2]) were provided a standardized meal and then buffet of desserts. Sessions were video-recorded, and trained coders reliably identified positive and negative restrictive statements, non-verbal restrictive behaviours and redirection to healthier foods. Mother/child anthropometrics were measured by trained study staff and child appetitive traits reported by mothers using subscales of the Children's Eating Behaviours Questionnaire. Negative binomial regression was used to examine associations between mother/child characteristics and restrictive practices.

Results: Nearly all mothers (89.8%) engaged in restrictive feeding during the dessert buffet. Positive restrictive statements were the most common form of restriction (mean statements/10 minutes = 3.2 [SD = 3.1]). No associations were observed between children's body mass index (BMI) or appetitive traits and mothers' restrictive feeding practices. Associations of small effect size were observed between mothers' BMI, use of positive restrictive statements (incidence rate ratio [IRR] = 0.98 [0.96-0.996]) and non-verbal restrictive behaviours (IRR = 0.96 [0.93-0.99]).

Conclusions: Laboratory-based feeding protocols can objectively assess nuances in restrictive feeding practices. Further research is needed to understand how specific approaches to restriction affect children's eating behaviours and weight.

KEYWORDS
child eating behaviour, food parenting, pre-adolescence, restrictive feeding

1 | INTRODUCTION

One of Dr Leann Birch's greatest contributions was her research on child feeding practices and their effects on children's eating behaviours and obesity risk. In particular, her focus on restrictive feeding and development of the Child Feeding Questionnaire (CFQ) to

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measure parents' restriction of their children's intake[1] launched an important and impactful area of research. Early studies by Birch and colleagues using the restriction subscale of the CFQ indicated that higher maternal restriction predicted greater eating in the absence of hunger among children and ultimately, greater weight gain over time.[2-5] Further, her research suggested that restrictive feeding was particularly harmful for some children, for example, those with poorer self-regulation.[6] In total, this body of work informed clinical guidelines for the prevention and treatment of childhood obesity including recommendations that parents avoid overly restricting their children's eating.[7,8]

While the existence of clinical guidelines to dissuade parents from restrictive feeding suggests that the impacts of restrictive feeding are well understood, this is not the case (as recognized by Birch herself[9]). Some studies have found, similar to Birch, that restrictive feeding practices are associated with greater child dysregulated eating and higher body weight.[10-13] Meanwhile, other studies have found that restrictive feeding does not differentially predict child eating behaviour and weight,[14-16] and still others have found that restrictive feeding predicts better-regulated eating by children.[17,18] Three hypothesized reasons for these inconsistent findings lie with use of the CFQ and similar parent-report measures of child feeding practices (most of which are adaptations of the CFQ[19,20]). First, parent-reported data may be biased, and more so, differently biased based on the study population. For example, parent characteristics such as culture and age may affect what parents believe is the socially desirable way to complete the measures.[21] Second, the CFQ conceptualizes restrictive feeding as a homogenous construct, summarized by a single score. Differences in how parents restrict cannot be examined with the CFQ. Third, the restriction subscale of the CFQ predominantly asks parents about their beliefs about feeding, not the practices they engage in. For example, the item, "If I did not guide or regulate my child's eating, she would eat too many junk foods" arguably assess parents' beliefs regarding their children's ability to self-regulate eating, not the behaviours they engage in to restrict. The restriction subscale of the CFQ only includes one item that specifically asks about a specific practice: keeping food out of the child's reach. Therefore, the CFQ cannot be used to determine how or the extent to which parents restrict their children's eating, only the extent to which they believe they have to restrict their children's eating.

Observational methods to assess child feeding may provide more objective, nuanced and specific information as compared to self-report.[22] This measurement approach has been used mainly among dyads of mothers and their young children, and protocols have varied widely. In some studies, naturalistic observations of meals or other feeding occasions in the home have been conducted,[23] whereas in other studies, parent/child dyads have participated in standardized, laboratory-based, feeding protocols.[24-28] The former approach may provide greater ecological validity, while the latter offers greater standardization across families. This standardization helps ensure that all families are exposed to similar eating situations, for example a highly desirable dessert. Irrespective of the eating situation, both approaches rely on the application of a standardized behavioural coding system to the observations by trained coders, helping ensure objectivity. In studies that have measured restrictive feeding via both parent-report and observation, the two have been weakly, and sometimes negatively, correlated,[23-25,29] suggesting that self-report vs observed feeding practices are capturing different constructs.[30]

Among studies that have measured restrictive feeding via observation, only a subset distinguished approaches to restriction, which is essential for understanding whether specific types of restriction may be helpful vs harmful. The Family Mealtime Coding System identifies verbal vs non-verbal restriction of young children's eating.[29] However, despite only a modest correlation between these two types of restriction,[27] many studies combine the two for analysis. Alternatively, in a series of studies, Pesch et al[26,31-33] differentiated statements that mothers used to restrict their young children's eating during a laboratory-based eating protocol where children were presented a large portion of cupcakes by their degree of directness and affect. Directness refers to the extent to which a statement addresses the others' behaviour vs is abstract regarding the value of a behaviour, while affect refers to the degree of warmth and empathy communicated. These studies identified that how mothers communicate restriction to their children differs by child characteristics including gender, weight status and appetitive traits. For example, children with obesity were much more likely to be the target of restrictive statements with negative affect compared to their counterparts with lower body mass indices (BMIs). In contrast, restrictive statements with positive affect were only slightly more frequent when children had obesity.[31] This body of research suggests that further work is needed to understand how parents use different approaches to restrict their children's eating; the extent to which specific family, parent or child characteristics may elicit different approaches to restriction; and, ultimately, whether different approaches to restriction have differential impacts on children's eating behaviours and obesity risk.

The objective of this study was therefore to: (a) describe the diverse verbal and non-verbal practices used by mothers to limit their pre-adolescent aged children's eating during a laboratory-based feeding protocol, and (b) examine associations between mother and child characteristics and mothers' diverse restrictive feeding practices. Poor dietary quality,[34] rapid weight gain,[35] and obesity[36] are common during pre-adolescence. However, many pre-adolescents also have heightened emotional sensitivity to comments about their eating and weight,[37] which can lead to disordered eating behaviours, extreme dieting and binge eating.[38] For these reasons, identifying feeding strategies that help parents of pre-adolescents effectively limit their children's intake without promoting unintended, harmful consequences are needed; yet, child feeding practices are rarely studied among parents of children this age.

2 | METHODS

2.1 | Study participants

A community-based sample of low-income mothers and their pre-adolescent aged children from south-eastern and south-central

Michigan was recruited between spring 2017 and summer 2018 through methods including flyers distributed at community locations and online postings. The study was advertised as one to help understand children's eating. Low-income families were recruited given the high prevalence of obesity among low-income youth[39]; identifying feeding strategies that protect low-income children from developing dysregulated eating and excessive weight gain is a priority. Mothers were eligible to participate in the study if they were their child's custodial and legal guardian, lived with their child at least 50% of the time, and reported that anyone in their family participated in an income-based assistance program such as the Supplemental Nutrition Assistance Program (SNAP), Supplemental Nutrition Program for Women, Infants and Children (WIC) or free or reduced-price school meals. Program participation was used as a proxy measure of families having a household income <185% of the federal poverty line. Children were eligible to participate if they were between 9.00 and 12.99 years old at the time of study consent; did not have food allergies, religious or cultural observances or medical conditions that significantly restricted their diet; and were developmentally and intellectually capable of completing study measures. Mothers and children must have also been able to complete all study tasks in English. Upon identifying eligibility, dyads were invited to complete a study visit at a community location. A total of 318 dyads were screened, 157 were eligible and 113 completed study visits. Data from 5 dyads were not included in this analysis (n = 3 provided inconsistent survey responses and n = 2 experienced video recording errors). Therefore, the final dyad n = 108. All mothers provided written informed consent for themselves and their child, and children provided written assent. The study was approved by the University of Michigan's Institutional Review Board.

2.2 | Study procedures

Data were collected via a single, 2-hour study visit that occurred over lunch or dinner mealtimes (eg, 5-7 PM). Participants were told that a meal would be provided at the study visit but were not asked to fast before the visit. After obtaining consent/assent, each member of the dyad was provided a standardized meal including a sandwich, cup of fruit cocktail and water. A video camera recorded the dyads as they consumed their meal while research staff waited outside the room. After 10 minutes, a research assistant came into the room and provided the dyads with a standardized "dessert buffet" (Figure 1). The research assistant stated, "Here are some desserts, you are welcome to have whatever you like, or not, it's completely up to you. I will be back in a little bit." and left the room while the dyads continued to be video recorded. Components of the standardized meal not eaten by the dyads were left on the table during the dessert buffet. After 10 minutes, the research assistant returned to the room, dinner and dessert foods were cleared and the mother and child were separated to complete additional components of the study. Research assistants then led mothers through study questionnaires using Research Electronic Data Capture (REDCap)[40] hosted by the Michigan Institute for

Contents of Dessert Buffet:
- 2, 1.5oz cups of yogurt covered raisins
- 2, 1.5oz cups of M&Ms
- 2, 1.5oz cups of Jelly Belly jelly beans
- 15 animal crackers
- 4 Entenmann's Little Bites Brownies
- 4 Hostess Powdered Mini Donuts
- 4 Mini Size Kit-Kat Bars
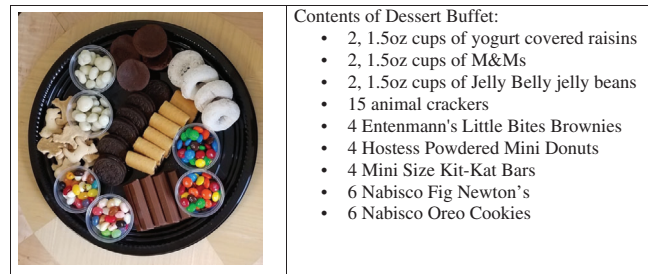- 6 Nabisco Fig Newton's
- 6 Nabisco Oreo Cookies

FIGURE 1 Standardized dessert buffet. Contents of dessert buffet: 2, 1.5 oz cups of yogurt covered raisins; 2, 1.5 oz cups of M&Ms; 2, 1.5 oz cups of Jelly Belly jelly beans; 15 animal crackers; 4 Entenmann's Little Bites Brownies; 4 Hostess Powdered Mini Donuts; 4 Mini Size Kit-Kat Bars; 6 Nabisco Fig Newton's; 6 Nabisco Oreo Cookies

Clinical Health Research. At the end of the study visit, mothers' and children's heights and weights were measured.

2.3 | Measures

2.3.1 | Restrictive feeding practices

Mothers' restrictive feeding practices during the dessert buffet recording were coded using a coding scheme adapted from Pesch et al[31] that identified restrictive statements with positive vs negative affect. Adaptations were made by study investigators after review of selected videos of children identified as having the five highest and lowest BMI percentiles for age and gender based on CDC growth charts, and five highest and lowest scores on measures of food responsiveness and satiety responsiveness. These videos were selected for review to help ensure that the range of feeding practices used by mothers of children across the range of weight statuses and appetitive traits were captured. The adapted coding scheme identified positive restrictive statements, negative restrictive statements, nonverbal restrictive behaviours and statements to redirect children's eating. Descriptions of each of these practices are provided in Table 1. Coders from the University of Michigan's Centre for Human Growth and Development Behavioural Coding Core, who were distinct from the data collection staff and had no participant contact, were given detailed instructions regarding how to code mothers' utterances (statements) and behaviours with respect to their timing and co-occurrence (full protocol available from the corresponding author). The coders then independently practiced applying the coding scheme to eight videos (7% of all videos). Once this process was complete, the coders met to review discrepant codes and refinements were made to the coding scheme to improve ease of use, with approval from study investigators. Once the coding scheme was finalized, two coders applied the coding scheme to three sub-sets of videos (total video n = 23), through which they achieved reliability in applying the coding scheme on the third sub-set (n = 7; Intra-class Correlation Coefficient ≥ 0.80 for all codes). The coders then independently coded the

TABLE 1 Restrictive feeding practices coding scheme

Practice	Definition and examples
Positive restrictive statements	Statements the mother makes with the goal of communicating that children should restrict their intake that are delivered in a neutral, sensitive, caring, affectionate, warm, gentle or benevolent manner. Mothers may be slightly critical of their child, or somewhat joking, but the statements are said in a kind way to guide the child's behaviour. Mothers' messages are not shaming or guilt-inducing to the child. Statements can range from matter of fact and straightforward (neutral) to more actively positive or affectionate (positive). Examples: "Slow down, honey, eat one bite at a time.", "What about eating just one first, then seeing if you want the second?", "These are too sweet for me.", "I do not like these.", "Chocolate is not your favourite.", "This is a special treat.", "We do not have these in our house, do we?", "These are unhealthy."
Negative restrictive statements	Statements the mother makes with the goal of communicating that children should restrict their intake that are delivered in a critical, barbed, unkind or harsh manner. Mothers may communicate disgust, embarrassment, disappointment or discomfort. Mothers may express a sense of sadness or there may be hostility in her voice. Mothers' messages may be shaming or guilt inducing. Mothers may harshly criticize the speed at which the child is eating, how much the child eats or the child's preferences; she may also call the child names. Examples: "You're going to be a stuffed pig!", "Do not eat that one too!", "You're not going to eat that much.", "Hey slow down!", "Are you really going to shove all that in your mouth at once?", "Oh my god, do not eat so crazy, that's gross", "You are scarfing that down like you have never seen food before!", "Do not stuff that all in your mouth.", "Quit eating like that, you are on camera!", "Were you raised in a barn? Do not eat like that", "These are nasty, gross."
Non-verbal restrictive behaviours	These behaviours are performed with the intention of physically limiting the child's access to the dessert or demonstrating to the child that they should not be eating. Mothers can display positive, negative or neutral affect while engaging in the behaviour. Cover: covering the plate with something Push away: pushing the plate away from child Frown: any frown or grimace in reaction to the plate Block: blocking the child from eating Take away: taking away dessert from child Return: returns food to plate Moves child: Moves child away from dessert
Redirection	Positive or negative statements that suggest the child eat something else in place of what they want or are eating, with the goal of reducing eating or eating healthier. Redirection can also include a non-verbal behaviour attached to a statement (eg, pointing to sandwich). Redirection does not apply if the mother is "adding" to child's eating (eg, "try these brownies"). Examples: "Eat one more bite of your sandwich.", "Have a Fig Newton first."

remainder of the videos; 20% of videos (n = 22) were double-coded to verify that no coder drift occurred. Resulting data were counts of each restrictive feeding practice.

2.3.2 | Mothers' and children's BMI

Mothers' and children's height and weight were measured using standardized protocols by trained study staff.[41] BMI was calculated as weight in kilograms divided by the square of height in meters, and children's age- and gender-specific BMI z-scores were calculated using CDC growth curves.[42] Mothers' and children's weight status categories were also identified based on BMI.[43]

2.3.3 | Children's appetitive traits

Mother-reported child appetitive traits were measured using the Children's Eating Behaviour Questionnaire.[44] Four subscales were examined: enjoyment of food (4 items, Cronbach's α = .87); emotional overeating (4 items, Cronbach's α = .84); food responsiveness (5 items,

Cronbach's α = .82); and satiety responsiveness (5 items, Cronbach's α = .74). For all subscales, mothers responded using five-point Likert scales ranging from "Never" (1) to "Always" (5). A mean score for each subscale was then calculated.

2.3.4 | Sociodemographic characteristics

Mothers reported their children's gender and birthdate, from which child age on the date of the study visit was calculated. Mothers also reported their highest level of educational attainment and their race/ethnicity.

2.4 | Statistical analysis

Univariate statistics were calculated to describe the sociodemographic characteristics of the study sample and identify the range, mean, median and per cent of mothers using any for each type of restrictive feeding practice. There was some variation in the amount of time dyads participated in the protocol (mean = 10.5 minutes [SD = 1.6]),

therefore the frequency of each restrictive feeding practice was calculated per 10 minutes of the protocol. Differences in rates of restrictive feeding practices by dyads' sociodemographic characteristics were tested for using Kruskal-Wallis tests and Dunn's tests post hoc.[45] Separate negative binomial regression models were then developed with counts of each type of restrictive feeding practice as dependent variables and each mother or child characteristic (eg, child BMI z-score) as independent variables. These models were adjusted for child age, mothers' race/ethnicity and mothers' educational attainment, and accounted for the amount of time the dyads participated in the protocol. Analyses were conducted using SAS version 9.4 (Cary, North Carolina).

3 | RESULTS

Among mothers, 22.2% reported that their highest level of education was a high school degree or less, 46.3% completed some college or other post-high school training and 31.5% had a college degree or greater (Table 2). Approximately half (50.5%) identified as non-Hispanic white, 36.5% non-Hispanic Black and the remainder (13.1%) as another race/ethnicity including Hispanic white and Asian. One-fifth (20.4%) of mothers had a BMI in the normal weight range, 12.0% had overweight and the remaining had Class 1, 2 or 3 obesity. On average, children were 11.0 years old. Nearly half (47.2%) had a BMI in the normal weight range, 15.7% had overweight and the remainder had obesity, including 14.8% with severe obesity.

Nearly all children (96.3%) attempted to eat something from the dessert buffet. The large majority of mothers (89.8%) engaged in at least one restrictive practice during the observation period, including the mothers of children who did not attempt to eat any dessert (n = 4). Positive restrictive statements were the most common restrictive feeding practice observed during the dessert buffet (Table 3). Most mothers (86.1%) made at least one positive restrictive statement. On average, among all dyads, mothers made 3.2 (SD = 3.1) statements per 10 minutes. Less than half of mothers (43.5%) made a negative restrictive statement during the protocol. On average, mothers made 1.0 (SD = 1.6) negative restrictive statements per 10 minutes. Sixty per cent (60.2%) of mothers engaged in a non-verbal restrictive behaviour, which included behaviours such as rolling their eyes at the desserts, covering the dessert plate with a napkin and pushing the plate away from the child, with an average of 2.0 (SD = 3.1) non-verbal restrictive behaviours per 10 minutes. Approximately one-third (31.5%) of mothers redirected their children from

the desserts to the remainder of their meal (ie, sandwich or fruit cup) or to what may be perceived as a healthier dessert option (eg, Fig Newton vs KitKat). No differences were observed in any of mothers' restrictive feeding practices by child gender or mothers' race/ethnicity (data not shown). Mothers' use of non-verbal restrictive behaviours varied by educational attainment (Chi-square = 6.38, P = .04) with mothers who had completed college using more non-verbal restrictive behaviours than mothers who completed high school or less.

Mothers' BMI was inversely associated with both frequency of positive restrictive statements (IRR = 0.98, 95% CI: 0.96-0.996) and non-verbal restrictive behaviours (IRR = 0.96, 95% CI: 0.93-0.99) (Table 4). Associations between the rate of negative restrictive

TABLE 2 Sociodemographic and body weight characteristics of mother/child dyads

	Total sample (n = 108)
Mothers' education, %	
High school or less	22.2%
Some college/training	46.3%
Finished college or higher	31.5%
Mothers' race/ethnicity, %	
Non-Hispanic white	50.5%
Non-Hispanic Black	36.5%
Other	13.1%
Mothers' BMI, mean (SD)	35.1 (9.9)
Mothers' weight status, %	
Normal weight (BMI ≥ 18.5, <25)	20.4%
Overweight (BMI ≥ 25, <30)	12.0%
Obesity class 1 (BMI ≥ 30, <35)	18.5%
Obesity class 2 (BMI ≥ 35, <40)	18.5%
Obesity class 3 (BMI ≥ 40)	30.6%
Child sex, % female	52.8%
Child age, mean (SD)	11.0 (1.2)
Child BMIz, mean (SD)	1.0 (1.1)
Child weight status, %	
Normal weight (BMI percentile ≥5, <85)	47.2%
Overweight (BMI percentile ≥85, <95)	15.7%
Obesity (BMI percentile ≥95, <120% of the 95th)	22.2%
Severe obesity (BMI percentile ≥120% of the 95th)	14.8%

TABLE 3 Restrictive feeding practices observed during dessert buffet per 10 minute observation

	Range	Mean (SD)	Median	Per cent with any of this practice
Positive restrictive statements	0-13.3	3.2 (3.1)	2.3	86.1%
Negative restrictive statements	0-10.0	1.0 (1.6)	0	43.5%
Non-verbal restrictive behaviours	0-21.0	2.0 (3.1)	0.9	60.2%
Redirection	0-11.8	0.7 (1.7)	0	31.5%

TABLE 4 Associations between mother and child characteristics and mothers' restrictive feeding practices during dessert buffet

	Positive restrictive statements IRR (95% CI)[a]	Negative restrictive statements IRR (95% CI)	Non-verbal restrictive behaviours IRR (95% CI)	Redirection IRR (95% CI)
Mothers' body mass index (BMI)[b]	0.98 (0.96-0.996)	0.97 (0.93-1.01)	0.96 (0.93-0.99)	0.98 (0.94-1.02)
Child BMI z-score	0.93 (0.79-1.10)	1.08 (0.79-1.48)	0.84 (0.66-1.09)	0.79 (0.53-1.18)
Child enjoyment of food	0.97 (0.77-1.23)	1.11 (0.72-1.72)	0.81 (0.55-1.19)	1.07 (0.63-1.81)
Child emotional over-eating	1.04 (0.84-1.28)	0.93 (0.64-1.37)	0.81 (0.59-1.13)	1.21 (0.77-1.90)
Child food responsiveness	1.02 (0.84-1.24)	1.17 (0.82-1.67)	0.76 (0.57-1.01)	1.22 (0.81-1.84)
Child satiety responsiveness	1.14 (0.88-1.49)	0.97 (0.57-1.65)	0.97 (0.63-1.51)	1.46 (0.84-2.54)

[a]IRR: Incidence Rate Ratio, CI: Confidence Interval.
[b]Negative binomial regression models adjusted for child age, mothers' race/ethnicity and mothers' educational attainment.

statements and mothers' BMI was similar in direction, but was not statistically significant at $P < .05$ (IRR = 0.97, 95% CI: 0.93-1.01). Additionally, the association between mothers' BMI and frequency of redirection was not statistically significant (IRR = 0.98, 95% CI: 0.94-1.02). Mothers' restrictive feeding practices did not vary by child BMI z-score or any of the child appetitive traits examined.

4 | DISCUSSION

Most mothers used verbal and non-verbal restrictive feeding practices to limit their pre-adolescents' eating during this laboratory-based feeding protocol. The majority of restrictive statements were positive in affective tone, suggesting that not all restriction is coercive.[9] Many mothers also attempted to limit their children's eating through redirection to healthier foods, a feeding practice that occurred because dyads were purposefully provided access to a range of foods with varying perceived healthfulness. Redirection has not been examined as an approach to restrict children's eating in previous studies. Further research is needed to understand if mothers redirect in hope that their child will ultimately eat less, or if they are trying to ensure that their child's consumption is balanced between "healthier" and less healthy foods. Unlike Pesch et al,[26,32] who studied restrictive practices used by mothers of younger children, in the current study, neither pre-adolescents' weight status nor appetitive traits were associated with frequency of mothers' restrictive feeding practices. In the current study, mothers of higher BMI were less likely to use positive restrictive statements and non-verbal restrictive behaviours than mothers of lower BMI. However, these associations were small in magnitude.

Previous studies that have examined associations between parents' own BMI or weight status and use of restrictive or controlling child feeding practices have produced mixed results. Some have observed that mothers with a higher BMI are more likely to report restrictive or otherwise controlling feeding practices,[29,46] while others have found no association between mothers' BMI and their feeding practices,[47] and still others have found that mothers of higher BMIs are less likely to use restrictive feeding practices.[48] One hypothesis regarding why mothers of higher BMI may be slightly less likely to engage in restrictive feeding with their children is because they have

frequently been the target of comments about their own eating and want to parent their children differently. However, it is important to consider that the observed associations are small in magnitude. Further, it is unclear if these differences in findings across previous studies are because of how feeding practices are assessed, or the potential that unmeasured factors may moderate or confound these associations. For example, factors associated with maternal BMI including mothers' weight history, concern about child's weight,[47] or experience of weight bias[49] may influence the use of specific feeding practices. Future studies would benefit from asking mothers of diverse body sizes about their motivations for restricting their children's eating the way they do.

One of the most important contributions of this study is the use of a carefully implemented laboratory protocol designed to elicit restrictive feeding among mothers. The current protocol, in which dyads were served a meal and then presented with large portions of common sweet foods while the meal was still available, was expanded from the protocol used by Pesch et al,[26,31-33] which provided dyads with chocolate cupcakes and only elicited restrictive statements in approximately half of mothers. However, the use of a new protocol means that findings across study samples cannot be perfectly compared. Therefore, it is unknown if differences in maternal restriction observed across studies are due to differences in the protocol or sample characteristics (eg, child age). Further, the lack of differences in mothers' restrictive feeding practices by most mother/child characteristics in the current study may be valid among this sample, or may reflect the protocol, which may have been such a strong behavioural press for restriction given that nearly all mothers used some form of restriction. Particularly given the lack of concordance between observed restrictive practices and parent-report in previous studies,[23-25,29] further research using standardized measurement approaches that capture "real world" feeding behaviour is needed.

Limitations of this study should be noted. First, the sample size was relatively small, limiting the ability to examine potential moderators of the relationships between mothers' restrictive feeding practices and child characteristics, such as child gender. Further, we examined a relatively small set of potential correlates of restrictive feeding practices. Other factors, such as what children ate earlier in the day, may have affected mothers' behaviours. Additionally, while

observing feeding practices provides distinct information from that obtained by parent-report, it is not without bias. For example, it is possible that recording dyads altered their behaviour. Finally, the study was cross-sectional in design. Therefore, we were unable to identify how the diverse approaches to restriction observed impacted children's eating and weight.

Objective assessment of child feeding practices in standardized settings that elicit restrictive feeding offers an important opportunity to advance the foundational work of Birch and colleagues. The current study extends prior research using objective assessment methods and identified new nuances in *how* mothers restrict their children's eating, which may be as important as the extent to which they restrict. Continued research is needed to understand which, if any, of the approaches to restriction identified in this study can moderate children's eating in the moment of the feeding encounter and long-term, without promoting food or weight concerns. This knowledge is essential for developing detailed and relevant clinical guidance for parents in our current obesogenic food environment.

CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

ORCID

Katherine W. Bauer https://orcid.org/0000-0003-3512-3994
Heidi M. Weeks https://orcid.org/0000-0003-3467-7987
Julie C. Lumeng https://orcid.org/0000-0002-7898-8210
Alison L. Miller https://orcid.org/0000-0002-9866-0204

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