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Approaches to restrictive feeding: Associations with child weight and eating behavior

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ABSTRACT

Background: Identifying differences in how mothers communicate restriction of their children's eating may be important to understanding the effects of restriction on children's intake and weight status.
Objectives: To characterize mothers' restrictive statements by affect and directness, and examine cross-sectional associations between restrictive statement types and children's body mass index and eating behaviors.
Methods: Mother-child dyads (N = 223, mean child age 5.9 years) participated in a structured eating task. A coding scheme reliably characterized mothers' restrictive statements. Mothers completed measures of child enjoyment of food, food responsiveness, and satiety responsiveness, and child anthropometrics were measured. Poisson regression was used to test associations between type of restrictive statements and child BMI z-score (BMIz) and eating behaviors, adjusting for covariates.
Results: Higher child BMIz was associated with mothers' more frequent use of negative direct restrictive statements, but not other types of statements. This association was stronger among girls (RR (95% CI) = 2.28 (1.45–3.59)) than boys (RR (95% CI) = 1.49 (1.05–2.10)). Among girls, but not boys, higher enjoyment of food and lower satiety responsiveness were associated with more frequent positive direct restrictive statements (RR (95% CI) = 1.63 (1.20–2.21) and RR (95% CI) = 1.94 (1.29–2.92), respectively). For both sexes, mothers' use of positive indirect restrictive statements was more frequent among children with higher enjoyment of food (RR (95% CI) = 1.38 (1.11–1.72).
Conclusions: The statements mothers use to restrict their children's eating vary in affect and directness. Child characteristics, such as sex, BMI, and the presence of specific eating behaviors, are associated with differing approaches to restriction by mothers.

1. Introduction

Parents' use of restrictive feeding practices, and the potential impact of restrictive feeding on child eating and obesity, has received significant attention (Faith, Scanlon, Birch, Francis, & Sherry, 2004; Rollins, Savage, Fisher, & Birch, 2016). Early evidence suggested that restrictive feeding overrides children's internal satiety signals and increases desire for forbidden foods (Birch & Fisher, 1998). This work informed current obesity prevention and treatment guidelines that encourage parents to avoid overly-restrictive feeding practices and avoid restricting access to specific foods (Barlow & Expert, 2007; Gidding et al., 2006). However, longitudinal studies investigating the associations between restrictive feeding, child eating behaviors, and child weight are inconclusive. Some studies have found that maternal

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restriction predicts increases disinhibited eating among children, increasing risk for obesity (Birch, Fisher, & Davison, 2003), while others have found no prospective associations between restriction and children's disinhibited eating (Bauer et al., 2017; Matton, Goossens, Braet, & Van Durme, 2013). Furthermore, parental restriction has been associated with increases in child body mass index (BMI) in some studies (Faith et al., 2004), but others have observed no associations between restrictive feeding and children's BMI change (Campbell et al., 2010; Gubbels et al., 2011; Webber, Hill, Cooke, Carnell, & Wardle, 2010).

One reason that existing research on the potential impacts of restrictive feeding is inconclusive may be that in nearly all prior studies, restriction has been operationalized as a homogenous practice. It has rarely been considered that there may be important differences in how individual parents or sub-populations of parents communicate restriction, and that these differences have differential impacts on child eating and weight. Nearly all prior studies of restrictive feeding have used the restriction subscale of the Child Feeding Questionnaire (CFQ) (Birch et al., 2001), or minor adaptations, to measure restriction. The CFQ restriction subscale provides a summary score indicating the extent to which parents endorse attitudes and practices regarding restricting their children's eating. This measure does not capture how restriction is communicated or implemented.

Affect and directness are two important components of parent-child communication. Affect refers to the degree of warmth and empathy communicated in statements (Pesch, Miller, Appugliese, Rosenblum, & Lumeng, 2016), while directness refers to the extent to which a statement specifically addresses the others' behavior versus a more abstract statement about the value of a behavior (Pesch, Miller, Appugliese, Rosenblum, & Lumeng, 2018). For example, a direct statement by parents to children would be, “Put on your shoes” while an indirect statement would be, “It's important that we wear shoes outside.” Statements that are affectively positive and direct best align with an authoritative parenting style (Baumrind, 1971) in which parents clearly communicate rules and boundaries in a manner that is sensitive and responsive to children's emotions. Consistent associations have been observed between parents' authoritative parenting style, and authoritative feeding style, and lower risk of obesity among children (Hubbs-Tait, Kennedy, Page, Topham, & Harrist, 2008; Patrick, Nicklas, Hughes, & Morales, 2005). Understanding the extent to which parent-child communications around limiting their child's intake of unhealthy foods reflect the dimensions of authoritative parenting, and how parent communications that vary in affect and directness may differentially impact children's eating and weight, can support the development of more specific guidance to parents regarding effective approaches to moderate their children's eating.

Prior work by the study team has separately examined the affect and directness of mothers' restrictive feeding statements (Pesch et al., 2016; Pesch, Miller, et al., 2018). This research identified that mothers of children with obesity used more negative restrictive statements and more direct restrictive statements than mothers of children without obesity (Pesch et al., 2016; Pesch, Miller, et al., 2018). However, these analyses did not consider the combination of affect and directness together despite literature suggesting differences in child compliance in response to parental statements that are warm versus harsh, and direct versus indirect (Kuczynski, Kochanska, Radke-Yarrow, & Girnius-Brown, 1987; Owen, Slep, & Heyman, 2012; Wilson & Wood, 2004). These findings, along with the team's work among a small sample of parents providing preliminary evidence of the feasibility of characterizing restrictive statements by affect and directness (Pesch et al., 2018), support the assertion that looking beyond whether mothers endorse beliefs and practices with regard to restriction, to the qualities of their restrictive statements, may yield important insight into harmful versus effective approaches to limit children's intake. Given this knowledge, it is critical to understand parents' use of statements that vary on dimensions of affect and directness in order to ultimately identify how these approaches to moderating children's eating may impact children's eating cognitions and behaviors.

Differences in how parents interact with their children around moderating their intake of unhealthy foods may also exist by child sex. It has been hypothesized that parents perceive certain eating behaviors as more problematic in their female children given greater societal pressures towards thinness in girls versus boys, and therefore may be more prone to monitor and restrict their daughters' intake (Fisher & Birch, 1999). However, to date, empirical research is inconclusive. At least one study has found that parents are more likely to engage in restrictive feeding with their daughters than sons (Costanzo & Woody, 1984), while other studies have not observed differences in parental restriction by child sex (Gray, Janicke, Wistedt, & Dumont-Driscoll, 2010; Spruijt-Metz, Lindquist, Birch, Fisher, & Goran, 2002; Wardle, Carnell, & Cooke, 2005). None of these studies have examined differences in how parents communicate restriction.

Given these gaps in our understanding regarding the nuances of how mothers communicate restriction to their children, and the extent to which mothers use different communication of restriction by characteristics of their children (e.g., sex, weight status, and eating behavior), the first objective of the current study is to characterize mothers' restrictive statements during a recorded, standardized eating protocol on dimensions of both affect and directness simultaneously. This approach allows for distinction between four types of statements: positive direct, positive indirect, negative direct, and negative indirect. The second objective is to examine cross-sectional associations between mothers' use of the four types of restrictive statements, child BMI z-score (BMIz), and child eating behaviors that have been associated with increased risk of obesity (Carnell & Wardle, 2007) including within this cohort (Domoff, Miller, Kaciroti, & Lumeng, 2015), as well as the extent to which these associations vary by child sex. By identifying how mothers' restrictive statements differ with respect to both affect and directness, and how mothers differentially use these types of restrictive statements in the presence of different child characteristics, this study will progress our understanding of the nuance in maternal restrictive feeding practices.

2. Materials and methods

2.1. Participants

Participants in the current study were a sample of 223 low-income mother-child dyads (mean child age 5.9 years, range 4.0–8.1 years) from southern Michigan. Participants were part of a longitudinal cohort, originally recruited between 2009 and 2011 through their child's Head Start program (a free, federally subsidized preschool program for children living in poverty). Data from the current study were obtained from the second large study to be conducted with this cohort, 2 years after the cohort was recruited, which aimed to understand maternal feeding practices. Of the 380 dyads from the original cohort, 296 participated in this second study. Of the 296 mothers participating in the second study, 95% were biological mothers. The remaining 5% were grandmothers, adoptive mothers, and stepmothers.

Children recruited into the original cohort must not have been born prior to 35 weeks gestation and could not have had significant perinatal or neonatal complications, serious medical problems or food allergies, exhibited disordered eating, or have been in foster care at time of recruitment. Dyads were also excluded if the mother did not speak English fluently or if she reported that she had completed a bachelor's degree. Additional exclusion criteria for the current study included if the mother had a food allergy or if the child had developed a new food allergy since the time of recruitment. The University of Michigan Institutional Review Board approved the study, mothers provided written informed consent and were compensated $60 for their participation in the data collection process for the current study.

The sample for this analysis was limited to dyads with complete demographic, anthropometric, and relevant questionnaire data, and

completion of the Structured Eating Protocol (SEP) (described below). Among the 296 possible dyads, 49 were excluded from participating in the SEP due to a new food allergy for the child or food allergy of the mother. An additional 3 dyads were not able to complete the SEP due to scheduling. Of the 244 who completed the SEP, dyads were excluded from this analysis for the following reasons: missing maternal BMI (N = 3), missing questionnaire data (N = 14), child becoming ill during the protocol (N = 1), mother speaking a language other than English during the SEP (N = 1), and the video being uncodable due to noise or video recording malfunction (N = 2). This resulted in a sample of 223 dyads for this analysis. There were no differences in the sample of 223 as compared to the entire cohort with regard to child sex, child BMIz, maternal age, maternal education, or maternal BMI.

2.2. Measures

2.2.1. Maternal restrictive statements

Maternal restriction of child food intake was assessed through mothers' behavior during the SEP, a standardized, structured eating protocol that has been described in detail elsewhere (Goulding et al., 2014; Pesch, Miller, et al., 2018; Radesky et al., 2014). This protocol examines mothers' and children's responses to different types of foods in a laboratory setting. During the protocol, the mother and child were sequentially presented with individualized portions of four standardized, familiar and unfamiliar foods (chocolate cupcakes, green beans, halva (a Middle Eastern sesame paste dessert), and artichokes) by a research assistant. Mother and child were seated at a table alone in a quiet room and were videotaped throughout. After presentation of each food, the mother and child were invited to try the food if they wanted and left alone for 4 min. This study focused only on the videotaped segment of the protocol during which the mother and child were presented with chocolate cupcakes. The mother and child were each served two cupcakes (Hostess Chocolate Cupcakes, 104.96 ± 0.5 g). It was hypothesized that this palatable and familiar dessert, served in a large portion size, would elicit restrictive statements from mothers.

A coding scheme (Table 1) was developed to reliably categorize mothers' restrictive statements on two dimensions: affect (positive vs. negative) and directness (direct vs. indirect). Each restrictive statement was simultaneously coded for affect and directness in the same pass, with coders categorizing each statement into one of the four types of restrictive statements: positive direct, positive indirect, negative direct, and negative indirect. A restrictive statement was defined as an utterance, comment, or question made by the mother that pertains to restricting, limiting, or discouraging the child's intake.

Two raters independently coded 20% of the video segments using the established coding scheme, with coders first identifying a restrictive statement and then categorizing it within one of the four statement restrictive statement types based on affect and directness. Cohen's kappa exceeded 0.70 for all codes. Once reliability was established, the remainder of the videos were coded. Counts of each restrictive statement type were summed across each video segment to indicate how often each mother used each of the 4 types of restrictive statements.

2.2.2. Child eating behavior

Mother-reported child eating behavior was measured using the Children's Eating Behavior Questionnaire (CEBQ) (Wardle, Guthrie, Sanderson, & Rapoport, 2001), a reliable and valid (Domoff et al., 2015) 35-item instrument consisting of eight subscales of children's eating behaviors. Three subscales most relevant to children's risk of developing obesity (Carnell & Wardle, 2007) were examined: food enjoyment, which assesses a mother's perception of her child's desire to eat and enjoyment of food (4 items, Cronbach's $\alpha = 0.80$); food responsiveness, which assesses a mother's perception of her child's perceived (5 items, Cronbach's $\alpha = 0.78$); and satiety responsiveness, which assesses a mother's perception of her child's attention to internal cues of fullness (5 items, Cronbach's $\alpha = 0.73$). For all subscales, mothers rated their child's eating behaviors on five-point Likert scales ranging from "Never" to "Always", with higher scores indicating more endorsement of the eating behavior. For consistency of interpretation between the subscales, the satiety responsiveness subscale was reverse coded so higher scores indicate lower satiety responsiveness (a risk factor for obesity). A score for each subscale was created by taking the mean of all contributing items.

2.2.3. Child BMI z-score (BMIz)

Children's heights and weights were measured according to standardized procedures (Shorr, 1986). BMI was calculated as weight in kilograms divided by height in meters squared. BMIz for age and sex were calculated for all children based on the United States Center for Disease Control and Prevention growth charts (Kuczmarski et al., 2000).

2.2.4. Covariates

Mothers reported their own age, race/ethnicity, and education level, as well as child age and sex. Heights and weights of mothers were measured according to standardized procedures and mothers' BMI were calculated as weight in kilograms divided by height in meters squared.

2.3. Statistical analysis

Univariate statistics were first calculated to examine the frequency, distribution, and range of key variables of interest among the total sample and for boys and girls separately. Pearson correlations were calculated to examine the associations between child BMIz and eating

Table 1
Coding conceptualization and examples of restrictive statements by affect and directness.

		Affect	
		Positive Statements with caring, warmth, or kindness in their content and tone of voice. May range from straightforward (neutral) to more actively positive or affectionate.	Negative Statements that are harsh, critical, barbed, or unkind in content and tone of voice, including use of hostility, belittling, shaming, or harsh sarcasm.
Directness	Direct Utterances directed to the child about limiting their food intake including use of the second person singular ("you"), however could also be directive commands.	Positive direct "Honey, only eat one cupcake." "You need to stop eating now, that's enough."	Negative direct "Stop eating, you pig!" "Quit shoving those in your mouth, that's disgusting"
	Indirect Utterances that are indirect or non-imperative, but convey an effort to limit the child's intake, including statements about the mother's role modeling of self-control or negative comments about the cupcakes.	Positive indirect "One (cupcake) is enough for me." "Cupcakes are not good for us." "I'm going to stop after this one, that's enough sugar for me."	Negative indirect "This is why I'm fat! Cupcakes and candy ruin my diet!" "We are so gross, pigging out like this!"

behaviors, and Spearman correlations were calculated to examine associations between mothers' use of each type of restrictive statement. To examine the potential for interactions by child sex, separate Poisson regression models were developed with counts of each type of restrictive statement as the dependent variable and child characteristics (BMIz food enjoyment, food responsiveness, and satiety responsiveness) as the independent variables, adjusted for child age, maternal race/ethnicity (white non-Hispanic vs. other race/ethnicity), maternal education level (mother earned a high school diploma or less vs. more than a high school diploma), and child sex, and including an interaction term for the child characteristic * child sex. Models including eating behaviors were additionally adjusted for child BMIz. In cases where there was no evidence of interaction by child sex (p-value for interaction term ≥ .05), associations between child characteristics and types of restrictive statements were examined for boys and girls together using individual Poisson regression models as described above excluding the interaction term. Sex-stratified associations were examined when there was evidence of differences by child sex (p-value for interaction term < .05).

3. Results

Characteristics of the sample are presented in Table 2. The majority of children had an underweight or normal weight status, 20% had an overweight weight status, and 20% had an obese weight status. Of the mothers, the average BMI was in the obese weight status range. The majority of mothers identified as White non-Hispanic race/ethnicity.

Correlations between child BMIz, enjoyment of food, food responsiveness, and low satiety responsiveness are presented in Table 3. BMIz was moderately, positively correlated with all of the eating behaviors.

Correlations between the types of restrictive statements are presented in Table 4. Mothers who made positive direct statements were also more likely to make positive indirect statements. A correlation was also observed between mothers' use of positive direct statements and negative direct statements, and use of negative direct and negative indirect statements were correlated.

Three associations between child characteristics and mothers' restrictive statements types differed by child sex at the threshold of p < .05 (Table 5). Sex-stratified findings are therefore presented for these associations.

Table 2
Participant characteristics, N = 223.

	Total N = 223	Boys n = 117	Girls n = 106
Child characteristics			
Age (years); mean (SD)	5.92 (0.70)	5.96 (0.72)	5.88 (0.67)
BMI z-score; mean (SD)	0.81 (1.0)	0.75 (0.99)	0.88 (1.06)
Child weight status			
Normal weight/underweight; n (%)	134 (60.09)	76 (64.96)	58 (54.72)
Overweight; n (%)	44 (19.73)	20 (17.09)	24 (22.64)
Obese; n (%)	45 (20.18)	21 (17.95)	24 (22.64)
Mother characteristics			
Age (years); mean (SD)	31.30 (7.23)	32.18 (7.64)	30.33 (6.65)
Mother BMI; mean (SD)	33.13 (9.54)	31.64 (8.86)	34.77 (10.02)
Mother race/ethnicity			
White non-Hispanic; n (%)	162 (72.65)	86 (73.50)	76 (71.70)
Black non-Hispanic; n (%)	28 (12.56)	14 (11.97)	14 (13.21)
Hispanic, any race; n (%)	17 (7.62)	7 (5.98)	10 (9.43)
Other race/ethnicity; n (%)	16 (7.17)	10 (8.55)	6 (5.66)
Highest level of education achieved			
High school diploma or less; n (%)	110 (49.33)	56 (47.86)	54 (50.94)
> High school diploma; n (%)	113 (50.67)	61 (52.14)	52 (49.06)

SD signifies standard deviation, BMI signifies body mass index.

Table 3
Pearson correlations between child BMI z-score and eating behaviors, N = 223.

	1	2	3	4
1. BMI z-score	1.00			
2. Enjoyment of food	0.22**	1.00		
3. Food responsiveness	0.29**	0.52**	1.00	
4. Low satiety responsiveness	0.26**	0.48**	0.23**	1.00

** p < .01.

Table 4
Spearman correlations between types of restrictive statements, N = 223.

	1	2	3	4
1. Positive direct	1.00			
2. Positive indirect	0.17*	1.00		
3. Negative direct	0.22**	−0.02	1.00	
4. Negative indirect	−0.08	0.01	0.17*	1.00

* p < .05.
** p < .01.

Overall, mothers most frequently used positive direct statements, followed by positive indirect statements, then negative direct statements, and finally negative indirect statements (Table 6). Among both boys and girls, mothers more frequently used negative direct restrictive statements among children of higher BMIz. However, the positive association between child BMIz and mothers' use of negative direct restrictive statements was stronger among girls than among boys. Mothers' use of the other types of restrictive statements did not vary by child BMIz.

Among girls, mothers were more likely to use positive directive statements with girls who demonstrated higher enjoyment of food and lower satiety responsiveness, even after accounting for children's BMIz. No associations between mothers' use of positive direct restrictive statements and eating behaviors were observed among boys. For both boys and girls, greater child enjoyment of food was associated with mothers' more frequent use of positive indirect restrictive statements. Neither mothers' use of negative direct nor negative indirect restrictive statements varied by child eating behaviors.

4. Discussion

The purpose of this study was to characterize restrictive feeding statements used by mothers with their young children during a structured eating protocol simultaneously on dimensions of affect and directness, and to examine how children's BMIz and eating behaviors were associated with use of these distinct types of restrictive statements, with the potential for differential relationships by child sex. During the 4-minute SEP, restrictive statements were common, with positive direct restrictive statements such as, “Sweetie, don't eat that second cupcake” the most frequent type of statement made. This type of statement most closely reflects an authoritative parenting style, where parent expectations of child behavior are clearly communicated but demonstrate high warmth and empathy. Negative indirect statements were least commonly used and of low frequency. Some differences in the associations between mothers' use of specific types of restrictive statements and child characteristics were observed by child sex. In all cases where differences by child sex were observed, the relationships between children's weight or eating behavior and mothers' the frequency of mothers' statements were stronger among girls than boys.

For both boys and girls, mothers of children with higher BMIz more frequently used negative direct restrictive statements. For boys, each higher BMIz unit was associated with 49% more frequent use of negative direct statements. Meanwhile among girls, each higher BMIz unit was associated 128% more frequent use of negative direct statements.

Table 5
Interaction term estimates and corresponding p-values for child characteristic by child sex predicting type of maternal restrictive statements.

	Positive direct		Positive indirect		Negative direct		Negative indirect	
	Estimate	p	Estimate	p	Estimate	p	Estimate	p
BMI z-score * sex	0.17	.20	0.16	.25	−0.60	.02	−1.30	.10
Enjoyment of food * sex	−0.41	.04	−0.36	.10	−0.09	.80	0.59	.52
Food responsiveness * sex	0.07	.64	−0.16	.34	−0.50	.06	−0.54	.47
Low satiety responsiveness * sex	−0.61	.01	−0.41	.09	0.14	.72	−0.84	.49

BMI signifies body mass index.

Table 6
Associations between body mass index z-score, eating behaviors, and maternal restriction types, N = 223.

	Restriction type			
	Positive direct	Positive indirect	Negative direct	Negative indirect
Mean ± SD, median, range	1.04 ± 1.41, 1.00, 0–7	0.85 ± 1.14, 0.00, 0–6	0.34 ± 0.97, 0.00, 0–7	0.07 ± 0.28, 0.00, 0–2
	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
BMI z-score	1.20 (1.05–1.37)	0.92 (0.80–1.06)	Boys: 1.49 (1.05–2.10)*	1.09 (0.63, 1.90)
			Girls: 2.28 (1.45–3.59)**	
Enjoyment of food	Boys: 1.02 (0.78–1.33)	1.38 (1.11–1.72)**	0.80 (0.58–1.12)	0.61 (0.30–1.24)
	Girls: 1.63 (1.20–2.21)**			
Food responsiveness	1.06 (0.91–1.24)	1.19 (1.00–1.41)	1.03 (0.80–1.34)	1.03 (0.58–1.84)
Low satiety responsiveness	Boys: 1.09 (0.81–1.49)	1.47 (1.00–2.17)	0.82 (0.56–1.22)	0.44 (0.19–1.02)
	Girls: 1.94 (1.29–2.92)**			

SD signifies standard deviation, CI signifies confidence interval, RR signifies relative rate, BMI signifies body mass index.
Models adjusted for maternal race/ethnicity, maternal education level, child age. Models with eating behaviors as independent variables additionally adjusted for child BMI z-score.
* $p < .05$.
** $p < .01$.

This large relative difference in frequency of use of negative direct restrictive statements towards girls with higher BMIz may be influenced by several factors. Prior work has shown that mothers are more likely to perceive their daughters, versus sons, to have overweight at a given BMI and are more concerned about overweight in their female versus male children, perhaps in part due to prominent Western standards of beauty and thinness for women (Maynard, Galuska, Blanck, & Serdula, 2003). Similarly, women are more likely to be the target of weight bias and stigma, even at lower relative weights than men (Puhl, Andreyeva, & Brownell, 2008). This concern, social pressure, and weight bias against girls and women of higher BMIs may be driving mothers of girls with higher BMIz to be more frequent and forceful in their restriction than mothers of boys. However, despite mothers' motivation, there is evidence to suggest these negative direct statements about restricting eating may lead to excess weight gain and disordered eating (Neumark-Sztainer et al., 2010). Given consistent evidence that weight teasing and body shaming are counterproductive to helping children moderate their weight, and may promote disordered eating behaviors (Neumark-Sztainer et al., 2010), it may be important to identify ways that mothers can talk with their children, particularly daughters, about healthy eating habits without relying on harsh or demeaning sentiments.

Unlike BMI, the presence of specific eating behaviors among children, and particularly girls' eating behaviors, were associated with a greater frequency of mothers making positive direct and positive indirect restrictive statements. Mothers' more frequent use of positive, but not negative, restrictive statements in the presence of these eating behaviors may reflect that these eating behaviors concern mothers, but may not prompt as great of concern or be perceived as as great of a threat as higher BMI, and therefore they may not elicit as much negative affect among mothers. Greater stigma around overeating in females than males (Schvey, Puhl, & Brownell, 2011) may contribute to parents being concerned about their children's eating and limiting their daughters' eating in particular. Mothers of girls with higher food enjoyment and lower satiety responsiveness more frequently made more positive direct restrictive statements during the SEP than mothers of daughters lower on these characteristics. These findings support prior research demonstrating greater restrictive feeding as measured the CFQ directed towards children with higher food enjoyment and lower satiety responsiveness (Jansen et al., 2012; Webber, Cooke, Hill, & Wardle, 2010). Our study expands on this prior work by providing a nuanced view of this restriction, demonstrating the importance of distinguishing restriction by affect and directness. Specifically, greater enjoyment of food and lower satiety responsiveness were only associated with mothers' use of positive restrictive statements, not negative restrictive statements.

This study has many strengths, but also limitations. Its cross-sectional design does not allow for examination of the temporal relationships between restrictive feeding statements, child eating behavior, and child BMIz. Further, children's eating behaviors were assessed through maternal report. While the CEBQ is widely-used and demonstrates strong psychometric properties (Domoff et al., 2015; Wardle et al., 2001), it may be subject to social desirability. Mothers who are bothered by their children's eating may report more extreme child eating behaviors, potentially inflating the associations between restrictive statements and children's eating behaviors. Finally, the SEP captured a time-limited and highly-specific eating interaction between mothers and children. Results may not be generalizable to eating interactions in other settings or populations other than low-income mothers from Michigan without a bachelor's degree.

5. Conclusions

This study demonstrates that mothers' restrictive statements can be reliably, simultaneously categorized in the domains of affect and directness. These dimensions reflect those used to characterize parenting more generally and may be an informative approach to characterizing mother/child communication around eating. The diversity in mothers' communication of food restriction evident in the current study is not

captured by any existing measures of restrictive feeding (Birch et al., 2001) and the associations observed between specific child characteristics and distinct maternal approaches to limiting children's eating suggest that different children may elicit differing affect and directness in communication with the goal of restriction by their mothers. Future prospective research that builds upon this nuanced conceptualization of restrictive feeding may contribute to a better understanding of the consequences of varying approaches parents use to communicate restriction on children's dietary quality, eating behavior, and weight trajectories.

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