Appetite 117 (2017) 40–50

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Family food talk, child eating behavior, and maternal feeding practices

Elizabeth Roach [a, e], Gail B. Viechnicki [b], Lauren B. Retzloff [a], Pamela Davis-Kean [a, c, d], Julie C. Lumeng [a, e, f], Alison L. Miller [a, g, *]

[a] Center for Human Growth and Development, University of Michigan, USA
[b] Independent Linguistic Consultant, Silver Spring, MD, USA
[c] Institute for Social Research, University of Michigan, USA
[d] Department of Psychology, University of Michigan, USA
[e] Department of Nutritional Sciences, University of Michigan School of Public Health, USA
[f] Department of Pediatrics, University of Michigan Medical School, USA
[g] Department of Health Behavior and Health Education, University of Michigan School of Public Health, USA

ARTICLE INFO

Article history:
Received 3 October 2016
Received in revised form
28 March 2017
Accepted 2 June 2017
Available online 3 June 2017

Keywords:
Family
Language
Child eating
Naturalistic methods
Maternal feeding practices
Child weight

ABSTRACT

Families discuss food and eating in many ways that may shape child eating habits. Researchers studying how families talk about food have examined this process during meals. Little work has examined parent-child food-related interactions outside of mealtime. We assessed family food talk at home outside of mealtime and tested whether food talk was associated with obesogenic child eating behaviors, maternal feeding practices, or child weight. Preschool and school-aged mother-child dyads ($n = 61$) participated in naturalistic voice recording using a LENA (Language ENvironment Analysis) recorder. A coding scheme was developed to reliably characterize different types of food talk from LENA transcripts. Mothers completed the Children's Eating Behavior Questionnaire (CEBQ) and Child Feeding Questionnaire (CFQ) to assess child eating behaviors and maternal feeding practices. Child weight and height were measured and body mass index z-score (BMIz) calculated. Bivariate associations among food talk types, as a proportion of total speech, were examined and multivariate regression models used to test associations between food talk and child eating behaviors, maternal feeding practices, and child BMIz. Proportion of child Overall Food Talk and Food Explanations were positively associated with CEBQ Food Responsiveness and Enjoyment of Food (p's < 0.05). Child food Desire/Need and child Prep/Planning talk were positively associated with CEBQ Enjoyment of Food ($p < 0.05$). Child Food Enjoyment talk and mother Overt Restriction talk were positively associated with CEBQ Emotional Over-Eating ($p < 0.05$). Mother Monitoring talk was positively associated with CFQ Restriction ($p < 0.05$). Mother Prep/Planning talk was negatively associated with child BMIz. Food talk outside of mealtimes related to child obesogenic eating behaviors and feeding practices in expected ways; examining food talk outside of meals is a novel way to consider feeding practices and child eating behavior.

1. Introduction

Childhood obesity is prevalent in the United States and tracks across childhood and through adulthood (Cunningham, Kramer, & Narayan, 2014; Nader et al., 2006). Parents are critical in efforts to prevent obesity (Faith, Scanlon, Birch, Francis, & Sherry, 2004) from early in development (Campbell et al., 2013). Much of what we know about maternal feeding practices comes from self-reported feeding behaviors (Birch et al., 2001; Rodgers et al., 2013) or from observational studies of behavioral interactions during mealtimes (Czaja, Hartmann, Rief, & Hilbert, 2011; Hilbert, Tuschen-Caffier, & Czaja, 2010; Kong et al., 2013; Moens, Braet, & Vandewalle, 2013). Few studies have examined how parents and children talk about food in naturalistic contexts, which may be important in shaping child eating behavior (Wiggins, 2004). We also know little about how such naturalistic interactions around food relate to the self-

Abbreviations: BMI, body mass index; BMIz, body mass index z-score; CEBQ, Child Eating Behavior Questionnaire; CFQ, Child Feeding Questionnaire; LENA, Language Environment Analysis.

* Corresponding author. Associate Research Scientist, Center for Human Growth and Development, University of Michigan, 300 North Ingalls Street, 1023NW, Ann Arbor, MI 48109-0406, USA.
E-mail address: alimill@umich.edu (A.L. Miller).

http://dx.doi.org/10.1016/j.appet.2017.06.001
0195-6663/

report measures of maternal feeding and/or child eating that are hypothesized to associate to obesity risk (Domoff, Miller, Kaciroti, & Lumeng, 2015; Faith et al., 2004). Furthermore, despite the decrease in regular mealtimes (Nicklas et al., 2004) and increased snacking among children and adults (Jahns, Siega-Riz, & Popkin, 2001; Piernas & Popkin, 2010), research on how parents and children interact around food outside of meals has been limited.

Frequent family mealtimes are promoted as an obesity prevention strategy, and parent-child feeding interactions during meals are the focus of significant research efforts (Fiese, Hammons, & Grigsby-Toussaint, 2012; Hammons & Fiese, 2011). Yet, findings are not always consistent (Rollins, Belue, & Francis, 2010; Valdes, Rodriguez-Artalejo, Aguilar, Jaen-Casquero, & Royo-Bordonada, 2013). One reason for the inconsistent findings may be that a substantial proportion of parent-child interactions around food occur outside the mealtime context and have historically been unmeasured. A proposed mechanism for the role of frequent family meals in lowered risk for obesity is a reduction in between-meal snacking, for example, yet we know little about food-related interactions outside of mealtimes (Martin-Biggers et al., 2014). Eating outside of mealtimes has increased in recent years (Gilbert, Miller, Olson, & St-Pierre, 2012; Ziegler, Hanson, Ponza, Novak, & Hendricks, 2006) and is proposed as a substantial contributor to excessive child weight gain (Larson & Story, 2013). Child snacking has been shown to be most prevalent during the afternoon (Wang, van der Horst, Jacquier, & Eldridge, 2016), and also to be associated with increased intake of food high in solid fats and added sugars (Davison et al., 2015). As well, parents have reported challenges in managing child snacking behavior and responding to requests for snacks outside of meals (Davison et al., 2015; Norman, Berlin, Sundblom, Elinder, & Nyberg, 2015). Understanding how parents and children talk about food outside of mealtimes (e.g., during after school hours when snacking requests may occur) may therefore be important in developing guidelines for how to manage this phenomenon and represents an important context in which to identify feeding and eating behavior patterns that may increase childhood obesity risk (Larson & Story, 2013).

There is a large literature on feeding practices, or the specific behaviors and strategies that parents use to influence child eating behavior (Hughes et al., 2013; Webber, Cooke, Hill, & Wardle, 2010). Parents' feeding practices as measured by the Child Feeding Questionnaire (CFQ) have been shown to relate to children's observed food preferences, dietary intake patterns, as well as weight status, but findings are not always consistent (Birch et al., 2001). For example, some studies find that restricting children's consumption of foods leads to an enhanced liking of restricted foods and increased intake, as well as higher weight status (Faith et al., 2004; Francis, Hofer, & Birch, 2001), others find that an indulgent feeding style relates to higher child weight status (Hughes, Shewchuk, Baskin, Nicklas, & Qu, 2008), and still others find no association (Powers, Chamberlin, van Schaick, Sherman, & Whitaker, 2006). One factor that contributes to these inconsistencies is the reliance on self-reported data to assess feeding practices, which may lead to response bias (Baranowski et al., 2013; Hughes et al., 2013). Moreover, many frequently-used parent-report measures require parents to reflect on their feeding practices broadly, but do not address feeding in contexts other than mealtime. Learning whether parent-child interactions around food outside of mealtimes relate to self-reported feeding practices would provide a more nuanced and comprehensive understanding of these frequently-used self-report measures. Studies that have observed maternal feeding practices specifically during mealtimes have found positive associations between observed encouraging feeding behaviors, such as food as a reward or praise, and child eating compliance (Haycraft & Blissett, 2008; Orrell-Valente et al., 2007). Naturalistic, observational assessment of parent-child interactions outside of mealtime has been recommended in order to inform prior findings from observational mealtime research, as it is not clear whether food parenting behaviors are similar across all settings (Boots, Tiggemann, & Corsini, 2016; Hughes et al., 2013).

In addition to direct feeding practices, two primary mechanisms by which parent-child interactions around food outside of mealtime may relate to child eating behaviors and weight are parent modeling and meal planning routines (Fiese et al., 2012; Hughes et al., 2013; Martin-Biggers et al., 2014). Parent modeling of eating has consistently been shown to relate to child eating behaviors, including food intake and attitudes toward food (Brown & Ogden, 2004; Patrick & Nicklas, 2005; Vaughn, Tabak, Bryant, & Ward, 2013). Routines and meal planning have also been highlighted as important for obesity prevention (Fiese et al., 2012), and aspects of these activities can take place outside of mealtime. Yet, the processes that shape how families engage in these behaviors are not clear. Determining to what degree modeling of eating behavior or mealtime planning occur naturalistically outside of the mealtime context is important because this may inform how best to encourage such behaviors in order to promote healthier eating habits and inform family-based obesity prevention efforts.

Finally, child eating behavior, or a child's general approach to food and eating, also plays an important role in the pathway to obesity risk. Parent reports of child eating behavior have been consistently associated with child weight in many studies (Domoff et al., 2015). The child eating behaviors that are most commonly associated with higher child weight are food responsiveness, enjoyment of food, and emotional overeating, whereas desire to drink, satiety responsiveness, slowness in eating, emotional undereating, and food fussiness are either not associated with overweight or are inversely associated (Domoff et al., 2015; Syrad, Johnson, Wardle, & Llewellyn, 2016). Understanding whether the way that parents and children talk about food relates to such child eating behaviors may have unique relevance for understanding childhood obesity risk and for helping parents manage such behaviors in their children.

The goal of the current study was to assess how parents and children talk about food outside of mealtimes in relation to parent-reported feeding practices, parent-reported child eating behaviors, and child weight. We used an enhanced digital recording approach (the Language ENvironment Analysis System; LENA Research Foundation, Boulder, CO) to characterize food talk outside of mealtime as it occurred in naturalistic home settings. We examined associations between different types of “digitally observed” food talk and parent-reported feeding practices and child eating behaviors that are known to associate with child weight. Specifically, based on a corpus of approximately 60 h of audio-recorded conversations with families of children in the preschool-age (3–5 years) or school-age (10–12 years) range, we addressed four aims. First, we documented the nature of parent and child food talk outside of the mealtime context. Second, we tested whether parent and child food talk outside of mealtime was associated with parent-reported feeding practices. Third, we examined whether food talk outside of mealtime was associated with parent-reported child eating behaviors. Finally, we tested whether food talk outside of mealtimes was associated with child weight (BMI z-score). We hypothesized that more overall food talk (as a proportion of total speech) would be positively associated with greater endorsement of feeding and child eating behaviors known to associate with child overweight/obesity. Although we did not have specific hypotheses for every food talk type that was coded, we did hypothesize that child food talk indicating enjoyment or requests for food would positively associate with greater mother-reported CEBQ Enjoyment, Food Responsiveness, and Emotional Overeating, and

negatively associate with CEBQ Satiety Responsiveness.

2. Materials and methods

2.1. Participants and recruitment

Families with a preschool- or school-aged child were recruited into the Healthy Families study from the community (1-h radius from Ann Arbor, Michigan) through a university-affiliated clinical research website, and flyers in community sites and pediatric primary care clinics. Interested families contacted the research team to complete a phone screening to determine eligibility. Inclusion criteria for the Healthy Families study, which was focused on specific developmental periods, were that children were between the ages of 3.0–5.99 years (preschool), or 10.0–12.99 years old (school age), were not outside of the parents' direct care for greater than 15 h per week (preschool age group); at least one biological parent lived in home with child; child lived in only one home at least 5 of 7 days of the week; family spoke English at home most of the time and could speak English only on days of recording; child did not have any major medical problems or developmental delays; child had no significant dietary restrictions that would impact growth or eating; and child was born at gestational age $\geq$ 36 weeks. Caregivers provided written informed consent, children in the school-age group provided written assent, and children in the preschool-age group provided verbal assent. The study was approved by the University of Michigan Institutional Review Board.

2.2. Study design and procedures

The Healthy Families Study was a short-term longitudinal observational study. Participant involvement took place over 6 months in 2014–2015, during which time three visits to the family's home occurred and generated the data for the current study. Trained research assistants administered questionnaires orally to assess demographics, feeding practices, and child eating behaviors. Three days of voice recordings of parent/child conversations using a LENA (Language ENvironment Analysis) recorder were collected (LENA Research Foundation, Boulder, CO). Parents and children were weighed and measured.

2.2.1. LENA data collection

The LENA system uses a 2-ounce digital language processor that can record up to 16 h of the child's language and words spoken to the child by others. The LENA device was snapped into a pocket on the child's shirt, or into a pocket in a band worn around the child's chest. Children wore the LENA device when they arrived home from school until bedtime for a total of three days. Parents were instructed that the child could wear the LENA recorder outside of the house. Parents completed a diary indicating activities they were engaged in throughout the afternoon, and what time they started and completed dinner, in order to determine the general setting for food talk. Upon retrieval from the family, the language processor was connected to a computer, the audio file was downloaded, and specialized software captured the timing of conversational exchanges. Students were trained to transcribe the audio files using a modified Discourse Transcription style, using turn-at-talk as the primary unit of analysis. We transcribed the first hour that the child wore the recorder during the afternoon on the first day of the participant's LENA data collection period in order to capture the afterschool/pre-dinner period, a time of day when snacking is prevalent (Wang et al., 2016) and we posited that families might engage in some food talk. We stopped transcribing if dinner took place during that time in order to focus on food talk outside of mealtime (n = 4 families started dinner within the hour; 3 families had dinner at the end of the hour; 1 family had dinner 17 min after recording started). Recordings began on average at 4:19 p.m. and dinner occurred on average around 6:00 p.m (mean length of recording for the sample was 58 min, 50 s).

2.3. Measures

2.3.1. Family food talk

We used the Atlas. ti 7.5.12 software program to code maternal and child speech in the LENA transcripts. First, an auto-coding feature quantified each type of speech as indicated by speaker notation (MOT, CHILD) in the transcript. This feature also generated total number of utterances ("total speech") for mother and child. Next, a team of coders was trained to identify food talk events to be coded using the family food talk coding system. Food talk was coded if the topic of the utterance had anything to do with food or eating. Our family food talk coding system was developed based on LENA recordings collected in a previous study (Miller, Ellis, & Domoff, 2016) in which we coded the content of food talk events during mealtimes (see Table 1). In the coding system developed for the current study we coded mother references to monitoring of consumption (e.g. restriction, encouragement, monitoring, negotiation, indulging); mother and child references to their own physiological or psychological states regarding food or eating (e.g. enjoyment, desire, refusal); and mother and child references to broader food-related discussion and reflections (e.g. meal preparation, food explanations, eating establishments outside the home, and discussion of mealtime routines). For statements regarding physiological or psychological states, we coded child and mother statements separately (e.g. child refusal, mother enjoyment). For broader food-related discussion and reflections (e.g., meal preparation), we did not code mother and child separately, but later analyzed the data by whether mother or child was the speaker.

The two coders coded 10% of the transcripts in order to assess inter-rater reliability, with intra-class correlation coefficients typically exceeding 0.80. Once reliability was established, the remaining transcripts were coded independently. Coding definitions and reliability statistics are presented in Table 1. Maternal food refusal and maternal and child references to eating establishments outside the home occurred very rarely and are not discussed further. Three sets of variables were created for each remaining food talk code to represent 1) the number of utterances for each food talk type, 2) food talk type as a proportion of total mother or child speech during the recorded hour, and 3) food talk type as a proportion of total number of food talk utterances.

2.3.2. Children's Eating Behavior Questionnaire

The Children's Eating Behavior Questionnaire (CEBQ) is a widely used and validated measure of eating behaviors in children (Wardle, Guthrie, Sanderson, & Rapoport, 2001). The original 35-item measure contains eight subscales: Food Responsiveness, Enjoyment of Food, Emotional Overeating, Desire to Drink, Satiety Responsiveness, Slowness in Eating, Emotional Undereating, and Food Fussiness (Wardle et al., 2001). Participants rated child eating behaviors on a 5-point Likert scale (with 5 indicating more of the eating behavior). We administered four of the CEBQ subscales that have been found to associate with childhood obesity risk in prior studies (Domoff et al., 2015; Wardle et al., 2001): Food Responsiveness, (5 items; preschool Cronbach's α = 0.78, school-aged α = 0.77), Emotional Over-Eating (4 items; preschool α = 0.83, school-aged α = 0.80), Enjoyment of Food (4 items; preschool α = 0.85, school-aged α = 0.85), and Satiety Responsiveness, which is inversely associated (5 items; preschool α = 0.78, school-aged α = 0.78).

Table 1
Food talk codes.

Code	Definition	Example	Reliability (ICC)
Physiological/Psychological States (mother or child)			
Enjoyment	A statement that mom or child likes or enjoys a particular food, brand, or type of food.	MOT: These apples are delicious. CHILD: I love this salsa. It's so good.	**0.86**
Desire/Need	A statement or request that mom or child wishes to have specific foods or that mom or child is generally hungry/thirsty.	MOT: I'm hungry. CHILD: I want a snack.	**0.89**
Food Refusal[a]	A statement that mom or child dislikes, does not want, is full, or does not enjoy a particular food, brand, or type of food.	MOT: Well I don't like them. CHILD: No I don't like blueberries.	**0.92**
Monitoring of Consumption (mother only)			
Indulgence	Parent gives in to child requests, or does not attempt to change eating behavior stated/exhibited by child.	MOT: You know what you can have one that's fine.	**0.71**
Monitoring	A neutral statement that tracks or checks in with what someone else is eating; general inquiry about eating	MOT: What are you eating?	**0.92**
Overt Restriction	A statement clearly and openly restricting or denying what someone might want or be eating or drinking in an attempt to reduce the amount or control what the person consumes	MOT: No you don't need to eat them all.	**0.95**
Overt Encouragement	A statement clearly and openly encouraging what someone might want or be eating or drinking in an attempt to increase the amount or control what the person consumes.	MOT: Eat your food!	**0.80**
Negotiation/Bribe/Reward	A statement that imposes a behavioral contingency on another person. Utterances reflect bargaining with another person to eat more or less, or to eat a particular food.	MOT: I'll give it to you if you eat dinner.	**0.92**
Broader Food Related Discussion & Reflections (mother or child)			
Prep/Planning	References to preparing or planning for a meal, or the helping of food being prepared. This includes serving and clean up tasks in the moment, as well as discussion of meals past, present, and future.	MOT: What would you like for dinner? CHILD: Mom there's garlic toast up here in the freezer.	**0.97**
Food Explanations	Explanation about a food in terms of the actual food itself or the preparation of the food.	MOT: Baking. Food. A lot of food is science. Especially when it comes to baking. Stuff that has to rise. Things that you have to get bigger. Like cakes and pancakes and pies. For them to stick together and their consistency and everything. That's all science. CHILD: Well you could drink the broth the broth is always healthy.	**0.82**
Eating Establishments/ Outside Home Food[a]	References to a specific restaurant or eating establishment, or when outside the home food are brought up.	MOT: And it looks like they don't- the restaurant doesn't open until 5:30 so I may have to pick you up something [else. CHILD: Okay. Can we go to Wendy's?	**1.00**
Mealtime Rules and Routines	References to or reminders of rules that the family has about how they consume food/drink during meals	MOT: Hey, you don't have to grab. You can just say thank you and take it. CHILD: Quit! You're not supposed to be in the pantry.	**0.97**

Bold font indicates the category of codes.
[a] Maternal food refusal and maternal and child references to eating establishments/outside home food rarely occurred and are not discussed further.

2.3.3. Child Feeding Questionnaire (CFQ)

The Child Feeding Questionnaire (CFQ) is a parent-report questionnaire that is frequently used to assess maternal feeding practices (Birch et al., 2001). Participants rated feeding behaviors on a 5-point Likert scale (with 5 indicating more of the feeding behavior). In the current study, we administered three of the CFQ subscales to assess maternal feeding practices: Monitoring (3 items; preschool $\alpha = 0.80$, school-aged $\alpha = 0.84$), Restriction (8 items; preschool $\alpha = 0.71$, school-aged $\alpha = 0.83$), and Pressure to Eat (4 items; preschool $\alpha = 0.82$, school-aged $\alpha = 0.80$).

2.3.4. Anthropometry

Child and mother weight and height were measured by trained research staff certified in standardized measurement technique (Shorr, 1986). Body Mass Index (BMI) was calculated as weight in kilograms divided by height in meters squared. Child BMI z-score (BMIz) was derived and weight status was categorized as not overweight (defined as a BMI <85th percentile) or overweight/obese (BMI $\geq$ 85th percentile) based on the US Centers for Disease Control and Prevention reference growth curves for age and sex (Kuczmarski et al., 2000).

2.3.5. Covariates

Maternal education and child age were considered as covariates a priori, as maternal education is known to associate with home speech patterns (Hart & Risley, 1995) and child language develops with age (Hoff, 2013). Child sex was considered as a potential covariate. Mothers reported child age and sex. Mothers also reported how many years of school they had completed, which was then categorized as less than 4-year college degree versus completed 4-year college degree or more. Mothers also reported on the total income from all sources and number of people in the home, and income-to-needs ratio was calculated.

2.4. Statistical analysis

Analyses were conducted using SAS 9.4 (SAS Institute Inc., Cary, NC). Univariate statistics were used to describe the sample. For descriptive purposes, different types of food talk were examined as number of utterances, proportion of total speech, and proportion of total food talk. Food talk type as a proportion of total speech were the set of food talk variables used in all subsequent analyses. To test our hypotheses, we first conducted t-tests and correlational analyses to examine bivariate associations among types of food talk, and between each type of food talk and CFQ and CEBQ subscales, child BMIz, and covariates. We included food talk variables that were significantly associated with our variables of interest (CFQ, CEBQ, and child BMIz) in bivariate analyses for use as predictors in

our multivariate regression models. Multivariate linear regression models were next used to predict maternal feeding practices (CFQ) and child eating behavior (CEBQ), and child BMIz, from each food talk type that was significantly associated with these variables in bivariate analyses, adjusting for covariates. A p-value of < 0.05 was considered statistically significant.

3. Results

A total of 64 children completed the LENA protocol. Of the completed LENA protocol recordings, three recordings were excluded from analysis: one for technical error (recording unable to upload), one for recording starting with dinner (vs. prior to dinner), and one for mother and child speaking a language other than English during the recording. The current sample included 61 participants with complete data for all variables in the analyses.

Characteristics of the sample, and CFQ and CEBQ descriptive statistics are shown in Table 2. The child sample was 44.3% female. Most (57.4%) of the sample was in the preschool-age group (3.0–5.99 years; mean age 4.45 years) and 42.6% of the sample was in the school-age group (10.0–12.99 years; mean age 11.57 years). Over one-half of mothers (55.7%) had an education level of less than a 4-year college degree, and 77.0% of mothers were non-Hispanic white. Income-to-needs ratio for the sample was 1.76 (SD 1.02). The prevalence of overweight among mothers of preschool-aged children was 73.5% and the prevalence of overweight among preschool-aged children was 25.7%. The prevalence of overweight among mothers of school-aged children was 53.9% and the prevalence of overweight among school-aged children was 42.3%.

The means for each food talk variable (mean number of utterances for each type of food talk, mean for each type of food talk as a proportion of total food talk utterances, and mean for each type of food talk as a proportion of total speech) are shown in Table 3. Child overall food talk represented 12.2% of total speech (range: 0.0%–57.0%) and mother overall food talk represented 14.7% of total speech (range: 0.0%–66.0%) during the hour recorded. The most frequent types of food talk by children were Prep/Planning (2.5% of total speech; 17.7% of total food talk utterances), and Desire/Need (2.3% of total speech; 17.2% of total food talk utterances). The most frequent types of food talk by mothers were Prep/Planning (9.0% of total speech; 31.4% of total food talk utterances) and Monitoring (1.0% of total speech; 7.3% of total food talk utterances). T-tests showed that preschool-aged children had more overall food talk utterances than school-aged children ($p < 0.01$) (preschool $M = 25.3$ utterances, $SD = 23.4$; school-age $M = 12.4$ utterances, $SD = 12.9$), although the amount of food talk as a proportion of total speech did not differ (preschool M proportion = 13.0%, school-age M proportion = 8.0%, $p = 0.17$). Additionally, mothers of preschool-aged children had more overall food talk than mothers of school-aged children ($p < 0.01$) (preschool $M = 36.4$ utterances, $SD = 45.6$; school $M = 9.4$ utterances, $SD = 10.4$), but amount of food talk as a function of total speech did not differ (preschool M proportion = 17.9%, SD = 16.6; school M proportion = 10.2%, SD = 11.4, $p = 0.05$). Bivariate analyses using Spearman's rank correlations also revealed multiple significant associations among food talk types (see Table 3).

Bivariate analyses between food talk variables and CFQ, CEBQ, and child BMIz conducted in preparation for the regression analyses (not shown) revealed numerous significant associations between different types of child and mother food talk and CEBQ Food Responsiveness, Emotional Over-Eating, Enjoyment of Food, and Satiety Responsiveness, as well as CFQ Concern about Child Weight, Restriction, Pressure to Eat, and Monitoring. These variables were therefore modeled as outcomes in linear regression analyses. Regarding associations with child BMIz, mothers' CFQ Concern about Child Weight was associated with higher child BMIz score ($r = 0.52$; $p < 0.05$), but CFQ Restriction, Pressure to Eat, and Monitoring were not significantly associated with child BMIz. CEBQ scores were associated with child BMIz in expected directions, with positive associations observed for Food Responsiveness ($r = 0.37$), Emotional Over-Eating ($r = 0.36$), and Enjoyment of Food ($r = 0.36$) and a negative association observed for Satiety Responsiveness ($r = -0.29$; all p's < 0.05). The only type of food talk associated with child BMIz was Mother Prep/Planning talk, which was negatively associated ($r = -0.26$, $p < 0.05$). A priori covariates for regression analyses were maternal education and child age group. T-tests indicated that child sex was only associated with one outcome variable and its presence as a covariate in multivariate analyses did not affect the significance of the associations between food talk and outcome variables. Thus child sex was not included as a covariate in subsequent regression analyses.

Results from the multivariate regression models in which food talk was associated with CEBQ, CFQ, or child BMIz outcomes are presented in Table 4. Adjusting for covariates (child age group, maternal education), food talk was associated with some child eating behavior outcomes. Greater child Overall Food Talk and child Food Explanations (as a proportion of total speech) were positively associated with CEBQ Food Responsiveness (p's < 0.05). Greater child Enjoyment and mother Overt Restriction were positively associated with CEBQ Emotional Over-Eating ($p < 0.05$). Greater child Overall Food Talk, child Desire/Need, child Prep/Planning, and child Food Explanations were positively associated with CEBQ Enjoyment of Food ($p < 0.05$). Food talk was associated with only one CFQ feeding practice in the multivariate regression analyses; specifically, mother Monitoring was positively associated with CFQ Restriction ($p < 0.05$). Mother Prep/Planning talk was negatively associated with child BMIz ($p < 0.05$). When we calculated follow-up Bonferroni corrections to adjust for multiple comparisons, we found that child Food Explanations remained associated with CEBQ Food Responsiveness and that child Overall Food Talk, Prep/Planning, and Food Explanations remained associated with CEBQ Food Enjoyment. Mother Monitoring remained associated with CFQ

Table 2
Characteristics of the sample (n = 61).

Variable	M (SD) or N (%)
Child	
Sex	
Female	27 (44.3)
Male	34 (55.7)
Age Group	
Preschool	4.45 (0.84)
School-age	11.57 (0.86)
Weight Status	
Overweight	20 (32.8)
Not overweight	41 (67.2)
Mother	
Education	
Less than 4-year college degree	34 (55.7)
Completed 4-year college degree or more	27 (44.3)
Race/Ethnicity	
Hispanic or not white	14 (23.0)
non-Hispanic white	47 (77.0)
Family Income-to-Needs Ratio	1.76 (1.02)
CFQ	
Restriction	3.03 (1.07)
Pressure to Eat	2.25 (1.16)
Monitoring	3.75 (1.12)
CEBQ	
Food Responsiveness	2.64 (0.89)
Emotional Over-Eating	1.71 (0.74)
Enjoyment of Food	4.01 (0.73)
Satiety Responsiveness	2.71 (0.60)

Table 3
Correlations among food talk codes.

	Code	Child (n=61)							Mother (n=58)										
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Child	1. Overall Food Talk	1																	
	Physiological/Psychological States																		
	2. Enjoyment	0.53**	1																
	3. Desire/Need	0.73**	0.36**	1															
	4. Refusal	0.36**	0.27*	0.19	1														
	Broader Food Related Discussion & Reflections																		
	5. Prep/Planning	0.78**	0.37**	0.45**	0.26*	1													
	6. Food Explanations	0.49**	0.55**	0.25	0.18	0.47**	1												
	7. Mealtime Rules/Routines	0.14	0.03	0.13	0.13	0.1	-0.02	1											
Mother	8. Overall Food Talk	0.76**	0.40**	0.52**	0.45**	0.68**	0.40**	0.16	1										
	Physiological/Psychological States																		
	9. Enjoyment	0.38**	0.50**	0.29*	0.19	0.30*	0.49**	-0.14	0.45**	1									
	10. Desire/Need	0.23	0.11	0.28*	-0.01	0.19	0.23	0	0.31*	0.48**	1								
	Monitoring of Consumption																		
	11. Indulgence	0.4**	0.18	0.56**	0.21	0.27*	0.08	0.09	0.41**	0.11	0.40**	1							
	12. Monitoring	0.5**	0.09	0.49**	0.33*	0.39**	0.07	0.13	0.56**	0.12	0.27*	0.37**	1						
	13. Overt Restriction	0.55**	0.27*	0.62**	0.29*	0.28*	0.17	0.17	0.51**	0.27*	0.17	0.44**	0.36**	1					
	14. Overt Encouragement	0.46**	0.29*	0.43**	0.41**	0.19	0.25	0.06	0.43**	0.16	0.26	0.48**	0.45**	0.34**	1				
	15. Negotiations/Bribe/Reward	0.16	0.1	0.26*	-0.06	0.24	0.08	-0.1	0.22	0.14	0.1	0.05	0.08	0.09	0.01	1			
	Broader Food Related Discussion & Reflections																		
	16. Prep/Planning	0.61**	0.37**	0.27*	0.36**	0.60**	0.33*	0.13	0.87**	0.38**	0.18	0.2	0.38**	0.28*	0.19	0.27*	1		
	17. Food Explanations	0.52**	0.46**	0.34**	0.19	0.37**	0.59**	0.06	0.65**	0.45**	0.37**	0.25	0.33*	0.30*	0.47**	0.11	0.53**	1	
	18. Mealtime Rules/Routines	0.4**	0.1	0.37**	0	0.25	0.18	0.09	0.53**	0.15	0.31*	0.44**	0.19	0.37**	0.25	-0.05	0.39**	0.62**	1
	Mean (SD) Utterances	19.89 (20.54)	0.93 (1.78)	3.54 (4.36)	1.15 (2.25)	4.18 (6.68)	0.84 (1.33)	0.15 (0.51)	24.85 (37.45)	0.44 (1.28)	0.38 (1.02)	0.31 (0.59)	0.97 (1.32)	0.75 (1.67)	0.59 (1.28)	0.21 (0.71)	8.95 (16.96)	1.30 (2.72)	1.08 (2.98)
	Mean (SD) Proportion of Total Speech	12.18 (12.22)	0.46 (0.71)	2.29 (2.89)	0.68 (1.26)	2.54 (3.71)	0.44 (0.75)	0.10 (0.40)	14.67 (15.01)	0.22 (0.72)	0.24 (0.61)	0.27 (0.62)	0.85 (1.50)	0.48 (0.95)	0.45 (1.06)	0.11 (0.38)	4.91 (6.19)	0.63 (1.25)	0.62 (1.51)
	Mean (SD) Proportion of Total Food Talk (n=57 for Child, n=48 for Mom)	100.0 (0.0)	3.80 (5.91)	17.16 (17.46)	8.22 (18.40)	17.67 (16.97)	3.93 (7.03)	0.96 (3.56)	100.0 (0.0)	1.00 (2.52)	2.42 (7.96)	2.79 (8.25)	7.28 (15.40)	2.93 (5.07)	3.53 (8.47)	0.81 (2.66)	31.39 (21.30)	3.35 (4.60)	3.93 (9.14)

*$p < 0.05$, **$p < 0.01$.
Note: % does not sum to 100% because very low frequency codes not included.

Table 4
Regression Analyses: Maternal and child food talk variables associated with child eating behavior, maternal feeding practices, and child BMIz.

	CEBQ Food Responsiveness		CEBQ Emotional Over-Eating		CEBQ Food Enjoyment		CFQ Restriction		Child BMIz	
	β (SE)	Model F (df)	β (SE)	Model F (df)	β (SE)	Model F (df)	β (SE)	Model F (df)	β (SE)	Model F (df)
Food Talk Variables (proportion of total speech)										
Child		F (3, 57)		F (3, 57)		F (3, 57)		F (3, 57)		F (3, 57)
Overall Talk	0.26 (0.12)*	3.41*	0.13 (0.13)	2.04	0.36 (0.12)**	3.28*	0.12 (0.12)	4.40**	0.03 (0.14)	1.18
Enjoyment	0.00 (0.13)	1.86	0.27 (0.12)*	3.40*	0.02 (0.13)	0.39	0.06 (0.12)	4.10*	0.08 (0.14)	1.28
Desire/Need	0.24 (0.13)ˆ	3.21*	0.20 (0.13)	2.59ˆ	0.27 (0.13)*	1.84	0.16 (0.12)	4.73**	0.07 (0.14)	1.26
Prep/Planning	0.20 (0.12)	2.80ˆ	0.01 (0.13)	1.67	0.38 (0.12)**	3.74*	0.16 (0.12)	4.77**	−0.05 (0.14)	1.22
Explanations	0.33 (0.12)**	4.64**	0.02 (0.13)	1.68	0.33 (0.13)*	2.68ˆ	0.10 (0.12)	4.28**	−0.05 (0.14)	1.22
Mealtime Rules & Routines	−0.09 (0.13)	2.03	−0.12 (0.13)	2.02	0.11 (0.13)	0.63	−0.23 (0.12)ˆ	5.57**	0.16 (0.14)	1.65
Mother		F (3, 54)		F (3, 54)		F (3, 54)		F (3, 54)		F (3, 54)
Overall Talk	0.11 (0.14)	2.07	−0.11 (0.14)	1.59	0.24 (0.14)ˆ	1.47	0.05 (0.13)	3.40*	−0.17 (0.15)	1.72
Desire/Need	0.15 (0.13)	2.35ˆ	0.15 (0.13)	1.83	0.22 (0.13)	1.38	0.06 (0.12)	3.45*	0.11 (0.14)	1.44
Restriction	0.19 (0.13)	2.61ˆ	0.31 (0.13)*	3.48*	0.15 (0.14)	0.87	0.07 (0.12)	3.46*	0.11 (0.15)	1.42
Monitoring	0.19 (0.13)	2.60ˆ	0.13 (0.13)	1.71	0.14 (0.13)	0.81	0.34 (0.12)**	6.72**	0.18 (0.15)	1.77
Prep/Planning	−0.04 (0.12)	2.21ˆ	−0.17 (0.09)ˆ	3.56*	0.11 (0.10)	0.45	−0.12 (0.13)	4.33*	−0.29 (0.14)*	2.82*

Note: Standardized regression coefficients. ˆ $p < 0.10$. *$p < 0.05$. **$p < 0.01$.
Adjusted for maternal education and child age group.

restriction.

4. Discussion

The current study had six main findings. First, food talk was observed to occur outside of the mealtime context. Second, mother and child Prep/Planning, child Desire/Need, and mother Monitoring were the most frequently-occurring types of food talk. Third, mother and child food talk were correlated. Fourth, as hypothesized, child and mother food talk were positively associated with mother-reported child obesogenic eating behavior. Fifth, mother Monitoring talk was positively associated with self-reported restriction. Finally, mother Prep/Planning talk was negatively associated with child BMI z-score.

Prior research has observed maternal feeding practices and child eating behaviors, but has primarily done so during mealtimes or in structured eating contexts (Lumeng et al., 2012; Orrell-Valente et al., 2007). Additionally, studies have examined mealtimes as a context for socialization around food and eating (Wiggins, 2013). As a result, efforts have focused on implementing family meals as a way to promote child health and well-being (Fiese et al., 2012; Videon & Manning, 2003). Yet, it is important to consider that families today live in a tempting food environment where energy-dense foods are readily available, and meals are not the only setting in which maternal feeding practices are relevant. Mealtimes provide an opportunity for parents to model healthy eating behaviors, check in, and plan with their children (Fiese et al., 2012; Videon & Manning, 2003), but considering the frequency of feeding and eating occurring outside of meals, it is important to look beyond the dinner table. Results from the current study highlight how examining food talk outside of mealtime may be an important step toward better understanding such processes.

Our results showed that families discussed food and eating with their preschool- and school-aged children, with food talk representing between 0 and 66 percent of total speech during the afterschool/pre-dinnertime period we examined. The most frequent types of food talk (child and mother Prep/Planning, child Desire/Need, and mother Monitoring) seemed to reflect activities that typically occur after school and before dinnertime, time periods when parents are likely to be preparing food (Norman et al., 2015). Indeed, review of the audio tapes indicated that most families were engaging in food or mealtime preparation activities during this time. This is also a time of day when children are most likely to snack (Wang et al., 2016), and the need to examine "food parenting" around snacking has recently been highlighted (Davison et al., 2015). Some parents view snacks as a quick way to "tide a child over" until mealtime (Younginer et al., 2016), for example, whereas others offer children food on a fixed schedule but do not consider this snacking (Jacquier, Gatrell, & Bingley, 2017). Parents seem to use a range of strategies to manage child snack intake (Boots et al., 2016) but in general food parenting outside of mealtimes, particularly as it occurs in naturalistic settings, is not yet fully understood (Davison et al., 2015; Jacquier et al., 2017). Prior work also suggests that family stress arises around managing child needs, specifically hunger, while attempting meal preparation (Norman et al., 2015), and maternal stress due to limited time for meal preparation has frequently been reported (Beshara, Hutchinson, & Wilson, 2010; Devine, Connors, Sobal, & Bisogni, 2003). Thus, food parenting during the afterschool/pre-dinner period that was considered here may present somewhat unique challenges. Our use of LENA as a "digital observer" provided a way to identify which types of food talk occurred during this time of day, in this naturalistic family context. Ultimately, characterizing how parents manage feeding and eating behavior in this manner may have implications for helping parents address the way they food parent outside of meals.

We also found that similar aspects of maternal and child food talk were positively correlated, highlighting the potential role of modeling involved in talking about food. For example, mothers' references to enjoyment of and desire/need for food were positively associated with children's references to these same physiologic/psychological states. It has recently been noted that modeling is most often studied as the overt modeling of healthy diet habits (Palfreyman, Haycraft, & Meyer, 2014; Vaughn et al., 2016). Relatively fewer studies have considered how the way in which parents and children talk about food beyond dietary intake (e.g., about enjoying or preparing food) may shape how children interact with food over time. This may be an important aspect of modeling to consider in future work. For example, in the current study mother and child talk about food preparation and planning and explanations about food were highly correlated, perhaps reflecting that dyads were engaged in dialogue regarding these topics.

Findings also highlighted the dyadic nature of mother-child interactions around food. For example, child emotional over-

eating on the CEBQ was associated with more restriction food talk by mothers, and more child desire/need statements were also associated with more mother restriction statements. This is somewhat consistent with the literature on how restriction can lead to a child's enhanced preference for restricted foods (Birch, Fisher, & Davison, 2003; Francis et al., 2001). Recent work also suggests that associations are bidirectional such that child eating behaviors both influence and are influenced by parental feeding practices (Webber et al., 2010). This process may also be reflected by this finding. For example, if a child tends to over-eat when he or she is emotionally upset, the child's mother may feel the need to restrict the child's eating behavior, and in turn, when the mother restricts desired foods, the child may respond by becoming upset. Prior literature has found support for such bidirectional associations between mother-reported feeding practices and mother-reported child eating behaviors (Jansen et al., 2012; Webber et al., 2010), but limited research has examined correspondence of observed behaviors as in the current study.

Study findings also provide validity for the CEBQ maternal-report measure, in that even outside of mealtimes, children who were reported by their mothers to be highly focused on food were more likely to talk about food in general and spend more time discussing properties of food. Children who talked more about food overall, and who had more food explanations were reported by mothers to have greater CEBQ food responsiveness. Children who talked more about food overall, had more desire/need statements, prep/planning statements, and food explanation statements had greater CEBQ enjoyment of food. Children who talked more about enjoying food were also rated as being likely to emotionally over-eat on the CEBQ. Similar to prior work (Domoff et al., 2015), we found associations between CEBQ ratings and child BMI z-scores. Yet, child food talk was unrelated to BMIz score. This finding is inconsistent with one prior study that found positive associations between parent-reported child BMI and the frequency of food-related mentions in a semi-structured interview with 4- to 6-year old children (Musher-Eizenman, Marx, & Taylor, 2015; Syrad et al., 2016), perhaps due to methodological differences in that we had an objective measure of child BMIz and observed food talk in a naturalistic setting versus in an interview. It may also be that the types of food talk we observed in the current study are more distally related to child weight outcomes than they are to child eating behavior as measured by the CEBQ, and that associations may emerge over time.

Talk about food preparation and planning was the most common type of food talk observed for both mothers and children, and was the only type of food talk associated with child BMIz. Specifically, more prep/planning talk by mothers (but not children) was associated with lower child BMIz. Given that involving children in food preparation has been highlighted as an obesity prevention strategy (Flattum et al., 2015; Robson, Stough, & Stark, 2016), this is an encouraging finding. Prep/planning talk was observed frequently, and it may be important to understand more about these conversations in order to learn how to promote such discussions in the home setting. Interestingly, however, children's prep/planning talk was associated with higher CEBQ food enjoyment ratings, which was in turn associated with higher child BMIz. It is possible that when children enjoy food more they have a desire to participate in the process of food preparation and discuss food properties, and may be more invested in it. Another explanation could be that if children participate more in preparation and planning of food, they may enjoy food more because they have some role in deciding what they are eating. Involving children in meal preparation has been shown to increase subsequent intake of the foods prepared, including vegetables, suggesting a wider acceptance of food following exposure during meal preparation (van der Horst, Ferrage, & Rytz, 2014). It will be important to test the causal direction of the association using longitudinal studies and/or experimental designs (e.g. intervention studies) in future work, as well as to consider the nature of the foods that are being prepared and discussed, which we could not address in the current study.

Unlike the more obesogenic types of eating behaviors assessed by the CEBQ, observed child references to satiety were unrelated to mother-reported child satiety responsiveness. The child food refusal code included references to satiety, but we observed almost no child or mother talk of satiety outside of mealtime. It may be that satiety cues are more subtle, or perhaps non-verbal. This finding is interesting in that many interventions focus on self-regulation and on recognizing satiety as a way to combat weight gain in children (Hughes et al., 2016). Indeed, we found that higher CEBQ Satiety Responsiveness was associated with lower child BMIz. The fact that we did not see overt discussion of satiety outside of the mealtime context may have implications for the effectiveness of such interventions. If families are discussing satiety during mealtimes, but are still engaging in snacking outside of mealtime, there may be unregulated energy intake during these times, particularly if less nutritious foods are offered (Wang et al., 2016). It is possible that parents are not expecting their child to be full from a snack, and in turn do not take the opportunity to reference satiety. If snacking frequently occurs prior to mealtime, however, it may lessen the likelihood that the child eats a nutritious meal at a later time.

Mothers' self-reported feeding practices on the CFQ were associated with child BMIz in expected directions, but with the exception of monitoring, self-reported feeding practices did not relate to observed food talk in multivariate analyses. Mothers who were observed to monitor their child's eating more frequently were more likely to report that they restrict their child's eating. If a mother generally endorses restricting her child's food intake, it makes sense that she would also monitor the child's eating outside of mealtime. The lack of association among other aspects of mother-reported and observed feeding practices such as indulgence however suggests that there is some level of disconnect between observed and reported feeding behaviors. This is consistent with prior work that has found that a mother's stated beliefs about her behavior often do not align with how she interacts with her child around food (Haycraft & Blissett, 2008; Lewis & Worobey, 2011). Given the reliance on self-reported feeding styles in many studies (Birch et al., 2003; Faith et al., 2004; Rodgers et al., 2013), it is important to consider why self-reported restriction compared to other feeding practices may more closely align with feeding practices observed in the naturalistic home context. It may be that restriction is more overt than other feeding behaviors and parents are more likely to notice when they are doing it, or it could be that they have concerns about child over-eating, particularly if a child enjoys food. Further examination of naturalistic feeding practices is needed in order to better understand these differences.

Finally, identifying how mothers and children talk about food in naturalistic settings may also be an important way to understand how maternal feeding practices and child eating behaviors change over time. Previous studies have examined feeding and eating behaviors in older children (Wardle & Carnell, 2007), and have also found that snacking patterns vary by age (Wang et al., 2016). When we stratified by age, we found less food talk overall in school-aged children compared to preschool-aged children. This may reflect developmental shifts in how mothers and children talk about food, with more food conversations occurring between mothers and younger children, and perhaps differences in how children access food outside of mealtimes. The higher prevalence of food talk outside of meals in the preschool-age years suggests a possible

context for intervention during early childhood, which has been identified as a developmental period when obesity prevention interventions may be most beneficial (Birch & Fisher, 1998). Identifying the nature of and changes in food talk patterns over time can also inform family-based intervention strategies for managing child weight and eating behaviors at different points in development (e.g., preschool vs. early adolescence).

4.1. Study strengths and limitations

Strengths of the study were the use of naturalistic data to assess food talk in the home setting outside of mealtimes, and assessing how food talk as observed in this context was associated with parent and child behaviors that have previously been shown to relate to child obesity risk. We also examined food talk in relation to measured child BMIz. Furthermore, prior studies that have utilized LENA technology to assess parent-child interactions rely on word counts that are automatically generated by the system, but often do not assess content of speech (Greenwood, Thiemann-Bourque, Walker, Buzhardt, & Gilkerson, 2011; Soderstrom & Wittebolle, 2013). Thus, an additional strength of the current study is the use of LENA technology to code the content of these naturalistic interactions between mother and child; ours is the first study to use this technology to examine food-related interactions.

As with all studies, ours also had several limitations. First, the sample size was relatively small, and as a result we did not have power to detect small effects or to examine how each type of food talk may associate with eating and feeding behaviors, as certain types of food talk rarely occurred (e.g., child references to eating establishments outside the home; discussion of mealtime routines) and may have been more prevalent with a larger sample. Although the current sample size is comparable to other studies that have examined parent-child conversations at this level of detail (Miller et al., 2016; Wiggins, 2013), in future work it would be important to test associations between food talk, maternal feeding practices, child eating behaviors and weight status in larger samples in order to assess whether findings are robust. As well, most prior studies that have examined food talk have done so within mealtimes (e.g., Wiggins, 2013), but it could be that talking about food during meals compared to outside of mealtimes has different associations with feeding, eating, or weight outcomes. For example, talking about enjoying food during mealtimes may be more normative than doing so outside of mealtimes and thus not associated with child eating behaviors that are proposed to associate with obesity risk, as we found in the current study. As well, certain types of food talk, such as maternal pressure to eat or child refusal, may be more prevalent at mealtimes compared to the afterschool/pre-dinner time period that we examined. As we did not compare food talk outside of mealtimes to food talk during meals in the current study, it is not known whether the amount and nature of food talk is similar across mealtime and outside of mealtime contexts, or whether associations with eating and feeding variables may differ across those contexts. Comparing food talk across contexts in future work could help guide recommendations for families regarding management of food parenting both during and outside of mealtimes. As well, in the current study we were unable to examine associations between food talk and food intake, as we did not assess what families were eating during the specific recording period. Understanding how naturalistic food talk relates to food intake in home context is an important direction for future work. Finally, our study is based on a convenience sample. Future studies with more diverse samples will be important in order to characterize food talk among different populations and in relation to the feeding practices and child eating behaviors of interest. For example, the nature of food talk may differ according to family structure (e.g., single-compared to dual-parent families; number of children in the household) or socio-economic status, which could have implications for working with families with different characteristics.

5. Conclusions

Observed food talk was associated with child obesogenic eating behaviors, maternal feeding practices, and child BMI z-score. Observing naturalistic conversations about food can inform our understanding of parent-child interactions around food and may lead to better nutrition-focused interventions that seek to reduce feeding and eating outside of meals. Future work should also consider bidirectional and longitudinal associations between food talk, maternal feeding practices, and child eating behaviors.

Conflict of interest

None of the authors have a conflict of interest to declare.

Acknowledgements/Funding source

All phases of this study were supported by the National Institutes of Health grant number R03HD083656, The Momentum Center, Office of the Provost of the University of Michigan. The MCubed program, Office for Research / Third Century Initiative at the University of Michigan.

References

Baranowski, T., O'Connor, T., Hughes, S., Sleddens, E., Beltran, A., Frankel, L., … Baranowski, J. (2013). We have a problem! Measurement of parenting. Houston *Childhood Obesity*, (9 Suppl), S1–S4. http://dx.doi.org/10.1089/chi.2013.0040.

Beshara, M., Hutchinson, A., & Wilson, C. (2010). Preparing meals under time stress. The experience of working mothers. *Appetite, 55*(3), 695–700. http://dx.doi.org/10.1016/j.appet.2010.10.003.

Birch, L., & Fisher, J. O. (1998). Development of eating behaviors among children and adolescents. *Pediatrics, 101*(Supplement 2), 539–549.

Birch, L., Fisher, J. O., & Davison, K. K. (2003). Learning to overeat: Maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *American Journal of Clinical Nutrition, 78*.

Birch, L., Fisher, J. O., Grimm-Thomas, K., Markey, C. N., Sawyer, R., & Johnson, S. L. (2001). Confirmatory factor analysis of the child feeding questionnaire: A measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite, 36*. http://dx.doi.org/10.1006/appe.2001.0398.

Boots, S. B., Tiggemann, M., & Corsini, N. (2016). Maternal responses to difficult food request scenarios: Relationships with feeding style and child unhealthy snack intake. *Journal of Health Psychology*, 1–11. http://dx.doi.org/10.1177/1359105316669584.

Brown, R., & Ogden, J. (2004). Children's eating attitudes and behaviour: A study of the modelling and control theories of parental influence. *Health Education Research, 19*(3), 261–271. http://dx.doi.org/10.1093/her/cyg040.

Campbell, K. J., Lioret, S., McNaughton, S. A., Crawford, D. A., Salmon, J., Ball, K., … Hesketh, K. D. (2013). A parent-focused intervention to reduce infant obesity risk behaviors: A randomized trial. *Pediatrics, 131*(4), 652–660. http://dx.doi.org/10.1542/peds.2012-2576.

Cunningham, S. A., Kramer, M. R., & Narayan, K. M. V. (2014). Incidence of childhood obesity in the United States. *New England Journal of Medicine, 370*(5), 403–411. http://dx.doi.org/10.1056/NEJMoa1309753.

Czaja, J., Hartmann, A. S., Rief, W., & Hilbert, A. (2011). Mealtime family interactions in home environments of children with loss of control eating. *Appetite, 56*(3), 587–593. http://dx.doi.org/10.1016/j.appet.2011.01.030.

Davison, K. K., Blake, C. E., Blaine, R. E., Younginer, N. A., Orloski, A., Hamtil, H. A., … Fisher, J. O. (2015). Parenting around child snacking: Development of a theoretically-guided, empirically informed conceptual model. *International Journal of Behavioral Nutrition and Physical Activity, 12*(1), 109. http://dx.doi.org/10.1186/s12966-015-0268-3.

Devine, C. M., Connors, M. M., Sobal, J., & Bisogni, C. A. (2003). Sandwiching it in: Spillover of work onto food choices and family roles in low- and moderate-income urban households. *Social Science & Medicine, 56*(3), 617–630. http://dx.doi.org/10.1016/S0277-9536(02)00058-8.

Domoff, S. E., Miller, A. L., Kaciroti, N., & Lumeng, J. C. (2015). Validation of the Children's eating behaviour questionnaire in a low-income preschool-aged sample in the United States. *Appetite, 95*, 415–420. http://dx.doi.org/10.1016/j.appet.2015.08.002.

Faith, M. S., Scanlon, K. S., Birch, L., Francis, L. A., & Sherry, B. (2004). Parent-child

feeding strategies and their relationships to child eating and weight status. *Obesity Research, 12*(11), 1711–1722. http://dx.doi.org/10.1038/oby.2004.212.
Fiese, B. H., Hammons, A., & Grigsby-Toussaint, D. (2012). Family mealtimes: A contextual approach to understanding childhood obesity. *Economics & Human Biology, 10*(4), 365–374. http://dx.doi.org/10.1016/j.ehb.2012.04.004.
Flattum, C., Draxten, M., Horning, M., Fulkerson, J. A., Neumark-Sztainer, D., Garwick, A., … Story, M. (2015). HOME Plus: Program design and implementation of a family-focused, community-based intervention to promote the frequency and healthfulness of family meals, reduce children's sedentary behavior, and prevent obesity. *International Journal of Behavioral Nutrition and Physical Activity, 12*(1), 53. http://dx.doi.org/10.1186/s12966-015-0211-7.
Francis, L. A., Hofer, S. M., & Birch, L. (2001). Predictors of maternal child-feeding style: Maternal and child characteristics. *Appetite, 37*(3), 231–243. http://dx.doi.org/10.1006/appe.2001.0427.
Gilbert, J.-A., Miller, D., Olson, S., & St-Pierre, S. (2012). After-school snack intake among canadian children and adolescents. *Canadian Journal of Public Health, 103*(6), 448–452. http://dx.doi.org/10.17269/cjph.103.3373.
Greenwood, C. R., Thiemann-Bourque, K., Walker, D., Buzhardt, J., & Gilkerson, J. (2011). Assessing children's home language environments using automatic speech recognition technology. *Communication Disorders Quarterly, 32*(2), 83–92. http://dx.doi.org/10.1177/1525740110367826.
Hammons, A. J., & Fiese, B. H. (2011). Is frequency of shared family meals related to the nutritional health of children and adolescents? *Pediatrics, 127*(6), e1565–e1574. http://dx.doi.org/10.1542/peds.2010-1440.
Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*. Paul H Brookes Publishing.
Haycraft, E. L., & Blissett, J. M. (2008). Maternal and paternal controlling feeding practices: Reliability and relationships with BMI. *Obesity, 16*(7), 1552–1558. http://dx.doi.org/10.1038/oby.2008.238.
Hilbert, A., Tuschen-Caffier, B., & Czaja, J. (2010). Eating behavior and familial interactions of children with loss of control eating: A laboratory test meal study. *The American Journal of Clinical Nutrition, 91*(3), 510–518. http://dx.doi.org/10.3945/ajcn.2009.28843.
Hoff, E. (2013). *Language development*. Cengage Learning.
van der Horst, K., Ferrage, A., & Rytz, A. (2014). Involving children in meal preparation. Effects on food intake. *Appetite, 79*, 18–24. http://dx.doi.org/10.1016/j.appet.2014.03.030.
Hughes, S. O., Frankel, L. A., Beltran, A., Hodges, E., Hoerr, S., Lumeng, J. C., … Kremers, S. (2013). Food parenting measurement issues: Working group consensus report. *Childhood Obesity, 9*(Suppl 1), S95–S102. http://dx.doi.org/10.1089/chi.2013.0032.
Hughes, S. O., Power, T. G., Beck, A., Betz, D., Calodich, S., Goodell, L. S., … Ullrich-French, S. (2016). Strategies for Effective Eating Development-SEEDS: Design of an obesity prevention program to promote healthy food preferences and eating self-regulation in children from low-income families. *Journal of Nutrition Education and Behavior, 48*(6), 405–418. http://dx.doi.org/10.1016/j.jneb.2016.04.388. e401.
Hughes, S. O., Shewchuk, R. M., Baskin, M. L., Nicklas, T. A., & Qu, H. (2008). Indulgent feeding style and children's weight status in preschool. *Journal of Developmental and Behavioral Pediatrics, 29*(5), 403–410. http://dx.doi.org/10.1097/DBP.0b013e318182a976.
Jacquier, E. F., Gatrell, A., & Bingley, A. (2017). "We don't snack": Attitudes and perceptions about eating in-between meals amongst caregivers of young children. *Appetite, 108*, 483–490. http://dx.doi.org/10.1016/j.appet.2016.11.003.
Jahns, L., Siega-Riz, A. M., & Popkin, B. M. (2001). The increasing prevalence of snacking among US children from 1977 to 1996. *The Journal of Pediatrics, 138*(4), 493–498. http://dx.doi.org/10.1067/mpd.2001.112162.
Jansen, P. W., Roza, S. J., Jaddoe, V. W., Mackenbach, J. D., Raat, H., Hofman, A., … Tiemeier, H. (2012). Children's eating behavior, feeding practices of parents and weight problems in early childhood: Results from the population-based generation R study. *International Journal of Behavioral Nutrition and Physical Activity, 9*, 130. http://dx.doi.org/10.1186/1479-5868-9-130.
Kong, A., Jones, B. L., Fiese, B. H., Schiffer, L. A., Odoms-Young, A., Kim, Y., … Fitzgibbon, M. L. (2013). Parent-child mealtime interactions in racially/ethnically diverse families with preschool-age children. *Eating Behaviors, 14*(4), 451–455. http://dx.doi.org/10.1016/j.eatbeh.2013.08.005.
Kuczmarski, R. J., Ogden, C. L., Grummer-Strawn, L. M., Flegal, K. M., Guo, S. S., Wei, R., … Johnson, C. L. (2000). CDC growth charts: United States. *Advance Data, 314*, 1–27.
Larson, N., & Story, M. (2013). A review of snacking patterns among children and adolescents: What are the implications of snacking for weight status? *Childhood Obesity, 9*(2), 104–115. http://dx.doi.org/10.1089/chi.2012.0108.
Lewis, M., & Worobey, J. (2011). Mothers and toddlers lunch together. The relation between observed and reported behavior. *Appetite, 56*(3), 732–736. http://dx.doi.org/10.1016/j.appet.2011.02.011.
Lumeng, J. C., Ozbeki, T. N., Appugliese, D. P., Kaciroti, N., Corwyn, R. F., & Bradley, R. H. (2012). Observed assertive and intrusive maternal feeding behaviors increase child adiposity. *American Journal of Clinical Nutrition, 95*(3), 640–647. http://dx.doi.org/10.3945/ajcn.111.024851.
Martin-Biggers, J., Spaccarotella, K., Berhaupt-Glickstein, A., Hongu, N., Worobey, J., & Byrd-Bredbenner, C. (2014). Come and get it! A discussion of family mealtime literature and factors affecting obesity risk. *Advances in Nutrition: An International Review Journal, 5*(3), 235–247. http://dx.doi.org/10.3945/an.113.005116.
Miller, A. L., Ellis, A., & Domoff, S. E. (2016). Family food talk. In P. Davis-Kean (Ed.), *Socializing children through language* (pp. 147–176). Oxford, UK.: Elsevier.
Moens, E., Braet, C., & Vandewalle, J. (2013). Observation of parental functioning at mealtime using a sibling design. *Appetite, 68*, 132–138. http://dx.doi.org/10.1016/j.appet.2013.04.024.
Musher-Eizenman, D. R., Marx, J. M., & Taylor, M. B. (2015). It's always snack time: An investigation of event scripts in young children. *Appetite, 85*, 66–69. http://dx.doi.org/10.1016/j.appet.2014.11.013.
Nader, P. R., O'Brien, M., Houts, R., Bradley, R., Belsky, J., Crosnoe, R., … Susman, E. J. (2006). Identifying risk for obesity in early childhood. *Pediatrics, 118*(3), e594–e601. http://dx.doi.org/10.1542/peds.2005-2801.
Nicklas, T. A., Morales, M., Linares, A., Yang, S., Baranowski, T., De Moor, C., et al. (2004). Children's meal patterns have changed over a 21-year period: The bogalusa heart study. *Journal of the American Dietetic Association, 104*(5), 753–761. http://dx.doi.org/10.1016/j.jada.2004.02.030.
Norman, Å., Berlin, A., Sundblom, E., Elinder, L. S., & Nyberg, G. (2015). Stuck in a vicious circle of stress. Parental concerns and barriers to changing children's dietary and physical activity habits. *Appetite, 87*, 137–142. http://dx.doi.org/10.1016/j.appet.2014.12.208.
Orrell-Valente, J. K., Hill, L. G., Brechwald, W. A., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2007). "Just three more bites": An observational analysis of parents' socialization of children's eating at mealtime. *Appetite, 48*(1), 37–45. http://dx.doi.org/10.1016/j.appet.2006.06.006.
Palfreyman, Z., Haycraft, E., & Meyer, C. (2014). Development of the parental modelling of eating behaviours scale (PARM): Links with food intake among children and their mothers. *Maternal & Child Nutrition, 10*(4), 617–629. http://dx.doi.org/10.1111/j.1740-8709.2012.00438.x.
Patrick, H., & Nicklas, T. A. (2005). A review of family and social determinants of children's eating patterns and diet quality. *Journal of the American College of Nutrition, 24*(2), 83–92. http://dx.doi.org/10.1080/07315724.2005.10719448.
Piernas, C., & Popkin, B. M. (2010). Snacking increased among U.S. adults between 1977 and 2006. *The Journal of Nutrition, 140*(2), 325–332. http://dx.doi.org/10.3945/jn.109.112763.
Powers, S. W., Chamberlin, L. A., van Schaick, K. B., Sherman, S. N., & Whitaker, R. C. (2006). Maternal feeding strategies, child eating behaviors, and child BMI in low-income African-American preschoolers. *Obesity, 14*(11), 2026–2033. http://dx.doi.org/10.1038/oby.2006.237.
Robson, S. M., Stough, C. O., & Stark, L. J. (2016). The impact of a pilot cooking intervention for parent-child dyads on the consumption of foods prepared away from home. *Appetite, 99*, 177–184. http://dx.doi.org/10.1016/j.appet.2016.01.021.
Rodgers, R. F., Paxton, S. J., Massey, R., Campbell, K. J., Wertheim, E. H., Skouteris, H., et al. (2013). Maternal feeding practices predict weight gain and obesogenic eating behaviors in young children: A prospective study. *International Journal of Behavioral Nutrition and Physical Activity, 10*(1), 1–10. http://dx.doi.org/10.1186/1479-5868-10-24.
Rollins, B. Y., Belue, R. Z., & Francis, L. A. (2010). The beneficial effect of family meals on obesity differs by race, sex, and household education: The national survey of children's health, 2003-2004. *Journal of the American Dietetic Association, 110*(9), 1335–1339. http://dx.doi.org/10.1016/j.jada.2010.06.004.
Shorr, I. (1986). *How to weigh and measure children*. New York: United Nations.
Soderstrom, M., & Wittebolle, K. (2013). When do caregivers talk? The influences of activity and time of day on caregiver speech and child vocalizations in two childcare environments. *PLoS One, 8*(11), e80646. http://dx.doi.org/10.1371/journal.pone.0080646.
Syrad, H., Johnson, L., Wardle, J., & Llewellyn, C. H. (2016). Appetitive traits and food intake patterns in early life. *The American Journal of Clinical Nutrition, 103*(1), 231–235. http://dx.doi.org/10.3945/ajcn.115.117382.
Valdes, J., Rodriguez-Artalejo, F., Aguilar, L., Jaen-Casquero, M. B., & Royo-Bordonada, M. A. (2013). Frequency of family meals and childhood overweight: A systematic review. *Pediatric Obesity, 8*(1), e1–e13. http://dx.doi.org/10.1111/j.2047-6310.2012.00104.x.
Vaughn, A. E., Tabak, R. G., Bryant, M. J., & Ward, D. S. (2013). Measuring parent food practices: A systematic review of existing measures and examination of instruments. *The International Journal of Behavioral Nutrition and Physical Activity, 10*. http://dx.doi.org/10.1186/1479-5868-10-61, 61–61.
Vaughn, A. E., Ward, D. S., Fisher, J. O., Faith, M. S., Hughes, S. O., Kremers, S. P. J., … Power, T. G. (2016). Fundamental constructs in food parenting practices: A content map to guide future research. *Nutrition Reviews, 74*(2), 98–117. http://dx.doi.org/10.1093/nutrit/nuv061.
Videon, T. M., & Manning, C. K. (2003). Influences on adolescent eating patterns: The importance of family meals. *Journal of Adolescent Health, 32*(5), 365–373. http://dx.doi.org/10.1016/S1054-139X(02)00711-5.
Wang, D., van der Horst, K., Jacquier, E., & Eldridge, A. L. (2016). Snacking among US children: Patterns differ by time of day. *Journal of Nutrition Education and Behavior, 48*(6), 369–375. e361 http://dx.doi.org/10.1016/j.jneb.2016.03.011.
Wardle, J., & Carnell, S. (2007). Parental feeding practices and children's weight. *Acta Paediatrica, 96*(454), 5–11. http://dx.doi.org/10.1111/j.1651-2227.2007.00163.x.
Wardle, J., Guthrie, C. A., Sanderson, S., & Rapoport, L. (2001). Development of the Children's eating behaviour questionnaire. *Journal of Child Psychology and Psychiatry, 42*. http://dx.doi.org/10.1111/1469-7610.00792.
Webber, L., Cooke, L., Hill, C., & Wardle, J. (2010). Associations between children's appetitive traits and maternal feeding practices. *Journal of the American Dietetic Association, 110*(11), 1718–1722. http://dx.doi.org/10.1016/j.jada.2010.08.007.
Wiggins, S. (2004). Good for 'You': Generic and individual healthy eating advice in family mealtimes. *Journal of Health Psychology, 9*(4), 535–548. http://dx.doi.org/

10.1177/1359105304044037.
Wiggins, S. (2013). The social life of 'eugh': Disgust as assessment in family mealtimes. *British Journal of Social Psychology, 52*(3), 489–509. http://dx.doi.org/10.1111/j.2044-8309.2012.02106.x.
Younginer, N. A., Blake, C. E., Davison, K. K., Blaine, R. E., Ganter, C., Orloski, A., et al. (2016). What do you think of when I say the word 'snack'?" towards a cohesive definition among low-income caregivers of preschool-age children. *Appetite, 98*, 35–40. http://dx.doi.org/10.1016/j.appet.2015.12.002.
Ziegler, P., Hanson, C., Ponza, M., Novak, T., & Hendricks, K. (2006). Feeding Infants and Toddlers Study: Meal and snack intakes of hispanic and non-hispanic infants and toddlers. *Journal of the American Dietetic Association, 106*(1, Supplement), 107–123. http://dx.doi.org/10.1016/j.jada.2005.09.037.