2016

Providers' response to child eating behaviors: A direct observation study

Alison Tovar
University of Rhode Island, alison_tovar@uri.edu

Amber E. Vaughn

See next page for additional authors

Citation/Publisher Attribution
Tovar, A., Vaughn, A. E., Fallon, M., Hennessy, E., Burney, R., Østbye, T., & Ward, D. S. (2016). Providers' response to child eating behaviors: A direct observation study. *Appetite, 105*, 534-541. doi: 10.1016/j.appet.2016.06.020
Available at: http://dx.doi.org/10.1016/j.appet.2016.06.020

Providers' Response to Child Eating Behaviors: A Direct Observation Study

Alison Tovar [1 §], Amber E. Vaughn[2], Megan Fallon[1], Erin Hennessy[3], Regan Burney[2], Truls Østbye,[4] Dianne S. Ward[2]

[1]Department of Nutrition and Food Sciences, University of Rhode Island, Kingston, Rhode Island 02881

[2] Center for Health Promotion and Disease Prevention, University of North Carolina at Chapel Hill, 1700 Martin L. King Jr. Blvd, CB 7426, Chapel Hill 27599-7426, NC, USA

[3] ChildObesity180, Friedman School of Nutrition Science and Policy, Tufts University, 150 Harrison Avenue, Boston, MA, 02111

[4] Duke University Medical Center, 310 Trent Drive, Durham, NC 27710

Email addresses:

AT: alison_tovar@mail.uri.edu

AV: avaughn@email.unc.edu

MF: mefallon@my.uri.edu

EH: erin.hennessy@tufts.edu

RB: reganb@email.unc.edu

TO: truls.ostbye@duke.edu

DW: dsward@email.unc.edu

[§]**Corresponding author.** Department of Nutrition and Food Sciences, University of Rhode Island, Kingston, Rhode Island 0288. Tel: 401-874-9855.

Key Words: Family Child-care Home, Feeding Practices, Children; Healthy Eating; Obesity

Abstract

Child care providers play an important role in feeding young children, yet little is known about children's influence on providers' feeding practices. This qualitative study examines provider and child (18 months -4 years) feeding interactions. Trained data collectors observed 200 eating occasions in 48 family childcare homes and recorded providers' responses to children's meal and snack time behaviors. Child behaviors initiating provider feeding practices were identified and practices were coded according to higher order constructs identified in a recent feeding practices content map. Analysis examined the most common feeding practices providers used to respond to each child behavior. Providers were predominately female (100%), African-American (75%), and obese (77%) and a third of children were overweight/obese (33%). Commonly observed child behaviors were: *verbal and non-verbal refusals, verbal and non-verbal acceptance, being "all done", attempts for praise/attention, and asking for seconds*. Children's acceptance of food elicited more autonomy supportive practices vs. coercive controlling. Requests for seconds was the most common behavior, resulting in coercive controlling practices (e.g., insisting child eat certain food or clean plate). Future interventions should train providers on responding to children's behaviors and helping children become more aware of internal satiety and hunger cues.

Background

Formation of dietary intake patterns, eating behaviors, and food preferences begin in early childhood (Cashdan, 1994; Dwyer, Suitor, & Hendricks, 2004; Skinner, Carruth, Wendy, & Ziegler, 2002) and are greatly influenced by children's adult caregivers (Davison & Birch, 2001; Ritchie, Welk, Styne, Gerstein, & Crawford, 2005). During early childhood, these adult caregivers include not only the child's parents/guardians but often child care providers. Over 60% of children under the age of 5 regularly spend time under someone else's care (Flynn et al., 2006; Johnson, 2005; Nicklas et al., 2001; Story, Kaphingst, & French, 2006). For children in full-time child care, approximately 50% of their daily dietary intake comes from meals and snacks eaten in this setting (Bollella et al., 1999; Gubbels, Raaijmakers, Gerards, & Kremers, 2014; Padget & Briley, 2005).

Adult caregivers help shape children's food intake and eating behaviors through their feeding practices (Cooke, Chambers, Anez, & Wardle, 2011; Gibson et al., 2012; McGowan, Croker, Wardle, & Cooke, 2012; Pearson, Biddle, & Gorely, 2009; Vereecken, Keukelier, & Maes, 2004). For example, parents' use of autonomy supporting practices such as encouragement and praise have been associated with higher dietary quality (e.g., greater fruit and vegetable intake) (Vollmer & Mobley, 2013); while their use of coercive practices such as restriction and pressure to eat have been associated with poorer dietary quality (e.g., lower fruit and vegetable intake, higher eating more sweet and savory snacks) and eating habits (e.g., eating in the absence of hunger) (Berge, 2009; Blissett, 2011; Blissett, Meyer, & Haycraft, 2006) . Studies with child care providers are limited; however, their feeding practices are thought to have a similar influence on children's food intake and eating behaviors. Child care providers use of enthusiastic role modeling (Hendy, 1999; Hendy & Raudenbush, 2000) and talking with children about healthy foods (Gubbels et al., 2010) have been associated with healthier eating habits in children.

Recent studies also suggests that not only are caregiver feeding practices influencing child eating habits, but child characteristics (e.g., behaviors, temperament, weight status) influence caregivers' use of certain feeding practices. For example, child behaviors such as food

refusals have been shown to elicit more frequent prompts to eat by parents (H. Bergmeier, Skouteris, & Hetherington, 2015; Klesges, Malott, Boschee, & Weber, 1986). In addition, child temperamental traits such as low adaptability to new situations and low persistence in the face of obstacles have been associated with greater use of pressure to eat and restriction by parents (Horn, Galloway, Webb, & Gagnon, 2011). Child weight, specifically being overweight/obese, has also been associated with parents' use of discouragement or negative comments during meals and restriction of energy dense snack foods (H. Bergmeier et al., 2015; H. J. Bergmeier, Skouteris, Haycraft, Haines, & Hooley, 2015; P. W. Jansen et al., 2014; May et al., 2007). Exploration of these relationships is a relatively new area of research focused exclusively to date on parent-child interactions. Given the important role that child care providers currently play in feeding young children (Fox M, 1997), better understanding of these provider-child feeding interactions is important. Knowing such information could help inform future intervention efforts. This qualitative study begins to address this critical gap in the literature by using direct observation to examine these provider-child feeding interactions within an intimate child-care setting, family child-care homes (FCCH).

Methods

This study is part of a larger ongoing cluster-randomized trial to study the efficacy of an intervention ("Keys to Healthy Family Child-care Homes") designed to help FCCH providers model healthy lifestyle behaviors, provide supportive food and physical activity environments, and implement effective business practices (Ostbye et al., 2015). To be eligible, FCCH's had to have at least two children currently enrolled who are between the ages of 18 months and 4 years, serve at least one meal and one snack, and have been in business for two years with no plans to close in the coming year. For data collection, FCCH providers completed self-administered surveys (including demographic information) and allowed a two-day visit at their home. During this visit, trained data collectors conducted an observational assessment of the home's nutrition and physical activity environment (using a modified version of the Environmental Policy Assessment and Observation (EPAO) tool (Ward et al., 2008) and measured height and weight of the provider and participating children using procedures similar to those used in NHANES (Troiano et al., 2008). Height and weight measures were used to calculate body mass index (BMI), and sex-specific growth charts from

the Centers for Disease Control and Prevention were used to calculate children's BMI percentile (Prevention, 2000). All study protocols were approved by the Institutional Review Boards at the University of North Carolina at Chapel Hill and Duke University.

For the current study, the EPAO was further modified to capture providers' responses to children's eating behaviors. This modification added prompts to data collectors to capture brief descriptions of episodes where children's behaviors influenced providers' feeding practices. Data collectors collected these descriptions for all meals and snack times observed (typically including breakfast, lunch and afternoon). A study-specific 1.5 hour training was incorporated into the existing EPAO training protocol. This training was conducted by the lead author (AT) and provided data collectors with examples and possible scenarios of what children might do or say to elicit such interaction. Data collectors were instructed to look for child behaviors such as verbal and nonverbal food refusal, food acceptance, food requests (e.g. asking for seconds/more, wanting praise/attention), and lost hunger/interest in food (e.g. playing with food, talking, leaving the table, "all done"). These examples were identified based on previous work video-taping provider-child interactions in FCCHs in Rhode Island (Tovar A, June 2015) and discussions between investigators and experienced data collectors. While these specific examples were given to data collectors to provide guidance around appropriate types of interaction to capture, data collectors were also instructed to capture descriptions of any observed interactions they thought might be relevant. These written episode descriptions captured the child behavior that initiated the interaction and the subsequent provider response.

This additional information was collected through observation of 48 family child-care providers, of which 28 had data on two days and 20 had data on one day, resulting in a total of 200 observed meals (70 breakfasts, 76 lunches and 68 snack times). The data collected represents the children who spoke during the meal or who elicited a non-verbal gesture (e.g. pushing plate away). The qualitative data captured on these observations provided descriptions of the interactions only, but no labeling or categorization of provider feeding practices and child behaviors. Once data collection was complete, all hand-written

descriptions were typed into Word. Eighteen descriptions were illegible and could not be transcribed.

Analysis of these data began with a general review and discussion of all written descriptions (conducted by MF and AT) (Krueger, 2000). A recently developed food parenting practices content map (Vaughn AE, In Press) helped guide the coding of the data and categorization of provider practices into three higher order constructs: coercive control, structure, or autonomy support. *Coercive control* reflects attempts to dominate, pressure or impose the provider's will upon the child and includes practices such as restriction, pressure to eat, threats and bribes, and soothing with food. *Structure* is a provider's way of organizing a child's environment to facilitate the child's competence and includes rules and limits, monitoring, meal and snack time routines, modeling, food availability and accessibility, food preparation, and permissiveness. *Autonomy support* provides sufficient structure within which the child can be involved in making food choices that are developmentally appropriate and includes guided choices, child involvement, encouragement and support, praise, reasoning, and negotiation. Based on this content map a codebook with definitions and examples was developed and utilized throughout the coding process. These higher order constructs were used as structural codes to categorize the data (Guest, 2011). With the codebook and the definitions being used, the transcripts were systematically reviewed whereby text segments were assigned to corresponding structural codes and then categorized into themes. Interactions that were not relevant or useful were removed. Once organized into central themes, child initiated interactions were further categorized into feeding practices that were consistent with autonomy supportive practices or coercive controlling practices, based on how the provider reacted to a child. Throughout the coding process, MF and AT met to discuss findings and reach consensus when there were disagreements and/or when there were questions about coding, by revisiting the parenting content map. Total interactions were summed to calculate frequencies and percentages. Differences of interactions consistent with autonomy supportive practices vs. those that were consistent with coercive control were explored across different meal types (breakfast, lunch and snack times). Concepts and themes were then reviewed multiple times to ensure that all of the *a priori* and emergent themes were captured.

Results

All 48 providers were female; most were non-Hispanic African-American (75%) or White (19%). Approximately half had a high school or associate's degree (56.5%) and almost 40% had bachelor's degree. The majority were obese (77% obese) or overweight (18%). Within the 48 homes, there were also 130 participating children. Children were, on average, 3.3 years (±1.1) years old; half were female. The majority of children were normal weight (67%), but a third was either overweight (13%) or obese (20%). In all of the homes, providers served the children a plated meal rather than a family style meal.

Across the 200 observed meals and snack times, 505 interactions were captured. However meals in which observers coded "no interactions occurred" (n=33) were excluded. Another 62 interactions were identified as provider-initiated and were removed from the analysis to focus on child-initiated interactions. Lastly, 183 additional interactions that were irrelevant qualitative notes (e.g., child spilling milk, provider making phone calls during meals, conversations during mealtimes) or interactions unrelated to self-regulation/satiety (e.g. child tells provider, "If I try my peaches, they will be delicious". Provider replies, "Good. They are delicious.") were also excluded. The final analysis sample therefore included 227 child-provider interactions.

Below, results are organized by child behaviors, specifically the most common child behaviors initiating these interactions were verbal refusals of food, non-verbal refusals of food, verbal and non-verbal signs of food acceptance, requests for seconds, being "all done", and attempts for praise/attention. These behaviors initiated 227 out of the 505 interactions coded (45%). Other less common child initiated interactions included child not being hungry or interested in meal, being distracted, or demanding food items. For each of the most common child behaviors, the most common feeding practice responses (autonomy supportive vs. coercive controlling) from providers are described along with the corresponding

frequencies (Figure 1). Each of the providers used a mix of autonomy supportive and coercive controlling practices within one meal. For additional quotes by themes and higher order feeding practices see Table 1.

Verbal Refusals of Food

During feeding interactions in the FCCH, one of the ways in which children elicited provider feeding responses was by refusing to eat (33 of the 227 interactions; 15%), usually with regards to a specific food. Verbal refusals generally included statements about not wanting or liking the food item. These verbal refusals to eat a certain food or foods from children elicited a variety of different provider feeding practices.

Some providers responded with autonomy support and structure practices like encouragement, reasoning, and/or role modeling (using self or child's peers as examples). These types of responses were observed in 18 of the 33 interactions (55%). Examples of such interactions include:

Child: "I don't like beans"
Provider: "Beans are good for you. They help you ride your bike and stay strong"

Child: *"Eww!"*
Provider: *"See I am eating hard-boiled eggs! Yum!"*

Similarly, providers responded with coercive controlling practices such as insistence, pressure, and threats. Coercive controlling responses were observed in 15 of the 33 interactions (45%). For example:

Child kept saying: *"I don't want to eat my bagel"*.
Provider: *"C'mon, eat it! Eat more so we can go to the park!"*

Many of these coercive control practices were rooted in the provider's concern for the child being hungry later on. For example:

Child: *"I don't want my waffle."*
Provider: *"Eat your waffle! You will be hollering 'I am hungry' when we are at the park!"*

Occasionally providers just ignored the child's refusal by not responding to the child's statement, in particular when the child's statement included comments such as "*this is nasty*".

Although the protocol did not prompt data collectors to capture the outcome of the interaction, it was often included within the qualitative descriptions of these interactions. From these data, it appeared that use of autonomy supporting practices more often resulted in child eating the desired food compared to use of coercive control practices. For example:

Child: *"I don't want my beans."*
Provider: *"Beans are good for you. They help you ride your bike and stay strong!"*
Child eats beans.

Compared to:

Child: *"I want to get down"* [from table]
Provider: *"No, finish your crackers"*
Child started playing with food, not eating

Non-Verbal Refusals of Food

Children's food refusals could also have been non-verbal such as the child shaking her head no or child just sitting in front of the food without eating it (24 out of 227 interactions; 11%). Non-verbal refusals elicited both autonomy supporting and coercive control practices equally (13 vs. 11 interactions).

Examples of the coercive practices included providers often pressuring children to eat by threatening, spoon feeding, and insisting. Providers most commonly spoon fed children (children who were developmentally ready to eat independently). For example:

Child picked out every pea from the mixed veggie dish.
Provider: *"You are going to eat every pea on that plate!"*

Child would not eat pancake.
Provider tried to feed the child pancake, but the child refused again.
Provider: *"If you don't eat your pancakes, you're going to be hungry later!"*
Child continued to ignore provider.

Examples of autonomy support and structure practices included providers using encouragement, reasoning, or making food easier to eat (e.g., cutting foods into bite-sized pieces or giving a straw to drink milk). For example:

Child would not eat oatmeal.
Provider*: "Let's take another bite of your oatmeal. Show me like a big boy so you can have big muscles!"*
Child takes a bite.
Provider: *"Yay! You took a bite. Take another and come give me a big high–five!"*

When the provider used autonomy supportive practices, other children had generally positive comments and also encouraged the child to eat. For example:

Provider: *"Can you at least taste one? They are really good!"*
Other child chimed in and said *"...beans are good too*."

Verbal and Non-Verbal Acceptance of Food

Children's compliance with eating foods served was also noted along with provider response (48 out of 227 interactions; 21%). Children's approval of a food could be verbal, such as

stating how good it was or how good it made them feel, or non-verbal, such as eating the foods without complaints. Providers reacted to food acceptance with autonomy support practices much more often than coercive control practices (43 vs. 5 interactions, respectively). Autonomy support practices often involved praise, encouragement, or reasoning. For example:

Child eats their blueberries
Provider: *"Mmmmm, isn't that blueberry good?"*

Child eats banana
Provider: *"Oh, I saw you eat that banana! That's right, eat that banana!"*

Requests for Seconds

Many of the interactions noted stemmed from children asking for seconds (66 out of 227 interactions; 29%). Children often asked for seconds of a specific food (often less healthy foods), while other foods (like fruits and vegetables) were still on their plate. Generally, providers responded to children's requests with coercive control practices (56 out of 66 interactions; 85%). These specific interactions of child requests for seconds followed by provider coercive control were observed primarily during lunch and less commonly during breakfast or snack time (27 vs. 12 and 17 interactions, respectively). Providers often pressured children to eat by insisting that children eat certain foods or clean their plates first (often referred to "making a happy plate"). For example:

Child asks: *"Can I have more meatballs?"* when she still has full serving of peas and fruit cocktail on their plate.
Provider: *"You can have more if you eat everything on your plate."*
Child eats everything over the course of 10 minutes and then gets more meatballs.

Child asks, *"Can I have more fish sticks?"*
Provider: *"I will give you more if you eat your beans and fruit."*
Child starts to cry and have tantrum.

Provider ignores the child.

Some providers simply complied with the children's requests. They rarely used such opportunities to help the child assess feelings of hunger or thirst before providing children with seconds. For example:

Child finished noodles, but still has other food on his plate.
Child: *"I want more noodles!"*
Provider [giving child more noodles]: *"Okay, your mommy is going to be so proud!"*

Child: *"I want more pizza."*
Provider brings that child one more slice and the other children another slice too.

Other providers responded to children's requests with bribes. Knowing a child wanted more of one food was used to encourage children to try the uneaten foods on their plate. For example, "*I'll give you more fish sticks if you eat your beans and fruit*."

Being "All Done"

Observations also captured situations in which children expressed that they were "all done" with their meal or snack (35 out of 227 interactions; 15%). Providers responded with both coercive controlling practices as well as autonomy supportive practices (18 vs 17, respectively. With regards to coercive controlling practices, pressuring children to eat more was frequently observed. For example:

Child: *"I'm done with my goldfish."*
Provider asks her to *"eat 5 more pieces"*.
Child says *"No"*.

Only once did observations capture a provider using this situation to inquire about the child's feelings of hunger. Examples of the more common response include:

After eating one bite of food child says*, "I'm finished"*.

Provider: *"Hurry up and eat! We are going bowling soon."*

Child did not eat anymore.

Attempts for Praise or Attention

Children were often seeking praise or attention for eating certain foods (21 out of 227 interactions; 9%). Most often providers responded by praising children for trying the foods, eating a certain food or cleaning their plates. Although the use of praise is consistent with autonomy supportive practices, this type of praise was for eating all or eating more food. For example:

Child: *"I am almost done with my plate!"*

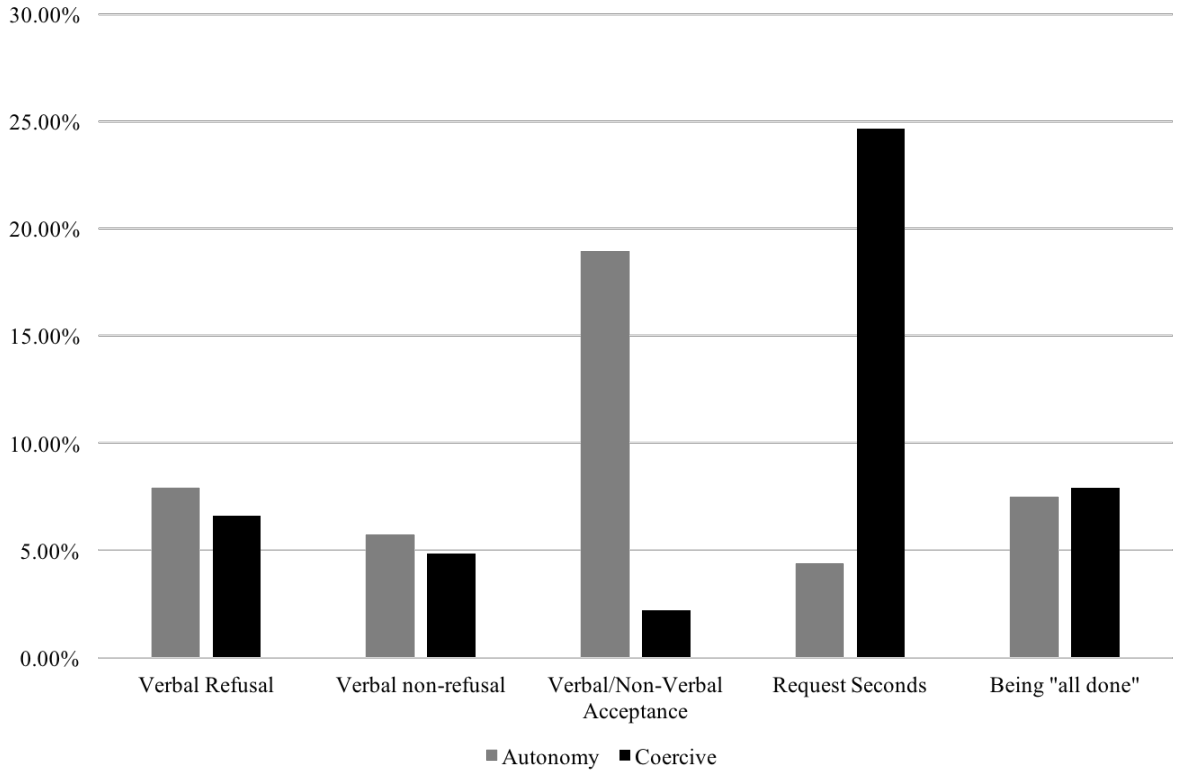
Provider: *"That is a happy plate!"*

On occasion, the provider responded to these situations to exert pressure on a different child. For example:

Child: *"I ate all my green beans!"*

Provider looks at other child and asks, *"Did you eat all of yours?"*

Figure 1: Frequency of Child Behaviors and Provider's Feeding Practice Responses



*Percentages reported are out of total number of interactions coded for (n=227)

Table 1: Examples of Provider Autonomy Support and Structure versus Coercive Control Responses to Child Behaviors

	Provider Reaction	
	Resulted in Feeding Practices Consistent with Autonomy Support or Structure	**Resulted in Feeding Practice consistent with Coercive Control**
Child Behavior		
Verbal child refusal (e.g., "Eww", "I don't want this")	Child: *"I don't like the crust."* Provider: *"Well why don't you try some? Just a bite, so you know if you like it."*	Child said *"No"* to eating Cheerios. Provider told him he had to eat them because she didn't want him to be hungry before lunch.
Non-verbal child refusal	Two children would not eat their waffles, so provider cut waffles into bite size pieces.	In response to child not liking pineapple, provider says *"eat your pineapple and then we can go on the swings"*. Child did not want to eat sweet potatoes, so provider spoon fed to make her try them. Child was eating grits, but hadn't touched his pears yet. Provider: *"Let's see if we can get you to eat some of your pears."* Provider spoon-feds pears to child. Provider: *"Mhmm good!"*

Verbal and non-verbal child approval (e.g., eating without complaint, eating quietly)	Child was eating cereal and drinking milk. Provider: *"I see those muscles forming!"* Child was eating veggies. Provider: *"Mmm, vegetables! Good job eating your vegetables!"* Child was eating green beans. Provider: *"Peas are some of my favorite veggies, yours too?"* Provider praises child for eating peas.	
Child Asks for Seconds	Child: "*Can I have some more strawberries?"* Provider: *"Can you taste this noodle right here for me? Taste this [peach] too and tell me what it is."* Child: *"I want some more corn!"* Provider: *"Let's try to eat your peas, and your corn, and your rice…. Then you can have some more. Look at me eat my peas! Mhmm*	Child finished milk and raised empty cup to provider. Provider: *"How about you eat your grapes and I'll give you more milk?"* Child: *"Can I have more water?"* Provider: *"After you eat your bagel."* Child: *"I want more broccoli."* Provider: *"You got to eat your noodles first."*

	good!" Child asked, *"Can I have another juice [pouch]?"* Provider: *"Well I'll get you some water if you're still thirsty."* Child finished waffles and nectarines and asked for three more waffle sticks. Provider: *"Well how about you start with two and I'll give you a third if you're still hungry."* Child asked *"Can I have more chicken?"* Provider said *"there's no more chicken left"*, but offered him seconds of pineapple or cucumbers.	Child: *"I want more too!"* Provider: *"You know you have to eat everything on your plate before you get more."*
Child "all done"	Child: *"I'm finished."* Provider: *"You are? What about the milk?"* Child shakes head *"No"*. Provider: *"Okay."* Kids told provider they're *"all done"* eating. Provider*: "Okay, try some of*	Child said: *"I'm done with my milk"* [but it was not finished]. Provider said she needed to drink her milk if she wanted a sticker. Child: *"I'm done!"* Provider: *"Sit back down and taste some of your milk now!*

	your milk before throwing away your plate." Children complied.	*You can go outside if you drink your milk."*
Child wants Praise or Attention	Child showed provider that she was eating [Child is a picky eater]. Provider: *"I'm so proud of you!"*	Child: *"I'm drinking my milk!"* Provider: *"Yeah, I'm proud of you!"* Provider said she will give child a sticker for finishing her milk. Child told provider that she had some banana. Provider: *"That's good! Now eat some more!"*

In general, no differences were observed across meal occasions between breakfast, lunch or snack times with the one exception noted earlier around requests for seconds. For breakfast, the providers used practices that were consistent with autonomy support 18% of the time vs. 16% which were consistent with coercive control. For lunch providers used practices that were consistent with autonomy support 24% vs. 23% of coercive controlling practices, and for snack times, 8% corresponded to autonomy supportive vs. coercive controlling practices 11% of the time

Discussion

For many young children, child-care providers can play an important role in shaping habits around food and eating. The meals and snacks consumed at child-care contribute a significant portion of their dietary intake (Ball, Benjamin, & Ward, 2008; Fox M, 1997; Story et al., 2006). Additionally, providers' feeding practices, like those of parents, can influence

children's dietary intake, eating behaviors, and food preferences (Benjamin Neelon, Briley, & American Dietetic, 2011; Blaine et al., 2015; Dev, McBride, & Team, 2013; Gubbels, Gerards, & Kremers, 2015; Hendy, 2002). This study has allowed a deeper exploration of these provider-child feeding interactions and demonstrated that the feeding practices providers use are at least partially a reaction to children's behaviors. Specifically, many of these interactions were initiated by children's refusals for certain foods, both verbally and non-verbally, to which providers responded with a mix of autonomy supporting and coercive practices. Children's acceptance of certain foods was often reinforced with autonomy supporting practices such as praise, and children sometimes pointed out how well they were eating as a way to elicit this praise. Children's requests for seconds were often met with coercive practices as they were often asking for seconds of less healthy foods while healthy ones remained on their plate. Providers also did not trust when children indicated they were done eating and often used coercive, controlling feeding practices to get children to eat more.

Only recently have studies begun to explore the bi-directional nature of caregiver-child feeding interactions, and almost all of this literature has focused on parents. The nascence of this area of research provides few opportunities for comparison; however, one theme that does emerge is caregivers' need to respond to food refusals. Recent studies with parents have found that they report greater use of controlling and restrictive feeding practices with children who are fussy or picky eaters (Farrow, Galloway, & Fraser, 2009; J. E. Gregory, S. J. Paxton, & A. M. Brozovic, 2010; Powell, Farrow, & Meyer, 2011). This study showed similar results in that child food refusal was common during feeding interactions and that this often lead providers to respond with coercive control practices such as pressure, insistence, threats, and spoon-feeding. In addition, we were able to capture both verbal and non-verbal refusals – this has not been done in previous studies. However, providers also responded with practices consistent with autonomy support and structure such as encouragement, reasoning, and modeling. This is similar to what has been observed in the parent feeding literature, although the directionality remains unclear, whereby parents' use of neutral prompts, and praise was significantly associated with child eating compliance whereas parental threats were associated with child refusal (Orrell-Valente et al., 2007). Because providers used autonomy support and structure practices as well as coercive control practices in response to

child food refusals, we were able to explore the effectiveness of these different strategies. Although the study was not designed to assess outcomes of these interactions, it was noted that children were more likely to eat or try the target food when the provider used these more responsive practices. These results seem to support current hypotheses that autonomy support and structure practices, which align closely with responsive feeding, are more successful strategies to promote healthy eating habits in children (Black & Aboud, 2011; DiSantis, Hodges, Johnson, & Fisher, 2011; Engle & Pelto, 2011; Orrell-Valente et al., 2007).

In response to a child asking for seconds, providers consistently used practices that were not consistent with autonomy support. Providers were well intentioned in that they were trying to encourage children to eat healthy foods still on their plate or to ensure that they had eaten enough food, a finding consistent with a study of Head Start providers (Ramsay et al., 2010) and also observed in the parent feeding literature (Mena, Gorman, Dickin, Greene, & Tovar, 2015). However, these practices are being set up more as a bribe ("if you eat what is on your plate first then you can have another food") which may unintentionally interfere with the development of healthy food preferences (Anez, Remington, Wardle, & Cooke, 2013; Rodenburg, Kremers, Oenema, & van de Mheen, 2014; Sleddens, Kremers, De Vries, & Thijs, 2010). Future research is needed to try and disentangle these nuance verbal comments and how they may relate to child dietary intake and weight status. The feeding literature suggests that practices that are not consistent with supporting a child's ability to self-regulate their dietary intake may in fact interfere with a child's internal cues for satiety and hunger, and can therefore contribute to the development of obesity (Birch, 1999). Interestingly, providers did not typically try to assess children's hunger or fullness in these situations.

This study begins to address a clear gap in the literature around provider-child feeding interactions; however, it does have certain limitations. First, the study was designed as exploratory, incorporating open-ended questions into an observation protocol. To help ensure some comparability across observations, the standard EPAO data collector training was enhanced to clearly define the types of interactions of interest and the information and level of detail that should be recorded. However, structure of these open-ended questions could be improved to capture data more consistently. While not required in the original protocol,

capturing quotes or the back-and-forth conversation between provider and child can be very informative when trying to assess the nuances that may be needed to accurately distinguish between autonomy supportive and coercive controlling practices. It would also be helpful to capture the outcome of the interaction (e.g., whether or not the child ate food initially refused) to assess the impact of providers' feeding practices. Furthermore, it would be helpful to capture repeated interactions between a provider and a specific child to see if this influenced the provider's response (e.g., does the provider take a different approach when the child is repeatedly refusing to eat food that day?). Additionally, this study was not designed to assess child-level factors such as temperament, which may also influence providers' use of different feeding practices. In spite of these limitations, this study represents an important step toward understanding provider-child feeding interactions.

These findings point towards several notable bilateral associations between feeding practices and child behaviors, offer useful qualitative data for hypothesis generation, and identify several provider behaviors that could be targeted in future intervention studies. We found that a child's response to food as well as their satiety cues influence what feeding practices a provider may in turn elicit. Future studies should try to capture these child-provider feeding interactions in a systematic way and assess the extent to which they are associated with child dietary intake and child weight status. In addition, these studies should also take into account a child's individual eating behavior such as food responsiveness or food fussiness which may influence feeding practices utilized by the provider (de Barse et al., 2015; Jane E Gregory, Susan J Paxton, & Anna M Brozovic, 2010a, 2010b; Pauline W Jansen et al., 2012). Several problematic feeding behaviors were also identified that highlight the need for better provider training on how to respond to children's food refusals and how to help children become more responsive to their internal cues of satiety and hunger (Rosenthal, Crowley, & Curry, 2013). Although there is some evidence that training in nutrition practices may result in improved center policies and increased provider knowledge (Alkon et al., 2014; Sigman-Grant et al., 2011), more research is needed on how child-care providers can develop and use responsive feeding practices leading to healthy eating behavior in the children in their care.

Acknowledgments

Funding for this research was provided by early career diversity grant funds for Alison Tovar, 3R01HL108390-03S1 from the National Institutes of Health, Bethesda MD

References

Alkon, A., Crowley, A. A., Neelon, S. E., Hill, S., Pan, Y., Nguyen, V., . . . Kotch, J. B. (2014). Nutrition and physical activity randomized control trial in child care centers improves knowledge, policies, and children's body mass index. *BMC Public Health, 14*, 215. doi: 10.1186/1471-2458-14-215

Anez, E., Remington, A., Wardle, J., & Cooke, L. (2013). The impact of instrumental feeding on children's responses to taste exposure. *Journal of Human Nutrition and Dietetics, 26*(5), 415-420.

Ball, S. C., Benjamin, S. E., & Ward, D. S. (2008). Dietary intakes in North Carolina child-care centers: are children meeting current recommendations? *Journal of the American Dietetic Association, 108*(4), 718-721.

Benjamin Neelon, S. E., Briley, M. E., & American Dietetic, A. (2011). Position of the American Dietetic Association: benchmarks for nutrition in child care. *J Am Diet Assoc, 111*(4), 607-615. doi: 10.1016/j.jada.2011.02.016

Berge, J. M. (2009). A review of familial correlates of child and adolescent obesity: what has the 21st century taught us so far? *Int J Adolesc Med Health, 21*(4), 457-483.

Bergmeier, H., Skouteris, H., & Hetherington, M. (2015). Systematic research review of observational approaches used to evaluate mother-child mealtime interactions during preschool years. *American Journal of Clinical Nutrition, 101*(1), 7-15. doi: DOI 10.3945/ajcn.114.092114

Bergmeier, H. J., Skouteris, H., Haycraft, E., Haines, J., & Hooley, M. (2015). Reported and Observed Controlling Feeding Practices Predict Child Eating Behavior after 12 Months. *Journal of Nutrition, 145*(6), 1311-1316. doi: 10.3945/jn.114.206268

Birch, L. L. (1999). Development of food preferences. *Annu Rev Nutr, 19*, 41-62. doi: 10.1146/annurev.nutr.19.1.41

Black, M. M., & Aboud, F. E. (2011). Responsive feeding is embedded in a theoretical framework of responsive parenting. *J Nutr, 141*(3), 490-494. doi: 10.3945/jn.110.129973

Blaine, R. E., Davison, K. K., Hesketh, K., Taveras, E. M., Gillman, M. W., & Benjamin Neelon, S. E. (2015). Child Care Provider Adherence to Infant and Toddler Feeding Recommendations: Findings from the Baby Nutrition and Physical

Activity Self-Assessment for Child Care (Baby NAP SACC) Study. *Child Obes, 11*(3), 304-313. doi: 10.1089/chi.2014.0099

Blissett, J. (2011). Relationships between parenting style, feeding style and feeding practices and fruit and vegetable consumption in early childhood. *Appetite, 57*(3), 826-831. doi: 10.1016/j.appet.2011.05.318

Blissett, J., Meyer, C., & Haycraft, E. (2006). Maternal and paternal controlling feeding practices with male and female children. *Appetite, 47*(2), 212-219.

Bollella, M. C., Spark, A., Boccia, L. A., Nicklas, T. A., Pittman, B. P., & Williams, C. L. (1999). Nutrient intake of Head Start children: home vs. school. *J Am Coll Nutr, 18*(2), 108-114.

Cashdan, E. (1994). A sensitive period for learning about food. *Hum Nat, 5*(3), 279-291. doi: 10.1007/BF02692155

Cooke, L. J., Chambers, L. C., Anez, E. V., & Wardle, J. (2011). Facilitating or undermining? The effect of reward on food acceptance. A narrative review. *Appetite, 57*(2), 493-497. doi: 10.1016/j.appet.2011.06.016

Davison, K. K., & Birch, L. L. (2001). Childhood overweight: a contextual model and recommendations for future research. *Obes Rev, 2*(3), 159-171.

de Barse, L. M., Tiemeier, H., Leermakers, E. T., Voortman, T., Jaddoe, V. W., Edelson, L. R., . . . Jansen, P. W. (2015). Longitudinal association between preschool fussy eating and body composition at 6 years of age: The Generation R Study. *International Journal of Behavioral Nutrition and Physical Activity, 12*(1), 153.

Dev, D. A., McBride, B. A., & Team, S. K. R. (2013). Academy of Nutrition and Dietetics benchmarks for nutrition in child care 2011: are child-care providers across contexts meeting recommendations? *J Acad Nutr Diet, 113*(10), 1346-1353. doi: 10.1016/j.jand.2013.05.023

DiSantis, K. I., Hodges, E. A., Johnson, S. L., & Fisher, J. O. (2011). The role of responsive feeding in overweight during infancy and toddlerhood: a systematic review. *Int J Obes (Lond), 35*(4), 480-492. doi: 10.1038/ijo.2011.3

Dwyer, J. T., Suitor, C. W., & Hendricks, K. (2004). FITS: New insights and lessons learned. *J Am Diet Assoc, 104*(1 Suppl 1), s5-7. doi: 10.1016/j.jada.2003.10.028

Engle, P. L., & Pelto, G. H. (2011). Responsive feeding: implications for policy and program implementation. *J Nutr, 141*(3), 508-511. doi: 10.3945/jn.110.130039

Farrow, C. V., Galloway, A. T., & Fraser, K. (2009). Sibling eating behaviours and differential child feeding practices reported by parents. *Appetite, 52*(2), 307-312. doi: 10.1016/j.appet.2008.10.009

Flynn, M. A., McNeil, D. A., Maloff, B., Mutasingwa, D., Wu, M., Ford, C., & Tough, S. C. (2006). Reducing obesity and related chronic disease risk in children and youth: a synthesis of evidence with 'best practice' recommendations. *Obes Rev, 7 Suppl 1*, 7-66. doi: 10.1111/j.1467-789X.2006.00242.x

Fox M, G. F., Endahl J, Wilde J. (1997). Early childhood and child care study. . Alexandria, VA: US Department of Agriculture: .

Gibson, E. L., Kreichauf, S., Wildgruber, A., Vogele, C., Summerbell, C. D., Nixon, C., . . . Grp, T.-S. (2012). A narrative review of psychological and educational strategies applied to young children's eating behaviours aimed at reducing obesity risk. *Obesity Reviews, 13*, 85-95. doi: 10.1111/j.1467-789X.2011.00939.x

Gregory, J. E., Paxton, S. J., & Brozovic, A. M. (2010). Pressure to eat and restriction are associated with child eating behaviours and maternal concern about child weight, but not child body mass index, in 2- to 4-year-old children. *Appetite, 54*(3), 550-556. doi: 10.1016/j.appet.2010.02.013

Gregory, J. E., Paxton, S. J., & Brozovic, A. M. (2010a). Pressure to eat and restriction are associated with child eating behaviours and maternal concern about child weight, but not child body mass index, in 2-to 4-year-old children. *Appetite, 54*(3), 550-556.

Gregory, J. E., Paxton, S. J., & Brozovic, A. M. (2010b). Research Maternal feeding practices, child eating behaviour and body mass index in preschool-aged children: a prospective analysis. *Int J Behav Nutr Phys Act, 7*(1), 55.

Gubbels, J. S., Gerards, S. M., & Kremers, S. P. (2015). Use of food practices by childcare staff and the association with dietary intake of children at childcare. *Nutrients, 7*(4), 2161-2175. doi: 10.3390/nu7042161

Gubbels, J. S., Kremers, S. P., Stafleu, A., Dagnelie, P. C., de Vries, N. K., & Thijs, C. (2010). Child-care environment and dietary intake of 2- and 3-year-old children. *J Hum Nutr Diet, 23*(1), 97-101. doi: 10.1111/j.1365-277X.2009.01022.x

Gubbels, J. S., Raaijmakers, L. G., Gerards, S. M., & Kremers, S. P. (2014). Dietary intake by Dutch 1- to 3-year-old children at childcare and at home. *Nutrients, 6*(1), 304-318. doi: 10.3390/nu6010304

Guest, G., MacQueen, Kathleen and Namey, Emily. (2011). *Applied Thematic Analysis*: Sage.

Hendy, H. M. (1999). Comparison of five teacher actions to encourage children's new food acceptance. *Ann Behav Med, 21*(1), 20-26. doi: 10.1007/BF02895029

Hendy, H. M. (2002). Effectiveness of trained peer models to encourage food acceptance in preschool children. *Appetite, 39*(3), 217-225.

Hendy, H. M., & Raudenbush, B. (2000). Effectiveness of teacher modeling to encourage food acceptance in preschool children. *Appetite, 34*(1), 61-76.

Horn, M. G., Galloway, A. T., Webb, R. M., & Gagnon, S. G. (2011). The role of child temperament in parental child feeding practices and attitudes using a sibling design. *Appetite, 57*(2), 510-516. doi: DOI 10.1016/j.appet.2011.06.015

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*(1), 130.

Jansen, P. W., Tharner, A., van der Ende, J., Wake, M., Raat, H., Hofman, A., . . . Tiemeier, H. (2014). Feeding practices and child weight: is the association bidirectional in preschool children? *American Journal of Clinical Nutrition, 100*(5), 1329-1336.

Johnson, J. O. (2005). Who's Minding the Kids? Child Care Arrangements: Winter 2002. P70-101.

Klesges, R. C., Malott, J. M., Boschee, P. F., & Weber, J. M. (1986). The Effects of Parental Influences on Childrens Food-Intake, Physical-Activity, and Relative Weight. *International Journal of Eating Disorders, 5*(2), 335-346. doi: Doi 10.1002/1098-108x(198602)5:2<335::Aid-Eat2260050212>3.0.Co;2-T

Krueger, R. A., & Casey, M. A. (Eds.) (Ed.). (2000). *Focus groups: A practical guide for applied research* (Third ed.). California: Sage Publications.

May, A. L., Donohue, M., Scanlon, K. S., Sherry, B., Dalenius, K., Faulkner, P., & Birch, L. L. (2007). Child-feeding strategies are associated with maternal concern about children becoming overweight, but not children's weight status. *Journal of the American Dietetic Association, 107*(7), 1167-1174. doi: DOI 10.1016/j.jada.2007.04.009

McGowan, L., Croker, H., Wardle, J., & Cooke, L. J. (2012). Environmental and individual determinants of core and non-core food and drink intake in preschool-aged children in the United Kingdom. *Eur J Clin Nutr, 66*(3), 322-328. doi: 10.1038/ejcn.2011.224

Mena, N. Z., Gorman, K., Dickin, K., Greene, G., & Tovar, A. (2015). Contextual and Cultural Influences on Parental Feeding Practices and Involvement in Child Care Centers among Hispanic Parents. *Child Obes*. doi: 10.1089/chi.2014.0118

Nicklas, T. A., Baranowski, T., Baranowski, J. C., Cullen, K., Rittenberry, L., & Olvera, N. (2001). Family and child-care provider influences on preschool children's fruit, juice, and vegetable consumption. *Nutr Rev, 59*(7), 224-235.

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. doi: DOI 10.1016/j.appet.2006.06.006

Ostbye, T., Mann, C. M., Vaughn, A. E., Namenek Brouwer, R. J., Benjamin Neelon, S. E., Hales, D., . . . Ward, D. S. (2015). The keys to healthy family child care homes intervention: study design and rationale. *Contemp Clin Trials, 40*, 81-89. doi: 10.1016/j.cct.2014.11.003

Padget, A., & Briley, M. E. (2005). Dietary intakes at child-care centers in central Texas fail to meet Food Guide Pyramid recommendations. *J Am Diet Assoc, 105*(5), 790-793. doi: 10.1016/j.jada.2005.02.002

Pearson, N., Biddle, S. J. H., & Gorely, T. (2009). Family correlates of fruit and vegetable consumption in children and adolescents: a systematic review. *Public Health Nutrition, 12*(2), 267-283. doi: 10.1017/S1368980008002589

Powell, F. C., Farrow, C. V., & Meyer, C. (2011). Food avoidance in children. The influence of maternal feeding practices and behaviours. *Appetite, 57*(3), 683-692. doi: DOI 10.1016/j.appet.2011.08.011

Prevention, C. f. D. C. a. (2000). CDC Growth Charts. Retrieved October 10, 2007, from http://www.cdc.gov/nccdphp/dnpa/growthcharts/resources/sas.htm

Ramsay, S. A., Branen, L. J., Fletcher, J., Price, E., Johnson, S. L., & Sigman-Grant, M. (2010). "Are you done?" Child care providers' verbal communication at mealtimes that reinforce or hinder children's internal cues of hunger and satiation. *J Nutr Educ Behav, 42*(4), 265-270. doi: 10.1016/j.jneb.2009.07.002

Ritchie, L. D., Welk, G., Styne, D., Gerstein, D. E., & Crawford, P. B. (2005). Family environment and pediatric overweight: what is a parent to do? *J Am Diet Assoc, 105*(5 Suppl 1), S70-79.

Rodenburg, G., Kremers, S. P., Oenema, A., & van de Mheen, D. (2014). Associations of parental feeding styles with child snacking behaviour and weight in the context of general parenting. *Public Health Nutrition, 17*(05), 960-969.

703 Rosenthal, M. S., Crowley, A. A., & Curry, L. (2013). Family child care providers' self-
704 perceived role in obesity prevention: working with children, parents, and
705 external influences. *J Nutr Educ Behav, 45*(6), 595-601. doi:
706 10.1016/j.jneb.2013.03.016
707 Sigman-Grant, M., Christiansen, E., Fernandez, G., Fletcher, J., Johnson, S. L., Branen, L., &
708 Price, B. A. (2011). Child care provider training and a supportive feeding
709 environment in child care settings in 4 states, 2003. *Prev Chronic Dis, 8*(5), A113.
710 Skinner, J. D., Carruth, B. R., Wendy, B., & Ziegler, P. J. (2002). Children's food
711 preferences: a longitudinal analysis. *J Am Diet Assoc, 102*(11), 1638-1647.
712 Sleddens, E. F., Kremers, S. P., De Vries, N. K., & Thijs, C. (2010). Relationship between
713 parental feeding styles and eating behaviours of Dutch children aged 6–7.
714 *Appetite, 54*(1), 30-36.
715 Story, M., Kaphingst, K. M., & French, S. (2006). The role of child care settings in obesity
716 prevention. *Future of Children, 16*(1), 143-168. doi: DOI 10.1353/foc.2006.0010
717 Tovar A, V. A., Fallon M, Ward D. (June 2015). *Modifying the Environment and Policy*
718 *Assessment and Observation tool to better capture feeding practices of family child*
719 *care providers.* Paper presented at the International Society of Behavioral
720 Nutrition and Physical Activity Edinburgh.
721 Troiano, R. P., Berrigan, D., Dodd, K. W., Masse, L. C., Tilert, T., & McDowell, M. (2008).
722 Physical activity in the United States measured by accelerometer. *Med Sci Sports*
723 *Exerc, 40*(1), 181-188.
724 Vaughn AE, W. D., Fisher JO, Faith MS, Hughes SO, Kremers S, et al. . (In Press).
725 Fundamental constructs in food parenting practices: A conceptual model to
726 guide future research. . *Nutrition Reviews.*
727 Vereecken, C. A., Keukelier, E., & Maes, L. (2004). Influence of mother's educational level
728 on food parenting practices and food habits of young children. *Appetite, 43*(1),
729 93-103. doi: 10.1016/j.appet.2004.04.002
730 Vollmer, R. L., & Mobley, A. R. (2013). Parenting styles, feeding styles, and their
731 influence on child obesogenic behaviors and body weight. A review. *Appetite, 71*,
732 232-241. doi: 10.1016/j.appet.2013.08.015
733 Ward, D., Hales, D., Haverly, K., Marks, J., Benjamin, S., Ball, S., & Trost, S. (2008). An
734 instrument to assess the obesogenic environment of child care Centers. *Am J*
735 *Health Behav, 32*(4), 380-386.
736