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

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24

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

26

27 **Abstract**

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

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62 Formation of dietary intake patterns, eating behaviors, and food preferences begin in early
63 childhood (Cashdan, 1994; Dwyer, Sutor, & Hendricks, 2004; Skinner, Carruth, Wendy, &
64 Ziegler, 2002) and are greatly influenced by children's adult caregivers (Davison & Birch,
65 2001; Ritchie, Welk, Styne, Gerstein, & Crawford, 2005). During early childhood, these
66 adult caregivers include not only the child's parents/guardians but often child care providers.
67 Over 60% of children under the age of 5 regularly spend time under someone else's care
68 (Flynn et al., 2006; Johnson, 2005; Nicklas et al., 2001; Story, Kaphingst, & French, 2006).
69 For children in full-time child care, approximately 50% of their daily dietary intake comes
70 from meals and snacks eaten in this setting (Bollella et al., 1999; Gubbels, Raaijmakers,
71 Gerards, & Kremers, 2014; Padget & Briley, 2005).

72

73 Adult caregivers help shape children's food intake and eating behaviors through their feeding
74 practices (Cooke, Chambers, Anez, & Wardle, 2011; Gibson et al., 2012; McGowan, Croker,
75 Wardle, & Cooke, 2012; Pearson, Biddle, & Gorely, 2009; Vereecken, Keukelier, & Maes,
76 2004). For example, parents' use of autonomy supporting practices such as encouragement
77 and praise have been associated with higher dietary quality (e.g., greater fruit and vegetable
78 intake) (Vollmer & Mobley, 2013); while their use of coercive practices such as restriction
79 and pressure to eat have been associated with poorer dietary quality (e.g., lower fruit and
80 vegetable intake, higher eating more sweet and savory snacks) and eating habits (e.g., eating
81 in the absence of hunger) (Berge, 2009; Blissett, 2011; Blissett, Meyer, & Haycraft, 2006) .
82 Studies with child care providers are limited; however, their feeding practices are thought to
83 have a similar influence on children's food intake and eating behaviors. Child care providers
84 use of enthusiastic role modeling (Hendy, 1999; Hendy & Raudenbush, 2000) and talking
85 with children about healthy foods (Gubbels et al., 2010) have been associated with healthier
86 eating habits in children.

87

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

91 refusals have been shown to elicit more frequent prompts to eat by parents (H. Bergmeier,
92 Skouteris, & Hetherington, 2015; Klesges, Malott, Boschee, & Weber, 1986). In addition,
93 child temperamental traits such as low adaptability to new situations and low persistence in
94 the face of obstacles have been associated with greater use of pressure to eat and restriction
95 by parents (Horn, Galloway, Webb, & Gagnon, 2011). Child weight, specifically being
96 overweight/obese, has also been associated with parents' use of discouragement or negative
97 comments during meals and restriction of energy dense snack foods (H. Bergmeier et al.,
98 2015; H. J. Bergmeier, Skouteris, Haycraft, Haines, & Hooley, 2015; P. W. Jansen et al.,
99 2014; May et al., 2007). Exploration of these relationships is a relatively new area of research
100 focused exclusively to date on parent-child interactions. Given the important role that child
101 care providers currently play in feeding young children (Fox M, 1997), better understanding
102 of these provider-child feeding interactions is important. Knowing such information could
103 help inform future intervention efforts. This qualitative study begins to address this critical
104 gap in the literature by using direct observation to examine these provider-child feeding
105 interactions within an intimate child-care setting, family child-care homes (FCCH).

106

107 **Methods**

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

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

125
126 For the current study, the EPAO was further modified to capture providers' responses to
127 children's eating behaviors. This modification added prompts to data collectors to capture
128 brief descriptions of episodes where children's behaviors influenced providers' feeding
129 practices. Data collectors collected these descriptions for all meals and snack times observed
130 (typically including breakfast, lunch and afternoon). A study-specific 1.5 hour training was
131 incorporated into the existing EPAO training protocol. This training was conducted by the
132 lead author (AT) and provided data collectors with examples and possible scenarios of what
133 children might do or say to elicit such interaction. Data collectors were instructed to look for
134 child behaviors such as verbal and nonverbal food refusal, food acceptance, food requests
135 (e.g. asking for seconds/more, wanting praise/attention), and lost hunger/interest in food (e.g.
136 playing with food, talking, leaving the table, "all done"). These examples were identified
137 based on previous work video-taping provider-child interactions in FCCHs in Rhode Island
138 (Tovar A, June 2015) and discussions between investigators and experienced data collectors.
139 While these specific examples were given to data collectors to provide guidance around
140 appropriate types of interaction to capture, data collectors were also instructed to capture
141 descriptions of any observed interactions they thought might be relevant. These written
142 episode descriptions captured the child behavior that initiated the interaction and the
143 subsequent provider response.

144
145 This additional information was collected through observation of 48 family child-care
146 providers, of which 28 had data on two days and 20 had data on one day, resulting in a total
147 of 200 observed meals (70 breakfasts, 76 lunches and 68 snack times). The data collected
148 represents the children who spoke during the meal or who elicited a non-verbal gesture (e.g.
149 pushing plate away). The qualitative data captured on these observations provided
150 descriptions of the interactions only, but no labeling or categorization of provider feeding
151 practices and child behaviors. Once data collection was complete, all hand-written

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

154

155 Analysis of these data began with a general review and discussion of all written descriptions
156 (conducted by MF and AT) (Krueger, 2000). A recently developed food parenting practices
157 content map (Vaughn AE, In Press) helped guide the coding of the data and categorization of
158 provider practices into three higher order constructs: coercive control, structure, or autonomy
159 support. *Coercive control* reflects attempts to dominate, pressure or impose the provider's
160 will upon the child and includes practices such as restriction, pressure to eat, threats and
161 bribes, and soothing with food. *Structure* is a provider's way of organizing a child's
162 environment to facilitate the child's competence and includes rules and limits, monitoring,
163 meal and snack time routines, modeling, food availability and accessibility, food preparation,
164 and permissiveness. *Autonomy support* provides sufficient structure within which the child
165 can be involved in making food choices that are developmentally appropriate and includes
166 guided choices, child involvement, encouragement and support, praise, reasoning, and
167 negotiation. Based on this content map a codebook with definitions and examples was
168 developed and utilized throughout the coding process. These higher order constructs were
169 used as structural codes to categorize the data (Guest, 2011). With the codebook and the
170 definitions being used, the transcripts were systematically reviewed whereby text segments
171 were assigned to corresponding structural codes and then categorized into themes.

172 Interactions that were not relevant or useful were removed. Once organized into central
173 themes, child initiated interactions were further categorized into feeding practices that were
174 consistent with autonomy supportive practices or coercive controlling practices, based on
175 how the provider reacted to a child. Throughout the coding process, MF and AT met to
176 discuss findings and reach consensus when there were disagreements and/or when there were
177 questions about coding, by revisiting the parenting content map. Total interactions were
178 summed to calculate frequencies and percentages. Differences of interactions consistent with
179 autonomy supportive practices vs. those that were consistent with coercive control were
180 explored across different meal types (breakfast, lunch and snack times). Concepts and themes
181 were then reviewed multiple times to ensure that all of the *a priori* and emergent themes
182 were captured.

183

184

185 **Results**

186

187 All 48 providers were female; most were non-Hispanic African-American (75%) or White
188 (19%). Approximately half had a high school or associate's degree (56.5%) and almost 40%
189 had bachelor's degree. The majority were obese (77% obese) or overweight (18%). Within
190 the 48 homes, there were also 130 participating children. Children were, on average, 3.3
191 years (± 1.1) years old; half were female. The majority of children were normal weight
192 (67%), but a third was either overweight (13%) or obese (20%). In all of the homes,
193 providers served the children a plated meal rather than a family style meal.

194

195

196 Across the 200 observed meals and snack times, 505 interactions were captured. However
197 meals in which observers coded "no interactions occurred" (n=33) were excluded. Another
198 62 interactions were identified as provider-initiated and were removed from the analysis to
199 focus on child-initiated interactions. Lastly, 183 additional interactions that were irrelevant
200 qualitative notes (e.g., child spilling milk, provider making phone calls during meals,
201 conversations during mealtimes) or interactions unrelated to self-regulation/satiety (e.g.
202 child tells provider, "If I try my peaches, they will be delicious". Provider replies, "Good.
203 They are delicious.") were also excluded. The final analysis sample therefore included 227
204 child-provider interactions.

205

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

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

217

218 Verbal Refusals of Food

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

224

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

229

230 *Child: "I don't like beans"*

231 *Provider: "Beans are good for you. They help you ride your bike and stay strong"*

232

233 *Child: "Eww!"*

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

235

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

239

240 *Child kept saying: "I don't want to eat my bagel".*

241 *Provider: "C'mon, eat it! Eat more so we can go to the park!"*

242

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

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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).

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

277

278 Child picked out every pea from the mixed veggie dish.

279 Provider: *“You are going to eat every pea on that plate!”*

280

281 Child would not eat pancake.

282 Provider tried to feed the child pancake, but the child refused again.

283 Provider: *“If you don’t eat your pancakes, you’re going to be hungry later!”*

284 Child continued to ignore provider.

285

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

289

290 Child would not eat oatmeal.

291 Provider: *“Let’s take another bite of your oatmeal. Show me like a big boy so you can
292 have big muscles!”*

293 Child takes a bite.

294 Provider: *“Yay! You took a bite. Take another and come give me a big high-five!”*

295

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

298

299 Provider: *“Can you at least taste one? They are really good!”*

300 Other child chimed in and said *“...beans are good too.”*

301

302 Verbal and Non-Verbal Acceptance of Food

303 Children’s compliance with eating foods served was also noted along with provider response
304 (48 out of 227 interactions; 21%). Children’s approval of a food could be verbal, such as

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

310

311 Child eats their blueberries

312 Provider: *“Mmmmm, isn’t that blueberry good?”*

313

314 Child eats banana

315 Provider: *“Oh, I saw you eat that banana! That’s right, eat that banana!”*

316

317 Requests for Seconds

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

327

328 Child asks: *“Can I have more meatballs?”* when she still has full serving of peas and
329 fruit cocktail on their plate.

330 Provider: *“You can have more if you eat everything on your plate.”*

331 Child eats everything over the course of 10 minutes and then gets more meatballs.

332

333 Child asks, *“Can I have more fish sticks?”*

334 Provider: *“I will give you more if you eat your beans and fruit.”*

335 Child starts to cry and have tantrum.

336 Provider ignores the child.

337

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

341

342 Child finished noodles, but still has other food on his plate.

343 Child: *"I want more noodles!"*

344 Provider [giving child more noodles]: *"Okay, your mommy is going to be so proud!"*

345

346 Child: *"I want more pizza."*

347 Provider brings that child one more slice and the other children another slice too.

348

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

352

353 Being "All Done"

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

359

360 Child: *"I'm done with my goldfish."*

361 Provider asks her to *"eat 5 more pieces"*.

362 Child says *"No"*.

363

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

366

367 After eating one bite of food child says, *“I’m finished”*.
368 Provider: *“Hurry up and eat! We are going bowling soon.”*
369 Child did not eat anymore.

370
371 Attempts for Praise or Attention

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

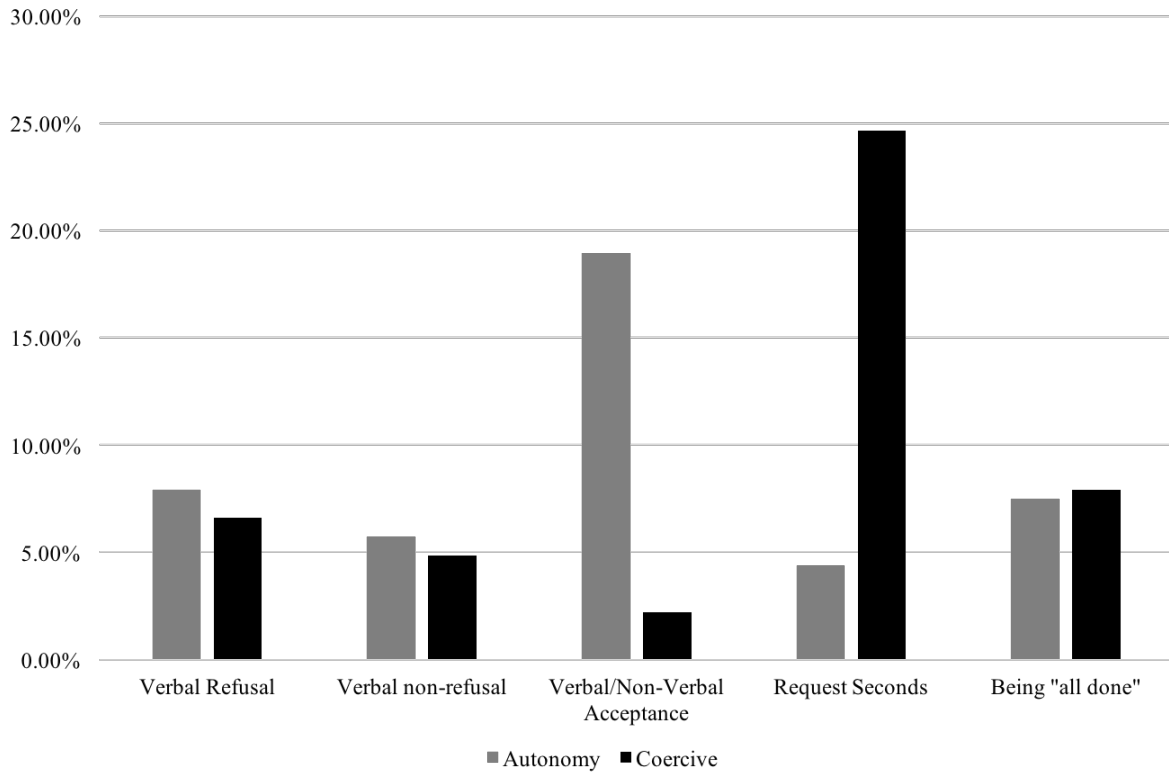
377
378 Child: *“I am almost done with my plate!”*
379 Provider: *“That is a happy plate!”*

380
381 On occasion, the provider responded to these situations to exert pressure on a different child.
382 For example:

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384 Child: *“I ate all my green beans!”*
385 Provider looks at other child and asks, *“Did you eat all of yours?”*

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398 **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)

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413 **Table 1:** Examples of Provider Autonomy Support and Structure versus Coercive Control
 414 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”)	<p>Child: <i>“I don’t like the crust.”</i></p> <p>Provider: <i>“Well why don’t you try some? Just a bite, so you know if you like it.”</i></p>	<p>Child said <i>“No”</i> to eating Cheerios.</p> <p>Provider told him he had to eat them because she didn’t want him to be hungry before lunch.</p>
Non-verbal child refusal	<p>Two children would not eat their waffles, so provider cut waffles into bite size pieces.</p>	<p>In response to child not liking pineapple, provider says <i>“eat your pineapple and then we can go on the swings”</i>.</p> <p>Child did not want to eat sweet potatoes, so provider spoon fed to make her try them.</p> <p>Child was eating grits, but hadn’t touched his pears yet.</p> <p>Provider: <i>“Let’s see if we can get you to eat some of your pears.”</i></p> <p>Provider spoon-feds pears to child.</p> <p>Provider: <i>“Mhmm good!”</i></p>

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

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

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

415

416

417 In general, no differences were observed across meal occasions between breakfast, lunch or
 418 snack times with the one exception noted earlier around requests for seconds. For breakfast,
 419 the providers used practices that were consistent with autonomy support 18% of the time vs.
 420 16% which were consistent with coercive control. For lunch providers used practices that
 421 were consistent with autonomy support 24% vs. 23% of coercive controlling practices, and
 422 for snack times, 8% corresponded to autonomy supportive vs. coercive controlling practices
 423 11% of the time

424

425

426 **Discussion**

427 For many young children, child-care providers can play an important role in shaping habits
 428 around food and eating. The meals and snacks consumed at child-care contribute a significant
 429 portion of their dietary intake (Ball, Benjamin, & Ward, 2008; Fox M, 1997; Story et al.,
 430 2006). Additionally, providers’ feeding practices, like those of parents, can influence

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

444
445 Only recently have studies begun to explore the bi-directional nature of caregiver-child
446 feeding interactions, and almost all of this literature has focused on parents. The nascence of
447 this area of research provides few opportunities for comparison; however, one theme that
448 does emerge is caregivers' need to respond to food refusals. Recent studies with parents have
449 found that they report greater use of controlling and restrictive feeding practices with
450 children who are fussy or picky eaters (Farrow, Galloway, & Fraser, 2009; J. E. Gregory, S.
451 J. Paxton, & A. M. Brozovic, 2010; Powell, Farrow, & Meyer, 2011). This study showed
452 similar results in that child food refusal was common during feeding interactions and that this
453 often lead providers to respond with coercive control practices such as pressure, insistence,
454 threats, and spoon-feeding. In addition, we were able to capture both verbal and non-verbal
455 refusals – this has not been done in previous studies. However, providers also responded with
456 practices consistent with autonomy support and structure such as encouragement, reasoning,
457 and modeling. This is similar to what has been observed in the parent feeding literature,
458 although the directionality remains unclear, whereby parents' use of neutral prompts, and
459 praise was significantly associated with child eating compliance whereas parental threats
460 were associated with child refusal (Orrell-Valente et al., 2007). Because providers used
461 autonomy support and structure practices as well as coercive control practices in response to

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

469
470 In response to a child asking for seconds, providers consistently used practices that were not
471 consistent with autonomy support. Providers were well intentioned in that they were trying to
472 encourage children to eat healthy foods still on their plate or to ensure that they had eaten
473 enough food, a finding consistent with a study of Head Start providers (Ramsay et al., 2010)
474 and also observed in the parent feeding literature (Mena, Gorman, Dickin, Greene, & Tovar,
475 2015). However, these practices are being set up more as a bribe (“if you eat what is on your
476 plate first then you can have another food”) which may unintentionally interfere with the
477 development of healthy food preferences (Anez, Remington, Wardle, & Cooke, 2013;
478 Rodenburg, Kremers, Oenema, & van de Mheen, 2014; Sleddens, Kremers, De Vries, &
479 Thijs, 2010). Future research is needed to try and disentangle these nuance verbal comments
480 and how they may relate to child dietary intake and weight status. The feeding literature
481 suggests that practices that are not consistent with supporting a child’s ability to self-regulate
482 their dietary intake may in fact interfere with a child’s internal cues for satiety and hunger,
483 and can therefore contribute to the development of obesity (Birch, 1999). Interestingly,
484 providers did not typically try to assess children’s hunger or fullness in these situations.

485
486 This study begins to address a clear gap in the literature around provider-child feeding
487 interactions; however, it does have certain limitations. First, the study was designed as
488 exploratory, incorporating open-ended questions into an observation protocol. To help ensure
489 some comparability across observations, the standard EPAO data collector training was
490 enhanced to clearly define the types of interactions of interest and the information and level
491 of detail that should be recorded. However, structure of these open-ended questions could be
492 improved to capture data more consistently. While not required in the original protocol,

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

504

505 These findings point towards several notable bilateral associations between feeding practices
506 and child behaviors, offer useful qualitative data for hypothesis generation, and identify
507 several provider behaviors that could be targeted in future intervention studies. We found that
508 a child's response to food as well as their satiety cues influence what feeding practices a
509 provider may in turn elicit. Future studies should try to capture these child-provider feeding
510 interactions in a systematic way and assess the extent to which they are associated with child
511 dietary intake and child weight status. In addition, these studies should also take into account
512 a child's individual eating behavior such as food responsiveness or food fussiness which may
513 influence feeding practices utilized by the provider (de Barse et al., 2015; Jane E Gregory,
514 Susan J Paxton, & Anna M Brozovic, 2010a, 2010b; Pauline W Jansen et al., 2012). Several
515 problematic feeding behaviors were also identified that highlight the need for better provider
516 training on how to respond to children's food refusals and how to help children become more
517 responsive to their internal cues of satiety and hunger (Rosenthal, Crowley, & Curry, 2013).
518 Although there is some evidence that training in nutrition practices may result in improved
519 center policies and increased provider knowledge (Alkon et al., 2014; Sigman-Grant et al.,
520 2011), more research is needed on how child-care providers can develop and use responsive
521 feeding practices leading to healthy eating behavior in the children in their care.

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524

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