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ORIGINAL PAPER

Children's Influence on Parents: the Bidirectional Relationship in Family Meal Selection

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Abstract

Feeding a child in the 21st century can be challenging. A child's diet is thought to be a parent's responsibility, and numerous studies have explored how parents influence their child's food intake through food availability, feeding practices, and modeling. However, this relationship is likely bidirectional such that the child influences the parent as well (sometimes called "pester power"). Pester power has been studied in grocery stores and restaurants. However, no research to date investigates how children influence parent's food selection when eating at home. This study addresses this gap by asking parent and child dyads ($N = 79$, 95% white) to create meals together and separately. Forty 6–8 and thirty-nine 13–15 year-olds participated. Most of the parents (97.5%) and children (49.4%) who participated were female; and parents reported an average annual income of over 80,000 dollars (68.3%). Mean differences in the nutrient content of the meals were analyzed using repeated measures ANOVAs to examine the strength of influence in the bidirectional relationship. Results suggested when children were present for meal selection, they exerted influence over their parents for more palatable items. When choosing foods as a dyad versus when the parent selected meals for the family, the foods contained more calories, sugar, and less fiber. Protein was the only nutrient that parents influenced in their child's selections. These findings have important implications for understanding the often-overlooked bidirectional dynamic of the feeding relationship, and the accompanying health outcomes of child dietary intake.

Keywords Pester power · Child influence · Bidirectionality · Family dynamic · Food decisions

Highlights

- This study helps bridge a gap in the literature on how children influence parental meal decisions when eating in the home.
- This study used a behavioral measure with four tasks to examine the influence children had in meal selection.
- Results have implications for family functioning, particularly in understanding the bidirectional nature of the parent-child dynamic surrounding food.

One in five children in the United States are classified as obese (CDC, 2020). Obesity has negative physical consequences for adults and children including hypertension and cardiovascular disease (Deckelbaum and Williams, 2001; Kelsey et al., 2013) and psychological outcomes such as higher rates of depression, anxiety, and bullying compared to average-weight peers (Rankin et al., 2016). A poor diet, coupled with sedentary behavior, can increase the risk of obesity in children (Sahoo et al. 2015).

Though there are multiple influences on a child's diet (i.e., peers, school, media), the context that has received the most attention is the family. Parents have primary responsibility for feeding their children. Indeed, previous research shows that when parents make more healthy options available at home, a child's fruit and vegetable intake increases (Loth et al., 2015). In addition, parents can also influence their child's diet by modeling functional food practices as children look to their guardians to learn how to behave in meal situations (Campbell et al., 2006; Sharps et al., 2015). Parents who prioritize family meals have more routines and expectations surrounding a meal

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(Friend et al., 2015). During these meals, parents have the opportunity to model and communicate balanced food choices, which has been related to increased healthy food intake (Fulkerson et al., 2010; Vaughn et al., 2018). Similarly, a limited amount of research suggests that when parents involve their children in food preparation, the child's fruit and vegetable intake increases (Ohly et al., 2013; Chu et al., 2014).

According to Ellyn Satter's Division of Responsibility model, parents and children have unique roles with regard to selecting food. Parents should be responsible for deciding what, when, and where food is offered, and children should be responsible for deciding whether and how much to eat (Satter, 1996, 2014). Adherence to this division of responsibility is linked to good child nutrition outcomes (Ruder & Lohse, 2017). However, research suggests that few parents follow this division of responsibility closely, especially concerning snacks (Loth et al., 2018), instead often letting children choose which foods are served.

Indeed, research that concerns how dyads make decisions (about things other than food) has found there are various ways that dyads can work together to make a decision, and each party involved has a unique role in the decision making process (Petrocchi et al., 2021). Importantly, decisions between two individuals, such as a parent and a child, are never additive. Depending on the relationship between the two individuals making the decision, the interaction and compromise that occurs may look very different (Brinberg & Jaccard, 1988). In addition, the power dynamic between the members of the dyad influences how they work together and the result of the decision (Locke and Anderson 2015). This has been studied in patient-provider relationships and between partners, and indicates that each individual has a role in the decision-making process which might vary based on individual differences and situations (Krueger, 1983; Schmid et al., 2010; Schuldt et al., 2015; LeBlanc et al., 2009).

A form of dyadic decision-making has been studied in the unique roles parents and children play when they make decisions about food. As a result of the power dynamic, parents are typically looked to as solely responsible for their child's diet. For example, parents may decide that their whole family is going to follow a special diet (i.e., all organic, gluten free, etc.) This may be in response to personal/family preference or necessity because of food allergies or sensitivities (Begen et al., 2017). Therefore, only diet-compliant foods would be found in the home. In addition, parents may modify their feeding practices in response to their child's weight status or typical eating behaviors (Jansen et al., 2017; Tschann et al. 2015). However, in practice, a child's diet is the result of the interaction in the parent-child dyad. Children naturally have a taste preference for foods that are packaged, processed, and nutrient poor (Snoek et al., 2010). As children prioritize taste and their food preferences when evaluating food options (Holsten et al., 2012), they might also deliberately try to influence the foods that their parents have available in the home or serve for eating occasions. Children's ability to create a situation where the parent compromises or modifies their food decision has sometimes been characterized as pester power. This can include successful efforts to convince parents to purchase particular foods (Siegel, 2019) through begging for the desired food item, politely requesting desired foods, and showing enthusiasm about certain food selections.

Most of the research on pester power has been done in the grocery store context (Huang et al., 2016, Swindle et al., 2020, Stoneman & Broky, 1982), documenting that during a single grocery store experience, children tried to persuade their parents to purchase nine food items (Holly et al., 2011). Parents agreed to these requests an average of six times (Siegel, 2019). The most requested items were candy, baked foods, chips, and cereal (Isler et al., 1987). One study (Monalisa, 2020) asked parents to report their perception of if their children influence them during grocery shopping. They found that 80% of parents reported they feel their child has at least 50% of the power in food purchasing decisions.

To further complicate the grocery shopping dynamic, children are targeted by marketing companies that advertise packaged and processed food directly to children. Marketing companies use cartoon characters, bright-colored packaging, and famous people to promote their products (Mehta et al., 2012). Seeing these products in the store, especially displayed at the child's eye level, may encourage children to ask their parents to purchase these highly palatable, low nutrition items (Musicus et al., 2015).

A limited amount of research has explored how this parent-child feeding dynamic functions in the restaurant setting. Children's menus can be an additional source of stress and influence in the dyad's dynamic as these menus tend to feature foods that are calorie and fat dense and nutrient poor. In the restaurant setting, most children determine what they will order when they arrive and have control over what food they choose to eat (Castro et al., 2016; McGuffin et al., 2014). Using unobtrusive observations and interviews after the dining experiences, Kasparian et al. (2017) found an interesting compromise that occurs. Parents allow children more freedom with regard to food choices in restaurants and object less to unhealthy options than when eating at home. However, parents expect children to behave better in restaurants compared to eating meals in the household in order not to disturb those around them.

The Current Study

To date, no research investigates the bidirectional nature of food decisions, and the child's role in impacting these

choices in meals served at home using a behavioral paradigm. The current study was part of a larger research effort to understand this phenomenon using both survey data from parents as well as the Build a Dinner behavioral measure described below. This behavioral measure consisted of four tasks during one Zoom videocall. The tasks were 1) the parent selecting foods for themselves/their partner, 2) the parent selecting foods for their family, 3) the parent and child selecting food for dinner together, and 4) the child selecting foods they would like their family to have for dinner. Hypotheses, tested with a series of repeated measures ANOVAs and post hoc comparisons between the tasks, were as follows:

1. The child's independent selections for dinner will have more calories, fat, and sodium and less fiber and protein than the parent's selections for the child (reflecting the child's preference for calorie dense, nutrient poor foods).
2. The parent's independent selections for themselves and their spouse will have fewer calories, fat, sugar, and sodium and more fiber and protein than what the parent selects for their family (reflecting that the parent has internalized their child's food preferences and caters to them).
3. When a parent and child choose together, their selections will have more calories, fat, sodium, and sugar and less protein and fiber than when the parent chooses for their family (reflecting the child's in the moment influence over food selection).
4. When the parent and child choose together, the selections will have less calories, fat, sugar, and sodium and more protein and fiber than when the child chooses alone (reflecting the parent's influence on the child).
5. Older children (age 13–15) will exhibit more influence on parental meal decisions than younger children (age 6–8).

Methods

Participants

One hundred and seven parent-child dyads were recruited. Families were excluded from the study if the parent and child could not complete the study (n = 3), were outside the age ranges (n = 21), or had severe dietary restrictions due to health ($n = 4$). Forty six-to-eight-year-olds and thirty-nine thirteen-to-fifteen year-olds participated. A power analysis was conducted with a repeated measures ANOVA in WebPower (Zhang & Yuan, 2018). A total sample of 66 parent-child dyads are adequate with a small effect size of 0.35 with 0.8 power. Most of the parents (96.2%) and children (93.7%) who participated were white, and the parents reported an average annual income of over 80,000 dollars (68.3%). A majority of the dyads reported that they were not following any special diet (75.9%). Among the 79 parent-child dyads, twelve dyads noted they followed a low carb diet, five reported following a gluten free diet, and two dyads indicated that their family follows a low-calorie style of eating. Dyads were recruited through snowball sampling, advertisements on social media, and by students in undergraduate psychology courses. In families with more than one parent, the guardian who self-identified as the individual who makes a majority of the meal decisions completed the study. Most of the parents who participated identified as female (97.5%). If families had more than one child in the age range, the child whose name came first alphabetically participated. Half of the children in the sample self-identified as female (49.4%). See Table 1 for additional demographic information.

Study Design

This study used a within family, experimental design.

Procedure

Children ages six-to-eight and thirteen-to-fifteen and their legal guardians were recruited from the Midwest United States to participate. Upon a parent's expressed interest, the researcher explained that the study was being conducted to investigate food decisions when eating in the home. Then, the researcher confirmed eligibility, scheduled a Zoom call, and received verbal consent to the study. Electronic consent and assent forms were signed via AdobeSign before the Zoom call was conducted, and parents completed a survey that collected demographic information, and included measures of perceived stress, the structure of family meals, problematic child mealtime behaviors, parental concern about a child's diet, spousal stress related to child mealtime behaviors, influence of child's food preferences on what other family members eat, goals in food choices, decision fatigue, and the child's

Table 1 Descriptive statistics of demographic variables

	Minimum	Maximum	Mean	SD
Child Age	6	15	10.56	3.45
Child Height	36.00	72.00	57.77	9.36
Child Weight	42	225	100.69	45.05
Annual Household Income	2	5	3.96	0.98
Child BMI Percentile	1.00	99.00	67.63	30.54

involvement in meals. During the Zoom call, additional verbal consent and assent were provided. Then, the parent completed two tasks of selecting options for dinner for themselves/spouses and their family. Next, the child joined the call and chose foods for dinner with their parent/guardian. Finally, the researcher watched the parent leave the room, and the child selected foods that they would like their family to have for dinner. All materials and analysis code are available by emailing the corresponding author. This study, hypotheses, and analytic plan were preregistered with Open Science Framework and are available at https://osf.io/5knr2/?view_only=cd6392b647884b1fbbcd56a054ade736. This study complies with APA's ethical standards and was approved by the Institutional Review Board at the authors' university.

Materials

Build a Dinner-Measure of Child Influence on Food Selection

For each of the four tasks, participants created four dinner meals (sixteen meals total) including one main dish, two side dishes, one dessert, and one drink. The parent/child was given twenty options for each part of the meal, randomized from a pool of 102 main dishes, 97 side dishes, 50 drinks, and 101 desserts. The foods presented in the study encompassed a wide variety of foods that included ethnic foods and items that were consistent with special diets such as gluten-free, organic, vegetarian, or vegan. If the randomly selected options did not appeal to the individual, participants could write in their own selection. Participants wrote in options for 1.7, 8.1, 2.7, and 29.8% of the main dishes, side dishes, desserts, and drinks respectively. The foods were presented as a picture with the name of the food without packaging or nutrition information. The foods were coded based on the calorie, fat, protein, sodium, sugar, and fiber content of each food. The nutrition information was primarily gathered from allrecipes.com and checked for accuracy on MyFitnessPal. If there was more than a 20% discrepancy between the two sites, the food was updated to reflect data from MyFitnessPal. Two researchers coded the nutrients and compared the findings to establish interrater reliability for the nutrients. Any discrepancies were discussed and agreed upon before moving forward. The same procedure was used for foods and drinks that were written in by participants. For analyses, the nutrients (i.e., calories, fat, sodium, fiber, protein, and sugar) of the foods selected in each task were averaged, and the means of the macronutrients in each task were compared. Significant mean differences between the nutrient content of the food parents selected for themselves/their spouses and the choices parents selected for a dinner with their family reflected the extent to which parents cater to their child's preferences even when the child does not help select foods (i.e., internalized child influence). The mean difference between the nutrient content of the meals created by the parent and child together and the parent's selections for dinner for the family reflected the extent to which having the child participate in meal decision making influences the parent (i.e., in the moment influence). Finally, significant mean differences between the nutrient content of the meals the child selects for the family and that selected by the dyad together reflected the parent's influence on the child (i.e., the extent to which working together on the meal selection changes the child's choices).

Results

A series of repeated measures ANOVAs examined differences between the tasks with regard to the macronutrients. The overall model for calories ($F(3,76) = 8.47$, $p < 0.001$, Partial $\eta^2 = 0.25$), sodium ($F(3,76) = 5.18$, $p = 0.003$, Partial $\eta^2 = 0.17$), sugar ($F(3,76) = 7.04$, $p < 0.001$, Partial $\eta^2 = 0.22$), protein ($F(3,76) = 5.09$, $p = 0.003$, Partial $\eta^2 = 0.17$), and fiber ($F(3,76) = 18.64$, $p < 0.001$) Partial $\eta^2 = 0.42$) were significant suggesting mean differences between the tasks.

Post hoc analyses were run to examine pairwise comparisons between the tasks with a Bonferroni correction. See Table 2 for means and standard deviations of the significant

Table 2 Means, standard deviations, and post hoc pairwise comparisons of study variables

	Mean	SD	Sig.
Child Food Preferences			
Child Calories	242.71	46.15	<0.001
Parent Calories	219.87	35.30	
Child Sugar	12.97	0.35	<0.001
Parent Sugar	11.13	3.02	
Child Fiber	1.79	0.48	0.005
Parent Fiber	1.94	0.43	
Internalized Child Influence			
Parent Family Calorie	219.87	35.29	0.003
Parent Spouse Calorie	239.69	44.01	
Parent Family Sugar	11.13	3.02	0.039
Parent Spouse Sugar	12.55	4.82	
Parent Family Fiber	1.86	0.37	0.001
Parent Spouse Fiber	2.14	0.44	
In the Moment Influence			
Parent Family Calories	219.87	35.30	0.013
Parent Child Calories	233.72	38.34	
Parent's Influence on their Child			
Parent Child Protein	8.62	1.69	0.010
Child Protein	7.79	1.74	

pairwise comparisons. To investigate child food preferences, the discrepancy between the nutrient content of foods selected when children selected alone and when the parents selected for the child was analyzed. Children selected dinners with significantly more calories and sugar and less fiber than when the parent chose for the child (see child food preferences in table) (Figs. 1 and 2). Concerning internalized child influence or the discrepancy between the macronutrients of what the parents chose for themselves/their spouse and what the parents chose for their child, there were also significant effects such that parents selected dinners for their family with fewer calories, sugar, and fiber than the calorie, sugar, and fiber content of foods when the parent chose for themselves and their spouse (see internalized influence in table). Furthermore, looking at the differences between when the parents chose for the child and when the parent and child chose together (i.e., how much children were able to influence in the moment of the food decision), there were significant effects such that parents and children together selected dinners with more calories than the parent chose for the family (see in the moment influence in table). Finally, to investigate if parents influenced their children's food decisions, the mean differences were analyzed between the nutrient content the parent and child selected together and the child selected alone. Parent-child dyads selected foods with more protein than when the children selected alone (see parent's influence on their child in table). No other nutrients were significantly different.

To examine possible age differences in the results, a series of multivariate ANOVAs were calculated by task. For the child choosing alone, the overall model ($F(6,72) = 4.97$,

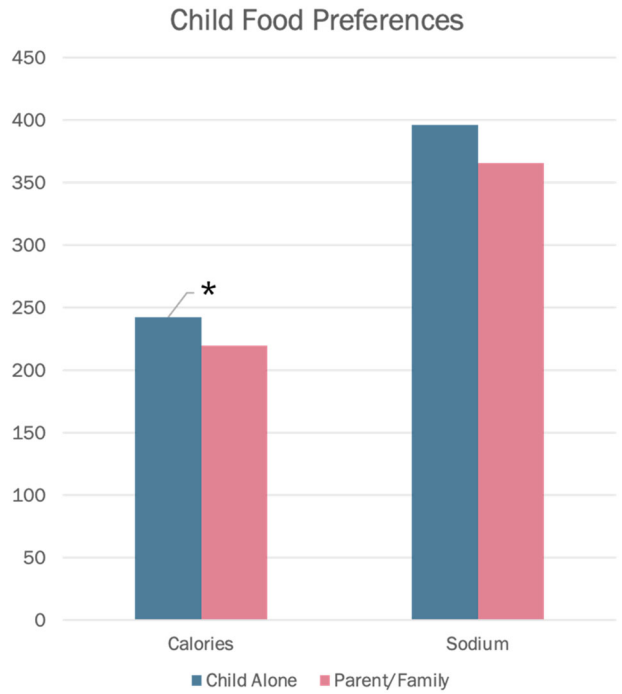

Fig. 1 Pairwise comparisons of Child Food Preferences for Calories and Sodium

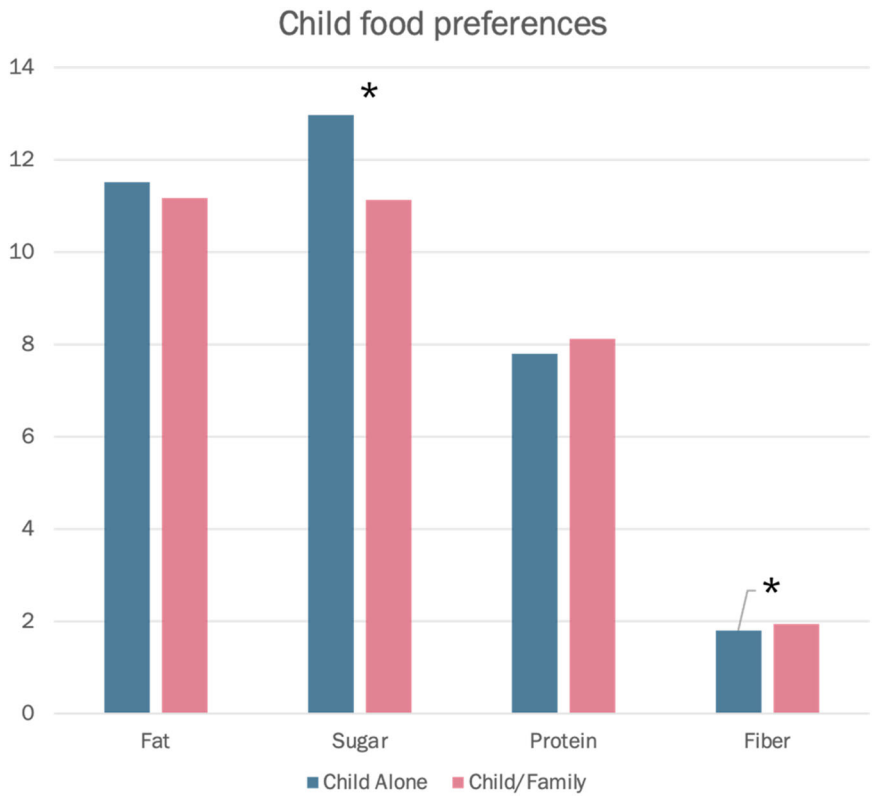

Fig. 2 Pairwise comparisons of Child Food Preferences for Fat, Sugar, Protein, and Fiber

$p < 0.001$) was significant. Posthoc tests indicated that 6–8 year olds ($M = 1.48$, $SD = 0.38$) chose foods with significantly less fiber than 13–15 year olds ($M = 1.78$, $SD = 0.36$, $p < 0.001$). When parents and children chose together, the overall model was not significant ($F(6,72) = 1.672$, $p = 0.140$). However, the 6–8 year-olds and their parents ($M = 13.3$, $SD = 3.50$) selected meals with more sugar than the 13–15 year-olds with their parents ($M = 11.24$, $SD = 3.77$; $p = 0.014$). No other macronutrients or tasks were significant by child age.

Discussion

The parent-child dynamic within the context of feeding is multifaceted, complex, and bidirectional. Although most research recognizes this bi-directionality, few studies have measured it directly. The current study was the first to examine the child's influence on their parents' food selections within the home using a behavioral paradigm. In general, children had more influence on their parents' selections than parents had on their children's.

In the current sample, when looking at the discrepancy between the nutrient content of food when the parent chose for the family and when the parent and child chose together (i.e., in the moment influence), children influenced their parents to select meals with significantly more calories which suggests that children are able to exert in the moment influence to modify food decisions. In contrast, when looking at the parent's influence on the child, or the mean differences between when the dyad chose foods together and when the child selected alone, the parent influenced the child to increase the protein in the selected foods. These findings are consistent with previous literature showing that children pester for highly palatable, low-nutrient foods in the grocery store and restaurant context (Isler et al.,1987), and with children's natural preference for sweet, high-fat foods over fruits and vegetables (Rioux & Wertz, 2021; Cornwell & McAlister, 2011). In the current task, children influenced the parent to select foods with an average of 18 more calories. Though these differences are small, over time they can have a large impact on weight status, not just for the children but also for the parents. Indeed, previous literature has found that consistently eating above the recommended nutritional values is related to obesity (Sahoo et al., 2015). Given that 42% of adults live with obesity (CDC, 2021), the influence that the child exerts on family food selection can have long-term consequences for every member of the family and should be investigated in greater detail in future studies.

It is also noteworthy that we used pictures of foods that did not have any packaging or brand name on them. The pictures included only a caption of the common name of the food. Even without packaging, children in this study still influenced their parents toward selecting foods that are nutrient poor. Given previous research on the impact of marketing on children's food preferences (Kraak & Pelletier, 1998; Story & French, 2004), it is possible that when packaging is available, the amount of child influence may be exacerbated.

Contrary to our hypothesis, parents selected meals for their family with healthier macronutrient profiles than they selected for themselves and their spouse (i.e., the mean differences between the nutrient content the parents selected for themselves/their partner and what they selected for their family). This might suggest that parents do not cater to children's preferences for higher fat, sugar, etc food when they select meals for their families. Alternatively, it might also indicate that parents see meals for themselves and their spouse as a special occasion (e.g., date night) to indulge in less healthy food options. Therefore, the influences surrounding food decisions may be context dependent and vary situationally within the family dynamic.

Finally, the child's age was largely unrelated to the amount of influence the child exhibited over food decisions. In other words, the influence that children have in the bidirectional relationship is consistent across the ages that were included in the study (6–15 years). In addition, parent influence did not differ across this age range, suggesting that parents want to provide nutrient dense food to their children, no matter their age (Lee-Kwan et al., 2018). A more nuanced understanding of this dynamic would be useful. For example, perhaps older children exert more control over their eating outside the home, but not in the home. It might also be the case that other factors are more important than child age in determining the amount of control children exert. For example, different parenting styles and feeding practices relate to the nutritional content of the meals they serve (Webber et al., 2010). Similarly, parents consider the weight status of their child and adapt their feeding practices accordingly (Jansen et al., 2017; Tschann et al., 2015). Future research should examine how parenting/feeding style or child weight status impacts how much influence a child has over meal decisions.

Though there were no differences by age with respect to the amount of influence children exerted, there were significant age differences in the nutrients of the foods selected. Children ages thirteen to fifteen chose foods with less sugar and more fiber than children ages six to eight. From a developmental perspective, as children grow, they have the cognitive and socio-emotional ability to start being autonomous in various aspects of their life. Therefore, older children might begin to show greater responsibility in food selection and to think about the longer term consequences of the foods they eat. For example, the older children in the

present study may be more aware of their nutritional needs and balance those needs with taste preferences.

These findings are also noteworthy within the larger context of family dynamics. Most research on the parent-child dyad has focused on how parents impact their children (Zemp et al., 2019). However, a growing body of research highlights the bidirectionality of this relationship in general (Chan et al., 2021) and in the arena of feeding (e.g., Ravindran et al. 2019, Berge et al., 2020). The bidirectional nature of food decisions was shown in this study without marketing labels for the food. The amount of child influence may be greater when common food brands or labels accompany the pictures of the food. The current findings add to this conceptualization and highlight the importance of considering the active role that children play in their development.

Limitations

Though this study provides important and novel contributions to the area of food decision making within parent-child relationships, it does not go without limitations. We collected data during the COVID-19 pandemic, which may have affected the results. The coronavirus has affected caregivers as they are under more stress, and they might not be able to uphold normal dietary habits at home (Jordan et al., 2021). In addition, research indicates that when parents were under increased stress related to the coronavirus pandemic, their children exhibited more problematic eating behaviors such as being fussy around food (Gonzalez et al., 2022). Therefore the dynamics between parents and children may shift during times of stress, or during the COVID-19 pandemic. Furthermore, as the majority of parents and children were working and going to school from home, the family dynamic may have changed with regard to food routines and decisions. Specifically, online ordering of food and groceries may have changed the food that is typically available in the home.

In addition, we utilized a cross-sectional design. As the parent-child relationship unfolds throughout the day, every day, this one timepoint of data might not fully capture these processes. Furthermore, parents and children were instructed to not think about any external variables (i.e., availability of ingredients, cost of food, ability to cook, etc) when selecting the foods. However, this still could have been an implicit factor when selecting each dish for the eating occasion. In turn, these results should be replicated naturalistically within the home or with families of varied socioeconomic backgrounds or with a variety of cooking skills. Additional external variables that were not measured in this study, but might impact how children influence food decisions, were birth order/number of siblings, parent weight status, and parent education. Finally, this sample was mostly white, financially comfortable, and resided in a rural area. As factors such as ethnicity and income undoubtedly influence family dynamics, future studies should look at how this bidirectional relationship between parents and children functions in other cultures, regions of the United States, demographic groups, and urban settings.

Conclusion

Understanding the parent-child relationship may better inform researchers about how food decisions are made within a family. Findings from the present study add to the literature to suggest that children exert an influence on their parents' food decisions at home. In addition, foods were presented here without marketing labels. Such labels are likely to increase a child's desire to select a particular food item, and might contribute to a larger child effect in the bidirectional food decisions. Understanding how decisions are made within a dyad regarding food can influence interventions that target healthy eating behaviors in children and parents to combat the public health concern of obesity in the United States.

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Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

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