



Published in final edited form as:

Appetite. 2022 July 01; 174: 106007. doi:10.1016/j.appet.2022.106007.

Associations of parent dietary role modeling with children's diet quality in a rural setting: Baseline data from the NU-HOME study

Jennifer A. Linde, PhD¹, Melissa L. Horning Dehmer, PhD², Jiwoo Lee, PhD, RN², Sarah Friend, MPH², Colleen Flattum, MS, RD¹, Chrisa Arcan, PhD, MHS, MBA, RD³, Jayne A. Fulkerson, PhD²

¹Division of Epidemiology & Community Health, School of Public Health, University of Minnesota, Minneapolis MN, 55454, USA

²School of Nursing, University of Minnesota, Minneapolis MN, 55455, USA

³Department of Family Medicine and Population Health, Division of Epidemiology, Virginia Commonwealth University, Richmond VA, 23284, USA

Abstract

These analyses examined associations of parent dietary role modeling with diet quality among school-age children in a rural community. Past research has found protective associations between parent role modeling and children's dietary intake; however, there is a gap in understanding these associations for families in rural communities. Baseline data (2017/2018) were drawn from the New Ulm at Home (NU-HOME) randomized controlled trial, conducted in the United States. The trial recruited 114 children (7-10 years old) and parents. Parents self-reported dietary intake [fruit and vegetable (FV), sugar-sweetened beverage (SSB), fast food (FF)] and frequency of sitting and eating with their child. Children reported parent role modeling of healthful eating (FV and salad at the evening meal; FV as snacks). Two 24-hour dietary recalls assessed child diet quality indicators [Healthy Eating Index-2015 (HEI-2015) total scores, FV intake, SSB intake]. General linear models (GLM) and logistic regression analyzed associations of child diet quality (HEI score, FV

Corresponding Author: Jennifer A. Linde, PhD, Division of Epidemiology & Community Health, School of Public Health, University of Minnesota, Minneapolis MN, 55454, USA; linde074@umn.edu.

Author Contributions

JAL conceived of this manuscript idea, analyzed the data, and wrote the draft in consultation with the research team.

MHD contributed to conceptualization and editing of this manuscript.

JL contributed to conceptualization and editing of this manuscript.

SF managed data collection and data reduction for the parent study and contributed to conceptualization and editing of this manuscript.

CF contributed to conceptualization and editing of this manuscript.

CA contributed to conceptualization and editing of this manuscript.

JAF conceived of the intervention, secured grant funding for the parent study, and contributed to conceptualization and editing of this manuscript.

All authors have approved the final article.

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The authors certify that there are no conflicts of interest to declare. All authors have reviewed and approved the final manuscript and accept full responsibility for all aspects of the work described here.

Parents gave informed consent before participating in the research described in this manuscript, and children provided assent. All research activities were approved by the University of Minnesota and Quorum Review Institutional Review Boards.

intake, SSB intake) with parent dietary intake, parent sitting and eating the evening meal with their child, and child perceptions of parent role modeling healthful eating, adjusted for highest level of education in the home. Higher child HEI-2015 scores were positively associated with more frequent parent role modeling of fruit intake at meals, and inversely associated with more frequent parent role modeling of fruit as a snack; no significant associations of child FV intake with parent role modeling were observed. Higher child SSB intake was positively associated with parent FF intake. In this rural community, parents play significant roles in shaping children's dietary quality and intake, though more work needs to be done to address optimal intervention strategies to promote parent role modeling of healthful eating.

Keywords

children; parents; role modeling; dietary intake; rural

1.0 Introduction

Role modeling, or providing examples of desired behaviors that may be observed and repeated by others, is a key feature of social-cognitive theories of behavior and a critical driver of child development (Bandura 1965; Bandura, 1986). One area of importance in child physiological and behavioral development is that of healthful dietary intake. Children in the United States typically do not meet recommended targets for intake of fruits and vegetables, which contribute to nutritional status, growth, and development (USDHHS & USDA, 2015). The home environment is the primary source of dietary exposures and development of dietary behaviors of children, and thus a key driver of dietary quality for children as well. At mealtimes that take place at home, children and parents are likely to eat together which provides opportunities for parents to act as dietary role models (Birch & Davison, 2001; Mahmood et al., 2021).

Past research has demonstrated associations between parent dietary intake behaviors and those of their children. Role modeling represents one avenue by which parent and child dietary intake behaviors come to show similarities. In a recent review of 83 studies of the effects of parent dietary intake or meal-related behaviors on children's dietary intake (Mahmood et al., 2021), eating behavior role modeling was defined broadly as whether parents provided, ate, or encouraged consumption of healthful foods. Eating behavior role modeling exerted significant influence on healthful dietary habits among children, including better overall diet quality, fruit and vegetable preference, and daily fruit and vegetable intake (e.g., de Bourdeaudhuij et al., 2008; Pearson, Biddle, & Gorely, 2008). In addition, a more recent study found positive cross-sectional associations of parent role modeling (i.e., consuming fruit in front of their children) with children's fruit intake (Flores-Barrantes et al., 2021).

Mahmood and colleagues (2021) noted in their review of the literature that "studies that have utilized both parent and child report" in relation to dietary role modeling are "very limited" (p. 5). Examinations of how parent role modeling indicators, as reported by both parent

and child, associate with children's dietary outcomes are needed to understand the relative contributions of those indicators to child diet quality.

Prior work by this research team addressed family mealtime as a means of preventing excess weight gain among children in an urban area (Fulkerson et al., 2015); in terms of outcomes, this trial was successful at fostering enhanced parent self-efficacy for understanding portion sizes, reduced sugar-sweetened beverage (SSB) consumption among children, and lower BMI z-scores among prepubertal child participants (Fulkerson et al., 2015; Fulkerson et al., 2018). In cross-sectional secondary analyses from this trial, we found positive associations between children's reports of parent's dietary role modeling and children meeting fruit/vegetable intake recommendations (Draxten et al., 2014). Another study from this trial examined nine indicators of family meal behaviors (e.g., parent reports of family members sitting and eating together; child reports of parents sitting with them while they ate) and found positive associations between parents sitting and eating with the child and child's fruit/vegetable intake and better diet quality, evidenced by higher Healthy Eating Index-2010 (HEI-2010) scores (Horning et al., 2016).

The prior trial described above, and many other studies designed to examine associations between parent role modeling and dietary intake among children, have focused primarily on households in suburban or urban areas (e.g., Draxten et al., 2014; Horning et al., 2016; Mahmood et al., 2021). However, rural children experience higher rates of overweight and obesity than their urban counterparts (Davis et al., 2011; Hales et al., 2017; Johnson & Johnson, 2015; Liu et al., 2012; Ogden et al., 2018) and less is known about the unique patterns of excess weight gain risk that may exist in rural environments (Forbes et al., 2020; Liu et al., 2012; Ogden et al., 2018; Strohlic, Au, & Ritchie, 2017). Childhood obesity is a complex condition influenced by many factors, including unhealthful dietary intake, level of physical activity, and social and physical environmental factors (Gurnani, Birken, & Hamilton, 2015; Kumar & Kelly, 2017; Weihrauch-Blüher & Wiegand, 2018), and the relative focus on urban or suburban communities has left a gap in understanding of role modeling and dietary intake patterns in rural communities. Given that residing in rural areas is associated with a greater risk of obesity in children, then a better understanding of why children from rural areas are more likely to develop excess adiposity is warranted; enhancing our understanding of parent-child dietary role modeling in rural communities may assist in reducing these disproportionate risks.

Therefore, the goal of this secondary data analysis was to examine patterns of association of parent role modeling (parent sitting and eating with child at evening meal, parent dietary intake, child perceptions of parent role modeling) with diet quality indicators (HEI total score and fruit and vegetable intake as healthful contributors and SSB intake as an unhealthful contributor) in children in a rural community in the United States. This examination provides a unique opportunity to examine parent and child reports of relevant parental mealtime behaviors and dietary intake simultaneously, and to examine the relative contributions of those indicators to child diet quality in an understudied, at-risk population.

2.0 Methods

Baseline measurements were collected in summer 2017 and summer 2018 for the New Ulm at Home (NU-HOME) study, a randomized controlled trial to test the effects of family-based intervention in a universal prevention program to address excess weight gain prevention among rural youth in Minnesota. One hundred fourteen children ages 7-10 and their parent or guardian who identified as the primary meal preparer in the home (herein: parent) were recruited to the study. Study measurement has been described elsewhere and measures that are relevant to the present study are described below (Fulkerson et al., 2021). Parents gave informed consent before participating, and children provided assent. All research activities were approved by the University of Minnesota (reference number: 1509S78583) and Quorum Review (reference number: 806161) Institutional Review Boards.

2.1 Measures

2.1.1 Sample Demographics—Demographic data were collected by parent report at the baseline survey administration. Child and parent variables examined here included age (calculated from date of birth and survey date), sex (male or female), and race (Asian, African American, Native American, Pacific Islander, white, or more than one). Race data were transformed into a binary variable due to reported frequencies [white or Black, Indigenous, or People of Color (BIPOC)]. Highest level of education in the household was also measured (recoded as less than a bachelor's degree vs. bachelor's degree or higher).

2.1.2 Outcome Variables—Three outcomes associated with child dietary intake were considered here; each was derived from data collected in two researcher-facilitated dietary recall interviews conducted using the Automated Self-Administered 24-hr (ASA24) Dietary Assessment Tool, version 2016 (Park et al., 2018). One weekday and one weekend day were assessed, with the index parent reporting on the dietary intake of their child to enhance accuracy of reporting for children in the target age range for this study (Burrows et al., 2010); data were averaged across the two administrations. Healthy Eating Index (HEI) scores were calculated using 2015 criteria (HEI-2015: Krebs-Smith et al., 2018; Reedy et al., 2018) to obtain an overall diet quality score ranging from 0 to 100. The HEI-2015 total score includes 13 food or nutrient components (total fruits, whole fruits, total vegetables, greens and beans, whole grains, dairy, total protein foods, seafood and plant proteins, fatty acids, refined grains, sodium, added sugars, and saturated fats) that correspond with recommendations from the Dietary Guidelines for Americans (USDHHS & USDA, 2015). Average fruit and vegetable (FV) intake (cups per day) and SSB intake were calculated from recall data. For SSBs, consumption was identified based on intake of beverages with added sugars. Due to low intake frequencies, these data were coded to indicate SSB intake on one recall day, both recall days, or neither recall day and then classified for analysis as any intake versus no intake based on median split. While FV and added sugars (such as those found in SSBs) are incorporated in the HEI-2015 scores, we opted to consider these two variables as outcome measures to isolate the relative contribution of parent role modeling to these key outcomes and to examine associations of these outcomes with comparable parent role modeling and intake data in this sample.

2.1.3 Independent Variables—Parent dietary intake and role modeling variables, measured by psychosocial survey at the baseline visit, were examined for associations with child dietary outcomes. Parent dietary intake variables included parent FV, SSB, and fast food (FF) intake. FV intake was assessed with two single-item questions asking parents to indicate how many cups of fruit or vegetables they typically consume per day (from 0-5 or more cups) (Yarooh et al., 2012); items were summed into a single FV variable for analyses. Parent total SSB intake in the past week was measured by collapsing four SSB categories (regular sodas, Kool-Aid, sports drinks, vitamin water, flavored coffee/tea) into a single item with response options of 0, less than 1 drink per week, 1 drink per week, 2-4 drinks per week, 5-6 drinks per week, 1 drink per day, more than 1 drink per day (Park et al., 2015); this variable was dichotomized into none or less than one drink in the past week versus one or more drinks per week based on the median split in the distribution. Past week frequency of parent FF intake was measured with the following item: “In the past SEVEN DAYS, how often did YOU eat something from a fast food restaurant, such as McDonald’s, Burger King, Hardee’s, Domino’s or similar places? (pizza counts),” with response options of 0, 1-2 times, 3-4 times, 5-6 times, or 7 or more times (French & Jeffery, 2000; Neumark-Sztainer et al., 2003) and was treated as a quasi-continuous variable based on the distribution.

To capture role modeling, parents also reported the number of times in the past week that they sat and ate with their child at the evening meal, as part of a survey assessing family meal frequency (continuous, from 0-7 times in the past week). In addition, children were asked to report frequency of observing their parent eating fruits, vegetables, or leafy green salads at the evening meal or fruits and vegetables as snacks using the following items: “Please think about times you eat with (the parent or guardian who accompanied you to the study visit). As I ask you each question, choose the ONE answer that fits best. When I ask about the evening meal, that’s the meal you usually eat between 5 and 8 pm. When you are with your (parent), does (he or she) eat [fruit, vegetables] as a snack?” and “When you are with your (parent), does (he or she) eat [fruit, vegetables, leafy green salad] at the evening meal?”; response categories for all five items were: never, sometimes, or usually/always (Fulkerson et al., 2015; Fulkerson et al., 2018); these items were adapted from an existing validated dietary role modeling scale (Cullen et al., 2001). Due to low internal consistency of these items as a scale in the current sample (Cronbach’s $\alpha=.50$), they were considered as individual categorical variables.

2.2 Data Analyses

Data were analyzed using SAS® OnDemand for Academics software, v9.4 (SAS Institute Inc., 2014). Descriptive statistics were calculated for all demographic and analytic variables. Three outcome variables were examined using regression modeling: child HEI-2015 total score, child FV intake, and child SSB intake. General linear models (GLM) were used for continuous outcomes (HEI-2015 and FV); in addition, pairwise comparisons of least-squares means were examined for categorical variables in GLMs [dichotomous parent SSB intake, five child-reported parent role modeling variables with three categories each (parent eats vegetables, fruits, or salad at evening meal, or vegetables and fruits as snacks)]. Logistic regression was used for the categorical outcome (SSB). Independent variables in all models included parent FV, SSB, and FF intake, parent sitting and eating the evening meal with their

child, and child perceptions of parent role modeling of healthful eating (fruits, vegetables, and salads at the evening meal; fruits and vegetables as snacks). Models were adjusted for highest level of education in the home, based on associations of education with diet quality among adults (Hiza et al., 2013) and on the bivariate association of parent educational attainment with children's diet quality in this sample [HEI-2015 $t(112)=-1.19$, $p=.06$; FV $t(112)=-1.71$, $p=.09$].

3.0 Results

Study demographics are presented in Table 1. Nearly all parents (97%) and nearly 60% of children were female. The sample was majority white, with somewhat more racial diversity among children compared to responding parents. The average age of children in this study was approximately 9 years.

Descriptive statistics for outcome variables and associated variables of interest are presented in Table 2. Child average HEI-2015 score was 51.96, which is slightly lower than the average of 53.8 for children ages 6-11 reported in a nationally representative sample (Federal Interagency Forum on Child and Family Statistics, 2021). Child FV intake averaged 2.37 cups per day; only 10.5% met the recommendation of at least 4 FV cups/day (USDHHS & USDA, 2015; NCHS & USDA, 2016). Two-thirds of children reported consuming at least one SSB in the past week; the modal response was a report of SSB consumption on one dietary recall only, and only 10% of children reported consumption on both dietary recalls. Average parent FV intake was 3.82 cups/day; 36.8% of parents consumed at least 5 FV cups/day, the current recommended level (USDHHS & USDA, 2015; NCHS & USDA, 2016). Parents reported median SSB consumption of one drink in the past week, and they reported consuming fast food 1.5 times per week on average. Parents frequently sat and ate the evening meal with their children, averaging 5.34 meals per week. Children's reports of seeing their parents usually or always consuming healthful foods at meals were somewhat variable, with 44% reporting parents consuming vegetables, 33% reporting parents consuming fruits, and 27% reporting parents eating leafy green salads at evening meals. Only 19% of children reported parents usually or always eating vegetables as snacks, and only 23% reported parents usually or always eating fruit as snacks.

Tables 3a and 3b present results from the general linear models examining associations between parent role modeling variables and dietary intake outcomes. Higher HEI-2015 total scores were observed for children whose parents usually or always ate fruit at evening meals, compared to those whose parents did sometimes [55.71 (2.31) vs. 50.16 (2.01), $p=0.02$ for paired comparison of least squares mean scores]. In contrast, lower HEI-2015 total scores were observed for children whose parents usually or always ate fruit as a snack, compared to those whose parents sometimes did so [49.31 (2.35) vs. 54.31 (1.64), $p=0.04$ for paired comparison of least squares mean scores]; no other associations in the HEI-2015 regression model were statistically significant. No statistically significant associations of child FV intake with parent dietary intake and role modeling variables were observed in the child FV intake general linear model (Table 3b).

Table 3c presents results from the logistic regression examining associations between parent role modeling variables and dietary intake variables with child SSB intake. Higher odds of SSB consumption were observed for children whose parents ate more fast food in the past week (OR=1.94, 95% CI=1.16-3.23, $p=0.01$); no other associations in the logistic regression model were statistically significant.

4.0 Discussion

This paper examined associations of parent role modeling of healthful eating behaviors with diet quality in children living in rural communities in the United States, where nutrition-related health disparities exist (Davis et al., 2011; Liu et al., 2012). In the present analyses, we considered the relative contributions of multiple role modeling indicators: parent dietary intake, parent sitting and eating with children at evening meals, and children's perceptions of their parents as role models for intake of healthful meals and snacks. Results suggest that children's observations of their parents have some effect on their own diet quality, supporting the general premise that parent role modeling makes a meaningful contribution to children's dietary intake.

As expected, higher HEI-2015 total scores were associated with children's observations of their parent usually consuming fruit at evening meals. These results correspond well with previous large-scale studies and reviews of the literature, indicating that parent behaviors at mealtime influence children's dietary intake patterns (e.g., de Bourdeaudhuij et al., 2008; Mahmood et al., 2021; Pearson et al., 2008). Data from families in a metropolitan area in proximity to the rural area reported here (within 2 hours by car) corroborate our observed associations of fruit consumption at evening meals in this rural sample. Survey data from 1928 parents in the same metropolitan area indicated that 32.5% of parents usually or always served fruit at dinner (Neumark-Sztainer et al., 2014), which is comparable to the data on fruit role modeling observed in the present study. Another study of 120 families assessed household food availability via home food inventory and found a significant association between availability of fruits (fresh, canned, or frozen) at home and parents serving fruits at dinner (Trofholz et al., 2016). However, we did not observe other significant effects of role modeling on HEI-2015 total scores, which are composed of many factors that were not captured in our role modeling variables (i.e., whole grains, dairy, total protein foods, seafood and plant proteins, fatty acids, refined grains, sodium, added sugars, and saturated fats).

We also did not observe any significant associations of parent role modeling with FV intake as a separate marker of child diet quality independent of the HEI-2015 total score, which may suggest that parent influences have a greater effect on children's overall dietary intake as described by the multicomponent HEI-2015, relative to potential influences on FV intake alone. Alternatively, these findings may be driven by a low frequency of children who met dietary guidelines for FV intake (10.5%), suggesting homogeneity of relatively low intake that may obscure role modeling effects, if any exist. It could also be that our findings capture the importance of fruit availability at evening meals as a marker of overall household diet quality; home food availability analyses were beyond the scope of this paper and future analyses will examine associations with dietary indicators to elucidate these relationships further.

Interestingly, and contrary to expectations, we observed a significant association between parents usually eating fruit as a snack with lower HEI-2015 total scores in children: children whose parents frequently snack on fruit have diet quality scores that are approximately five points lower than those of children whose parents sometimes or never engage in fruit snacking. Possible explanations for this finding are numerous. It could be that parents who keep fruit in the house for snacks rather than for meals end up consuming that fruit themselves, that the types of fruits they have on hand are not of interest to their children as snacks, or that parents are not always successful at encouraging their children to consume those fruits that are available. Additionally, it could be that snacking on fruit displaces snacking on other foods (whole grains or vegetables) which may be consumed less frequently and could contribute to higher HEI-2015 total scores, or that availability of fruit has no association with overall household diet quality in this sample. However, as just under 25% of children reported that their parents usually ate fruit as snacks (compared to 33% who observed their parents eating fruit at the evening meal), it is also likely that this result is due to children not seeing their parents snacking often enough to observe an influential effect on children's intake.

Also in line with past literature (e.g., Lopez et al., 2012), we found a significant association of greater parent fast food intake frequency with higher likelihood of child SSB consumption. These primary school-aged children have relatively limited independence and relatively greater reliance on parents to provide food compared to older children or adolescents. Thus, when parents are more likely to source food from fast food restaurants, where soft drinks are widely available, this provides ample opportunity for exposing children to greater consumption of SSBs. Parent fast food intake was not associated similarly with children's HEI-2015 total scores or FV intake, however. Given that parents reported a relatively low rate of fast food consumption in this sample (approximately 1.5 times per week on average), it could be that those meals act as a primary source of SSBs without detracting from overall diet quality of these children. It is also likely, given that fast food consumption frequency is associated with restaurant proximity (e.g., USDA ERS, 2018), that reduced proximity to fast food restaurants in a geographically sparser rural area contributes to reduced consumption of fast food overall, which would influence children's dietary patterns in this rural sample.

We observed no associations between parents sitting and eating with their children and all child diet quality outcomes in this study, which is also contrary to expectations from past studies (e.g., Hammons & Fiese, 2011; Horning et al., 2016). Given that parents reported a high average frequency of sitting and eating with their children at the evening meal (5.3 days per week), it is possible that there was not enough variance to observe a significant effect of this critical family mealtime behavior on child diet quality outcomes in this sample. In addition, we did not assess parent encouragement to eat healthful foods during those mealtimes, which is a key component of diet quality in children that may explain associations in previous research (Mahmood et al., 2021; Pearson et al., 2008) and should be explored in future research.

Results in this rural community sample reinforce past reviews indicating that parent role modeling contributes to healthful dietary intake in children, though past studies typically

have not considered geography (rural, suburban, urban) as a potential socio-environmental influence in their analyses (Mahmood et al., 2021; Pearson et al., 2009). Findings from the present study suggest that rurality may not be as important of a contributor to intake as other factors, such as parents modeling healthful dietary habits for their children (Mahmood et al., 2021). The comparability between our role modeling results for rural families and past work in urban/suburban areas is encouraging, but more work needs to be done in rural communities to ensure that positive features of the rural food environment (e.g., reduced access to fast food restaurants; USDA ERS, 2018) are leveraged, and that broader spatial disparities in access to healthful foods are not overlooked or unaddressed (Dean et al, 2011).

4.1 Limitations and Strengths

Limitations of this study include the cross-sectional design, which does not allow for explorations of causal pathways in these data, and the racial homogeneity of the sample, which reflects some rural areas in the United States but may restrict generalizability to other regions with more heterogeneous rural populations, such as rural areas of the southern or southwestern United States where higher proportions of Black or African-American, Latino/a, and Native American families reside (Housing Assistance Council, 2012; USDA ERS, 2018). The randomized trial that generated these data was not designed to examine intervention effects of role modeling, but we consider these analyses to be an opportunity to explore potential associations between parent role modeling and child dietary intake in a rural setting, which is understudied relative to urban or suburban settings. Other strengths of this study include the collection of data in the context of a community-engaged project, the use of high-quality assessment of children's dietary intake (multiple dietary recalls and calculation of HEI-2015 total scores), and the examination of multiple indicators of parent dietary role modeling reported by parents (whether they sat and ate with their children, and their dietary intake of FV and fast food) and children (what they observed their parents eating), which is a unique feature of the present study that expands on role modeling indicators in past work (e.g., de Bourdeaudhuij et al., 2008; Mahmood et al., 2021; Pearson et al., 2008).

4.2 Conclusion

Parents play significant roles in shaping healthful dietary intake of rural school-age children in ways that compare with other communities and contexts. Family-based interventions should continue to seek optimal targets and strategies to promote parent role modeling of healthful eating, and to assess those effects of role modeling over time.

Acknowledgements

The NU-HOME study (PI: Dr. J. Fulkerson) was supported by grant number R01HL123699 from the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health (NIH). The use of REDCap for data collection and management was supported by grant number UL1TR002494 from the NIH National Center for Advancing Translational Sciences (NCATS). Co-author J. Lee was supported by UL1TR002494 and by KL2TR002492 (NIH NCATS). This study is registered with NIH [ClinicalTrials.gov: NCT02973815](https://clinicaltrials.gov/ct2/show/study/NCT02973815). The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

We would like to thank the research team members (Daheia Barr-Anderson, Abbey Sidebottom, Jennifer Beaudette, Rebecca Freese, Justin Clark, Lori Rathburn, Yazmin Cespedes, Jessica Ramos, Christie Martin, Eydie Kramer,

Brooke Wagner, Samantha Sommersness, Stephanie Grace, Amanda Folk), community advisors, and NU-HOME study participants for their time and engagement.

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Table 1.

Sample Demographic Characteristics for the NU-HOME Study

Variable	N	Mean (SD) or Percent	Range
Child Age (years)	114	8.95 (1.05)	6.90-11.03
Child Sex			
Female	67	58.8	
Male	47	41.2	
Child Race			
White	106	93.0	
BIPOC ^a	8	7.0	
Parent Age (years) ^b	114	37.84 (5.30)	27.28-54.95
Parent Sex			
Female	111	97.4	
Male	3	2.6	
Parent Race			
White	110	96.5	
BIPOC ^a	4	3.5	
Parent Education (highest household level)			
< Bachelor's Degree	47	41.2	
Bachelor's Degree	67	58.8	

^aBIPOC=Black, Indigenous, People of Color: includes responses of Black, Asian, Native American, or more than one race in this sample.

^bParent=primary meal-preparing adult in the home.

Table 2.

Descriptive Statistics for Child Outcomes and Child-Reported Parent Role Modeling Independent Variables

Variable	N	Mean (SD) or Percent	Range
Outcomes			
Child Healthy Eating Index-2015 total score	114	51.96 (10.47)	26.75-81.82
Child FV intake (average cups/day)	114	2.37 (1.34)	0.15-6.13
Child SSB Intake (from two dietary recalls, median split)			
None	37	32.5	
Reported on at least one dietary recall	77	67.5	
Role Modeling Independent Variables			
Parent FV intake (typical cups/day)	114	3.82 (1.70)	1-9
Parent fast food intake (past week)	114	1.48 (1.25)	0-7
Parent SSB Intake (past week, median split)			
None or less than one per week	49	43.0	
At least one per week	65	57.0	
Parent sitting and eating with child (past week)	114	5.34 (1.91)	0-7
Child report of observing parent consuming:			
Fruits at evening meal			
Never	25	21.9	
Sometimes	51	44.7	
Usually/Always	38	33.3	
Vegetables at evening meal			
Never	11	9.7	
Sometimes	53	46.5	
Usually/Always	50	43.9	
Leafy green salads at evening meal			
Never	19	16.7	
Sometimes	64	56.1	
Usually/Always	31	27.2	
Fruits as snacks			
Never	10	8.8	
Sometimes	78	68.4	
Usually/Always	26	22.8	
Vegetables as snacks			
Never	21	18.4	
Sometimes	71	62.3	
Usually/Always	22	19.3	

Note: FV=fruit and vegetable. SSB=sugar-sweetened beverage.

Tables 3a-c.

Regression Models (Linear and Logistic) for Associations of Child HEI-2015, FV Intake, and SSB Intake with Parent Role Modeling (N=114)

a: Linear Regression: Child HEI-2015 Total Score			
Covariate	Coefficient	95% CI	P-Value
Parent-Reported Variables			
Parent education			
Less than a BA	-4.85	-9.04, -0.67	0.02
BA or greater	Ref		
Parent fruit/vegetable intake	0.21	-1.11, 1.53	0.75
Parent fast food intake	0.47	-1.13, 2.06	0.56
Parent SSB intake			
None or less than one per week	-0.26	-4.33, 3.81	0.90
At least one per week	Ref		
Parent sitting and eating with child	0.95	-0.18, 2.07	0.10
Child-Reported Variables			
Parent eats vegetables at meals			
Never	2.53	-4.94, 10.00	0.50
Sometimes	-1.44	-6.21, 3.33	0.55
Usually or always	Ref		
Parent eats fruit at meals			
Never	-4.91	-10.79, 0.97	0.11
Sometimes	-5.54	-10.22, -0.86	0.02
Usually or always	Ref		
Parent eats leafy green salad at meals			
Never	3.08	-4.03, 10.20	0.39
Sometimes	2.31	-2.65, 7.27	0.36
Usually or always	Ref		
Parent eats vegetables as snack			
Never	-0.55	-7.01, 5.91	0.87
Sometimes	-2.05	-8.05, 2.84	0.35
Usually or always	Ref		
Parent eats fruit as snack			
Never	4.09	-3.93, 12.11	0.31
Sometimes	5.17	0.19, 10.16	0.04
Usually or always	Ref		
b: Linear Regression: Child FV Intake (average cups per day)			
Co variate	Coefficient	95% CI	P-Value
Parent-Reported Variables			
Parent education			

a: Linear Regression: Child HEI-2015 Total Score			
Covariate	Coefficient	95% CI	P-Value
Less than a BA	-0.41	-0.96, 0.13	0.13
BA or greater	Ref		
Parent fruit/vegetable intake	0.07	-0.10, 0.24	0.43
Parent fast food intake	0.12	-0.09, 0.33	0.25
Parent SSB intake			
None or less than one per week	-0.37		0.16
At least one per week	Ref		
Parent sitting and eating with child			0.33
Child-Reported Variables			
Parent eats vegetables at meals			
Never	-0.74	-1.17, 0.23	0.13
Sometimes	-0.47	-1.09, 0.15	0.14
Usually or always	Ref		
Parent eats fruit at meals			
Never	-0.33	-1.10, 0.43	0.39
Sometimes	-0.39	-1.00, 0.22	0.21
Usually or always	Ref		
Parent eats leafy green salad at meals			
Never	0.35	-0.57, 1.27	0.45
Sometimes	0.36	0.28, 1.00	0.27
Usually or always	Ref		
Parent eats vegetables as snack			
Never	-0.34	-1.18, 0.49	0.42
Sometimes	-0.18	-0.89, 0.53	0.61
Usually or always	Ref		
Parent eats fruit as snack			
Never	-0.69	-0.35, 1.73	0.19
Sometimes	-0.20	-0.44, 0.85	0.54
Usually or always	Ref		
c: Logistic Regression: Child SSB Intake (at least one vs. none)			
Covariate	Odds Ratio	95% CI	P-Value
Parent-Reported Variables			
Parent education			
Less than a BA	1.41	0.51, 3.88	0.51
BA or greater	Ref		
Parent fruit/vegetable intake	1.12	0.82, 1.53	0.47
Parent fast food intake	1.94	1.16, 3.23	0.01
Parent SSB intake			

a: Linear Regression: Child HEI-2015 Total Score			
Covariate	Coefficient	95% CI	P-Value
None or less than one per week	0.88	0.35, 2.23	0.78
At least one per week	Ref		
Parent sitting and eating with child	0.96	0.73, 1.25	0.75
Child-Reported Variables			
Parent eats vegetables at meals			
Never	6.68	0.83, 53.78	0.16
Sometimes	2.66	0.86, 8.24	0.96
Usually or always	Ref		
Parent eats fruit at meals			
Never	0.46	0.13, 1.71	0.20
Sometimes	0.94	0.33, 2.75	0.48
Usually or always	Ref		
Parent eats leafy green salad at meals			
Never	0.36	0.06, 1.97	0.29
Sometimes	0.61	0.19, 1.96	0.97
Usually or always	Ref		
Parent eats vegetables as snack			
Never	2.78	0.65, 11.95	0.29
Sometimes	2.02	0.63, 6.47	0.70
Usually or always	Ref		
Parent eats fruit as snack			
Never	0.63	0.09, 4.33	0.90
Sometimes	0.50	0.15, 1.66	0.41
Usually or always	Ref		

Note: Ref=reference category. BA=Bachelor's degree. HEI-2015=Healthy Eating Index, 2015 version. FV=fruit and vegetable. SSB=sugar-sweetened beverage. Statistically significant associations are highlighted in **bold** text.

Note: FV=fruit and vegetable. Ref=reference category. BA=Bachelor's degree. SSB=sugar-sweetened beverage.

Note: SSB=sugar-sweetened beverage. BA=Bachelor's degree. CI=confidence interval. Ref=reference category. Odds ratios with confidence intervals that exclude 1 are highlighted in **bold** text.