Published in final edited form as:

J Am Diet Assoc. 2011 March ; 111(3): 425–430. doi:10.1016/j.jada.2010.12.013.

The Relationship Between Child and Parent Food Hedonics and Parent and Child Food Group Intake in Overweight/Obese Children

Hollie Raynor, Ph.D., R.D., L.D.N.,

Associate Professor, Department of Nutrition, University of Tennessee, 1215 W. Cumberland Avenue, JHB 341, Knoxville, TN 37996-1920, Tel: 865-974-6259, Fax: 865-974-3491

Emily L. Van Walleghe, Ph.D.,

Post-doctoral Fellow, Department of Nutrition, University of Tennessee, 1215 W. Cumberland Avenue, JHB 229, Knoxville, TN 37996-1920, Tel: 865-974-0752, Fax: 865-974-3491

Kathrin M. Osterholt, M.S.,

Project Coordinator, The Weight Control and Diabetes Research Center, The Miriam Hospital, 196 Richmond Street, Providence, RI 02903, Tel. 401-793-8951, Fax. 401-793-8944

Chantelle N. Hart, Ph.D.,

Assistant Professor (Research), Psychiatry & Human Behavior, The Weight Control and Diabetes Research Center, The Miriam Hospital/Brown Medical School, 196 Richmond Street, Providence, RI 02903, Tel. 401-793-9727, Fax. 401-793-8944

Elissa Jelalian, Ph.D.,

Associate Professor (Research), Psychiatry & Human Behavior, The Weight Control and Diabetes Research Center, The Miriam Hospital/Brown Medical School, 196 Richmond Street, Providence, RI 02903, Tel. 401-444-8945, Fax. 401-793-8944

Rena R. Wing, Ph.D., and

Professor, Psychiatry & Human Behavior, The Weight Control and Diabetes Research Center, The Miriam Hospital/Brown Medical School, 196 Richmond Street, Providence, RI 02903, Tel. 401-793-8959, Fax. 401-793-8944

Gary S. Goldfield, Ph.D. C. Psych.

Assistant professor of Pediatrics, Human Kinetics and Psychology, University of Ottawa, Scientist, Healthy Active Living and Obesity Research Group (HALO), CHEO Research Institute. 401 Smyth Rd., Ottawa, ON Canada K1H 8L1, Phone: 613-737-7600, Ext. 3288, Fax: 613-738-4869

Hollie Raynor: hraynor@utk.edu; Emily L. Van Walleghe: evanwall@utk.edu; Kathrin M. Osterholt: kosterholt@lifespan.org; Chantelle N. Hart: chart@lifespan.org; Elissa Jelalian: ejelalian@lifespan.org; Rena R. Wing: rwing@lifespan.org; Gary S. Goldfield: ggoldfield@cheo.on.ca

Abstract

Address Correspondence to: Hollie Raynor, Ph.D., R.D., L.D.N., Associate Professor, Department of Nutrition, University of Tennessee, 1215 W. Cumberland Avenue, JHB 341, Knoxville, TN 37996-1920, Tel: 865-974-6259, Fax: 865-974-3491, hraynor@utk.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Many factors influence children's dietary intake, including children's and parents' food hedonics (liking), and parent intake. This secondary data analysis studied the relationship between child and parent liking (CL and PL), and parent and child intake (PI and CI) of fruits (F), vegetables (V), low-fat dairy (LFD), snack foods (SF), and sweetened beverages (SB) in four- to nine-year-old overweight/obese (body mass index (BMI) $\geq 85^{\text{th}}$ percentile) children presenting for obesity treatment (September 2005 to 2007) in Providence, RI. One-hundred thirty-five parent-child pairs, with complete baseline dietary (three-day food record) and food group hedonic data were included. Hedonic ratings were mean ratings using a five-point Likert scale (lower scores represented greater liking of a food group). Children were 7.2 ± 1.6 years, 63.0% female, 12.6% Black, 17.8% Hispanic, with a mean z-BMI of 2.3 ± 0.6 . Total servings consumed by children over three days were: F: 2.7 ± 3.2 ; V: 3.4 ± 2.5 ; LFD: 2.4 ± 2.1 ; SF: 5.9 ± 4.2 ; SB: 2.7 ± 3.1 . After demographic and anthropometric variables were controlled, PI was positively related ($p < 0.05$) to CI of all food groups except SB. CL was only significantly ($p < 0.05$) related to CI of V. In young overweight/obese children, PI was consistently related to CI. Changing PI may be important in aiding with changing young overweight/obese children's dietary intake.

Keywords

Child obesity; parent dietary intake; child dietary intake; hedonics; food group

The prevalence of childhood obesity has tripled over the last 20 years in westernized countries (1). As American's genetic makeup has not greatly changed, the rising prevalence of childhood obesity is believed to be a consequence of environmental factors promoting excessive energy intake and decreased energy expenditure (2–3). National dietary surveys indicate that children and adults, especially those who are overweight/obese, do not meet dietary recommendations and generally consume too much fat and not enough fruits and vegetables, which may contribute to energy imbalance (4–5). To develop effective childhood obesity prevention/treatment programs, identifying modifiable determinants of child intake is important.

What a child consumes is influenced by a complex set of variables at the macro-environment, and familial- and individual-levels (6). At the individual-level, child dietary intake has been shown to be related to a child's hedonic appraisal (liking) of specific foods (7–8). At the familial-level, parental hedonics of specific foods, which may be associated through a genetic link in food preferences, is correlated with child's dietary intake (9). Additionally, parental dietary intake, which may influence child intake through food accessibility and availability and/or parental modeling, has also been shown to be related to child's dietary intake (6,10–13).

While previous research has examined familial-level determinants of child intake of fruits and vegetables (8,11–13), little research has examined the relationship between parent and child liking and parent dietary intake with child intake across a broad range of food groups, and no studies have examined these relationships in overweight/obese children. Most importantly, examining familial- and child-level determinants of food group intake that are related to child weight status, such as fruits and vegetables (14–15) and low-fat dairy (16–17), as well as energy-dense snack foods (18) and sugar-sweetened beverages (19), may assist in identifying modifiable determinants of child intake that can be targeted in childhood obesity prevention/treatment programs. Thus, this study examined the relationship between child liking (CL), parent liking (PL), parent intake (PI), and child intake (CI) of fruits (F), vegetables (V), low-fat dairy (LFD), snack foods (SF), and sweetened beverages (SB) in overweight/obese children. It was hypothesized that both child and parent hedonics and parent intake would be associated with child intake for all food groups.

Methods

Participants

Participants were recruited from September 2005 to September 2007 in Providence, RI, through newspaper advertisements, posters, flyers, direct mailings, television advertisements, and personal and family physician referrals for two, six-month, family-based childhood weight control trials (NCT00259324, NCT00200265). The trials delivered a family-based intervention to participating parents via eight, one-hour sessions over six months. One trial focused on increasing physical activity and decreasing sweetened drink intake vs. decreasing TV watching and increasing low-fat milk intake [trial 1]. The other trial focused on increasing fruits, vegetables, and low-fat dairy vs. decreasing sweet/salty snack foods and sweetened drinks [trial 2]). Eligibility criteria for the trials included: children aged four to nine years; body mass index (BMI) $\geq$ 85th percentile (overweight/obese); not meeting at least one recommended dietary (fruits and vegetables, low-fat dairy, sweetened beverages, and energy-dense snack foods) or leisure-time activity (physical activity and screen time) guideline; a parent willing to attend eight treatment meetings over six-months; parent and child having ability to speak English; not participating in another childhood weight control program; no major psychiatric disease; and no dietary or physical activity restrictions.

The sample consisted of 135 overweight/obese children along with their parent that participated in the trials with complete baseline data. This cross-sectional, secondary data analysis only investigated the relationship between child and parent food group hedonics and parent food group consumption on child food group consumption at entry into the trial (baseline). This study was approved by the Institutional Review Board of The Miriam Hospital (Providence, RI).

Procedures

Following a phone screen, families attended an orientation, in which informed consent (and child assent for children aged $\geq$ eight years) was obtained. Families were scheduled for a baseline assessment, prior to randomization, in which anthropometric measures were collected, questionnaires were completed, and food records were reviewed. Measures were obtained from the child and parent.

Measures

Participant Characteristics—Child and parent sociodemographic variables were assessed by self-reported questionnaire and included ethnicity, race, sex, age, and parent education and marital status. Ethnicity, race, sex, and parent education and marital status were all nominal measures.

Anthropometric Measures—Height was measured, without shoes, to the nearest 0.125 inch using a wall-mounted stadiometer (SECA, ITIN Scale Company, Brooklyn, NY). Body weight, wearing light clothing without shoes, was measured to the nearest 0.1 lb using an electronic scale (Healthometer Professional, Sunbeam Product Inc., Raton, FL). BMI was calculated by dividing weight in kilograms by height in meters squared. For children, those with a BMI at or above the 85th percentile for age and sex or higher based on U. S. population norms were considered overweight/obese and eligible to participate. BMI Z values (z-BMI) standardized for child age and gender were calculated based on comparison to population norms (20).

Hedonic (Liking) Ratings of Foods—Parents completed hedonic ratings of foods alone, while children completed hedonic ratings with the help of a research assistant. Each

food was listed, along with a picture of the food, and parents and children rated hedonics for each food individually. Hedonic ratings were obtained using a five-point Likert scale, anchored by one = “I like it a lot” and five = “I do not like it a lot,” thus lower scores reflect greater liking of foods. Each point on the scale was also represented by a face demonstrating appropriate degrees of like and dislike. To aid children, research assistants read each food item to the child and asked the child about his/her hedonic rating by reading each of the five-point ratings while pointing to the face that represented each hedonic rating, and asking the child to point to the face which described his/her liking/disliking of the food. This method of obtaining hedonic ratings has been used with young children previously (21–23). Ratings for each food group were calculated as the mean rating of the food items within each food group (F = nine items [i.e., apples, bananas, oranges, etc., and did not include 100% juice]; V = 11 items [i.e., carrots, celery, green beans, etc., and did not include fried potatoes]; LFD = four items [i.e., milk, yogurt, string cheese, etc.]; SF = 10 items [i.e., cookies, ice cream, potato chips, etc.]; and SB = three items [i.e., soda, kool-aid, ice tea, and did not include 100% juice]). Foods in each food group were those that are most frequently reported eaten by the Continuing Survey of Food Intakes by Individuals (CSFII) (24), and in this sample all but two of the food items had been eaten by at least 85% of the children and parents. A list of the food items can be obtained from the authors. There was an option to indicate if a food had never been eaten; these foods were not included in the mean ratings for each food group. Thus, the mean hedonic rating for each food group was the sum of the ratings for each food that received a hedonic rating divided by the total number of food items in the food group that had received a hedonic rating (23). Foods never consumed were not included in the sum or denominator.

Dietary Intake—Information on parent and child dietary intake was assessed using three-day food records collected at baseline. During the orientation, parents were given instructions on how to complete the food records for themselves and for their child. Under the age of eight years, children do not have the cognitive capabilities to self-report food intake (25) thus all parents were asked to complete the food records for their children. During the three-day period, if the child was under the supervision/care of another adult other than the parent, the parent was instructed to obtain information from this other adult about what the child consumed. Food records were completed on two weekdays and one weekend day. Food records were reviewed for completeness and portion sizes of recorded foods were reviewed for accuracy with the use of measuring cups and spoons, and a ruler by a trained research assistant. Each food record was entered into the Nutrition Data System for Research (version 2006, 2006, Nutrition Coordinating Center [NCC], University of Minnesota, Minneapolis, MN) software. Using the NDSR software food grouping system, total number of servings consumed over the three day period was calculated for F (did not include 100% fruit juice), V (did not include fried potatoes), LFD, SF (i.e., cookies, cakes, chips, candy, etc.), and SB (did not include 100% fruit juice). Serving sizes for each food group were based on the *Dietary Guidelines for Americans 2005* (26).

Analytic Plan

Means and standard deviations and percentages were calculated to determine socio-demographic and anthropometrics of the sample. Mean and median hedonic ratings of each food group and mean servings consumed over the three days for each food group were quantified. Spearman's rho correlations assessed the relationship between CL, PL, and CI and Pearson correlations assessed the relationship between PI and CI for each food group. Hierarchical regressions for each food group analyzed the relationship between CL and PL (recoded as 0 or 1, with 0 coded as hedonic ratings indicating no degree of liking and 1 coded as hedonic ratings indicating some degree of liking) and PI on CI, above and beyond the independent contribution of child and parent demographics and anthropometrics. Thus,

on Block one, child z-BMI, ethnicity, race, sex, and age were force entered, and on Block two, parent sex, education, BMI, age, marital status, ethnicity and race were force entered. Then if CL, PL, or PI were significantly correlated with CI for a food group, these variables were entered stepwise into separate Blocks, with CL entered on the first additional Block, PL on the second additional Block, and PI on the third additional Block. If CL or PL were not entered into the equation due to not having a statistically significant relationship in the simple correlations, those variables that were significant were entered into earlier Blocks (i.e., if CL and PL were not significant, PI was entered into the first additional Block). Two-tailed tests of significance were used for all analyses, with $p < 0.05$ indicating significance. All analyses were conducted using SPSS software (version 17.0, 2007, SPSS Inc., Chicago, IL).

Results and Discussion

Demographic and anthropometric characteristics of the sample are reported in Table 1. Both children and parents, on average, were obese, primarily Caucasian, with parents moderately well educated and mainly married. The vast majority of parents were mothers.

Table 1 shows the mean and median hedonic ratings and mean number of servings consumed of the different food groups over the three-day period. The values indicate that most foods were moderately well-liked, with lower scores indicating greater liking. Interestingly, the child ratings of fruit and low-fat dairy were similar to those of snack foods, indicating that the hedonic values of these food groups were similar in these children. Children and parents consumed fewer than the number of recommended servings for fruits and vegetables and low-fat dairy, and higher than the number of recommended servings for energy-dense snack foods and sweetened beverages. Of particular note is that these young, overweight/obese children consumed close to six servings of SB over three days.

PI was consistently positively correlated with CI across all food groups, including F ($r = 0.226$, $p < 0.01$), V ($r = 0.298$, $p < 0.01$), LFD ($r = 0.447$, $p < 0.01$), SF ($r = 0.238$, $p < 0.01$), and SB ($r = 0.222$, $p < 0.01$). Thus, PI was included in all regression models of CI. In contrast, CL ($r = -0.287$, $p < 0.01$) and PL ($r = -0.239$, $p < 0.01$) of V were only related to CI of V. Thus CL and PL were only entered in the regression model for CI of V. No other correlations between CL and PL and CI of any other food groups were significant.

Table 2 shows the results of the hierarchical regressions. All models accounted for a significant ($p < 0.05$) amount of variance for CI for each food group, except for SB. For all significant models, after child and parent demographics and anthropometrics were controlled, PI significantly ($p < 0.05$) increased the proportion of the variance explained for CI for each food group. CL also significantly ($p < 0.05$) increased the proportion of the variance explained for CI for V.

The present study is the first to examine the relationship between child and parent food group liking and parent food group intake on food group intake of overweight/obese children. Results indicated that PI was associated with CI across all food groups, except SB, above and beyond the contribution of parent and child demographics and anthropometrics. In contrast, CL was only related to CI of one food group: vegetables. The magnitude of the relationships between parent-child dietary intake was moderate and consistent with previous studies that examined intake in other food groupings in non-obese parents and children (27–30). As PI appears to influence CI for many food groups, understanding the mechanisms by which PI influences CI may provide useful targets for intervention in child obesity prevention/treatment programs. Systematic and narrative reviews have shown evidence that PI may influence CI through increasing the availability and accessibility of foods in the

home and/or by parental modeling (6,11,31). The findings from this investigation suggest that changing parental dietary intake may be an effective strategy to change overall dietary intake in overweight/obese children.

Limitations of the study include the use of a select, fairly homogenous sample (i.e., primarily white families with overweight/obese children presenting for a family-based weight control study), so it is unknown whether these results generalize to overweight/obese children of other races or ethnicities and in other community settings. In addition, the majority of parents were mothers, and research has shown that the relationship between mother-child dietary intake is stronger than that for father-child intake (32–33). Additionally, while a validated measure of food liking was used in this investigation, absolute dislike (i.e., hate) of foods was not assessed, which may differentially impact on intake.

Conclusions

In young overweight/obese children, parent intake of specific food groups, rather than child and parent liking of these food groups, was most consistently related to child food group intake. This relationship may be due to food availability/accessibility in the home, and/or parent modeling. Additional research is needed to determine the mechanisms by which parent intake is related to child intake. This study suggests that changing parent dietary intake may be important in aiding with changing young overweight/obese children's dietary intake. Research using family-based interventions, in which both children and parents are asked to make a change in behavior, also indicates that changing parent dietary intake may be an important strategy in changing children's dietary intake (34). These results highlight the importance of targeting parents and their own behaviors in the prevention and treatment of childhood obesity.

References

1. Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999–2002. *J Am Med Assoc.* 2004; 291:2847–2850.
2. French SA, Story M, Jeffery RW. Environmental influences on eating and physical activity. *Annual Rev Public Health.* 2001; 22:309–335. [PubMed: 11274524]
3. Popkin BM, Duffey K, Gordon-Larson P. Environmental influences on food choice, physical activity and energy balance. *Physiol Behav.* 2005; 86:603–613. [PubMed: 16246381]
4. Briefel RR, Johnson CL. Secular trends in dietary intake in the United States. *Annu Rev Nutr.* 2004; 24:401–431. [PubMed: 15189126]
5. Nielson SJ, Siega-Riz AM, Popkin BM. Trends in energy intake in U.S. between 1977 and 1996: Similar shifts seen across age groups. *Obesity Res.* 2002; 10:370–378.
6. Patrick H, Nicklas TA. A review of family and social determinants of children's eating patterns and diet quality. *J Amer Coll Nutr.* 2005; 24:83–92. [PubMed: 15798074]
7. Perez-Rodrigo C, Ribas L, Serra-Majem LL, Aranceta J. Food preferences of Spanish children and young people: The enKid study. *Euro J Clin Nutr.* 2003; 57:S45–S48.
8. Brug J, Tak NI, Te Velde SJ, Bere E, De BI. Taste preferences, liking and other factors related to fruit and vegetable intakes among schoolchildren: Results from observational studies. *Br J Nutr.* 2008; 99:S7–S14. [PubMed: 18257952]
9. Wardle J, Cooke L. Genetic and environmental determinants of children's food preferences. *Br J Nutr.* 2008; 99:S15–S21. [PubMed: 18257946]
10. Pearson N, Biddle SJ, Gorely T. Family correlates of breakfast consumption among children and adolescents: A systematic review. *Appetite.* 2009; 52:1–7. [PubMed: 18789364]

11. Pearson N, Biddle SJ, Gorely T. Family correlates of fruit and vegetable consumption in children and adolescents: A systematic review. *Public Health Nutr.* 2009; 12:267–283. [PubMed: 18559129]
12. Hanson NI, Neumark-Sztainer D, Eisenberg ME, Story M, Wall M. Associations between parental report of the home food environment and adolescent intakes of fruits, vegetables and dairy foods. *Public Health Nutr.* 2005; 8:77–85. [PubMed: 15705248]
13. Bere E, Klepp K. Correlates of fruit and vegetable intake among Norwegian schoolchildren: Parental and self-reports. *Public Health Nutr.* 2004; 7:991–998. [PubMed: 15548337]
14. Field AE, Gillman MW, Rosner B, Rockett HR, Colditz GA. Association between fruit and vegetable intake and change in body mass index among a large sample of children and adolescents in the United States. *Int J Obes.* 2003; 27:821–826.
15. Tohill BC, Seymour J, Serdula M, Kettel-Khan L, Rolls BJ. What epidemiologic studies tell us about the relationship between fruit and vegetable consumption and body weight. *Nutr Rev.* 2004; 62:365–374. [PubMed: 15508906]
16. Skinner JD, Bounds W, Carruth BR, Ziegler P. Longitudinal calcium intake is negatively related to children's body fat indexes. *J Amer Diet Assoc.* 2003; 103:1626–1631. [PubMed: 14647089]
17. Carruth BR, Skinner JD. The role of dietary calcium and other nutrients in moderating body fat in preschool children. *Int J Obes.* 2001; 25:559–566.
18. Jahns L, Siega-Riz AM, Popkin BM. The increasing prevalence of snacking among US children from 1977 to 1996. *J Pediatr.* 2001; 138:493–498. [PubMed: 11295711]
19. Malik VS, Schulze MB, Hu FB. Intake of sugar sweetened beverages and weight gain: A systematic review. *Amer J Clin Nutr.* 2006; 84:274–288. [PubMed: 16895873]
20. Kuczmarski, RJ.; Ogden, CL.; Grummer-Strawn, LM. CDC growth charts: United States. Hyattsville, MD: National Center for Health Statistics; 2000.
21. Bell KI, Tepper BJ. Short-term vegetable intake by young children classified by 6-n-propylthiouracil bitter-taste phenotype. *Amer J Clin Nutr.* 2006; 84:245–251. [PubMed: 16825702]
22. Leon F, Couronne T, Marcuz MC, Koster EP. Measuring food liking in children: A comparison of non verbal methods. *Food Quality and Preference.* 1999; 10:93–100.
23. Cooke LJ, Wardle J. Age and gender differences in children's food preferences. *Br J Nutr.* 2005; 93:741–746. [PubMed: 15975175]
24. Nanney MS, Haire-Joshu D, Elliot M, Hessler K, Brownsor RC. Evaluating changeability to improve fruit and vegetable intake in school aged children. *Nutr J.* 2005; 4:e34.
25. Livingstone MBE, Robson PJ, Wallace JMW. Issues in dietary intake assessment of children and adolescents. *Br J Nutr.* 2004; 92:S213–S222. [PubMed: 15522159]
26. Department of Health and Human Services, United States. Dietary Guidelines for Americans, 2005. 6. U.S. Government Printing Office; Washington, DC: 2005.
27. Perusse L, Tremblay A, Leblanc C, Cloninger C, Reich T, Rice J, Bouchard C. Familial resemblance in energy intake: Contribution of genetic and environmental factors. *Amer J Clin Nutr.* 1988; 47:629–635. [PubMed: 3354487]
28. Oliveria S, Ellison R, Moore L, Gillman M, Garrahe E, Singer M. Parent-child relationships in nutrient intake: The Framingham children's study. *Amer J Clin Nutr.* 1992; 56:93–98. [PubMed: 1319110]
29. Stafleu A, Van Staveren WA, de GC, Burema J, Hauvast JG. Family resemblance in energy, fat, and cholesterol intake: A study among three generations of women. *Prev Med.* 1994; 23:474–480. [PubMed: 7971875]
30. Cullen KW, Lara KM, de MC. Familial concordance of dietary fat practices and intake. *Fam Community Health.* 2002; 25:65–75. [PubMed: 12010116]
31. Savage JS, Fisher JO, Birch LL. Parental influence on eating behavior: Conception to adolescence. *J Law and Medical Ethics.* 2007; 35:22–34.
32. Beydoun MA, Wang Y. Parent-child dietary intake resemblance in the United States: Evidence from a large representative survey. *Soc Sci Med.* 2009; 68:2137–2144. [PubMed: 19375837]

33. Wang Y, Li J, Caballero B. Resemblance in dietary intakes between urban low-income African-American adolescents and their mothers: The healthy eating and active lifestyles from school to home for kids study. *J Amer Diet Assoc.* 2009; 109:52–63. [PubMed: 19103323]
34. Robertson W, Friede T, Blissett J, Rudolf MCJ, Wallis M, Stewart-Brown S. Pilot of “Family for Health”: Community-based family intervention for obesity. *Archiv Diseases in Childhood.* 2008; 93:921–926.

Table 1

Child and Parent Demographics, Food Group Hedonic Ratings, and Food Group Servings Consumed over a Three Day Period

Variable	Child (n = 135)	Parent (n = 135)
← mean ± standard deviation →		
Age (years)	7.2 ± 1.6	38.0 ± 5.8
BMI (kg/m ²)	24.5 ± 4.0	33.8 ± 8.6
z-BMI	2.3 ± 0.6	N/A
← % →		
Female	63.0	92.6
White	67.4	71.1
African- American	12.6	8.9
Hispanic/Latino	17.8	17.0
Other	2.2	3.0
Married	N/A	75.6
Some College Education	N/A	46.4
Hedonic Ratings		
← mean ± standard deviation →		
Fruits	1.8 ± 0.6	1.8 ± 0.5
Vegetables	2.3 ± 0.7	1.9 ± 0.5
Low-fat Dairy	1.7 ± 0.7	2.2 ± 0.7
Snack Foods	1.7 ± 0.6	2.0 ± 0.6
Sweetened Beverages	1.9 ± 0.8	2.9 ± 1.0
← median, IQR →		
Fruits	1.6, 0.8	1.7, 0.8
Vegetables	2.3, 1.0	1.9, 0.6
Low-fat Dairy	1.7, 1.3	2.3, 1.1
Snack Foods	1.6, 0.8	2.0, 0.9
Sweetened Beverages	2.0, 1.3	2.7, 1.0
Servings Consumed		
← mean ± standard deviation →		
Fruits	2.7 ± 3.2	2.4 ± 2.7
Vegetables	3.4 ± 2.5	7.3 ± 5.7
Low-fat Dairy	2.4 ± 2.1	1.4 ± 1.6
Snack Foods	5.9 ± 4.2	5.1 ± 4.6
Sweetened Beverages	2.7 ± 3.1	3.7 ± 7.5

Notes. Hedonics were rated on a 5 point Likert scale, with lower scores reflecting greater liking; BMI = body mass index; z-BMI = standardized BMI; N/A = not applicable; IQR = interquartile range.

Table 2

Hierarchical Regression Models of Child and Parent Hedonics and Parent Intake on Child Food Group Consumption

Block	Variables	R^2_{Δ}	P
Fruit			
I	Child age, sex, race, ethnicity, zBMI	0.063	0.129
II	Parent age, sex, race, ethnicity, education, marital status, BMI	0.070	0.207
III	Parent intake	0.036	0.025
$R^2_{\text{cum}} = 0.169$, $F(13, 121) = 1.90$, $p < 0.05$			
Vegetables			
I	Child age, sex, race, ethnicity, zBMI	0.107	0.022
II	Parent age, sex, race, ethnicity, education, marital status, BMI	0.056	0.409
III	Child hedonic rating	0.049	0.012
IV	Parent intake	0.151	0.001
$R^2_{\text{cum}} = 0.363$, $F(14, 120) = 4.31$, $p < 0.001$			
Low-fat Dairy			
I	Child age, sex, race, ethnicity, zBMI	0.126	0.004
II	Parent age, sex, race, ethnicity, education, marital status, BMI	0.095	0.046
III	Parent intake	0.169	0.000
$R^2_{\text{cum}} = 0.390$, $F(13, 121) = 5.94$, $p < 0.001$			
Snack Foods			
I	Child age, sex, race, ethnicity, zBMI	0.074	0.074
II	Parent age, sex, race, ethnicity, education, marital status, BMI	0.108	0.031
III	Parent intake	0.034	0.024
$R^2_{\text{cum}} = 0.216$, $F(13, 121) = 2.56$, $p < 0.01$			
Sweetened Beverages			
I	Child age, sex, race, ethnicity, zBMI	0.055	0.195
II	Parent age, sex, race, ethnicity, education, marital status, BMI	0.023	0.877
III	Parent intake	0.065	0.003
$R^2_{\text{cum}} = 0.143$, $F(13, 121) = 1.56$, $p > 0.10$			

Notes. R^2_{Δ} = incremental variance accounted for by each block; Δ = change; R^2_{cum} = variance accounted for by entire model; z-BMI = standardized BMI; BMI = body mass index.