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Associations between nine family dinner frequency measures and child weight, dietary and psychosocial outcomes

Melissa L. Horning, PhD, RN PHN,

Assistant Professor, University of Minnesota, School of Nursing, 5-140 Weaver Densford Hall, 308 Harvard St SE, Minneapolis, MN 55455, phone 612-624-1947, fax: 612-626-6606

Jayne A. Fulkerson, PhD,

Professor; Director, Center for Child and Family Health Promotion Research; Director, Graduate Studies; Director, PhD Program, University of Minnesota, School of Nursing, 5-140 Weaver Densford Hall, 308 Harvard St SE, Minneapolis, MN 55455, phone: 612-624-4823, fax: 612-626-6606

Sarah E. Friend, MPH, RD, and

Evaluation Director HOME Plus Study, University of Minnesota, School of Nursing, 5-140 Weaver Densford Hall, 308 Harvard St SE, Minneapolis, MN 55455, phone: 612-624-2610, fax: 612-626-6606

Dianne Neumark-Sztainer, PhD RD

Professor, Interim Division Head, University of Minnesota, School of Public Health, Division of Epidemiology & Community Health, 1300 S 2nd St, Suite 300, Minneapolis, MN 55454, phone: 612-624-0880

Melissa L. Horning: horn0199@umn.edu; Jayne A. Fulkerson: fulke001@umn.edu; Sarah E. Friend: adki0032@umn.edu; Dianne Neumark-Sztainer: neuma011@umn.edu

Abstract

Background—Family meal frequency has been consistently and significantly associated with positive youth dietary and psychosocial outcomes but less consistently associated with weight outcomes. Family meal frequency measurement has varied widely and it is unclear how this variation may impact relationships with youth weight, dietary, and psychosocial outcomes.

Objective—This study assesses how five parent/caregiver-reported and four child-reported family dinner frequency measures correlate with each other and are associated with health-related outcomes.

Design/Participants—This secondary, cross-sectional analysis uses baseline, parent/caregiver (n=160) and 8–12 year old child (n=160) data from the Healthy Home Offerings via the Mealtime

Correspondence to: Melissa L. Horning, horn0199@umn.edu.

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Environment (HOME) Plus trial (collected 2011–2012). Data were obtained from objective measurements, dietary recall interviews, and psychosocial surveys.

Outcome measures—Outcomes included child body mass index z-scores (BMIz), fruit, vegetable and sugar-sweetened beverage intake, dietary quality (Healthy Eating Index-2010 [HEI-2010]), family connectedness, and meal conversations.

Statistical analyses performed—Pearson correlations and general linear models were used to assess associations between family dinner frequency measures and outcomes.

Results—All family dinner frequency measures had comparable means and were correlated within and across parent/caregiver- and child-reporters ($r=0.17$ – 0.94 , $p<0.01$). In unadjusted analyses, 78% of family dinner frequency measures were significantly associated with BMIz scores and 100% were significantly associated with fruit/vegetable intake and HEI-2010. In adjusted models, most significant associations with dietary and psychosocial outcomes remained but associations with child BMIz remained significant only for parent/caregiver- ($\beta\pm SE=-0.07\pm 0.03$; $p<0.05$) and child-reported ($\beta\pm SE=-0.06\pm 0.02$; $p<0.01$) family dinner frequency measures asking about ‘*sitting and eating*’ dinner.

Conclusions—In spite of phrasing variations in family dinner frequency measures (e.g., which family members were present and how meals were occurring), few differences were found in associations with dietary and psychosocial outcomes but differences were apparent for child BMIz, which suggests phrasing of family dinner frequency measures may influence associations found with weight outcomes.

Key words/phrases

Measurement; family meals; dietary intake; body mass index; connectedness

Family meals are of importance given their associations with a variety of positive youth health outcomes. Recently, family meal literature reviews have found robust and positive associations between family meal frequency and beneficial psychosocial outcomes (e.g., positive family relationships^{1,2} and reduced risky behaviors^{2–5}) and dietary quality outcomes (e.g., higher intake of fruits, vegetables and a variety of vitamins/minerals and lower intake of sugar-sweetened beverages (SSB) and energy-dense, nutrient-poor foods^{1,3–7}) for youth. However, findings have been mixed in regard to associations with youth weight status.^{4–6}

The robust, cross-sectional positive associations with family meal frequency for youth have been found in spite of a lack of a gold standard measure/definition and wide variation of family meal frequency measurement, as discussed in recent reviews.^{1,6} More specifically, the phrasing of family meal frequency questions has varied on any or all of several dimensions, including *who* must be present for it to be defined as a family meal (e.g., from at least one parent^{7,8} to the whole family/core household^{9,10}) and the family *eating occasion* (e.g., breakfast,^{11–13} dinner,^{10–12,14–17} or any family meal^{4,9,18,19}). In addition, the *timeframe* of family meal frequency questions has varied and is most often within the past week^{4,15,18,19} or in a typical week^{7–10,12,17} but can be longer.^{20,21} **Response options** have varied widely, including a full response range of all possible eating occasions,^{12,16} to categorical,^{4,7–9} Likert,^{17,22} binary,¹¹ and open-ended responses.¹⁹ Some questions also

have *added specificity* regarding location of family meals (e.g., at the table,^{17,23} sitting together,^{14,22,23} or at home^{9,13,24}). The manner in which family meal frequency questions differ in phrasing regarding who must be present, response options, timeframes of reporting, which meals are considered, and/or where meals are located may create substantial variation in the total number of possible family eating occasions. This variation potentially alters responses rates, prevalence of eating together, assessment of associations with outcomes of interest, and increases the complexity in comparing across studies, systematic reviews, and meta-analyses.^{1,2,5,6}

Therefore, the present study explored family meal frequency measurement variation using baseline data from parents/caregivers (n=160) and their 8–12 year old children (n=160) to: (1) Assess correlations between nine parent- and child-reported family dinner frequency measures (i.e., seven individual items measuring dinner frequency in the past seven days, that varied by who was present and whether they were sitting and/or eating together, and two summative scales); and (2) Evaluate cross-sectional associations between each of the nine family dinner frequency measures and outcomes previously examined with family meal frequency in the research literature (i.e., child age- and gender- adjusted body mass index (BMI), dietary intake of fruits and vegetables and SSB, dietary quality, family connectedness, and meal conversations).

METHODS

Participants

The present cross-sectional, secondary analysis used baseline data (2011 and 2012) from the Healthy Home Offerings via the Mealtime Environment (HOME) Plus study.²⁵ The community-based, HOME Plus randomized controlled trial aimed to decrease excess child weight gain through family intervention activities. Detailed in full elsewhere,²⁵ trained staff recruited families from the Minneapolis/St. Paul Metropolitan area from community centers using various techniques (e.g., flyers, presentations), and recruitment criteria included English fluency, parent participants to be the primary meal preparer (99% were parents with 1% caregivers; therefore, parents is used herein to refer to the adult caregivers of child participants), and child participants to be 8–12 years old and at/or above the 50th BMI percentile. If more than one child in a family was eligible, the parent selected the child who participated in data collection. Families were randomized into a control group (newsletters) or the HOME Plus intervention group (10-monthly, interactive, family sessions aiming to increase family meal frequency and the healthfulness of meals, snacks and home food environment and reduce sedentary behavior).^{25,26} The University of Minnesota Institutional Review Board approved trial protocols; parent and child participants provided written informed consent and assent, respectively.

Measures

Trained study staff collected data from primary meal-preparing parent (n=160) and child participants (n=160), who completed psychosocial surveys independently. All items on child and parent psychosocial surveys were pilot-tested with cognitive interviews with children

and parents, respectively. Measures used in this study are described below; missing data was low (<4%, n = 5) with the exception of one measure (described below).

Sociodemographic characteristics—Parents reported the participant child’s ethnicity (Hispanic/non-Hispanic) and race(s) (American Indian or Alaskan Native, Asian, Black or African American, Native Hawaiian or Pacific Islander, Other, White), their own education level (no high school diploma, high school diploma or equivalent, some college, associate’s degree, bachelor’s degree, or graduate degree), and whether their family received public assistance (e.g., free- or reduced-price lunches, food support/stamps, Women, Infants and Children).

Family dinner frequency measures

Individual item measures: Family dinner frequency measures included four parent-reported individual items and three child-reported individual items. Each item began with the question stem: “During the past seven days, how many times...”. Items following the question stem were adapted from the literature^{3,27–29} for the present study to ask about family *dinner* frequency, provide a *full* range of possible responses (i.e., 0–7) and provide *additional meal specifics*. For parents, the four items following the question stem were: (1) Did all or most of your family living in your home eat dinner together?; (2) Was at least one parent sitting with your child when your child ate his/her dinner?; (3) Were you sitting and eating with your child when he/she ate his/her dinner?; and (4) Were most members of your family sitting and eating dinner together? The three items asked of children varied slightly from parent items to accommodate their cognitive development and were: (5) Did all or most of your family eat dinner together?; (6) Did you sit down with other people in your family to eat dinner?; and (7) Was at least one parent sitting with you when you ate dinner?

Summative family dinner frequency scores: In addition to the seven individual items measuring family meal frequency, we created two family dinner frequency summary scores. Specifically, responses of the four individual parent items were summed to form a parent-reported summative family dinner frequency score ($\alpha=0.92$); similarly, responses of the child items were summed to create the child-reported summative family dinner frequency score ($\alpha=0.72$).

Weight outcome—Trained study staff objectively measured participant height and weight using standardized protocols and procedures with a stadiometer and calibrated scale.³⁰ Center for Disease Control Guidelines and Growth Chart Parameters³¹ were utilized to calculate age- and sex-adjusted (standardized) BMI z-scores (BMIz) using child height and weight data.

Dietary outcomes—Children completed three 24-hour dietary recall interviews (two weekdays, one weekend day) with trained, certified staff using the multiple pass approach.³² The first interview was conducted face-to-face; the next two were scheduled and completed by phone. Staff collected data using Nutrition Data System for Research software (versions 2011 and 2012, Nutrition Coordinating Center, University of Minnesota); data were analyzed with version 2012 with no modifications or imputations made to the database.

Dietary recall interviews with children have been validated^{33,34} and were appropriate for the study design with dietary intake as a dependent variable.³⁵ Parents were allowed to assist children during recall interviews, if needed. The Healthy Eating Index-2010 total dietary quality scores compare diet quality to the 2010 Dietary Guidelines for Americans.^{36,37} Each child's diet quality score was calculated³⁸ using dietary recall data by summing 12 dietary component scores: nine assessing meeting adequate intake (e.g., whole fruit intake, whole grain intake) and three assessing moderation (e.g., empty calorie intake). Higher dietary quality scores indicated higher dietary quality. Dietary outcomes used for analysis include: children's average daily intake of fruit and vegetable servings, average daily intake of SSB, and dietary quality.

Family connectedness outcome—Family Connectedness ($\alpha=0.72$) was measured by *child* report with an eight-item scale created for HOME Plus with factor analysis (results not shown) using items adapted from existing scales.^{4,39,40} This scale included items like: 'Do you think it is important to eat at least one meal a day together with your family?' and 'Our family has good conversations at dinner.' Higher scale scores indicated higher levels of connectedness. Data were missing for 8.2% of the sample ($n=13$) as expected, given the scale included questions about relationships with both parents, so child participants with only one parent were unable to have scale scores calculated.

Meal conversation outcome—Meal Conversation ($\alpha=0.89$) was measured by *parent* report with a three-item scale. Two items were adapted from previous research: 'In my family, dinner time is about more than just getting food,' and 'In my family, mealtime is a time for talking with other family members.'^{4,40} The third item was created for HOME Plus: 'In my family, we have good conversations at dinner.' Higher scale scores indicated more meal conversations.

Data Analysis

To evaluate relationships between all family dinner measures (given their distributional properties), we calculated both Pearson and Spearman correlations. Additionally, because parent and child data are linked by kinship, we used intraclass correlations (ICCs) to assess agreement/consistency between parent- and child-reported family dinner frequency items (ICCs were not used to evaluate relationships between parent and child summative measures and individual items, as the summative measures had different response options). The ICCs were consistent with both Spearman and Pearson correlations; therefore, only Pearson correlations are reported herein.

We used general linear models to assess unadjusted and multivariate-adjusted associations between family dinner frequency measures and common outcomes previously shown to be associated in the literature. Bivariate analyses were used to evaluate which covariates to include in multivariate-adjusted models. For analysis, race was collapsed into two groups (white, all other responses) as was education (an associate's degree or lower, bachelor's degree or higher). Child race and parent education level were significantly associated with the outcomes in bivariate analyses and thus were used as covariates in multivariate models.

Child age, child sex, and family economic assistance use were not significantly associated with the outcomes and therefore were not used in final models.

The significance level for all models was set to $p < 0.05$. All analyses were performed with SAS (version 9.3, 2011, SAS Institute Inc), aside from the ICCs, which were analyzed with IBM SPSS Statistics for Windows (version 22.0, 2013, IBM Corp).

RESULTS

As shown in Table 1, parent participants were on average 41 years old and 95% female; 59% held a bachelor's degree or higher. The majority of children were white (68%), on average 10 years old, and 47% female. Thirty-nine percent of families reported receiving economic assistance. All family dinner frequency items had comparable means, with families reporting about five shared dinners per week. Additionally, family dinner frequency measures were significantly and positively correlated within reporter (i.e., parent-reported items were correlated; child-reported items were correlated) and across reporters (i.e., parent and child items were correlated; the correlation table is available upon request from the first author).

Relationships with the BMI Outcome

In regard to unadjusted associations between family dinner frequency measures and weight outcomes (Table 2), all five parent-reported and two of four child-reported dinner frequency measures were significantly and inversely associated with child BMIz. However, only one parent-reported measure and one child-reported measure specifying family members were *sitting and eating together* remained significantly and inversely associated with child BMIz when adjusting for sociodemographic characteristics in multivariate models (Table 3).

Relationships with Dietary Outcomes

In unadjusted analyses, all parent- and child-reported family dinner frequency measures were significantly and positively associated with children's average fruit and vegetable intake and overall dietary quality (Table 2). All five parent-reported and two of four child-reported measures (i.e., "...Did all or most of your family eat dinner together?" and the summative score) remained significantly associated with dietary outcomes in multivariate analyses, although results were attenuated with the addition of sociodemographic characteristics (Table 3). In unadjusted analyses, only two of five parent-reported measures and no child-reported measures were significantly and inversely related to SSB intake; only one parent-reported measure remained significantly associated with SSB intake in multivariate models.

Relationships with Psychosocial Outcomes

Unadjusted analyses with family dinner frequency and psychosocial outcomes found four of five parent-reported measures and three of four child-reported measures were significantly associated with Family Connectedness (Table 2); these significant associations were attenuated but remained significant in adjusted, multivariate models (Table 3). All parent-reported but no child-reported measures of family dinner frequency were significantly associated with family Meal Conversations in unadjusted analyses; again associations were

attenuated but remained significant for four of five parent measures in multivariate-adjusted models.

DISCUSSION

The primary purpose of this study was to examine associations between several family dinner frequency measures (items and scales) that varied in phrasing related to who was present for the meal and meal specifics with health-related outcomes previously identified in the literature. In spite of variations in phrasing, parents and children similarly reported family dinner frequency, and all measures were significantly associated within and across parent- and child-reporters. Additionally, when adjusting for sociodemographic characteristics, most measures, regardless of phrasing, remained significantly associated with dietary and psychosocial outcomes, but few measures remained significantly associated with BMIz.

Correlations between parent-reported and child-reported items, although statistically significant, were relatively lower in magnitude than correlations within reporter, suggesting parent- and child-reports of family dinner frequency may be capturing somewhat different information. These findings corroborate previous research findings.^{12,41} This difference in reporting may also be in part related to social desirability on behalf of parents or less accurate recall or cognitive maturity of children.

However, even though correlations were lower in magnitude between parent- and child-reported measures, in this sample, both parent- and child-reported family dinner frequency measures were significantly associated with children's average daily servings of fruits and vegetables and dietary quality; almost all associations remained in multivariate analyses controlling for demographic characteristics. These findings are aligned with those of previous research, which have consistently shown associations between family meal frequency and fruit and vegetable intake and dietary quality, regardless of how family meal frequency was measured across studies.^{1,3-7} However, unlike previous research findings,^{1,3-7} in the present study, associations between family meal frequency and SSB were not found with most measures, which may be the result of low SSB intake in the study population. Findings from the present study, in conjunction with past research findings, suggest when examining relationships between dietary outcomes and family meal frequency, it may not matter whom is asked (i.e., parent or child) or how the question is phrased.

Family dinner frequency measures consistently showed significant associations with youth psychosocial outcomes, most of which were retained in multivariate analyses. These findings are similar to those in previous research,^{1,2} and suggest, for psychosocial outcomes, it may not matter how the question is phrased or whether parents or children are asked.

Family meal frequency has been inconsistently associated with weight outcomes within the family meals literature⁴⁻⁶ and the present study demonstrates the complexity of these relationships, as associations between dinner measures and child BMIz were attenuated when adjusted for sociodemographic covariates. Only measures relating to family members sitting and eating together remained significant in adjusted models. Given that weight is

impacted by a host of factors (e.g., biological, social, environmental, and structural factors), which are, in part, captured with sociodemographic characteristics, this attenuation of findings was not entirely surprising.

Study findings suggest the specificity regarding how and with whom meals are eaten may have important measurement implications for assessing associations with weight outcomes. It is possible that how family meals are occurring (i.e., *sitting and eating together with others*) might be important. These findings are plausible, in that if family members are sitting and eating together, they have an opportunity to connect with one another and role-model healthful behaviors. However, the context of *sitting and eating* warrants further study, as it could mean in fast food restaurants, in front of electronic media/devices and other less engaging contexts. Additionally, it also is possible, greater specification of a family meal captures other relevant family characteristics, traits, and/or behaviors, such as organization, structure, level of chaos at mealtimes, and/or cohesiveness, which could be mediators, moderators, or mechanisms by which family meal frequency is associated with better outcomes. Future research should further explore these notions, the context in which meals are occurring, and replicate findings in a larger, more generalizable sample of parents and children.

This study provided a unique opportunity to assess and report results on nine different family dinner measures and associations with outcomes. Although this study only asked about family dinner frequency, rather than frequency of all family meals, family dinners capture most meals eaten together.²⁸

This study also has limitations. The Family Connectedness and Meal Conversation scales used items adapted from previous research and were created for the present research to measure important family psychosocial outcomes, so future validity testing is warranted. Also, although children may be prone to misreporting dietary intake data,⁴² child dietary recalls have been validated³³ and parents were allowed to assist if needed. Additionally, these cross-sectional study findings cannot establish causal or temporal relationships and generalizability is limited, as parents and children volunteered to be in a family meals study and may be more interested in healthful eating and family meals. Furthermore, although we carefully considered important covariates in our analyses collected as part of the HOME Plus study, it is possible other potentially confounding variables (e.g., physical activity, social desirability) may be important to consider in future research. Future research is needed to confirm findings in a larger, more nationally-representative sample, ideally with longitudinal data.

CONCLUSIONS

Findings from this study suggest variations in phrasing of family dinner frequency questions may not influence associations with dietary and psychosocial outcomes but may make a difference for weight outcomes. Future research should build on this work by further investigating if certain aspects of family meal frequency question phrasing (e.g., which family members were present at meals and how meals are occurring, for example while

sitting and eating) are particularly important in order to assess associations with weight outcomes in larger, more economically- and racial/ethnically-diverse populations.

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Table 1

Sociodemographic characteristics, family dinner measures, and dependent variables of interest of parent (N=160) and child (N=160) participants in the HOME Plus trial

Variables of Interest	n (%)	Mean±SD ^a	Range
Sociodemographic Characteristics			
Parent age (years)		41.3±7.7	24.7 – 65.8
Parent sex			
Female	152 (95%)		
Male	8 (5%)		
Parent education			
Associate's Degree or lower	64 (41%)		
Bachelor's Degree or higher	91 (59%)		
Child race			
White	109 (68%)		
Other ^b	51 (32%)		
Child ethnicity			
Non-Hispanic	145 (91%)		
Hispanic	15 (9%)		
Child age (years)		10.3±1.4	8 – 12.9
Child sex			
Female	75 (47%)		
Male	85 (53%)		
Family Economic Assistance Use ^c			
Yes	62 (39%)		
No	98 (61%)		
Family Dinner Frequency Measures			
<i>Parent-reported:</i>			
<i>During the past seven days, how many times...</i>			
...Did all or most of your family living in your home eat dinner together?		4.8±1.8	0 – 7
...Was at least one parent sitting with your child when your child ate his/her dinner?		5.1±2.0	0 – 7
...Were you sitting and eating with your child when he/she ate his/her dinner?		4.7±2.0	0 – 7
...Were most members of your family sitting and eating dinner together?		4.7±1.9	0 – 7
Summative family dinner frequency score (of parent items)		19.2±7.0	0 – 28
<i>Child-reported:</i>			
<i>During the past seven days, how many times...</i>			
...Did all or most of your family eat dinner together?		5.2±2.2	0 – 7
...Did you sit down with other people in your family to eat dinner?		4.6±2.7	0 – 7
...Was at least one parent sitting with you when you ate dinner?		5.2±2.4	0 – 7
Summative family dinner frequency score (of child items)		14.9±5.9	0 – 21
Dependent Variables			
Child BMI z-scores ^d		1.0±0.8	–0.5 – 2.7

Variables of Interest	n (%)	Mean±SD ^a	Range
Child daily servings of fruits and vegetables ^e		2.3±1.5	0 – 7.5
Child daily servings of sugar-sweetened beverages ^e		0.7±0.9	0 – 6.1
HEI-2010 ^f		53.7 ±11.3	29 – 82
Family Connectedness scale score		18.7±3.9	5 – 25
Meal Conversation scale score		15.5±2.5	3 – 12

^aStandard deviation

^bThose identified by their parent as American Indian or Alaskan Native, Asian, Black or African American, Native Hawaiian or Pacific Islander, Other, or More than one race

^cFamily economic assistance use indicates a family reported receiving one or more forms of economic assistance (e.g., free- or reduced-price school lunch, food support/stamps, Electronic Benefit Transfer, Women Infants and Children, Temporary Assistance for Needy Families, Supplemental Security Income or Minnesota Family Investment Program)

^dStandardized, child age and sex adjusted Body Mass Index

^eDaily intake was averaged over the 24-hour dietary recall interviews

^fThe Healthy Eating Index-2010 is a measure of dietary quality in comparison to the 2010 Dietary Guidelines and is calculated using the 24-hour dietary recall interview data (averaged over the recalls)

Table 2

Unadjusted general linear models: Associations between family dinner measurement variables and child weight, dietary and psychosocial outcomes as reported by parents (N=160)^a and children (N=160)^a in the HOME Plus study

Family Dinner Frequency Measure	Weight Outcome		Child Dietary Outcomes		Psychosocial Outcomes	
	Child BMI z-score	Average Daily F&V ^b Intake	Average Daily SSB ^c Intake	HEL-2010 ^d	Family Connectedness	Meal Conversation
	$\beta \pm SE^e$	$\beta \pm SE^e$	$\beta \pm SE^e$	$\beta \pm SE^e$	$\beta \pm SE^e$	$\beta \pm SE^e$
Parent-reported:						
<i>During the past seven days, how many times...</i>						
...Did all or most of your family living in your home eat dinner together?	-0.08±0.03*	0.20±0.06** ^f	-0.08±0.04*	1.50±0.49**	0.51±0.17**	0.21±0.08**
...Was at least one parent sitting with your child when your child ate his/her dinner?	-0.08±0.03*	0.20±0.06**	-0.03±0.04	1.79±0.45***	0.29±0.17	0.25±0.07***
...Were you sitting and eating with your child when he/she ate his/her dinner?	-0.09±0.03**	0.21±0.06***	-0.03±0.04	2.12±0.44***	0.42±0.16*	0.19±0.07*
...Were most members of your family sitting and eating dinner together?	-0.11±0.03***	0.25±0.06***	-0.09±0.04*	2.27±0.44***	0.56±0.16***	0.21±0.07**
Summative family dinner frequency score (of parent items)	-0.03±0.01**	0.06±0.02***	-0.02±0.01	0.56±0.12***	0.13±0.04**	0.07±0.02**
Child-reported:						
<i>During the past seven days, how many times...</i>						
...Did all or most of your family eat dinner together?	-0.05±0.03	0.16±0.05**	-0.06±0.03	1.76±0.4***	0.37±0.15*	0.09±0.07
...Did you sit down with other people in your family to eat dinner?	-0.07±0.02**	0.1±0.04*	-0.04±0.03	0.81±0.32*	0.14±0.11	0.02±0.05
...Was at least one parent sitting with you when you ate dinner?	-0.03±0.02	0.10±0.05*	-0.02±0.03	0.94±0.37*	0.47±0.13***	0.04±0.06
Summative family dinner frequency score (of child items)	-0.03±0.01**	0.06±0.02**	-0.02±0.01	0.59±0.14***	0.16±0.05**	0.03±0.02

^aSample size varied minimally for each analysis (from 157–160), with the exception of models with family connectedness in which the sample size ranged from 145–147

^bDaily fruit and vegetable servings, averaged over the 24-hour dietary recall interviews

^cSugar-sweetened beverages servings, averaged over the 24-hour dietary recall interviews

^dThe Healthy Eating Index-2010 is a measure of dietary quality in comparison to the 2010 Dietary Guidelines and is calculated using the 24-hour dietary recall interview data (averaged over the recalls)

^eBeta=standard error

^fAs an example of the interpretation of a beta value, the beta value in this model indicates that for each increase of 1 day of a family dinner per week the outcome of average fruit and vegetable intake will increase by 0.20 servings

1000 > d

;100 > d
**
500 > d

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Table 3

Multivariate general linear models: Associations between family dinner measurement variables and child weight, dietary and psychosocial outcomes (adjusted for sociodemographic characteristics^a) as reported by parents (N=160)^b and children (N=160)^b in the HOME Plus study

Family Dinner Frequency Measure	Weight Outcome		Child Dietary Outcomes		Psychosocial Outcomes	
	Child BMI z-score	Average Daily F&V ^c Intake	Average Daily SSB ^d Intake	HEI-2010 ^e	Family Connectedness	Meal Conversation
	$\beta \pm SE^f$	$\beta \pm SE^f$	$\beta \pm SE^f$	$\beta \pm SE^f$	$\beta \pm SE^f$	$\beta \pm SE^f$
Parent-reported:						
<i>During the past seven days, how many times...</i>						
...Did all or most of your family living in your home eat dinner together?	-0.05±0.03	0.19±0.06 ^{**g}	-0.07±0.04	1.23±0.48*	0.41±0.18*	0.20±0.08*
...Was at least one parent sitting with your child when your child ate his/her dinner?	-0.03±0.03	0.15±0.06*	-0.01±0.04	1.42±0.45 ^{**}	0.22±0.17	0.22±0.07 ^{**}
...Were you sitting and eating with your child when he/she ate his/her dinner?	-0.04±0.03	0.17±0.06 ^{**}	-0.02±0.04	1.71±0.42 ^{***}	0.32±0.16*	0.14±0.07
...Were most members of your family sitting and eating dinner together?	-0.07±0.03*	0.21±0.06 ^{***}	-0.08±0.04*	1.86±0.45 ^{***}	0.47±0.17 ^{**}	0.17±0.08*
Summative family dinner frequency score (of parent items)	-0.02±0.01	0.06±0.02 ^{***}	-0.01±0.01	0.48±0.12 ^{***}	0.11±0.05*	0.06±0.02 ^{**}
Child-reported:						
<i>During the past seven days, how many times...</i>						
...Did all or most of your family eat dinner together?	-0.03±0.03	0.14±0.05 ^{**}	-0.05±0.03	1.54±0.38 ^{***}	0.33±0.15*	0.06±0.07
...Did you sit down with other people in your family to eat dinner?	-0.06±0.02 ^{**}	0.06±0.04	-0.03±0.03	0.71±0.32	0.14±0.12	0.00±0.05
...Was at least one parent sitting with you when you ate dinner?	-0.01±0.02	0.09±0.05	-0.01±0.03	0.77±0.37*	0.44±0.14 ^{***}	0.01±0.06
Summative family dinner frequency score (of child items)	-0.02±0.01	0.05±0.02*	-0.02±0.01	0.50±0.14 ^{***}	0.15±0.05 ^{***}	0.01±0.03

^a All general linear models were adjusted for education level of the parents and child race

^b Sample size varied minimally for each analysis (from 152–155) with the exception of models with family connectedness in which the sample size ranged from 140–142

^c Daily fruit and vegetable servings, averaged over the 24-hour dietary recall interviews

^d Sugar-sweetened beverages servings, averaged over the 24-hour dietary recall interviews

^e The Healthy Eating Index-2010 is a measure of dietary quality in comparison to the 2010 Dietary Guidelines and is calculated using the 24-hour dietary recall interview data (averaged over the recalls)

^f Beta=standard error

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As an example of the interpretation of a beta value, the beta value in this model indicates that for each increase of 1 day of a family dinner per week the outcome of average fruit and vegetable intake will increase by 0.19 servings

p<0.05
**
P < 0.01;

P > 0.001