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Family Functioning: Associations With Weight Status, Eating Behaviors, and Physical Activity in Adolescents

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A B S T R A C T

Purpose: This article examines the relationship between family functioning (e.g., communication, closeness, problem solving, behavioral control) and adolescent weight status and relevant eating and physical activity behaviors.
Methods: Data are from EAT 2010 (Eating and Activity in Teens), a population-based study that assessed eating and activity among socioeconomically and racially/ethnically diverse youths (n = 2,793). Adolescents (46.8% boys, 53.2% girls) completed anthropometric assessments and surveys at school between 2009 and 2010. Multiple linear regression was used to test the relationship between family functioning and adolescent weight, dietary intake, family meal patterns, and physical activity. Additional regression models were fit to test for interactions by race/ethnicity.
Results: For adolescent girls, higher family functioning was associated with lower body mass index *z* score and percent overweight, less sedentary behavior, higher intake of fruits and vegetables, and more frequent family meals and breakfast consumption. For adolescent boys, higher family functioning was associated with more physical activity, less sedentary behavior, less fast-food consumption, and more frequent family meals and breakfast consumption. There was one significant interaction by race/ethnicity for family meals; the association between higher family functioning and more frequent family meals was stronger for nonwhite boys compared with white boys. Overall, strengths of associations tended to be small, with effect sizes ranging from −.07 to .31 for statistically significant associations.
Conclusions: Findings suggest that family functioning may be protective for adolescent weight and weight-related health behaviors across all race/ethnicities, although assumptions regarding family functioning in the homes of overweight children should be avoided, given small effect sizes.

IMPLICATIONS AND CONTRIBUTION

Family functioning (e.g., communication, closeness, problem solving, behavioral control) has not been well researched in relation to adolescent weight and weight-related behaviors that occur daily. The current study showed significant associations between higher family functioning and more fruit and vegetable consumption, higher frequency of family meals, more hours of physical activity and lower BMI in adolescents.

Family functioning refers to the structural/organizational properties and the interpersonal interactions of the family group, such as problem solving, communication, roles, adaptability, warmth/closeness, and behavior control [1,2]. According to family systems theory, the interactions that occur within the family are reciprocal [3]. That is, each family member is shaping and being shaped by other family members' actions. These mutual influencing patterns may provide particular insight into the behaviors that ultimately determine dietary intake and physical activity in youths. Although family functioning has not been well researched in relation to youth weight and health behaviors, its influence on the physical, social, and emotional well-being of youths has been studied in social science and medical research. Specifically, studies have

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shown associations between poor family functioning and higher depressive symptoms [4], less academic success [5], more high-risk behaviors [6], and more disordered eating behaviors in adolescents [7], and worse metabolic control in youths with diabetes [8]. It is of interest to explore whether and how family functioning is associated with weight status, eating patterns, and physical activity behaviors, given the youth obesity public health problem [9].

Numerous expert panels and researchers have pointed to the influence of the family and home environment as an important and neglected area of research related to adolescent obesity [10,11]. A recent review found fewer than 10 studies in the past decade that investigated overall family functioning (e.g., communication, closeness, problem solving, interpersonal relationships) in relation to childhood and adolescent obesity [12], whereas several studies have evaluated the association of parenting style (i.e., authoritative, authoritarian, permissive, neglectful) and parenting practices (e.g., modeling health behaviors) with childhood weight and weight-related behaviors [13–15]. Although parenting behaviors (e.g., parenting style, modeling behaviors, encouraging healthful behaviors) have been found to be related to child weight and health behaviors, they may not account for the overall impact of interpersonal behaviors that occur at the family level that might have an influence on child health behaviors and weight status.

The few studies that have evaluated the association between family functioning and youth weight and behaviors of potential relevance for weight status have mainly shown that poor family communication [16] and lower family functioning [17,18] were associated with higher body mass index (BMI) in youths, although two studies did not find a significant association [19,20]. Thus, research evaluating the influence of family functioning on childhood obesity has shown mixed results, and study designs have mainly used small samples [18], white participants [19], higher-income populations [16], and younger children [17], making it difficult to extrapolate findings to diverse adolescent populations. Understanding whether the results found in these previous studies hold across racial/ethnic and socioeconomically diverse groups of youths and with adolescents is an important next step needed to better inform the development of public health interventions targeting youths at greatest risk for obesity. In addition, it is important to identify whether and how family functioning is associated with other behavioral outcomes beyond BMI or weight status, such as eating and physical activity behaviors. Understanding the potential influence of family functioning on variables that are upstream from adolescent weight status might allow for targeting modifiable family behaviors (e.g., communication, behavioral control, problem solving) to improve youth health behaviors.

This article investigates the association between overall family functioning and adolescent BMI and multiple weight-related health behaviors that occur daily. The main research questions include the following: (a) What are the associations between family functioning and BMI, meal patterns (i.e., family meals, breakfast consumption), dietary intake (i.e., fruit and vegetable intake, fast-food intake), and physical and sedentary activity? and (b) Do these associations differ by race/ethnicity?

Methods

Study design and population

EAT 2010 (Eating and Activity in Teens) is a population-based study designed to assess dietary intake, physical activity, weight control behaviors, and weight status in adolescents. Surveys and anthropometric measures were completed by 2,793 adolescents from 20 public middle schools and high schools in the Minneapolis/St. Paul metropolitan area of Minnesota during the 2009–2010 academic year. The mean age of the study population was 14.4 (standard deviation [SD] = 2.0) years; 46.1% were in middle school (6th–8th grades) and 53.9% were in high school (9th–12th grades). Participants were equally divided by gender (46.8% boys, 53.2% girls) and were racial/ethnically and socioeconomically diverse (Table 1).

Trained research staff administered surveys and measured adolescents' height and weight during selected required health, physical education, and science classes. Measurements were completed in a private area, and surveys were administered during two class periods that were typically 45–50 minutes. After survey completion, participants were given a $10 gift card. Study procedures were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee and by the research boards of the participating school districts. All adolescents within selected classes were given the opportunity to assent if their parent/guardian did not return a signed consent

Table 1
Sociodemographic characteristics, BMI, and health behaviors of EAT 2010 adolescent study participants

	Girls n = 1,486	Boys n = 1,307	*p* value
Ethnicity/race, %			
White	16.7	21.2	.004[a]
Black	28.9	29.0	
Hispanic	17.2	16.5	
Asian	19.9	19.9	
Native American	3.6	3.7	
Mixed/other	13.7	9.7	
Socioeconomic status, %			
Low	42.8	33.4	<.001[a]
Low middle	20.9	21.8	
Middle	16.2	17.7	
High middle	11.2	13.8	
High	5.9	8.8	
Missing	3.0	4.6	
Age in years, mean (SD)	14.4 (1.9)	14.5 (2.1)	.037
Body mass index, mean (SD)	23.8 (5.8)	23.7 (5.7)	.481
Overweight (>85 percentile), % (n)	38.6 (565)	41.7 (535)	.099
Family meals, mean meals per week (SD)	3.8 (2.6)	4.0 (2.6)	.008
Fast-food intake, mean times per week (SD)	3.7 (4.4)	3.6 (4.2)	.512
Fruits and vegetables, mean servings per day(SD)	2.7 (2.1)	2.7 (2.2)	.789
Breakfast intake, mean times per week (SD)	4.0 (2.6)	4.4 (2.6)	<.001
Moderate-to-vigorous physical activity, mean hours per week (SD)	5.0 (4.4)	6.7 (4.9)	<.001
Sedentary activity, mean hours per week (SD)	36.3 (24.1)	44.5 (28.8)	<.001

BMI = body mass index; EAT = Eating and Activity in Teens; SD = standard deviation.
[a] *p* value for χ^2 test of any differences across categories by gender.

form indicating their refusal to have their child participate. Among adolescents who were at school on the days of survey administration, 96.3% had parental consent and chose to participate.

Adolescent survey development

The EAT 2010 survey is a 235-item self-report instrument assessing a range of factors of potential relevance to weight status and weight-related behaviors among adolescents. Survey development was guided by a review of previous Project EAT surveys [21] to identify the most salient items; a theoretical framework, which integrates an ecological perspective with social cognitive theory [22]; expert review by professionals from different disciplines; and extensive pilot testing with adolescents. The test–retest reliability of measures over a 1-week period was examined in a diverse sample of 129 middle school and high school students.

Measures

Family functioning. Six items were drawn from the general functioning scale of the Family Assessment Device [1,2] to measure overall family functioning. Previous research has shown high validity (r = .92) and test–retest reliability (r = .71) for the general functioning scale with racially/ethnically and socioeconomically diverse populations [23]. Additionally, the general functioning scale has been found to correlate highly with other longer measures of family functioning ($r > .50$) and to have a positive linear relationship with two other reliable and valid measures of family functioning: the Family Environment Scale and the Family Adaptability and Cohesion Evaluation Scale IV [24].

The general functioning scale on the Family Assessment Device measures structural, organizational, and interaction patterns of the family, including problem solving, communication, roles, affective responsiveness, affective involvement, and behavior control among family members. Adolescents were asked, "How strongly do you agree with the following statements? For these questions, think about your family in general (including your parents and your brothers and sisters). . . [Strongly disagree, Somewhat disagree, Somewhat agree, Strongly agree] (a) Family members are accepted for who they are; (b) Making decisions is a problem for the family; (c) We don't get along well together; (d) We can express feelings to each other; (e) Planning family activities is difficult because we misunderstand each other; (f) We confide in each other (By 'confide' we mean to trust your family members enough to tell them something that is important to you)." Responses were assigned values from 1 to 4, and all statements were converted to the positive form before the values were summed. The responses for this scale ranged from 6 to 24, with higher scores representing higher family functioning (scale α = .70).

BMI z score. All measurements were completed following standardized procedures [25]. Students were first asked to remove shoes, outerwear (e.g., heavy sweaters), and items of considerable weight (e.g., wallets) from their pockets. Height was assessed to the nearest .1 cm using a Shorr Board, and weight assessed to the nearest .1 kg using a calibrated scale. BMI values were calculated according to the following formula: weight (kg)/height $(m)^2$, and converted to z scores, standardized for gender and age [26].

Family meals. Family meal frequency was assessed by asking adolescents the following question: "During the past 7 days, how many times did all, or most, of your family living in your house eat a meal together?" Response options included never, one to two times, three to four times, five to six times, seven times, and more than seven times (test–retest r = .63). The highest two categories were collapsed.

Fast-food intake. Fast-food intake was assessed with the following question: "In the past month, how often did you eat something from the following types of restaurants (include take-out and delivery)?" Types of restaurants included traditional burger-and-fries, Mexican fast food, fried chicken, sandwich or sub shop, and pizza place. Response options ranged from never/rarely to one or more times a day (test–retest r = .49). To prevent outlying values from influencing results, responses were trimmed at 90 times per month (that is, three fast-food meals per day).

Fruit/vegetable intake. Dietary intake was assessed with the 149-item Youth and Adolescent Food Frequency Questionnaire (YAQ) [27]. For fruit and vegetable intake, a daily serving was defined as the equivalent of one-half cup. Validity and reliability of the YAQ have been previously tested in youths [27]. Test–retest correlations between two YAQs over a 1-year period were .49 for fruit and .48 for vegetables. Responses to questions on the frequency of intake of fruits and vegetables (excluding potatoes) were summed to assess average total daily intake.

Breakfast consumption. Adolescents were asked, "During the past week, how many days did you eat breakfast?" Five response options ranged from never to every day (test–retest r = .76).

Physical activity. Physical activity questions were adapted from the Godin Leisure-Time Exercise Questionnaire [28]. Adolescents were asked: "In a usual week, how many hours do you spend doing the following activities: (1) strenuous exercise (e.g. biking fast, aerobics, jogging, swimming laps, soccer, rollerblading) and (2) moderate exercise (e.g. walking quickly, easy bicycling, skiing, dancing, skateboarding, snowboarding)." Response options ranged from "none" to "6+ hours a week" (test–retest r = .73).

Sedentary behavior. Adolescents were asked, "In your free time on an average weekday (Monday–Friday), how many hours do you spend doing the following activities? . . . [0 hour, ½ hour, 1 hour, 2 hours, 3 hours, 4 hours, 5+ hours]." The activities assessed included watching TV/DVDs/videos, using a computer (not for homework), and Xbox/PlayStation/other electronic games that they play when sitting. This same question was asked for an average weekend day. For each sedentary behavior, an "hours per week" variable was created by calculating a weighted sum of weekday and weekend use (test–retest r = .86).

Covariates. Race/ethnicity, socioeconomic status (SES), and age were assessed by self-report. Race/ethnicity was assessed with the question: " Do you think of yourself as. . .? (1) White, (2) Black or African American, (3) Hispanic or Latino, (4) Asian American, (5) Native Hawaiian or other Pacific Islander, (6) American Indian or Native American, or (7) Other." The responses "'Native Hawai-

ian or other Pacific Islander'" and "Other" were coded as "mixed/other" owing to small numbers. Classification tree methodology [29] was used to generate five categories of SES (low SES, low-middle SES, Middle SES, upper-middle SES, high SES) [30]. The prime determinant of SES was the higher education level of either parent. Subsidiary variables were family eligibility for free/reduced-price school meals, family receipt of public assistance, and parent employment status. Age was calculated using self-reported birth date and survey completion date.

Statistical analysis. Tests of mean differences across gender for all outcome variables and family functioning were conducted using two-sample *t* tests. One-way analysis of variance was used to test for differences in family functioning by race/ethnicity, SES, and age categories. Hierarchical linear regression including a random effect to account for clustering within schools was used to estimate and test the relationship between family functioning and each of the outcomes, controlling for age, SES, and race/ethnicity. All regressions were stratified by sex a priori owing to previous research findings showing sex differences in BMI, fruit and vegetable intake, and physical activity between boys and girls [31,32]. Regression results describing the association of each outcome with family functioning are presented in two ways. First, outcomes and family functioning were standardized within gender, and standardized β estimates represent the expected SD difference in the outcome variable associated with a 1-SD increase in family functioning, controlling for covariates. The standardized β represents an effect size, with benchmarks for describing its magnitude as follows: small = .10–.29, moderate = .30–.49, or large = >.50 [33]. Second, regression-adjusted mean outcome values on their original scales (unstandardized) are presented at fixed values corresponding to an adolescent reporting a family functioning value at the 5th and 95th percentile. Additional regression models were fit to test for interactions by race/ethnicity in six categories: white, black or African American, Hispanic or Latino, Asian, Native American, mixed/other (combining Hawaiian Pacific Islander, other, and mixed race/ethnicity). In cases where the *F* test for the 5 degree-of-freedom interaction of family functioning and race/ethnicity had a *p* value <.05, additional multiple regressions were fit stratified by race/ethnicity. Analyses were performed in SAS (v9.2; Cary, NC, 2011).

Results

Descriptive analysis

Adolescent boys reported significantly higher frequencies of family meals and breakfast consumption and more hours of both physical and sedentary activity than girls (Table 1). In addition, boys reported higher family functioning scores compared with girls; African American adolescents reported higher family functioning scores compared with adolescents from other racial/ethnic backgrounds; and adolescents from higher SES reported higher family functioning compared with adolescents from lower SES (Table 2).

Table 2
Family functioning score* by adolescents' demographics

	Family functioning score Mean (SD)**	*p* value
Gender		
Female	17.7 (3.75)[a]	.005
Male	18.1 (3.33)[b]	
Ethnicity/race, %		
White	17.9 (3.70)[a,b]	<.001
Black	18.5 (3.68)[a]	
Hispanic	18.1 (3.37)[a,b]	
Asian	17.2 (3.26)[c]	
Native American	17.7 (3.47)[b,c]	
Mixed/other	17.8 (3.63)[b]	
Socioeconomic status, %		
Low	17.6 (3.54)[a]	<.001
Low middle	17.7 (3.39)[a]	
Middle	18.3 (3.58)[b]	
High middle	18.3 (3.79)[b]	
High	19.0 (3.53)[c]	
Age		
<14 years	18.0 (3.56)	.244
≥14 years	17.9 (3.57)	

* Scores are mean family functioning scores. The range is 6–24; higher scores indicate higher family functioning.
** For categories within each demographic variable, means with differing letter superscripts [a,b,c] are statistically different from one another ($p < .05$).

Family functioning: associations with adolescent BMI z scores and health behaviors

Adolescent girls. Higher family functioning was significantly associated with more frequent family meals ($p < .001$) and more frequent breakfast consumption ($p < .001$) in girls after adjusting for age, SES, and race/ethnicity (Table 3). Specifically, the standardized β estimate of .31 for family meals represents the SD increase in number of family meals, given one SD increase in family functioning, after controlling for demographic variables. On the original scale, this effect corresponds to a mean number of family meals of 2.61 for girls with family functioning at the 5th percentile and a mean number of family meals of 5.12 for those with family functioning at the 95th percentile.

Higher family functioning was also modestly associated with greater daily intake of fruits and vegetables ($p = .037$), more frequent breakfast consumption ($p < .001$), fewer hours of sedentary behavior ($p = .004$), lower BMI *z* scores ($p = .020$), and lower percent overweight ($p = .044$) in adolescent girls, after adjusting for age, SES, and race/ethnicity (Table 3). There were no significant associations between family functioning and fast-food intake or hours of physical activity per week for adolescent girls. The standardized β estimates in all results for adolescent girls ranged from −.07 to .31 for all statistically significant results, which represent small to moderate effect sizes.

Adolescent boys. Higher family functioning was associated with more frequent family meals ($p < .001$) in boys after adjusting for age, SES, and race/ethnicity (Table 4). Higher family functioning was also modestly associated with more frequent breakfast consumption ($p = .002$), less frequent fast-food intake ($p < .001$), more hours of physical activity ($p < .001$), and fewer hours of sedentary behaviors ($p = .001$), after adjusting for age, SES, and race/ethnicity (Table 4). There were no significant associations found between family functioning and BMI *z* score or servings of fruits and vegetables. The standardized β estimates in all results for adolescent boys ranged from −.11 to .25 for all statistically significant results, which represent small effect sizes.

Interactions by race/ethnicity. There was only one significant interaction by race/ethnicity for adolescent boys related to family meal frequency ($F_5 = 2.47$; $p = .031$). Post hoc analyses stratified

Table 3
Relationship between family functioning and adolescent girls' BMI and health behavior outcomes[a]

Outcome	Family functioning score at 5th percentile[b]	Family functioning score at 95th percentile[b]	Standardized β[c]	SE	*t* value	*p* value
Meal patterns						
Family meals (meals/wk)	2.61	5.12	.31	.02	12.38	**<.001**
Breakfast consumption (daily)	3.31	4.75	.18	.03	6.78	**<.001**
Dietary intake						
Fruits and vegetables (servings/d)	2.52	2.91	.06	.03	2.31	**.037**
Fast-food intake (times/wk)	3.86	3.49	−.03	.03	−.86	.285
Physical activity						
Moderate-to-vigorous activity (hr/wk)	4.65	5.12	.03	.03	1.17	.207
Sedentary behavior (hr/wk)	39.0	33.2	−.08	.03	−2.74	**.004**
Weight						
Body mass index *z* score	.79	.62	−.06	.03	−2.33	**.020**
Percent overweight (>85th percentile)	41.4	33.2	−.05	.01	−2.01	**.044**

SE = standard error.
p values in bold are statistically significant at $p < .05$.
[a] All results adjusted for age, race, and socioeconomic status.
[b] Adjusted mean outcomes at 5th percentile and 95th percentile score for family functioning (i.e., 12 vs. 24).
[c] Standardized β estimates represent the standard deviation increase (or decrease) in the outcome, given one standard deviation increase in family functioning. Small = .10–.29, medium = .30–.49, large ≥ .50.

by race/ethnicity indicated that the effect of family functioning was significantly stronger in nonwhite compared with white adolescent boys ($p = .012$), especially for Hispanic ($p = .002$) and Native American ($p = .057$) boys. This means that for adolescent nonwhite boys, higher family functioning was associated with more frequent family meals than white boys. There were no other interactions between family functioning and race/ethnicity that were statistically significant.

Discussion

Findings from the current study indicate that family functioning may be a small, but relevant, correlate of adolescent weight and weight-related health behaviors. Specifically, positive family functioning, including healthy communication, having rules and structure, and using problem-solving skills may be protective for adolescent girls in relation to greater family meal participation, more frequent breakfast consumption, higher fruit and vegetable intake, less sedentary activity, and lower BMI *z* scores. For boys, positive family functioning may be protective for greater family meal participation, more frequent breakfast consumption, greater physical activity, and less sedentary activity and fast-food intake. These findings extend the results of a limited number of previous studies on family functioning and adolescent health [16–18] by showing that there are associations between higher family functioning and positive health behaviors (e.g., fruit and vegetable intake, family meals, breakfast consumption, physical activity) and fewer unhealthful behaviors (e.g., sedentary behaviors) in adolescents, in addition to lower BMI found in previous studies [16–18]. Furthermore, the comparisons between the 5th and 95th percentiles of family functioning scores suggest that at the more extreme ends, family functioning is strongly associated with a number of weight and weight-related health behaviors in adolescents, compared with the middle range of scores, suggesting that most adolescents' family functioning was adequate.

Current findings can be explained using our guiding theoretical model. According to family systems theory, children live within a family context that shapes their health behaviors and their understanding of health and well-being. Under conditions

Table 4
Relationship between family functioning and adolescent boys' BMI and health behavior outcomes[a]

Outcome	Family functioning score at 5th percentile[b]	Family functioning score at 95th percentile[b]	Standardized β[c]	SE	*t* value	*p* value
Meal patterns						
Family meals (meals/wk)	2.87	5.13	.25	.03	8.98	**<.001**
Breakfast consumption (daily)	3.95	4.94	.10	.03	3.70	**.002**
Dietary intake						
Fruits and vegetables (servings/d)	2.54	2.85	.04	.03	1.38	.178
Fast-food intake (times/wk)	4.37	3.00	−.09	.03	−3.27	**<.001**
Physical activity						
Moderate-to-vigorous activity (hr/wk)	5.81	7.60	.10	.03	3.71	**<.001**
Sedentary behavior (hr/wk)	50.0	40.3	−.10	.03	−3.38	**.001**
Weight						
BMI *z* score	.76	.65	−.03	.03	−.91	.357
Percent overweight (>85th percentile)	46.0	38.0	−.09	.05	−1.75	.080

p values in bold are statistically significant at $p < .05$.
[a] All results adjusted for age, race, and socioeconomic status.
[b] Adjusted mean outcomes at 5th percentile and 95th percentile score for family functioning (that is, 12 vs. 24).
[c] Standardized β estimates represent the standard deviation increase (or decrease) in the outcome, given one standard deviation increase in family functioning. Small = .10–.29, medium = .30–.49, large ≥ .50.

of poor family functioning (e.g., less structure/rules, warmth/communication, problem-solving skills), people become vulnerable to developing risk behaviors (e.g., less family structure leads to fewer family meals) [7,17,34].

However, it may also be the case that families who have regular family meals are also more likely to have higher family functioning.

The interaction analyses showed that for nonwhite adolescent boys, especially for Hispanic and Native American boys, higher family functioning scores were associated with more frequent family meals. Thus, higher family functioning may be highly protective for racially/ethnically diverse adolescent boys compared with white boys with regard to the frequency of family meals. The lack of overall significant interactions by race/ethnicity for other variables, suggests the importance of family functioning for adolescents across all race/ethnicities for outcomes that were found to be significant in the main analyses.

It is important to note that all findings in the current study had small to moderate effect sizes. This suggests that although family functioning is contributing to adolescent health behavior outcomes, it likely does not represent the entire story. For example, individual and environmental factors such as adolescents' taste preferences and home availability of fruits and vegetables may play a greater role in shaping health behavior outcomes than family functioning. Furthermore, the small correlations suggest that for many families of overweight adolescents, the level of family functioning may be just as high as in families where all adolescent members are not overweight. Therefore, assumptions about levels of family functioning within families in which there are overweight children should be avoided. However, findings in the current study are supported by previous research on family meals. For example, the finding that adolescent girls with low family functioning had an average of approximately three family meals per week whereas girls with high family functioning (at the 95th percentile) had an average of five family meals per week is significant because having five or more family meals per week has been linked to better dietary intake and lower risk for substance use and disordered eating among diverse adolescents in previous research [31,35,36].

Study strengths and limitations should be taken into account when interpreting the study findings. Study strengths included the use of a large and diverse population-based sample, the ability to examine many health behaviors among the same sample, and to test for interactions by race/ethnicity. One limitation of this study is the cross-sectional design. Because we were unable to examine longitudinal associations, we cannot determine causality or temporality of associations between family functioning and adolescent BMI and health behavior outcomes. However, theoretically, it is more likely that family functioning would be influencing these outcomes rather than the adolescent's behaviors (e.g., adolescent fruit and vegetable intake, sedentary behaviors) influencing family functioning. In addition, the family functioning measure used in the survey was not the full measure and may not have been inclusive of all family behaviors that contribute to measuring family functioning. Six of the 12 items on the scale were used in this study, thus we may have underestimated the association between family functioning and adolescent weight and health behaviors.

Conclusions

Study findings suggest that higher family functioning may be protective for adolescent weight and weight-related health behaviors that occur daily. These findings are consistent with other findings showing the value of healthy family functioning for other health-related domains and overall psychosocial development [4–8,37–39]. Obesity prevention efforts may want to consider targeting family functioning as a way of improving adolescent health behaviors that precede, or moderate, weight outcomes. For example, public health interventions may want to include education for families about the importance of family communication, structure/rules, problem solving, and closeness/warmth. Pointing out that higher family functioning may be protective for youths with regard to weight and weight-related health behaviors, in addition to emotional well-being, academic success, and reduced high-risk behaviors, may give families an increased incentive to work on improving their family functioning [4–8,37–40]. Future research should look longitudinally at the relationship found between family functioning and adolescent weight and health behaviors to confirm temporality of associations.

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All coauthors made a substantial contribution to the paper. Dr Berge conceptualized the paper, interpreted the data, and wrote all drafts of the paper. Dr Wall conducted the data analysis and assisted with the interpretation of the data and critical review of the paper. She also critically revised it and gave final approval of the version to be published. Dr Larson assisted with the acquisition of data and critical review of the paper. She also critically revised the paper and gave final approval of the version to be published. Dr Loth assisted with the interpretation of the data. She also critically revised the paper and gave final approval of the version to be published. Dr Neumark-Sztainer assisted in conceptualizing the paper and contributed to the design of the study. She also critically revised it and gave final approval of the version to be published.

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