Fast Food and Body Weight among Adolescents

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Abstract

The objective of this study was to examine (1) the association between consumption of fast food and sweets on overweight among U.S. adolescents; and (2) how consumption of different types of food and physical exercise is associated with parental education and other background variables. The data were based on cross-sectional, national survey study of 15,686 students from grades 6 to 10 (age 10 to 15) in the U.S. Results indicated that after adjusting for covariates, participants with high fast food consumption were statistically significantly associated with overweight. Eating habits and amount of exercise were significantly associated with parental education level and ethnicity, particularly among African-American adolescents. Results of this study also suggest that parental education is an important key factor in keeping adolescents healthy.

Key words: *Fast Food Consumption, Overweight, Ethnicity, Parental Education, Adolescents*

Introduction

The importance of adolescent physical health has been studied and documented globally, and concerns are rising over the increasing rates of overweight and obesity in children and adolescents. In the U.S., Paxson, Donahue, Orleans, and Grisso[1] reported that the number of children who are considered obese has doubled over the past thirty years from 15% in the 1970's to nearly 30% today, and the number of children considered overweight has tripled. Similar findings were also reported by other studies.[2-4] The effects of childhood overweight and obesity on health problems were well documented.[5]

Although there is growing concern about the increasing rate of childhood and adolescent overweight and obesity, there is a lack of consensus about the causes. Among many hypothesized causes, weight gain has been attributed to genetics, an increase in television viewing and computer games, or an increase in consumption of sugar and fast food, which is typically defined as food consisting of potato chips, French fries or fried potatoes, hamburgers, hot dogs, and sausages. In recent years, concerns about the kinds and quantities of foods consumed by America's youth have taken a prominent position in discussions of overweight across the country. Many American children are said to develop the same eating habits that trouble the nation's adults- too much fat and sugar, and too few fruits and vegetables.[6] According to Lin, Guthrie and Frazao,[7] children's calorie consumptions from fast food and soft drinks increased dramatically. For example, in response to items about food intake on the previous day, 42% of middle-school students reported eating hamburgers, hot dogs, or sausage; 56.4% reported eating French fries or potato chips; and 54% reported eating cookies, doughnuts, pies, or cakes. Although these rates of food intake may vary from study to study, depending on specific samples and instruments used, the message is clear: this pattern of fast food and sweets intake may be related to, or even may be causing, the obesity and overweight among children in the U.S.[8]

Effects of Food and Sweets Intake

The effects of fast food on overweight are documented in most of the obesity studies, For instance, Binkley, Eales, and Jekanowski [9] reported that eating at fast food establishments significantly increased body mass index (BMI) for males and females. Ebbeling, Sinclair, Pereira, Garcia-Lago, Feldman, and Ludwig[10] showed that overweight participants (adolescents aged 13 to 17 years) had a higher energy intake than lean participants in an observed fast food meal, and overweight participants consumed significantly more total energy on days when they ate fast food than on days when they did not.

On the other hand, some studies suggested that fast food consumption is not related to increased body weight.[11] Jeffrey and French[12] did not find a significant association between TV viewing, fast food consumption, and BMI in males, but there was a positive relationship between television viewing and fast food consumption and body weight in females. In another study, French, Story, Neumark-Sztainer, Fulkerson, and Hannan[13] reported that frequency of fast food restaurant use was not significantly associated with overweight.

Some studies also specifically examined the relationship between the consumption of sugar-sweetened drinks and body weight. Ludwig, Peterson, and Gortmaker[6] and Binkley et al.[9] reported that consumption of sugar-sweetened drinks (soda, drinks from powders, fruit drinks less than 100% fruit juice, and non-artificially sweetened iced tea) contributed to obesity in students (average age of 11.7 years). As consumption of sugar-sweetened drinks increased, so did the chances of a student becoming obese. This was supported by long-term studies of children that found a positive link between all sweet beverages (soda, juice, and other fruit drinks) and overweight.[10, 12]

Effects of Education and Ethnicity

In the health-related literature, there are not many studies focused on relationships between adolescents' overweight and parental education or ethnicity. Lowry, Kann, Collins, and Kolbe[14] had suggested that family socioeconomic status were strongly related to physical diseases and insufficient consumptions of healthy food such as fruit or vegetables. Similarly, a study of 15-year-old Norwegian and Welsh students found a positive correlation between non-manual labor occupations of one or both parents (as reported by the youth) with healthy food consumption, use of vitamins, and regular physical activity, and a negative correlation with cigarette smoking.[13] French, Harnack, and Jeffery[15] found that increased fast food consumption was related to younger age, being unmarried, lower income, and non-White ethnicity. According to Kumanyika and Grier[16], low-income and minority students have been found to watch more television and thus are exposed to more commercials for high-fat and high-sugar foods. From the results of these studies, it seems that parental education level and

ethnicity play a role in adolescents' health behaviors. However, in these studies, there was no direct investigation of whether parental education or ethnicity is associated with adolescent overweight.

Given the importance of issues of overweight and obesity in adolescents, this paper aims to further elucidate the associations among overweight, lifestyles, and parental education level using a U.S. nationally representative sample of children age 10 to 15. While the issues addressed here were not new, the study was useful in that it was a large study and may add further support to the associations between obesity and lifestyles in children, and the role of parental education. Additionally, more potential confounding variables were controlled in this study than did previous studies examining overweight and fast food consumptions. Specifically, the following research questions were investigated: (1) explore the association between consumption of fast food and sweets and overweight while controlling for exercise, age, gender, ethnicity, parental education level, and residence location; (2) examine the extent to which consumption of different types of foods (i.e., fast food, sweets, as well as healthy food) and exercise are associated with level of parental education, ethnicity, gender, and residential location (urban, suburban/town, or rural).

Based on previous results, it was hypothesized that after controlling for potential confounding variables, overweight in U.S. adolescents is associated with reported higher consumption of fast food and sweets. It was further hypothesized that types of food consumption and exercise are associated with family characteristics, such as parental education level.

Methods

Sample

This study used the data collected by the World Health Organization (WHO) from the survey of Health Behavior of School-Aged Children (HBSC).[17] The survey participants were drawn from a nationally representative sample of U.S. youth in grades 6 through 10 and included public, Catholic and other private school students in all 50 states and the District of Columbia. Very small schools, those with enrollments of less than 14 students (comprising about 1% of the total enrollment of U.S. schools), were excluded. The study employed a three-stage cluster sampling design in which the school's county was the primary sampling unit (PSU) or first stage, the school was the second stage, and the classroom was the third stage. The sample was also stratified by racial/ethnic status, geographic region, and metropolitan statistical area status. The sampling weight was used to correct for over-sampling of African American and Hispanic students in the sample.

A full research protocol has been developed for HBSC survey including scientific rationales for the survey items, the standard international questionnaire and technical appendices on data collection and management [17]. The final study sample included 15,686 students. Table 1 shows the demographic characteristics of the sample.

Procedures

The HBSC survey was conducted in school settings and was administered to participating students by a school representative (for example, teacher, nurse, guidance counselor, and the like). The school representatives read scripts that explained the survey procedures. Students completed a self-reporting questionnaire in a regular classroom setting. The questionnaire took approximately 45 minutes to complete.

Measures

The following measures were developed from the original items used in the HBSC survey. It should be noted that since the study was based on data from secondary data analysis, our ability in modifying the existing variables was limited.

Consumption of fast food. In this study, fast food consumption was defined as eating any of the following items anywhere: potato chips, French fries or fried potatoes, hamburgers, hot dogs, and sausages. In the original survey, participants were asked, on a 5-point Likert-type scale, how often they ate these food items. Based on their responses to these items, participants were classified into two fast food consumption groups: low or high. The low group included participants who responded 1 (*never*), 2 (*rarely, less than once a week*), and 3 (*once a week, but not daily*). The high group included participants who responded 4 (*once a day*) and 5 (*more than once a day*). Thus, the consumption of fast food was a variable with response option of 1 (*low consumption group*) or 2 (*high consumption group*).

Consumption of sweets. Consumption of sweets was defined as eating or drinking any of the following items anywhere: Coke or other soft drinks that contain sugar, sweets (candy or chocolate), and cakes or pastries. As in the case of consumption of fast food, the participants were asked to report, on a 5-point Likert-type scale, how often they ate and drank

these food items, and participants were classified into 1 (*low consumption group*) or 2 (*high consumption group*). The low sweet consumption group included the participants who responded 1 (*never*), 2 (*rarely, less than once a week*), and 3 (*once a week, but not daily*). The high sweet consumption group included participants who responded 4 (*once a day*) and 5 (*more than once a day*).

Consumption of healthy food. Healthy food consumption was defined as eating or drinking any of the following food items anywhere: fruit, raw vegetables, cooked vegetables, whole wheat or rye bread, and low fat milk. Participants were asked to report, on a 5-point Likert-type scale, how often they ate and drank these food items, and the participants were also classified into low (1) or high (2) consumption groups. The low healthy food consumption group included the participants who responded 1 (*never*), 2 (*rarely, less than once a week*), and 3 (*once a week, but not daily*). The high healthy food consumption group included participants who responded 4 (*once a day*) and 5 (*more than once a day*).

Table 2 shows the distribution of response options for these three food types. It should be noted that not all food items that were considered as fast food, sweets, or healthy food were included in the original HBSC survey. The definition used in this paper did not encompass all of what would be considered fast, sweet, or healthy food in the U.S. food items. Only certain samples of these types of food were included here (see Table 2).

Amount of exercise. Students were asked two questions with respect to how often (*1 = "never" to 7 = "every day"*) and how many hours per week (*1 = "none" to 6 = "7 hours or more"*) during their free time outside school hours they usually exercised to the extent that they were out of breath or perspired. These two items assessed the frequency and intensity of the exercise students performed. The exercise index was created by summing students' responses to these two questions. The correlation between these two items was .74, and the reliability (α) was .85 for this sample.

Weight status. Participant's self-reported weight and height were converted into BMI units (kg/m2). Adolescent overweight was based on age- and gender-specific growth charts published by the Centers for Disease Control and Prevention. Overweight was determined as at or above the 95th percentile on BMI. In the current sample, 13% of the students (n = 1964) were considered overweight based on this criterion (see Table 1).

Residence location. Student residence location was identified by students' response to the question: "Which of the following best describes where you live?" The participants could check urban area, suburban/town, or rural area. Residence location was included in the analysis since the location may indirectly indicate the accessibility of fast food.

Parent education level[1]. Two items asked about the highest level of education attained by the students' mother or father on a response options that ranged from "did not finish high school" (1) to "graduated from college" (4). In this study, we used either mother's or father's education level as students' parental education variable regardless of whether students lived with only one of the parents or both parents (including stepparents).

Other person and family background variables. In addition to parent education level and residence location, the following person characteristic variables were also employed: age/grade, gender, and ethnicity (see Table1).

Covariates. In examining research Question 1, we attempted to control for the variables that may have potential confounding effects on overweight. Covariates included grade/age, gender, ethnicity, parental education, residence location, and amount of exercise.

Data Analysis Methods

Logistic regression models were used because the dependent variables were dichotomous. In examining research question 1, the analysis was adjusted for potential confounders of age/grade, parental education level, race, gender, and amount of exercise. In analyzing the second hypothesis, parental education level, ethnicity, gender, and residential location were entered as independent variables and they were dummy coded. In all analyses, the logistic regression was implemented via a SAS survey regression procedure, which takes into consideration the complex sampling design. Since the SAS survey regression used maximum likelihood estimation, *p*-value associated with χ^2 tests were reported, and *p*-values less than .05 were considered

[1] In order to utilize all the information, an "unknown" category was also created for participants who did not report the educational level of either parent.

statistically significant. Sample weight was used to adjust for the over-sampling of minority students and to obtain student totals by grade that were comparable to grade estimates of the total population from the U.S. National Center of Education Statistics.

Results

Research Question 1: Effects of Fast Food and Sweets while Controlling for Covariates

In the current sample, 20% of adolescents were classified into the high fast food consumption group and 24% was classified into the high sweet consumption group. After adjusting for the effects of covariates, which were all statistically significant, results showed that high fast food consumption participants were 1.23 times as likely to report overweight than the low fast food consumption participants (χ^2 =5.05, $p < .05$); but high sweets consumption participants was 0.68 times as likely to report overweight (χ^2 =18.49, $p < .05$).

In addition, the mean weight of adolescents by parent education level and by ethnicity is shown in Table 3. The mean comparisons seemed to indicate that adolescents whose parents had no high school or only had school education had the highest mean weight. In comparison to adolescents of other ethnicity, African-American adolescents seemed to have the highest mean weight.

Research Question 2: Potential Predictors of Food Consumption Types and of Exercise

Parental education level. A second set of logistic regression analyses was performed to examine the food consumption types (fast food, sweets, and healthy food) and exercise as a function of parental education level, ethnicity, residence location, and gender. In this analysis, the dichotomized food consumption types (low consumption and high consumption groups) were used. Results of the analyses are shown in Table 4. Findings indicated that, in comparison to participants who had a parent with a college education, the participants who had one or both parents with no high school were 1.45 times as likely to consume fast food, 1.48 times as likely to consume sweets, but 0.40 times as likely to consume healthy food. Similarly, the participants of one or both parents with unknown education level were 1.49 times as likely to report eating fast food, but 0.56 times as likely to report consuming healthy food. On the other hand, the participants who had one or both parents with a high school education did not show significant association with types of food consumption. The participants who had one or both parents with some college education showed significant association with consuming healthy food (i.e., 0.81 times as likely to report consuming healthy food).

Ethnicity . Compared to Whites, African-American students were 2.67 times as likely to report eating fast food, 2.68 times as likely to consume sweets, but 0.28 times as likely to consume healthy food. As for the students of other ethnicities, Native American students were 2.37 times as likely to report eating fast food, and Hispanic American students were 1.49 times as likely to report consuming fast food. Asian Americans did not show significant differences in types of food consumptions in comparison with Whites.

Residence location. Results indicated residential locations showed no statistically significant association with types of food consumption.

Gender. The results revealed that male participants were 1.68 times as likely to report eating fast food, 1.24 times as likely to report consuming sweets, and 1.12 times as likely to report eating healthy food in comparison to female participants.

Exercise

In this analysis, amount of exercise (number of hours) was a continuous dependent variable and parental education level, ethnicity, residence location, and gender were independent variables. Results showed that participants were more likely to report higher level of exercise as their parents' education level increased ($b = 0.11$, $p < .001$). In comparison to White adolescents, African-American adolescents were less likely to report exercise ($b = -1.08$, $p < .001$). Similarly, Asian-American and Hispanic-American adolescents were also less likely to report exercise ($b = -0.65$, $p < .001$, $b = -0.69$, $p < .001$, respectively). Males were more likely to report exercise ($b = 1.16$, $p < .001$).

Discussion

Adolescent obesity is one of the major health concerns for school-aged children. More than one in four children has been found to be overweight in previous studies, and obesity in children has increased at least three times during the past three decades.[18] Many studies of health behaviors among youth indicated that American children are developing unhealthy eating habits that include too much fat, sugar, and salt, and too few fruits and vegetables.[19] However, in linking adolescent obesity

with eating habits, especially with the consumption of fast food and sweets, there is not enough empirical evidence in the current health literature to determine the degree to which fast food impacts adolescent obesity or overweight despite the common belief that consumption of fast food and sweets such as hamburgers, fries, and colas may be the culprit. The association of effects of fast food on overweight are sometimes implied rather than directly examined. For example, Bowman & colleagues[19] suggested that fast-food consumption may be one factor contributing to overweight among children since children who ate fast food consumed on average 187 kcal per day more than those who did not. This increased energy intake promoted risk for overweight. In the current study, two research questions were examined: (1) the effects of consumption of fast food and sweets on the reported overweight after controlling for the parental education level, ethnicity, age, gender, and amount of exercises; and (2) how consumption of different types of food and exercises were associated with family background variables (such as parental education, ethnicity, and location of residence) and gender. A U.S. nationally representative sample was used to examine these questions.

With respect to the association between consumption of fast food and sweets, the results showed participants who consumed more fast food were associated with reported overweight, even after adjusting for covariates that have been indicated to be related to overweight. This finding clearly revealed the potential negative impact of fast food and provided further support to previous findings.[20] However, what was surprising was that adolescents who reported consuming high sweets did not report a higher degree of overweight. This result was inconsistent with some previous findings.[19, 21] One possible explanation may be due to different samples used. That is, the current study used national representative sample, while previous studies employed local samples. For example, Welsh, et al.[22] studied low-income children in Missouri, and Ludwig etc. [6] studied sweetened drink consumption in only 548 11-year-old children. This age range difference as well as the particular population studied may contribute to the discrepancy in the results. But other studies suggested that there was no clear evidence that consumption of sugar per se impacted overweight.[23] Thus, replication studies using national representative sample are needed to further elucidate this relations.

Additionally, results in this study revealed that male participants were more likely to consume all types of food than female participants. It is possible that male students may have a greater need for consumptions of all food types due to body size and caloric need. However, this difference could also be interpreted as female adolescents are more likely to be concerned with eating or weight control.

How may one's personal and parental education be associated with one's eating habits and exercise? Consistent with previous findings showing that socioeconomic status and culture may explain some differences in eating habits,[14] results of this study indicated that adolescents with less educated parent or parents had higher consumption of fast food and sweets, lower consumption of healthy food, and less exercise. Furthermore, the adolescents whose parents were less educated also had a higher body weight. Another consistent finding was that in comparison with white adolescents, African American youth reported consuming less healthy food, more fast food and sweets, and less exercise, and they also had a higher body weight. It appears that lower education level (e.g., parents without a high school education) may have adverse effects on eating and exercise habits and contribute weight gain in adolescents.[24] One possible explanation for the parental education factor in relation to adolescent eating behaviors and overweight may be that parents can provide a role model and guidance in helping adolescents to develop healthy behavior. Furthermore, if parents are health conscious and knowledgeable, it is possible that they will pass these values to their children, particularly if parenting skills are taught in combination with weight management and healthier behaviors.

As in any other studies, there are some limitations that need to be addressed. First, the issues of overweight are complex. The data used in this study are secondary data and would not allow fore all issues to be fully addressed. For example, the long-term effects of consumption of fast food on overweight can not be explored. Secondly, this study used cross sectional data and is limited to examine the association among reported fast food consumption, body weight, and some personal characteristic variables at one point in time. While some confounding variables related to body weight were controlled, the mechanism underlying this relationship was unknown. Also, the measures in the survey limited detailed study of food consumption patterns. Finally, self-reported food consumption and weight and height may have underestimated or overestimated types of food consumed and the degree of overweight.

Implications

This study could serve in part as a replication study using nationally representative data on children of 10 to 15 years of age as it lent further support to the role of family (in terms of parent education level) in adolescents' eating habits and amount of exercise, which was associated with overweight.[16] Although the data cannot provide evidence for causal relationships among overweight and eating habits, there is a theoretical basis for the role of education in promoting healthy behaviors, especially with respect to education of parents. Given that the proportion of overweight children continues to increase, particularly among African American adolescents,[25] better education for parents about choices of healthy food could be an important step toward impacting adolescent's eating behavior.

The findings about the role of education in promoting adolescent health are consistent with the newly authorized School Wellness policies. The federal law requires that the local schools involve both parents and students in enhancing adolescents' health. Thus, there is a need to provide regular courses in health education in both middle school and high school. Doing so can provide the infrastructure for producing quality health instruction. Particularly, instructional strategies should engage family members in reinforcing healthy behaviors such as nutritional diet and exercises. Engaging family members in promoting healthy behaviors can address the need for consistent health message between home and the school environment. Consistent health education should also be provided to parents and families through systematic channels such as parent meetings, school newsletter, informational handouts, and other venues.

Additionally, schools need to provide a safe and healthy environment that supports health literacy and choices and reflects a sense of community and mutual support among students. For example, school education course content can include such topics as: effects of physical activities on dynamic health, mechanics of body movement, or nutritional knowledge. Thus, for adolescents to achieve and maintain a healthy weight, better prevention and intervention options should address the broad spectrum of weight-related issues, including education of adults. Since we cannot eliminate the availability of fast food, parents should be educated to engage in healthy eating habits to help promote positive social and educational experiences for all school-aged children.

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Table 1. Demographic Characteristics of the Sample

	Female		Male	
	N	%	N	%
Total	8370	53	7316	47
Ethnic				
Hispanic	851	10	643	9
Native American	240	3	221	3
Asian American/Pacific Islander	412	5	476	7
African American	1555	19	1170	16
White	5219	63	4749	65
Grade				
6^{th} grade	1498	18	1461	20
7^{th} grade	1445	17	1229	17
8^{th} grade	1820	22	1596	22
9^{th} grade	1903	23	1553	21
10^{th} grade	1628	20	1413	19
Parental Education Level				
no high-school education	1341	16	807	11
high-school education	2184	26	1791	25
some college education	1678	20	1314	18
college education	2282	27	2457	34
education level unknown	851	10	918	13
Residence location				
Urban area	2148	26	1621	22
Suburban area	2413	29	2367	33
Town	2308	28	2043	28
Rural area	1354	16	1200	17
Weight Status				
Overweight	934	11	1030	14
Not overweight	7436	89	6286	86

Table 2. Distribution of Response Options of Food Types and Food Group Classification

	Distribution of Response Options (%)				
Fast food items eat	Never	Rarely (less than one week)	Once a week, but not daily	Once a day	More than once a day
Potato chips	8	26	33	21	12
French fries or fried potatoes	4	27	44	17	8
Hamburgers, hot dogs, sausages	7	27	46	13	7
Sweet food items eat or drink					
Coke or other soft drinks with sugar	6	9	17	25	42
Sweets (candy or chocolate)	5	14	28	28	25
Cakes or pastries	6	34	36	15	8
Health food items eat or drink					
Fruit	4	11	27	34	25
Raw vegetables	20	21	28	21	11
Cooked vegetables	9	16	31	32	12
Whole wheat or rye bread	18	19	20	26	16
Low fat milk	21	10	10	22	37

Food Group Classification		Distribution (%)
Fast food consumption group		
	low	80
	high	20
Sweet consumption group		
	low	76
	high	24
Healthy food consumption group		
	low	41
	high	59

Table 3. Mean Weight of adolescents by Parental Education Level and by Ethnicity

	N	Mean (S.D.)
Parental Education Level		
no high-school education	2148	131.47 (36.81)
high-school education	3975	129.25 (35.67)
some college education	2992	128.43 (33.69)
college education [a]	4739	124.01 (34.56)
education level unknown [b]	1769	118.90 (33.97)
Ethnic		
Hispanic	1494	124.54 (34.08)
Native American	461	123.27 (38.83)
Asian American/Pacific Islander	888	121.22 (39.21)
African American [c]	2725	130.67 (36.41)
White	9968	126.52 (34.23)

Note. S.D. is standard deviation in parenthesis. Weight is in the unit of pound. Multiple comparisons among the means were performed using Bonferroni method with experimentwise error rate. [a] indicates that the mean weight for students whose parents had college education was statistically significant from mean weight of other education groups. [b] indicates that the mean weight for students whose parents education level was unknown was statistically significant from mean weight of other education groups. [c] indicates that the mean weight for Black students statistically significant from means weight of other ethnic groups.

Table 4. Potential Predictors of Food Consumption Types

	Food Consumption Types					
	Fast food		Sweet		Healthy Food	
	OR	95% CI	OR	95% CI	OR	95% CI
Parental education level						
No high school	1.45*	(1.21, 1.77)	1.48**	(1.20, 1.76)	0.40**	(0.35, 0.48)
High school	1.11	(0.95, 1.32)	1.25	(1.07, 1.45)	0.65	(0.58, 0.76)
Some college	0.93*	(0.80, 1.14)	1.18	(0.99, 1.38)	0.81*	(0.70, 0.94)
Unknown level	1.49*	(1.16, 1.74)	1.28	(1.03, 1.54)	0.56*	(0.47, 0.67)
Ethnicity background						
Hispanic	1.49**	(1.22, 1.82)	1.14	(0.94, 1.42)	0.46	(0.39, 0.55)
Native American	2.37**	(1.76, 3.19)	1.4	(1.04, 1.54)	0.47	(0.35, 0.62)
Asian American	1.56	(1.19, 2.03)	1.36	(1.04, 1.77)	0.55	(0.45, 0.68)
African American	2.67**	(2.31, 3.09)	2.68**	(2.32, 3.07)	0.28**	(0.24, 0.31)
Residential Location						
Urban area	0.86	(0.71, 1.03)	1.01	(0.83, 1.29)	0.91	(0.77, 1.06)
Suburban/town	0.84	(0.64, 0.92)	0.92	(0.73, 1.03)	0.97	(0.91, 1.22)
Gender						
Male	1.68*	(1.49, 1.89)	1.24**	(1.13, 1.39)	1.12*	(1.01, 1.23)

Note. The reference groups for fast food, sweet, and healthy food are high consumption group, respectively. The reference group for parental education level, ethnicity, location, and gender are college degree, White, rural area, and female, respectively. OR = odds ratio. * $p < .05$, ** $p < .01$.