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Young adults and eating away from home: associations with dietary intake patterns and weight status differ by choice of restaurant

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Abstract

Background—Young adults report frequent away-from-home eating; however, little is known regarding what types of restaurants are patronized or if associations with dietary intake and weight status differ according to restaurant type.

Objective—This cross-sectional study in a diverse sample of young adults examines sociodemographic differences in the frequency of eating at different types of fast-food and full-service (server brings food to table) restaurants. Additionally, this study examines whether associations between away-from-home eating, dietary intake, and weight status differ according to restaurant type.

Design—There were 1030 men and 1257 women (mean age=25.3) who participated in Project EAT-III. Participants were members of a longitudinal cohort who completed baseline surveys at schools in Minneapolis/St. Paul, Minnesota and completed the EAT-III surveys online or by mail in 2008–2009.

Main outcome measures—Height, weight, and usual dietary intake were self-reported.

Statistical analyses performed—Regression models adjusted for sociodemographic characteristics were used to examine associations between frequency of restaurant use, dietary intake, and weight status.

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Results—More frequent use of fast-food restaurants that primarily served burgers and fries was associated with higher risk for overweight/obesity; higher intake of total energy, sugar-sweetened beverages, and fat; and with lower intake of healthful foods and key nutrients. For example, those who reported burger-and-fries restaurant use on three or more occasions/week consumed nearly one additional sugar-sweetened beverage per day compared to those who reported burger-and-fries restaurant use on less than one occasion/week. More frequent use of fast-food restaurants that primarily served sandwiches/subs was related to a few markers of poorer diet quality, but unrelated to weight status. More frequent use of full-service restaurants was also unrelated to weight status and to higher intake of vegetables.

Conclusions—There may be a need for interventions to promote healthier food choices among young adults who report frequent burger-and-fries restaurant use.

Keywords

Young adults; Restaurants; Dietary intake; Weight status

INTRODUCTION

Young adults (20–29 years) consume approximately 40% of their total daily energy away from home; thus, the foods and beverages selected at restaurants may have a considerable impact on overall dietary quality (1). Research investigating dietary patterns during young adulthood has found that eating at fast-food restaurants occurs an average of two to three times per week (2); however, few studies have examined what types of fast-food restaurants are patronized or how frequently young adults purchase food at full-services restaurants (3). The availability of healthful and energy-dense menu options likely differs between fast-food restaurants and full-service restaurants (4), and among fast-food restaurants according to the type of food served (e.g., burgers and fries, deli sandwiches, Mexican entrees). Therefore, the implications of eating away from home for dietary intake and weight status could differ according to the types of restaurants patronized by young adults.

While several studies have found frequent away-from-home eating is associated with higher daily energy intake (5–10), poorer diet quality (5–7, 10–13), and greater weight gain (2, 14–16), few studies have considered whether these associations differ according to restaurant type. One study among adults, adolescents, and children found that meals consumed away from home were higher in calories compared to meals prepared at home, regardless of whether they were purchased at a fast-food or full-service restaurant (9). However, another study found that dining at non-fast food restaurants (e.g., full-service restaurants) was associated with higher fruit and vegetable consumption among non-Hispanic black adolescents (17). Furthermore, studies suggest that residents in communities with greater access to full-service restaurants have lower risk for obesity, consume more fruits and vegetables, and are more likely to meet dietary recommendations for saturated fat (18–20). These relationships were found to exist above and beyond differences in the sociodemographic characteristics of neighborhood residents, suggesting the findings were not simply an artifact of disparities in the availability of healthy foods (21). Additional studies are needed to clarify these findings as proximity to restaurants may not be a major influence on patterns of actual restaurant use among young adults (22).

The current study was designed to examine sociodemographic differences in the frequency of eating at different types of fast-food and full-service restaurants in a diverse sample of young adults. Fast-food restaurants were defined as establishments that provide limited service and require customers to place orders and pay before eating at a counter or table. Full-service restaurants were, in contrast, defined as establishments where customers are

seated and meals are brought to their tables by a server. In addition, this study aimed to examine whether associations between away-from-home eating, dietary intake, and weight status differ according to restaurant type. A better understanding of these relationships can help to inform the design of nutrition interventions and target relevant health behavior messages for young adults.

METHODS

Sample and Study Design

Data for this cross-sectional analysis were drawn from Project EAT-III (Eating and Activity in Teens and Young Adults), the third wave of an observational study designed to examine dietary intake, physical activity, weight control behaviors, weight status, and factors associated with these outcomes among diverse young adults. At baseline (1998–1999), a total of 4,746 junior and senior high school students at 31 public schools in the Minneapolis/St. Paul metropolitan area of Minnesota completed surveys and anthropometric measures (23, 24). Ten years later, original participants were mailed letters inviting them to complete online or paper versions of the Project EAT-III survey and a food frequency questionnaire (FFQ). A total of 2,287 young adults completed the Project EAT-III survey between November 2008 and October 2009, representing 66.4% of participants who could be contacted (48.2% of the original school-based sample) (25). All study protocols were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee.

Survey Development

The original Project EAT survey (24) that was used to assess determinants of dietary intake and weight status among adolescents was modified at follow-up to improve the relevance of items for young adults. New items were also added to the Project EAT-III survey to allow for investigating areas of growing research interest such as frequency of restaurant use. Four focus groups were conducted to pre-test an initial draft of the Project EAT-III survey. Feedback from the 27 young adult participants was used to reword or eliminate problematic survey measures and expand on topic areas of perceived importance prior to additional pilot testing. A revised survey was pilot tested with a different sample of 66 young adults to examine test-retest reliability over a period of one to three weeks. Additional details of the survey development process are described elsewhere (26).

Restaurant Use—Frequency of eating food from full-service restaurants and five categories of fast-food restaurants (i.e., burger-and-fries, fried chicken, Mexican, pizza, sandwich/sub) was assessed on the Project EAT-III survey with the question: “In the past month, how often did you eat something from the following types of restaurants (include take-out and delivery)?” Examples of quick-service and fast casual (e.g., Panera Bread®, St. Louis, Missouri) restaurant chains were provided for each type of fast-food restaurant. Response options were “never/rarely,” “one to three times per month,” “one to two times per week,” “three to four times per week,” “five to six times per week,” and “one or more times per day.” This measure was adapted from a screener previously developed to assess restaurant use among adolescents (27). The test-retest reliability of reported frequencies among young adults varied according to the type of food served at restaurants, ranging from $r=0.43$ (pizza) to $r=0.83$ (fried chicken) (26).

Dietary Intake—A semi-quantitative FFQ was administered at the same time as the Project EAT-III survey to assess usual past year intake of fruit, vegetables, dark green/orange vegetables, whole grains, milk products, and sugar-sweetened beverages (28). A daily serving was defined as the equivalent of one-half cup for fruit and vegetables, 16 g for

whole grains, and one cup for milk products. For sugar-sweetened beverages, a serving was defined as the equivalent of one glass, bottle, or can. In addition, the FFQ was used to assess usual daily intake of total energy (kcal), total fat (percent of total energy), saturated fat (percent of total energy), sodium (mg), fiber (g), and calcium (mg). Nutrient intakes were determined in 2009 by the Nutrition Questionnaire Service Center at the Harvard School of Public Health using a specially designed database, primarily based on the United States Department of Agriculture's Nutrient Database for Standard Reference (release 19). Previous studies have examined and reported on the reliability and validity of intake estimates (29, 30). Responses to the FFQ were excluded if participants reported a biologically implausible level of total energy intake (<500 kcal/day or >5000 kcal/day).

Weight status—Weight status was assessed using self-reported height and weight, from which body mass index (BMI, kg/m²) was calculated. Self-report of height and weight (test-retest $r=0.99$ for height and weight) were validated in a subsample of 63 male and 62 female participants in Project EAT-III for whom height and weight measurements were completed by trained research staff. Results showed very high correlations between self-reported BMI and measured BMI in males ($r=0.95$) and females ($r=0.98$). Weight status was defined according to current BMI guidelines for adults (overweight or obese: BMI ≥ 25 kg/m²; obese: BMI ≥ 30 kg/m²) (31).

Sociodemographic characteristics—Sociodemographic characteristics were self-reported and included gender, age, race/ethnicity, family socioeconomic status (SES), current employment, post-secondary student status, and parental status. SES was based primarily on parental educational level, defined by the higher level of either parent at baseline (23, 32). Current employment was assessed with the question: "How many hours a week do you currently work for pay?" Young adults who reported working ≥ 40 hours per week were categorized as employed full-time. Post-secondary student status in the past year was reported according to whether young adults were enrolled full-time or part-time in a two-year college, four-year college, or graduate degree program. Responses were dichotomized for analysis (student or not a student). Parental status was assessed with the question: "How many children do you have (including step-children or adopted children)?"

Physical activity—Physical activity was also examined as a covariate in analytic models where weight status was the outcome of interest as some research has found that activity patterns may be associated with restaurant use (33). Energy expended in physical activity was assessed using questions adapted from the widely used Godin Leisure-Time Exercise Questionnaire (34). Three survey items individually assessed strenuous, moderate, and mild activity, asking "In a usual week, how many hours do you spend doing the following activities?" (Response options included: none, less than one half hour, one half hour to two hours, two and a half to four hours, four and a half to six hours, six or more hours). Strenuous activity was described as activity during which the heart beats rapidly, moderate activity was described as not exhausting, and mild activity was described as an activity requiring little effort. Examples of specific activities were given after each question. Each response was assigned a midpoint value and responses were then summed to compute weekly hours of physical activity.

Statistical Analyses

Descriptive statistics were calculated to determine the percentage of young adults that ate from different types of restaurants at least once per week. The χ^2 statistic was used to examine differences in restaurant dining patterns according to characteristics of young adults. For full-service restaurants and the two most patronized types of fast-food restaurants (burger-and-fries, sandwich/sub), linear and logistic regression models were used to

examine associations between frequency of restaurant use (less than one time/week, one or two times/week, three or more times/week) and the outcomes of interest. Regression models were adjusted for sociodemographic characteristics (Model 1) and additionally adjusted for the frequency of eating from other restaurants in order to account for overall frequency of restaurant use (Model 2). For Model 2, dietary intake outcomes were also adjusted for total energy using the nutrient density approach (35). When the dietary outcome variable of interest exhibited positive skewness, testing was carried out using the square root transformation. Regression models used to examine associations with weight status were examined with and without additional adjustment for energy expended in physical activity.

Because attrition from the baseline sample (1998–1999) did not occur at random, in all analyses, the data were weighted using the response propensity method (36). When compared to nonrespondents in Project EAT-III, respondents were more likely to be female, white, younger in age, and of higher SES. Response propensities (i.e., the probability of responding to the Project EAT-III survey) were estimated using a logistic regression of response at EAT-III on a large number of predictor variables from the baseline Project EAT survey. Weights were additionally calibrated so that the weighted total sample sizes used in analyses accurately reflect the actual observed sample sizes for men and women. The weighting method resulted in estimates representative of the demographic make-up of the original school-based sample, thereby allowing results to be more fully generalizable to the population of young people in the Minneapolis/St. Paul metropolitan area. A 99% confidence level was used to interpret the statistical significance of probability tests, corresponding to a P value <0.01 . Analyses were conducted using the Statistical Analysis System (SAS, version 9.1, 2002–2003, SAS Institute, Cary, NC).

RESULTS

A total of 1030 men and 1257 women with a mean age of 25.3 years ($SD=1.7$) were included in the sample for the current study. The racial/ethnic backgrounds of the participants were as follows: 48.4% white, 18.6% African American, 19.6% Asian, 5.9% Hispanic, 3.3% Native American, and 4.2% mixed or other race/ethnicity. The sample was also well-distributed across categories of SES: 37.0% low or low-middle, 26.2% middle, and 36.8% upper-middle or high.

Patterns of Restaurant Use

Young adults reported eating food from a restaurant an average of three to four times per week. Nearly all young adults (95%) reported eating something from one or more type of restaurant in a given week and, on average, reported eating something from 1.3 different types of restaurants in a given week (range=0–6). For each type of restaurant, Table 1 shows the proportion of young adults in different sociodemographic groups who reported at least weekly use. Although most young adults (88%) reported eating food from one or more type of fast-food restaurant at least once per week, just one third of young adults reported eating food from a full-service restaurant this often. Approximately one third (30%) of young adults reported eating food from a burger-and-fries fast-food restaurant at least once per week. A similar percentage of young adults (29%) reported eating food from a sandwich/sub shop at least weekly. In contrast, fewer than one in five young adults reported weekly use of fast-food restaurants that primarily served fried chicken, Mexican food, or pizza. Given the less frequent use of these fast-food restaurants, subsequent analyses focused on the use of full-service restaurants and fast-food restaurants that primarily served burgers and fries or sandwiches/subs.

Full-service restaurant use was significantly related to SES and parental status. Nearly 40% of young adults from high SES backgrounds reported at least weekly full-service restaurant

use compared to 25% of young adults from low SES backgrounds. Similarly, 37% of young adults with no children reported full-service restaurant use at least once per week compared to 23% of young adults who were parents. Gender, age, race/ethnicity, employment status, and weight status were not significantly related to full-service restaurant use.

Overall, fast-food restaurant use significantly differed by gender. Approximately 92% of males reported at least weekly fast-food restaurant use compared to 85% of females. A similar pattern was observed for burger-and-fries restaurants and sandwich/sub shops. At least weekly use was reported by more than one third of males compared to 25% of females for burger-and-fries restaurants and for sandwich/sub shops. Young adults who were employed full- or part-time were also significantly more likely than those who were not employed to eat food from a sandwich/sub shop at least weekly. Young adults in their early twenties; those from low SES backgrounds; those who reported African American, Hispanic or Native American race/ethnicity; non-students; parents; and those who were obese were most likely to report at least weekly burger-and-fries restaurant use.

Restaurant Use and Dietary Intake

After adjusting for sociodemographic characteristics, more frequent full-service restaurant use was associated with higher intake of vegetables (Table 2, Model 1). Compared to young adults who reported full-service restaurant use less than one time per week, an average of 0.4 additional daily vegetable servings were consumed by those who reported full-service restaurant use on three or more occasions per week. A similar association was observed for vegetables and dark green/orange vegetables after further adjustment for total daily energy intake and frequency of eating food from other restaurants (Table 2, Model 2).

In contrast, more frequent burger-and-fries restaurant use was related to lower intake of fruit, vegetables, whole grains, and fiber in models that included sociodemographic characteristics (Table 3, Model 1). More frequent burger-and-fries restaurant use (Table 3, Model 1) and sandwich/sub shop use (Table 4, Model 1) were similarly related to higher intake of total energy, total fat, saturated fat, and sodium. Intake of sugar-sweetened beverages was also related to burger-and-fries restaurant use but not significantly related to sandwich/sub shop use. Compared to young adults who reported burger-and-fries restaurant use less than one time per week, nearly one additional sugar-sweetened beverage per day was consumed by those who reported burger-and-fries restaurant use on three or more occasions per week. With few exceptions, similar significant findings were observed after further adjustment for total energy intake and frequency of eating from other restaurants. Total energy and saturated fat intake were not related to sandwich/sub shop use in Model 2 (Table 4). However, Model 2 additionally showed an association between more frequent burger-and-fries restaurant use and lower intake of milk products and calcium (Table 3).

Restaurant Use and Weight Status

More frequent burger-and-fries restaurant use was related to a higher prevalence of overweight/obesity after adjusting for sociodemographic characteristics (Model 1: $\chi^2 = 27.3$, P value < 0.001), and additionally adjusting for frequency of eating food from other restaurants (Model 2: $\chi^2 = 24.0$, P value < 0.001). Full-service restaurant use and sandwich/sub shop use were unrelated to weight status in either model. Similar results were found when energy expended in physical activity was included as a covariate in the models and in separate analyses where the outcome was obese weight status (data not shown).

DISCUSSION

This study described patterns of away-from-home eating for different types of restaurants and associations with dietary intake and weight status among young adults. The results suggest that young adults frequently patronize restaurants (with 95% reporting restaurant use at least once per week), and are more likely to eat food from a fast-food restaurant than a full-service restaurant in a given week. More frequent use of fast-food restaurants that primarily serve burgers and fries was associated with higher risk for overweight/obesity; higher intake of sugar-sweetened beverages, total energy, total fat, and saturated fat; and with lower intake of healthful foods and key nutrients. These associations were observed above and beyond the influence of total frequency of restaurant use. In contrast, sandwich/sub shop use and full-service restaurant use were unrelated to weight status. While sandwich/sub shop use was related to higher total energy, fat, and sodium intake, full-service restaurant use was related only to higher intake of vegetables and dark green/orange vegetables.

The findings build on previous studies in young adults and suggest future studies should examine influences on the availability and selection of healthy foods at restaurants. Consistent with prior research among university students, the current study, which utilizes a more diverse sample of both students and non-students, found that young adults were more likely to eat food from fast-food restaurants that primarily serve burgers and fries or sandwiches/subs than other fast-food restaurants (3). Overall, there has been little prior research specifically examining associations between eating food from these types of fast-food restaurants, dietary intake, and weight status. However, the results of the current study are consistent with one previous study that related frequent burger-and-fries restaurant use to increased risk of type 2 diabetes (37). In regard to full-service restaurants, the findings of the current study are also in line with studies that have shown associations of eating at non-fast food restaurants (17) or community access to non-fast food restaurants (20) with higher fruit/vegetable consumption.

Certain strengths and limitations are important to consider in drawing conclusions from this study. Early adulthood is an understudied life stage (38) and the large sample of young adult participants was diverse in terms of race, SES, student status, and parental status. A validated FFQ was used to comprehensively assess dietary intake (29, 30); however, this FFQ was designed to measure usual consumption patterns for the past year and does not specifically assess restaurant menu choices. Therefore, it is not possible to draw clear conclusions about the nutritional quality of menu items purchased at different categories of restaurants. While the current study attempted to assess restaurant use by asking young adults how often they ate something from six categories of restaurants, it is possible the survey did not capture the full diversity of restaurants that impact their food choices and weight status. As the restaurant use survey items were developed and piloted primarily among a young, Midwestern population, the generalizability of their restaurant choices may be limited. In addition, the current study did not assess the nature of eating occasions that occurred at restaurants or how often young adults chose to get take-out or delivery versus dining in.

Study findings indicate there is a need for interventions to help young adults who report frequent fast-food restaurant use to select healthy options. In particular, there is a need for health behavior messages to address the use of fast-food restaurants that primarily serve burgers and fries and the consumption of foods from sandwich/sub shops that are high in fat and sodium. The results of this study and others suggest that effective efforts are needed to encourage young adults to alternatively prepare food at home when possible and provide tools to help in selecting healthy options when eating away from home (2, 14, 16, 39).

Nutrition professionals can provide concrete tips to assist young adults in making healthy choices at restaurants (e.g., drinking water or low-fat milk with meals) and help to address common perceived barriers to at-home food preparation such as time constraints and limited cooking skills (39).

CONCLUSIONS

The study results indicate that young adults frequently patronize restaurants, and most away-from-home eating occurs at fast-food restaurants. Additionally, the results suggest that young adults who frequently eat food from burger-and-fries fast-food restaurants are at increased risk for overweight/obesity and poor dietary intake. While sandwich/sub shop use and full-service restaurant use were unrelated to weight status, those who frequently eat food from sandwich/sub shops may be more likely to have high intakes of total energy, total fat, saturated fat, and sodium. In contrast, those who frequently eat food from full-service restaurants may be more likely to have higher intakes of vegetables and dark green/orange vegetables.

Future studies in young adult populations will be needed to confirm the results and develop a better understanding of the factors that influence food choice selections at restaurants. It will also be important for studies to examine how often young adult parents purchase food from restaurants for their children. If young adults are frequently purchasing food from restaurants for family meals, interventions for young adult parents should be designed to address dietary implications for their children. Finally, as legislation that requires chain restaurants to list calorie information on the menu will be going into effect in the near future, it will be important to assess whether calorie labeling helps young adults to choose nutrient-dense menu options.

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Table 1

Percentage reporting restaurant use at least once per week according to sociodemographic characteristics of young adult participants in Project EAT-III (Eating Among Teens and Young Adults)^e

	n	Any restaurant ^f	Any sit-down ^g %	Any fast food ^h %	Burger- and-fries %	Fried chicken %	Mexican %	Pizza %	Sandwich or sub %
Total	2287	95.1	32.7	88.0	30.5	9.4	17.0	17.0	29.4
Gender									
Male	1030	95.9	32.8	92.2	37.8	10.9	21.5	20.6	35.2
Female	1257	94.3	32.6	84.6	24.5	8.2	13.4	14.0	24.8
P value		0.09	0.90	<0.001	<0.001	0.02	<0.001	<0.001	<0.001
Age									
20-24 years	689	96.2	32.0	90.1	35.2	13.6	19.7	18.1	29.2
25-31 years	1546	94.5	33.7	87.0	28.1	6.8	15.6	16.3	29.2
P value		0.10	0.45	0.05	<0.001	<0.001	0.02	0.28	0.96
Race									
African American	420	94.0 ^a	27.5	88.1	40.2 ^{bc}	19.3 ^b	24.1 ^{bc}	18.5	31.3
Asian	442	93.0 ^a	31.0	84.5	27.3 ^{ad}	14.5 ^b	12.3 ^a	12.3	24.4
Hispanic	133	100.0 ^a	27.1	93.0	39.7 ^{cd}	12.1 ^b	22.3 ^{ac}	22.9	33.1
Native American	74	96.9 ^a	34.7	95.5	41.3 ^{ac}	6.3 ^{ab}	15.6 ^{ac}	19.1	33.8
White	1094	96.1 ^a	36.2	88.9	25.9 ^a	2.9 ^a	16.4 ^a	17.2	30.6
Mixed/other ⁱ	96	91.0 ^a	27.9	84.4	37.4 ^{ac}	19.0 ^b	11.4 ^{ac}	20.5	24.0
P value		0.004	0.02	0.02	<0.001	<0.001	<0.001	0.04	0.08
Socioeconomic status									
Low	814	95.1	25.5 ^a	89.3	35.0 ^a	12.8 ^a	18.3	18.1	30.6
Middle	577	95.3	35.3 ^b	87.2	30.5 ^{ac}	11.2 ^a	17.4	16.5	27.5
High	811	95.4	39.3 ^b	88.4	25.8 ^{bc}	3.9 ^b	15.6	16.5	30.2
P value		0.97	<0.001	0.54	<0.001	<0.001	0.34	0.63	0.42
Student status									
Student	762	95.1	36.1	86.5	25.9	8.7	15.4	14.9	29.2
Non-student	1504	95.2	30.8	88.9	32.7	9.4	17.7	18.0	29.6
P value		0.94	0.01	0.12	0.001	0.57	0.17	0.07	0.84

	n	Any restaurant ^f	Any sit-down ^g %	Any fast food ^h %	Burger- and-fries %	Fried chicken %	Mexican %	Pizza %	Sandwich or sub %
Employment status									
Not employed	246	90.7 ^a	27.3	84.7	31.1	8.0	15.9	18.0	17.6 ^a
Part-time	758	95.0 ^{ab}	32.6	86.6	29.1	8.8	18.1	18.8	30.7 ^b
Full-time	1137	96.3 ^b	33.9	90.0	31.8	9.2	16.5	15.8	32.4 ^b
<i>P</i> value		0.002	0.14	0.03	0.46	0.82	0.61	0.23	<0.001
Parental status									
No children	1528	95.8	37.3	87.7	28.0	7.9	16.3	16.0	31.0
One or more child	741	93.4	22.8	88.9	35.7	12.6	18.5	19.1	26.7
<i>P</i> value		0.03	<0.001	0.42	<0.001	<0.001	0.18	0.07	0.04
Weight status^j									
Not overweight	1035	92.6 ^a	35.8	83.2 ^a	24.2 ^a	7.6	14.6 ^a	16.4	27.7
Overweight	626	97.6 ^b	31.2	91.7 ^b	33.4 ^b	10.1	18.0 ^{ab}	15.8	31.0
Obese	483	97.1 ^{ab}	30.5	93.7 ^b	41.2 ^b	11.6	24.1 ^b	18.8	32.5
<i>P</i> value		<0.001	0.05	<0.001	<0.001	0.03	<0.001	0.36	0.12

^{a,b,c,d}

Values with unlike superscript letters were significantly different (*P* value <0.001)

^e All percentages are weighted to reflect the probability of responding to the EAT-III survey.

^f Eating from one or more type of full-service restaurant or fast-food restaurant.

^g Eating from a full-service restaurant, excluding burger-and-fries restaurants, fried chicken restaurants, Mexican restaurants, pizza places, and sandwich or sub shops.

^h Eating from one or more type of fast-food restaurant, including burger-and-fries restaurants, fried chicken restaurants, Mexican restaurants, pizza places, and sandwich or sub shops.

ⁱ Includes respondents who reported their race as Hawaiian/Pacific Islander.

^j BMI=body mass index; calculated as kg/m²; Not overweight: BMI<25.0; Overweight: BMI=25.0–29.9; Obese: BMI≥30.0

Full-service restaurant use and daily mean ($\pm$ standard error) dietary intake of young adult participants in Project EAT-III (Eating Among Teens and Young Adults)

Table 2

	Full-service restaurant use ^a			Model 1 ^a		Model 2 ^b	
	<1 time n=1344	1–2 times n=488	≥ 3 times n=140	F value	P value	F value	P value
Food (servings)^c							
Fruit	2.03 (0.05)	1.98 (0.08)	2.03 (0.17)	0.15	0.86	0.57	0.56
Vegetables	2.23 (0.05)	2.42 (0.09)	2.60 (0.17)	4.83	0.008	6.19	0.002
Dark green/orange vegetables	0.66 (0.02)	0.72 (0.03)	0.84 (0.06)	4.41	0.01	5.44	0.004
Milk products	1.96 (0.04)	1.84 (0.07)	1.86 (0.14)	1.32	0.27	2.54	0.08
Whole grains	1.90 (0.04)	1.95 (0.07)	1.61 (0.14)	2.75	0.06	4.31	0.01
Sugar sweetened drinks	0.87 (0.03)	0.85 (0.06)	0.88 (0.11)	0.48	0.62	3.01	0.05
Nutrients							
Energy (kcal)	2061 (24)	2155 (39)	2263 (76)	4.93	0.01	0.82	0.44
Energy from fat (%)	30.1 (0.2)	30.3 (0.3)	31.0 (0.5)	1.45	0.23	0.46	0.63
Energy from saturated fat (%)	10.4 (0.1)	10.2 (0.1)	10.6 (0.2)	1.27	0.28	2.37	0.09
Sodium (mg)	2249 (29)	2350 (48)	2480 (95)	4.22	0.01	0.41	0.66
Fiber (g)	18.8 (0.3)	20.0 (0.5)	19.3 (1.0)	2.65	0.07	4.16	0.01
Calcium (mg)	1027 (16)	1001 (26)	1050 (51)	0.20	0.82	1.15	0.32

^aThe weighted linear regression model is adjusted for gender, race/ethnicity, socioeconomic status, age, employment status, student status, and parental status.

^bThe weighted linear regression model is adjusted for the covariates in Model 1 as well as total energy intake (for all outcomes with the exceptions of energy, energy from fat, and energy from saturated fat) and the frequency of eating from other restaurants.

^cA daily serving was defined as the equivalent of one-half cup for fruit and vegetables, 16 g for whole grains, and one cup for milk products. For sugar-sweetened beverages, a serving was defined as the equivalent of one glass, bottle, or can.

Table 3
Burger-and-fries restaurant use and daily mean ($\pm$ standard error) dietary intakes of young adult participants in Project EAT-III (Eating Among Teens and Young Adults)

	<u>Burger-and-fries restaurant use^a</u>			<u>Model 1^a</u>		<u>Model 2^b</u>	
	<1 time n=1408	1-2 times n=410	≥ 3 times n=153	F value	P value	F value	P value
Food (servings)^c							
Fruit	2.16 (0.05)	1.70 (0.09)	1.60 (0.16)	15.58	<0.001	33.90	<0.001
Vegetables	2.50 (0.05)	1.89 (0.10)	1.61 (0.16)	24.02	<0.001	40.16	<0.001
Dark green/orange vegetables	0.75 (0.02)	0.56 (0.03)	0.46 (0.06)	24.36	<0.001	33.78	<0.001
Milk products	1.99 (0.04)	1.75 (0.08)	1.76 (0.13)	2.82	0.06	7.98	<0.001
Whole grains	2.00 (0.04)	1.63 (0.08)	1.69 (0.13)	9.00	<0.001	16.83	<0.001
Sugar-sweetened beverages	0.73 (0.03)	1.03 (0.06)	1.68 (0.10)	50.90	<0.001	41.09	<0.001
Nutrients							
Energy (kcal)	2041 (23)	2190 (43)	2386 (73)	12.08	<0.001	3.59	0.03
Energy from fat (%)	29.6 (0.1)	31.7 (0.3)	32.2 (0.5)	26.76	<0.001	15.33	<0.001
Energy from saturated fat (%)	10.1 (0.1)	10.9 (0.1)	11.1 (0.2)	20.85	<0.001	12.96	<0.001
Sodium (mg)	2215 (29)	2401 (53)	2687 (90)	14.23	<0.001	0.33	0.72
Fiber (g)	19.9 (0.3)	17.2 (0.5)	17.9 (0.9)	8.77	<0.001	42.56	<0.001
Calcium (mg)	1048 (16)	956 (29)	951 (49)	4.03	0.02	26.24	<0.001

^aThe weighted linear regression model is adjusted for gender, race/ethnicity, socioeconomic status, age, employment status, student status, and parental status.

^bThe weighted linear regression model is adjusted for the covariates in Model 1 as well as total energy intake (for all outcomes with the exceptions of energy, energy from fat, and energy from saturated fat) and the frequency of eating from other restaurants.

^cA daily serving was defined as the equivalent of one-half cup for fruit and vegetables, 16 g for whole grains, and one cup for milk products. For sugar-sweetened beverages, a serving was defined as the equivalent of one glass, bottle, or can.

Table 4
Sandwich/sub shop use and daily mean ($\pm$ standard error) dietary intakes of young adult participants in Project EAT-III (Eating Among Teens and Young Adults)

	Sandwich/sub shop use ^a			Model 1 ^a		Model 2 ^b	
	<1 time n=1407	1–2 times n=449	≥ 3 times n=107	F value	P value	F value	P value
Food (servings)^c							
Fruit	2.02 (0.05)	2.00 (0.09)	2.19 (0.19)	0.61	0.54	0.54	0.58
Vegetables	2.30 (0.05)	2.27 (0.09)	2.61 (0.19)	1.88	0.15	2.31	0.10
Dark green/orange vegetables	0.68 (0.02)	0.69 (0.03)	0.79 (0.07)	1.31	0.27	2.60	0.07
Milk products	1.92 (0.04)	1.91 (0.07)	2.04 (0.15)	0.81	0.44	0.47	0.62
Whole grains	1.92 (0.04)	1.85 (0.07)	1.81 (0.16)	0.03	0.97	0.62	0.54
Sugar-sweetened beverages	0.84 (0.03)	0.89 (0.06)	0.97 (0.12)	1.99	0.14	2.03	0.13
Nutrients							
Energy (kcal)	2048 (23)	2161 (40)	2491 (85)	12.09	<0.001	1.86	0.15
Energy from fat (%)	29.9 (0.2)	30.9 (0.3)	32.4 (0.6)	12.21	<0.001	4.56	0.01
Energy from saturated fat (%)	10.2 (0.1)	10.5 (0.1)	11.1 (0.2)	7.06	<0.001	1.89	0.15
Sodium (mg)	2206 (28)	2396 (50)	2923 (104)	22.39	<0.001	10.58	<0.001
Fiber (g)	19.1 (0.3)	19.2 (0.5)	20.7 (1.1)	1.56	0.21	0.24	0.79
Calcium (mg)	1014 (16)	1027 (27)	1113 (57)	2.18	0.11	0.60	0.55

^aThe weighted linear regression model is adjusted for gender, race/ethnicity, socioeconomic status, age, employment status, student status, and parental status.

^bThe weighted linear regression model is adjusted for the covariates in Model 1 as well as total energy intake (for all outcomes with the exceptions of energy, energy from fat, and energy from saturated fat) and the frequency of eating from other restaurants.

^cA daily serving was defined as the equivalent of one-half cup for fruit and vegetables, 16 g for whole grains, and one cup for milk products. For sugar-sweetened beverages, a serving was defined as the equivalent of one glass, bottle, or can.