

The Influence of Weekday Eating Patterns on Energy Intake and BMI Among Female Elementary School Personnel

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Many health practitioners recommend eating small, frequent meals for weight loss, yet the relationship of eating patterns, such as eating occasion frequency (EOF), to energy intake and body weight is controversial. Broad-based efforts to promote worksite wellness programs increase the importance of this issue, as many work environments inherently restrict eating patterns. The eating patterns of school personnel are understudied, but are of particular interest, not only because they have limited eating opportunities during the day but also because their diet and weight outcomes are likely to influence behaviors of a much larger population. We examined relationships between weekday EOF and energy intake and BMI among female elementary school personnel in 22 schools in a suburban county of southeastern Louisiana. Two 24-h dietary recalls were administered to randomly-selected employees ($n = 329$) on nonconsecutive days by registered dietitians. Measured heights and weights were used to calculate BMI (weight/height²). On average, employees consumed 2.2 of their total 5.9 meals and snacks during the school day, accounting for 37% of daily energy. In multiple regression models controlling for demographic and health variables, EOF as well as separate counts of meal and snack frequency were each positively and significantly associated with energy intake. However, neither the number of meals, snacks, nor overall EOF was associated with BMI. The proportion of energy consumed during the school day and the positive association of weekday EOF with energy intake suggest an important role for worksite wellness programs that target the dietary improvement of elementary school personnel.

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INTRODUCTION

Eating patterns—such as the number of times one eats during the day (i.e., eating occasion frequency (EOF)), breakfast and snack consumption, and meal timing—may play an important role in energy intake and weight management, and have received considerable attention (1). For example, many health organizations, diet books, and Internet sites recommend eating small, frequent meals for weight loss (2). Such an eating pattern may help to control hunger and appetite, increase the thermogenic effect of food, and result in favorable changes in glucose regulation and lipid profiles (1,3–5). Many studies support an inverse relationship between EOF and body weight status (6,7). One recent study in the United States found a significant 45% lower risk of obesity among those consuming ≥ 4 eating occasions per day compared to those consuming ≤ 3 (8).

Although many health professionals recommend eating small, frequent meals for weight loss or maintenance, some argue that there is no clear evidence to support such advice (9). In fact, rather than prevent or control obesity, EOF has been positively

associated with obesity and may contribute to weight gain because of its positive association with energy intake (10–12). Based on nationally representative data, BMI increased as eating frequency increased among US adults (11). In a Swedish study, obese women consumed more meals per day than normal weight women (6.1 vs. 5.2, $P < 0.0001$) (13). It is important to note that these studies had methodical strengths (e.g., exclusion of under-reporters) compared to the many studies finding an inverse relationship. This, along with the positive association with EOF and energy intake, raises serious doubt about the promotion of small, frequent meals for weight control.

Although epidemiological and experimental studies have attempted to explain the role of EOF on weight status, conflicting findings clearly bring into question the direction of the relationship and whether a relationship even exists (14). In addition, much of the evidence is tempered by substantial methodological limitations, such as the inclusion of under-reporters in analysis, which may result in spurious associations. Given the prevalence of overweight and obesity, more

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research is needed to explore relationships between this eating pattern and BMI and energy intake.

It is also important to consider EOF and other eating patterns in the context of different work environments. Worksite wellness programs are the vanguard of environmental interventions to control obesity. A large proportion of waking hours are spent at work, thus several eating occasions likely occur during the workday, especially for those following a small, frequent meal pattern. Understanding these patterns is key to designing appropriate interventions. Eating patterns of school personnel are of particular interest in obesity control because of their unique work situation compared to other occupations (e.g., more limited eating opportunities during the school day) and because they likely influence a large proportion of children with a rising prevalence rate of obesity. Unfortunately, however, dietary data for school personnel are sparse. To close these gaps, the current paper examined the eating patterns of female elementary school personnel and whether these patterns, specifically EOF, were associated with energy intake and BMI.

METHODS AND PROCEDURES

Study sample

ACTION Worksite Wellness for Elementary School Personnel (ACTION) is an intervention trial set in 22 schools in a suburban county of southeastern Louisiana and funded by the National Institutes of Health (15). The current study presents cross-sectional data collected at baseline where 440 employees (i.e., 20 per school) were randomly selected for dietary interviews. However, 45 participants were excluded from analysis because they were ineligible (e.g., substitute teacher) ($n = 12$), pregnant or breastfeeding ($n = 7$), Hispanic ($n = 11$), had missing or other race-ethnicity data ($n = 4$), or only reported dietary intake data for weekends ($n = 11$). The current paper focused only on weekday intake due to the interest in the worksite environment. Using Huang *et al.* method for identifying implausible reports of energy intake and Institute of Medicine equations to calculate predicted energy, we excluded an additional 43 participants (i.e., under-reporters) with reported energy intake below a 2.0 s.d. cutoff of predicted energy (16,17). Few males were interviewed in the original sample and remained after these exclusions for underreporting ($n = 23$), thus analyses were restricted to females.

Data collection methods and procedures

Baseline measurements were conducted during the fall of 2006. All protocols were approved by the Tulane University institutional review board and all participants provided voluntary written consent before participation. Height and weight were measured to the nearest 0.1 cm and 0.1 kg, respectively, in duplicate by trained examiners during a physical examination using a portable stadiometer and calibrated scale. Date of birth, race-ethnicity, gender, and tobacco data were collected via self-report through short written surveys. Job category was obtained from school employee rosters. Physical activity was measured objectively by an ActiGraph uniaxial accelerometer (ActiGraph, Pensacola, FL) and data were converted into mean minutes of moderate-to-vigorous physical activity per day (18). Participants were instructed to wear the device for seven complete days except while sleeping and during water activities.

Dietary information was obtained from two in-person 24-h dietary recalls administered by three, trained registered dietitians on nonconsecutive days using the Nutrition Data System for Research (version 2006; University of Minnesota, Nutrition Coordinating Center, Minneapolis, MN). Nutrition Data System for Research, a computer-assisted

software program with a database of over 18,000 foods and beverages, was developed and is maintained by the University of Minnesota for standardized dietary recall and record collection. Nutrition Data System for Research also features the multiple-pass approach with prompts to help users collect data in a thorough manner in an effort to minimize underreporting. The study protocol included standardized probes and prompts to further reduce recall bias as well as standardized two- and three-dimensional measurement aids and visuals to assist respondents in quantifying reported items.

Definition of key variables

The dependent variables of primary interest were total energy intake (in kJ) and BMI (kg/m^2). BMI was also used to classify participants as normal weight (BMI $<25.0 \text{ kg}/\text{m}^2$), overweight (BMI $25.0\text{--}29.9 \text{ kg}/\text{m}^2$), or obese (BMI $\geq 30.0 \text{ kg}/\text{m}^2$) (19). No universally accepted definition exists for EOF, the primary independent variable under investigation. In this study, we calculated total EOF by summing eating occasions reported by respondents for each 24-h recall (e.g., breakfast, lunch, dinner, snack, or other) and then averaged over each respondent. Dietary interviewer documentation in Nutrition Data System for Research was used to recode "other" eating occasions. Brunch was coded as breakfast if consumed before 11 AM and lunch if consumed at or after 11 AM, an approach comparable to other studies (16). The remaining "other" eating occasions were coded as snacks.

Statistical analysis

Dietary analyses were based on mean weekday intake per individual, calculated by averaging dietary intake from two 24-h dietary recalls. For the 47.4% of participants ($n = 156$) who completed only one recall on a weekday, dietary data from this single recall were used in place of mean intake. Differences in intake were examined through *t*-tests and ANOVA. If the ANOVA table was significant ($P < 0.05$), least significant difference multiple comparison tests were used to determine which specific means differed. χ^2 -analysis was used to test for differences in breakfast, lunch, dinner, and snack consumption. Fisher's exact tests were used if the cell size was too small for χ^2 -analysis.

Multiple linear regression models were developed to test the associations of EOF with energy intake or BMI. The control variables in the models were either dichotomous indicator variables or continuous variables. All models controlled for race-ethnicity (African American = 1, white = 0), age (continuous variable), job category (instructional staff = 1, noninstructional staff = 0), minutes of moderate-to-vigorous physical activity per day (continuous variable), smoking status (smoker = 1, nonsmoker = 0), and geographical location of the school (East bank of the Mississippi River = 1, West bank of the Mississippi River = 0). We included the latter variable to control for unobserved environmental characteristics that might influence dietary behavior, such as socio-economic status or access to retail food outlets, which both tend to be lower on the West bank. Statistical analyses were performed using SPSS for Windows (version 14.0.1; SPSS, Chicago, IL).

RESULTS

Sample characteristics

Key demographic characteristics and weight status are presented in **Table 1**. Most employees were between 30 and 59 years of age (mean age 47.3 years \pm 10.7), white, and instructional personnel, with a mean BMI of $29.1 \text{ kg}/\text{m}^2$ (± 6.7) (data not shown). Approximately 69% of the sample was overweight or obese, 91.2% was nonsmoking, and all were classified as sedentary (i.e., engaged in <30 min of daily moderate-to-vigorous physical activity) (data not shown).

Frequency of eating occasions and snacking

On average, respondents reported six eating occasions per day, about three snacks and three meals across most groups

(Table 1). African Americans reported significantly fewer total eating occasions than whites ($P < 0.05$). No significant differences in total EOF, meal, or snack frequency were observed based on age group, job category, or weight status. There was, however, a positive relationship between total EOF and age ($r = 0.140$, $P = 0.011$) in a correlation analysis using Pearson correlation coefficients.

Overall, ~28% ($n = 93$) of the sample skipped breakfast at least once during interview days, and most regularly ate lunch, dinner, and snacks. There were no significant differences in breakfast consumption by demographic or weight category. There were, however, significant differences in regular lunch and snack consumption by race-ethnicity, with whites eating more frequently than African Americans.

Weekday energy intake

Mean weekday energy intake and the proportion of daily energy consumed at breakfast, lunch, dinner, and snacks are presented in Table 2. Based on least significant difference multiple comparison tests, obese individuals consumed 1,101 and 603 more kJ per day than those who were normal weight and overweight, respectively ($P < 0.05$). Using the full sample, including those who skipped eating occasions, breakfast provided the smallest proportion of daily energy for all groups. Dinner provided the largest proportion of daily energy intake across all groups, accounting for over one-third of calories. Approximately 26%

of calories were consumed at lunch and another 24% at snacks across most groups.

Time of consumption

Almost one-quarter of interviewed employees consumed no beverages or foods before school whereas the majority consumed something during the school day (Table 3). Approximately 37% of daily energy was consumed during the school day and over 50% was consumed after 3 PM. On average, employees consumed two eating occasions during the school day, which was slightly less than after school and evening time intervals combined.

Relationship between EOF and energy intake and BMI

In Table 4, multiple regression models are presented that investigated the impact of weekday EOF on energy intake or BMI when controlling for various demographic and health characteristics. Energy model 1 examined total EOF and energy model 2 examined the independent associations of meal and snack frequency on energy intake. For both models, frequency was positively and significantly associated with energy intake. In energy model 1, an increase in total EOF by one was associated with a 367 kJ increase in daily energy. In energy model 2, each additional meal and snack consumed was associated with a 630 kJ and 333 kJ increase in energy intake, respectively. In both models, predicted energy intake was ~770 kJ higher for

Table 1 Daily eating occasion frequency (EOF) and consumption on weekdays among female elementary school personnel

	<i>n</i>	%	EOF						% Regularly consuming ^a			
			Total		Meals		Snacks		Breakfast	Lunch	Dinner	Snacks
			Mean	±s.d.	Mean	±s.d.	Mean	±s.d.				
All	329	n/a	5.91	±1.48	2.76	±0.57	3.16	±1.42	71.7	94.2	96.7	95.7
Age group												
<30 years old	23	7.0	5.11	±0.96	2.72	±0.45	2.39	±0.83	65.2	100.0	95.7	100.0
30–39 years old	70	21.3	5.85	±1.51	2.72	±0.52	3.13	±1.55	64.3	97.1	94.3	92.9
40–49 years old	82	24.9	5.86	±1.42	2.74	±0.62	3.12	±1.40	69.5	96.3	97.6	95.1
50–59 years old	119	36.2	6.11	±1.55	2.78	±0.59	3.33	±1.41	76.5	91.6	97.5	98.3
60+ years old	35	10.6	6.01	±1.46	2.80	±0.56	3.21	±1.47	80.0	88.6	97.1	91.4
Race-ethnicity ^b												
White	267	81.2	6.04	±1.49	2.78	±0.55	3.26	±1.43	71.9	96.3	97.0	97.0
African American	62	18.8	5.33	±1.31	2.64	±0.62	2.69	±1.32	71.0	85.5	95.2	90.3
Job category												
Instructional	265	80.5	5.91	±1.52	2.75	±0.58	3.17	±1.47	70.9	94.3	96.6	95.8
Noninstructional	64	19.5	5.91	±1.32	2.80	±0.53	3.11	±1.22	75.0	93.8	96.9	95.3
Weight status												
Normal weight	102	31.0	5.83	±1.47	2.80	±0.57	3.03	±1.32	72.5	96.1	97.1	96.1
Overweight	98	29.8	6.07	±1.39	2.73	±0.61	3.33	±1.37	70.4	91.8	95.9	96.9
Obese	129	39.2	5.85	±1.55	2.73	±0.54	3.12	±1.53	72.1	94.6	96.9	94.6

n/a, not applicable.

^aDefined as the percent consuming a food or beverage during the eating occasion for all weekday recalls (i.e., 1 or 2) that the respondent completed. ^bSignificant differences in total EOF ($P = 0.001$) and snack frequency ($P = 0.004$) based on race using *t*-tests. Significant differences in regular lunch consumption ($P = 0.003$) and regular snack consumption ($P = 0.030$) based on race using Fisher's exact tests.

Table 2 Proportion of daily weekday energy consumed by eating occasion among female elementary school personnel

	<i>n</i>	Total energy (kJ)		% Of total energy consumed during			
		Mean	±s.d.	Breakfast	Lunch	Dinner	Snacks
All	329	7,669	±2,131	12.9	26.2	36.8	24.1
Age group ^a							
<30 years old	23	6,939	±1,785	14.3	30.3	35.7	19.7
30–39 years old	70	7,839	±2,053	11.3	27.3	37.0	24.4
40–49 years old	82	7,820	±2,206	13.3	27.5	35.7	23.5
50–59 years old	119	7,744	±2,157	12.4	25.3	37.8	24.5
60+ years old	35	7,203	±2,170	15.4	21.6	36.1	26.9
Race-ethnicity							
White	267	7,574	±2,103	12.9	26.2	36.9	24.1
African American	62	8,081	±2,218	12.9	26.3	36.5	24.3
Job category							
Instructional	265	7,653	±2,126	12.7	26.2	37.3	23.8
Noninstructional	64	7,738	±2,164	13.6	26.2	34.8	25.4
Weight status ^b							
Normal weight	102	7,090	±1,982	13.1	27.6	35.7	23.6
Overweight	98	7,587	±2,063	12.5	25.2	36.5	25.9
Obese	129	8,191	±2,182	13.0	25.9	37.9	23.3

^aSignificant differences in the proportion of daily energy consumed at lunch by age group ($P = 0.020$). ^bSignificant differences in mean weekday energy intake based on weight status ($P < 0.001$).

Table 3 Total daily energy consumption (%) and eating occasion frequency (EOF) on weekdays by time intervals

Time interval	During the time interval					
	Frequency of regularly consuming a food or beverage ^a		% Of total daily energy among consumers	% Of total daily energy among full sample ($n = 329$)	Total EOF	
	<i>n</i>	%			Mean	±s.d.
Before school (before 8 AM)	251	76.3	12.7	10.2	1.06	±0.70
During school (8 AM–2:59 PM)	325	98.8	37.3	37.0	2.19	±0.87
After school (3 PM–6:59 PM)	282	85.7	32.2	28.5	1.38	±0.74
Evening (7 PM–midnight)	269	81.8	28.3	24.4	1.28	±0.72

^aDefined as the percent consuming a food or beverage during the time interval for all weekday recalls (i.e., 1 or 2) that the respondent completed.

African Americans. Total EOF, meal frequency, and snack frequency were not significant correlates of BMI in BMI models 1 and 2; however, BMI was consistently and ~4 kg/m² higher for African Americans and inversely related to minutes of daily moderate-to-vigorous physical activity. In an analogous multivariate regression model, the proportion of daily energy consumed during various time intervals (e.g., before school, during school) was not associated with BMI (data not shown).

DISCUSSION

Results from this study on the weekday diets of elementary school personnel showed that EOF played an important role in energy intake, but not BMI. An increase of one EOF was

associated with a 367 kJ increase in daily energy. Energy intake increased an average 630 kJ and 333 kJ for each additional meal and snack consumed, respectively. EOF was not associated with BMI in multiple regression models controlling for demographic and health variables.

The lack of association between weekday eating frequency and BMI might be due to the difficulties in measuring energy expenditure. Although we obtained objective estimates of moderate-to-vigorous physical activity, respondents who ate more frequently may have had increased energy expenditure from thermogenic effects of food or from increases in low-level activities (standing vs. sitting). Either of these would have gone undetected in our accelerometry data. The lack of association

Table 4 Associations with eating occasion frequency on weekdays among female elementary school personnel

Dependent variables	Energy model 1		Energy model 2		BMI model 1		BMI model 2	
	Energy intake		Energy intake		BMI		BMI	
Independent variables	<i>b</i> ^a	<i>P</i>						
Total eating occasion frequency	+367.39	<0.001	—	—	+0.15	0.543	—	—
Meal frequency	—	—	+629.78	0.003	—	—	-0.15	0.818
Snack frequency	—	—	+333.06	<0.001	—	—	+0.19	0.466
African American	+764.47	0.013	+774.43	0.012	+4.18	0.000	+4.17	0.000
Age (years)	-17.04	0.129	-16.49	0.141	-0.00007	0.998	-0.001	0.984
Instructional staff	-68.20	0.818	-48.02	0.871	-1.45	0.114	-1.48	0.110
Physical activity (min)	-19.34	0.609	-24.91	0.512	-0.43	0.000	-0.42	0.000
Smoker	+118.32	0.773	+210.43	0.613	-0.77	0.543	-0.88	0.495
East bank	+136.41	0.564	+81.48	0.734	+0.33	0.656	+0.39	0.601
Constant	+6,162.26	<0.001	+5,530.13	<0.001	+29.07	0.000	+29.80	0.000
Adjusted <i>R</i> ²	0.055		0.057		0.091		0.092	

^aValues are unstandardized β -coefficients from multiple regression analysis. Models 1 and 3 explore the relationship with eating occasion frequency and the dependent variable using a single variable, whereas models 2 and 4 use two variables, accounting for meals and snacks separately.

between eating frequency and BMI is consistent with several review articles that concluded that there was no relationship, or an inverse relationship that was weak and likely an artifact (14,20). Subsequently, other studies have supported an inverse relationship between EOF and body weight status or mass, although it is possible that weak methodologies resulted in spurious associations (6–8,21,22). Only a few studies described a positive relationship between greater EOF and obesity, many of which had methodological strengths (11,13). As inconsistencies exist and have to be clarified, research should continue to explore the relationship between EOF and weight status. In the meantime, health professionals should be cautious in encouraging small, frequent meals for weight control given the positive association, seen in some studies, between weekday EOF and energy intake.

African-American school employees ate fewer times per day than whites, 5.3 vs. 6.0, yet their overall energy consumption was slightly, though not significantly, higher (8,081 kJ vs. 7,574 kJ). The higher energy content of their meals and snacks was evident in our **Table 4** regression results, where controlling for the number of eating occasions, African Americans consumed over 750 kJ more than the white employees. To explore a possible interaction between ethnicity and EOF, we tested regression models like those in **Table 4** but included interaction effects (i.e., African American \times EOF). In none of the models were the interaction effects significant, nor were the main effects of ethnicity; moreover, all of these models had lower *R*² statistics than our original models without interactions. Thus, the **Table 4** models are our preferred models.

Most people increase EOF by increasing snacks (23). In the current study, ~96% of the sample regularly consumed at least one snack, and snacks contributed one-quarter of daily energy intake which is consistent with national estimates of 26% (24). A 333 kJ increase in daily energy intake was also observed with

each additional snack in regression models. Although snack frequency was not associated with BMI in the current study, snacking may initiate an energy imbalance that promotes weight gain over time because people do not fully compensate for snack calories by decreasing meal calories and/or increasing physical activity (25,26). Indeed, evidence exists that snack calories are primarily contributing to the rise in energy intake in the United States (27). Greater snack consumption among obese children and adults have also been observed (13,28,29). Although the relationship between snacking and weight warrants further investigation, health promotion programs should encourage less frequent snacking as well as snacks that are micronutrient dense and do not promote excess caloric intake.

Of all eating occasions, breakfast was the one most commonly skipped. Only 71.7% of female employees regularly consumed breakfast during the week, compared to 84% of US women based on nationally representative data (30). One possible reason that people, especially overweight people, skip breakfast is to reduce total caloric intake in an effort to lose weight (31). Regular breakfast consumption, however, is common among individuals who are successful at losing weight and maintaining that weight loss long-term (32). An inverse relationship between breakfast consumption and body mass has also been well-documented in cross-sectional and longitudinal studies (31,33). Consuming breakfast may control hunger, improve physical activity performance, and lead to healthier choices later in the day (31,32).

Limited evidence has shown that shifting dietary intake to later in the day is associated with body weight (34). In the current study, energy consumed during various time intervals, including after the school day ends, was not associated with BMI. This is consistent with several US studies using nationally representative data which found no relationship between eating after 5:00 PM and BMI (35,36). Despite limited

eating opportunities during the school day, especially among instructional staff who spend much of their work day in the classroom, our findings suggest that school personnel are not overcompensating for inadequate intake during the school day by overeating after school. In fact, during school hours over one-third of daily energy was consumed, an average of two eating occasions occurred, and almost 99% of employees consumed at least one food or beverage. Given this consumption during the school day, school-based worksite wellness efforts could improve eating behaviors by increasing attention to the quality and quantity of food consumed at work.

The current study included a number of strengths. The focus on eating patterns of elementary school personnel is unique relative to the context of other worksites. In addition, objective measurements for height, weight, and physical activity eliminated biases associated with self-report. Underreporting, which is especially problematic for overweight and obese individuals, may account for the inconsistencies in some of the eating pattern literature (9,14,37). Our 24-h dietary recall methodology was designed to minimize underreporting, and we also removed under-reporters from the analysis using accepted procedures.

The current research also included some limitations. We are unable to assess causality, given the cross-sectional nature of our study design. For example, the inverse relationship between EOF and weight status may be due to overweight people trying to skip eating occasions in an effort to lose weight or prevent additional weight gain (14). Another potential limitation is the focus on school employees from southeastern Louisiana, which may limit generalizability to other regions of the United States. This group is also relatively homogeneous compared to national or multi-state samples. Given the lack of variability, this could also explain why the R^2 statistics in our regression models were somewhat low.

Self-report of eating occasion type can also be a problem in eating pattern research because individuals may have different perceptions of what constitutes a meal or snack. To address this, two extensions of our basic approach were explored that calculated EOF by summing self-reported eating occasions that (i) provided some energy, and (ii) provided at least 210 kJ. These extensions were used to avoid giving undue weight to eating occasions that only included water, low-calorie beverages, or small quantities of foods. The main outcomes were unchanged using these two extensions of our approach.

Two weekday dietary recalls were available for only 52.6% of the sample. Averaging eating patterns might be more representative of usual patterns, but it might also dilute effects. To address the latter, we conducted additional multivariate analyses using only the first weekday recall. Because similar results emerged, our final analytical sample included a combination of one and two 24-h dietary recalls in an effort to use all available information. We also compared those employees with one weekday dietary recall to those with two to rule out any potential bias. We did not observe any statistically significant differences between these groups with regards to energy intake or EOF; however, those with one recall were older (49.0 years

vs. 45.8 years, $P = 0.007$) and had higher BMI (30.0 kg/m² vs. 28.3 kg/m², $P = 0.21$). Finally, when controlling for the number of weekday recalls in additional multivariate analyses (data not shown), we observed results comparable to those presented in **Table 4**.

This study focused on weekday intake due to the interest in the worksite setting; however, one possible explanation for the lack of association between EOF and BMI is that employees compensate for additional weekday calories during the weekend. To explore this, we examined the diets of 141 employees with dietary data for a weekend day (only Sunday data were available). These employees consumed 8,055 kJ, 5.36 total eating occasions, 2.50 meals, and 2.87 snacks on Sunday. Interestingly, energy intake was higher on Sunday than our main results (7,669 kJ), but lower in total eating occasions, number of meals, and snacks (5.91, 2.76, 3.16, respectively). Nevertheless, in multivariable models no significant associations were observed between Sunday eating frequency and energy intake or BMI. This is likely due to the imprecision of one day of dietary data as well as the smaller sample size used to explore this concern.

In conclusion, this study provides evidence that EOF plays an important role in energy intake among female elementary school personnel. Although we did not observe differences in BMI with increased EOF, the greater energy intake associated with EOF is of concern considering the prevalence of overweight and obesity and physical inactivity among this group as well as across the United States. Given that one-third of daily energy and two eating occasions were consumed during the school day, there is a clear role for worksite wellness programs to play in improving school employee diets.

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DISCLOSURE

The authors declared no conflict of interest.

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