



Published in final edited form as:

Appetite. 2007 September ; 49(2): 494–499.

Dietary Correlates of Emotional Eating in Adolescence

Selena T. Nguyen-Michel^a, Jennifer B. Unger^a, and Donna Spruijt-Metz^a

a University of Southern California, Keck School of Medicine, Institute for Health Promotion and Disease Prevention Research, 1000 S. Fremont, Unit 8, Alhambra, CA 91803, USA

Abstract

To better understand the relation between emotional eating and dietary choices, dietary correlates of emotional eating were investigated in an adolescent sample. Participants were 617 predominantly Latino middle school students from seven schools in Los Angeles County. Analyses of cross-sectional data revealed that emotional eating was associated with increased frequency of intake of sweet high energy-dense foods, such as cake and ice cream, salty high energy-dense foods like chips, and soda. Gender stratified analyses revealed an association between emotional eating and more frequent fruit and vegetable intake in boys only, and a positive association between emotional eating and salty high energy-dense intake in both boys and girls. These data support previous literature that reports a preference for high energy-dense food in emotional eating, and shows that this association may be generalizable to Latino youth. Considering that emotional eating may lead to overeating because it often takes place in the absence of hunger, it may be appropriate to develop interventions to teach youth healthier substitutions and regulate mood by means other than eating in order to reduce risk for obesity, especially in high risk populations, such as Latinos.

Keywords

Emotional eating; adolescence; dietary choices; high-energy dense; Latino

Introduction

Despite a longstanding recognition of the occurrence of emotional eating (including stress-induced eating), many questions remain regarding its associated precursors and outcomes. Review papers have pointed to the need for additional research to identify specific dietary choices in emotional eating, (especially considering its assumed association with obesity) as well as studies of males and youth populations (Faith, Allison, & Geliebter, 1997; Ganley, 1989; Greeno & Wing, 1994). As evidenced in these reviews, emotional eating has predominantly been studied in Caucasian adults, usually females, often in the lab, and little is known about specific food preferences. Findings from review papers on adults and the few studies in youth reporting on dietary outcomes are below.

In Ganley's (1989) review of emotional eating and obesity, it was made apparent that individual food choice is an important factor in this relationship, and that consumption often involved "high-calorie or high-carbohydrate food" (p. 354). Another review of the same topic addressed the issue of "carbohydrate cravers" (Faith, Allison, & Geliebter, 1997). The mechanism thought

Corresponding author: [Selena T. Michel], e-mail: selenang@usc.edu, "not for publication", tel: 626 457-6632, fax: 626 457-6633.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

to be at work here is based on animal studies, where increases in carbohydrates led to increases of serotonin levels in rats. This would support a preference for emotional eaters to ingest carbohydrates to improve mood.

A 2004 study of eating patterns of adolescents and adults found that 1) in adults emotional eating was associated with higher intake of oleaginous fruits (e.g. peanuts) and cakes/pastries/biscuits, and 2) in adolescents and young adults (mean age 17 years old), there was a negative relationship with fruits and vegetables and a positive association with yogurt in males (de Lauzon *et al.*, 2004). In Braet and van Strien's (1997) study of eating styles in children, relationships were found between emotional eating and all measures of food intake, indicating overall increased consumption. Wardle (1992) found that those scoring high on emotional eating gave high ratings of liking fattening food as well as them being "good for you." In contrast to the abovementioned studies, baseline findings from the Stanislas Study found no associations between emotional eating and dietary intake (Luch, Herbeth, Mejean, & Siest, 2000).

Greeno & Wing's (1994) review of stress-induced eating found studies that supported a preference for high energy dense foods in response to stress, specifically women preferred sweets (Grunberg & Straub, 1992). An adolescent study of stress and dietary practices revealed that higher stress increased the chances of unhealthy dietary practices, such as increased consumption of fatty foods and decreased consumption of fruits and vegetables (Cartwright *et al.*, 2003). Michaud's (1990) study of high school students showed that a stressful life event (major exam) did in fact change eating behavior. A gender interaction showed that on the day of the exam, increased total energy intake was significant for girls, and there was an increase in percentage from fat in the diet of boys.

A close look at the studies on emotional eating in youth also reveals that the large majority of these studies have been conducted with European populations, with only a few in the United States. Hedley and colleagues (2004) reported national data that show that over 30% of children and adolescents are 'at risk for overweight' and 'overweight.' Further, Latino youth in the U.S. have been shown to be at increased risk for obesity. Data from 1999–2002 show that nearly 40% of Mexican American children and adolescents were reported to be at least at risk for overweight and more than 20% were overweight; these numbers were similar for African Americans, 35.4% and 20.5%, respectively (Hedley *et al.*, 2004). Considering these striking numbers, it seems that studies of emotional eating in American minority adolescents are warranted, as this may help us to better understand this increased risk.

The primary aim of this study was to identify dietary choices associated with emotional eating in a predominantly Latino adolescent population. Based on outcomes of the literature presented, the following hypotheses were tested. It was hypothesized that emotional eating would be associated with higher consumption of sweet and salty high energy-dense items and soda, and not with fruit and vegetable intake. Further, we expected that emotional eaters (vs. those not categorized as emotional eaters) would be more likely to consume the high energy-dense choices than fruits and vegetables. We also sought to explore gender differences in the associations between emotional eating and dietary choices.

Methods

Sample

Cross-sectional data from 617 middle school students in Los Angeles County, collected as part of a larger survey on physical activity and diet in Latino children, were employed for the present study. Seventh and eighth grade students were from seven public and private middle schools.

Participants completed a psychosocial questionnaire that assessed emotional eating and dietary choices, among other factors.

School selection

Sampling methods aimed to obtain a sample of predominantly Latino adolescents. Data from the California Board of Education and the Roman Catholic Archdiocese were used to identify schools with high numbers of Latino students and a range of socioeconomic statuses (SES). The principal investigator approached nine schools fitting study selection criteria and eight agreed to participate. At the time of data collection, one school was no longer able to participate due to curriculum priorities of the district, therefore seven schools took part in the study.

Student recruitment

The principal investigator contacted physical education teachers at each school to recruit individual classrooms for participation. Seventeen of the eighteen teachers approached agreed to participate, and all students from each classroom were invited to complete the surveys. Recruitment and data collection took place across five days. The study was explained on the first day by the principal investigator, and parental consent forms were distributed. Separate parent refusal forms were given out on the third day of recruitment to those students who had not yet returned parental consent forms. All forms were collected through four days (students were asked to choose the appropriate language forms, English or Spanish, for their parents); on the fourth and fifth days, data collection took place. All students who gave active personal assent, and active parental consent or whose parents did not actively refuse participation completed surveys. Those students with implied consent (i.e., those who did not provide written parental consent or written parental refusal) filled out an abbreviated version of the survey. All study procedures were approved by the University Institutional Review Board and the appropriate boards of participating schools and school districts. Active or implied consent was provided by 85% of students.

Procedure

Trained data collectors followed data collection manual procedures and scripts in distribution and collection of surveys. Paper-and-pencil surveys were completed across two class periods. Confidentiality was maintained by identifying surveys only by a unique identification number assigned to each student. The survey took approximately 45 minutes to complete.

Measures

Dietary choices—Items from a validated food frequency questionnaire (FFQ) were used to assess dietary choices. The instrument asks participants to indicate how often they had eaten the item in the past year. Due to constraints of survey length, we used an abbreviated FFQ as it has been shown that short versions of FFQs for dietary assessment in middle school aged youth are valid (Field *et al.*, 1999), and also grouped similar individual items (for example, we combined cookies, cakes, pastries and donuts into one item). Items were taken from surveys used in the Nurse's Health Study (Willett *et al.*, 1985), which is the instrument on which the Youth/Adolescent Food Frequency Questionnaire (YAQ) was based (Rockett *et al.*, 1997). Our dietary choices measure included a range of food items from fruits and vegetables to cakes, chips, and ice cream. Items were categorized as: (1) fruits and vegetables (7 items), (2) salty high energy-dense (2 items), (3) sweet high energy-dense (4 items), and (4) soda (full sugar; 1 item) (Phillips *et al.*, 2004). Response options varied by item and were of an ordinal format. Therefore in the resulting grouped scores for these items, it was not possible to provide specific numbers of servings nor to compare specific numbers of servings between the categories of foods. For example, the response options for chocolate included: Never/less than once per month, 1–3 per month, one a week, 2–6 a week, 1 or more per day; while the response options

for ice cream were: Never/less than 1 per month, 1–3 times per month, once per week, 2–4 times per week, 5 or more times per week. Hence, frequency responses were summed in order to obtain scores to indicate the relative frequency of intake for each of these categories, where a higher score indicated higher frequency of consumption.

Emotional eating—The Emotional Eating subscale of the Dutch Eating Behavior Questionnaire (DEBQ) was employed to measure emotional eating (van Strien, Frijters, Bergers, & Defares, 1986). Responses to 13-items range from “never” to “very often” across a 5-point Likert scale. Two measures of emotional eating were used in analyses: the mean of items was calculated to obtain a continuous score (Cronbach $\alpha = 0.95$), and a categorical variable based on predetermined age-and-gender-specific cut-points (van Strien, 2005).

Body image—Body image was assessed via Cash’s (2002) Body Image States Scale (BISS). The mean of items was obtained to calculate a body image score (Cronbach $\alpha = .69$). Participants rated their feelings of satisfaction with looks, attractiveness, and how they compared to others on 6 items along a 7-point Likert scale.

Weight concerns—Weight concerns were measured using a 7-item scale (Tomeo, Field, Berkey, Colditz, & Frazier, 1999) (Cronbach $\alpha = .77$). Responses ranged from “never” to “very often” across a 4-point Likert scale. Items assessed how much participants worried about or felt negatively or positively about their looks or body.

Age—Using birth date (obtained from school administration) and test date, age in months at the time of assessment was computed. All analyses included age as a covariate.

Ethnicity—Ethnic background was obtained using Phinney’s (1992) ethnicity scale. In a “mark all that apply” format, participants were asked to check off, from a wide range of ethnic backgrounds, which ethnicity (or ethnicities) corresponded to their ethnic background. Participants were categorized as Multi-ethnic if they marked more than one option. Because of small numbers in several groups, an “Other” category was created in which these ethnic backgrounds were combined.

Data analysis

Means and frequencies were obtained to report descriptive statistics of the sample. T-tests were used to test differences in dietary intake by gender and in emotional eaters vs. non-emotional eaters. To test relationships between emotional eating and dietary intake, multi-level model (MLM) linear regression was performed. When data is nested, for example students nested within schools, MLM is the appropriate method of analyses in order to control for random effect of school (otherwise, the fundamental assumption of independence in regression analysis is violated). Separate models for fruit and vegetable, salty high energy-dense, sweet high energy-dense, and soda intake were tested. Emotional eating was the independent variable in the four models, with dietary intake as the dependent variable. Age, gender, ethnicity, body image, weight concerns, and intervention were included in all models as covariates. Although there was no reason to believe that the physical activity intervention would impact emotional eating or dietary choices, it was controlled for because analyses were conducted on follow-up data. Interaction analyses (interactions of gender X emotional eating) were performed using these same regression methods. Standardized parameter estimates were obtained by standardizing all continuous variables to a mean of 0 and a standard deviation of 1.

Results

Complete data on model variables were available for 512 (83%) of the 617 students who completed the survey. There were more boys in the sample of those with incomplete data (35.9%) compared to those who provided complete data (23.5%). Table 1 provides information on characteristics of the sample. Participants were predominantly Latina girls, with an average age of 13.4 years old, and approximately 22% were categorized as emotional eaters. The food category with the highest frequency of intake was sweet high energy-dense foods, while consumption of fruits and vegetables was the lowest.

Table 2 shows that emotional eaters had significantly more frequent intake of both salty ($t = -2.06$, $p = 0.0395$) and sweet ($t = -3.48$, $p = 0.0005$) high energy-dense foods than those not categorized as emotional eaters. Differences in frequency of fruit and vegetable intake approached significance ($p = 0.0521$), and soda intake was similar in both groups. There were no significant gender differences in dietary intake.

Results of multilevel regression analyses are found in Table 3. After controlling for model covariates and random effect of school, emotional eating was significantly related to frequency of salty high energy-dense (Std. $\beta = 0.1611$, $p = 0.0005$), sweet high energy-dense (Std. $\beta = 0.2056$, $p < 0.0001$), and soda (Std. $\beta = 0.1061$, 0.0212) intake. The only model covariate associated with dietary intake was (positive) body image with more frequent intake of sweet high energy-dense foods ($p = 0.0372$); the following covariates approached significance: Asian ethnicity in the salty high energy-dense model (less intake; $p = 0.0501$), "other" ethnicity ($p = 0.0513$) and body image (0.0699) in the soda model. Variables significantly associated with lower frequency of fruit and vegetable intake were Latino (0.0339) and multiethnic ($p = 0.0230$), while weight concern ($p = 0.0006$) and body image ($p = 0.0102$) were associated with more frequent intake.

Although gender did not have significant main effects on frequency of food intake, because the literature has shown gender differences in dietary behavior (e.g., Jane Wardle et al., 2004), gender interaction analyses were performed for each model. Significant gender interactions were found for frequency of fruit and vegetable (Std. $\beta = 0.3601$, $p = 0.0005$) as well as salty high energy-dense (Std. $\beta = 0.2133$, $p = 0.0402$) intake. Gender stratified analyses of these two models reveal that emotional eating was associated with more frequent fruit and vegetable intake in boys (Std. $\beta = 0.3242$, $p = 0.0009$), but not in girls; and was associated with frequency of salty high energy-dense intake in both boys (Std. $\beta = 0.2779$, $p = 0.0048$) and girls (Std. $\beta = 0.1140$, $p = 0.0298$).

Discussion

This study provides a significant contribution to the emotional eating literature, as it shows that findings from previous literature may generalize to a Latino youth sample, and also provides information about specific dietary correlates in this unique population. Emotional eaters were more likely to eat high energy-dense foods more often than non-emotional eaters. Of note is the fact that the mean frequency of energy dense intake is approximately three to four times that of fruits and vegetables. It seems clear that these minority students are not meeting the daily recommendations for fruit and vegetable intake and have far too many opportunities to indulge in energy dense snacks. This may be due to availability of these items at school or in the home, suggesting environmental changes as potential intervention points.

In overall multilevel regression analyses, emotional eating was shown to have a significant relationship with frequency of high energy dense dietary choices as well as soda intake. However, gender stratified analyses revealed differences in dietary outcomes of emotional eating in boys and girls. Results showed a significant association of emotional eating with

increased frequency of fruit and vegetable intake in boys. This positive association was not expected, and is an important finding as it shows that emotional eating may not always lead to high caloric intake in adolescent boys. Perhaps boys increase overall intake, including fruits and vegetables, while girls increase intake of specific foods. This is similar to the findings of Michaud (1990), however in that study, French girls increased overall intake while boys increased fat.

We were able to find a direct association between emotional eating and frequency of dietary choices. However, we do not know if this finding may have been due to instances of negative affect. For example, in a laboratory study of adults, Oliver et al. (2000) found that a stressor was necessary to prompt emotional eaters to consume sweet high-fat foods and a more energy-dense meal. This is a potential mechanism through which the dietary behavior of emotional eaters is impacted and should be further explored in future studies.

This data provided the opportunity to explore dietary preferences and emotional eating in a minority sample of adolescents. Results showed that Latino and Multi-ethnic students were more likely to eat fruits and vegetables less often. Minority populations often have a lower socioeconomic status, which is also associated with less access to healthy foods (CDC, 1995–2003). Insufficient fruit and vegetable consumption is associated with risk for overweight, therefore this finding has important implications for obesity risk in minority populations.

One important limitation of this study is the measure of dietary choices. Although taken from a larger validated measure, the number and breadth of items was abbreviated, and many food items that may be associated with emotional eating were therefore likely to be missed. However, items were chosen to reflect foods that are readily available to minority middle school populations, and thus relevant to the current sample. Response options had been modified to be consistent across items and to increase understanding by the intended sample, however subsequent additions to the scale preserved their original format, making it difficult to interpret exact frequency of intake within and across groups. Despite the limited range of dietary choices included, these items provide valuable information on dietary choices of urban minority adolescents.

An additional limitation is that data are cross-sectional, hence disallowing assessment of directionality. It is implicit that eating follows emotional stimulation in emotional eating. Therefore the assumed relationships in these cross-sectional analyses are that emotional eating leads to consumption of these particular foods, as this makes theoretical sense. Considering the high association between emotional eating and external eating, it would have been optimal to control for external eating in these analyses in order to identify relationships purely associated with emotional eating. However, due to space constraints, we were unable to include this scale in our survey. Future studies should include an assessment of other eating styles to control for their possible confounding effects.

Another potential limitation of this study is that all data are self-reported. Therefore, it is possible that dietary intake and/or emotional eating may have been over or underreported. However, we employed previously validated questionnaires in our survey, which should yield legitimate results. The generalizability of results to adolescent males may also be problematic since there was a smaller percentage of boys in this sample than in the underlying population.

In this study, we found that emotional eating may lead to increased frequency in the consumption of high caloric food in a minority adolescent population, thus replicating findings from adolescent and adult literature. Importantly, this may be the first data to explore dietary behavior associated with an eating style that may be a precursor to overweight in an American population at significantly increased risk for obesity. We did not expect to find the gender specific significant positive relationship between emotional eating and frequency of

consumption of fruits and vegetables, as this is contrary to previous literature. It does however provide support for being able to teach healthy substitutions in emotional eating. Although emotional eating was associated with more frequent intake of fruits and vegetables in boys, there were also associations with the other high energy dense items and soda, which puts them at risk for overconsumption of unhealthy foods. As emotional eating has often been examined as a possible risk factor for obesity (e.g., (Faith, Allison, & Geliebter, 1997; Ganley, 1989; Greeno & Wing, 1994), the mechanisms by which they are related are important points of intervention. Therefore, if emotional eating leads to obesity through overconsumption of energy-dense foods, intervention programs that focus on substituting healthier snacks and teaching healthier coping strategies for negative affect could help to reduce risk for obesity.

Acknowledgements

We would like to thank the funding agencies that have made this research possible: National Institute for Health (NIH) & National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK, Grant # KO1 DK59293-01)

References

- Braet C, Van Strien T. Assessment of emotional, externally induced and restrained eating behaviour in nine to twelve-year-old obese and non-obese children. *Behaviour Research & Therapy* 1997;35:863–873. [PubMed: 9299807]
- Cartwright M, Wardle J, Steggle N, Simon AE, Croker H, Jarvis MJ. Stress and dietary practices in adolescents. *Health Psychology* 2003;22:362–369. [PubMed: 12940392]
- Cash TF, Fleming EC, Alindogan J, Steadman L, Whitehead A. Beyond body image as a trait: The development and validation of the body image states scale. *Eating Disorders: The Journal of Treatment & Prevention* 2002;10:103–113.
- CDC. Behavioral risk factor surveillance system online prevention data. 1995–2003. Retrieved May 3, 2006, from <http://www.cdc.gov/brfss>
- de Lauzon B, Romon M, Deschamps V, Lafay L, Borys JM, Karlsson J, et al. The three-factor eating questionnaire-r18 is able to distinguish among different eating patterns in a general population. *Journal of Nutrition* 2004;134:2372–2380. [PubMed: 15333731]
- Faith, MS.; Allison, DB.; Geliebter, A. Emotional eating and obesity: Theoretical considerations and practical recommendations. In: Dalton, S., editor. *Overweight and weight management: The health professional's guide to understanding and practice*. Gaithersburg, Md: Aspen Publishers; 1997. p. 439-465.
- Field AE, Peterson KE, Gortmaker SL, Cheung L, Rockett H, Fox MK, et al. Reproducibility and validity of a food frequency questionnaire among fourth to seventh grade inner-city school children: Implications of age and day-to-day variation in dietary intake. *Public Health Nutrition* 1999;2:293–300. [PubMed: 10512564]
- Ganley RM. Emotion and eating in obesity: A review of the literature. *International Journal of Eating Disorders* 1989;8:343–361.
- Greeno CG, Wing RR. Stress-induced eating. *Psychological Bulletin* 1994;115:444–464. [PubMed: 8016287]
- Grunberg NE, Straub RO. The role of gender and taste class in the effects of stress on eating. *Health Psychology* 1992;11:97–100. [PubMed: 1582385]
- Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among us children, adolescents, and adults, 1999–2002.[see comment]. *JAMA* 2004;291:2847–2850. [PubMed: 15199035]
- Lluch A, Herbeth B, Mejean L, Siest G. Dietary intakes, eating style and overweight in the Stanislas Family Study. *International Journal of Obesity & Related Metabolic Disorders: Journal of the International Association for the Study of Obesity* 2000;24:1493–1499. [PubMed: 11126347]
- Michaud CI, Kahn JP, Musse N, Bulet C, Nicolas JP, Mejean I. Relationships between a critical life event and eating behaviour in high school students. *Stress Medicine* 1990;6:57–64.
- Oliver G, Wardle J, Gibson EL. Stress and food choice: a laboratory study. *Psychosomatic Medicine* 2000;62:853–865. [PubMed: 11139006]

- Phillips SM, Bandini LG, Naumova EN, Cyr H, Colclough S, Dietz WH, et al. Energy-dense snack food intake in adolescence: Longitudinal relationship to weight and fatness. *Obesity Research* 2004;12:461–472. [PubMed: 15044663]
- Phinney JS. The multigroup ethnic identity measure: A new scale for use with diverse groups. *Journal of Adolescent Research* 1992;7:156–176.
- Rockett HR, Breitenbach M, Frazier AL, Witschi J, Wolf AM, Field AE, et al. Validation of a youth/adolescent food frequency questionnaire. *Preventive Medicine* 1997;26:808–816. [PubMed: 9388792]
- Tomeo CA, Field AE, Berkey CS, Colditz GA, Frazier AL. Weight concerns, weight control behaviors, and smoking initiation. *Pediatrics* 1999;104:918–924. [PubMed: 10506235]
- van Strien, T. Nederlandse vragenlijst voor eetgedrag. Handleiding en verantwoording. (dutch eating behaviour questionnaire, manual). Amsterdam: Boomtestpublishers; 2005.
- van Strien T, Frijters JER, Bergers GPA, Defares PB. The Dutch Eating Behavior Questionnaire (DEBQ) for assessment of restrained, emotional, and external eating behavior. *International Journal of Eating Disorders* 1986;5:295–315.
- Wardle J, Haase AM, Steptoe A, Nillapun M, Jonwutiwes K, Bellisle F. Gender differences in food choice: The contribution of health beliefs and dieting. *Annals of Behavioral Medicine* 2004;27:107–116. [PubMed: 15053018]
- Wardle J, Marsland L, Sheikh Y, Quinn M, Fedoroff I, Ogden J. Eating style and eating behaviour in adolescents. *Appetite* 1992;18:167–183. [PubMed: 1510461]
- Willett WC, Sampson L, Stampfer MJ, Rosner B, Bain C, Witschi J, et al. Reproducibility and validity of a semiquantitative food frequency questionnaire. *American Journal of Epidemiology* 1985;122:51–65. [PubMed: 4014201]

Table 1

Characteristics of the sample (N = 514).

Variable	M	(SD)	Range
Female *	393	(76.46)	
Age in Months	161.39	(7.68)	147 – 189
Ethnicity *			
Asian/PI	98	(17.86)	
Latino	313	(61.49)	
Multi-ethnic	56	(11.00)	
Other	31	(6.09)	
White	18	(3.54)	
Emotional Eating			
Emotional eating score	1.88	(0.90)	1 – 5
Emotional eaters *	113	(21.98)	
Fruit & Vegetable Intake	2.83	(1.01)	1 – 42
Salty High Energy-dense Intake	5.61	(2.13)	1 – 10
Sweet High Energy-dense Intake	10.23	(3.75)	1 – 20
Soda (Full Sugar)	3.28	(1.72)	1 – 7
Body Image	4.02	(1.12)	1 – 7
Weight Concerns	2.31	(0.69)	1 – 4

Note. Intake refers to frequency of consumption in the past year

* N (%)

Table 2

Differences in dietary choices between emotional eaters and non-emotional eaters.

Dietary Choices Category	Emotional Eaters	Non-emotional Eaters	t	p-value
	Mean (SD)	Mean (SD)		
Fruit & Vegetable Intake	2.99 (1.08)	2.78 (0.99)	-1.95	0.0521
Salty High Energy-dense Intake	5.97 (2.26)	5.51 (2.09)	-2.06	0.0395
Sweet High Energy-dense Intake	11.30 (3.80)	9.92 (3.68)	-3.48	0.0005
Soda (Full Sugar)	3.51 (1.81)	3.22 (1.70)	-1.57	0.1161

Note. Intake refers to frequency of consumption in the past year

Table 3

Associations between emotional eating and food categories.

	Fruit & Vegetable Intake		Salty High Energy-dense Intake		Sweet High Energy-dense Intake		Soda Intake (Full Sugar)	
	Std. β	p-value	Std. β	p-value	Std. β	p-value	Std. β	p-value
Emotional Eating	0.0421	0.3552	0.1611	0.0005	0.2056	< 0.0001	0.1061	0.0212
Ethnicity								
Asian	-0.4252	0.0960	-0.5048	0.0501	0.0832	0.7442	-0.3470	0.1780
Latino	-0.5115	0.0339	-0.2559	0.2924	0.0683	0.7784	-0.2746	0.2589
Multi-ethnic	-0.6141	0.0230	-0.3769	0.1654	-0.0882	0.7429	-0.1676	0.5376
Other	-0.2063	0.4821	-0.2546	0.3896	-0.0505	0.8633	-0.5783	0.0513
Gender Stratified Analyses	0.3601	0.0005	0.2133	0.0402	0.1413	0.1703	0.1221	0.2414
Males	0.3242	0.0009	0.2779	0.0048	--	--	--	--
Females	-0.0384	0.4382	0.1140	0.0298	--	--	--	--

Note. All parameter estimates (standardized betas) are adjusted for age, gender, ethnicity, weight concern, body image, intervention group, and random effect of school. Intake refers to frequency of consumption in the past year.