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Psychological Determinants of Emotional Eating in Adolescence

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Abstract

Emotional eating is conceptualized as eating in response to negative affect. Data from a larger study of physical activity was employed to examine the associations among specific emotions/moods and emotional eating in an adolescent sample. Six-hundred and sixty-six students of diverse backgrounds from 7 middle schools in Los Angeles County participated. Cross-sectional analysis revealed no gender differences in emotional eating, and showed that perceived stress and worries were associated with emotional eating in the total sample. Gender stratified analyses revealed significant associations of perceived stress, worries and tension/anxiety to emotional eating for girls, while only confused mood was related to emotional eating in boys. These findings bear potential implications for the treatment and prevention of pediatric obesity and eating disorders because they suggest that interventions would benefit from incorporation of stress-reduction techniques and promotion of positive mood.

Despite indications that emotional eating is a problematic and common behavior, empirical documentation of this phenomenon is not as extensive. Recognition of this common behavior as troublesome is evidenced by recurring scenes in television shows and movies when someone (particularly a female) is sad or stressed, is shown devouring far more food than is physiologically necessary. The extent of the negative mood, often resulting from a break-up or stressful events, is exemplified by the amount of food eaten. It may be a whole box of candy, an entire bag of chips, a carton of ice cream, or all of the above. Not just in the media, but in everyday life, we often see people eating in an attempt to deal with stressful situations, bad news and/or moods. Although the general public seems to be aware of the phenomenon of emotional eating, the scientific literature exploring this issue is not as wide, especially in adolescents.

Emotional eating is most often defined as (over)eating in response to negative affect (Thayer, 2001), without specificity to particular moods or emotions (Faith, Allison, & Geliebter, 1997). Because the study of emotional eating came about in an attempt to explain obesity, many studies focus on obese populations (e.g., Faith et al., 1997; Ganley, 1989). For example, Sims et al. (2008) found that perceived stress explained a higher proportion of the variance in emotional eating in a sub-sample of overweight and obese participants than in the overall sample. However, there are few studies that address specific emotions in relation to emotional eating. It has been argued that the lack of specificity of emotion inhibits detailed study of the psychological precursors to overeating (Arnow, Kenardy, & Agras, 1995). Further, studies that assess specific emotions tend to measure eating behavior in response to specific emotions/moods, and do not use the construct of emotional eating.

Thayer (2001) cites feelings of increased tension and low-energy, “tense tiredness,” as the primary culprit in emotional eating, as it underlies many of the negative moods (for example, depression and anxiety) that have been found to be associated with overeating. Hence, food is used in an attempt to self-medicate and self-regulate mood. Weingarten and Elston (1991) found that tension in undergraduates often preceded urges to eat. Researchers have also identified tiredness, boredom, loneliness, anxiety, tension, and stress as triggers to overeating in women and found that these feelings improved after eating (Popless-Vawter, Brandau, & Straub, 1998). Although women also ate when angry and depressed, these feelings did not improve after the eating episode; in obese participants, these feelings increased (the authors concluded this may have resulted from feelings of guilt and anger at self for overeating). Steptoe, Lipsey, and Wardle (1998) found that nurses and schoolteachers increased energy intake during stressful weeks vs. less stressful weeks, indicated by food diary reports.

Several theories have been proposed to explain emotional eating, its determinants and outcomes. The major theory associated with emotional eating is the Psychosomatic Theory of Obesity which contends that in times of distress, food is used as an emotional defense which, in turn, leads to obesity (Kaplan & Kaplan, 1957). It also posits that obesity results from overeating in order to deal with negative affective states, including anxiety, depression, anger, and boredom (no specific negative emotion is cited as a primary culprit). It further states that obese persons engage in excessive eating in response to negative emotions, while normal weight persons have more adaptive coping mechanisms and do not eat in response to emotional distress (Faith et al., 1997). Consequently, emotional eating research, particularly in adults, has often focused on obese populations.

In an early review of this literature, the anxiety reduction model was proposed (Kaplan & Kaplan, 1957) which posited that obesity was developed and maintained by overeating in an attempt to reduce anxiety. Ganley’s (1989) subsequent review of emotional eating in obese adults (clinical, non-clinical, and lab studies) revealed a more complex model that accounted for individual differences. He found that obese persons often reported eating in response to anger, loneliness, boredom, and depression. He further noted the importance of a comprehensive assessment of stress and the need for attention to the specific mood states that led to overeating. Evident in this review was the fact that much of the literature focused on females. Faith, Allison, and Geliebter’s (1997) examination of the issues of obesity differences and the assessment and treatment of emotional eating offered suggestions for further exploration of this construct. Among these suggestions were inclusion of children as participants, study of chronic stressors, and exploration of specific emotions.

Theories applied to the stress-induced eating literature is also applicable to emotional eating. Within this literature, there are two models of thought: General Effects (almost entirely animal studies) and Individual Differences (only human studies). The General Effects Model holds that stress will increase eating in all organisms, while the Individual Differences Model states that eating in response to stress will depend upon certain factors of an individual. Three major hypotheses have been tested within the Individual Differences Model: obesity vs. normal weight, restrained vs. unrestrained eaters, and females vs. males, where the former group in each of these comparisons is thought to be more prone to stress-induced eating. Greeno’s review resulted in support for either model of stress-induced eating, therefore, it does appear that stress is often a precursor to overeating. Since many studies of individual differences were significant, the authors suggest studies continue in the individual differences model. Several questions were put forth by the authors, including what types of stress lead to eating, and whether or not this relationship applies to males and non-adult populations in non-lab settings.

Obesity prevention is a number one public health research priority. It is clear that emotional eating may play a significant role in the etiology of obesity. Further, Latino adolescents are at highest risk for being overweight compared to their Caucasian counterparts (Ogden, Carroll, & Flegal, 2008). Thus, it is necessary to study potential determinants of behavior leading to weight gain in order to identify methods of prevention—emotional eating poses a good point of intervention because it appears to be a modifiable risk factor. Therefore, the goal of this study was to further elucidate the emotional eating literature to help identify avenues for obesity prevention. We aimed to identify specific psychological determinants of emotional eating in a school-based sample of minority adolescents. We expected that all negative emotional and mood states would be associated with emotional eating. It was also predicted that girls may be more likely to emotionally eat than boys, as has been the found in the adult literature.

METHODS

Sample

The present study used cross-sectional data from a sample of 666 students from seven Los Angeles County public and private (Catholic) middle schools. Students were in seventh and eighth grades, participating in a larger intervention study of physical activity in Latina girls. Surveys assessed demographic factors and employed psychosocial and behavioral measures, including mood, perceived stress, and emotional eating.

School Selection

School selection was designed to select schools with larger Latino populations from Los Angeles County. The ethnic distributions of schools were identified through data from the California Board of Education and the Roman Catholic Archdiocese. Socioeconomic status (SES) for schools was also identified in order to obtain schools across the range of SES. The principal investigator approached nine schools with high proportions of Latino students and a variety of SES, eight of which agreed to participate. Due to curriculum requirements of the school district, one school was unable to participate, thus we collected data from seven schools.

Student Recruitment

Physical education teachers at each school were contacted in order to identify classrooms to take part in the study. Of the 18 teachers who were asked to participate, only 1 refused due to scheduling issues. All students in classrooms of teachers who agreed to participate were invited to join the study. Student recruitment took place across 4 days (including the day of data collection). On the first day, the principal investigator explained the research project and distributed parental consent forms. On the second and third days, consent forms were collected and, on the third day, parent refusal forms were distributed (separate consent and refusal forms were used in order to allow for “implied consent” if participants did not return active consent or active refusal forms). This combined active/implied consent procedure was approved by the Institutional Review Board, the school districts, and the Archdiocese. Parent consent, refusal, student assent forms, and surveys were collected on the fourth day. All parent forms were available in Spanish and students were asked to choose the appropriate language forms.

If a parent provided active written consent for a child to be a part of the study (i.e., signed and returned the consent form), this student was eligible to participate. If a parent provided active written refusal (i.e., signed and returned the refusal form), this made a child ineligible to fill out the survey. Those students whose parents did not actively refuse permission on a parent refusal form were eligible to complete only a portion of the survey. This shortened

version of the survey contained only those questions that, according to the regulations of the IRB and the California Board of Education, could be administered without active consent.

Students who were eligible to participate were then asked for written assent to be a part of the study. Those who had active parental consent or did not present active parental refusal and provided active written assent took part in the study. Eighty-five percent of students participated in the study (this included those that had active or implied consent).

Procedure

The surveys were delivered and picked up by trained data collectors, not acquainted with the students, according to a data collection manual and script provided to each data collector. Students filled out an English language paper-and-pencil survey during two class periods. Because classes are taught in English, participants were assumed to have the ability to read English. In addition, our previous research with Latino adolescents in Los Angeles has indicated that when presented with surveys in English and Spanish, fewer than 1% of the students selected the Spanish version. Schools did provide a translator during data collection when needed and/or possible, otherwise data collectors were also available for translation. These surveys were identified by a number specific to each child in order to maintain confidentiality of data.

Measures

Emotional eating—Emotional eating was measured with the Emotional Eating subscale of the Dutch Eating Behavior Questionnaire (DEBQ; van Strien, Frijters, Bergers, & Defares, 1986). This 13-item scale asks about eating in response to a variety of emotions. Participants gave responses along a 5-point Likert scale from *never* to *very often*. Two different coding schemes were used in our measurement of emotional eating: (1) Continuous scale scores were obtained by taking the mean score of the thirteen items (Cronbach $\alpha = 0.95$), and (2) To assess gender differences in proportions of “emotional eaters,” students’ continuous emotional eating scores were categorized based on cut-points delineated in the DEBQ manual (van Strien, 2005).

Perceived stress—Stress was assessed via a modified version of the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983). The PSS is a 14-item scale that inquires about perception of stressful experiences in the last month. Response options range from *never* to *very often* along a 5-point Likert scale. Based on feedback from short interviews with adolescents reviewing this scale, language was modified for comprehension and three items were added to this measure. These items included: “felt that I just have too much work to do,” “had to keep secrets from my friends or parents,” and “been worried about my social life.” A sum of the item scores is calculated to obtain a scale score (Cronbach $\alpha = 0.73$).

Worries—Worries were measured via a worries scale developed by Spruijt-Metz and Spruijt (1997). Worries are similar to measures of stress and anxiety. This measure inquires about how much the person had worried about each item in the past month. Items related to several issues pertinent to adolescent life including self-image, relationships and school. Worries scores were obtained by computing the mean of the score on each item (Cronbach $\alpha = 0.88$).

Mood—The Adolescent version of the Profile of Mood States (POMS-A) was used to assess mood (Terry, Lane, Lane, & Keohane, 1999). This scale is made up of six subscales (4 items each): Anger (Cronbach $\alpha = 0.80$), Confused Mood (Cronbach $\alpha = 0.81$), Depressed Mood (Cronbach $\alpha = 0.88$), Fatigue (Cronbach $\alpha = 0.85$), Tension (Anxiety) (Cronbach $\alpha =$

0.79), and Vigor (Cronbach $\alpha = 0.72$). These scales asked respondents to indicate how they felt at that moment, with 5-point Likert scale response options ranging from *not at all* to *extremely*.

Body image—The Body Image States Scale (BISS) is a 6-item scale (Cronbach $\alpha = 0.69$) that assesses body image (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002). This scale has a 7-point Likert response format where participants indicate their feelings of satisfaction with looks, attractiveness, and comparison to others. Body image was included in the model as a covariate.

Weight concerns—To measure weight concerns (Tomeo, Field, Berkey, Colditz, & Frazier, 1999), respondents indicated on a 4-point range from *never* to *very often* how much they worried about or felt negatively or positively about their looks or body (Cronbach $\alpha = 0.77$). Weight concerns were included as a covariate in the model.

Age—Age in months was used in all analysis. This was calculated using birth date obtained from school administrative offices and test date.

Ethnicity—Phinney's (1992) ethnicity scale was used to obtain information on ethnicity. A wide range of ethnic backgrounds are presented and respondents are asked to mark which ethnicity corresponds to their background. If participants marked more than one, they were categorized as Multi-ethnic. Several groups had small numbers and were therefore combined into an "Other" category.

Data Analysis

Descriptive statistics were computed for all demographic variables. T-tests and Chi-square tests were used to assess gender differences in emotional eating. Because the data were nested within schools, multi-level model multiple regression was performed to test the associations between emotional/mood states and emotional eating, while controlling for age, gender, ethnicity, body image, weight concerns, and intervention group (cross-sectional follow-up data were used in analyses, therefore we needed to control for any possible intervention effects, although we did not anticipate any effects of intervention on emotional eating since the intervention focused only on physical activity). Age, gender and ethnicity were included as covariates to account for any influence these factors may have on associations. Due to the possibility that body image and weight concerns were likely to impact our independent and dependent variables, we included these factors in the models in order to account for any potential confounding effect. Interaction analyses (interactions of gender X significant emotions) were performed using these same regression methods. Each variable was standardized to a mean of 0 and a standard deviation of 1 in order to produce standardized parameter estimates.

RESULTS

Seventy-six percent of the 666 participants that completed the surveys provided complete data for the variables of interest in this study. Those providing complete data did not differ significantly from those with incomplete data on the covariates, independent, and dependent variables, with the exception of angry mood and confused mood. Those with complete data ($M_{\text{angry}} = 0.7054$; $M_{\text{confused}} = 0.6228$) scored lower on anger ($t = 2.18$, $p = .03$) and confused mood ($t = 2.07$, $p = .04$) than those with incomplete data ($M_{\text{angry}} = 0.8869$; $M_{\text{confused}} = 0.7772$). Demographic characteristics of the sample by gender are shown in Table 1. Overall, students were 74% girls, with a mean age of 12.5 ($SD = 0.65$), and ethnic distribution was as follows: 62.0% Latino, 17.7% Asian, 10.5% Multi-ethnic, 6.2% Other,

and 3.6% White. Table 1 also shows gender differences in demographic variables and other covariates.

Analyses reveal that emotional eating did not differ significantly by gender (Table 1). Chi-square tests indicate that there were no significant differences in the proportions of emotional eaters in boys (16.5%) vs. girls (20.4%; $\chi^2 = 0.95$, $p = .33$). Additionally, t-tests illustrated no significant differences in emotional eating scores between males ($M = 1.80$) and females ($M = 1.87$; $t = -0.78$, $p = .43$).

Table 2 reports the results of multilevel multivariate regression models of emotional eating as a correlate of emotion and mood. Controlling for the aforementioned covariates and random effect of school, overall analyses revealed that emotional eating was found to be significantly associated with perceived stress (Std. $\beta = 0.1835$, $p < .0001$) and worries (Std. $\beta = 0.1189$, $p = .02$). No other psychological predictors were related to emotional eating, although tension/anxiety ($p = .05$) and confused mood ($p = .07$) approached significance.

Because we expected to find gender differences in emotional eating, interaction analyses were performed for perceived stress and worries to explore gender differences in these associations. Gender interaction terms for these factors were added to separate models, and results showed no interaction effect for perceived stress ($\beta = 0.0299$, $p = .77$) or worries ($\beta = 0.0071$, $p = .94$). Although interactions were not significant, previous literature supports gender differences in emotions and eating behavior, therefore, stratified multilevel model regression analyses were performed (Table 2), controlling for covariates. Gender stratified analyses revealed that confused mood ($\beta = 0.3513$, $p = .03$) was associated with emotional eating in boys, while perceived stress ($\beta = 0.1905$, $p = .0002$), worries ($\beta = 0.1384$, $p = .01$) and tension/anxiety (Std. $\beta = 0.1843$, $p = .01$) were significantly related to emotional eating in girls.

DISCUSSION

An exploration of the specific emotional/mood states associated with emotional eating revealed that perceived stress and worries were related to emotional eating in an adolescent sample. Interestingly, contrary to our expectations, there were no gender differences in the proportion of emotional eaters or level of emotional eating between boys and girls in this sample. Where we did find gender differences was in the specific moods associated with emotional eating. Of the psychological factors hypothesized to be associated with emotional eating, perceived stress, worries and tension/anxiety were correlates of emotional eating in girls, while only confused mood affected emotional eating in boys.

The eating literature (eating disorder, dieting, emotional eating) has traditionally focused on females (Ganley, 1989), therefore the lack of gender differences in emotional eating in this adolescent sample is quite significant. It points to the potential need to address these issues in males as well as females. Measurement issues may be the reason that findings have more often pointed to this being a female issue. It may be that detecting whether or not boys are affected may depend on what is measured and how it is asked. This makes sense for the emotional eating literature because many adult studies often tested eating in response to emotions versus differences in the construct of emotional eating itself. Alternatively, these eating issues may be increasing in today's males. This seems quite plausible in an age where looks seem to be an increasing concern for boys (Cohane & Pope, Jr., 2001), and is further supported by the fact that in these analyses the covariate of weight concerns was related to emotional eating in boys. Although we have seen this association for girls (Johnson & Wardle, 2005), additional studies should include or also focus on males in their samples in

order to increase understanding of these issues for boys as it seems to be important for them as well.

The differing emotions/moods related to emotional eating in boys vs. girls is also of note. Emotional eating in boys seems to follow a more diffuse emotion of confused mood, while those associated with emotional eating in girls come from a cluster of similar psychological states of stress, worries and tension/anxiety. Therefore, it may be that interventions should be tailored to gender. This may indicate that stress-reduction efforts could serve as useful intervention methods to reduce overeating specifically in girls, while strategies that increase understanding of situations may be more helpful for boys.

Surprisingly, we did not find associations with many of the negative moods included in the model. Based on the literature cited above (e.g., Popless-Vawter, 1998), we expected that emotional eating would be associated with depressed mood and fatigue. A potential explanation for this may be because these previous findings were from adult studies. Perhaps the specific negative affect that leads to emotional eating is different during adolescence. It could be that stress and confusion are experienced more by adolescents, while depressed mood and fatigue are experienced more frequently in adults. The fact that there was no significant association with the one positive emotion in the model, vigor, may offer support for the notion that emotional eating occurs in response to negative emotions. However feeling energized may be a specific emotion that would not be associated with a need for increased energy intake, thus there was no negative association. Additional research is needed to assess the associations between other positive emotions and emotional eating among adolescents.

A potential limitation of this study is that the emotional eating scale asks about eating in response to specific emotions and we tested associations between this scale and specific emotions. This may have possibly led to spurious associations due to the fact that both scales included specific emotions. However, the fact that the psychological scales are measuring the level of a particular mood or emotion, while the emotional eating scale measures eating behavior in response to mood or emotion indicates that the scales are measuring two completely different constructs (Arnold et al., 1995). Therefore, we believe that our findings represent genuine relationships.

The cross-sectional nature of the study did not allow us to determine if emotions or moods were experienced prior to emotional eating, however the nature of the emotional eating scale makes the direction of the association implicit. The scale items ask if eating occurs when feeling a certain way. Our findings suggest that boys who experience more confusion and girls who perceive more stress, worries and tension/anxiety are more prone to eat in response to a variety of emotions. The use of ecological momentary assessment (EMA) methods could prove useful in order to determine whether emotional eating episodes directly follow specific mood states. EMA allows for measurement of events/factors as they occur (Stone & Shiffman, 1994); this has shown to be a useful assessment method in the study of several health behaviors, including anxiety and eating behavior (Henker, Whalen, Jamner, & Delfino, 2002) as well as attention deficit hyperactivity disorder (Whalen et al., 2006).

The validity of data could also be affected by the self-report nature of the study. However, participants were ensured of the confidentiality of all data, and measures were taken to display this confidentiality to all participants. Therefore, there is no reason to believe that students were not honest in their answers.

The generalizability of our results is limited by several factors. We conducted this research in a novel population, minority adolescents, thus we cannot assume that these findings would hold in other adolescent populations. However, based on literature review,

considering that the large majority of emotional eating research is conducted in White adult females, and that our study revealed similar findings, we feel this study adds to the generalizability of emotional eating research. Further research in a more diverse group of adolescents is warranted in order to add to the generalizability of pediatric findings.

The construct of pediatric emotional eating remains understudied in the United States. Therefore, there are no national data against which our results can be compared. The ability to compare rates of emotional eating along with rates of overweight and obesity would be useful in order to determine the potential impact that reduction of emotional eating may have on obesity. In a sample of more than 1,400 children in Belgium, Braet and colleagues (2008) reported that 10.5% of overweight children displayed emotional eating. Thus, emotional eating may have a significant impact on overweight and obesity, warranting further investigation of emotional eating in obesity prevention efforts.

Results from this study support the hypothesis that eating behavior is influenced by negative affect (Sims et al., 2008). This study is unique in that it was conducted with a minority adolescent population that included boys, and identified specific emotions related to emotional eating in a non-lab setting. Hence, previous findings illustrating that negative affect leads to emotional eating were shown to be applicable to a new population. We also found that not all negative affect leads to emotional eating in adolescents, which can possibly provide a focus for intervention in this population. These conclusions bear potential implications for the treatment and prevention of pediatric obesity and eating disorders because they suggest that interventions would benefit from incorporation of stress-reduction techniques and promotion of positive mood. Further, considering that minority pediatric populations are at highest risk for obesity (Ogden et al., 2008), this research is quite relevant to current public health efforts. Although it seems intuitive that removal of the “trigger” to emotional eating would reduce emotional eating, future research is needed to determine whether these types of interventions can reduce emotional eating.

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TABLE 1

Characteristics of the Sample (n = 505)

Variable	Male n = 133 (26%)		Female n = 372 (74%)		Range	Gender differences
	M	(SD)	M	(SD)		
Age	12.55	(0.75)	12.50	(0.62)	11–15	t(199) = 0.63, p = .5262
Ethnicity*						
Asian/Pf	39	(29.6%)	50	(13.5%)		$\chi^2(1) = 17.02$, p < .0001
Latino	69	(52.3%)	243	(65.5%)		$\chi^2(1) = 7.49$, p = .0062
Multi-ethnic	10	(7.6%)	43	(11.6%)		$\chi^2(1) = 1.70$, p = .1920
Other	6	(4.6%)	25	(6.7%)		$\chi^2(1) = 0.829$, p = .3623
White	8	(6.1%)	10	(2.7%)		$\chi^2(1) = 3.15$, p = .0757
Anger	0.73	(0.99)	0.70	(0.80)	0–4	t(198) = 0.39, p = .6944
Confused	0.60	(0.86)	0.63	(0.75)	0–4	t(208) = -0.44, p = .6637
Depressed	0.64	(1.00)	0.68	(0.89)	0–4	t(503) = -0.46, p = .6444
Fatigue	1.00	(1.03)	1.02	(0.96)	0–4	t(503) = -0.23, p = .8159
Perceived stress	17.95	(6.39)	19.17	(7.61)	0–58	t(275) = 0.180, p = .0733
Tension/anxiety	0.73	(0.86)	0.82	(0.81)	0–4	t(503) = -1.07, p = .2843
Vigor	2.03	(1.01)	1.80	(1.00)	0–4	t(501) = 2.33, p = .0202
Worries	2.22	(0.64)	2.41	(0.59)	1–4	t(503) = 3.04, p = .0025
Emotional eating						
Emotional Eating Score	1.80	(0.94)	1.87	(0.81)	1–5	t(207) = -0.78, p = .434
Emotional Eaters*	22	(16.5%)	76	(20.4%)		$\chi^2(1) = 0.947$, p = .330
Body Image	4.29	(1.09)	4.18	(1.18)	1–7	t(503) = 0.97, p = .3328
Weight Concerns	2.17	(0.72)	2.29	(0.72)	1–4	t(503) = -1.54, p = .1239

Note:

* n (%).

TABLE 2

Associations Between Emotions/Moods and Emotional Eating

	Emotional eating					
	Overall		Males		Females	
	β	p-value	β	p-value	β	p-value
Independent Variables						
Anger	−0.0287	.6562	−0.0030	.9801	−0.0469	.5448
Confused Mood	0.1321	.0727	0.3513	.0270	0.0365	.6643
Depressed Mood	−0.0578	.4613	−0.0701	.6438	−0.0570	.5428
Fatigue	−0.0479	.3839	−0.0789	.5224	−0.0228	.7158
Perceived Stress	0.1835	<.0001	0.1493	.2165	0.1905	.0002
Tension/anxiety	−0.1310	.0505	−0.0138	.9261	0.1843	.0148
Vigor	−0.0230	.6061	−0.0995	.7061	0.0228	.6479
Worries	0.1189	.0174	0.0503	.6444	0.1384	.0145
Covariates						
Body Image	0.0005	.9918	−0.1143	.3502	0.0349	.5320
Weight Concerns	0.1422	.0073	0.2583	.0387	0.1132	.0533

Note. All parameter estimates (betas) are adjusted for age, gender, ethnicity, weight concern, body image, and random effect of school.