



Association of Eating Behaviors and Obesity with Psychosocial and Familial Influences

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ABSTRACT

Background: Overeating is often attributed to emotions and has been linked to psychological challenges and obesity. **Purpose:** This study investigated the effect of emotional and external cue eating on obesity and the correlation of emotional and external cue eating with positive and negative psychological factors, as well as early familial eating context. **Methods:** 483 young adults attending two universities completed instruments measuring obesity, emotional and external cue eating, familial eating patterns, depression, anxiety, stress behaviors and somaticism, optimism, self-esteem, resilience, gratitude, humility, happiness, religiosity, and disordered eating. **Results:** Disordered eaters (with anorexia, bulimia, purging signs) reported worse mental health and more emotional eating. Gender was the only consistent predictor of obesity and external cue eating. In addition to gender, being offered food for comfort as a child was an important predictor of emotional cue eating. **Discussion:** More emphasis should be given to familial eating context, particularly the practice of offering children food for comfort, as a potential precursor to young adult emotional eating behavior. **Translation to Health Education Practice:** Findings point to a potential need to monitor and to train primary caregivers and those supervising young children in other settings regarding the use of food for non-nutritional purposes, and to provide training to children on more constructive methods of coping with strong emotions.

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BACKGROUND

Most of the research on food behaviors in psychology has focused on obesity or eating disorders, with relatively few studies targeting behaviors such as emotional or external cue overeating and their correlates to psychological health and familial influence.¹ Understanding these correlates is important because emotional overeating behavior increases risk for obesity and may potentially be a precursor to more serious disordered eating.

Distinguishing emotional or external cues to eat from physiological hunger requires an awareness of the signals that differentiate desire to eat based on emotions

or outside stimulus from appetite based on true physical need. The emotional stressors that trigger bouts of emotional eating differ among individuals, although most episodes occur when people are at home by themselves.² Common emotional cues to eating include feelings of anger, hopelessness, lack of control, and boredom as well as positive emotions, such as celebration.³ Additionally, using food to cope with emotional problems can become a habitual response, which not only may lead to weight-related problems, but also may prevent individuals from learning constructive coping skills for effectively resolving emotional distress.

Depression, anxiety, and poor self-esteem

are often related to emotional eating behavior.⁴ There is some evidence that disordered eating practices might mediate the relationship between depression and obesity, with more severe disordered eating practices

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like binge eating strongly associated with depression.^{5,6} Moreover, dieting frequency has been found to be positively associated with depression and inversely associated with self-esteem.⁷ Fisher et al., who studied eating patterns of female adolescents, found that even sub-clinical abnormal eating attitudes were strongly correlated with both low self-esteem and high anxiety.⁸

With the exception of self-esteem, there is scant research on the association between emotional eating and positive psychological traits. A study among more than 80,000 adolescents found that in addition to self-esteem, general emotional well being was protective against disordered eating behaviors in both males and females.⁹

Although there is no research on the influence of childhood family context on adult eating behavior, some have studied its influence on adolescent eating behavior. For example, among adolescents, high levels of family connectiveness have been associated with lower rates of extreme dieting and other disordered eating behaviors among both males and females,^{9,10} and with more frequent breakfast eating among overweight males.¹⁰ Laliberte and his colleagues suggest that eating-disordered individuals are more likely to perceive their families as prioritizing appearance and achievement over other family characteristics.¹¹ They conclude that an individual engaged in disordered eating practices "reflects that family's attempt to conform to the standards of self-restraint, success, and physical appearance." Further research into the influence familial factors may have in the etiology of clinical and even sub-clinical disordered eating behavior may prove valuable in future efforts to prevent the development of unhealthy eating practices.

PURPOSE

Only in recent years, researchers have begun to investigate the etiology of over-eating behavior in people with sub-clinical disordered eating practices (i.e., emotional and external cue eating). Perhaps with a better understanding of the etiology of sub-clinical disordered eating practices, we

will be better equipped to design prevention programs that identify and alter unhealthy eating habits before they progress into more serious eating disorders.

This exploratory study had two purposes. The first was to measure the association of emotional and external cue eating with obesity. We hypothesized that emotional and external cue eating would correlate with and predict Body Mass Index (BMI). The other purpose was to investigate the correlation of emotional and external cue eating with depression, anxiety, self-esteem, other psychological factors not previously studied, and aspects of early familial eating context. We hypothesized that disordered eaters would have higher scores for negative and lower scores for positive psychological traits, that negative psychological factors would correlate positively and positive psychological factors would correlate negatively with emotional and external cue eating, and that familial emotional eating patterns would correlate with individual eating patterns.

METHODS

Sample

Following human subjects approval, participants were sampled from two large public universities (one in the Midwestern and one in the Mid-Atlantic United States). The researchers solicited participants from students in lower-level (mostly freshmen and sophomores) personal health classes in early Fall 2003. After reading the consent form, students were allowed to complete the instruments in class. Those who did not want to participate were excused from class early without penalty; very few students declined to participate. Of 507 students who began the survey, 483 completed all the self-report instruments. Two-thirds (67%) of participants were Caucasian, 19% were African-American, 7% were Asian American, 5% were Hispanic, and 2% were other. Fifty-five percent were female.

Instrumentation

The entire questionnaire of 200 items took approximately 30-40 minutes to complete and included 13 variables.

Obesity. In this study, obesity was approximated by the BMI which is calculated as $BMI = (\text{weight in pounds} / (\text{height in inches})^2) \times 703$. A BMI of 18.5 to 25 is considered normal; a BMI of 25-29 is considered overweight; a BMI of 30 or greater is considered obese; a BMI less than 18.5 is considered underweight.¹² Participants self-reported their heights and weights to facilitate this calculation.

Emotional and external cue eating. Two subscales of the Dutch Eating Behavior Questionnaire (DEBQ) measuring overeating triggered by negative emotions (psychosomatic theory) and eating in response to visual and environmental cues to eat were used.^{3,13} The DEBQ is widely used in the field of dietary behavior because it has consistently shown high internal consistency, factorial validity, and dimensional stability.¹⁴ Five response choices include: never, seldom, sometimes, often, and very often. In this sample, Cronbach's alphas for the Emotional and External cue eating were .95 and .83 respectively.

Familial eating patterns. Four additional items were created to measure family patterns potentially associated with emotional eating: (1) While growing up, did your family show they love or care by offering food?; (2) While growing up, how often were you offered food to comfort you when you were emotionally upset?; (3) Who usually offered you this food, while you were growing up?; and (4) While growing up, how often did this person (or persons) eat for comfort when he or she was emotionally upset? Questions 1, 2, and 4 were patterned after the DEBQ and allowed the same response choices;¹⁵ question 3 offered the response options father, mother, both parents, someone else, or not applicable.

Depression. The 20-item Zung Self-Rated Depression Scale (SDS) addresses each of the four most commonly found characteristics of depression: the pervasive effect, the physiological equivalents, other disturbances, and psychomotor activities.¹⁵ Responses range from 1 (little of the time) to 4 (most of the time). A score of 25 to 49 is considered Normal; 50-59, Mildly Depressed; 60-69,



Moderately Depressed, and above 69; Severely Depressed. The scale has been able to discriminate between clinically depressed patients and normal controls.¹⁵ Cronbach's alpha for this sample was .82.

Stress behaviors and somaticism. The 49-item Strain Questionnaire was designed to measure frequency of behavioral, cognitive, and somatic stress complaints.¹⁶ The scale has shown high test-retest and internal consistency reliability and correlates with the Beck Depression Inventory (.71). The somatic and behavioral subscales were used in this study. Cronbach's alphas for this sample were .88 and .71 respectively.

Anxiety. According to the manual, the Spielberger State/Trait Anxiety Inventory (STAI) is the most widely used measure of anxiety in the world. The Trait subscale consists of 20 items designed to measure general anxiety proneness. The test-retest reliability for the Trait scale for male and female college students over a six month period are .73 and .77 respectively.¹⁷ In a sample of 126 college women, the Trait scale correlated highly with the IPAT Anxiety Scale (.75), and the Manifest Anxiety Scale (.80).¹⁷ Cronbach's alpha for this sample was .91.

Optimism. Optimism, defined as the tendency to believe that one will generally experience good outcomes in life,^{18,19} was measured by the revised Life Orientation Test (LOT), a 10-item measure focusing on the assessment of generalized outcome expectancies.²⁰ The mean for an undergraduate population was 14.3, with a test-retest reliability of .79 and a Cronbach's alpha of .76.²⁰ Cronbach's alpha for this sample was also .76. The scale has shown convergent validity with the Self-Mastery Scale ($r=.55$) and the Rosenberg Self-Esteem Inventory ($r=.54$), and discriminant validity with the State-Trait Anxiety Inventory ($r=-.59$) and the Guilford-Zimmerman Temperament Survey ($r=-.50$).

Self-Esteem. The Rosenberg Self-Esteem Inventory (RSE) has been used to measure self-esteem in diverse groups of adults and adolescents since 1962.²¹ This 10-item, Likert-type scale has been validated in many groups including college students and

adults. The RSE has a two-week, test-retest reliability in college students of .85-.88. It also correlates significantly with other self-esteem measures such as the Coopersmith Self-Esteem Inventory and divergently with measures of depression and anxiety.²² A study among a large group of college students found a mean of 32.3 and standard deviation of 4.8.²³ Cronbach's alpha for this sample was .89.

Resilience. The 5-point Resilience Scale has eight items representing acceptance of self and life by indicating adaptability, balance, flexibility, and a balanced perspective on life.²⁴ The remaining 17 items represent personal competence by measuring self-reliance, independence, determination, invincibility, mastery, resourcefulness, and perseverance.²⁴ The scale had a Cronbach alpha of .91 among a random sample of older adults. Cronbach's alpha for this sample was also .91.

Gratitude. The Gratitude Questionnaire-6 (GQ-6) includes six self-report items designed to assess experiences and expressions of gratefulness and appreciation in daily life, as well as feelings about receiving from others. Items reflect the intensity, frequency, span, and density facets of gratitude. Responses are given on a 5-point Likert-type scale. Cronbach's alpha estimates have ranged from .76 to .84. Cronbach's alpha for this sample was .81. The GQ-6 has shown moderate (.30 to .50) convergent correlations with life satisfaction, vitality, optimism, and hope; and modest (less than .4) discriminant correlations with depression, and anxiety.²⁵

Humility. Humility was measured using a new scale developed by two of the authors. The instrument contains 16 items measured on a 5-point Likert-type scale from strongly agree to strongly disagree. The measure includes four factor subscales: esteem for others, acceptance of own fallibility, recognition of need for external support, and low demand for recognition. In a large sample of college undergraduates, Cronbach's alpha reliability was .73 and two-week test-retest reliability was .73. It has shown positive (.55) correlation with the GQ-6, the Resilience Scale (.49), the revised LOT (.43) and the RSE (.40); and moderate discriminant correlations with the SDS (-.30) and the STAI (-.40).

Happiness. The Happiness Measure (HM) is thought to be the most widely used instrument for measuring happiness in general adult samples.²⁶ It consists of two, self-reporting items measuring emotional well-being; an 11-point, happiness/unhappiness scale, and a question asking for the time spent in happy, unhappy, and neutral moods.

Religiosity. A revised version of the Duke Religion Index (DRI) included two items assessing organizational religious behavior (e.g. church attendance) using a 5-point scale ranging from "once a year or less" to "2-3 times per week" and three items concerning non-organized religion (e.g. prayer or meditation) and spiritual beliefs (e.g. involvement of religion in all aspects of life) using a 5-point scale ranging from "Definitely Not True" to "Definitely True".²⁷ The five-item scale has shown a Cronbach's alpha of .75 and moderate correlations with other measures of religiousness such as the Age Universal Religious Scale and the Santa Clara Strength of Religious Faith. Cronbach's alpha for this sample was .87.

Disordered Eating. Three questions adapted from Yanovski²⁸ were used to screen participants with clinical or sub-clinical eating disorders: (1) During the past 6 months, did you often eat within any two-hour period what most people would regard as an unusually large amount of food, PLUS have the feeling that your eating was out of control?; (2) If yes, did you do anything to counteract the effect of eating a large amount of food, like making yourself vomit, take laxatives, strict dieting, fasting or exercising a lot?; and (3) I am tormented by the idea that I am fat or might gain weight AND/OR if I don't have a specific routine for my daily eating, I'll lose control and I'll gain weight.²⁸ The first two questions screen for bulimia-like behavior and the third question is used to screen for anorexia-like thoughts or behavior.

Analysis

Three questions were used to screen par-



ticipants for disordered eating (i.e., anorexia, bulimia, purging behaviors). Those with any “yes” response were compared to those with all “no” responses using independent t-tests for interval variables and chi-squared tests for categorical variables. To address the study hypotheses regarding sub-clinical emotional and external cue eating and their correlates, those screened as disordered eaters were not included in any additional analyses.

Prior to completing analyses of non-disordered cases, all variables were checked for linearity, homoscedasticity, and normality. Two variables, *Resilience* and *BMI* had kurtosis greater than 2.0. To preserve the original scale, *BMI* was not transformed; one outlier, more than four standard deviations from the mean, was removed to correct kurtosis. The kurtosis in *Resilience* could not be corrected by any transformations and two outliers, more than four standard deviations from the mean, were removed. No other response patterns were apparent for the outliers.

Spearman correlations were run among all the variables for participants with no apparent disordered eating; coefficients were corrected for attenuation due to measurement reliability. Next, after confirming low multicollinearity, multivariate linear regression (with variables entered simultaneously) was used to predict *Emotional Cue Eating* and *External Cue Eating* from the positive psychological variables, the negative psychological variables, and the interval familial eating variables. Finally, to include the categorical independent variables of gender, race, and the familial eating variable (who offered comfort food), a multivariate logistic regression was conducted. For this model, the dependent variables were dummy coded. For *BMI*, the NIH cutoff of 25 and above was used. For *Emotional Cue Eating* and *External Cue Eating*, the respondents were divided into equal halves (high versus low).

RESULTS

Two hundred seventy-five participants (57%) answered “yes” to one or more of the questions used to screen for disordered eating. Disordered eaters were more likely to

be female and to express depressive, somatic, stress behavior and anxiety symptoms, and to be emotional eaters (Table 1). Additionally, disordered eaters were less likely to have high optimism, self-esteem, resilience, gratitude or humility (Table 1). They were also more likely to say a family member offered food to comfort them while growing up (Table 1). There were no significant differences in *BMI* or race/ethnicity (Table 1).

Table 2 shows correlations among variables for non-disordered eaters. *BMI* showed no significant correlation with any other variables. In addition to Emotional Cue Eating, External Cue Eating was moderately correlated with the familial eating patterns of showing love through food (.36) and offering food to comfort (.30). It was slightly correlated with parental emotional eating (.17), anxiety (.25), and low optimism (-.21). Emotional Cue Eating was strongly correlated with having a family member offer food for comfort (.55); moderately correlated with parental Emotional Cue Eating (.41), all the negative psychological measures (.30 to .46), and three positive psychological measures: optimism (-.21), self-esteem (-.34), and resilience (-.40). It was slightly correlated with family showing love through food (.29) and gratitude (.17).

Because many of the measures used typically share variance, regression analyses were conducted to isolate unique contribution. Table 3 shows results of simultaneous regressions for Emotional Cue Eating, and External Cue Eating. Because no variables were significantly correlated with *BMI*, no regression was conducted for *BMI*. Three variables predicted External Cue Eating in a simultaneous model: anxiety ($B=.48$), depression (negatively, $B=-.31$), and family showing love through food ($B=.27$). Two variables predicted Emotional Cue Eating: family offered food to comfort ($B=.54$) and happiness (positively, $B=.21$).

Because demographic variables, including gender and race/ethnicity, are sometimes associated with eating behaviors and obesity, a logistic regression model was built to include these variables (Table 4). To do this, the outcome variables were dummy coded.

Women were much less likely than men in this sample to report a high *BMI* ($AOR=0.1$). External Cue Eating was also a significant, but minor predictor of *BMI* ($AOR=0.8$). Although women had lower means for External Cue Eating, the differences were not statistically significant in this model. In addition to gender, the primary predictor of External Cue Eating was who offered comfort food. According to the logistic regression, those who were offered food by “both parents” or “someone else” were much more likely to express External Cue Eating than those who responded “not applicable.” Anxiety was also a significant, but minor predictor of External Cue Eating ($AOR=1.1$). There were two important predictors of Emotional Cue Eating in this study: women were four times as likely to be emotional eaters, and those whose families offered food to comfort were nearly three times as likely ($AOR=2.6$) to be emotional eaters.

DISCUSSION

In a model including gender and race/ethnicity, the only significant predictors of emotional eating were gender and being raised in a family that offered food for comfort. Earlier studies have established that women have a greater tendency to eat for emotional reasons.²⁹ The unique contribution of this study, is the finding that those who report being frequently offered food to comfort them when they were emotionally upset as children were over two-and-a-half times more likely to admit to frequent emotional eating as young adults. However, these young adults were not significantly more likely to report having observed a parent participate in emotional eating.

What is unclear from this finding is the nature of these food offerings. For example, did the individual, as a child, initiate these exchanges by explicitly asking for or hinting for comfort food when emotionally upset? It is also unclear whether the parent(s) offered every person or child in the family food for comfort or whether the interaction was unique to this individual. Further, whether a child transitioned from being offered comfort foods to seeking them autonomously,

**Table 1. Independent t-tests and Chi-Squared Tests between Those with (N=275) and Those without (N=208) Disordered Eating**

	Without Disordered Eating Mean (SD)	With Disordered Eating Mean (SD)	t	P
Depression	35.6 (8.1)	39.3 (8.3)	4.8	0.001
Somatic Symptoms	45.6 (12.9)	51.0 (16.2)	3.9	0.001
Behavioral Symptoms	18.8 (5.7)	21.1 (6.8)	3.8	0.001
Anxiety	37.9 (10.5)	42.1 (10.9)	4.2	0.001
Optimism	25.7 (5.6)	23.9 (6.0)	3.4	0.001
Self-Esteem	33.3 (5.7)	31.2 (5.8)	4.0	0.001
Resilience	58.8 (9.1)	56.5 (9.4)	2.8	0.006
Gratitude	25.2 (3.9)	24.3 (4.2)	2.4	0.018
Humility	57.3 (6.7)	55.0 (7.4)	3.5	0.001
Happiness	75.0 (15.6)	72.5 (17.4)	1.5	0.141
Religiosity	9.2 (3.8)	8.8 (3.9)	0.9	0.348
Emotional Cue Eating	28.8 (11.9)	31.3 (11.8)	2.3	0.022
External Cue Eating	30.3 (6.9)	30.5 (7.3)	0.3	0.747
BMI	23.8 (4.9)	24.7 (5.6)	1.8	0.079
Family showed love by offering food	2.7 (1.2)	2.9 (1.3)	1.4	0.166
Family offered food to comfort	2.3 (1.1)	2.6 (1.2)	2.5	0.013
Parent ate when upset	2.3 (1.1)	2.5 (1.1)	1.8	0.078
	Proportion	Proportion	X ²	P
Gender (Female)	41.6	65.4	26.2	0.001
Race			2.5	0.649
Asian	7.7	7.1		
African-American	17.8	19.4		
Hispanic-American	5.3	4.9		
Caucasian-American	66.8	67.9		
Other	2.4	0.7		
Who offered food			8.6	0.072
Father	7.2	6.0		
Mother	33.5	38.8		
Both	31.6	29.1		
Someone else	4.8	10.1		
NA	23.0	16.0		
Notes: Emotional and External Eating Subscales from Dutch Eating Behavior Questionnaire, BMI = Body Mass Index, Depression = Zung Depression Scale, Somatic Symptoms = STRAIN Somaticism Subscale, Behavioral Symptoms = STRAIN Behavioral Subscale, Anxiety = Spielberger Trait Anxiety Subscale, Self-Esteem = Rosenberg Self-Esteem Inventory, Resilience = Wagnild and Young Resilience Scale, Optimism = revised Life Orientation Test, Humility = The Humility Scale (unpublished), Religiosity = Duke Religion Index, Happiness = Fordyce Happiness Scale.				



Table 2. Spearman Correlation of Emotional Cue Eating, External Cue Eating, and BMI with Psychological Traits and Familial Eating (disordered eaters removed; N=208)

	Emotional Eating	External Eating	BMI
Depression	0.33**	0.05	0.01
Somatic Symptoms	0.30**	0.10	0.09
Behavioral Symptoms	0.39**	0.13	0.08
Anxiety	0.46**	0.25**	-0.03
Optimism	-0.31**	-0.21*	0.13
Self-Esteem	-0.34**	-0.15	0.01
Resilience	-0.40**	-0.12	0.03
Gratitude	-0.17*	-0.04	0.03
Humility	-0.15	-0.13	-0.12
Happiness	-0.13	-0.11	0.02
Religiosity	0.01	0.04	0.03
Family showed love by offering food	0.29**	0.36**	-0.08
Family offered Food to comfort	0.55**	0.30**	-0.07
Parent ate when upset	0.41**	0.17*	-0.05
Emotional Cue Eating		0.43**	-0.05
External Cue Eating			-0.12

Notes: Emotional and External Eating Subscales from Dutch Eating Behavior Questionnaire, BMI = Body Mass Index, Depression = Zung Depression Scale, Somatic Symptoms = STRAIN Somaticism Subscale, Behavioral Symptoms = STRAIN Behavioral Subscale, Anxiety = Spielberger Trait Anxiety Subscale, Self-Esteem = Rosenberg Self-Esteem Inventory, Resilience = Wagnild and Young Resilience Scale, Optimism = revised Life Orientation Test, Humility = The Humility Scale (unpublished), Religiosity = Duke Religion Index, Happiness = Fordyce Happiness Scale. Correlations disattenuated. ** = P<0.01, * = P<0.05

and the age at which this transition occurred, is also unknown from these preliminary findings. These, and other issues regarding the relationships and environment surrounding the tender of comfort foods to children, need further investigation.

In addition to men, in this study, those who were more anxious were also slightly more likely to admit to external cue eating. This study contributes to the understanding of external cue eating by showing a pattern among those who offered food for comfort. Those who were offered food by both parents, or someone other than a parent, were more likely to admit external cue eating as young adults than those who said they were not offered food for comfort as a child.

The only consistent predictor of BMI was gender. In this sample of young adults, women were much less likely to be overweight than men. The men in the sample had BMI proportions similar to national

averages.¹³ Specifically, 55% had BMI scores less than 25, 40% had BMI scores between 25 and 29, and 5% had scores 30 or greater. However, the women in this sample reported BMI rates much lower than national averages.¹³ Eighty-two percent reported weights and heights for BMI scores less than 25, 14% had BMI scores between 25 and 29, and 4% had BMI scores 30 or greater.

Limitations

The finding of no association between the emotional eating patterns, or any of the familial or psychological precursors with BMI may mean that these factors have limited influence on the BMI of non-disordered eaters in this sample of young adults, which is similar to results seen in other samples.³⁰ An alternative explanation is the possibility that the weight and/or height data, which were volunteered by participants, were misreported. It may also mean

that the effects of emotional eating patterns are not yet apparent in samples of young adults, most of who were in their twenties. In addition to self-report data, other limitations include fairly narrow, nonrandom sampling; which limits generalizability and recall from childhood.

Based on these findings, we cannot judge the actual frequency of participants' being offered comfort food as children. This level of understanding could be achieved by designing a prospective study with observations of food offerings during childhood. Such a longitudinal approach may also help determine whether emotional eating patterns eventually lead to increases in BMI in later adulthood. However, it is apparent that those with salient memories of these exchanges, or perceptions that these exchanges took place frequently, are much more likely to admit to emotional eating patterns as young adults.

**Table 3. Simultaneous Linear Regression for Variables Predicting Emotional Eating, and External Cue Eating (disordered eaters removed; N=208)**

	Emotional Eating		External Eating	
	B (SEB)	β	B (SEB)	β
Depression	-0.13 (0.17)	-0.08	-0.27 (0.12)	-0.31*
Somatic Symptoms	0.08 (0.09)	0.08	0.05 (0.06)	0.09
Behavioral Symptoms	0.29 (0.20)	0.13	-0.09 (0.13)	-0.07
Anxiety	0.14 (0.18)	0.12	0.32 (0.12)	0.48**
Optimism	-0.11 (0.22)	-0.05	-0.25 (0.15)	-0.21
Self-Esteem	0.20 (0.19)	0.16	-0.18 (0.29)	-0.08
Resilience	-0.06 (0.17)	-0.04	0.07 (0.11)	0.07
Gratitude	-0.16 (0.31)	-0.05	0.12 (0.21)	0.06
Humility	0.05 (0.14)	0.03	-0.12 (0.10)	-0.11
Happiness	0.16 (0.07)	0.21*	0.02 (0.05)	0.04
Religiosity	-0.06 (0.23)	-0.05	0.09 (0.16)	0.05
Family showed love by offering food	-1.01 (0.78)	-0.11	1.45 (0.54)	0.27**
Family offered Food to comfort	5.70 (0.97)	0.54**	0.68 (0.66)	0.11
Parent ate when upset	1.62 (0.82)	0.15	-0.33 (0.56)	-0.05

Notes: R² for Emotional Eating=0.49; and R² for External Cue Eating=0.28. 1- β for emotional Eating =0.99 and 1- β for External Cue Eating=0.98. B=coefficient (unstandardized), SEB=standard error (unstandardized), β =coefficient (standardized). Emotional and External Eating Subscales from Dutch Eating Behavior Questionnaire, Depression = Zung Depression Scale, Somatic Symptoms = STRAIN Somaticism Subscale, Behavioral Symptoms = STRAIN Behavioral Subscale, Anxiety = Spielberger Trait Anxiety Subscale, Self-Esteem = Rosenberg Self-Esteem Inventory, Resilience =Wagnild and Young Resilience Scale, Optimism =revised Life Orientation Test, Humility = The Humility Scale (unpublished), Religiosity =Duke Religion Index, Happiness = Fordyce Happiness Scale. ** = P<0.01, * = P<0.05.

Other Findings

Similar to earlier studies,⁵⁻⁸ those screened for disordered eating in this study generally had poorer mental health. This is evidenced by higher scores for depression, anxiety, and stress symptoms, as well as lower scores for optimism, self-esteem, resilience, gratitude, and humility.

One striking finding was not part of the original hypotheses. Forty-four percent of the men and more than two-thirds of the women answered “yes” to at least one of the questions used to screen for disordered eating. This is higher than estimates from the recent replication of the National Comorbidity Study, in which rates for anorexia nervosa, bulimia nervosa, and binge eating disorder were estimated at 0.3%, 0.5%, and 2.0% among all men in the U.S. and 0.9%, 1.5%, and, 2.5% among all women.³¹ This

is also higher than the DSM estimates that 1-4% of all young women in the U.S. will have one or more of these.³²

Part of the explanation for higher proportions is that the abbreviated method used to assess disordered eating in this study, an affirmative response to any of the three screening questions, likely led to an inflated prevalence compared to more comprehensive measures of disordered eating. However, there may also be other reasons for proportions higher than clinical estimates. For example, more recent research by the American Psychiatric Association estimate that 8% of all women have clinical eating disorders and this estimate does not include binge eating, which is thought to be the most common of the three eating disorders. Another explanation is that rates calculated for all ages are not representative

of rates in younger populations, particularly adolescent and young adult rates. Additionally, rates may be even higher among college students. For example, a national poll on college campuses in 2006 found that nearly 20% of respondents admitted to currently suffering with or to having suffered from an eating disorder, although nearly three-quarters had never received treatment.³³

In this study, 20% of the men and 29% of the women responded affirmatively to the binge eating question: “During the past 6 months, did you often eat within any two-hour period what most people would regard as an unusually large amount of food, PLUS have the feeling that your eating was out of control?” As expected, a lesser number, 13% of the men and 15% of the women, gave affirmative responses to the purging question: “If yes, did you do anything to counteract the



Table 4. Multivariate Logistic Regression for Variables Predicting Emotional Cue Eating, External Cue Eating, and BMI for Overweight (BMI>25) vs. Normal/underweight (BMI<25) [N=208]

	Emotional Eating AOR (CI)	External Eating AOR (CI)	BMI AOR (CI)
Gender (female)	4.0 (1.2-12.8)*	0.3 (0.1-0.9)*	0.1 (0.1-0.4)**
Ethnicity	NS	NS	NS
African-American	0.1 (0.1-1.0)	3.2 (0.5-21.1)	0.9 (0.1-5.4)
Asian-American	0.4 (0.1-1.8)	0.4 (0.2-1.6)	2.0 (0.3-9.1)
Hispanic-American	2.3 (0.2-32.5)	0.6 (0.1-4.5)	0.0 (0.0-0.0)
Other	1.1 (0.1-25.9)	0.2 (0.1-4.5)	0.0 (0.0-0.0)
Caucasian-American	1.0	1.0	1.0
Depression	1.0 (0.9-1.1)	0.9 (0.9-1.0)	1.0 (0.9-1.1)
Somatic Symptoms	1.0 (0.9-1.1)	1.0 (0.9-1.1)	1.0 (0.9-1.1)
Behavioral Symptoms	1.0 (0.9-1.2)	0.9 (0.8-1.0)	1.0 (0.9-1.2)
Anxiety	1.1 (0.9-1.2)	1.2 (1.1-1.3)**	1.0 (0.9-1.1)
Optimism	1.0 (0.8-1.1)	0.9 (0.8-1.0)	1.1 (0.9-1.2)
Self-Esteem	1.1 (0.9-1.3)	1.2 (0.9-1.4)	0.9 (0.8-1.1)
Resilience	1.0 (0.9-1.1)	1.1 (0.9-1.2)	1.1 (0.9-1.2)
Gratitude	0.9 (0.7-1.1)	1.1 (0.9-1.4)	1.1 (0.9-1.4)
Humility	1.0 (0.9-1.1)	1.0 (0.9-1.1)	1.0 (0.9-1.0)
Happiness	1.1 (0.9-1.1)	1.0 (0.9-1.1)	1.0 (0.9-1.0)
Religiosity	1.0 (0.9-1.2)	1.0 (0.9-1.2)	1.0 (0.9-1.2)
Family showed love by offering food	1.1 (0.7-1.8)	1.2 (0.8-1.8)	1.0 (0.6-1.7)
Family offered Food to comfort	2.6 (1.3-5.4)**	0.9 (0.5-1.6)	0.9 (0.4-1.9)
Who offered food to comfort	NS	p<0.02	NS
Father	0.5 (0.1-8.5)	1.7 (0.2-18.0)	0.0 (0.0-0.0)
Mother	0.8 (0.2-3.4)	2.7 (0.8-9.3)	1.0 (0.3-4.2)
Both Parents	0.9 (0.2-3.7)	7.5 (2.1-26.8)**	1.5 (0.4-6.4)
Other	0.2 (0.1-2.3)	9.3 (1.0-84.4)*	0.2 (0.1-9.2)
NA	1.0	1.0	1.0
Parent ate when upset	1.2 (0.7-2.1)	0.9 (0.5-1.4)	1.4 (0.8-2.3)
Emotional Cue Eating			1.0 (0.9-1.1)
External Cue Eating			0.8 (0.8-0.9)*

Notes: All variables Nagelkerke R² for Emotional Eating=0.53; External Cue Eating=0.25; and for BMI=0.37. 1-β for emotional Eating =0.99; for External Cue Eating=0.98 and for BMI=0.99. AOR=adjusted odds ratio, CI=confidence interval. Emotional and External Eating Subscales from Dutch Eating Behavior Questionnaire, BMI = Body Mass Index, Depression = Zung Depression Scale, Somatic Symptoms = STRAIN Somaticism Subscale, Behavioral Symptoms = STRAIN Behavioral Subscale, Anxiety = Spielberger Trait Anxiety Subscale, Self-Esteem = Rosenberg Self-Esteem Inventory, Resilience = Wagnild and Young Resilience Scale, Optimism = revised Life Orientation Test, Humility = The Humility Scale (unpublished), Religiosity = Duke Religion Index, Happiness = Fordyce Happiness Scale. ** = P<0.01, * = P<0.05.

effect of eating a large amount of food, like making yourself vomit, take laxatives, strict dieting, fasting or exercising a lot?" The most dramatic responses were to the question that was intended to screen for anorexia-like

thinking: "I am tormented by the idea that I am fat or might gain weight AND/OR if I don't have a specific routine for my daily eating, I'll lose control and I'll gain weight." Twenty-nine percent of the men and 60%

of the women marked that they agreed with this statement. An alternative explanation for this finding is that this item is not only measuring anorexia-like thinking, but also excessive concerns about weight gain and/or



body image among college students. A large study of adolescent and young adult women found that 48% were dissatisfied with their bodies and that 49% had preoccupations with their weight.³⁴ In a review of the literature, Bergstorm and Neighbors concluded that heterosexual college students, which account for the majority of this sample, appear to be most susceptible to these body image disturbances, which often stem from incorrect assumptions about the normative beliefs of those of the opposite sex regarding preferred body image.³⁵ For example, college women perceive that men their age prefer much thinner women and college men perceive that women their age prefer more muscular men than is the case.

TRANSLATION TO HEALTH EDUCATION PRACTICE

These preliminary findings point to a need for further research on the influence of childhood family context on adult eating patterns. Specifically, it is important to investigate the possibility that emotional eating may, at least in part, be a behavior learned from parents or other caregivers. If supported, this may point to a greater need for health educators to train caregivers regarding the use of food for non-nutritional purposes among young children. Three types of familial influence were measured in this study: (1) Is food being used as a symbol of love, care or celebration?; (2) Is food being used as means of emotional comfort or coping during difficult times?; and (3) Are caregivers showing a personal example of using food for comfort? Other familial food patterns not measured in this study may also be helpful to address including the practice of forcing children to empty their plates; even when this act causes them emotional distress and the practice of using food as a punishment or reward.

These findings may also point to the need for health educators to monitor the use of food as part of a reward or punishment system for children in other settings, such as is common in many elementary schools and youth groups. Many teachers and youth leaders feel that this is their only remaining

means for classroom or group discipline and may need to be trained in alternative disciplinary methods.

In summary, these preliminary findings may point to a need for health educators to provide training to children and adolescents, directly or through training care givers and teachers, on more constructive methods of coping with strong emotions or stress. These could include guidance in youth development and resilience skills such as stress management, social support, and communication.

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