

The Role of Weight Stigmatization in Cumulative Risk for Binge Eating*

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Previous research supports a positive association between weight stigmatization experiences and binge eating. However, the extent to which weight stigmatization accounts for binge eating in the context of other risk factors requires further investigation. Using a cumulative risk model, we examine previously studied risk factors (environmental stress, psychological functioning, negative coping, body dissatisfaction) as well as weight stigmatization as predictors of binge eating bariatric patients and undergraduate students. Results show a unique contribution of weight stigmatization. Analyses by sample indicated that this was only the case for the undergraduate student sample. Results support weight stigmatization as a meaningful predictor of binge eating and highlight the need for further work investigating how these experiences work to promote eating pathology. © 2010 Wiley Periodicals, Inc. *J Clin Psychol* 67:278–292, 2011.

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Today, more adults living in the United States are obese than in previous decades. The National Health and Nutrition Examination Survey (NHANES) of 2007–2008 found 68% of adults to be either overweight or obese (Flegal, Carroll, Ogden, & Curtin, 2010). There are multiple physical health risks associated with obesity (Centers for Disease Control and Prevention, 2009). Underscoring the importance of investigating its risk factors, obesity correlates with poor psychological adjustment and can lead to early death (e.g., Goldstein et al., 2008). In this study, we investigated a variety of personal and contextual risk factors for binge eating, a key predictor of overweight and obesity (Stice, Cameron, Killen, Hayward, & Taylor, 1999). Binge eating is described in the Diagnostic and Statistical Manual of Mental Disorders 4th Edition–Text Revision as the consumption of a large amount of food coupled with a sense of loss of control over the eating behavior. Binge eating disorder involves the binge eating behavior in the absence of compensatory behavior (American Psychiatric Association, 2000) and obese individuals with binge eating disorder report higher levels of impairment in terms of emotional functioning and quality of life compared with obese individuals without binge eating disorder (de Zwaan et al., 2002).

Risk Factors for Binge Eating

Studies of risk factors for binge eating suggest that risk for binge eating is determined by multiple areas of risk including psychological, social-contextual, and biological domains (Jacobi, Morris, & de Zwaan, 2004).

Personal risk factors. Evidence suggests that binge eating is more prevalent among those who feel depressed, anxious, and distressed (Johnsen, Gorin, Stone, & Le Grange, 2003; Stice, Presnell, & Spangler, 2002). It is common for feelings of sadness to occur with binge eating (Masheb & Grilo, 2006). Some researchers have conceptualized binge eating as “emotional eating,” or a way of avoiding negative thoughts and emotions (e.g., Spoor, Bekker, Van Strien, & Van Heck, 2007). Supporting the idea that binge eating behaviors are negatively reinforcing,

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research has shown that in women with bulimia nervosa, mood worsens leading up to bulimic episodes, whereas mood actually improves for a brief period of time after these episodes (Smyth et al., 2007). Binge eating may be associated with other maladaptive forms of coping such as substance use (e.g., Stewart, Brown, Devoulyte, Theakston, & Larsen, 2007). Early work suggested that disordered eating was associated with increased use of maladaptive coping strategies and decreased use of adaptive strategies (Troop, Holbrey, & Treasure, 1998). More recent work supports a positive association between binge eating and both emotion-focused and avoidance distraction coping strategies (Freeman & Gil, 2004; Spoor et al.).

Contextual risk factors. Stress has been shown through daily diary research to be a significant risk factor for binge eating in college women (Freeman & Gil, 2004). Lack of social support appears to be another important risk factor for binge eating. Binge eaters report more stressful relationships and social interactions than nonbinge eaters (Steiger, Gauvin, Jabalpurwala, Seguin, & Stotland, 1999). Interpersonal theorists have argued that binge eating can be triggered by difficult interpersonal experiences or feelings of loneliness (Wilfley, Pike, & Streigel-Moore, 1997). In stressful situations, eating behaviors may serve as coping strategies that would otherwise be provided through social support networks (Stice et al., 2002). Binge episodes may also be more likely to occur when one is alone (Stein et al., 2007). Thus, social support may restrict the advancement of binge eating pathology, at least in part, by keeping one in the presence of others more often.

Weight Stigmatization

Large segments of our society appear to hold a strong negative bias against fatness (Puhl & Latner, 2007), and this negative bias may be increasing (Andreyeva, Puhl, & Brownell, 2008). Negative attitudes about being overweight exist despite reports that more than half of the citizens of the United States are overweight (National Center for Health Statistics, 2008) and reports of rising prevalence of obesity in several other countries around the world (e.g., Great Britain, Brazil, China; Rennie & Jebb, 2005; Wang, Monteiro, & Popkin, 2002). Research on nonweight related stigma has illuminated the detrimental psychological impact of stigmatization (e.g., Hebl, Tickel, & Heatheron, 2000). Stigmatization because of weight (e.g., teasing or ostracism of overweight individuals) has been found to predict binge eating behavior, with greater experience with stigma correlating with higher levels of binge eating symptoms (Ashmore, Friedman, Reichmann, & Musante, 2008; Friedman et al., 2005).

Experiencing rejection, prejudice, and discrimination from family, peers, and partners can be traumatizing and difficult to manage. The more weight stigmatization one experiences, the more coping efforts they engage in (Myers & Rosen, 1999). Reports of weight stigma are also associated with reports of binge eating as a way of coping (Friedman et al., 2005). Eating more food and refusing to diet are two commonly endorsed strategies for coping with weight stigma (Puhl & Brownell, 2006). Puhl, Moss-Racusin, and Schwartz (2007) observed these same coping strategies specifically among weight loss support group members who endorsed negative stereotypes about overweight people. In addition, Durso and Latner (2008) reported positive associations between internalized weight bias (attributions about the "self" which suggest internalized negative messages about being overweight) and binge eating. As further support for weight stigma as a barrier to healthy weight maintenance, undergraduates who report higher levels of experience with weight stigma are also likely to report higher levels of motivation to avoid exercise. It might be that the shame or embarrassment resulting from stigmatization reduces motivation to exercise, though more research is needed to explore this link (Vartanian & Shaprow, 2008).

The Present Study

The principal goal of this study was to investigate the relation of multiple personal and contextual risk factors to binge eating; specifically, we aimed to determine the unique contribution of weight stigmatization in the context of cumulative risk for binge eating. From a cumulative risk perspective on psychopathology, the number of risk factors experienced by

an individual is more important for predicting negative outcomes than the types of risk factor experienced (Sameroff, 2000). We hypothesized that including exposure to weight stigmatization would lead to significant improvement in the prediction of binge eating relative to a cumulative risk indicator excluding stigmatization. We elected to utilize a cumulative risk modeling approach (Rutter, 1983; Sameroff) in light of our goal to examine a broad matrix of risk that potentially could be linked to binge eating problems in our samples. This approach permits a clear and unambiguous analysis of the unique role of weight stigmatization. Our analyses of cumulative risk are similar to those reported in an earlier case-control study by Fairburn and colleagues (1998); however, in contrast to that work, we utilized quantitative survey methods rather than clinical interview assessment. Further, to expand on Fairburn et al.'s investigation of the role of teasing and negative comments concerning the risk-promoting experience of weight stigmatization, we relied on a more extensive assessment of weight stigmatization experiences. The group of binge eating risk factors we explore includes factors that have been established in previous research (i.e., weight stigmatization, body dissatisfaction). Because of our interest in considering risk related to more generalized psychopathology, we also include factors that do not have established, distinct relations to binge eating (psychological maladjustment, low perceived social support, daily stress, negative coping).

Previous research using patients in weight loss programs has claimed this group of people experience high amounts of stigma and seem to internalize society's antifat beliefs and prejudices, which, in turn, creates low self-esteem (Friedman et al., 2005; Myers & Rosen, 1999). Less work has examined the correlates of weight stigma among undergraduate students (e.g., Vartanian & Shaprow, 2008). Although research has shown that stigma is associated with body mass index (BMI), with higher BMI relating to higher stigma encounters (Myers & Rosen), health-risking responses to weight stigmatization are reported by nonoverweight, overweight, and obese individuals (e.g., eating more food; Puhl & Brownell, 2006). The selective nature of samples of individuals who are enrolled in support groups or weight loss programs could skew results. Studying correlates of weight stigmatization in an undergraduate sample is an important step in determining the generalizability of existing findings in this area. Further, previous research has shown that disordered eating behaviors occur frequently among college women (e.g., Hill, 2002) and that level of risk may progress over the course of the college experience (e.g., Drownowski, Yee, Kurth, & Krahn, 1994). Undergraduate students are therefore an important "at-risk" group among which weight stigmatization experiences should be studied. Accordingly, we recruited undergraduate students as well as patients from a weight control clinic for the present study.

Method

Participants

The patient sample comprised 99 patients aged 18 years and older (Mean age = 35.44 years, standard deviation [*SD*] = 8.70, 94% female, 9% White/Caucasian, 48% Black/African American, 38% Latino/a/Hispanic, 4% Asian/Other) receiving medical treatment from a bariatric specialist in a weight control clinic. The student sample comprised 100 undergraduate students aged 18 years and older (Mean age = 20.03 years, *SD* = 3.74, 77% female, 20% White/Caucasian, 16% Black/African American, 14% Latino/a/Hispanic, 50% Asian/Other). Most participants in the clinic sample had some college education (45%) or were college graduates/post college (34%). BMI scores computed from participants' self-reported height and weight confirmed that the clinic sample (mean BMI = 33.51, *SD* = 7.30) was significantly more overweight than was the student sample (mean BMI = 24.01, *SD* = 4.29), $t(193) = 11.15, p < .001$.

Measures

Risk factors related to urban communities. Because data were collected from participants living in or near highly concentrated urban areas, a battery of questionnaires was included to address risk factors associated commonly with these living conditions. Participants

completed a checklist of 15 items describing various examples of *neighborhood social and physical disorder*, based on observational research reported by Raudenbush and Sampson (1999). Raudenbush and Sampson used video cameras to sample randomly the social and physical characteristics of urban, inner-city neighborhoods and detailed the prevalence of various signs of disorder (see Raudenbush & Sampson, Table 2, p. 15); their list formed the basis of the present measure. Participants were asked, "Think about the neighborhood you currently live in—what does it look like?" and to indicate whether they had seen each sign of disorder (e.g., houses or apartments with broken windows, empty beer or wine bottles on the street or sidewalk, people who are drunk or high in the street or on the sidewalk). Although this measure was in essence an events checklist, internal reliability was adequate ($KR20 = .94$). A total score was computed based on the sum of events experienced.

Participants completed the *Stressful Urban Life Events scale* (Attar, Guerra, & Tolan, 1994). This scale measures stressful, difficult experiences during the prior year, with 12 items sampling life events typical in urban populations (e.g., "During the last year, have you had to hide someplace because of shootings in your neighborhood?" "Have you seen anyone beaten, shot, or really hurt by someone?"). Responses were coded as whether these events occurred (1 = yes, 0 = no). A total score was derived from the sum of the events experienced ($KR20 = .56$).

Psychological adjustment. Participants completed three subscales of Achenbach and Rescorla's (2003) *Adult Self Report*, a broad band screen for psychopathology in adults aged 18–59 years. Subscales administered measured depressive symptoms (11 items; e.g., "I cry a lot," "I feel worthless or inferior"; $\alpha = .84$), anxiety symptoms (7 items; e.g., "I worry about my future," "I am too fearful or anxious"; $\alpha = .80$), and antisocial behaviors (19 items; e.g., "I do things that may cause me trouble with the law," "I steal"; $\alpha = .82$). Responses were made on a 3-point scale, 0 (*not true*), 1 (*sometimes or somewhat true*), and 2 (*very or often true*), to evaluate behavior the prior 3 months. Composite scores were the raw mean of items on each scale.

Binge eating. Participants completed the *Binge Eating Scale* (BES; Gormally, Black, & Daston, 1982). The scale comprises 16 questions: eight describe feelings/cognitions (e.g., guilt and the fear of being unable to stop eating) and eight describe behavioral manifestations (e.g., eating large amounts of food). Responses were made on a 4-point scale, ranging from 0 (*no binge eating*) to 3 (*severe binge eating*). Responses for the eight behavioral items were summed to indicate overall severity of binge behaviors (Cronbach's $\alpha = .77$). The BES yields internally consistent scores (e.g., Cronbach's $\alpha = .91$; Benas & Gibb, 2008). Scores of 18–26 on the full scale indicate moderate bingeing, and scores of 27 and higher indicate severe bingeing. When compared with severity level determined through interview-based assessment, the BES reliably discriminates between levels of binge eating severity (Gormally et al.). For the present study, however, the full original set of 16 items presents some lack of conceptual precision. Some items on the BES could be construed as indicators of weight stigma (e.g., concerns about eating differently in front of others), thus potentially confounding our predictive effects. To address this, we computed a total score that included only items from the behavioral subscale of the BES. Each of these items relates directly to engagement in binge eating behavior.

Body dissatisfaction. As an indicator of body dissatisfaction, participants completed one item from the feelings/cognitions subscale of the binge eating scale. Participants were presented with a scale of statements and were asked to select the statement that best described their feelings: 0 (*I don't feel self-conscious about my weight or body size when I'm with others*), 1 (*I feel concerned about how I look to others, but it normally does not make me feel disappointed with myself*), 2 (*I do get self-conscious about my appearance and weight which makes me feel disappointed in myself*), 3 (*I feel very self-conscious about my weight and frequently, I feel intense shame and disgust for myself. I try to avoid social contacts because of my self-consciousness*).

Weight stigmatization experiences. Participants completed Myers and Rosen's *Stigmatizing Situations Inventory* (1999). This measure assesses experiences of weight stigma and includes 50 items covering a range of different stigmatization experiences (e.g., inappropriate comments from doctors, social exclusion, perceived discrimination, and

encountering physical barriers). Each question is answered according to how often each situation has happened (0 = never, 1 = once in your life, 2 = several times in your life, 3 = about once a year, 4 = several times a year, 5 = about once a month, 6 = several times a month, 7 = about once a week, 8 = several times a week, 9 = daily). Although the measure includes 11 subscales, high internal consistency for the overall measure has been demonstrated in other studies, supporting the use of a total score of all items (Myers & Rosen; Puhl & Brownell, 2006). A total weight stigmatization composite was computed as the mean of all 50 items (Cronbach's $\alpha = .94$).

Negative coping mechanisms. Participants completed subscales of the *Brief Cope* (Carver, 1997), as measures of maladaptive strategies used to cope with stress. These subscales are as follows: (a) self-distraction (e.g., "I've been turning to work or other activities to take my mind off things"); (b) denial (e.g., "I've been saying to myself this isn't real"); (c) substance use (e.g., "I've been using alcohol or other drugs to make myself feel better"); (d) disengagement (e.g., "I've been giving up trying to deal with it"); (e) venting (e.g., "I've been saying things to let my unpleasant feeling escape"); (f) self-blame (e.g., "I've been criticizing myself"). Responses were coded as follows: 1 (*I haven't been doing this at all*), 2 (*I've been doing this a little bit*), 3 (*I've been doing this a medium amount*), 4 (*I've been doing this a lot*). Composite scores were derived from the mean of items on each subscale (internal reliability via Cronbach's $\alpha = .67$ for self-distraction, $.64$ for denial, $.78$ for substance use, $.74$ for disengagement, $.63$ for venting, and $.74$ for self-blame).

Social support. As an indicator of social support, participants completed Cutrona and Russell's (1987) *Social Provisions Scale*. This 24-item scale assesses components of social support, including reliable alliance, attachment, guidance, nurturance, social integration, and reassurance of worth (e.g., "There are people I can depend on to help me if I really need it," "I have close relationships that provide me with a sense of emotional security and well-being," "I feel part of a group of people who share my attitudes and beliefs"). Responses were coded as follows 1 (*strongly disagree*), 2 (*disagree*), 3 (*agree*), 4 (*strongly agree*). After reverse scoring, a composite was computed as the sum of all scale items, and a Cronbach's score of $.92$ suggests that this scale to be highly reliable. Because there is evidence that reports of perceived social support may be stronger predictors of adjustment compared with reports of received social support (Wethington & Kessler, 1986), we also included a 6-item Perceived Social Support Scale (Dubow & Ullman, 1989) to measure the amount of support participants felt they received from family and friends (e.g., "some people think their families really care about them, but other people think their families don't care about them. Do you think your family cares about you?"). Responses were coded as follows: 0 (*never*), 1 (*hardly ever*), 2 (*sometimes*), 3 (*most of the time*), 4 (*always*). After reverse scoring, a composite score was derived from the mean of all scale items (internal reliability via Cronbach's $\alpha = .77$).

Procedure

All procedures were reviewed and approved by the institutional review board overseeing research activities at our university, and by the director of the bariatric weight control clinic, from which about half of the sample was drawn. Recruitment of the undergraduate sample was conducted via a subject pool maintained by the psychology department at our university. Students in the pool were enrolled in introductory psychology courses and required to participate in research studies as part of their course requirements (alternatives to research participation were available to students who did not wish to serve as research subjects). Students signed up to participate through an online study portal and came to a private lab space in the psychology department at an appointed time to provide informed consent and complete the survey, after which they received research credit in partial fulfillment of their course requirements.

Recruitment of the clinic sample occurred onsite at the host clinic. Once the study began, all clinic patients were offered participation when they arrived for their regularly scheduled appointments. As they checked in for their appointment, the first author (a part-time employee of the clinic) described information about the survey to all patients. At this time, it was made clear

to patients that their choice to participate would have no impact on or relation to the services they received at the clinic. All patient participants provided informed consent and were assured that their survey responses would remain anonymous and separate from their clinic records. As an incentive, two \$25 cash prizes were offered via random lottery drawing to patient participants.

Results

Table 1 shows descriptive statistics for the study variables, including cutoff scores utilized for our risk analysis (described below). Table 2 shows the correlations among all study variables. As shown, we observed significant correlations among weight stigmatization, binge eating, and other risk factors. Patients also were more likely than were students to meet the “moderate-to-severe risk” range cutoff on our clinical measure of binge eating symptoms, i.e., 37% versus 13%; $\chi^2(1) = 15.71, p < .0001$, but not more likely to meet the “severe risk” cutoff, i.e., 7% versus 4%; $\chi^2(1) = .90$, nonsignificant (ns). As illustrated in Table 1, the ranges of scores for the risk variables were very similar across samples. In both samples, the upper end of each range for many variables indicates endorsement of the highest possible symptom ratings (i.e., body dissatisfaction, experience with neighborhood social and physical disorder, self-blame, substance use, denial, self-distraction).

Following typical approaches to combining multiple sources of risk (see, e.g., Appleyard, Egeland, van Dulmen, & Sroufe, 2005; Boxer, Huesmann, Bushman, O’Brien, & Mocerri, 2009; Evans, 2003; Gutman, Sameroff, & Cole, 2003), we recoded the key risk factor variables and the weight stigmatization variable to indicate dichotomized levels of risk. Participants in the highest quartile of risk on a factor received a 1, indicating “risk present,” and participants in the lower three quartiles received a 0, indicating “risk absent.” These dichotomized scores were then used to compute three composites. The weight stigmatization risk composite was based on the one dichotomized score derived from mean level of weight stigmatization. Our dichotomization method is directly in line with prior research using the cumulative risk strategy as well as recommendations against the use of the median split technique (Maxwell & Delaney, 1993). Unlike the median split technique, this method allows for meaningful risk comparisons. Regression analyses are robust to the unequal cell sizes, which result from our

Table 1
Descriptive Statistics and Cutoff Values for Risk Variables

Study variable	Patient sample			Student sample			Risk cutoff
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>	
Depression	.50	.39	.00–1.7	.46	.34	.00–1.8	.75
Anxiety	.50	.45	.00–1.9	.70	.41	.00–1.6	.86
Antisocial behavior	.16	.22	.00–1.6	.15	.15	.00–.75	.20
Self-distraction	2.1	.79	.5–4	2.6	.89	1–4	3
Denial	1.6	.63	1–4	1.5	.68	1–4	2
Substance use	1.4	.65	1–4	1.2	.58	1–4	1.5
Venting	1.7	.64	1–3	2.0	.85	1–4	2.5
Self-blame	2.2	.91	1–4	2.0	.83	1–4	2.5
ENSPD	3.4	4.8	0–16	5.3	4.8	0–16	8
SULE	2.1	1.8	0–7	1.7	1.7	0–9	3
PSS	3.1	.78	1.2–4	3.2	.54	1.3–4	2.67
Social provisions	73.9	12.9	54–96	81.7	9.7	50–96	68
BD	.83	1.0	0–3	.39	.74	0–3	1
SS	.59	.65	0–3.9	.49	.76	0–5.2	.72

Note. *M* = mean; *SD* = standard deviation; ENSPD = experience with neighborhood social and physical disorder; SULE = stressful urban life events; PSS = perception of social support; BD = body dissatisfaction; SS = weight stigma experiences mean.

* $p < .05$; ** $p < .01$.

Table 2
Correlation Among All Major Study Variables

Measures	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Sex	—																	
2. BMI	.04	—																
3. Subject type	-.25**	-.62**	—															
4. Binge eating	.06	.39**	-.24**	—														
5. Depression	.12	.18**	-.05	.51**	—													
6. Anxiety	.01	-.01	.22**	.41**	.68**	—												
7. Antisocial behavior	-.02	.04	-.00	.25**	.45**	.47**	—											
8. Self-distraction	-.03	.02	.27**	.15*	.27**	.30**	.10	—										
9. Denial	-.00	.14*	-.09	.19**	.20**	.20**	.03	.22**	—									
10. Substance use	-.11	.10	-.15*	.16*	.04	-.02	.14*	-.01	.30**	—								
11. Venting	.00	-.01	.18**	.17*	.31**	.37**	.21**	.45**	.42**	.21**	—							
12. Self-blame	.01	.31**	-.10	.37**	.51**	.33**	.22**	.35**	.34**	.15*	.45**	—						
13. BDE	-.09	.09	-.05	.26**	.20**	.17*	.07	.15*	.56**	.55**	.35**	.36**	—					
14. ENSPD	-.07	-.01	.19**	-.04	.10	.19**	.05	.16*	.01	-.08	.09	.04	-.02	—				
15. SULE	.10	.12	-.12	.17*	.21**	.18*	.13	.19**	.25**	.00	.10	.14*	.11	.16*	—			
16. PSS	-.01	-.01	.11	-.09	-.18**	-.12	-.16*	-.07	-.22**	-.26**	-.06	-.13	-.16*	-.03	-.07	—		
17. SP	.00	-.20**	.33**	-.19**	-.10	.03	-.07	.11	-.34**	-.37**	.03	-.17*	-.41**	.06	-.05	.49**	—	
18. BD	.16*	.34**	-.24**	.46**	.41**	.22**	.06	-.03	.11	.05	-.01	.35**	.14*	-.10	.10	-.11	-.17*	—
19. SS	.04	.32**	-.07	.43**	.37**	.25**	.20**	.22**	.16*	.17**	.21**	.37**	.20**	.04	.18**	-.23**	-.15*	.37**

BMI = body mass index; BDE = behavioral disengagement; ENSPD = experience with neighborhood social and physical disorder; SULE = stressful urban life events; PSS = perception of social support; SP = Social Provisions; BD = body dissatisfaction; SS = weight stigma experiences mean. Correlations for dichotomous variables to the continuous indicators represent point-biserial correlations and the relation of these variables to one another represents the phi coefficient.
* $p < .05$; ** $p < .01$.

dichotomization method (Aiken & West, 1991). The “other risk” (OR) composite was the sum of all dichotomized scores, which were derived from composites of the key binge eating risk factors assessed. These risk factors included psychological maladjustment (depression, anxiety, antisocial behavior), low social provisions, low perceived social support, daily stress (stressful urban life events and exposure to neighborhood social/physical disorder), negative coping (disengagement, self-distraction, denial, self-blame, venting, substance use), and body dissatisfaction. The “total risk” (TR) composite was computed as the sum of the weight stigmatization risk composite and the OR composite. The weight stigmatization composite has a theoretical range of 0–1, the OR composite has a theoretical range of 0–14, and the TR composite has a theoretical range of 0–15. This type of cumulative risk modeling strategy has been fairly common in developmental psychopathology studies (e.g., Appleyard et al.; Boxer et al.). One benefit of this approach is reduction in the potential impact of multicollinearity when considering the prediction of outcomes from a set of predictors that are typically moderately to highly correlated. This approach also enables a clearer focus on weight stigmatization as a predictor by grouping the other predictors into a single score. Using the top 25% of scores to establish a “risk present” group is standard in the literature.

The mean for the OR composite was 4.24 ($SD = 2.87$; range = 0–11), the mean for the TR composite was 4.50 ($SD = 3.06$; range = 0–12), and the mean for the weight stigmatization risk composite was 0.26 ($SD = 0.44$; range = 0–1). Approximately 25% of the sample reported “at risk” levels of weight stigmatization. Chi-squared analyses indicated that stigma risk was not related to sex or participant group. Two-way analyses of variance (ANOVAs), with sex and participant group as independent variables, indicated no main effects and no interactions for the TR composite and the OR composite. Seven patients and four students endorsed severe levels of binge eating (BES total score cutoff value of ≥ 27 ; Gormally et al., 1982).

Two-way ANOVAs indicated a significant interaction between race/ethnicity and participant group for the TR composite and the OR composite. Among patients, there were no race/ethnicity group differences in either composite. Post hoc comparisons indicated that Caucasian/White students’ mean scores for the OR composite (mean [M] = 5.40, $SD = 3.03$) and the TR composite ($M = 5.85$, $SD = 3.31$) were significantly higher than the Latino/a/Hispanic students’ scores for the OR composite ($M = 2.64$, $SD = 2.53$) and the TR composite ($M = 2.86$, $SD = 2.68$). Chi-squared analyses indicated that participants in the Asian/other group ($\chi^2 = 5.06$, $p = .02$) and participants in the Black/African American group ($\chi^2 = 7.33$, $p = .01$) were significantly less likely than those in the White/Caucasian group to report at risk levels of weight stigmatization. Participants in the Black/African American group were also less likely to report at risk levels of weight stigmatization compared to participants in the Latino/a/Hispanic group ($\chi^2 = 6.69$, $p = .01$). Given the findings described above and the wide range of race/ethnicity groups represented in our sample, we explored additional race/ethnicity group mean differences for binge eating, BMI, and body dissatisfaction. Group differences were observed for BMI only. The Asian/other group had a significantly lower BMI ($M = 23.88$, $SD = .58$) than the Caucasian/White group ($M = 28.31$, $SD = 5.30$), the Black/African American group ($M = 31.93$, $SD = 8.78$), and the Latino/a/Hispanic group ($M = 29.89$, $SD = 6.51$).

We examined the relative strength of the risk composite with weight stigmatization included for predicting binge eating in comparison to the risk composite excluding weight stigmatization following an analytic procedure presented by Boxer et al. (2009). We computed a series of four hierarchical regression analyses, each with sex, BMI, age, and ethnic minority status (0 = white/caucasian, 1 = Black/African American, Latino/a/Hispanic, or Asian/Other), entered as control variables in step 1. Table 3 shows the results of these analyses.¹ All reported change statistics are from step 1.

¹In addition to the cumulative risk modeling analyses presented here, we ran multiple regression analyses with the predictors entered simultaneously to examine independent effects of each of the risk factors observed. The results of this analysis in relation to our hypotheses about weight stigmatization were not different from the analyses we present. Weight stigmatization maintained a unique significant predictive relation to binge eating independent of the effects of psychological maladjustment, low social provisions, low perceived social support, daily stress, negative coping, and body dissatisfaction.

Table 3
Regression Analyses Predicting Binge Eating From Cumulative Risk Composites

Step/predictors	<i>b</i>	<i>SE(b)</i>	<i>B</i>
Step 1: Control variables			
Sex (0 = female, 1 = male)	.470	.867	.037
BMI	.221***	.042	.380***
Age	.008	.032	.019
Minority status	-1.146	.831	-.092
<i>R</i> ²	.159***		
Step 2a: Add to step 1			
WSR	2.93***	.706	.289***
<i>R</i> ² change from step 1	.070***		
Step 2b: Add to step 1			
OR	.609***	.099	.396***
<i>R</i> ² change from step 1	.142***		
Step 2c: Add to step 1			
TR = OR+WSR	.608***	.093	.421***
<i>R</i> ² change from step 1	.156***		
Step 2d: Add to step 1			
OR	.529***	.101	.344***
WSR	1.88**	.691	.186**
<i>R</i> ² change from step 1	.168***		

All reported change statistics are from step 1. SE = standard error; BMI = body mass index; WSR = weight stigmatization risk; OR = other risks; TR = total risk.

** $p < .01$; *** $p < .001$.

As shown in step 2a, weight stigmatization alone accounts for significant variance in binge eating after controlling for sex, BMI, age, and ethnic minority status. The OR composite, including all risk factors except for weight stigmatization, also accounts for significant variance in binge eating after controlling for sex, BMI, age, and ethnic minority status (see step 2b). Notably, as can be seen in comparing *R*² change for steps 2c with 2b (change from *R*² at step 1), the TR composite, including both weight stigmatization risk and the other risks, accounted for significantly more variance in binge eating than other risks alone. The analysis shown in step 2d indicated that the weight stigmatization risk term, when entered along with the other risk term, made a unique contribution to the prediction of binge eating. As shown, weight stigmatization has a significant additional effect over the other risk term for predicting binge eating ($p < .01$). The increase in *R*² for step 2d is higher than the increase in *R*² for step 2c indicating that the combination of weight stigmatization risk and other risks create an optimal model for predicting binge eating.

When the analyses described above were run separately for the patient sample and the student sample, the pattern of results was not the same across samples (see Table 4). After controlling for sex, BMI, age, and ethnic minority status, weight stigmatization accounted for significant variance in binge eating among students only. Weight stigmatization had a significant additional effect over the other risk term for predicting binge eating in students (unstandardized $b = 2.54$, $p = .017$) but not in patients (unstandardized $b = 1.07$, $p = .265$).

Discussion

Binge eating represents a major health risk and is likely to result from a variety of psychological and social difficulties. In this study, data were collected from 99 patients enrolled in a weight control clinic and 100 undergraduate students to examine psychological and social factors contributing to binge eating symptoms. In accordance with past research, our results show that binge eating and BMI are correlated, with higher binge eating related to a higher BMI (Johnsen et al., 2003). Our results also confirm a previously noted association

Table 4
Regressions Predicting Binge Eating From Cumulative Risk Composites for Patients and Students

Step/predictors	Patient sample			Student sample		
	<i>b</i>	<i>SE(b)</i>	<i>B</i>	<i>b</i>	<i>SE(b)</i>	<i>B</i>
Step 1: Control variables						
Sex (0 = female, 1 = male)	-.156	2.106	-.008	-.156	2.106	-.008
BMI	.127*	.061	.226*	.127*	.061	.226*
Age	-.035	.050	-.076	-.035	.050	-.076
Minority status	-.812	1.435	-.059	-.812	1.435	-.059
<i>R</i> ²	.067			.220***		
Step 2a: Add to step 1						
WSR	1.596	.937	.182	3.670**	1.106	.342**
<i>R</i> ² change from step 1	.030			.082**		
Step 2b: Add to step 1						
OR	.388*	.159	.257*	.661***	.130	.451***
<i>R</i> ² change from step 1	.060*			.168***		
Step 2c: Add to step 1						
TR = OR + WSR	.388*	.150	.274*	.668***	.123	.483***
<i>R</i> ² change from step 1	.067*			.185***		
Step 2d: Add to step 1						
OR	.339*	.165	.224*	.584***	.131	.398***
WSR	1.072	.955	.122	2.536*	1.040	.236*
<i>R</i> ² change from step 1	.072*			.205***		

All reported change statistics are from step 1. SE = standard error; BMI = body mass index; WSR = weight stigmatization risk; OR = other risks; TR = total risk.

* $p < .05$; ** $p < .01$; *** $p < .001$.

between weight stigmatization experiences and binge eating symptoms (Ashmore et al., 2008; Friedman et al., 2005; Myers & Rosen, 1999).

Our investigation expands upon previous work examining weight stigmatization in a larger risk context associated with binge eating. Specifically, our goal was to test the utility of weight stigmatization experiences in conjunction with other acknowledged risk factors in a cumulative risk model for binge eating. Fairburn and colleagues (1998) also found that greater cumulative risk was linked to a greater likelihood of binge eating. However, they utilized a clinical interview methodology making determinations of risk through ratings of interview material about risk factors (i.e., clinical rater judgments of risk present/absent) rather than our quantitative approach based on psychometric data. There are benefits to interview methods, although they can be limiting in terms of generalizability. It is important to recognize that additional knowledge may be gained through investigations that involve broader band quantitative assessments. Where Fairburn et al. measured binge eating via clinical diagnosis, we utilized a rating scale instrument. We view the present study as a current and complementary extension of their findings, while acknowledging that our results might generalize only to individuals experiencing binge-eating problems at subclinical levels. Still, given the large number of binge eaters who seek treatment but do not meet all criteria for a binge eating disorder diagnosis (Britz et al., 2000; Westenhoefer, 2001) and mixed evidence regarding the validity of some criteria for binge eating disorder (Latner & Clyne, 2008), it is important to study risks associated with a continuum of binge eating severity.

We observed a significant unique contribution of weight stigmatization over other important risk factors, with weight stigmatization experiences accounting for a significant amount of variance in binge eating symptoms. This speaks to the importance of addressing weight stigmatization as a risk factor. The finding that weight stigmatization contributed only to the prediction of binge eating among students is somewhat surprising. One might expect that given their motivation to lose weight, the patient group would be more sensitive to

mistreatment because of their weight. This finding deserves further investigation before any clear conclusions should be drawn; however, it may be that the disruptions that occur in both interpersonal relationships and eating habits during the transition to adulthood (e.g., Barker & Galambos, 2007) make undergraduate students especially vulnerable to weight stigmatization experiences.

The significant contribution made by weight stigmatization to the prediction of binge eating while controlling for the effects of other stressors (psychological maladjustment, daily stress, poor social provisions, and body dissatisfaction) could be an indication that weight stigmatization experiences contribute to binge eating symptoms, because they serve as unique stressors separate from the broader array of personal and contextual risk factors. Experimental research or longitudinal work evaluating proximal processes is necessary to determine how weight stigmatization experiences may influence eating behavior. However, it is also possible that some of the underlying cognitions and attitudes that could be linked to binge eating (e.g., self-blame, negative attitudes about weight) are reinforced by stigmatizing experiences, which draw attention to one's weight or eating habits. For example, weight stigmatization might contribute to disordered eating by increasing shame associated with eating and being seen by others while eating. This relation might account partially for the unique contribution made by weight stigmatization to binge eating. Cross sectional research has shown that internalized weight bias predicts binge eating (Durso & Latner, 2008) and that negative weight attitudes predict poorer weight maintenance-related outcomes (e.g., Carels et al., 2009). It has been proposed that negative weight attitudes and stereotypes, potentially shaped by stigmatizing experiences, may undermine healthy eating and exercise habits by increasing negative affect and decreasing the motivation and self-efficacy necessary to maintain these habits (Carels et al.). On the other hand, Latner, Wilson, Jackson, and Stunkard (2009) recently observed that despite positive associations between weight stigmatization and both body image disturbance and fear of fat, higher frequency of weight stigmatization predicted higher levels of weight loss for participants enrolled in a weight loss program. Thus, there is a clear need for further research investigating behavioral and motivational consequences of weight stigma. If there is a causal pathway that links weight stigmatization to increased binge eating, this could indicate a dangerous cycle in which weight stigmatization leads to binge eating, which, in turn, leads to continued or worsened struggle with weight gain, which then has the potential to increase one's risk for weight stigmatization.

There is evidence suggesting that inducing empathy for the overweight and changing beliefs about the controllability of weight may not be sufficient strategies to reduce weight bias (e.g., Anesbury & Tiggemann, 2000). Thus, public education campaigns incorporating these strategies might not be the best recommendation for dealing with weight stigma. Instead, it may be more beneficial to address the negative impact of weight stigma through therapeutic interventions which involve assessment of weight stigmatization and management of pathological thoughts, feelings, and behaviors that might be triggered by weight stigmatization.

Previous research on race/ethnic differences in weight stigmatization has focused on comparisons between Caucasian and African American groups. This study expands upon previous work by including members of multiple ethnic groups. Our results are inconsistent with previous research, which suggests that the highest prevalence of weight-related discrimination exists among minorities, particularly African Americans (Puhl, Andreyeva, & Brownell, 2008). We observed that African American participants were less likely than White/Caucasian participants and Latino/a/Hispanic participants to report at-risk levels of weight stigmatization. This finding, in combination with the higher prevalence of other binge eating risk factors observed among White/Caucasian participants points to a need for further work exploring what underlying factors may account for the vulnerability that appears to exist in this group.

The conclusions of this study must be tempered by a few key limitations. First, the study relied on self-report data; future investigations should incorporate multiple informants particularly in regard to obtaining better indicators of psychological and behavioral functioning. Further, it should be noted that our patient group completed the survey after being weighed, which might have influenced their responses. Some questions might have had a

strong emotional effect on participants, potentially magnified by discouraging weigh-in results. This study was correlational, and thus we cannot draw causal inferences from our analyses. Longitudinal or experimental investigations are needed to understand more clearly the role that weight stigmatization plays in the development or maintenance of binge eating pathology. It also should be noted that the validity of BES has been questioned. Celio, Wilfley, Crow, Mitchell, and Walsh (2004) reported evidence that this measure is efficient at identifying binge eating presence but may perform inadequately at identifying individuals who do not binge eat. Some researchers argue for the use of interview-based methods for the assessment of binge eating and BED (e.g., Tanofsky-Kraff et al., 2003). Hence, it may be important for further research in this area to involve multiple methods of binge eating assessment. Finally, some of the risk factor measures asked participants about their experiences over the past 3 months (e.g., psychological adjustment measure) and over the past year (e.g., stressful urban life events scale). Further work should address the timecourse of these experiences in relation to binge eating to establish whether weight stigmatization experiences precede the onset of binge eating behaviors and whether the timing of other risk factors play any part in determining the order of events.

Our findings are still useful in spite of the limitations described above. This study adds to the current body of research on binge eating and weight stigmatization. It reinforces past findings of the social and psychological forces that serve as risk factors for binge eating symptoms. Further, weight stigmatization was found to predict binge-eating symptoms after other risk and protective factors had already been accounted for. Although the effect of choice of predictor variables should be considered in interpreting these findings, future studies of binge eating that involve the assessment of multiple risk factors should include weight stigmatization as a key social risk factor.

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