The Weight of Stigma:
The Effects of Internalized Weight Bias on Eating Behaviors in Young Adults Across the Weight Spectrum

Julia Nicholas
Eating Disorder Lab
Duke University
Abstract

This study aimed to explore the nature of internalized weight bias in young adults across the weight spectrum and to investigate the potential role of restrictive eating in social settings in the relationship between internalized weight bias and binge eating. Ninety-seven Duke undergraduates completed an online questionnaire that included measures of internalized weight bias, binge eating, and restrictive eating in social settings. Participants also wrote about past experiences of body shame and responded to scales related to the salience and significance of these memories. The findings supported the hypothesis that restrictive eating in social settings would mediate the relationship between internalized weight bias and binge eating. The results did not support gender differences in the relationship between internalized weight bias and restrictive eating in social settings. Participants’ ratings of their memories of body shame indicated that more salient and significant body shame experiences were associated with more severe internalized weight bias. Qualitative analysis of participants’ body shame memories suggested that everyday experiences, such as changing clothes in the locker room or taking photos with friends at the beach, can be distressing and stigmatizing, and may contribute to weight bias internalization in individuals across the weight spectrum.

*Key words:* weight stigma, internalized weight bias, binge eating
Internalized Weight Bias and Eating

Introduction

More than 2 in 3 adults in the United States are living with overweight or obesity, and prevalence rates continue to rise at an alarming rate (Fryar, Carrol, & Ogden, 2016). Even as overweight has become increasingly common, bias against those who are overweight remains ubiquitous in society (Puhl & Latner, 2007). Weight stigma, defined as negative attitudes and weight-related stereotypes that result in rejection, discrimination, and prejudice against those who are overweight, pervades important areas of living, including education, employment, and health care (Puhl & Brownell, 2001). Individuals who are overweight report experiencing weight-related bullying as early as elementary school, leading to poor self-esteem and body dissatisfaction in adulthood (Pont, Puhl, Cook, & Slusser, 2017). Studies have demonstrated that overweight individuals face prejudice when applying for jobs and may be less likely to receive raises or promotions (Agerstrom & Rooth-Olof, 2011; Miller & Lundgren, 2010). Individuals with overweight also experience discrimination in health care, including disparaging comments from providers, reluctance of providers to treat patients who are overweight or obese, and exclusion of obesity treatments from health insurance plans (Puhl & Brownell, 2001). Weight bias in the medical field may discourage patients with overweight or obesity from seeking health care and prevent them from receiving the health care they need (Puhl & Brownell, 2001). In addition to these systemic effects of weight bias, weight-based discrimination is associated with depression, poor body image, low self-esteem, and even suicidality (Puhl & Heuer, 2009).

One of the most insidious effects of weight stigma is internalized weight bias. Internalized weight bias occurs when an individual views their own self-worth through the lens of common negative stereotypes and attitudes about people who are overweight (Durso & Latner, 2008). Weight bias internalization results in holding negative beliefs about oneself, not
necessarily related to physical appearance or ability, as a result of one’s size. For instance, an individual who considers herself overweight and internalizes the stereotype that overweight people are lazy might begin to view herself as lazy. Internalized weight bias has been found to be a powerful predictor of poor physical and mental health, above and beyond the effects of BMI, experienced weight stigma, and body dissatisfaction (Durso & Latner, 2008).

It is a common misconception that weight stigma may motivate individuals with overweight or obesity to engage in healthy behaviors that promote weight loss, such as healthy eating and exercise. On the contrary, studies have consistently demonstrated that weight stigma contributes to binge eating (Almeida, Savoy, & Boxer, 2010; Ashmore, Friedman, Reichmann, & Musante, 2008; Pearl & Puhl, 2014; Puhl & Suh, 2015). Experiencing weight stigmatization predicts binge eating, with more frequent stigmatization associated with more severe binge eating disorder (BED) symptoms (Ashmore et al., 2008). BED is characterized by recurrent episodes of binge eating, the consumption of large amounts of food with a subjective sense of loss of control over one’s eating (American Psychiatric Association, 2013). Two key behavioral features of BED are eating alone out of embarrassment about the quantity of food one is eating and feeling disgusted with oneself, depressed, or guilty in response to binge eating episodes (American Psychiatric Association, 2013). Weight stigmatization may contribute to these symptoms by making someone more likely to eat alone and more likely to feel ashamed of their eating. Judgmental comments about food (e.g., “Do you really need another slice of pizza?”) may lead an individual to avoid eating in front of other people, opting instead to eat alone, increasing risk for binge eating episodes (Almeida et al., 2010). Shame induced by such judgmental comments may also trigger episodes of emotional eating, a maladaptive coping mechanism common among individuals who struggle with internalized weight bias (Hayward,
Vartanian, & Pinkus, 2018). Furthermore, these overeating episodes may confirm one’s internalized belief that they are to blame for their weight, perpetuating the cycle of stigma, shame, and unhealthy eating (Almeida et al., 2010).

Experienced and internalized weight bias may also lead to rigid dietary restraint, the deliberate restriction of food in an attempt to regulate body weight. In particular, individuals who experience loss-of-control eating may set strict rules about eating certain foods due to the belief that they are unable to control their eating unless they take an “all-or-none” approach (Linardon, 2018, p. 126). Rather than eating a balanced diet and enjoying all types of foods in moderation, an all-or-none approach to eating involves complete avoidance of foods the individual has deemed ‘bad’. This rigid restraint is unsustainable, and breaking the rules may trigger an all-or-nothing reaction, leading to binge eating (see Figure 1; Craighead, 2006; Fairburn & Wilson, 1993; Linardon, 2018).

Although most research related to weight stigma is conducted in weight loss treatment seeking samples, several studies suggest that individuals across the weight spectrum suffer from internalized weight bias (Pearl & Puhl, 2014; Schvey & White, 2015). In a study of undergraduates across the weight spectrum, Pearl and Puhl (2014) found that while BMI was positively associated with scores on a measure of internalized weight bias, even underweight and normal weight individuals showed internalized weight bias. Perceived weight status was more predictive of internalized weight bias scores than actual weight status, with individuals who considered themselves overweight or obese reporting higher levels of internalized weight bias than individuals who considered themselves to be of normal weight, regardless of their actual weight (Pearl & Puhl, 2014). Furthermore, a study by Schvey and White (2015) found that internalized weight bias predicted binge eating and binge/purge behaviors in a large sample of
lean individuals, suggesting that the pernicious influences of weight stigma impact the mental and physical health of individuals across the weight spectrum.

Few studies have examined the relationship between internalized weight bias and eating behavior in men and women across the weight spectrum. Pearl and Puhl (2014) found that women across the weight spectrum endorse higher levels of internalized weight bias, which may reflect the greater scrutiny applied to women’s physical appearance compared to men’s (Puhl, Andreyeva, & Brownell, 2008). The same study also found that weight bias internalization was associated with binge eating among both men and women across the weight spectrum (Pearl & Puhl, 2014). However, it is unknown whether gender moderates the relationship between internalized weight bias and restrictive eating. It is possible that internalized weight bias may be more predictive of restrictive eating among women, due to the increased pressure on women to conform to strict weight standards (Puhl et al., 2008). Women may also be more likely to engage in restrictive eating due to the relatively higher popularity of dieting among women (Wardle et al., 2004). In line with research demonstrating that women experience more objectified body consciousness, the monitoring of one’s appearance and behavior as if one were an outside observer (Fredrickson & Roberts, 1997; McKinley, 1998), women who feel shame related to their weight or shape may be more self-conscious about eating in social settings, where they are vulnerable to judgement from others.

The purpose of the current study was to explore the potential relationship between internalized weight bias, restrictive eating, and binge eating (see Figure 1). First, the study aimed to characterize the potential role of restrictive eating in social settings in binge eating behavior. It was predicted that internalized weight bias would be associated with both restrictive eating in social settings and binge eating, and that restrictive eating in social settings would mediate the
relationship between internalized weight bias and binge eating (Hypothesis 1). The second aim of this study was to investigate the potential role of gender in the relationship between internalized weight bias and restrictive eating in social settings. It was predicted that gender would moderate the relationship between internalized weight bias and restrictive eating in social settings, with women evidencing a stronger association between internalized weight bias and restrictive eating in social settings than men (Hypothesis 2). The third aim of this study was to understand the types of experiences that contribute to internalized weight bias in individuals across the weight spectrum. It is hypothesized that participants who recount more salient and significant body-shame-related memories will show higher levels of internalized weight bias (Hypothesis 3).

**Method**

**Overview**

The Eating, Memory, and Body Image (EMBODI) study was conducted as part of the larger REThink study, a dissertation project exploring the potential role of hippocampal-dependent memory in the development and maintenance of BED. The measures used in the present study, described below, were incorporated into a longer online survey of self-report measures for the REThink study. All procedures for the present study were approved by the Duke University Institutional Review Board (Pro2018-0644).

**Participants**

Duke University undergraduates ($N = 100$) were recruited from the Psychology & Neuroscience subject pool to participate in a study on eating, memory, and body image. The Psychology & Neuroscience subject pool comprises of Duke University undergraduate freshmen, sophomores, juniors, and seniors enrolled in introductory psychology courses. Students enrolled
in these courses must fulfill 5 hours of research participation before the end of the semester. Students who are not eligible to participate in research studies (e.g., students under the age of 18) or who do not want to participate in research may choose to write short research papers instead of participating in studies.

One hundred participants submitted the online survey. The data from 3 participants were incomplete and were excluded from analysis. The remaining 97 participants were 62 women and 35 men (ages 18-24, $M = 18.94$, $SD = 1.16$). Participant Body Mass Indexes (BMIs) ranged from 18.07 to 44.93 ($M = 23.67$), with 26.8% of participants classified as overweight or obese (i.e., BMI $\geq 25$).

**Procedure**

Participants were able to sign up for the study in the online SONA research participation portal from September 25 to November 18, 2018. After registering for the study in SONA, participants were directed to an online survey hosted on the Duke Qualtrics website. The survey took approximately 45 minutes to an hour to complete. At the start of the survey, subjects were provided with a brief description of the nature of the study, as well as contact information of the researchers and the Duke University Institutional Review Board. Subjects provided informed consent for participation in the study by clicking to the next page. Upon completion of the measures, the participants viewed a debriefing page that thanked them for their participation and provided information about on-campus, local, and online resources for individuals struggling with eating disorders and other mental illnesses. Participants were automatically granted a 1-hour research participation course credit upon completion of the survey.
Measures

The online survey included self-report measures of eating disorder symptoms, weight stigma, restrictive eating in social settings (see Appendix B for a copy of the measures).

Demographics. Participants reported their gender, age, and ethnicity, as well as their height and weight, which were used to calculate body mass index (BMI).

Binge eating. The Eating Disorder Diagnostic Scale (EDDS; Stice, Telch, & Rizvi, 2000) is a brief, 22-item measure that assesses eating disorder symptomatology for diagnostic purposes. In accordance with the DSM-5 criteria for eating disorder diagnoses, participants indicate whether or not they experience eating disorder symptoms such as fasting, bingeing, purging, and driven exercise, and report how often they have engaged in these behaviors over the past 3 months. The EDDS has demonstrated excellent concurrent validity with interview-based diagnoses for anorexia, bulimia, and binge-eating disorder (e.g., kappa coefficient of .78 and overall accuracy of .96 in a large sample of US adolescent girls and young women; Stice, Fisher, & Martinez, 2004), as well as strong internal consistency (e.g., $\alpha=.91$ in a large sample of US women ages 13 to 65; Stice et al., 2000). Of interest in the present study were responses to EDDS item 6, “How many times per month on average over the past 3 months have you eaten an unusually large amount of food and experienced a loss of control?” which was used as a measure of binge eating.

Internalized weight bias. The Weight Bias Internalization Scale (WBIS; Durso & Latner, 2008) assesses the degree to which an individual ascribes negative weight-related attitudes and stereotypes to their own self-concept. The present study used the Modified Weight Bias Internalization Scale (WBIS-M) developed by Pearl and Puhl (2014), which employs weight-neutral language (i.e., “my weight” rather than “overweight”) in order to be more
accessible and less stigmatizing for individuals across the weight spectrum. The WBIS-M includes 11 items which are rated using a 7-point Likert scale (i.e., 1=strongly disagree; 7=strongly agree). The WBIS-M has demonstrated high internal consistency in previous studies (i.e., $\alpha=.94$ in a large sample of US adults) as well as in the current study (i.e., $\alpha=.93$). Furthermore, the WBIS-M validation study (Pearl & Puhl, 2014) produced a distribution of scores similar to that observed in the original WBIS validation study (Durso & Latner, 2008), suggesting that the shift to weight-neutral language did not interfere with comprehension of the items.

**Restrictive eating in social settings (RESS).** Participants answered several investigator-designed questions related to shame-motivated restrictive eating behavior in social settings. These 8 items included statements such as, “I eat less when I am eating with other people than when I am eating alone” and “When I eat in front of other people, I feel anxious about the amount I am eating”. Participants rated these items using a 5-point Likert scale (i.e., 1=never; 2=rarely; 3=sometimes; 4=often; 5=very often). 7 of the 8 items demonstrated good internal consistency (i.e., $\alpha=.878$), and all further analyses were conducted using these 7 items.

**Depression.** Symptoms of depression were measured using the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). Participants report the degree to which they have experienced each of 21 symptoms of depression over the past 2 weeks. Responses are scaled from 0 to 3, with higher scores representing more severe depression symptoms. Total scores on the BDI-II range from 0 to 63, with 0 to 13 indicating minimal depression, 14 to 19 indicating mild depression, 20 to 28 indicating moderate depression, and 29-63 indication severe depression. The BDI-II has demonstrated high internal consistency in previous studies (i.e.,...
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\( \alpha = .93 \) in a large sample of undergraduate students; Beck et al., 1996) as well as in the current study (i.e., \( \alpha = .91 \)).

Weight stigma memories. Memories of experienced weight stigma were assessed using a modified version of the Autobiographical Memory Questionnaire (Rubin, Schrauf, & Greenberg, 2003) specific to memories of body shame (Duarte & Pinto-Gouveia, 2017). The modified AMQ prompts participants to describe a specific episode from their life in which they experienced body shame. After writing a detailed description of their memory, participants respond to questions about the vividness and intensity of the memory. Additionally, participants completed the 7-item version of the Centrality of Event Scale (CES; Berntsen & Rubin, 2006), which measures the significance of a specific memory to an individual’s identity and worldview. The CES asks participants to rate items such as “My memory of this event helps me to better understand myself” and “I feel that this event has become a central part of my life story” on a 5-point scale (1=totally disagree; 7=totally agree), with higher scores attributing more importance to the memory. The CES demonstrated strong internal consistency in a study of traumatic memories among undergraduate students (\( N=707, \alpha = .88 \); Berntsen & Rubin, 2006). Furthermore, a Portuguese version of the CES had excellent internal consistency in a study of body shame related memories among Portuguese college students (\( N=331, \alpha = .96 \); Duarte & Pinto-Gouveia, 2017). The scale demonstrated excellent internal consistency in the current sample (\( N=86, \alpha = .96 \)).

Analysis

Quantitative data analysis was performed using SPSS Statistics Version 25. To test the hypothesis that restrictive eating in social settings would mediate the relationship between internalized weight bias and binge eating, mediation of the relationship between weight bias
internalization (i.e., WBIS-M score) and binge eating frequency reported on the EDDS by restrictive eating in social settings (RESS) was tested using the four step process described by Baron and Kenny (1986). In this process, linear regression is used to establish a predictive relationship between the independent variable and the mediator while controlling for covariates. Next, a hierarchical regression predicting the outcome variable is calculated, with the independent variable and covariates entered in Block 1, and the mediator entered in Block 2. This process is used to test that the independent variable predicts the mediator, that the independent variable predicts the outcome, that the mediator predicts the outcome, and that the effects of the independent variable on the outcome are partly or fully accounted for by the effects of the mediator.

Linear regression is not typically recommended for count variables with non-normal distributions, such as binge frequency. However, the process described above was followed because the small sample size ($N = 97$) was not suitable for nonparametric regression modeling or bootstrapping techniques (Li, Wong, Lamoureux, & Wong, 2012). Furthermore, as binge eating episodes may vary in the quantity of food consumed and the level of distress they trigger, binge frequency may be considered an indicator of binge eating severity rather than a mere tally of binge eating episodes. These points notwithstanding, negative binomial regression was conducted to check that mediation was supported by a model more suited to skewed count data.

The hypothesis that gender will moderate the relationship between internalized weight bias and restrictive eating in social settings was tested using the method described by Baron and Kenny (1986) for evaluating a categorical moderator with a continuous independent variable. A regression equation was created for participants of each gender, with RESS score as a criterion variable and WBIS-M score as a predictor. The difference between the regression coefficients for
men and women was tested to determine whether gender moderates the relationship between internalized weight bias and restrictive eating in social settings.

In order to detect multivariate outliers, correlation plots were visually inspected and Mahalanobis distances were calculated for all regression equations. Cases were considered multivariate outliers if they had a Mahalanobis distance that was significant at the $p < .001$ level, which is evaluated as $X^2$ with degrees of freedom equal to the number of predictor variables in the regression equation.

In order to explore the role that stigmatizing experiences play in internalized weight bias for individuals across the weight spectrum, participants’ responses to the AMQ will be analyzed qualitatively using NVivo Version 12. The salience of these memories, as measured by the multiple-choice section of the AMQ, as well as the significance an individual ascribes to the event, as measured by the CES, will be tested as possible predictors of internalized weight bias. Additionally, an independent-samples $t$-test will be used to compare mean WBIS-M scores between individuals who recalled memories of body shame and those who did not.

**Results**

The purpose of this study was to explore the relationship between internalized weight bias and eating behavior among young adults across the weight spectrum using an online survey including self-report measures of eating disorder symptoms, internalized weight bias, and restrictive eating in social settings. Participants also wrote about personal experiences of weight stigma and body shame, and rated the salience and significance of these memories. Participant demographics and descriptive statistics are provided in Table 1, and correlations are provided in Table 2.
Hypothesis 1: Restrictive Eating in Social Settings Mediates the Effect of Weight Bias Internalization on Binge Eating Frequency

It was hypothesized that internalized weight bias, as measured by WBIS-M scores, would be correlated with frequency of binge eating episodes, and that this relationship would be mediated by restrictive eating in social settings (RESS). This mediation effect was tested using Baron and Kenny’s recommended four step process (1986), with BDI score included as a control variable due to its significant correlations with WBIS-M score, RESS, and binge eating frequency.

Before mediation analysis was conducted, all variables were centered at zero and the data were inspected for multivariate outliers. Visual inspection of correlation plots revealed no multivariate outliers when all cases were examined together. However, when data from male and female participants were analyzed separately, visual inspection of the correlation plot of WBIS-M score and RESS for male participants revealed a potential outlier. Review of the participant’s responses suggested that the participant was not answering the survey questions randomly or in an extreme manner. Additionally, the participant’s relatively high WBIS-M and RESS scores were consistent with the memory of weight stigma that they wrote about for the AMQ. Following this inspection, the case was retained in the model.

The first step in testing mediation was to establish a relationship between the causal variable, WBIS-M score, and the mediator, RESS. A regression equation was calculated with WBIS-M score predicting RESS, with BDI score as a control. The regression was significant ($R^2 = .282, F(2, 94) = 18.475, p < .001$), with WBIS-M score predicting RESS ($\beta = .481, p < .001$). The significant relationship between WBIS-M score and RESS after controlling for BDI confirmed that RESS could be a mediator in the relationship between WBIS-M score and binge
eating frequency. The second step was to establish a relationship between the causal variable, WBIS-M score, and the outcome variable, binge frequency. A hierarchical regression was conducted with WBIS-M score and BDI score in Block 1, and RESS in Block 2 (see Table 3). In Block 1, WBIS-M score and BDI score accounted for significant variance in binge eating frequency ($R^2 = .231, F (2, 94) = 14.112, p < .001$). WBIS-M score significantly predicted binge eating frequency ($\beta = .234, p < .03$), as did BDI score ($\beta = .325, p < .01$), fulfilling the second step of the four step process for testing mediation. The third step was to show that the mediator, RESS, affects the outcome variable, binge frequency, while accounting for the effects of WBIS-M score. In Block 2, RESS added significantly to the variance accounted for in binge frequency ($\Delta R^2 = .034, p < .05$). The coefficient for RESS was significant ($\beta = .216, p < .05$), confirming that RESS predicts binge frequency while accounting for WBIS-M score. The final step in the four step process for testing mediation was to establish that the mediator, RESS, fully mediated the relationship between WBIS-M score and binge frequency. When RESS was entered in Block 2, the coefficient for WBIS-M score decreased to $\beta = .130$ and was no longer statistically significant ($p = .252$), suggesting that RESS fully mediated the relationship between WBIS-M score and binge eating frequency. The direct and indirect effects of the mediation model are depicted in Figure 2. Mahalanobis distances were calculated for all 97 cases in the model, and no multivariate outliers were detected. The mediation model was also tested using negative binomial regression, a model more suited to modeling skewed count outcomes such as binge eating frequency. Since the negative binomial model confirmed the mediation described above, results of the hierarchical linear regression are reported for ease of interpretation.
Hypothesis 2: Weight Bias Internalization Predicts Restrictive Eating in Social Settings

More Strongly in Women Than in Men

Second, it was predicted that gender would moderate the relationship between internalized weight bias and RESS, with internalized weight bias explaining more variance in RESS in women than in men. This hypothesis was tested by calculating separate linear regressions predicting RESS based on WBIS-M score for men and women and then comparing the regression coefficients (see Figure 3). The regression equations were significant for men \((F(1, 33) = 7.346, p < .02, R^2 = .182)\) as well as women \((F(1, 60) = 17.954, p < .001, R^2 = .230)\). However, the difference between the regression coefficients in the male and female regression equations was nonsignificant \((\beta_{\text{men}} = .312, \beta_{\text{women}} = .256, t = -.375, p = .708)\), meaning that the data failed to support the hypothesis that gender moderates the relationship between internalized weight bias and binge eating. Mahalanobis distances were calculated for the 35 male and 62 female cases. None of the Mahalanobis distances were significant at the \(p < .001\) level; however, the male case identified as a potential outlier prior to mediation analysis had a Mahalanobis distance of 9.337, which was much closer to the threshold of \(X^2(1) = 10.828\) than any of the other cases. When the model was analyzed without this case, the regression equation was no longer significant for men \((F(1, 32) = 0.560, p = .460, R^2 = 0.017)\), suggesting that this case was driving the relationship between WBIS-M score and RESS among male participants.

Hypothesis 3: More Salient and Significant Body Shame Memories Predict Higher Levels of Internalized Weight Bias

Finally, it was hypothesized that more salient and significant memories of experienced weight stigma and body shame would be associated with higher levels of internalized weight bias. Eighty-six participants (55 women, 31 men) wrote about past experiences of weight stigma
and body shame; 11 participants (7 women, 4 men) wrote that they could not recall a time when they had experienced weight stigma or body shame. An independent-samples *t*-test revealed that WBIS-M scores were significantly higher among participants who recalled memories of body shame ($M = 2.78$, $SD = 1.35$) compared to those who did not ($M = 1.71$, $SD = .88$); $t(94) = -2.435$, $p < .02$, suggesting that experiencing body shame is associated with higher levels of internalized weight bias.

After writing about a weight stigma or body shame experience, each participant answered questions designed to assess the salience of the memory (i.e., how often and how vividly they recall the event) as well as the significance of the memory (i.e., how important they consider the event to their identity and life outlook). Memory salience accounted for significant variance in WBIS-M score ($R^2 = .271$, $F(1, 84) = 31.281$, $p < .001$), with a coefficient of $\beta = .521$ ($p < .001$). Memory significance also accounted for significant variance in WBIS-M score ($R^2 = .154$, $F(1, 84) = 15.293$, $p < .001$), with a coefficient of $\beta = .392$ ($p < .001$). These regression analyses supported the hypothesis that more salient and significant weight stigma experiences would predict higher levels of internalized weight bias.

**Qualitative Analysis of Body Shame Memories**

The memories participants wrote about for the AMQ were analyzed qualitatively in order to investigate the types of events that may induce internalized weight bias in individuals across the weight spectrum. Participants often wrote about reluctance to remove clothing in front of others, such as the multiple participants who wrote that they felt “insecure” or “embarrassed” when changing in the locker room. Others wrote about feeling exposed when wearing small, tight, or revealing clothing. For instance, one woman, age 18, wrote, “I ordered a small tennis
outfit and it was really tight and squeezed my fat. I remember feeling extremely shameful, especially after I saw photos of myself from that day.”

Disgust at one’s appearance in photographs was a common thread among many participants’ stories. It was common for participants to compare their own appearance in photographs to others’, such as the participant who wrote, “I was on a beach trip with friends and I remember wanting to lose weight because I was so sad with the bikini photos that we took. Most of my friends on the trip were skinnier than me.” Similarly, another participant wrote, “My friend is very small, and being with her amplified my guilt. I felt large compared to her and didn’t like the pictures we took together.” Additionally, simply looking at photos of other people triggered body shame for several participants. One participant wrote, “I saw my younger sister post a picture of herself with friends on social media and I was jealous of how her body looked better than mine.”

Many participants recalled comparing their bodies with their peers, such as the participant who wrote, “I felt uncomfortable about my body the first time I was changing in a locker room…upon seeing the rolls on my stomach and the size of my thighs as compared to my peers, I felt subsequent embarrassment.” Others remembered comparing their bodies at the time with their bodies when they were younger. One participant wrote, “I was trying on dresses for a special occasion and felt none of them looked good. I was much bigger than I have ever been in my entire life.” It was particularly common for participants to compare their bodies after starting college to their bodies before they left for college. For instance, one participant wrote, “The unhealthy habits of freshman year finally caught up to me, and I had an emotional breakdown about my weight and body image while looking at myself in the mirror.”
Several participants wrote about instances in which they felt ashamed of their bodies after eating a large amount of food. For some participants, the act of eating a large amount of food was in itself a source of shame. For instance, one participant wrote, “I significantly overrate, eating ice cream and also bread, and cried in shame.” Others wrote that they felt ashamed after eating because they felt or looked bloated. Participants also wrote about feeling judged by others for their eating habits, such as one participant who wrote, “When I come home during school breaks and go out to meals with [my mother]... I feel ashamed that I am eating and I feel like she would prefer it if I didn’t.” Comparing one’s food intake with that of others was another source of shame; one participant wrote, “An older cousin was visiting the family for a few days, and it was obvious that the amount of food we ate at each meal was very different. He ate very little compared to myself... I felt like I was overeating at every meal with him.”

There were gender differences in the types of experiences that elicited body shame for men and women. Men wrote about wanting to be more muscular, a theme that did not appear in women’s memories of body shame. Additionally, several men wrote about feeling body shame related to athletic performance, another sentiment that none of the women expressed. The majority of female participants expressed that they wished they were thinner; by contrast, the majority of men were ashamed of their bodies for being “too skinny”.

Several men wrote that they felt ashamed for not being muscular enough. One participant recalled noticing the size of his friend’s biceps, and feeling ashamed because his own arms were “noticeably skinnier”. Another wrote that he was reluctant to take his shirt off at the beach because he had stopped working out every day and no “longer had abs”. Several men remembered being teased by their peers for not being muscular. One participant wrote, “[I] felt ashamed of my body for being too skinny. When I went to a party, someone joked and said ‘Bro,
do you even lift?’ because I was not muscular compared to others.” Multiple men felt ashamed after being told that they “looked like a twig”. Many of the men did not specify why they were ashamed of their bodies. For instance, one wrote, “While at the beach for senior week, I felt uncomfortable taking off my shirt and taking pictures with my friends… I did not feel good about my body.” From this description, it is not clear whether he was uncomfortable taking off his shirt because he felt overweight, because he wished he were more muscular, or for some other reason. By contrast, drive for muscularity was not apparent in any of the women’s memories of body shame. While five of the 55 women wrote about times when they felt ashamed for being “too skinny” or “looking anorexic”, the vast majority of women wrote about times when they wished they were thinner, and none of the women in this study expressed a desire to be more muscular or more toned.

Several men recalled feeling body shame due to poor athletic performance. Embarrassment about lagging behind in sports practices was a recurring theme. One participant wrote, “I was doing football drills at practice and I simply could not move as fast as everyone else. If I was leaner I would have been faster.” Although one woman wrote about a time when a coach told her to watch her weight, it is not clear whether the concern about her weight was related to athletic performance or appearance. Two women who were competitive ballet dancers wrote about feeling body shame during auditions; however, it seems their feelings related more to their appearance than their ability to dance. One wrote, “I felt like I was being compared to my really skinny peers.” The other recalled her teacher telling her that she was “too large to play the lead”. Both of these statements suggest that the women felt they were being judged based on appearance rather than their skill as dancers. These quotes stand in contrast to men’s
performance-related concerns, which focused on aspects of fitness such as cardiovascular endurance, strength, and agility.

**Discussion**

The current study expanded upon prior research linking internalized weight bias to binge eating (Almeida et al., 2010; Ashmore et al., 2008; Pearl & Puhl, 2014; Puhl & Suh, 2015) by investigating restrictive eating as a potential mediator in the relationship between internalized weight bias and binge eating, testing gender as a potential moderator of the relationship between internalized weight bias and restrictive eating in social settings, and exploring the types of experiences that contribute to internalized weight bias in young adults across the weight spectrum. The results supported the hypothesis that restrictive eating in social settings would mediate the effect of internalized weight bias on binge eating. The results did not lend support to the hypothesis that gender would moderate the effect of internalized weight bias on restrictive eating in social settings. The results supported the hypothesis that participants with more salient and significant memories of body shame would evidence higher levels of internalized weight bias.

The first aim of this study was to test restrictive eating as a mediator of the relationship between internalized weight bias and binge eating. The data suggest that higher levels of internalized weight bias predict more frequent binge eating, and that this relationship is mediated by restrictive eating in social settings. Regression modeling using Baron and Kenny’s four step process for testing mediation revealed that internalized weight bias significantly predicted binge eating ($\beta = .234, p < .03$), and that this effect became nonsignificant when restrictive eating in social settings was entered into the model ($p = .252$), evidencing full mediation by restrictive eating in social settings (Figure 2). Consistent with the all-or-nothing model of binge eating
(Figure 1), which suggests that binge episodes follow periods of food restriction (Craighead, 2006), individuals with high levels of internalized weight bias may be at increased risk for binge eating because they engage in restrictive eating. This restriction may be motivated by self-consciousness about eating in front of other people due to shame about one’s body weight or shape and fear of living up to negative stereotypes about people who are overweight. In the current study, participants across the weight spectrum reported restricting their food intake in front of other people out of embarrassment or shame, suggesting that internalized weight stigma can influence eating behavior in individuals of all body weights and shapes.

It is likely that restrictive eating in social settings is just one facet of a repertoire of restrictive eating behaviors stemming from internalized weight bias. Other forms of restrictive eating, such as rigid dieting or meal skipping, may also mediate the relationship between internalized weight bias and binge eating. The current study did not include other measures of restrictive eating or rigid dieting, and further study into these potential mechanisms could help elucidate the relationship between internalized weight bias and binge eating. It is worth noting, however, that even this specific manifestation of restrictive eating fully mediated the effect of internalized weight bias on binge eating. The findings of this study suggest that forms of restrictive eating less severe than complete fasting can have significant impacts on binge eating.

It is possible that the relationship between internalized weight bias and binge eating may be mediated by another factor that covaries with restrictive eating in social settings. One potential candidate is anxiety. It seems likely that individuals with higher levels of anxiety would be more likely to worry that other people are judging the amount of food they are eating, and that negative affect resulting from anxiety may also trigger binge eating episodes. Because the current study did not assess anxiety symptoms, the possibility that the mediating effect of
restrictive eating in social settings might be better explained by anxiety symptoms cannot be ruled out. Future studies should explore the potential relationship between anxiety and restrictive eating in social settings.

The second aim of this study was to test whether gender moderates the relationship between internalized weight bias and restrictive eating in social settings. The results do not support the hypothesis that the relationship between internalized weight bias and restrictive eating in social settings is stronger for women than men. When separate linear regression equations predicting restrictive eating in social settings were calculated for women and men, the difference between the regression coefficients was nonsignificant (β<sub>men</sub> = .312, β<sub>women</sub> = .256, t = -0.375, p = .708). However, a single outlier with high levels of both internalized weight bias and restrictive eating in social settings seemed to be driving the relationship between internalized weight bias and restrictive eating in social settings among men; when this case was excluded from the model, internalized weight bias no longer predicted significant variance in restrictive eating in social settings for men (F(1, 32) = 0.560, p = .460, R<sup>2</sup> = 0.017). This nonsignificant relationship was likely a result of the small number of men included in the study (n = 35). Due to the rarity of severe internalized weight bias among young adult men, especially among those who are lean or underweight, a larger sample size is needed to adequately study the effect of internalized weight bias on eating behavior among men.

It cannot be concluded based on these results that there is no gender difference in the relationship between internalized weight bias and binge eating. Based on the memories of body shame that men shared for the AMQ, it seems that body shame for men revolved more around a drive for muscularity than a drive for thinness, a finding consistent with prior research on body dissatisfaction among men (Murray, Griffiths, & Mond, 2016; Pope, Gruber, Choi, Olivardia, &
Phillips, 1997). It seems unlikely that men who internalize weight bias, who are more concerned with being “too skinny” than with being overweight, would engage in restrictive eating to the same degree as females who internalize weight bias. Future studies of gender differences in the impact of internalized weight bias on eating behavior should recruit larger samples of men in order to capture a wider range of internalized weight bias severity.

The data support the hypothesis that more significant and salient memories of body shame are associated with higher levels of internalized weight bias. Internalized weight bias was higher among individuals who recalled memories of body shame ($M = 2.78, SD = 1.35$) than those who did not ($M = 1.71, SD = .88$); $t(94) = -2.44, p < .02$. Among those who wrote about episodes in which they had experienced body shame, memory salience was associated with higher internalized weight bias scores ($\beta = .521, p < .001$). Similarly, more significant memories were associated with higher internalized weight bias scores ($\beta = .392, p < .001$). This suggests that individuals with more salient and significant stigmatizing experiences, either of overt stigma such as teasing or internal thought processes such as comparing one’s body to others, are more likely to have high levels of internalized weight bias. This suggests that frequently recalling a memory of body shame may in itself be a stigmatizing experience that contributes to internalized weight bias. Alternatively, it is possible that stigmatizing experiences in the present could be reminding the individual of past experiences of body shame, making these memories more salient and significant because they are recalled more often and continue to have relevance in their lives. Another possible explanation is that individuals who spend more time ruminating on past negative experiences, such as experiences of body shame, may also be more likely to internalize weight stigma. Further study is needed in order to understand the ways in which past experiences of weight stigmatization inform current internalized weight bias, the factors that
make one more susceptible to internalizing stigma, and therapeutic strategies for disentangling weight stigma from one’s current identity and eating behaviors.

Participants’ responses to the Autobiographical Memory Questionnaire provided insight into the types of experiences that contribute to weight bias internalization in individuals across the weight spectrum. Participants recalled feeling body shame while changing clothing in front of others or while wearing tight or revealing clothing; they expressed feeling disgusted at their own appearance in photographs; they wrote about times when they were criticized for their weight or shape by family, friends, coaches, and medical professionals; and they wrote about feeling ashamed after eating large amounts of food. In these memories, participants’ body shame stemmed from comparing their own bodies to those of their peers or to their own bodies when they were younger. In all, the memories participants wrote about suggest that normative, everyday experiences such as changing in the locker room or eating with family members have the potential to be highly stigmatizing. Furthermore, several trends in the stories participants wrote about suggest gender differences in the ways men and women experience body shame. However, it is worth noting that each participant only wrote about one memory of body shame, so it is highly likely that many men who wrote about performance-related body shame also experienced appearance-related body shame, and that many women also experienced performance-related body shame. Still, it is interesting that the most memorable episodes of body shame for women tended to be related to appearance, and that men were more likely than women to write about a time when they felt ashamed about their physical abilities rather than their physical appearance.

Future research should improve upon the shortcomings of the current study. The sample of the current study was small (N = 97) and comprised of undergraduates at a highly competitive
private university, where the student body is not representative of the general population in terms of socioeconomic status, racial diversity, body composition, or levels of disordered eating and other mental health concerns such as depression. Furthermore, the study included only 35 men. The small number of men included in the study limited the capacity to examine the impact of internalized weight bias on eating behavior in men, as only a few men in the study endorsed high levels of internalized weight bias. Notably, the study did not include any individuals who identified as gender nonconforming and therefore cannot be considered representative of the full range of gender diversity observed in the general population. Future studies of internalized weight bias and eating behavior should aim to recruit participants of all genders from across the weight spectrum in order to capture a wider range of experiences of internalized weight bias and its effects on eating behaviors.

Additionally, this study relied on self-report measures of binge eating and restrictive eating in social settings, which cannot be considered perfect indicators of an individual’s actual food intake. It is likely that some participants underreported the number of binge eating episodes they had experienced, due to difficulty in estimating the number of times one had binged per month over the span of three months (Stice et al., 2000), and due to shame and embarrassment related to binge eating (Craighead, 2006; Fairburn & Wilson, 1993). The measure of binge eating frequency could be improved in future studies by using the Eating Disorder Evaluation (EDE) interview (Fairburn, Cooper, & O’Connor, 2014), which asks participants more detailed questions about overeating episodes in order to determine whether and how often an individual experiences a true binge eating episode (i.e., eating an objectively large amount of food with a subjective sense of loss of control). Although this measure still relies on the participant honestly reporting episodes of overeating, it does not require the participant to label these episodes as
binges themselves, and may provide a more accurate measure of binge eating. Similarly, the EDE asks detailed questions about the reasons why and the circumstances in which participants restrict their food intake, and may provide a more accurate measure of how often a participant engages in restrictive eating in social settings.

The current study was based upon the “all-or-nothing” model of binge eating, which proposes that binge eating episodes follow attempts to restrict one’s eating (Figure 1). However, due to the cross-sectional design of this study, it was not possible to establish a causal pathway between restrictive eating in social settings and binge eating episodes. Future studies may be able to establish causation by assessing participants at multiple time points or asking for detailed accounts of participants’ eating behaviors over the course of one or multiple days in order to test whether binge eating episodes are more likely to occur directly after attempts to restrict one’s eating in social settings.

Conclusion

Although overweight is becoming increasingly common (Fryar, Carrol, & Ogden, 2016), stigma against those who are overweight remains prevalent (Puhl & Latner, 2007). The current study confirms prior research suggesting that weight stigma can be internalized by individuals across the weight spectrum (Pearl & Puhl, 2014), and that internalized weight bias can have deleterious effects on eating behavior, particularly by increasing one’s risk of binge eating (Schvey & White, 2015). Weight bias internalization allows toxic attitudes and stereotypes about weight to creep into an individual’s everyday consciousness. Internalized weight bias influences the way an individual interacts with others, leading those with high levels of internalized weight bias to restrict their eating out of fear of judgement. This pattern of restrictive eating in social settings was found to mediate the relationship between internalized weight bias and binge eating,
suggesting that binge eating in those with high levels of internalized weight bias may be induced by attempts to restrict food intake in front of other people. The memories of body shame that individuals wrote about suggest that normative experiences, such as changing in the locker room or taking photos at the beach, may contribute to internalized weight bias. That body shame colors young adults’ memories of everyday experiences demonstrates the salience of weight stigma for individuals across the weight spectrum, and the pressing need to dismantle these harmful attitudes and weight-related stereotypes.
References


### Table 1

**Participant demographics**

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Men (n = 35)</th>
<th>Women (n = 62)</th>
<th>Total (n = 97)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>24</td>
<td>36</td>
<td>60</td>
</tr>
<tr>
<td>Black</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Asian</td>
<td>12</td>
<td>17</td>
<td>29</td>
</tr>
<tr>
<td>Latinx</td>
<td>4</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Native American</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>M</th>
<th>SD</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>19.23*</td>
<td>1.31</td>
<td>18.68*</td>
<td>0.83</td>
<td>18.94</td>
<td>1.16</td>
</tr>
<tr>
<td>BMI</td>
<td>23.43</td>
<td>3.14</td>
<td>23.80</td>
<td>4.45</td>
<td>23.67</td>
<td>4.01</td>
</tr>
<tr>
<td>WBIS-M</td>
<td>2.03*</td>
<td>0.79</td>
<td>3.05*</td>
<td>1.46</td>
<td>2.68</td>
<td>1.35</td>
</tr>
<tr>
<td>Binge episodes per month</td>
<td>0.63*</td>
<td>1.61</td>
<td>2.63*</td>
<td>3.92</td>
<td>1.91</td>
<td>3.41</td>
</tr>
<tr>
<td>RESS</td>
<td>1.58*</td>
<td>0.58</td>
<td>2.05*</td>
<td>0.78</td>
<td>1.88</td>
<td>0.75</td>
</tr>
<tr>
<td>BDI</td>
<td>8.40*</td>
<td>7.59</td>
<td>12.35*</td>
<td>9.31</td>
<td>10.92</td>
<td>8.89</td>
</tr>
</tbody>
</table>

**Note.** BMI = Body Mass Index. WBIS-M = Modified Weight Bias Internalization Scale. RESS = Restrictive Eating in Social Settings. * = mean difference between men and women, $p < .05$. 

### Summary

The table provides demographic information for participants, including ethnicity, age, BMI, WBIS-M scores, and selected psychological measures. It compares men (n = 35), women (n = 62), and the total (n = 97). Means and standard deviations are provided, along with mean differences between men and women, where applicable. The note clarifies the abbreviations and significance levels.
Table 2

**Correlation Matrix**

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. WBIS-M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Binge episodes per month</td>
<td></td>
<td>.39***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. RESS</td>
<td></td>
<td></td>
<td>.53***</td>
<td>.38***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. BDI</td>
<td></td>
<td>.47***</td>
<td>.43***</td>
<td>.32**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. BMI</td>
<td></td>
<td></td>
<td>.44***</td>
<td>-.06</td>
<td>.14</td>
<td>.09</td>
</tr>
<tr>
<td>6. Memory salience</td>
<td></td>
<td>.52***</td>
<td>.36**</td>
<td>.38***</td>
<td>.32**</td>
<td>.31**</td>
</tr>
<tr>
<td>7. Memory significance</td>
<td></td>
<td>.39***</td>
<td>.18</td>
<td>.37***</td>
<td>.11</td>
<td>.34**</td>
</tr>
</tbody>
</table>

*Note. WBIS-M = Modified Weight Bias Internalization Scale; RESS = Restrictive Eating in Social Settings; BDI = Beck Depression Inventory; BMI = Body Mass Index.*

* p < .05, ** p < .01, *** p < .001
Table 3

Mediation Model for Internalized Weight Bias and Binge Eating Frequency

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
<th>$B$</th>
<th>$SE$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WBIS-M</td>
<td>.231</td>
<td>.231</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BDI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block 2</td>
<td>.264</td>
<td>.033</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WBIS-M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BDI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RESS</td>
<td>.987</td>
<td>.479</td>
<td></td>
<td></td>
<td>.216*</td>
</tr>
</tbody>
</table>

Note. In a model with binge frequency as a dependent variable, WBIS-M mean score and BDI score were entered in Block 1, and RESS mean score was entered in Block 2. WBIS-M mean score and BDI score significantly predicted binge frequency in Block 1. When RESS was entered in Block 2, RESS and BDI significantly predicted binge frequency. WBIS-M was no longer a significant predictor of binge frequency after RESS was added, suggesting mediation of the relationship between WBIS-M and binge frequency by RESS. WBIS-M = Modified Weight Bias Internalization Scale; BDI = Beck Depression Inventory; RESS = Restrictive Eating in Social Settings.

* $p < .03$, ** $p < .01$
Figure 1. The proposed role of internalized weight bias in the all-or-nothing model of binge eating (Craighead, 2006). It is possible that internalized weight bias may lead an individual to set a strict restriction on food. Negative emotions following a binge may reify internalized weight bias, feeding the cycle.

Figure 2. Mediation of the relationship between WBIS-M mean score and EDDS binge frequency by RESS mean score after controlling for BDI score. Standardized weights are shown. 

$N = 97$. The direct path from internalized weight bias to binge frequency ($\beta = .234, p < 0.05$) becomes non-significant with the addition of restrictive eating in social settings as a mediator ($\beta = .130, p = .253$). The indirect path of internalized weight bias mediated by restrictive eating in social settings was significant, $\beta = .104, p < .05$.

* $p < .05$, *** $p < .001$
Figure 3. Restrictive Eating in Social Settings (RESS) mean score by Modified Weight Bias Internalization Scale (WBIS-M) mean score for men and women.
Appendix B

Eating Disorder Diagnostic Scale (EDDS)

Instructions: Please carefully complete all questions.

Over the past 3 months…

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

1. Have you felt fat?
2. Have you had a definite fear that you might gain weight or become fat?
3. Has your weight influenced how you think about (judge) yourself as a person?

During the past 6 months have there been times when you have eaten what other people would regard as an unusually large amount of food (e.g., a quart of ice cream) given the circumstances? (Yes/No)

If yes…

During the times when you ate an unusually large amount of food, did you experience a loss of control (feel you couldn’t stop eating or control what or how much you were eating)? (Yes/No)

How many DAYS per week on average over the past 6 MONTHS have you eaten an unusually large amount of food and experienced a loss of control? (1-7)

How many TIMES per week on average over the past 3 MONTHS have you eaten an unusually large amount of food and experienced a loss of control? (0-14)

During these episodes of overeating and loss of control did you… (Yes/No)
1. Eat much more rapidly than normal?
2. Eat until you felt uncomfortably full?
3. Eat large amounts of food when you didn’t feel physically hungry?
4. Eat alone because you were embarrassed by how much you were eating?
5. Feel disgusted with yourself, depressed, or very guilty after overeating?
6. Feel very upset about your uncontrollable eating or resulting weight gain?

How many times per week on average over the last 3 MONTHS have you made yourself vomit to prevent weight gain or counteract the effects of eating? (0-14)

How many times per week on average over the last 3 MONTHS have you fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating? (0-14)

How many times per week on average over the last 3 MONTHS have you engaged in excessive exercise specifically to counteract the effects of overeating episodes? (0-14)
Over the past 3 months, how many menstrual periods have you missed? (0-4 or N/A)

Have you been taking birth control pills during the past 3 months? (Yes/No)
Modified Weight Bias Internalization Scale (WBIS-M)

Instructions: The following questions relate to your feelings about your weight. Please read each statement and indicate the degree to which you agree or disagree.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

1. Because of my weight, I feel that I am just as competent as anyone.
2. I am less attractive than most other people because of my weight.
3. I feel anxious about my weight because of what people might think of me.
4. I wish I could drastically change my weight.
5. Whenever I think a lot about my weight, I feel depressed.
6. I hate myself for my weight.
7. My weight is a major way that I judge my value as a person.
8. I don’t feel that I deserve to have a really fulfilling social life, because of my weight.
9. I am OK being the weight that I am.
10. Because of my weight, I don’t feel like my true self.
11. Because of my weight, I don’t understand how anyone attractive would want to date me.
Restrictive Eating in Social Settings (RESS)

Instructions: Please answer the following questions based on your experience over the PAST 3 MONTHS.

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Very often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. I choose healthier food options when I am eating with other people than when I am eating alone.
2. I eat less when I am eating with other people than when I am eating alone.
3. I choose not to eat when other people are present, even if they are eating.
4. If someone else offers me food, I say no even if I am hungry.
5. I pretend not to like certain unhealthy foods because of what other people might think of me.
6. I eat more when I am with other people than when I am alone.
7. I choose not to eat certain foods because I am worried about what other people might think of me.
8. I avoid eating at work or at school because I do not want to eat in front of other people.
Beck Depression Inventory-II

*Instructions:* This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the statement in each group that best describes the way you have been feeling during the past two weeks, including today. Select the number beside the statement you have picked. If several statements in the group seem to apply equally well, select the highest number for that group.

1. Sadness
   - 0 I do not feel sad.
   - 1 I feel sad much of the time.
   - 2 I am sad all the time.
   - 3 I am so sad or unhappy that I can’t stand it.

2. Pessimism
   - 0 I am not discouraged about my future.
   - 1 I feel more discouraged about my future than I used to be.
   - 2 I do not expect things to work out for me.
   - 3 I feel my future is hopeless and will only get worse.

3. Past Failure
   - 0 I do not feel like a failure.
   - 1 I have failed more than I should have.
   - 2 As I look back, I see a lot of failures.
   - 3 I feel like I am a total failure as a person.

4. Loss of Pleasure
   - 0 I get as much pleasure as I ever did from the things I enjoy.
   - 1 I don’t enjoy things as much as I used to.
   - 2 I get very little pleasure from the things I used to enjoy.
   - 3 I can’t get any pleasure from the things I used to enjoy.

5. Guilty Feelings
   - 0 I don’t feel particularly guilty.
   - 1 I feel guilty over many things I have done or should have done.
   - 2 I feel quite guilty most of the time.
   - 3 I feel guilty all of the time.

6. Punishment Feelings
   - 0 I don’t feel I am being punished.
   - 1 I feel I may be punished.
   - 2 I expected to be punished.
   - 3 I feel I am being punished.
7. Self-Dislike
   0  I feel the same about myself as ever.
   1  I have lost confidence in myself.
   2  I am disappointed in myself.
   3  I dislike myself.

8. Self-Criticalness
   0  I don’t criticize or blame myself more than usual.
   1  I am more critical of myself than I used to be.
   2  I criticize myself for all of my faults.
   3  I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes
   0  I don’t have any thoughts of killing myself.
   1  I have thoughts of killing myself, but I would not carry them out.
   2  I would like to kill myself.
   3  I would kill myself if I had the chance.

10. Crying
    0  I don’t cry any more than I used to.
    1  I cry more than I used to.
    2  I cry over every little thing.
    3  I feel like crying, but I can’t.

11. Agitation
    0  I am no more restless or wound up than usual.
    1  I feel more restless or wound up than usual.
    2  I am so restless or agitated that it’s hard to stay still.
    3  I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest
    0  I have not lost interest in other people or activities.
    1  I am less interested in other people or things than before.
    2  I have lost most of my interest in other people or things.
    3  It’s hard to get interested in anything.

13. Indecisiveness
    0  I make decisions about as well as ever.
    1  I find it more difficult to make decisions than usual.
    2  I have much greater difficulty in making decisions than I used to.
    3  I have trouble making any decisions.
14. Worthlessness
   0  I do not feel I am worthless.
   1  I don’t consider myself as worthwhile and useful as I used to.
   2  I feel more worthless as compared to other people.
   3  I feel utterly worthless.

15. Loss of Energy
   0  I have as much energy as ever.
   1  I have less energy than I used to have.
   2  I don’t have enough energy to do very much.
   3  I don’t have enough energy to do anything.

16. Changes in Sleeping Pattern
   0  I have not experienced any change in my sleeping pattern.
   1a I sleep somewhat more than usual.
   1b I sleep somewhat less than usual.
   2a I sleep a lot more than usual.
   2b I sleep a lot less than usual.
   3a I sleep most of the day.
   3b I wake up 1-2 hours early and can’t get back to sleep.

17. Irritability
   0  I am no more irritable than usual.
   1  I am more irritable than usual.
   2  I am much more irritable than usual.
   3  I am irritable all the time.

18. Changes in Appetite
   0  I have not experienced any change in my appetite.
   1a My appetite is somewhat less than usual.
   1b My appetite is somewhat greater than usual.
   2a My appetite is much less than before.
   2b My appetite is much greater than usual.
   3a I have no appetite at all.
   3b I crave food all the time.

19. Concentration Difficulty
   0  I can concentrate as well as ever.
   1  I can’t concentrate as well as usual.
   2  It’s hard to keep my mind on anything for very long.
   3  I find I can’t concentrate on anything.
20. Tiredness or Fatigue
   0  I am no more tired or fatigued than usual.
   1  I get more tired or fatigued more easily than usual.
   2  I am too tired or fatigued to do a lot of the things I used to do.
   3  I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex
   0  I have not noticed any recent change in my interest in sex.
   1  I am less interested in sex than I used to be.
   2  I am much less interested in sex now.
   3  I have lost interest in sex completely.
Autobiographical Memory Questionnaire (AMQ)

Instructions: Shame is a common emotion in humans. Almost everyone experiences shame at some point in their lives. In this study, we are interested in your experiences of shame related to your body (for example, your weight, body size or body shape). By shame we mean the negative emotion associated with a sense of personal inferiority and devaluation. We feel ashamed when, in a situation, we evaluate ourselves (due to an action or characteristic) as awkward, different, inadequate, inferior, weak, disgusting or bad, but also when we have the idea that others see us as inferior, defective, inadequate, weak, disgusting or bad. When we feel ashamed, we often have other feelings simultaneously, such as anxiety, anger or disgust, and we have an overwhelming desire to disappear, to hide or to flee.

Next, try to remember a (significant) situation or experience where you think you have felt shame about your body. That is, a situation in which you have judged yourself negatively, or you have thought or felt that others were judging you, criticizing you or devaluing you, because of your physical appearance.

Instructions: Think of an event that…
1) Involves a specific episode in which you felt shame about your body.
2) Is a specific event. For example, do not write, "People stare at me when I am out in public" but try to think of a particular episode or event.
3) You have thought or talked about often.
This could be something that happened a long time ago or very recently. On the next page, you will be asked to describe an episode/event that fits criteria 1-3 above. Now, take some time to think of an event. It may take a few minutes, and that is normal.

Press the button only when you have the event in mind. Take your time.

Instructions: Please describe the event you thought of in as much detail as you can. Remember that it should be a specific episode of a time you were treated differently because of your weight that you have thought or talked about often.
When did the event you are remembering originally occur? (Choose the most accurate range.)
  o Within the past day
  o Within the past week
  o Within the past month
  o Within the past 3 months
  o Within the past year
  o Within the past 5 years
  o Within the past 10 years
  o More than 10 years ago

Please estimate how old you were when this event occurred: ________
Thank you for sharing. Now, please answer the following questions about the event you just described.

<table>
<thead>
<tr>
<th>Since it happened, I have thought or talked about this event.</th>
<th>Not at all 1</th>
<th>2</th>
<th>Vaguely 3</th>
<th>4</th>
<th>Distinctly 5</th>
<th>6</th>
<th>As clearly as if it were happening now 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>When remembering this event, I can see it in my mind.</td>
<td>Not at all 1</td>
<td>2</td>
<td>Vaguely 3</td>
<td>4</td>
<td>Distinctly 5</td>
<td>6</td>
<td>As clearly as if it were happening now 7</td>
</tr>
<tr>
<td>When remembering this event, I can hear it in my mind.</td>
<td>Not at all 1</td>
<td>2</td>
<td>Vaguely 3</td>
<td>4</td>
<td>Distinctly 5</td>
<td>6</td>
<td>As clearly as if it were happening now 7</td>
</tr>
<tr>
<td>When remembering the event, I feel as though I am living through it again.</td>
<td>Not at all 1</td>
<td>2</td>
<td>Vaguely 3</td>
<td>4</td>
<td>Distinctly 5</td>
<td>6</td>
<td>As clearly as if it were happening now 7</td>
</tr>
<tr>
<td>In my memory of the event, I feel the emotions as strongly as I originally experienced them.</td>
<td>Not at all 1</td>
<td>2</td>
<td>Vaguely 3</td>
<td>4</td>
<td>Distinctly 5</td>
<td>6</td>
<td>As clearly as if it were happening now 7</td>
</tr>
<tr>
<td>When remembering the event, the emotions are extremely positive.</td>
<td>Not at all 1</td>
<td>2</td>
<td>Hardly 3</td>
<td>4</td>
<td>Somewhat 5</td>
<td>6</td>
<td>Extremely 7</td>
</tr>
<tr>
<td>When remembering the event, the emotions are extremely negative.</td>
<td>Not at all 1</td>
<td>2</td>
<td>Hardly 3</td>
<td>4</td>
<td>Somewhat 5</td>
<td>6</td>
<td>Extremely 7</td>
</tr>
<tr>
<td>When remembering the event, the emotions I feel are intense.</td>
<td>Not at all 1</td>
<td>2</td>
<td>Hardly 3</td>
<td>4</td>
<td>Somewhat 5</td>
<td>6</td>
<td>Extremely 7</td>
</tr>
</tbody>
</table>
When you remember the event, do you see it:
   o Through your own eyes, like a first-person perspective?
   o As an outside observer, like a third-person perspective?
   o As a mixture of the two perspectives above?
   o Neither (no visualization)

If you try, can you switch perspectives?
   o Yes
   o No
   o Does not apply (no visualization)

In what context do you think or talk about this event? In other words, when does it come to mind? ____________________________
Internalized Weight Bias and Eating

Centrality of Event Scale (CES)

Instructions: These are the last questions about the memory you shared.

<table>
<thead>
<tr>
<th>Totally disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Totally agree</th>
</tr>
</thead>
</table>

1. I feel that this event has become part of my identity.
2. This event has become a reference point for the way I understand myself and the world.
3. I feel that this event has become a central part of my life story.
4. This event has colored the way I think and feel about other experiences.
5. This event permanently changed my life.
6. I often think about the effects this event will have on my future.
7. This event was a turning point in my life.