

AN EXAMINATION OF THE LINK BETWEEN WEIGHT STIGMA AND BINGE EATING

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**Title**

An Examination of the Link between Weight Stigma and Binge Eating

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The Supervisory Committee certifies that this *disquisition* complies with North Dakota State University's regulations and meets the accepted standards for the degree of

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## ABSTRACT

Past research shows that weight-related teasing is linked to binge eating, but little is known about the individual risk factors that render certain people more vulnerable than others. The current study examined three potential risk factors for binge eating in response to weight-related teasing: weight stigmatization experiences, weight bias internalization, and emotion dysregulation. The current study empirically investigated how these factors interacted to predict concurrent binge eating behavior through a self-report questionnaire and eating behavior in a laboratory following exposure to a weight stigma vignette. First, it was hypothesized that higher levels of weight stigmatization and emotion dysregulation would be associated with higher levels of binge eating, which was consistent with the results of a multiple linear regression analysis. Second, it was predicted that higher levels of weight stigmatization and emotion dysregulation would predict greater quantities of cookie consumption during a bogus taste test following exposure to a weight stigma vignette. The hypothesis was not supported by a multiple linear regression. Third, we posited that weight bias internalization would moderate the relationship between weight stigmatization and emotion dysregulation on disordered eating, such that higher levels of weight bias internalization would be associated with higher levels of binge eating. This was not supported by a hierarchical regression analysis. Overall, the results highlight variables pertinent to the relationship between weight stigma and binge eating. Future research should test the model in clinical samples to see if it is more relevant to people with more severe levels of eating pathology.

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# AN EXAMINATION OF THE LINK BETWEEN WEIGHT STIGMA AND BINGE EATING

## Introduction

Between 1988 and 2008, the obesity rate in the United States increased by 10% (Centers for Disease Control [CDC], 2010). It is now estimated that up to a third of adults fall in the obese weight range (Ogden, Carroll, Kit, & Flegal, 2014). Many consider the rise in obesity levels to be a signal of an obesity epidemic (Visscher, Heitmann, Rissanen, Lahti-Koski, & Lissner, 2015). In an attempt to combat this trend, there have been efforts from several sources to reduce obesity levels at local and national levels (Puhl, Peterson, & Luedicke, 2012; Walls, Peeters, Proietto, & McNeil, 2011). Some of these campaigns utilize societal bias towards individuals who are overweight or obese in an attempt to promote weight loss (Puhl et al., 2012; Walls et al., 2011). These campaigns have included overstating the health benefits of losing weight (Walls et al., 2011) or equating childhood obesity to child abuse (Puhl et al., 2012). These anti-fat biases reflect a pervasive social issue: the stigmatization of individuals who are overweight.

Weight stigmatization includes the discrimination and negative experiences a person endures due to negative social biases against those who are overweight or obese (Puhl & Brownell, 2001). To be considered overweight or obese, an individual must have an elevated body mass index (BMI), a proportionate measure of height and weight ( $\text{weight (kg)} / [\text{height (m)}]^2$ ), of 25 or higher; CDC, 2017). While the rate of obesity has increased (CDC, 2010), so has the rate of weight-based discrimination, with a rise of 66% between 1995 and 2006 (Andreyeva, Puhl, & Brownell, 2008; Puhl & Brownell, 2001). Research has shown that weight stigmatization is prevalent in the workplace (Roehling, 1999), in healthcare settings (Schwartz, Chambliss, Brownell, Blair, & Billington, 2003), by healthcare providers (Puhl & Brownell, 2001; Raves, Brewis, Trainer, Han, & Wutich, 2016), in educational settings (Puhl & Brownell,

2001), by friends and family (O'Hara, Tahboub-Schlute, & Thomas, 2016; Puhl & Brownell, 2001), and by strangers (Puhl, Moss-Racusin, Schwartz, & Brownell, 2008). Rates of weight-based discrimination are reported at higher levels than those reported by other commonly discriminated against groups (Latner, O'Brien, Durso, Brinkman, & MacDonald, 2008) and some consider it to be the last socially acceptable form of discrimination (Puhl, Andreyeva, & Brownell, 2008).

### **Weight Stigmatization and Disordered Eating**

With high rates of weight-based stigmatization, researchers have prioritized research that investigates the consequences. One negative consequence of weight stigmatization is disordered eating, such as emotional eating (Hubner et al., 2016), overeating (Sutin, Robinson, Daly, & Terracciano, 2016), and binge eating (Almeida, Savoy, & Boxer, 2011). Binge eating is characterized as eating of an abnormally large amount of food in a discrete period of time (e.g., two hours) accompanied by a feeling of loss of control over eating (American Psychiatric Association, 2013). In a study, stigmatized individuals explicitly reported overeating in an effort to cope with weight stigmatization experiences (Puhl & Brownell, 2006). The increased consumption of food as a consequence of weight stigmatization could worsen the situation for the individual, as this increased consumption often leads to weight gain, and there is a positive correlation between a higher BMI and weight stigmatization (Almeida et al., 2011; Jendrzyca & Warschburger, 2016; Puhl & Brownell, 2001).

It may seem counterintuitive that weight stigma would lead to binge eating when it could increase chances for further stigmatization. Heatherton and Baumeister's (1991) escape theory of binge eating proposes that an individual binge eats when they fail to meet a personal goal or standard, and it results in negative affect via an increase in aversive self-awareness. In other

words, a stigmatizing experience may lead an individual to feel they have a pronounced shortcoming, which can be highly unpleasant. In order to cope with this aversive self-awareness and negative feelings, the theory proposes that the individual will binge eat in order to experience dissociation (i.e., cognitive narrowing) through a focus on the physical act of eating (e.g., chewing, swallowing) instead of hypercritical thoughts of themselves (Heatherton & Baumeister, 1991). Cognitive narrowing has been conceptualized as an avoidant style of coping, which has been found to be predicted by negative affect and, in turn, to predict binge eating (Blackburn, Johnston, Blampied, Popp, & Kallen, 2006), although some research has found that depressive symptoms were a better predictor than avoidance coping (Paxton & Diggins, 1996).

Aubie and Jarry (2009) tested the escape theory in a laboratory study where college women were randomly assigned to read one of three vignettes: 1) one focused on weight-related teasing, 2) one focused on competence-related teasing, or 3) one involving no teasing. Participants were categorized as being binge-eaters if they indicated they binge ate at least once a week and also had an accompanying sense of being at least somewhat out of control on the Binge Scale (Hawkins & Clement, 1980). Although negative affect was similarly increased for binge eaters and non-binge eaters for both experimental conditions, the binge-eaters only consumed significantly more food in the weight-related teasing condition. The authors posited that weight-related teasing may specifically trigger standards for weight and shape that the individual may hold, and that aversive self-awareness for not meeting these standards may be activated. The teasing conditions had similarly high levels of negative affect elicited by the competence and weight teasing vignettes, but binge-eaters only ate significantly more in the weight-related teasing condition. This conforms to the escape theory, which specifies that

disordered eating cognitions are particularly potent risk factors for binge eating (Aubie & Jarry, 2009).

Although Aubie and Jarry's (2009) findings appear to support the escape theory of binge eating, other variables may account for the increases in food consumption, such as weight stigmatization experiences. Experiencing weight stigmatization is predictive of disordered eating (e.g., Almeida, et al., 2011; Puhl et al., 2008), so it is conceivable that being reminded of these experiences via reading about a woman being teased for her weight would trigger the women to want to engage in some behavior to regulate their mood and, as food was free and available to consume, engage in disordered eating. The desire to regulate one's mood in the face of being reminded of one's history of weight stigmatization brings up another pertinent variable: Emotion dysregulation.

### **Weight Stigmatization and Emotion Dysregulation**

Emotion dysregulation has been defined as the overarching inability to utilize adaptive coping when dealing with one's feelings (Gratz & Roemer, 2004). Disordered eating is linked to many facets of emotion dysregulation (e.g., Brockmeyer et al., 2014; Danner, Sternheim, & Evers, 2014; Lavender et al., 2014). The literature has found a strong link between emotion dysregulation and impulse control difficulties, especially for binge eating (Brockmeyer et al., 2014). In a study that investigated the link between emotion dysregulation to sub- and full-threshold bulimia nervosa diagnoses, bulimia nervosa was found to have a strong correlation to emotion dysregulation (Lavender et al., 2014). Emotion dysregulation has been found to be a strong predictor of disordered eating in non-clinical samples of adult women as well (Ty & Francis, 2013).

Emotion dysregulation has been studied in conjunction with weight bias internalization and weight stigmatization. Weight bias internalization can be defined as the phenomenon where a person internalizes societies' negative evaluations and stereotypes of people with overweight and obesity, applying the negative evaluations and stereotypes to themselves (Durso & Latner, 2008). In one study, emotion dysregulation was found to mediate the relationship between weight bias internalization and the disordered eating symptoms of emotional eating and eating in the absence of hunger (Baldofski et al., 2016). In particular, the emotion dysregulation subsets of nonacceptance of emotional responses and lack of emotional clarity were linked to disordered eating symptoms in this sample (Baldofski et al., 2016). Nonacceptance of emotional responses is when one does not accept the emotional responses they have to stimuli, and this can lead to the use of maladaptive coping mechanisms. Meanwhile, lack of emotional clarity is the inability to recognize or label one's emotions (Gratz & Roemer, 2004). In particular, nonacceptance of emotional responses may be the most pertinent because of its relationship to negative urgency (Anestis, Smith, Fink, & Joiner, 2009; Gratz & Roemer, 2004). Negative urgency is the tendency to act rashly in the face of negative affect in order to ameliorate negative emotions (Anestis, Selby, & Joiner, 2007; Anestis et al., 2009). Specifically, negative urgency has been linked to impulsive bulimic symptoms as a form of an escape mechanism from one's negative affective state (Anestis, et al., 2007; Anestis et al., 2009).

### **Weight Stigmatization and Weight Bias Internalization**

Emotion dysregulation and weight stigmatization may not be the only factors at play when it comes to individuals who binge eat. Weight bias internalization has also been linked to weight stigmatization and disordered eating. Research has found that the combination of weight stigmatization and weight bias internalization can lead to a worsening of symptoms, and thus it is

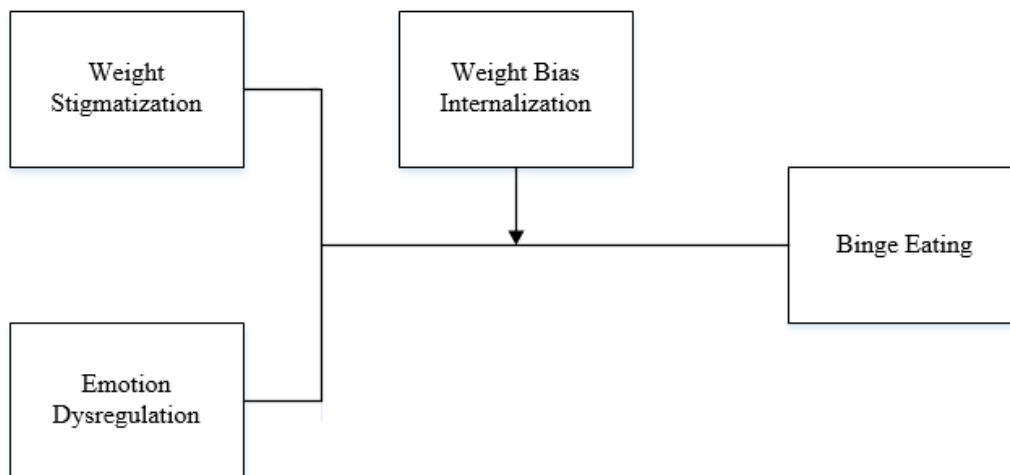
often considered a vulnerability factor (Savoy, Almeida, & Boxer, 2012). Weight bias internalization has been found to be a vulnerability factor even outside of the realm of weight stigmatization, however. For example, a study found that high levels of weight bias internalization were correlated to higher levels of body dissatisfaction as well as more frequent binge eating (Schvey & White, 2014). One study found that people with higher BMIs had higher levels of weight bias internalization (Pearl & Puhl, 2014), although another study implicates that BMI may not be a good indicator of weight bias internalization level (Schvey & White, 2014). Specifically, this study included a sample of women who fell in the normal BMI category. However, nearly 40% of these women perceived themselves as overweight or obese, and these individuals had much higher weight bias internalization. The study also found that those who were on diets had much higher weight bias internalization and that nearly 50% of these individuals thought they were overweight or obese. Importantly, this study found that higher weight bias internalization was linked to binge eating symptoms. The study showed a link between higher weight bias internalization with binge eating despite this sample being comprised of only women in the normal BMI range (Schvey & White, 2014).

The study states that weight stigmatization, weight bias internalization, and emotion dysregulation may all be important variables to investigate in how they affect disordered eating and binge eating. This assertion is based on a cross-sectional study of the variables on disordered eating. This study established that there is a direct relationship between emotion dysregulation and weight stigmatization and that the variables are significantly positively correlated (Douglas & Varnado-Sullivan, 2016). The two variables together explained 38% of the variance in eating disorder symptoms in a college sample. When weight bias internalization was added, the model explained 55% of the variance in disordered eating symptoms, showing that the three variables

explained over half of the variance in disordered eating symptoms (Douglas & Varnado-Sullivan, 2016).

### **Current Study**

Previous research has investigated the links between weight stigmatization, emotion dysregulation, weight bias internalization, and disordered eating via self-report, but not through behavioral data. The current study sought to elucidate the nature of these relationships and to investigate whether these factors were predictive of real time behavior following exposure to a weight stigmatization vignette. First, it was predicted that increased weight stigmatization and emotion dysregulation would predict more concurrent binge eating, as measured by questionnaires. Second, it was predicted that higher levels of weight stigmatization and emotion dysregulation, as measured by questionnaires, would predict higher levels of consumption of cookies during a bogus taste test in the lab following exposure to a weight stigma vignette. Third, we posited that weight bias internalization would moderate the relationship between weight stigmatization and emotion dysregulation on disordered eating, such that higher levels of weight bias internalization would be associated with higher levels of binge eating, as measured both on a self-report questionnaire and in cookie consumption quantity in the lab. See Figure 1 for a visual representation of the proposed interaction.



*Figure 1.* Proposed triple interaction model of the moderating effect of weight bias internalization of weight stigmatization and emotion dysregulation on binge eating.

## Method

### Participants

For both studies, participants were recruited from the pool of undergraduate students at North Dakota State University (NDSU) via a secure, computerized system. Participants completed the studies for course credit in partial fulfillment of class requirements. All participants were required to be 18 or older, provided informed consent before starting the studies, and were subsequently debriefed after completing the studies. This research was approved by the Institutional Review Board of NDSU. All participants were treated in compliance with the “Ethical Principles of Psychologists and Code of Conduct” (American Psychological Association, 2002). For the online portion of the study, 157 participants were recruited. Fifty-seven of these participants were recruited for the lab portion of study. For the laboratory sample, nine participants were excluded due to figuring out the purpose of the study (e.g., mentioning the study had to do with weight bias or mentioning we were examining binge eating of cookies), two were excluded for not completing the affect measure, and one who did not eat any cookies during the taste test. Ultimately, 45 participants remained for the laboratory analyses.



## Measures

All measures, the informed consent, and the debriefing are available in full in the Appendix.

**Demographics.** A demographics questionnaire about age, gender, race and ethnicity, and student status (e.g., freshman, senior) was completed during the online portion. Participants also completed a Likert-type scale that assessed how the participant viewed their body in terms of weight from “1 (*Extremely Underweight*)” to “7 (*Extremely Overweight*)” (Durso & Latner, 2008). In addition, during the lab portion of the study, participants were weighed and measured in order to calculate their BMI.

**Weight-based stigmatization experiences.** To assess participants’ experiences with weight-based stigmatization, Puhl and Brownell’s (2006) adaptation of the Stigmatizing Situations Inventory (SSI; Myers & Rosen, 1999) was completed during the online portion. This adapted version uses 12 items which assess lower level stigmatization experiences and have been determined to be more likely to be reported by students (Puhl & Brownell, 2006). Participants indicated how often they experience a stigmatizing situation from “0 (*never*)” to “3 (*once a year or more*).” An example stigmatizing situation item is, “Having people assume that you overeat or binge-eat because you are overweight.” Higher scores indicate more weight-based stigma experiences and range from 12 to 60. The modified SSI has high internal consistency with a Cronbach’s alpha of 0.96 (Puhl & Brownell, 2006). For the current study, Cronbach’s alpha was 0.91 in the laboratory sample and 0.89 in the full sample.

**Weight bias internalization.** Internalized weight bias was assessed using the modified version of the Weight Bias Internalization Scale (WBIS; Durso & Latner, 2008) during the online portion. The original WBIS assesses the degree to which one believes in negative

stereotypes about overweight and obese people and applies these stereotypes to themselves (Durso & Latner, 2008). However, the original WBIS does not use weight-neutral self-identifiers and may interfere with participant's ability to identify with the statements. The modified version of the WBIS addresses this issue by changing the self-identifiers to weight neutral terms (Pearl & Puhl, 2014). For example, instead of "As an overweight person, I feel that I am just as competent as anyone" as found on the original version (Durso & Latner, 2008), the modified version says, "Because of my weight, I feel that I am just as competent as anyone," (Pearl & Puhl, 2014). The modified WBIS has high internal consistency with a Cronbach's alpha of 0.94 (Pearl & Puhl, 2014) which is comparable to the original scale's Cronbach's alpha of 0.90 (Durso & Latner, 2008). The laboratory sample had a Cronbach's alpha of 0.93, and the full sample a Cronbach's alpha of 0.94. The modified WBIS has 11 items and utilizes a 7-point *Likert* type scale ranging from "1 (*strongly disagree*)" to "7 (*strongly agree*)." Higher scores on the WBIS indicate more internalization and scores can range from 11 to 77.

**Emotion dysregulation.** Emotion dysregulation was assessed with the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) during the online portion. This 36-item measure separates emotion dysregulation into six distinct domains: Limited access to emotion regulation strategies, lack of emotional awareness, lack of emotional clarity, difficulties in engaging in goal-directed behavior, impulse control difficulties, and non-acceptance of emotional responses. Participants indicated the amount of time that they display the behaviors described in the items, ranging from "1 (*Almost never [0-10%]*)" to "5 (*Almost always [91-100%]*)". Higher scores on the DERS indicate worse emotion dysregulation and range from 36 to 180. The DERS overall score has high internal consistency ( $\alpha = 0.93$ ; Gratz & Roemer, 2004). In

the laboratory sample, the Cronbach's alpha for the overall score was 0.94 and it was 0.93 in the full sample.

**Disordered eating.** The Eating Loss of Control Scale (ELOCS; Blomquist et al., 2014) was used for self-report binge eating behaviors and completed during the online portion. This questionnaire assesses behavioral and emotional factors that are related to binge eating over the past four weeks. An example of a behavioral question is, "During the past four weeks, how many times did you ignore an interruption (such as a phone call) to keep eating?". An example of an emotional type of question is, "On average, during these times, how disgusted with yourself, depressed, or very guilty did you feel?". A total score was used for self-report binge eating by averaging the *Likert*-item scores. Higher *Likert*-item scores indicate more loss of control, with scores ranging from one to eleven. The ELOCS has adequate internal consistency at a Cronbach's alpha of 0.90 (Blomquist et al., 2014), a Cronbach's alpha of 0.95 in the laboratory sample, and 0.86 in the full sample.

The Eating Disorder Diagnostic Scale (EDDS; Stice, Fisher, & Martinez, 2004) provided descriptive information about the participants and their overall disordered eating pathology but was not used for the main analyses. Participants completed this measure during the online portion. The EDDS measures disordered eating using 22 items based on the 4<sup>th</sup> edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1994). The EDDS has a symptom composite and a diagnostic function (Stice et al., 2004). The diagnostic function differentiates scores into seven symptoms patterns: a no symptom group and full- and sub-threshold groups for anorexia nervosa, bulimia nervosa, and binge eating disorder. The symptom composite indicates overall disordered eating severity, with a higher score indicating more disordered eating. The EDDS has adequate internal consistency ( $\alpha = 0.89$ ; Stice

et al., 2004), with a Cronbach's alpha of 0.82 in the laboratory sample and 0.81 in the full sample.

**Current affective state.** To assess the effects of the vignette, participants completed the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS measures both positive and negative affect in the moment using 20 items on a *Likert*-type scale where participants indicate how well different adjectives describe their mood from “1 (*very slightly or not at all*)” to “5 (*extremely*)”. Both the positive affect and negative affect subscales consist of ten items. Examples of negative affect adjectives include “distressed,” “scared,” and “jittery,” while positive affect adjectives include “interested,” “enthusiastic,” and “proud.” A higher score reflects more of the corresponding affect being reported and scores can range from 10 to 50. The PANAS has shown adequate momentary internal consistency for both the negative ( $\alpha = 0.85$ ) and positive ( $\alpha = 0.89$ ) affective subscales (Watson et al., 1998). In the current sample, the momentary internal consistency for negative ( $\alpha = 0.80$ ) and positive ( $\alpha = 0.85$ ) affective subscales was adequate.

**Weight stigma vignette.** All participants read a vignette that was constructed to depict a social interaction where a female shopping at a mall was teased by two female peers for her weight (Aubie & Jarry, 2009). Participants were instructed to try to identify with the main character of the vignette and imagine themselves in her place.

**Manipulation check.** To assess how well the participants identified and related with the vignette character, participants were asked to rate the strength of this identification on a 5-point *Likert*-type scale. The scale went from “0 (*Couldn't imagine being in her situation at all*)” to “5 (*Could imagine being in her situation completely*),” as was used by Aubie and Jarry (2009).

**Food stimulus.** Three types of commercially available small cookies were utilized for the food stimulus. We used the same procedure as Aubie and Jarry (2009). Thirty-five of each type of cookie was presented to participants on separate plates, for a total of one-hundred and five cookies. The cookies were counted and weighed before and after each participant in order to determine the quantity consumed.

### **Procedure**

The study largely replicated the experimental procedures conducted by Aubie and Jarry (2009). First, an online pre-screening survey was available on Sona System for participants to complete separately from the lab portion. On this pre-screening survey, participants completed the demographics questionnaire, SSI, WBIS, DERS, ELOCS, and EDDS on Qualtrics. In addition, participants were pre-screened for any relevant food allergies, medical conditions (e.g., celiac disease), or food dislikes (e.g., chocolate) which would make them unsuitable for the lab study. Participants completed these measures before the lab portion in an effort to control for the vignette potentially affecting their responses to the measures. After completing the pre-screening survey, participants were invited to sign-up for a separate study on Sona System, which was the lab portion. Participants were not told that they were invited to this second study based on their completing the pre-screening survey in an effort to reduce the chances of the participants hypothesis-guessing.

For the laboratory portion of the study, the study was advertised on Sona System as a study investigating how reading short stories affect taste perception. All participants were instructed not to eat for three hours before their time slot in order to standardize participant hunger levels. Participants were brought to the lab room, completed the informed consent, and asked when the last time they ate was and what they ate. First, participants were instructed to

read the vignette, paying careful attention to the main character and trying to identify with this character as much as they could, before the experimenter left the room to give them privacy. The participants also completed the manipulation check after reading the vignette. Participants indicated to the experimenter they were ready to move on to the next phase by ringing a bell.

Upon returning to the room, the experimenter told the participant that another research assistant went to go get another bag of cookies from a storage room in a different part of the building as they had just realized they had run out, as a ruse to be able to administer the PANAS. The participants were then asked if, in the interim, they would like to help out another research study by filling out a survey while they wait. Participants were then administered the PANAS if they agreed to participate. No participants refused the PANAS; however, two did not fill out the PANAS after agreeing to do so. This ruse was designed to disguise the purpose of measuring their mood and to minimize any hypothesis-guessing. The experimenter left the room to give them privacy and returned upon the participant ringing the bell.

When returning, the experimenter brought a tray with the three plates of cookies and a glass of water. The plates were randomly labelled cookie A, B, or C. The participants were given a rating sheet and instructed on how to fill it out, as well as how to properly taste test. Participants were instructed to eat only one type of cookie at a time. For example, the participant was told to eat cookie A to assess it for the rating sheet and to eat as many of cookie A as needed to accurately assess the cookie. Then, before moving on to cookie B, the participant was instructed to take a sip of water to cleanse their palate. This same procedure was repeated for each cookie. The experimenter told the participant that the taste test time was standardized and, as such, everyone received 10 minutes for the taste test. The experimenter told the participant that they could feel free to eat as many of any of the cookies as they wanted after completing the

taste test, as we were required to throw out any uneaten cookies after each participant due to health concerns. After 10 minutes, the experimenter returned and remove the cookies. At that point, the participants were then asked to fill out a suspicion check which assessed if and/or when the participant became suspicious that they were being deceived. Participants were then led to a weighing scale and height ruler and asked if they consented to having their weight and height being recorded. Participants were given the option to have a blind weighing, backing up onto the scale so they could not see the number, if they preferred. Upon completion, participants were then debriefed and told about the deception.

### **Statistical Analysis Plan**

To determine an appropriate sample size, G\*Power (Faul, Erdfelder, Buchner, & Lang, 2009) was utilized. The power analysis was set at a minimum of 0.80 power and an alpha of 0.05 for seven predictors in a multiple linear regression model at a predicted large effect size of 0.35. It was determined that a minimum of 49 participants would be required, however, it was determined that 100 participants would be desired. For descriptive statistics of the sample, the bivariate correlations, frequencies, means, medians, and standard deviations were calculated as appropriate for age, gender, race/ ethnicity, student status, perceived weight status, and BMI, as well as for each measure. Pairwise deletion was used throughout.

The first hypothesis was that levels of weight stigmatization and emotion dysregulation would predict concurrent binge eating, as measured by questionnaires, and was analyzed using a multiple linear regression. This regression used the SSI and DERS scores to predict the ELOCS score. Second, it was predicted that higher levels of weight stigmatization and emotion dysregulation would predict higher levels of consumption of cookies and was analyzed using a

multiple linear regression. This regression used the SSI and DERS scores as independent variables and cookie consumption as the dependent variable.

The third hypothesis was that weight bias internalization would moderate the relationship between weight stigmatization and emotion dysregulation on disordered eating, such that higher levels of weight bias internalization would be associated with higher levels of binge eating, as measured by both the self-report questionnaire and cookie consumption quantity. This was assessed using two different hierarchical linear regressions. Both regression analyses entered the simple predictors of the SSI, DERS, and WBIS in the first step. The two-way interactions of SSI x DERS, SSI x WBIS, and DERS x WBIS were entered in the second step. The three-way interaction of SSI x DERS x WBIS was entered in the third step. In the first regression (hypothesis 3A), the dependent variable was ELOCS score and in the second regression (hypothesis 3B), the dependent variable was cookie consumption in grams. To interpret any significant interactions, simple slopes analyses were planned to be conducted (Preacher, Curran, & Bauer, 2006). Before the regression analyses were conducted, it was ensured the regression assumptions (normality, multicollinearity, homoscedasticity, linearity, outliers) were not violated. In addition, the post-hoc effect size was calculated for each analysis and the Cohen's  $f^2$  was assessed. As the amount of participants who were able to be included in the laboratory sample was below what the power analysis required, the full sample was assessed for hypothesis 3A in addition to the originally planned analysis.

## Results

### **Laboratory Sample Characteristics**

For the participants who participated in both the online and laboratory portion, 12 identified as men and 33 as women. The average age of participants was 19.69 ( $SD = 2.37$ ) and



ranged from 18 to 33. The racial composition of the sample was 2.2% American Indian or Alaska Native ( $n = 1$ ), 4.4% Asian ( $n = 2$ ), 2.2% Native Hawaiian or other Pacific Islander ( $n = 1$ ), 4.4% Black or African American ( $n = 2$ ), and 86.7% ( $n = 39$ ) White or Caucasian. For ethnicity, 2.2% ( $n = 1$ ) reported being of Hispanic origin, 95.6% ( $n = 43$ ) reported not being of Hispanic origin, and 2.2% ( $n = 1$ ) did not report their ethnicity. For student status, 53.3% ( $n = 24$ ) reported being freshman, 24.4% ( $n = 11$ ) reported being sophomores, 6.7% ( $n = 3$ ) were juniors, 13.3% ( $n = 6$ ) were seniors, and 2.2% ( $n = 1$ ) reported being other.

Using the CDC (2017) conventions and height and weight recorded in the laboratory, the average BMI was 26.13 ( $SD = 4.95$ ), which is in the overweight category, and ranged from 18.01 (underweight BMI) to 39.85 (obese category). The breakdown by BMI category was 2.2% ( $n = 1$ ) underweight, 40% ( $n = 18$ ) healthy weight, 40% ( $n = 18$ ) overweight, and 8% ( $n = 8$ ) obese. For self-ratings of weight as used by Durso and Latner (2008), 0% rated themselves as extremely or moderately underweight, 2.2% ( $n = 1$ ) as underweight, 68.9% ( $n = 31$ ) as average weight, 22.2% ( $n = 10$ ) as overweight, 4.4% ( $n = 2$ ) as moderately overweight, and 2.2% ( $n = 1$ ) as extremely overweight. The mean category chosen for self-ratings of weight was the average category. Using the EDSS tentative diagnostic categorizations for eating disorders, one participant (1.8%) had symptoms congruent with full-threshold bulimia nervosa, two participants (3.5%) had symptoms congruent with sub-threshold anorexia nervosa, and 94.7% ( $n = 54$ ) did not meet full- or sub-threshold criteria for the EDSS included eating disorders. When examining the scales, trends can be found. Overall, the sample scored lower on weight stigmatization, with the mean SSI score being a 13.96 when the minimum possible score is a 12 and maximum is 60. The sample also scored lower on loss of control eating, with the mean ELOCS score being a 2.62 when the minimum score is a 1 and the maximum is 11.

Per study protocol for the lab portion, participants were instructed to eat one of each of the three cookies at minimum. The mean amount of cookies consumed was 4.65, which reflects overall compliance with the instructions. However, some participants consumed less than the three cookies with the least amount of total cookies consumed being 0.90. Overall, the participants tended to somewhat identify with the main character as assessed by the manipulation check, with a mean identification of 2.89 on a 5-point *Likert* scale. Similarly, participants' affects did not seem to reflect any probable negative effects from reading the vignette with the mean positive affect score of 30 ( $SD = 6.35$ ; range = 19 - 40) and the mean negative affect score of 13.18 ( $SD = 3.81$ ; range = 10 - 23). Participant scores for each measure and cookie consumption are displayed in Table 1. When looking at the characteristics of men and women specifically for the manipulation check, negative affect, and positive affect, some differences were noted; however, these were not assessed for statistical significance due to the sample size. For men, the mean identification with the character was 2.50 ( $SD = 1.38$ ; range = 1 - 5), the mean negative affect was 11.50 ( $SD = 11.50$ ; range = 10-15), and the mean positive affect was 30.92 ( $SD = 7.03$ ; range = 19 - 40). For women, the mean identification with the character was 3.15 ( $SD = 1.06$ ; range = 0 - 5), the mean negative affect was 13.00 ( $SD = 4.15$ ; range = 10-23), and the mean positive affect was 29.30 ( $SD = 6.22$ ; range = 19 - 40). Correlations for variables for this sample are in table 2.

Table 1

*The means and standard deviations of scores on variables for the laboratory sample.*

Variable	Mean	SD	Min	Max	N
SSI	13.96	4.77	12	40	45
WBIS	26.44	16.36	11	73	45
DERS	79.18	20.48	48	138	44
ELOCS	2.62	1.36	1	8.17	44
EDDS	1.84	3.82	0	15	44
Cookie grams	72	39.22	13	247	45
Number of Cookies	4.66	1.96	0.90	11	45
Manipulation	2.89	1.25	0	5	45
PANAS-Positive	30.07	6.33	19	40	45
PANAS-Negative	13.18	3.80	10	23	45

*Note.* SSI = Stigmatizing Situations Inventory; WBIS = Weight Bias Internalization Scale; DERS = Difficulties in Emotion Regulation Scale; ELOCS = Eating Loss of Control Scale; EDDS = Eating Disorder Diagnostic Scale; Cookie grams = The number of grams of cookies consumed; Number of cookies = The number of cookies consumed; Manipulation = Manipulation check; PANAS-Positive = The positive affect subscale of the Positive and Negative Affect Scale; PANAS-Negative = The negative affect subscale of the Positive and Negative Affect Scale.

Table 2

*Laboratory sample variable correlations.*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Age	-											
2. Gender	0.01	-										
3. Race	-0.31*	-0.6	-									
4. Ethnicity	-0.09	-0.09	-0.41	-								
5. Student Status	0.76**	-0.10	-0.26	-0.25	-							
6. Weight Description	-0.17	0.14	-0.26*	-0.14	-0.03	-						
7. Weight Bias	-0.52	0.14	0.32	0.04	-0.08	0.62**	-					
Internalization												
8. Weight Stigma	0.12	0.15	0.77	-0.41	0.17	0.42**	0.62**	-				
9. Emotion Dysregulation	-0.06	0.00	0.20	0.10	-0.10	0.17	0.58**	0.41**	-			
10. Loss of Control Eating	-0.07	-0.03	0.15	0.08	0.02	0.15	0.44**	0.39**	0.56**	-		
11. BMI	-0.10	0.03	-0.17	-0.07	-0.16	0.73**	0.44**	0.40**	-0.01	-0.05	-	
12. Negative Affect	-0.21	0.27	-0.05	0.12	-0.17	-0.01	0.23	0.05	0.28*	0.01	-0.07	-
13. Positive Affect	0.13	-0.21	-0.08	0.10	0.04	-0.10	-0.09	0.39	-0.13	-0.13	0.09	-0.32*

Note. \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.01$

## Full Sample Characteristics

For all of the participants who participated in the online component of the study, 41 identified as men and 116 as women. The average age of participants was 19.34 ( $SD = 1.58$ ) and ranged from 18 to 33. The racial composition of the sample was 0.6% American Indian or Alaska Native ( $n = 2$ ), 4.5% Asian ( $n = 7$ ), 0.6% Native Hawaiian or other Pacific Islander ( $n = 1$ ), 3.2% Black or African American ( $n = 5$ ), and 91.1% ( $n = 143$ ) White or Caucasian. For ethnicity, 2.5% ( $n = 4$ ) reported being of Hispanic origin, 96.8% ( $n = 152$ ) reported being not of Hispanic origin, and 0.6% ( $n = 1$ ) did not report an ethnicity. For student status, 52.9% ( $n = 83$ ) reported being freshman, 26.1% ( $n = 41$ ) reported being sophomores, 13.4% ( $n = 21$ ) were juniors, 7% ( $n = 11$ ) were seniors, and 0.6% ( $n = 1$ ) reported being other.

Using the CDC (2017) conventions and height and weight recorded in the laboratory, the average BMI was 24.90 ( $SD = 5.34$ ), which is in the healthy weight category, and ranged from 16.72 (underweight BMI) to 50.89 (obese category). The breakdown by BMI category was 3.2% ( $n = 5$ ) underweight, 54.8% ( $n = 86$ ) healthy weight, 27.4% ( $n = 43$ ) overweight, 12.1% ( $n = 19$ ) obese, and 2.5% ( $n = 4$ ) missing. For self-ratings of weight as used by Durso and Latner (2008), 0% rated themselves as extremely underweight, 1.3% ( $n = 2$ ) moderately underweight, 7% ( $n = 11$ ) as underweight, 64.3% ( $n = 101$ ) as average weight, 19.1% ( $n = 30$ ) as overweight, 5.1% ( $n = 8$ ) as moderately overweight, and 3.2% ( $n = 5$ ) as extremely overweight. The mean category chosen for self-ratings of weight was the average category. Using the EDSS tentative diagnostic categorizations for eating disorders, 4 participants (2.5%) had symptoms congruent with full-threshold bulimia nervosa, 6 participants (3.8%) had symptoms congruent with sub-threshold anorexia nervosa, and 93.6% ( $n = 147$ ) did not meet full- or sub-threshold criteria for the EDSS included eating disorders. Again, when examining the scale scores of this sample, trends can be

found. Overall, the sample scored lower on weight stigmatization, with the mean SSI score being a 14.24 when the minimum possible score is a 12 and maximum is 60. The sample also scored lower on loss of control eating, with the mean ELOCS score being a 2.68 when the minimum score is a 1 and the maximum is 11. For participant scores for each measure, see Table 3.

Correlations for variables for this sample are in table 4.

Table 3

*The means and standard deviations of scores on variables for the full sample.*

Variable	Mean	SD	Min	Max	N
SSI	14.24	4.71	12	40	156
WBIS	28.75	16.25	11	73	157
DERS	82.55	20.47	46	148	154
ELOCS	2.68	1.56	1	10.06	156
EDDS	1.56	3.58	0	24	157

*Note.* SSI = Stigmatizing Situations Inventory; WBIS = Weight Bias Internalization Scale; DERS = Difficulties in Emotion Regulation Scale; ELOCS = Eating Loss of Control Scale; EDDS = Eating Disorder Diagnostic Scale.

Table 4

*Full sample variable correlations.*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Age	-									
2. Gender	0.02	-								
3. Race	-0.22**	-0.11	-							
4. Ethnicity	-0.08	-0.05	-0.02	-						
5. Student Status	0.74**	-0.01	-0.15	-0.18*	-					
6. Weight Description	0.15	0.22**	-0.10	-0.07	0.14	-				
7. Weight Bias	0.10	0.25**	0.06	0.04	0.08	0.62**	-			
Internalization										
8. Weight Stigma	0.11	0.23**	0.05	-0.02	0.14	0.48**	0.65**	-		
9. Emotion Dysregulation	0.06	0.08	0.11	0.07	-0.10	0.07	0.46**	0.40**	-	
10. Loss of Control Eating	0.02	0.16*	0.12	0.04	0.03	0.34**	0.42**	0.35**	0.40**	-
11. BMI	0.10	-0.01	-0.02	-0.03	0.06	0.75**	0.55**	0.53**	0.06	0.19*

*Note.* \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.01$

## Sample Comparisons

Independent sample t-tests (two-tailed) were conducted to investigate for any selection biases for those whom chose to participate in the laboratory study after their invitation. The samples did not significantly differ for age, gender, race, student status, weight stigmatization experiences, emotion dysregulation, loss of control eating, or BMI. The samples only differed on weight bias internalization,  $t(155) = 2.06, p = .041$ , with the online sample scoring significantly higher ( $M = 30.63$ ) than the laboratory sample ( $M = 25.14$ ). See table 5 for a summary of t-tests.

Table 5

*Summary of two-tailed independent sample t-tests for pertinent variables comparing the online sample to the laboratory sample.*

Variable	<i>t</i>	<i>df</i>	<i>p</i>
Age	-1.28	155	0.202
Gender	0.76	155	0.451
Race	0.60	155	0.553
Ethnicity	1.34	155	0.183
Student Status	-0.47	155	0.637
Weight Stigma	1.14	154	0.258
Weight Bias Internalization	2.06	155	0.041
Emotion Dysregulation	1.35	152	0.178
Loss of Control Eating	0.36	154	0.723
BMI	-0.08	150	0.941

## Hypothesis Testing

The first hypothesis was that weight stigmatization and emotion dysregulation would predict more concurrent binge eating, as measured by questionnaires. This was supported by a multiple linear regression. One participant was identified by casewise diagnostics and residual statistics as an outlier and was removed from the analysis, leaving 44 participants included. The regression did not violate the regression assumptions of normality, multicollinearity, homoscedasticity, outliers, or linearity. The correlation matrix indicated that emotion dysregulation was significantly correlated to binge eating ( $r = 0.45, p = 0.001$ ) and to weight



stigmatization ( $r = 0.43, p = 0.002$ ). Weight stigmatization was also significantly correlated to binge eating ( $r = 0.45, p = 0.001$ ). The regression analysis was significant,  $F(2, 41) = 7.59, p = 0.002$  and accounted for 28% of the variance ( $R^2 = 0.28$ ). Emotion dysregulation did not explain unique variance ( $\beta = 0.02, p = 0.045$ ), but weight stigmatization was a significant simple predictor ( $\beta = 0.07, p = 0.044$ ). A post-hoc statistical power analysis found that the analysis was adequately powered at 0.96 and a post-hoc statistical effect size analysis found a medium to large Cohen's  $f^2$  of 0.39.

The second hypothesis predicted that higher levels of weight stigmatization and emotion dysregulation would predict higher levels of cookie consumption and was not supported using a multiple linear regression. One participant was identified by casewise diagnostics and residual statistics as an outlier and was removed from the analysis, leaving 44 participants included. The regression did not violate the regression assumptions of normality, multicollinearity, homoscedasticity, outliers, or linearity. The correlation matrix indicated that emotion dysregulation and weight stigmatization were significantly correlated ( $r = 0.44, p = 0.001$ ). Cookie consumption was not significantly correlated to weight stigmatization ( $r = 0.18, p = 0.115$ ) or emotion dysregulation ( $r = 0.21, p = 0.115$ ). The model ( $R^2 = 0.05; F(2, 42) = 1.14, p = 0.330$ ) was not statistically significant in predicting the amount of cookies consumed. A post-hoc statistical effect size analysis found a small Cohen's  $f^2$  of 0.05 and a post-hoc statistical power analysis was not conducted due to the non-significant results.

Hypothesis 3A predicted that weight bias internalization would moderate the relationship between weight stigmatization and emotion dysregulation on disordered eating, such that higher levels of weight bias internalization would be associated with higher levels of binge eating as measured by survey. Due to the small sample size for the laboratory sample and the availability

of the full online sample whom took the surveys, hypothesis 3A is first reported for the laboratory sample and then for the full sample. For the laboratory sample, one participant was identified by casewise diagnostics and residual statistics as an outlier and was removed from the analysis, leaving 44 participants included. The regression for the laboratory sample was found to not violate the regression assumptions of normality, homoscedasticity, outliers, or linearity and was within tolerable range for multicollinearity (see Table 6 for correlations). The first level of the model entered the centered simple predictors, was statistically significant, and accounted for 28% of the variance ( $R^2 = 0.28$ ;  $F(3, 41) = 3.65$ ,  $p = 0.005$ ). Emotion dysregulation ( $\beta = 0.02$ ,  $p = 0.074$ ), weight stigmatization ( $\beta = 0.07$ ,  $p = 0.076$ ), and weight bias internalization ( $\beta = -0.001$ ,  $p = 0.951$ ) were not found to be significant simple predictors. A post-hoc statistical power analysis found that the analysis was adequately powered at 0.93 and a post-hoc statistical effect size analysis found a large Cohen's  $f^2$  of 0.39. The second level of the model entered all two-way combinations of the centered simple predictors. The second level of the model was found to be significant ( $F(6, 35) = 3.65$ ,  $p = 0.006$ ). However, the second level was not found to be a significant change from the first level of the model ( $R^2 = 0.39$ ;  $\Delta R^2 = 0.11$ ,  $p = 0.134$ ). The interaction of weight stigmatization and emotion dysregulation ( $\beta = 0.008$ ,  $p = 0.223$ ) and the interaction of weight stigmatization and weight bias internalization ( $\beta = -0.01$ ,  $p = 0.438$ ) were not found to be significant simple predictors, but the interaction of emotion dysregulation and weight bias internalization was found to be a significant simple predictor ( $\beta = -0.001$ ,  $p = 0.043$ ). A post-hoc statistical effect size analysis found a large Cohen's  $f^2$  of 0.64 and a post-hoc statistical power analysis was not conducted due to the non-significant results. The third level of the model was found to be significant ( $F(7, 34) = 3.29$ ,  $p = 0.009$ ); however, the second level was not found to be a significant change from the previous levels of the model ( $R^2 = 0.40$ ;  $\Delta R^2 =$

0.02,  $p = 0.308$ ). A post-hoc statistical effect size analysis found a large Cohen's  $f^2$  of 0.67 and a post-hoc statistical power analysis was not conducted due to the non-significant results. See

Table 7 for a summary of the hierarchical regression analysis.

Table 6

*Bivariate correlations of the hierarchical linear regression used in hypothesis 3A for the laboratory sample.*

	DERS	SSI	WBIS	SSI x DERS	SSI x WBIS	DERS x WBIS	DERS x WBIS x SSI
DERS	-						
SSI	0.43*	-					
WBIS	0.60**	0.61**	-				
SSI x DERS	0.41*	0.89**	0.49**	-			
SSI x WBIS	0.48*	0.94**	0.51**	0.98**	-		
DERS x WBIS	0.51**	0.53**	0.68**	0.69**	0.63**	-	
DERS x WBIS x SSI	0.56**	0.85**	0.56**	0.96**	0.94**	0.76**	-
ELOCS	0.45*	0.45*	0.37*	0.37*	0.41*	0.14	0.37*

*Note.* SSI = Stigmatizing Situations Inventory; WBIS = Weight Bias Internalization Scale; DERS = Difficulties in Emotion Regulation Scale; ELOCS = Eating Loss of Control Scale. \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.001$ .

Table 7

Summary statistics of the hierarchical regression analysis for hypothesis 3A for the laboratory sample.

Variable	$\beta$	$t$	$R$	$R^2$	$\Delta R^2$
Step 1			0.53	0.28**	0.28**
Emotion Dysregulation	0.02	1.84			
Weight Stigmatization	0.07	1.83			
Weight Bias Internalization	-0.00	-0.06			
Step 2			0.62	0.39**	0.11
Weight Stigmatization x Emotion Dysregulation	0.01	1.24			
Weight Stigmatization x Weight Bias Internalization	-0.01	-0.79			
Emotion Dysregulation x Weight Bias Internalization	-0.00	-			
Step 3			0.64	0.40**	0.02
Weight Stigmatization x Emotion Dysregulation x Weight Bias internalization	0.00	-1.04			

Note. \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.01$ ; \*\*\* denotes  $p < 0.001$ .

Due to the interaction of emotion dysregulation and weight bias internalization being significant in the hierarchical regression, a follow-up hierarchical linear regression was conducted. Step one of the regression included the centered simple predictors of emotion dysregulation and weight bias internalization, and step two included the interaction term. One participant was identified by casewise diagnostics and residual statistics as an outlier and was removed from the analysis, leaving 44 participants included. Emotion dysregulation was significantly correlated to loss of control eating ( $r = 0.447, p = 0.001$ ) and weight bias internalization ( $r = 0.597, p < 0.001$ ). Weight bias internalization was significantly correlated to loss of control eating ( $r = 0.371, p = 0.007$ ). The first level of the model was statistically significant and explained 22% of the variance ( $F(2, 39) = 5.41, p = 0.008; R^2 = 0.22$ ). Neither emotion dysregulation ( $\beta = 0.019, p = 0.054$ ) or weight bias internalization ( $\beta = 0.011, p = 0.364$ ) were significant simple predictors. A post-hoc statistical power analysis found that the analysis

was adequately powered at 0.82 and a post-hoc statistical effect size analysis found a medium-large Cohen's  $f^2$  of 0.28. The second level of the model was found to be significant ( $F(2, 38) = 4.32, p = 0.010$ ), however, the second level was not found to be a significant change from the first level of the model ( $R^2 = 0.25; \Delta R^2 = 0.04, p = .177$ ). A post-hoc statistical effect size analysis found a small-medium Cohen's  $f^2$  of 0.04 and a post-hoc statistical power analysis was not conducted due to the non-significant results.

The same procedures that were used to analyze the laboratory sample for hypothesis 3A were utilized to analyze the full 156 participant sample for the same hypothesis. The regression for the full sample was not found to violate the regression assumptions of normality, homoscedasticity, outliers, or linearity and was within tolerable range for multicollinearity. See Table 8 for correlations. The first level of the model entered the centered simple predictors, was statistically significant, and accounted for 24% of the variance ( $R^2 = 0.24; F(3, 138) = 15.34, p < 0.001$ ). Emotion dysregulation ( $\beta = 0.02, p = 0.003$ ) and weight bias internalization ( $\beta = 0.02, p = 0.012$ ) were found to be significant simple predictors whereas weight stigmatization ( $\beta = 0.03, p = 0.352$ ) was not. A post-hoc statistical power analysis found that the analysis was adequately powered at 1 and a post-hoc statistical effect size analysis found a medium-large Cohen's  $f^2$  of 0.32. The second level of the model entered all two-way combinations of the centered simple predictors. The second level of the model was found to be significant ( $F(6, 145) = 7.69, p < 0.001$ ), however, the second level was not found to be a significant change from the first level of the model ( $R^2 = 0.24; \Delta R^2 = 0.004, p = 0.859$ ). None of the interactions were found to be statistically significant simple predictors. A post-hoc statistical effect size analysis found a large Cohen's  $f^2$  of 0 and a post-hoc statistical power analysis was not conducted due to the non-significant results. The third level of the model was found to be significant ( $F(7, 144) = 6.57, p$

< 0.001). However, the third level was not found to be a significant change from the previous levels of the model ( $R^2 = 0.24$ ;  $\Delta R^2 = 0.001$ ,  $p = 0.709$ ). A post-hoc statistical effect size analysis found a Cohen's  $f^2$  of 0 and a post-hoc statistical power analysis was not conducted due to the non-significant results. See Table 9 for a summary of the hierarchical regression analysis.

Table 8

*Bivariate correlations of the hierarchical linear regression used in hypothesis 3A for the full sample.*

	DERS	SSI	WBIS	SSI x DERS	SSI x WBIS	DERS x WBIS	DERS x WBIS x SSI
DERS	-						
SSI	0.40**	-					
WBIS	0.46**	0.65**	-				
SSI x DERS	0.32**	0.75**	0.42**	-			
SSI x WBIS	0.38**	0.83**	0.53**	0.81**	-		
DERS x WBIS	0.32**	0.51**	0.47**	0.80**	0.64**	-	
DERS x WBIS x SSI	0.53**	0.71**	0.51**	0.92**	0.85**	0.77**	-
ELOCS	0.40**	0.35**	0.42**	0.24*	0.32**	0.22*	0.31**

*Note.* SSI = Stigmatizing Situations Inventory; WBIS = Weight Bias Internalization Scale; DERS = Difficulties in Emotion Regulation Scale; ELOCS = Eating Loss of Control Scale. \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.001$ .

Table 9

*Summary statistics of the hierarchical regression analysis for hypothesis 3A for the full sample.*

Variable	$\beta$	$t$	$R$	$R^2$	$\Delta R^2$
Step 1			0.49	0.24***	.24**
Emotion Dysregulation	0.02	3.07**			
Weight Stigmatization	0.03	0.93			
Weight Bias Internalization	0.02	2.53*			
Step 2			0.49	0.24***	.00
Weight Stigmatization x Emotion Dysregulation	0.00	-0.23			
Weight Stigmatization x Weight Bias Internalization	0.00	0.78			
Emotion Dysregulation x Weight Bias Internalization	0.00	-0.31			
Step 3			0.49	0.24***	.00
Weight Stigmatization x Emotion Dysregulation x Weight Bias Internalization	-0.00	-0.37			

*Note.* \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.01$ ; \*\*\* denotes  $p < 0.001$ .

Hypothesis 3B predicted that weight bias internalization would moderate the relationship between weight stigmatization and emotion dysregulation on disordered eating, such that higher levels of weight bias internalization would be associated with higher levels of binge eating as measured by cookie consumption. One participant was identified by casewise diagnostics and residual statistics as an outlier and was removed from the analysis, leaving 44 participants included. The regression for the laboratory sample was not found to violate the regression assumptions of normality, homoscedasticity, outliers, or linearity and was within tolerable range for multicollinearity. Weight bias internalization was the only simple predictor to correlate to cookie consumption ( $r = 0.390$ ,  $p = 0.004$ ). See Table 10 for correlations. The first level of the model entered the centered simple predictors and was not statistically significant ( $F(3, 39) = 2.45$ ,  $p = 0.078$ ;  $R^2 = 0.16$ ). The simple predictor of weight bias internalization was significant ( $\beta = 0.84$ ,  $p = 0.034$ ), but emotion dysregulation ( $\beta = -0.08$ ,  $p = 0.781$ ) and weight stigmatization ( $\beta = -0.49$ ,  $p = 0.665$ ) were not. A post-hoc statistical effect size analysis found a medium- large

Cohen's  $f^2$  of 0.19 and a post-hoc statistical power analysis was not conducted due to the non-significant results. The subsequent two levels were also not statistically significant. See Table 11 for a summary of the hierarchical regression analysis.

Table 10

*Bivariate correlations of the hierarchical linear regression used in hypothesis 3B.*

	DERS	SSI	WBIS	SSI x DERS	SSI x WBIS	DERS x WBIS	DERS x WBIS x SSI
DERS	-						
SSI	0.44*	-					
WBIS	0.63**	0.61**	-				
SSI x DERS	0.42*	0.89**	0.50**	-			
SSI x WBIS	0.49**	0.94**	0.51**	0.98**	-		
DERS x WBIS	0.56**	0.54**	0.72**	0.68**	0.63**	-	
DERS x WBIS x SSI	0.57**	0.85**	0.56**	0.96**	0.94**	0.75**	-
Cookies	0.21	0.18	0.39*	0.09	0.08	0.15	0.16

*Note.* SSI = Stigmatizing Situations Inventory; WBIS = Weight Bias Internalization Scale; DERS = Difficulties in Emotion Regulation Scale; Cookies = Amount of cookies eaten in grams. \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.001$ .

Table 11

*Summary statistics of the hierarchical regression analysis for hypothesis 3B.*

Variable	$\beta$	$t$	$R$	$R^2$	$\Delta R^2$
Step 1			0.40	0.16	0.16
Emotion Dysregulation	-0.06	-0.28			
Weight Stigmatization	-0.49	-0.44			
Weight Bias Internalization	0.84	2.20*			
Step 2			0.50	0.12	0.09
Weight Stigmatization x Emotion Dysregulation	0.30	1.51			
Weight Stigmatization x Weight Bias Internalization	-0.61	-1.63			
Emotion Dysregulation x Weight Bias Internalization	-0.01	-0.70			
Step 3			0.53	0.14	0.04
Weight Stigmatization x Emotion Dysregulation x Weight Bias internalization	0.01	1.35			

*Note.* \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.01$ ; \*\*\* denotes  $p < 0.001$ .



## Exploratory Analyses

Due to Aubie and Jarry (2009) conducting their study with only women, the small size of men included in the current study, and the potential difference between men and women in the samples, the hypotheses were re-tested with only women included. The first hypothesis was that weight stigmatization and emotion dysregulation would predict more concurrent binge eating, as measured by questionnaires. This was supported by a multiple linear regression. The regression did not violate the regression assumptions of normality, multicollinearity, homoscedasticity, outliers, or linearity, and 38 participants were included. The correlation matrix indicated that emotion dysregulation was significantly correlated to binge eating ( $r = 0.66, p < 0.001$ ) and to weight stigmatization ( $r = 0.47, p = 0.002$ ). Weight stigmatization was also significantly correlated to binge eating ( $r = 0.42, p = 0.004$ ). The regression analysis was significant,  $F(2, 34) = 13.69, p < 0.001$ , and accounted for 45% of the variance ( $R^2 = 0.45$ ). Emotion dysregulation was a significant simple predictor ( $\beta = 0.04, p < 0.001$ ), but weight stigmatization was not a significant simple predictor ( $\beta = 0.04, p = 0.310$ ). A post-hoc statistical power analysis found that the analysis was adequately powered at 1 and a post-hoc statistical effect size analysis found a large Cohen's  $f^2$  of 0.82.

The second hypothesis predicted that higher levels of weight stigmatization and emotion dysregulation would predict higher levels of cookie consumption and was not supported using a multiple linear regression when examining only women. The regression did not violate the regression assumptions of normality, multicollinearity, homoscedasticity, outliers, or linearity, and 39 participants were included. The correlation matrix indicated that emotion dysregulation and weight stigmatization were significantly correlated ( $r = 0.48, p = 0.001$ ). Cookie consumption was not significantly correlated to weight stigmatization ( $r = 0.23, p = 0.082$ ) or

emotion dysregulation ( $r = 0.26, p = 0.057$ ). The model ( $R^2 = 0.08; F(2, 36) = 1.55, p = 0.226$ ) was not statistically significant in predicting the amount of cookies consumed. A post-hoc statistical effect size analysis found a small Cohen's  $f^2$  of 0.09 and a post-hoc statistical power analysis was not conducted due to the non-significant results.

Hypothesis 3A predicted that weight bias internalization would moderate the relationship between weight stigmatization and emotion dysregulation on disordered eating, such that higher levels of weight bias internalization would be associated with higher levels of binge eating as measured by survey. Due to the small sample size for the laboratory sample and the availability of the full online sample whom took the surveys, hypothesis 3A is first reported for the laboratory sample and then for the full sample and was repeated here with only women included in the sample. The regression for the laboratory sample included 38 participants and was found to not violate the regression assumptions of normality, homoscedasticity, outliers, or linearity and was within tolerable range for multicollinearity (see Table 12 for correlations). The three-way interaction was found to not be significant ( $R^2 = 0.56; \Delta R^2 = .007, p = .500$ ). Emotion dysregulation ( $\beta = 0.05, p = 0.016$ ) was a significant simple predictor, however weight bias internalization ( $\beta = 0.01, p = 0.781$ ) and weight stigmatization ( $\beta = 0.03, p = 0.858$ ) were not. A post-hoc statistical effect size analysis found a large Cohen's  $f^2$  of 3.17. See Table 13 for a summary of the hierarchical regression analysis.

Table 12

*Bivariate correlations of the hierarchical linear regression used in hypothesis 3A lab sample in women only.*

	DERS	SSI	WBIS	SSI x DERS	SSI x WBIS	DERS x WBIS	DERS x WBIS x SSI
DERS	-						
SSI	0.47*	-					
WBIS	0.62**	0.61**	-				
SSI x DERS	0.47*	0.90**	0.53**	-			
SSI x WBIS	0.53**	0.95**	0.54**	0.98**	-		
DERS x WBIS	0.53**	0.56**	0.73**	0.71**	0.65**	-	
DERS x WBIS x SSI	0.61**	0.85**	0.59**	0.96**	0.94**	0.78**	-
ELOCS	0.66*	0.42*	0.59*	0.33*	0.41*	0.13	0.37*

*Note.* SSI = Stigmatizing Situations Inventory; WBIS = Weight Bias Internalization Scale; DERS = Difficulties in Emotion Regulation Scale; ELOCS = Eating Loss of Control Scale. \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.001$ .

Table 13

*Summary statistics of the hierarchical regression analysis for hypothesis 3A in the lab sample.*

Variable	$\beta$	$t$	$R$	$R^2$	$\Delta R^2$
Step 1			0.68	0.47	0.47
Emotion Dysregulation	0.04	4.11***			
Weight Stigmatization	0.06	1.44			
Weight Bias Internalization	-0.02	-1.11			
Step 2			0.75	0.57	0.10
Weight Stigmatization x Emotion Dysregulation	0.40	0.19			
Weight Stigmatization x Weight Bias Internalization	0.00	0.26			
Emotion Dysregulation x Weight Bias Internalization	-0.00	-2.00			
Step 3			0.76	0.58	0.01
Weight Stigmatization x Emotion Dysregulation x Weight Bias internalization	-0.00	-0.68			

*Note.* \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.01$ ; \*\*\* denotes  $p < 0.001$ .

The same procedures that were used to analyze the laboratory sample for hypothesis 3A were utilized to analyze the full participant sample for the same hypothesis. This analysis was repeated with just women, so only 116 participants remained. The regression for the full sample

was not found to violate the regression assumptions of normality, homoscedasticity, outliers, or linearity and was within tolerable range for multicollinearity. See Table 14 for correlations. The three-way interaction was found to not be significant ( $R^2 = 0.27$ ;  $\Delta R^2 = .001$ ,  $p = .652$ ). Emotion dysregulation ( $\beta = 0.03$ ,  $p = 0.007$ ) was a significant simple predictor. A post-hoc statistical effect size analysis found a medium Cohen's  $f^2$  of 0.37. See Table 15 for a summary of the hierarchical regression analysis.

Table 14

*Bivariate correlations of the hierarchical linear regression used in hypothesis 3A in the full sample for women only.*

	DERS	SSI	WBIS	SSI x DERS	SSI x WBIS	DERS x WBIS	DERS x WBIS x SSI
DERS	-						
SSI	0.45**	-					
WBIS	0.47**	0.65**	-				
SSI x DERS	0.36**	0.73**	0.41**	-			
SSI x WBIS	0.42**	0.78**	0.84**	0.78**	-		
DERS x WBIS	0.34**	0.48**	0.46**	0.80**	0.62**	-	
DERS x WBIS x SSI	0.60**	0.70**	0.52**	0.90**	0.84**	0.75**	-
ELOCS	0.46**	0.33**	0.41**	0.21*	0.31**	0.18*	0.32**

*Note.* SSI = Stigmatizing Situations Inventory; WBIS = Weight Bias Internalization Scale; DERS = Difficulties in Emotion Regulation Scale; ELOCS = Eating Loss of Control Scale. \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.001$ .

Table 15

*Summary statistics of the hierarchical regression analysis for hypothesis 3A for the full sample with women only.*

Variable	$\beta$	$t$	$R$	$R^2$	$\Delta R^2$
Step 1			0.51	0.26	0.26
Emotion Dysregulation	0.03	3.46**			
Weight Stigmatization	0.01	0.30			
Weight Bias Internalization	0.02	1.97			
Step 2			0.52	0.27	0.01
Weight Stigmatization x Emotion Dysregulation	0.00	-0.21			
Weight Stigmatization x Weight Bias Internalization	0.00	1.07			
Emotion Dysregulation x Weight Bias Internalization	0.00	-0.60			
Step 3			0.52	0.27	0.001
Weight Stigmatization x Emotion Dysregulation x Weight Bias internalization	-0.00	-0.45			

*Note.* \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.01$ ; \*\*\* denotes  $p < 0.001$ .

Hypothesis 3B predicted that weight bias internalization would moderate the relationship between weight stigmatization and emotion dysregulation on disordered eating, such that higher levels of weight bias internalization would be associated with higher levels of binge eating as measured by cookie consumption. One participant was identified by casewise diagnostics and residual statistics as an outlier and was removed from the analysis, leaving 40 female participants included. The regression for the laboratory sample was not found to violate the regression assumptions of normality, homoscedasticity, outliers, or linearity and was within tolerable range for multicollinearity. Weight bias internalization was the only simple predictor to correlate to cookie consumption ( $r = 0.40$ ,  $p = 0.006$ ). See Table 16 for correlations. The three-way interaction was found to not be significant ( $R^2 = 0.25$ ;  $\Delta R^2 = .063$ ,  $p = .117$ ) and no other variables explained unique variance. A post-hoc statistical effect size analysis found a medium Cohen's  $f^2$  of 0.33. See Table 17 for a summary of the hierarchical regression analysis.

Table 16

*Bivariate correlations of the hierarchical linear regression used in hypothesis 3B in women only.*

	DERS	SSI	WBIS	SSI x DERS	SSI x WBIS	DERS x WBIS	DERS x WBIS x SSI
DERS	-						
SSI	0.48*	-					
WBIS	0.65**	0.62**	-				
SSI x DERS	0.47*	0.89**	0.52**	-			
SSI x WBIS	0.53*	0.94**	0.53**	0.98**	-		
DERS x WBIS	0.55**	0.55**	0.74**	0.70**	0.63**	-	
DERS x WBIS x SSI	0.61**	0.85**	0.59**	0.95**	0.94**	0.75**	-
Cookies	0.26	0.23	0.40*	0.15	0.15	0.21	0.23

*Note.* SSI = Stigmatizing Situations Inventory; WBIS = Weight Bias Internalization Scale; DERS = Difficulties in Emotion Regulation Scale; ELOCS = Eating Loss of Control Scale. \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.001$ .

Table 17

*Summary statistics of the hierarchical regression analysis for hypothesis 3B for the lab sample with women only.*

Variable	$\beta$	$R$	$R^2$	$\Delta R^2$
Step 1		0.40	0.16	0.16
Emotion Dysregulation	-0.00			
Weight Stigmatization	-0.20			
Weight Bias Internalization	0.73			
Step 2		0.44	0.19	0.04
Weight Stigmatization x Emotion Dysregulation	0.15			
Weight Stigmatization x Weight Bias Internalization	-0.31			
Emotion Dysregulation x Weight Bias Internalization	-0.01			
Step 3		0.50	0.25	0.06
Weight Stigmatization x Emotion Dysregulation x Weight Bias internalization	0.01			

*Note.* \* denotes  $p < 0.05$ ; \*\* denotes  $p < 0.01$ ; \*\*\* denotes  $p < 0.001$ .

## Discussion

The current study examined the relationships between weight stigmatization, emotion dysregulation, weight bias internalization, and binge eating using laboratory and survey data.

The first hypothesis, based on previous research (e.g., Baldofski et al., 2016; Douglas &

Varnado-Sullivan, 2016), was that weight stigmatization and emotion dysregulation would predict higher levels of binge eating, as measured by survey data. The hypothesis was supported in the main analysis, and weight stigmatization and emotion dysregulation were significantly correlated. This is congruent with Douglas and Varnado-Sullivan (2016), who found support for these variables in predicting disordered eating and found a significant correlation between the two variables. Unlike Douglas and Varnado-Sullivan (2016), however, weight stigmatization was the only significant simple predictor. This is surprising given the replicated relationship between emotion dysregulation and disordered eating (e.g., Brockmeyer et al., 2014; Danner et al., 2014; Douglas & Varnado-Sullivan, 2016; Lavender et al., 2014). This finding supports the growing body of literature purporting that weight stigmatization is an important variable in relation to disordered eating and throws into question whether emotion dysregulation is an important variable in relation to weight stigmatization and disordered eating. When examining the zero-order correlations between emotion dysregulation and binge eating, and weight stigmatization and binge eating, the similar sizes become apparent. It may be that emotion dysregulation is only related to binge eating via the shared variance it has with weight stigmatization. Thus, when controlling for the variance explained by weight stigma, there is no longer a statistically significant relationship between emotion dysregulation and binge eating. It is possible that the relationship emotion dysregulation has been found to have with disordered eating, perhaps specifically with binge eating, may be better explained by weight stigmatization.

However, when examining the same hypothesis in the women only sample, weight stigmatization was not a significant simple predictor whereas emotion dysregulation was. This shifts the focus from being on if emotion dysregulation versus weight stigmatization is the more important variable, to how gender may affect which variable is most important to examine. It

may be that emotion dysregulation is most important for women whereas weight stigmatization is most important for men. Future research needs to recruit a large enough sample of men to do comparative analyses.

The second hypothesis was that higher levels of weight stigmatization and emotion dysregulation would predict greater quantities of cookie consumption after exposure to a weight stigmatization vignette. This prediction was based on previous research, which found that weight stigmatization and emotion dysregulation were predictive of disordered eating via self-report (e.g., Baldofski et al., 2016; Douglas & Varnado-Sullivan, 2016). It was hypothesized that reading the vignette would trigger negative emotions/aversive self-awareness and lead to binge eating among people who had experienced higher levels of weight stigmatization and had greater emotion dysregulation difficulties. The second hypothesis was not supported, however. Again, emotion dysregulation and weight stigmatization were significantly correlated, but neither were correlated to cookie consumption. The results were replicated in the exploratory women only analysis.

The third hypothesis was broken into two parts. Hypothesis 3A posited that weight bias internalization would moderate the relationship between weight stigmatization and emotion dysregulation on disordered eating, such that higher levels of weight bias internalization would be associated with higher levels of binge eating as measured by self-report. Hypothesis 3A was testing a replication of the non-significant model proposed by Douglas & Varnado-Sullivan (2016) in a study with greater statistical power. Weight stigmatization, emotion dysregulation, and weight bias internalization were all significantly correlated, replicating findings by Douglas & Varnado-Sullivan (2016). Weight stigmatization, emotion dysregulation, and weight bias internalization did not explain unique variance, however. The only two-way interaction found to



be a significant simple predictor was emotion dysregulation and weight bias internalization. Douglas and Varnado-Sullivan (2016) found that one two-way interaction, the interaction of weight stigmatization and emotion dysregulation, was significantly predictive of disordered eating. Due to this and the interaction of emotion dysregulation and weight bias internalization in the current study being significant, this interaction was investigated further but was found to not be significant. In the exploratory women only analysis, no levels of the analysis were significant and emotion dysregulation was the only significant simple predictor.

The hypothesis 3A analyses were repeated in the larger online sample. Replicating the laboratory sample's results, all predictors were significantly correlated. Unlike the laboratory sample, emotion dysregulation and weight bias internalization were found to be significant simple predictors. None of the interactions, however, were significant. Based upon hypothesis 3A as assessed in the laboratory and online samples, the current study does support that weight bias internalization, emotion dysregulation, and weight stigmatization are associated with each other and with binge eating, but does not support the interaction of weight bias internalization and emotion dysregulation nor these variables being moderated by weight bias internalization when binge eating is assessed via self-report. Again, the exploratory women only analysis replicated the original analysis and also found that emotion dysregulation was the only significant simple predictor.

To understand if these variables were associated or predictive of real time binge eating, hypothesis 3B was assessed. Hypothesis 3B is identical to hypothesis 3A, except that cookie consumption in the lab was used as the outcome variable. Noteworthy findings were that the only variable significantly correlated to cookie consumption was weight bias internalization and weight bias internalization was the only significant simple predictor. In the exploratory women

only analyses, weight bias internalization was the only variable correlated to cookie consumption, however it did not explain any unique variance. When thinking of the escape theory of binge eating (Heatherton & Baumeister, 1991), so far in the paper it has been proposed that the weight stigmatization experiences would make an individual susceptible to binge eating in response to being reminded of how they do not meet their own personal standards when they read the vignette, as the stigmatizing situations would reinforce the message that they do not reach their own standards as set out by society. However, perhaps for individuals with increased weight bias internalization, weight stigmatization experiences are not necessitated as the individual may already stigmatize themselves. These individuals may have read the vignette and begun to imagine themselves in a similarly situation. This may have led them to think about not meeting their own standards, leading to an aversive self-awareness and urge to binge eat in order to escape. In essence, perhaps it is not being personally stigmatized for one's weight that is key in relation to binge eating but buying into the stigma of overweight and obesity. This is consistent with an experimental vignette study in which those who were assigned to an internalization condition (e.g., an employee did not get a promotion due to their weight and blamed themselves) versus a stigmatization condition (e.g., the employee was angry about the discrimination) had higher negative affect, less positive affect, and lower self-esteem (Pearl & Puhl, 2016). In future replications, it would be crucial to recruit enough individuals with high levels of weight bias internalization to be able to compare groups. For instance, those with increased weight bias internalization may have found the vignette to be more upsetting or identified with the character more than those with lower internalization. This would also be an opportune time to investigate if emotion dysregulation and weight stigmatization were salient factors.

When viewing all of the hypotheses and analyses results as a whole, many potential implications and subsequent questions arise. Although weight stigmatization, weight bias internalization, and emotion dysregulation were consistently correlated to binge eating, these individual variables were mixed in their significance as simple predictors. Not only does this provide more support that the proposed full model is incorrect, as Douglas and Varnado-Sullivan (2016) also found null results for the three-way interaction, but it also casts doubt onto the configuration of the variables in the model. When observing the results of 3B, perhaps a more accurate model would be for weight stigmatization to moderate the relationship of emotion dysregulation and weight bias internalization on the outcome of binge eating. Alternatively, weight bias internalization may act as a mediator rather than a moderator. Future research needs to assess these competing models in larger, longitudinal samples to determine which is the more likely path.

Another consideration is that binge eating (or the particular measure used) is not the most appropriate outcome to investigate and that assessing the more general outcome of disordered eating is most relevant. When examining the past literature, there is a link between weight stigmatization and binge eating (Almeida, Savoy, & Boxer, 2011). However, many studies examining weight stigma have found significant associations with different types of specific disordered eating behaviors such as emotional eating (Baldofski et al., 2016; Hubner et al., 2016), overeating (Sutin, Robinson, Daly, & Terracciano, 2016), or eating in the absence of hunger (Baldofski et al., 2016) or even the more general outcome of disordered eating (Douglas & Varnado-Sullivan, 2016). Perhaps weight stigmatization is more strongly related to disordered eating in general.

When observing the types of disordered eating associated with weight stigmatization such as overeating, emotional eating, or binge eating, this may suggest that the specific “types” of disordered eating most salient for those who have been stigmatized are those that land on the over-consumption side of the spectrum of disordered eating versus the restricting side. This suggests that future replications may want to be assessed in the context of the cyclic obesity/weight-based stigma model (COBWEBS; Tomiyama, 2014). The COBWEBS model posits that a positive feedback loop exists between weight stigmatization and weight gain as weight stigmatization is stressful, stress leads to increased eating and/or increased cortisol production, and increased eating/cortisol leads to weight gain, which leads to increased weight stigmatization, and so on (Tomiyama, 2014). The outcome that may be best to assess disordered eating in conjunction with weight stigma could be dysregulated increased consumption, which may not necessarily mean binge eating, but may encompass a larger umbrella of disordered increased food consumption behaviors. This idea needs to be assessed in future replications or in studies examining which disordered eating measure may be ideal to use in weight stigma research.

Our findings should be considered in light of the study limitations. To begin, it was postulated that individuals who experienced weight stigma would experience greater negative affect in response to the weight stigma vignette. However, the PANAS subscales in the laboratory sample do not suggest that participants generally experienced heightened negative affect. This could be due to the sample experiencing low levels of historical weight stigmatization and thus feeling less upset by the vignette. It may be that if the participants do not have the history of weight stigmatization that they do not feel vulnerable in this area and that the exposure would not trigger aversive self-awareness, negative emotions, and a need to escape as

would be consistent with the escape theory of binge eating (Heatherton & Baumeister, 1991). This could also be due to that, overall, the weight stigma vignette was simply not very upsetting despite it having an effect when used in previous research. Participants did not rate how upsetting they felt the vignette was, and this was not pilot tested due to the significant results found by Aubie and Jarry (2009). Another potential limiting factor is that the participants only marginally identified with the character in the vignette, which may be related to any of the aforementioned points or due to some inherent unknown quality of the vignette. These potential issues may be especially relevant as the current study included both men and women, whereas Aubie and Jarry (2009) only included women. Due to the sample size, it cannot be statistically assessed that the vignette affects men the same way as it affected women and would need to be assessed in future replications with larger sample sizes. However, when observing the means for men and women, men appeared to identify with the character less, had less negative affect, and had more positive affect in comparison to women. Adding to the complexity, however, the exploratory analyses including only women largely replicated the original analyses. This may be an artifact of women comprising the majority of the original sample, making any potential differences between the sample including men and the sample only including women hard to detect.

Related to the potential issues with the vignette and lack of negative affect elicited, another limitation is that, overall, the laboratory sample did not binge eat the cookies. The mean number of cookies eaten was 4.66, the standard deviation was 1.96, and the max was 11 cookies. Considering that the participants were instructed to eat a minimum of three cookies during the bogus taste test, a mean of 4.66 is not elevated. A maximum amount of cookies consumed of 11 is comparatively elevated, however, considering that the standard deviation for the mean is 1.96

cookies. This indicates that the participants ate a seemingly normative amount of cookies- only one or two more cookies than asked in the instructions. Considering participants were instructed prior to the study to not eat for three hours beforehand and thus may have experienced hunger, the amount of cookies consumed is less surprising. Due to this restriction on the low end of the range, any true effects may be undiscoverable in the current study. However, this may be due to inherent characteristics of the laboratory sample than the vignette. It was found that those in the laboratory sample were significantly different than the online sample in that they had lower weight bias internalization. If, as mentioned previously, weight bias internalization may be the pertinent variable, versus weight stigmatization, perhaps the vignette was just not triggering of negative affect due to the sample having less of a vulnerability. This also has interesting implications in so far as, perhaps those whom agree to complete a taste test study are those who are overall less worried about their weight and are less biased based on weight than those whom turn down completing a taste test study. Perhaps if those whom did not seek out the laboratory study were investigated they would be more likely to have a negative reaction to the vignette and perhaps binge eat.

As mentioned, consistently throughout many of the measures and both samples, there was restriction of range. For example, there was a restriction of range noted for the binge eating measure as, overall, the laboratory sample displayed lower rates of loss of control eating, with a mean of 2.62 when the minimum score is a 1 and the maximum is 11. The same issue was present in the full sample and both samples also showed lower scores in the weight stigmatization scale. The limited range was especially problematic with the eating task in the laboratory. It was previously discussed that this could be due to issues with vignette, participant responses to the vignette, or inherent differences in the full sample versus laboratory sample.

Another explanation may be that despite our efforts to hide the true intent of the taste test task, the observer effect may have been strong enough to alter participant behavior.

A related potential explanation may be that, unfortunately, many participants knew that the taste test was bogus and altered their behavior due to contamination of the sample. As noted in the participant section, some had to be excluded due to failing the deception check. In addition, many of these were in a temporal row, suggesting that word may have started getting around the applicant pool about the true nature of the study. It may be especially important for any replications of this study to collect the data over a longer time period so that the participant pool may be less likely to be contaminated. It is also important to test the current model within a clinical sample with individuals with more severe eating pathology to alleviate issues with restriction of range. Less restriction of range would enable the model to be fully tested in order to see if the model itself is incorrect or if it is just hard to detect in a more normative, range-restricted sample. In addition, a statistical limitation noted in all of the hierarchical regression analyses was increased levels of multicollinearity. Although the multicollinearity was still in a tolerable range, it may have impacted the analyses. This suggests the need for a replication with even larger sample sizes and/or the use of alternative statistical analyses such as structural equation modeling.

Despite the limitations, the current study contributes to the weight stigma literature in substantial ways. First, the model proposed by Douglas and Varnado-Sullivan (2016) was retested and found, like in the original study, to be non-significant. Unfortunately, the current study's three-way interaction was also most likely under-powered which made the analyses less likely to detect any true effect. However, it suggests that the model is incorrect and that perhaps the variables in the model need to be reconfigured. Second, the finding that weight bias

internalization was the only variable significantly associated with and predictive of cookie consumption perhaps suggests that weight bias internalization may be a strong enough variable on its own, without the influence of weight stigmatization or emotion dysregulation, to exert an effect on eating. Perhaps weight bias internalization needs a more prominent position in the model. Third, results suggest that when assessing which disordered eating outcome to analyze in conjunction with weight stigma, it may be more worthwhile for future studies to assess dysregulated increased consumption of food versus specific behaviors on this end of the disordered eating spectrum (e.g., binge eating, emotional eating, overeating), which may better capture a range of potential consequences of weight stigmatizing experiences.



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## APPENDIX A. DEMOGRAPHICS QUESTIONNAIRE

INSTRUCTIONS: This survey asks you a series of questions about your feelings, experiences, and behaviors. Your answers are completely anonymous. Your total honesty and completeness in answering the questions are essential to the value of this research. Please answer the questions as indicated. Read each item carefully. Most questions require that you use specific rating scales. Answer all questions in one sitting and in the order in which they are presented.

What is your cell phone number?

What is your NDSU email?

Age: \_\_\_\_\_

Weight: \_\_\_\_\_ lbs

Height: \_\_\_\_\_ foot \_\_\_\_\_ inches

Gender: Man    Woman    Other: \_\_\_\_\_

Race: American Indian or Alaska Native    Asian    Native Hawaiian or other Pacific Islander  
Black or African American    White or Caucasian

Ethnicity: Hispanic origin    Not of Hispanic origin

Student status: Freshman    Sophomore    Junior    Senior    Graduate Student    Other: \_\_\_\_\_

Do you have any food allergies or sensitivities? Please list: \_\_\_\_\_

Do you have any strong food dislikes to the following: Chocolate    Peanut Butter    Oatmeal  
Cream

Do you have any medical illnesses that limit what foods you can eat (ex., Celiac disease, Irritable  
Bowel Syndrome, etc.)? Please list: \_\_\_\_\_

Please describe your weight:

1. Extremely Underweight

2. Moderately Underweight
3. Underweight
4. Average
5. Overweight
6. Moderately Overweight
7. Extremely Overweight



## APPENDIX B. STIGMATIZING SITUATIONS INVENTORY

For each of the situations described below, please indicate how often you have had such an experience in the past year.

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Never	About once a month	Several times a month	About once a week	Several times a week	Daily

1. A parent or other relative nagging you to lose weight.
2. Being the only heavy person, or the heaviest person, at a family gathering.
3. A doctor saying that your weight is a health problem, even when you are in good health.
4. Being told, "All you really need is a little willpower."
5. Being unable to get a date because of your size.
6. Having a doctor recommend a diet even if you did not come in to discuss weight loss.
7. Having family members feel embarrassed by you or ashamed of you.
8. Having friends not notice weight loss, or not encourage your efforts to lose weight.
9. Having people assume that you overeat or binge-eat because you are overweight.
10. Not being able to find clothes that fit.
11. Parents or other relatives telling you how attractive you would be, if you lost weight.
12. People telling you that you will never find a partner if you don't lose weight.

APPENDIX C. WEIGHT BIAS INTERNALIZATION SCALE

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Moderately Agree	Strongly Agree

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.

APPENDIX D. DIFFICULTIES IN EMOTION REGULATION SCALE

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Almost never	Sometimes	About half the time	Most of the time	Almost always
(0-10%)	(11-35%)	(36-65%)	(66-90%)	(91-100%)
1. I am clear about my feelings.				
2. I pay attention to how I feel.				
3. I experience my emotions as overwhelming and out of control.				
4. I have no idea how I am feeling.				
5. I have difficulty making sense out of my feelings.				
6. I am attentive to my feelings.				
7. I know exactly how I am feeling.				
8. I care about what I am feeling.				
9. I am confused about how I feel.				
10. When I'm upset, I acknowledge my emotions.				
11. When I'm upset, I become angry with myself for feeling that way.				
12. When I'm upset, I become embarrassed for feeling that way.				
13. When I'm upset, I have difficulty getting work done.				
14. When I'm upset, I become out of control.				
15. When I'm upset, I believe that I will remain that way for a long time.				
16. When I'm upset, I believe that I'll end up feeling very depressed.				
17. When I'm upset, I believe that my feelings are valid and important.				
18. When I'm upset, I have difficulty focusing on other things.				

19. When I'm upset, I feel out of control.
20. When I'm upset, I can still get things done.
21. When I'm upset, I feel ashamed with myself for feeling that way.
22. When I'm upset, I know that I can find a way to eventually feel better
23. When I'm upset, I feel like I am weak.
24. When I'm upset, I feel like I can remain in control of my behaviors.
25. When I'm upset, I have difficulty concentrating.
26. When I'm upset, I have difficulty controlling my behaviors.
27. When I'm upset, I believe that there is nothing I can do to make myself feel better.
28. When I'm upset, I feel guilty for feeling that way.
29. When I'm upset, I become irritated with myself for feeling that way.
30. When I'm upset, I start to feel very bad about myself.
31. When I'm upset, I believe that wallowing in it is all I can do.
32. When I'm upset, I lose control over my behaviors.
33. When I'm upset, I have difficulty thinking about anything else.
34. When I'm upset, I take time to figure out what I'm really feeling.
35. When I'm upset, it takes me a long time to feel better.
36. When I'm upset, my emotions feel overwhelming.

APPENDIX E. EATING LOSS OF CONTROL SCALE

This questionnaire will ask about your eating over the past four weeks (28 days) only.

Please think about just the past four weeks and indicate your responses below.

1a. During the past four weeks, how many times did you go out of your way to get the food you were craving? \_\_\_\_\_ # of times

1b. On average, during these times, how much did you go out of your way to get the food you were craving?

0	1	2	3	4	5	6	7	8	9	10
Not at all out of my way										Completely out of my way

2a. During the past four weeks, how many times have you felt helpless to control your eating urges? \_\_\_\_\_ # of times

2b. On average, during these times, how helpless did you feel to control your eating urges?

0	1	2	3	4	5	6	7	8	9	10
Not at all helpless										Completely helpless

3a. During the past four weeks, how many times, before you started eating, did you make a definite decision to not control what you ate? \_\_\_\_\_ # of times

3b. On average, during these times, how much control did you give up over what you ate before you started to eat?

0	1	2	3	4	5	6	7	8	9	10
Did not give up control										Completely gave up control

4a. During the past four weeks, how many times did you give in to an impulse to eat even though you were not hungry? \_\_\_\_\_ # of times

4b. On average, during these eating occasions, how much did you give in to an impulse to eat even though you were not hungry?

0      1      2      3      4      5      6      7      8      9      10

Did not give in      Completely gave in

5a. During the past four weeks, how many times did you ignore an interruption (such as a phone call) to keep eating? \_\_\_\_\_ # of times

5b. On average, during these times, how much did you ignore the interruption (such as a phone call) to keep eating?

0      1      2      3      4      5      6      7      8      9      10

Did not ignore interruption to keep eating      Completely ignored interruption to keep eating

6a. During the past four weeks, how many times did you keep eating even though you thought you should stop? \_\_\_\_\_ # of times

6b. On average, during these times, how much did you keep eating even though you thought you should stop?

0      1      2      3      4      5      6      7      8      9      10

Stopped eating      Did not stop eating

7a. During the past four weeks, how many times have you eaten much more rapidly than normal? \_\_\_\_\_ # of times

7b. On average, during these times, how much more rapidly than normal did you eat?

0	1	2	3	4	5	6	7	8	9	10
No more										Much more
rapidly than										rapidly than
normal for me										normal for me

8a. During the past four weeks, how many times have you eaten until you felt uncomfortably full? \_\_\_\_\_ # of times

8b. On average, during these times, how uncomfortably full did you feel?

0	1	2	3	4	5	6	7	8	9	10
Not at all										Extremely
uncomfortably										uncomfortably
full										full

9a. During the past four weeks, how many times have you eaten when you haven't felt physically hungry? \_\_\_\_\_ # of times

9b. On average, during these times, how large was the amount of food you ate when you didn't feel physically hungry?

0—(e.g., small, like a handful of grapes or one cookie)

1

2—(e.g., like a granola bar or snack size bag of chips)

3

4—(e.g., moderate, like a bagel and cream cheese or 6" sandwich)

5

6—(e.g., like a cheeseburger and small French fries or 4 brownies)

7

8—(e.g., large, like a 12” sandwich, snack size bag of chips, and a side salad)

9

10—(e.g., unusually large, like two full meals or three main courses (3 double-cheeseburgers) or eating an unusually large amount of one food or combination of foods, like a whole large cake, one whole medium pizza)

10a. During the past four weeks, how many times have you eaten alone because you have felt embarrassed about how much you were eating? \_\_\_\_\_ # of times

10b. On average, during these times, how embarrassed have you felt about how much you were eating when you ate alone?

0	1	2	3	4	5	6	7	8	9	10
Not at all										Extremely
embarrassed										embarrassed

11a. During the past four weeks, how many times have you felt disgusted with yourself, depressed, or very guilty while eating? \_\_\_\_\_ # of times

11b. On average, during these times, how disgusted with yourself, depressed, or very guilty did you feel?

0	1	2	3	4	5	6	7	8	9	10
Not at all										Extremely
disgusted,										disgusted,



depressed, very  
guilty

depressed,  
very guilty

12a. During the past four weeks, how many times have you been afraid of losing control over eating? \_\_\_\_\_ # of times

12b. On average, during these times, how afraid of losing control over eating have you been?

0      1    2    3    4    5    6    7    8    9      10

Not at all  
afraid

Completely  
afraid

13a. During the past four weeks, how many times have you felt driven or compelled to eat?  
\_\_\_\_\_ # of times

13b. On average, during these times, how driven or compelled to eat have you felt?

0      1    2    3    4    5    6    7    8    9      10

Not at driven  
or compelled  
to eat

Completely  
driven or  
compelled to eat

14a. During the past four weeks, how many times have you not been able to stop eating once you've started? \_\_\_\_\_ # of times

14b. On average, during these times, how hard has it been to stop eating once you've started?

0      1    2    3    4    5    6    7    8    9      10

Not at all hard  
to stop

Extremely hard to  
stop

15a. During the past four weeks, how many times have you given up even trying to control your eating because you know that, no matter what, you're going to overeat? \_\_\_\_\_ # of times

15b. On average, during these times, how much have you given up even trying to control your eating because you know that, no matter what, you're going to overeat?

0 1 2 3 4 5 6 7 8 9 10

Not at all given  
up

Completely given  
up

16a. During the past four weeks, how many times did you feel upset by the feeling that you couldn't stop eating or control what or how much you were eating? \_\_\_\_\_ # of times

16b. On average, during these times, how upset were you by the feeling that you couldn't stop eating or control what or how much you were eating?

0 1 2 3 4 5 6 7 8 9 10

Not at all upset  
that you could  
not stop eating

Completely upset  
that you could not  
stop eating

17a. During the past four weeks, how many times could you not take your mind off the food you were craving and feel you needed to eat it in order to stop the thoughts? \_\_\_\_\_ # of times

17b. On average, during these times, how hard was it for you to stop thinking about the food you were craving?

0 1 2 3 4 5 6 7 8 9 10

Not at all hard  
to stop

Extremely hard to  
stop

18a. During the past four weeks, how many times have you felt out of control and eaten an unusually large amount of food (for example, eating two full meals; or eating three main courses;

or eating an unusually large amount of one food or combination of foods) in a short period of time (1–2 hours)? \_\_\_\_\_ # of times

18b. On average, during the past four weeks, when you have eaten an unusually large amount of food (for example, eating two full meals; or eating three main courses; or eating an unusually large amount of one food or combination of foods) in a short period of time (1–2 hours), how have you felt?

0            1    2        3        4        5        6        7        8    9            10

Not at all out  
of control

Completely out of  
control

APPENDIX F. EATING DISORDER DIAGNOSTIC SCALE

Please carefully complete all questions.

Over the past 3 months... Not at all Slightly Moderately Extremely

1. Have you felt fat? 0 1 2 3 4 5 6
2. Have you had a definite fear that you might gain weight or become fat? 0 1 2 3 4 5 6
3. Has your weight influenced how you think about (judge) yourself as a person? 0 1 2 3 4 5 6
4. Has your shape influenced how you think about (judge) yourself as a person? 0 1 2 3 4 5 6
5. During the past 6 months have there been times when you felt 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
6. 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
7. 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? 0 1 2 3 4 5 6 7
8. 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 1 2 3 4 5 6 7 8 9 10 11 12 13 14

During these episodes of overeating and loss of control did you...

9. Eat much more rapidly than normal? . . . . . YES NO
10. Eat until you felt uncomfortably full? . . . . . YES NO
11. Eat large amounts of food when you didn't feel physically hungry? . . . . . YES NO
12. Eat alone because you were embarrassed by how much you were eating? . . . . . YES NO
13. Feel disgusted with yourself, depressed, or very guilty after overeating? . . . . . YES NO

14. Feel very upset about your uncontrollable overeating or resulting weight gain? . . . YES NO
15. How many times per week on average over the past 3 months have you made yourself vomit to prevent weight gain or counteract the effects of eating? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
16. How many times per week on average over the past 3 months have you used laxatives or diuretics to prevent weight gain or counteract the effects of eating? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
17. How many times per week on average over the past 3 months have you fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
18. How many times per week on average over the past 3 months have you engaged in excessive exercise specifically to counteract the effects of overeating episodes? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
19. How much do you weigh? If uncertain, please give your best estimate. lbs.
20. How tall are you? Please specify in inches (5 ft.= 60 in.)\_\_\_ in.
21. Over the past 3 months, how many menstrual periods have you missed? 0 1 2 3 n/a
22. Have you been taking birth control pills during the past 3 months? . . . . . YES NO

## APPENDIX G. POSITIVE AND NEGATIVE AFFECT SCALE

This scale consists of a number of words that describe different feelings and emotions.

Read each item and then list the number from the scale below next to each word. Indicate to what extent you feel this way right now, that is, at the present moment.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1. Interested				
2. Distressed				
3. Excited				
4. Upset				
5. Strong				
6. Guilty				
7. Scared				
8. Hostile				
9. Enthusiastic				
10. Proud				
11. Irritable				
12. Alert				
13. Ashamed				
14. Inspired				
15. Nervous				
16. Determine				

17. Attentive

18. Jittery

19. Active

20. Afraid

## APPENDIX H. WEIGHT STIGMA VIGNETTE

Elaine got up Saturday morning and decided to make a trip to the mall for her mom, who needed flowers for a party she was hosting tonight.

At the flower shop, Elaine found a bouquet of flowers she thought her mom would like for the centerpiece. As she left the flower shop and headed into the rest of the mall, she saw Lisa and Melanie, two girls from school.

"Hi, Elaine," Lisa said. "Buying flowers for someone?" she said as she disgustedly motioned to the flowers in Elaine's arms.

"They're for my mom's party tonight," Elaine explained.

"Sure they are. Where are you going now then? The plus-size store is in the other direction," Lisa asked, while snickering with Melanie.

"Yeah, fatty. You better watch out. If you gain any more weight you won't be able to even fit through the door of the mall next time," Melanie chimed in, laughing.

Not wanting to reply to their teasing, Elaine turned around and headed for the nearest exit, scanning to see what direction Melanie and Lisa went.



## APPENDIX I. MANIPULATION CHECK

Use the following scale to indicate how well you were able to imagine yourself in the situation Elaine was in.

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Couldn't					Could
imagine					imagine
being in her					being in her
situation at					situation
all					completely

APPENDIX J. TASTE TEST APPRAISAL FORM

Instructions: Please eat as many cookies as you would like to increase the accuracy of your evaluation. Evaluate the cookies on the following domains using the scale below.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Not at all perfect			Very perfect	
Cookie A				
Sweetness: _____		Saltiness: _____		Creaminess: _____
Moisture: _____		Texture: _____		Deliciousness: _____
Cookie B				
Sweetness: _____		Saltiness: _____		Creaminess: _____
Moisture: _____		Texture: _____		Deliciousness: _____
Cookie C				
Sweetness: _____		Saltiness: _____		Creaminess: _____
Moisture: _____		Texture: _____		Deliciousness: _____

## APPENDIX K. INFORMED CONSENT: ONLINE STUDY

### **Behaviors and emotions**

**This study is being conducted by:** Psychology professor Kathryn Gordon (phone: 231-9798; e-mail: kathryn.gordon@ndsu.edu) and clinical psychology graduate student Valerie Douglas (valerie.douglas@ndsu.edu).

Key Information about this study:

#### **Why am I being asked to take part in this study?**

This consent form is designed to inform you about the study you are being asked to participate in. Here you will find a brief summary about the study; however you can find more detailed information later on in the form. You are being asked to participate as part of your introductory psychology course for two main reasons: 1) to learn more about the research process in psychology and 2) to contribute important data which can help us to gain a deeper understanding of psychological processes. You must be at least 18 years old. If you are not at least 18 years old please exit out of this study.

#### **What will I be asked to do?**

You will complete a set of 12 questionnaires.

#### **Where is the study going to take place, and how long will it take?**

The Study will take place on the Qualtrics link you are currently on. The study will take approximately 30 minutes.

#### **What are the risks and discomforts?**

You might experience slight psychological distress or discomfort while answering questions about mental health symptoms. After you have submitted your questionnaires the experimenter will pay attention to your responses to questions about suicide. This will be done

for your safety. If your responses indicate that you may be at risk for suicide, the experimenter will email and/or call you to discuss your safety and what can be done or will contact NDSU's safety office. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known risk to the participant. If new findings develop during the course of the research which may change your willingness to participate, we will tell you about these findings.

**What are the expected benefits of this research?**

**Individual Benefits:** You may not get any benefit from being in this research study.

Compensation is discussed in a different section.

**Societal Benefits:** Results from this study may contribute to generalized knowledge about attitudes and feelings and how they relate to behavior and mental health. This may help to improve psychological services to individuals with mental health issues.

**Do I have to take part in this study?**

Your participation in this research is your choice. If you decide to participate in the study, you may change your mind and stop participating at any time without penalty or loss of benefits to which you are already entitled.

**What are the alternatives to being in this study?**

You can choose not to participate in this study. There are other psychological studies that you can volunteer for instead. You can also consult your course syllabus or instructor for descriptions of other ways to get credit.

**Who will have access to my information and how will my information be used?**

Your participation in this experiment will remain confidential, and your identity will not be stored with your data. We will keep private all your research records that identify you.

Results will be reported in group format only, meaning that your information will be combined with information from other people taking part in the study. When we write about the study, we will write about combined information that we have gathered. You will not be identified in these written materials. We may publish results of the study; however, we will keep your name and other identifying information private.

Participants' responses will be collected through and stored in the secure NDSU Psychology Department's SONA systems, which is designed to keep all participant data secure and confidential. Only the research team will have access to these data. When this study ends, these data will be transferred to password-protected computers in the laboratories located in Minard Hall and participants' names, email address, and cell phone numbers will be deleted.

We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. In rare cases, we may have to share your information with other people. For example, if we believe you pose a danger to yourself (as indicated by your responses on questionnaires), we will contact NDSU Safety Services or the NDSU Counseling Center.

**Will I receive any compensation for participating in the study?**

You will receive course credit for participation in this study. Participation in psychological research is meant to complement in-class learning of psychology by familiarizing you with some of the measures and techniques used in scientific studies of behavior. You will also receive a debriefing that tells you more about the purpose of the study. However, you may not get any benefit from being in this research study. You will be awarded 1 credit point for every 15 minutes of participation. The study should take about 30 minutes so you will receive a

total of 2 points. At the end of the study, we will award you such credit using the SONA system, which will relay the information to your instructor.

**What if I have questions?**

If you have any questions about the study, you may contact the research supervisor, Kathryn Gordon, on her email before you agree to participate. Later, if you have questions about the study, you can contact the researcher supervisor at [kathryn.gordon@ndsu.edu](mailto:kathryn.gordon@ndsu.edu).

**What are my rights as a research participant?**

You have rights as a research participant. All research with human participants is reviewed by a committee called the Institutional Review Board (IRB) which works to protect your rights and welfare. If you have questions about your rights, an unresolved question, a concern or complaint about this research you may contact the IRB office at 701.231.8995, toll-free at 855-800-6717 or via email ([ndsu.irb@ndsu.edu](mailto:ndsu.irb@ndsu.edu)).

**Documentation of Informed Consent:**

You are freely making a decision whether to be in this research study. Marking that you agree to this form means that

1. you have read and understood this consent form
2. you have had your questions answered, and
3. you have decided to be in the study.

I am 18 or over and agree to participate in this study:

I agree

I do not agree

## APPENDIX L. DEBRIEFING: ONLINE STUDY

Thank you for participating in our study. The main purpose of this study is to determine how different health habits and behaviors affect mental health outcomes such as emotions. We want you to know that you are helping us do very important research that could potentially be used to help researchers and clinicians determine risk of psychological outcomes based on health-related behaviors.

If you have any concerns about the study you can contact the primary investigator, Dr. Kathryn Gordon (kathryn.gordon@ndsu.edu; 701-231-9798). In case you feel upset by anything during the study we have included resources for you.

### **Mental Health Resources**

NDSU Counseling Center:

212 Ceres Hall

701-231-7671

National Suicide Prevention Lifeline (a free, 24-hour hotline available to anyone in emotional distress)

1-800-273-TALK (8255)

[www.suicidepreventionlifeline.org](http://www.suicidepreventionlifeline.org)

Prairie St. Johns

510 4th St S

Fargo, ND 58103

701-476-7216

The Village Family Service Center

1201 25th St S

Fargo, ND 58103

800-627-8220

Sanford Eating Disorders Institute

100 4th St S, Ste. 204

Fargo, ND 58103

701-234-4111



## APPENDIX M. INFORMED CONSENT: LABORATORY STUDY

### **How reading short stories affects taste perception**

**This study is being conducted by:** Psychology professor Kathryn Gordon (phone: 231-9798; e-mail: [kathryn.gordon@ndsu.edu](mailto:kathryn.gordon@ndsu.edu)) and clinical psychology graduate student Valerie Douglas ([valerie.douglas@ndsu.edu](mailto:valerie.douglas@ndsu.edu)).

#### **Key Information about this study:**

##### **Why am I being asked to take part in this study?**

This consent form is designed to inform you about the study you are being asked to participate in. Here you will find a brief summary about the study; however you can find more detailed information later on in the form. You are being asked to participate as part of your introductory psychology course for two main reasons: 1) to learn more about the research process in psychology and 2) to contribute important data which can help us to gain a deeper understanding of psychological processes. You must be at least 18 years old. If you are not at least 18 years old please inform the experimenter.

##### **What will I be asked to do?**

You will read a short story and then will complete a taste testing of cookies where you will rate the cookies on different dimensions of taste.

##### **Where is the study going to take place, and how long will it take?**

The Study will take place in 134D20, 134D22, or 134E12 Minard Hall. The study will take approximately 30 minutes.

##### **What are the risks and discomforts?**

You might experience slight psychological distress or discomfort while reading the short stories. It is not possible to identify all potential risks in research; however, reasonable

safeguards have been taken to minimize known risks. If new findings develop during the course of the research which may change your willingness to participate, we will tell you about these findings.

As this study involves the consumption of food: If you are known to have a sensitivity to any food or food ingredient, or have had a violent allergic reaction to drugs, chemicals, or food ingredients you should not take part in this study.

### **What are the expected benefits of this research?**

**Individual Benefits:** You may not get any benefit from being in this research study. Compensation is discussed in a different section.

**Societal Benefits:** Results from this study may contribute to generalized knowledge about how what you read can affect your taste perception.

### **Do I have to take part in this study?**

Your participation in this research is your choice. If you decide to participate in the study, you may change your mind and stop participating at any time without penalty or loss of benefits to which you are already entitled.

### **What are the alternatives to being in this study?**

You can choose not to participate in this study. There are other psychological studies that you can volunteer for instead. You can also consult your course syllabus or instructor for descriptions of other ways to get credit.

### **Who will have access to my information and how will my information be used?**

Your participation in this experiment will remain anonymous, and your identity will not be stored with your data. We will keep private all your research records that identify you. Results will be reported in group format only, meaning that your information will be combined with

information from other people taking part in the study. When we write about the study, we will write about combined information that we have gathered. You will not be identified in these written materials. We may publish results of the study; however, we will keep your name and other identifying information private.

We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. For example, your name will be kept separate from your research records and these two things will be stored in different places. In rare cases, we may have to share your information with other people. For example, if we believe you pose a danger to yourself (as indicated by your responses on questionnaires), we will contact NDSU Safety Services or the NDSU Counseling Center.

**Will I receive any compensation for participating in the study?**

You will receive course credit for participation in this study. Participation in psychological research is meant to complement in-class learning of psychology by familiarizing you with some of the measures and techniques used in scientific studies of behavior. You will also receive a debriefing that tells you more about the purpose of the study. However, you may not get any benefit from being in this research study. You will be awarded 1 credit point for every 15 minutes of participation. The study should take about 45 minutes so you will receive a total of 3 points. At the end of the study, we will award you such credit using the SONA system, which will relay the information to your instructor.

**What if I have questions?**

Before you decide whether you'd like to participate in this study, please ask any questions that come to mind now. Later, if you have questions about the study, you can contact the researcher supervisor, Kathryn Gordon, at [kathryn.Gordon@ndsu.edu](mailto:kathryn.Gordon@ndsu.edu).

**What are my rights as a research participant?**

You have rights as a research participant. All research with human participants is reviewed by a committee called the *Institutional Review Board (IRB)* which works to protect your rights and welfare. If you have questions about your rights, an unresolved question, a concern or complaint about this research you may contact the IRB office at 701.231.8995, toll-free at 855-800-6717 or via email ([ndsu.irb@ndsu.edu](mailto:ndsu.irb@ndsu.edu)).

**Documentation of Informed Consent:**

You are freely making a decision whether to be in this research study. Signing this form means that

- 1. you have read and understood this consent form
- 2. you have had your questions answered, and
- 3. you have decided to be in the study.

You will be given a copy of this consent form to keep.

\_\_\_\_\_  
Your signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Your printed name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of researcher explaining study

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed name of researcher explaining study

## APPENDIX N. DEBRIEFING: IN-LAB STUDY

Thank you for participating in our study. This study is actually a follow-up study to a study you previously participated in. You participated in the online study “Behaviors and emotions” and were invited to the study you just completed due to this participation. The main purpose of this study is to determine how internalization of weight bias, being discriminated against for one’s weight, difficulties in regulating one’s emotions, abnormal eating habits, and other maladaptive coping mechanisms are all related both in surveys and consumption of food in the lab.

We want you to know that you are helping us do very important research that could potentially be used to help decrease disordered eating for those who are discriminated against for their weight. As this study is open to everyone who participated in the online pre-screening study, participation does not mean you engage in disordered eating behaviors or exhibit abnormal eating. We really appreciate your participation in our study. We ask that you do not tell other students at NDSU about what occurred during the study or the true purpose of the study.

If you have any concerns about the study you can contact the primary investigator, Dr. Kathryn Gordon ([kathryn.gordon@ndsu.edu](mailto:kathryn.gordon@ndsu.edu); 701-231-9798). In case you feel upset by anything during the study we have included resources for you. You can also feel free to talk to any of the researchers.

### **Mental Health Resources**

NDSU Counseling Center:

212 Ceres Hall

701-231-7671

National Suicide Prevention Lifeline (a free, 24-hour hotline available to anyone in emotional distress)

1-800-273-TALK (8255)

[www.suicidepreventionlifeline.org](http://www.suicidepreventionlifeline.org)

Prairie St. Johns

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Fargo, ND 58103

701-476-7216

The Village Family Service Center

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701-234-4111