Emotion Regulation Strategies in Response to Ostracism: Effects on Mood and Eating Behavior in Individuals with and without Binge Eating

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Akanksha Srivastav

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This dissertation titled
Emotion Regulation Strategies in Response to Ostracism: Effects on Mood and Eating Behavior in Individuals with and without Binge Eating

by
AKANKSHA SRIVASTAV

has been approved for
the Department of Psychology
and the College of Arts and Sciences by

Sarah E. Racine
Assistant Professor of Psychology

Robert Frank
Dean, College of Arts and Sciences
Abstract

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Emotion Regulation Strategies in Response to Ostracism: Effects on Mood and Eating Behavior in Individuals with and without Binge Eating

Director of Dissertation: Sarah E. Racine

Binge eating is a core symptom of eating disorders that often occurs in response to increases in negative affect. Recent data suggest that negative affect arising from interpersonal stressors is particularly potent at triggering binge eating. Given that binge eating is conceptualized as a maladaptive strategy for regulating emotions in individuals who have pre-existing deficits in this domain, training in emotion regulation may help persons susceptible to binge eating to better manage negative affect from interpersonal stress, thereby reducing their vulnerability to binge eating. The current study examined whether use of emotion regulation strategies (i.e., cognitive reappraisal versus expressive suppression) while being ostracized via Cyberball differentially impacts subsequent emotions and eating behaviors during a taste test. Females with binge eating ($N = 53$) and without binge ($N = 51$) were recruited and trained on either cognitive reappraisal or expressive suppression. Participants then engaged in a Cyberball paradigm designed to ostracize them, and they were asked to simultaneously implement the learned emotion regulation strategy. Subsequently, all participants completed a taste test, during which they consumed pretzels and chocolate M&Ms. Neither binge eating status nor emotion regulation strategy had a significant main effect on emotions or eating behaviors after Cyberball. Further, no significant interaction effects between binge eating status and
emotion regulation strategy were detected. The hypothesis that use of cognitive reappraisal compared to expressive suppression can lead to reduced negative emotions as well as reduced eating behaviors was not supported. Non-significant results may be due to a lack of understanding or compliance with emotion regulation instructions. Participants reported using similar levels of both cognitive reappraisal and expressive suppression strategies during Cyberball despite being trained and instructed to use one of the two strategies. Further investigation of the negative effects of interpersonal stress in persons with binge eating is warranted. Future studies may benefit from examining the use of other emotion regulation strategies, as well as more intensive emotion regulation training.
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The Role of Negative Affect in Binge Eating

Binge eating is an eating disorder symptom that involves consumption of an unusually large quantity of food accompanied by a perceived sense of loss of control (LOC) over eating (American Psychological Association (APA), 2013). Binge eating is both a behavioral risk factor for the development of clinically significant eating disorders (Stice, 2001) and a symptom of several eating disorders (i.e., bulimia nervosa (BN), binge eating disorder (BED), anorexia nervosa-binge/purge subtype (AN-BP)). Prevalence rates for binge eating have been estimated to range between 5-20% (Hay, 2003; Hudson et al., 2007; Ortega-Luyando et al., 2015), and regular binge eating has been associated with poor quality of life, role impairment, and physical and mental health problems (Hay, 2003; Hudson et al., 2007). Therefore, it is critical to isolate key factors that contribute to the maintenance of binge eating and that can be targeted in treatments in order to improve the suffering of individuals with binge eating.

Multiple theoretical models propose that negative affect is an important factor in the development and maintenance of binge eating. For example, the Affect Regulation model emphasizes the role of maladaptive behaviors such as binge eating in alleviating distress (Hawkins & Clement, 1984; McCarthy, 1990, Gross, 2007). The Affect Regulation model of binge eating suggests two basic processes central to the maintenance of binge eating: 1) negative affect precipitates binge eating episodes, and 2) negative affect decreases after binge eating episodes, which increases the likelihood of future binge eating behavior (Haedt-Matt & Keel, 2011). A substantial body of research has established the proposed temporal sequence of negative affect preceding binge eating.
Results from studies using both retrospective questionnaires and ecological momentary assessment (EMA) converge to suggest that negative affect is elevated immediately prior to binge eating episodes in individuals with eating disorders (Cools, Schotte, & McNally, 1992; Haedt-Matt & Keel, 2011; Telch & Agras, 1996; Vanderlinden et al., 2001; Yeomans & Coughlan, 2009). For example, a meta-analysis by Haedt-Matt & Keel (2011) demonstrated that negative affect is elevated prior to binge eating episodes, as compared to both average levels of negative affect and levels of negative affect prior to regular eating, in individuals with BN and BED. However, contrary to the Affect Regulation Model, results from this meta-analysis indicated that negative affect was further elevated after binge eating occurred (Haedt-Matt & Keel, 2011). These findings are in contrast to questionnaire and other EMA studies that have provided evidence for reduced levels of negative affect after binge eating (Berg et al., 2012; Kenardy, Arnow, & Agras, 1996; Smyth et al., 2007; Stickney, Miltenberger, & Wol, 1999). Inconsistent results may be due to the fact that binge eating may differentially regulate the multiple facets of negative affect (Berg et al., 2012; Engel et al., Haedt-Matt & Keel, 2011). In fact, Binford, Mussell, Peterson, Crow, & Mitchell (2004) reported simultaneous increase in one facet of negative affect (depression) and decrease in another facet of negative affect (anxiety) in women with BED after binge eating, suggesting that binge eating may only serve to reduce certain negative emotions. Therefore, our understanding of the relationship between binge eating and negative affect is incomplete until tied to specific negative emotions.
Experimental laboratory studies have reported similar results to studies based on self-report. Specifically, negative affect induced by different mood induction methods (e.g., vignettes, film excerpts, recalling personal past events, and providing false feedback) has been found to increase food consumption in persons who are vulnerable to binge eating, such as those with BED, emotional eating, and restrained eating (Telch & Agras, 1996; Chua et al., 2004; Rosenberg et al., 2013; van Strien et al., 2013). The effect of food consumption on subsequent negative affect has been examined by only a single lab study, with findings indicating that negative affect and tension decreased after food intake for persons with BED (Munsch et al., 2008). The use of laboratory settings in the above studies offers the advantage of random allocation of participants to mood conditions, objective assessment of food and calorie consumption, and standardized settings and procedures (e.g., identical mood induction processes for all participants), which reduces the presence of confounding variables (Moskowitz & Young, 2006). Taken together, research findings across studies and settings have provided evidence for the strong association between negative affect and binge eating, consistent with theoretical models that emphasize the role of binge eating in initially triggering, and then temporarily alleviating negative affect. The use of binge eating to manage negative emotions suggests a possible lack of access to effective emotion regulation strategies for persons with binge eating.
**Emotion Dysregulation and Binge Eating**

Individuals most vulnerable to developing binge eating may be those persons with pre-existing difficulties with emotion regulation. As discussed in two recent reviews of emotion dysregulation and eating disorders (Kittel, Brauhardt, & Hilbert, 2015; Lavender et al., 2015), persons with eating disorders characterized by binge eating tend to report increased use of maladaptive emotion regulation strategies compared to healthy controls. For example, women with BN and BED report significantly greater use of expressive suppression, a maladaptive emotion regulation strategy that involves inhibiting one’s emotional expressions and feelings by maintaining a neutral facial expression, compared to healthy control females (Svaldi, Tuschen-Caffier, Lackner, Zimmermann, & Naumann, 2012). Women with BN and BED also report reduced use of cognitive reappraisal, an adaptive emotion regulation strategy which involves construing a potentially emotion-eliciting situation in a way that changes its emotional impact, compared to controls (Danner, Sternheim, & Evers, 2014; Svaldi, Griebenstroh, Tuschen-Caffier, & Ehring, 2012). Other studies have found increased use of additional maladaptive emotion regulation strategies such as thought suppression and avoidance in women with BED and BN (Svaldi, Tuschen-Caffier, et al., 2012). Brockmeyer et al. (2014) extended prior results by including an AN-B/P sample as well as an overweight control group, with findings indicating that patients with AN-B/P, BN, and BED report greater levels of emotion dysregulation compared to both overweight and normal weight controls. Finally, a meta-analysis of emotion regulation strategies used across different psychopathologies confirmed that maladaptive strategies such as rumination, suppression
and avoidance were positively and significantly related to eating disorder symptoms, whereas adaptive strategies including problem solving and reappraisal were negatively associated with eating disorder symptoms (Aldao et al., 2010). These findings suggest that persons with binge eating use adaptive strategies less often, and use maladaptive strategies more frequently, than healthy individuals.

Importantly, results from initial laboratory studies suggest that training individuals on the use of effective emotion regulation strategies may decrease binge eating tendencies in response to negative emotions (Svaldi, Tuschen-Cafléer, et al., 2012; Vohs & Heatherton, 2000). Svaldi et al. (2014) found that both females with BED and overweight females without BED consumed significantly fewer calories when using reappraisal than when using suppression to regulate feelings of sadness. However, overall calories consumed were significantly greater for those with BED compared to those without BED (Svaldi et al., 2014). In a separate study also using a sadness induction procedure in females with BED, Svaldi et al. (2010) found an increase in desire to binge from baseline to post-film when participants were asked to use suppression, but not reappraisal, to regulate their emotions. In contrast, there were no significant changes in food cravings across either condition for female controls. To date, no studies have examined the effects of emotion regulation training on eating tendencies in persons with BN. However, training in reappraisal strategies also has been shown to decrease eating behaviors in response to negative emotion in non-clinical populations. Both unselected female participants and females at risk for binge eating (i.e., those self-reporting high dietary restraint) showed decreased food consumption when instructed to use reappraisal
or respond naturally, compared to instructions to use suppression (Evers, Stok & Ridder, 2010; Taut Renner, & Baban, 2012; Vohs & Heatherton, 2000). The pattern of reduced food consumption while using cognitive reappraisal to manage negative affect, and increased food consumption when using suppression to manage negative affect, is consistent across samples of individuals reporting clinically relevant binge eating, persons reporting restrained eating, and unselected samples, suggesting that differential effects of emotion regulation strategies are particularly robust.
Interpersonal Sources of Negative Affect and Binge Eating

Although initial results from laboratory studies of emotion regulation and binge eating are promising, studies have been limited in their consideration of the types of negative affect for which emotion regulation training might be most effective. As mentioned previously, the relationship between binge eating and negative affect should be examined with respect to specific negative emotions, since binge eating may differentially impact various facets of negative affect (Berg et al., 2012; Corstorphine, 2006; Powell & Thelen, 1996). Based on the Interpersonal Psychotherapy Model for Eating Disorders (IPT-ED), negative affect that arises due to interpersonal stressors, such as social rejection, may be a particularly potent trigger for binge eating (Rieger et al., 2010; Wilfley et al., 1993). The IPT-ED model explains that interpersonal problems are largely responsible for the low self-esteem and negative affect that characterizes eating disorders, and maladaptive behaviors such as binge eating are used to cope with negative self-evaluation and associated negative emotions. Individuals whose self-esteem is closely tied to their appearance may be most at risk for binge eating in the context of negative social evaluation. These individuals may be most sensitive to rejection, vulnerable to interpreting ambiguous social information negatively, and may resort to binge eating to manage negative self-evaluation and associated affect (Rieger et al., 2010; Wilfley et al., 1993).

Several research studies using different methodologies have supported the IPT-ED model of binge eating. A large cross-sectional study in a sample of women with BED (\(N = 255\)) found that the relationship between interpersonal problems and BED
symptoms was mediated by negative affect, thereby providing initial evidence for the IPT model in a clinical sample of (Ivanova et al., 2015). Using EMA methodology, Goldschmidt et al. (2014) demonstrated that increases in negative affect prior to binge eating and purging significantly mediated the relationship between interpersonal stressors and the occurrence of bulimic behaviors in women with BN. In contrast, work/environment stressors were not predictive of the increases in negative affect that were associated with either binge eating or purging (Goldschmidt et al., 2014). Finally, in a sample of adolescent females with overweight or obesity, interpersonal problems predicted increases in negative affect as well as the occurrence of LOC eating episodes, as assessed via a 2-week EMA protocol (Razenhofer et al., 2014). Overall, results from studies testing the IPT-ED model of binge eating have supported the premise that interpersonal situations are particularly important triggers for binge eating.

Laboratory studies also provide provisional support for the IPT-ED model. Tuschen-Caffier & Vogele (1999) used two procedures to induce feelings of social rejection — showing participants a move clip, along with instructions to identify with the protagonist who is experiencing interpersonal stress, and a separate guided imagery of a different interpersonally stressful situation. They found that, in response to both experiences of interpersonal stress, women with BN reported an increase in desire to binge, restrained eaters showed little change, and controls reported a decrease in desire to binge. Women with BN also reported higher ratings of insecurity during the interpersonal stress conditions compared to both restrained eaters and controls, suggesting that social rejection was more salient for women with BN (Tuschen-Caffier & Vogele, 1999). In a
second study, vivid imagery of idiosyncratic, stressful situations to relive past rejection also resulted in higher levels of sadness and significantly greater desire to binge in females with BN compared to healthy controls (Hilbert, Vögele, Tuschen-Caffier, & Hartmann, 2011). Live interpersonal rejection procedures have produced similar findings — participants with high levels of restraint consumed significantly more ice cream than participants with low levels of restraint after a five minute discussion with same-sex confederates in which participants were made to feel excluded and isolated (Stroud et al., 2000). These results support the IPT-ED model’s conceptualization of binge eating as misdirected attempts to change mood after experiencing feelings of inadequacy or low self-esteem in interpersonal settings.
Ostracism and Binge Eating

Given that interpersonal stress appears to be a particularly potent trigger of binge eating, it is crucial to examine the effects of ostracism on binge eating behavior, as ostracism is a specific interpersonal stressor associated with intense negative affect. Ostracism involves ignoring and excluding individuals or groups by other individuals or groups (Williams, 2007). Due to its implicit nature, ostracism is experienced by participants as more aversive than other rejection paradigms and is more likely to lead to feelings of helplessness and loss of control, which sets it apart from the other more explicit social rejection paradigms (Gerber & Wheeler, 2009; Hartgerink, van Beest, Wicherts, & Williams, 2015). Given that interpersonal negative affect is a significant trigger for binge eating, and different facets of negative affect may be important precipitants of binge eating (Berg et al., 2012; Engel et al., 2013; Haedt-Matt & Keel, 2011; Zeeck et al., 2011), it is important to examine the specific effects of ostracism. Ostracism has larger negative effects on self-esteem compared to other rejection paradigms (e.g., demarcated rejection, future rejection, and reliving rejection; Gerber & Wheeler, 2009), and low self-esteem is a primary trigger for binge eating as suggested by the IPT-ED. In addition to leading to reduced feelings of belongingness, negative mood, and loss of control (Geller, Goodstein, Silver, & Sternberg, 1974), the experience of ostracism has been associated with activation of brain regions responsible for detecting physical pain (Eisenberger, Jarcho, Lieberman, & Naliboff, 2006; Eisenberger & Lieberman, 2003; Macdonald & Leary, 2005). Thus, compared to other interpersonal
stressors, ostracism has a substantially more negative impact on one’s level of well-being, which makes a compelling case for examining ostracism as a trigger for binge eating.

Cyberball is a popular task that is used to induce ostracism and involves participants playing a virtual ball-toss game with other “players” (controlled by the computer). In the Cyberball inclusion condition, participants receive the ball an equal number of times as other “players”, but in the Cyberball ostracism condition, the other “players” stop passing the ball to the participant after the first few throws (Williams, Cheung, & Choi, 2000). A meta-analysis conducted by Hargerink et al. (2015) found that ostracism experienced during Cyberball has a large negative impact (Cohen’s $d > 1.4$) on levels of fundamental needs (i.e. belonging, self-esteem, control and meaningful existence) and interpersonal variables (e.g., self-reported anger, anti/pro-social behavior), relative to baseline (Hartgerink et al., 2015). The meta-analysis also reported on the effectiveness of Cyberball across situations (e.g., number of Cyberball players; number of throws) and individual difference variables (e.g., gender, age and culture), with results suggesting that Cyberball is a robust method to induce ostracism (Hartgerink et al., 2015).

Initial laboratory studies examining the effects of Cyberball-induced ostracism on eating behavior have produced results similar to studies using general interpersonal stress inductions. Salvy and colleagues examined the effects of ostracism on both motivation to eat (i.e., earning points exchangeable for food) and food consumption in adolescents across two similar studies (Salvy et al., 2011; 2012). In the first study, Salvy et al. (2011)
found that overweight participants who were ostracized showed increased motivation to work for food and also consumed significantly more food compared to overweight participants who were included, suggesting that overweight individuals had difficulty regulating eating behaviors after being ostracized (Salvy et al., 2011). These results hold relevance for binge eating, since some overweight persons show similar patterns of using food to regulate negative affect as is seen in persons with binge eating (Striegel-Moore et al., 2005). Salvy et al. (2012) examined the effects of Cyberball (ostracism or inclusion condition) and social connection on eating behaviors. Adolescents engaged in different tasks (i.e., social connection task, distraction task, or cognitive load task) soon after playing Cyberball, with the expectation that engaging in social connection would repair negative affect resulting from Cyberball, and improve one’s ability to regulate eating behaviors. Surprisingly, persons who completed the social connection task after being ostracized consumed more food than all other ostracized groups, as well as than non-ostracized persons who completed the social connection task. The authors suggested that being ostracized might have primed participants to recall past negative social experiences, and completing the social connection task may have exacerbated negative affect and reduced ability to engage in emotion regulation, thereby leading to increased eating.

Two other studies have examined the effects of Cyberball-induced ostracism on eating behavior in adults. In the first study, participants who were ostracized ate significantly more cookies immediately after Cyberball as well as after a delay of 45 minutes, compared to participants who were included, suggesting that the negative effects
of ostracism were powerful enough to persist even after a considerable time delay (Oaten et al., 2008). In the second study, Hayman, McIntyre and Abbey (2014) randomly assigned African-American undergraduate females to a Cyberball ostracism or Cyberball inclusion condition. Ostracized participants consumed more chips than included participants, with results approaching significance ($p = 0.051$), but there were no differences in consumption of chocolate across conditions (Hayman et al., 2014).

Given the significant differences in eating behavior between individuals who are ostracized via Cyberball and those who are included, it is surprising that no study to date has used Cyberball to induce negative affect in participants with binge eating or other disordered eating symptoms. This gap in the research is especially notable given the large body of research suggesting that interpersonal stressors are particularly strong sources of negative affect for binge eating (Blomquist et al., 2012; Goldschmidt et al., 2014; Ivanova et al., 2015). Thus, considering whether persons with binge eating are more susceptible to the emotional and behavioral consequences of being ostracized than persons without binge eating is an important next step in isolating key factors that contribute to the maintenance of binge eating.

Interpersonal contexts are associated with both negative affect and dysregulated eating for individuals with binge eating, which implies that learning to use effective emotion regulation strategies in interpersonal settings may be particularly important. Nonetheless, no laboratory study examining the effects of instructed emotion regulation on eating behavior has used interpersonal stressors to induce a negative mood. An interesting set of preliminary results suggests that emotion regulation strategies may
impact how individuals respond to ostracism. Sethi, Moulds, & Richardson (2013) found that participants who reported engaging in spontaneous reappraisal recovered more quickly and experienced lower negative affect 8 minutes after Cyberball-induced ostracism, compared to non-reappraising participants. These results were replicated in a second study; participants using spontaneous reappraisal showed lower need-threat immediately after Cyberball, as well as after a delay of 8 minutes, compared to non-reappraising participants (Sethi et al., 2013). Unfortunately, the participants were not randomly assigned to groups in which they were trained and instructed to use reappraisal techniques. Therefore, we cannot rule out the impact of confounding variables, such as individual differences on personality traits and pre-existing psychopathology, and attribute the results only to use of different emotion regulation techniques. In fact, Sethi et al. (2013) reported that, in contrast to persons who used reappraisal, persons who failed to reappraise were significantly more socially anxious and reported significantly more symptoms of stress.

In summary, cognitive reappraisal has been shown to be an effective strategy to manage negative affect in individuals with binge eating. Initial data suggest that this strategy may also buffer the effects of ostracism on negative mood and need threats in healthy individuals. However, the potential for emotion regulation strategies to improve mood and decrease reliance on eating behavior after interpersonal stressors such as ostracism in individuals with binge eating has not been considered.
Current Study

The current study examined the impact of brief emotion regulation training on mood, self-reported eating urges, and food consumption after ostracism in women with and without binge eating. Specifically, female participants with and without binge eating were recruited and randomly assigned to receive training in either an adaptive emotion regulation strategy (cognitive reappraisal) or a maladaptive emotion regulation strategy (suppression), and were asked to use the strategy while playing the ostracism version of Cyberball. Given that the median age of onset for binge eating behaviors is between ages 18-21 years, and prevalence rates are 2-3 times higher in females than males (Hudson, Hiripi, & Pope, 2007; Kelly-Weeder, Jennings, & Wolfe, 2012), the current study recruited female college students. This study represented a first step in assessing the utility of emotion regulation interventions for alleviating the consequences of interpersonal stress in persons with binge eating. Laboratory based emotion regulation interventions for interpersonal stressors can provide crucial evidence for the interpersonal mechanisms posited to precipitate binge eating. Subsequent training in adaptive emotion regulation strategies may then help persons cope with interpersonal stressors without resorting to binge eating to manage negative affect.

First, it was hypothesized that, compared to females without binge eating, females with binge eating would respond to ostracism with: (i) higher levels of negative and lower levels of positive affect, (ii) greater negative effects on psychological needs, (iii) higher levels of desire to eat, and (iv) consumption of more calories. Second, it was hypothesized that, compared to females using reappraisal, females using suppression
would respond to ostracism with (i) higher levels of negative affect and lower levels of positive affect, (ii) greater negative effects on psychological needs, (iii) higher levels of desires to eat, (iv) and consumption of more calories. Finally, it was hypothesized that females with binge eating using suppression would be most vulnerable to the negative impact of ostracism, and would be the most unsuccessful at managing binge eating desires and behaviors. Conversely, females without binge eating using cognitive reappraisal were expected to be the most buffered from the effects of ostracism on mood and eating behavior.
Method

Participants

One hundred and eight women with \((N = 55)\) and without \((N = 53)\) binge eating were recruited for the study. Eligibility for the study was based on responses to a screening measure of binge eating symptoms (see *Eating Pathology Symptom Inventory (EPSI) Binge Eating Subscale*) and to the following two questions that map on to the DSM-5 definition of binge eating: 1) In the past three months, have you had one or more times when you have eaten what most people would consider an unusually large amount of food (e.g., a pint of ice cream) in a short period of time?; 2) During the times when you ate an unusually large amount of food, did you feel like you couldn't stop eating or control what or how much you were eating? Participants in the Binge Eating Group were required to score in the top 33\(^{rd}\) percentile (i.e., score \(\geq 16\)) of the EPSI Binge Eating Subscale and endorse current binge eating, defined as a positive response to the two questions assessing DSM-5 binge eating. Participants in the No Binge Eating Group were required to score in the bottom 33\(^{rd}\) percentile (i.e., score \(\leq 11\)) of the EPSI Binge Eating Subscale, and were required to deny current overeating (i.e., respond “no” to the first question, meaning that the second question will not be applicable).

Data from four participants were eliminated due to concerns about invalid responding or lack of opportunity to obtain consent for use of study data. Specifically, two of the participants from the No Binge Eating Group were eliminated because they were familiar with the use of the Cyberball paradigm for inducing ostracism. Further, one of the participants in the Binge Eating Group was eliminated because she indicated
during debriefing that she suspected that the study was examining eating patterns and had intentionally reduced her consumption of food during the taste test. Finally, one participant in the Binge Eating Group was eliminated because she only participated in half the study procedures, which prevented the interviewers from conducting the debriefing session and obtaining consent for use of study data. Therefore, the final sample for data analysis was 104 female participants, which included 53 with and 51 without binge eating.

**Procedure**

All participants in the No Binge Eating Group were recruited from the Psychology Subject pool and were awarded two research credits for their participation. There were a relatively small number of participants in the Psychology Subject pool that were eligible for the Binge Eating Group. After four months of running participants, the following two steps were taken to enhance recruitment of participants for the Binge Eating Group. First, monetary compensation ($10.00) was offered in addition to two research credits. Second, female undergraduate students who were identified as eligible for the Binge Eating Group based on their responses to a prior online study were contacted. These participants were offered monetary compensation ($10.00) along with the option to earn two research credits. In the Binge Eating Group, 15 participants were awarded only research credits, 9 participants were only provided monetary compensation, and 29 were given both monetary compensation and research credits.

Eligible participants were invited to participate in a study titled ‘Examining the Impact of Attention on Cognitive Tasks, Social Tasks and Taste Preferences’ (see
Appendix A for SONA study materials and Consent Forms). In order to help ensure that participants did not become aware of study hypotheses and alter their behavior as a result, the emotion regulation training was described as attention training. Further, advertising a taste preference test is consistent with other studies that have examined the impact of affect and emotion regulation on eating behavior (Svaldi et al., 2014). The guise of the taste preference test allowed the study requirements to include a two-hour period of fasting before study procedures, which attempted to ensure that all participants had similar levels of hunger prior to the taste test.

Participants were assigned to emotion regulation condition prior to arrival at the study. Assignment to emotion regulation conditions was random, with an attempt to allocate at least 25 participants to each condition with replacement (i.e., Binge Eating Group-Expressive Suppression, Binge Eating Group-Cognitive Reappraisal, No Binge Eating Group-Expressive Suppression, No Binge Eating Group-Cognitive Reappraisal). Upon arrival, informed consent was obtained and adherence to food restrictions was verified by asking participants if they had consumed food in the two hours prior to participation (Dingemans et al., 2009). Participants then completed questionnaires to assess trait levels of emotion regulation and depressive symptoms as well as baseline positive and negative affect, hunger, and desire to eat (See Measures).

The emotion regulation training was administered in a standardized manner via pre-recorded instructions on a computer. However, to ensure participant understanding of strategies taught, the principal investigator or a trained research assistant was present throughout training, and participants were allowed to ask questions. Training instructions
and procedures were modeled based on the Svaldi et al. (2014) emotion regulation module (see Appendix B for Emotion Regulation Training Instructions). Briefly, participants assigned to the Cognitive Reappraisal condition were instructed to maintain an objective distance from any feelings or emotions that they were experiencing by focusing their attention on non-affective details. Meanwhile, participants assigned to the Expressive Suppression condition were instructed to conceal their feelings and emotions, and to hold a neutral facial expression at all times. Participants were given suggestions for phrases that they could use to understand and adopt each strategy, and were also given the option to develop their own phrase. All participants wrote their chosen phrase on a sheet to aid recall.

Following the emotion regulation instructions, the participant practiced the emotion regulation strategy to which they were assigned using pictures selected from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 1997) (see Appendix B for pictures) based on normative ratings for females. To prevent cuing participants to an upcoming negative mood, participants practiced their emotion regulation skills by viewing pictures that were negative, positive, and neutral in valence. Participants were allowed to train as long as they needed, and the number of training cycles required for each participant was recorded.

After completing emotion regulation training, participants completed a simple cognitive, letter-circling task (Zajonc, 1965) while practicing the assigned emotion regulation strategy. The neutral letter-circling task was included to provide participants an additional opportunity to practice their emotion regulation strategy, and to prevent
Cyberball from being identified as a task meant to induce negative emotions. All participants then engaged in the ostracism version of Cyberball during which they played a ball-tossing game against three other “players”. As per recommendations when using Cyberball (Williams, et al., 2000), participants were told that they were playing a ball-tossing game against other students at the university. In addition, participants were reminded to use their assigned emotion regulation strategy, and were encouraged to refer to the chosen phrase to remind themselves of their strategy while playing the game. The version of Cyberball used in the current study was designed by van Run at the University of Utrecht (2014). After Cyberball, participants filled out measures to assess the impact of ostracism (i.e., Ostracism Questionnaire; Williams, 2007). They also completed state measures of emotion regulation to evaluate whether they complied with instructed emotion regulation techniques. Finally, participants completed Post-Cyberball state measures of positive and negative affect, hunger, and desire to eat.

Participants then completed the Taste Test. Participants were provided with pre-weighed bowls of M&Ms (430 g) and pretzels (320 g) and asked to taste each item while completing food ratings (see Taste Test Questionnaire in Measures). Participants were informed that they could eat as much of the food as they liked, as long they tried and rated each item, and that any leftover food would be thrown away. After providing these instructions, the researcher left the room so that the food consumption would not be inhibited by the researcher’s presence. After exactly 10 minutes, the researcher returned, removed the leftover food, and weighed it in order to determine the amount consumed. The manufacturer’s information was used to convert the consumed food weight into
energy intake in calories. After the taste test, participants again completed state measures of positive and negative affect, hunger, and desire to eat. They were also asked to report on their perceived amount of food intake and loss of control over eating during the taste test. Finally, participants were asked to complete additional questionnaires assessing eating disorder symptoms, have their height and weight measured, and participate in a semi-structured interview to assess the presence of objectively large binge eating episodes (see Appendix D).

Upon completing all study procedures, a debriefing session (see Appendix C for copy of Debriefing Form) was held during which participants were asked whether they knew about the true nature of Cyberball (i.e., the fact that they were being excluded by the computer), if they were aware of the true purpose of the study, and if they intentionally changed their responses or eating behaviors. Participant responses to these questions were used to identify potentially invalid data. Participants were also asked for post-study consent to use their data upon informing them of all study deception elements.

**Measures**

All participants completed the following measures (see Appendix D for a copy of all study measures).

**State measures.**

* Affect-related state measures.

**Positive and negative affect schedule (PANAS; Watson, Clark, & Tellegen, 1988).**

The PANAS is comprised of two 10-item scales designed to assess positive affect and negative affect, respectively. The scales have demonstrated excellent internal consistency
(all \(\alpha’s > 0.85\)) and are largely uncorrelated \((r’s < -0.15)\). Previously reported findings support the convergent validity of the scales (Watson et al., 1988). Participants were instructed to indicate the extent to which they experienced the various positive and negative feelings listed in the PANAS “right now” (Watson, Clark, McIntyre, & Hamaker, 1992). The PANAS was administered several times during study procedures to assess the impact of study procedures (most importantly, Cyberball and the emotion regulation strategy) on state negative and positive affect: Baseline, Pre-Cyberball, Post-Cyberball, and Post-Taste Test. The Positive and Negative Affect scales demonstrated good internal consistency in the present sample (Cronbach \(\alpha’s\) ranged from 0.81 to 0.87 across assessment points).

**Eating-related state measures.**

**Hunger.** Participants indicated how hungry they were using a 100-point rating bar ranging from ‘Not at all’ to ‘Extremely’ (Munsch et al., 2008) at several points throughout the study: Baseline, Pre-Cyberball, Post-Cyberball, and Post-Taste Test. These ratings provided confirmation that participants were at least moderately hungry when arriving to the experiment, given that they were asked not to eat for 2 hours prior.

**Desire to eat.** Participants were asked to rate their subjective experience of desire to eat on a 100-point rating bar, ranging from ‘Not at all’ to ‘Very much’ (Svaldi et al., 2012) at several points throughout the study: Baseline, Pre-Cyberball, Post-Cyberball, and Post-Taste Test.

**Taste test questionnaire (TTQ).** This 5-item measure was developed by the principal investigators for use by the participants to rate snack foods (i.e., M&Ms and
pretzels). Specifically, foods were rated on the dimensions of sweetness, saltiness, softness, and crunchiness using a 100-point rating bar ranging from ‘Not at all’ to ‘Extremely’. Participants were also asked to indicate their preferred item of the two, in order to maintain consistency with the apparent purpose of the study to assess test preferences.

Perceived food intake and loss of control. Two subjective aspects of food intake were rated on separate 100-point rating bars after the taste test ended. Perceived food intake was assessed via the question “How much did you eat?” on a scale varying from ‘Very little’ to ‘A lot’. Loss of control was evaluated by the item “Did you have control over the amount of food that you ate?” and rated on a scale varying from ‘Not at all’ to ‘Completely’. The participants’ perception of amount of food consumed and loss of control while eating were used to assess aspects of binge eating.

Food and calories consumed. The amount of food consumed was calculated by subtracting the weight of the food leftover after the participant finished the taste test from the weight of the food that was served to the participant. Nutrition information from the manufacturers was used to calculate caloric intake (Pretzels: 1g = 4 calories; M&Ms: 1g = 5 calories).

Other state measures.

Ostracism questionnaire (OQ; Williams, 2007; Zadro et al., 2006). The OQ is a 28-item questionnaire that assesses the effects of the ostracism manipulation on the fundamental psychological needs of belonging, self-esteem, meaningful existence, and control. Participants were asked to indicate the extent to which they agreed with the items
on a 5-point scale ranging from “Not at all” to “Extremely”. Manipulation checks were also included in the OQ to examine the participants’ perception of the extent to which they felt included during the game and the percentage of ball tosses they received. The OQ was administered immediately after the Cyberball task to assess how participants felt while playing the game. Internal consistency for the ostracism questionnaire is excellent in previous research (Cronbach’s α = 0.89) (Sethi et al., 2013). The OQ demonstrated adequate internal consistency in the present sample (α = 0.79).

_State reappraisal and suppression scales (Egloff, Schmukle, Burns, & Schwerdtfeger, 2006)._ The State Reappraisal and Suppression Scales are two brief 3-item scales that measure state levels of reappraisal and suppression during stressful tasks. The measure uses a 6-point scale ranging from 0 (not at all) to 5 (extremely) to assess the degree to which the strategies of reappraisal and suppression were used during a specific situation. Adequate internal consistency has been reported for the scales in previous research (mean α = 0.73) (Egloff et al., 2006). The item content was adapted to better suit the purpose of the study (see Appendix D). The reverse-scored items were re-worded to avoid confusion, and the statements were revised to refer to the use of emotion regulation strategies during Cyberball. Adequate internal consistencies were found for both the State Reappraisal subscale (α = 0.77) and State Suppression subscale (α = 0.76) in the current study.

_Trait measures._

_Demographics questionnaire._ The demographics questionnaire is an 18-item investigator designed questionnaire used to collect basic demographic information (e.g.,
sex, age, and ethnicity) as well as information about past and present psychological conditions and treatment.

**Emotion regulation questionnaire (ERQ, Gross & John, 2003).** The ERQ is a 10-item questionnaire examining individual differences in the habitual use of emotion regulation strategies of cognitive reappraisal and expressive suppression using a 7-point response scale ranging from “Not at all true” to “Very True”. The scales have shown moderate to strong internal consistencies ($\alpha$’s = 0.68-0.76), two-week test-retest reliability ($r$’s = 0.73-0.79), and convergent validity (Gross & John, 2003). Adequate and excellent internal consistency was found for the Cognitive Reappraisal ($\alpha = 0.77$) and Expressive Suppression ($\alpha = 0.81$) subscales, respectively.

**Patient Health Questionnaire (PHQ-9; Spitzer, Kroenke, & Williams, 1999).** The PHQ-9 is a self-report questionnaire assessing depressive symptoms. The PHQ-9 assesses the frequency of the nine DSM-IV (APA, 2000) depression symptoms over the past two weeks. Internal consistency values range from 0.86 to 0.89, and 2-day test-retest reliabilities are excellent at 0.84 (Kroenke et al., 2001). The PHQ-9 demonstrated excellent internal consistency in the current study ($\alpha = 0.86$). Since there is often significant overlap between symptoms of binge eating and depression (Boujut & Gana, 2014), it was expected that the Binge Eating Group would have higher levels of depression than the No Binge Eating Group.

**Eating Pathology Symptom Inventory (EPSI; Forbush et al., 2013).** The EPSI is a 45-item self-report questionnaire that assesses disordered eating symptom dimensions via 8 empirically-derived subscales that measure: dissatisfaction with body weight and/or
shape (i.e., Body Dissatisfaction Subscale); consumption of unusually large amounts of
food accompanied by a sense of loss of control (i.e., Binge Eating Subscale); cognitive
efforts to limit or avoid eating (i.e., Cognitive Restraint Subscale); self-induced vomiting,
laxative use, diuretic use, and diet pill use (i.e., Purging Subscale); physical exercise that
is intense and/or compulsive (i.e., Excessive Exercise); efforts to avoid or reduce food
consumption (i.e., Restricting Subscale); desire for increased muscularity and use of
muscle building supplements (i.e., Muscle Building Subscale); and negative attitudes
towards individuals who are overweight or obese (i.e., Negative Attitudes towards
Obesity Subscale). As previously mentioned, the EPSI Binge Eating Scale was used to
screen participants for inclusion into the Binge Eating and No Binge Eating groups. The
full EPSI was administered to participants during the laboratory session to confirm that
the Binge Eating and No Binge Eating participants scored high and low, respectively, on
the Binge Eating subscale. The additional subscales provided information about the
severity of disordered eating symptoms in addition to binge eating. The EPSI shows
strong discriminant, convergent, and criterion related validity. Internal consistency values
for the EPSI are excellent (coefficient alphas ranging from 0.84-0.89), as is the 2-week
test-retest reliability (mean retest $r=0.73$). This measure has demonstrated a robust factor
structure across obese and non-obese females, and community and clinical populations
(Forbush et al., 2013, Forbush 2014). Internal consistency estimates for the EPSI
subscales in the current study ranged from adequate-to-excellent ($\alpha$ coefficients between
0.76 and 0.95).
\textit{Loss of Control over Eating Scale (LOCES; Latner, Mond, Kelly, Haynes, \\& Hay, 2014).} The LOCES is a 24-item scale that assesses loss of control over eating by having participants respond to questions that measure their experience of loss of control eating over the past 4 weeks. The LOCES shows high 2-4 week test-retest reliability ($r = 0.86$) and excellent internal consistency ($\alpha = 0.96$). Construct validity has been demonstrated by large, positive correlations ($r$’s ranging from 0.59 to 0.64) with existing measures of disordered eating (Latner et al., 2014). The LOCES provides a comprehensive assessment of perceived loss of control over eating, which is an integral part of binge eating and is not assessed by other study measures. The internal consistency for the LOCES in the current study was excellent ($\alpha = 0.96$).

\textit{Emotional Eating Scale (EES; Arnow, Kenardy, Agras, 1995).} The EES is a 25-item questionnaire that examines eating behavior in the context of negative emotions. The EES has three subscales assessing eating as a reaction to frustration and anger, eating as a reaction to anxiety, and eating as a reaction to depression or depressed mood. Internal consistency values for the total scale ($\alpha = 0.81$) and the subscales ($\alpha$’s = 0.72-0.78) are acceptable. Two-week test-rest correlations indicate adequate temporal stability ($r = 0.79$). The EES shows adequate discriminant and criterion validity in treatment-seeking obese females (Arnow et al., 1995). In the current study, internal consistency estimates for the total score ($\alpha = 0.94$) and the subscales ($\alpha$’s = 0.81-0.88) were excellent. The EES is being used to capture the tendency to eat in response to negative emotions, which is conceptually relevant for binge eating behavior and is not assessed by other study measures.
Eating Disorder Examination Questionnaire-Version 6. (EDE-Q; Fairburn & Beglin, 2008). The EDE-Q is a 28-item questionnaire for assessing eating disorder symptomatology. Participants are asked to indicate the extent to which they experience eating disorder symptoms over the past four weeks using a 7-point scale ranging from “No Days” to “Every Day”. The EDE-Q is the self-report version of the Eating Disorder Examination (EDE), the gold standard clinical interview for eating disorders (see below). Since the EDE was only used to assess eating disorder behaviors (as described in the following paragraph), the EDE-Q was used to assess the cognitive aspects of eating disorder psychopathology. The EDE-Q includes four subscales (i.e., Restraint, Eating Concern, Shape Concern, and Weight Concern), and these four subscales are averaged to form a Global Score. The EDE-Q Global Score and subscales have shown adequate test-retest reliability (r values ranging from 0.81 to 0.94) and internal consistency (α values ranging from 0.70 to 0.93). The EDE-Q shows positive associations with other self-report measures of eating disorder symptoms and correlates strongly with diagnostic interviews (Berg, Peterson, Frazier, & Crow, 2012). The EDE-Q Global Score showed excellent internal consistency in the current sample (α = 0.95).

Eating Disorder Examination-Edition 17 (EDE-17; Fairburn, Cooper & O’Connor, 2014). The EDE-17 is the “gold standard” investigator-based interview for assessing eating disorder psychopathology. In the current study, a modified version of the EDE-17 was used to confirm the presence of objectively large binge eating episodes (i.e., unusually large eating episodes accompanied by loss of control) over the past 3 months. The Binge Eating section was modified to ask the participants to describe at least two
instances of consuming an objectively large amount of food in a discrete period of time (< 2 hours). Participants were asked to list the specific foods and amounts of each food and describe the context surrounding the eating episode in order to determine whether the participant consumed an amount that that was definitely larger than what other people might have consumed under similar circumstances. Measurement of the accompanying loss of control was improved with the addition of questions about the behavioral (e.g., going back to the cabinets or refrigerator to find more food) and emotional aspects (e.g., feeling guilty or ashamed after eating) of loss of control. The original EDE-17 demonstrates good reliability and validity in several populations (Berg, Peterson, Frazier, Crow, 2012). Test-retest reliabilities for objective binge eating across a period of 2 – 14 days are above 0.70 and coefficients for inter-rater reliability ranged from 0.91 to 1 (Berg et al., 2012).

When asked to self-identify binge eating, people find it difficult to determine whether an amount of food consumed was objectively large, and instead rely only on perceived loss of control or associated negative emotions (Wilfley, Schwartz, Spurrell, & Fairburn, 1997). Given these difficulties, information gathered during the diagnostic interview was used to redefine group membership, such that only individuals who endorsed objectively large binge eating episodes (i.e., unusually large amount of food consumed along with a perceived sense of loss of control) were included in the new Interview-Binge Eating Group, and only individuals who denied objectively large binge eating episodes were included in the new Interview-No Binge Eating Group.
Other measures.

**Body Mass Index.** Height and weight measures were obtained from participants using a wall-mounted height rod and digital scale, respectively. The following formula was used to calculate Body Mass Index (BMI) for participants: \( \text{BMI} = 703 \times \frac{\text{Weight in Pounds}}{\text{Height in Inches}^2} \).
Data Analyses and Results

Initial analyses were conducted to ensure that all primary study variables were normally distributed. Appropriate transformations (e.g., square-root transformation, log transformation) were carried out to correct variables that were not normally distributed (i.e., skewness or kurtosis values that fell outside the range of ± 2). The following transformations were used: 1) inverse tan transformation for variables assessing Post-Cyberball Negative affect (i.e., PANAS Negative Affect), purging behaviors (i.e., EPSI – Purging Subscale), and desire for increased muscularity (i.e., EPSI – Muscle Building Subscale); 2) square root transformations for variables assessing depression (i.e., PHQ-9), negative attitudes towards individuals who are obese (i.e., EPSI – Attitudes Towards Obesity Subscale), and total caloric intake; and 3) log transformations for variables assessing loss of control over eating (i.e., LOCES total score). After transformations, all variables of interest were normally distributed (all skewness and kurtosis values range between ± 2).

Group Selection

Preliminary analyses focused on group differences to determine if the selected groups differed on expected clinical correlates; results are presented in Table 1. T-tests were used for these analyses. The present study used corrections for multiple comparisons based on the false discovery rate (FDR; Benjamini & Hochberg, 1995), and accordingly, preliminary analyses were evaluated with regards to $\alpha = (4 / 17) \times 0.05 = 0.012^{1}$. As expected, participants in the Binge Eating Group reported significantly higher levels of binge eating symptoms, body dissatisfaction, purging behaviors, and negative

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1. For simplicity, the calculation of $\alpha$ is simplified here. The actual calculation should use the FDR formula which is not explicitly stated in the text.
attitude towards obesity on the EPSI, as well as overall eating disorder symptoms on the EDEQ, compared to participants in the No Binge Eating Group (see Table 1). Participants with binge eating also endorsed significantly greater loss of control during eating and eating in response to negative emotions (i.e., anxiety, anger/frustration, depression assessed by EES subscale scores) compared to participants without binge eating. Finally, the Binge Eating Group had significantly higher levels of depression and higher BMI values compared to the No Binge Eating Group. Surprisingly, the two groups showed similar trait levels of the emotion regulation strategies of cognitive reappraisal and expressive suppression (i.e., ERQ subscales).
Table 1. Comparison of Binge Eating and No Binge Eating Group on Clinical Correlates

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Binge Eating (n=53)</th>
<th>No Binge Eating (n=51)</th>
<th>t (102)</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPSI-Binge Eating</td>
<td>16.32 7.77</td>
<td>5.75 4.89</td>
<td>8.27*</td>
<td>1.63</td>
</tr>
<tr>
<td>EPSI-Body Dissatisfaction</td>
<td>17.28 6.32</td>
<td>10.65 6.30</td>
<td>5.36*</td>
<td>1.05</td>
</tr>
<tr>
<td>EPSI-Cognitive Restraint</td>
<td>6.43 3.12</td>
<td>5.43 3.16</td>
<td>1.63</td>
<td>0.32</td>
</tr>
<tr>
<td>EPSI-Purging</td>
<td>3.47 4.86</td>
<td>1.29 2.88</td>
<td>3.28*</td>
<td>0.55</td>
</tr>
<tr>
<td>EPSI-Restricting</td>
<td>5.77 4.92</td>
<td>5.59 4.78</td>
<td>0.20</td>
<td>0.04</td>
</tr>
<tr>
<td>EPSI-Exercise</td>
<td>8.53 5.73</td>
<td>6.78 5.60</td>
<td>1.60</td>
<td>0.31</td>
</tr>
<tr>
<td>EPSI-Obesity Attitude</td>
<td>6.43 4.53</td>
<td>4.25 3.78</td>
<td>2.64*</td>
<td>0.52</td>
</tr>
<tr>
<td>EPSI-Muscle</td>
<td>2.66 3.35</td>
<td>1.69 3.10</td>
<td>2.21</td>
<td>0.30</td>
</tr>
<tr>
<td>LOCES-Total</td>
<td>2.27 0.88</td>
<td>1.32 0.48</td>
<td>7.81*</td>
<td>1.34</td>
</tr>
<tr>
<td>EES-Anxiety</td>
<td>18.78 7.40</td>
<td>12.14 2.72</td>
<td>6.02*</td>
<td>1.91</td>
</tr>
<tr>
<td>EES-Depression</td>
<td>12.51 4.36</td>
<td>8.10 2.16</td>
<td>6.62*</td>
<td>1.28</td>
</tr>
<tr>
<td>EES-Anger/Frustration</td>
<td>24.51 6.56</td>
<td>16.61 4.18</td>
<td>7.29*</td>
<td>1.44</td>
</tr>
<tr>
<td>EDE-Q-Global Score</td>
<td>2.98 1.26</td>
<td>1.60 1.15</td>
<td>5.84*</td>
<td>1.14</td>
</tr>
<tr>
<td>PHQ-9</td>
<td>9.23 0.75</td>
<td>4.37 3.57</td>
<td>5.42*</td>
<td>1.88</td>
</tr>
<tr>
<td>ERQ-Reappraisal</td>
<td>30.55 5.86</td>
<td>31.08 4.74</td>
<td>0.50</td>
<td>0.10</td>
</tr>
<tr>
<td>ERQ-Suppression</td>
<td>14.32 5.64</td>
<td>14.47 4.49</td>
<td>0.15</td>
<td>0.03</td>
</tr>
<tr>
<td>BMI</td>
<td>26.31 5.86</td>
<td>23.86 4.06</td>
<td>2.59*</td>
<td>0.49</td>
</tr>
</tbody>
</table>

*Note. EPSI = Eating Pathology Symptom Inventory; LOCES = Loss of Control Eating Scale; EDE-Q = Eating Disorder Examination Questionnaire; PHQ-9 = Patient Health Questionnaire-9; ERQ = Emotion Regulation Questionnaire; BMI = Body Mass Index.

*p ≤ 0.012
**Demographic and Baseline Measures**

To test for differences in demographic and baseline measures across all four groups, Analyses of Variance (ANOVA) and Chi square analyses were conducted. The two-way ANOVA included the between-subject factors Group (Binge Eating and No Binge Eating) and Strategy (Expressive Suppression and Cognitive Reappraisal) as independent variables, along with a Group by Strategy interaction. Per FDR corrections\(^1\), hypotheses were tested against \(\alpha = (4 / 9) \times 0.05 = 0.022\). Analyses showed that there were statistically significant main effects of both group and strategy for participant age, such that persons in the Binge Eating Group were significantly older than persons in the No Binge Eating Group \((p = 0.01)\), and persons assigned to use cognitive reappraisal were significantly older than persons assigned to use expressive suppression \((p = 0.01)\) (See Table 2). Given these findings, participant age was included as a control variable in subsequent analyses. Chi-square analyses showed that across all four groups, similar number of persons identified as being from each ethnic group (White/Caucasian, Black/African-American, Asian, and Multiracial), \(\chi^2 (1, 9) = 4.22, p = 0.90\) (See Table 3).

There were no statistically significant main effects of group (Binge Eating and No Binge Eating) or strategy (Cognitive Reappraisal and Expressive Suppression), nor any significant interaction effects, for number of emotion regulation training cycles, baseline positive affect, baseline hunger levels, or baseline desire to eat (See Table 2). However, there was a statistically significant main effect of group on baseline negative affect, such that the Binge Eating Group reported significantly higher levels of baseline negative affect compared to the No Binge Eating Group \((p = 0.003)\) (See Table 2).
Table 2. ANOVA Results Examining Group (Binge Eating; No-Binge Eating) and Strategy (Cognitive Reappraisal; Expressive Suppression) and the Group by Strategy Interaction as Predictors of Demographic and Clinical Correlates, and Affect and Eating Behaviors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Binge Eating</th>
<th>No-Binge Eating</th>
<th>F (1, 98)</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reappraisal</td>
<td>Suppression</td>
<td>Reappraisal</td>
<td>Suppression</td>
</tr>
<tr>
<td></td>
<td>(n = 26)</td>
<td>(n = 27)</td>
<td>(n = 28)</td>
<td>(n = 23)</td>
</tr>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
</tbody>
</table>

Demographic and Clinical Correlates

<table>
<thead>
<tr>
<th>Variable</th>
<th>Binge Eating</th>
<th>No-Binge Eating</th>
<th>F (1, 98)</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>19.31 (1.31)</td>
<td>18.85 (0.82)</td>
<td>18.89 (0.63)</td>
<td>6.65*</td>
</tr>
<tr>
<td>Training Cycle</td>
<td>1.27 (0.53)</td>
<td>1.11 (0.42)</td>
<td>1.00 (0)</td>
<td>3.34</td>
</tr>
<tr>
<td>PA Baseline</td>
<td>2.78 (0.86)</td>
<td>2.48 (0.75)</td>
<td>2.65 (0.98)</td>
<td>0.01</td>
</tr>
<tr>
<td>NA Baseline</td>
<td>1.47 (0.52)</td>
<td>1.55 (0.49)</td>
<td>1.25 (0.22)</td>
<td>9.19*</td>
</tr>
<tr>
<td>Hunger Baseline</td>
<td>48.40 (23.41)</td>
<td>46.36 (26.51)</td>
<td>38.79 (22.37)</td>
<td>1.87</td>
</tr>
<tr>
<td>DTE Baseline</td>
<td>49.38 (23.80)</td>
<td>51.39 (32.78)</td>
<td>42.38 (27.70)</td>
<td>2.86</td>
</tr>
</tbody>
</table>

Affect and Psychological Needs

<table>
<thead>
<tr>
<th>Variable</th>
<th>Binge Eating</th>
<th>No-Binge Eating</th>
<th>F (1, 98)</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA Post-Cyberball</td>
<td>2.18 (0.10)</td>
<td>2.09 (0.10)</td>
<td>2.20 (0.11)</td>
<td>0.05</td>
</tr>
</tbody>
</table>
Table 2: continued

<table>
<thead>
<tr>
<th></th>
<th>NA Post-Cyberball&lt;sub&gt;b&lt;/sub&gt;</th>
<th>Belonging</th>
<th>Self-Esteem</th>
<th>Meaningful</th>
<th>Control</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>0.91 (0.01)</td>
<td>10.70 (0.75)</td>
<td>11.41 (0.74)</td>
<td>10.86 (0.81)</td>
<td>7.34 (0.63)</td>
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<td></td>
<td>0.89 (0.01)</td>
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<td>8.85 (0.60)</td>
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<tr>
<td></td>
<td>0.868 (0.02)</td>
<td>12.04 (0.81)</td>
<td>11.27 (0.79)</td>
<td>12.48 (0.87)</td>
<td>9.16 (0.68)</td>
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<td>0.02</td>
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<td>0.10</td>
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<td>0.07</td>
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<td>0.00</td>
<td>0.00</td>
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<td></td>
<td></td>
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<td>0.00</td>
<td>0.03</td>
<td>0.04</td>
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<td>0.01</td>
<td>0.00</td>
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</tr>
<tr>
<td>Meanings Existence</td>
<td>10.86 (0.81)</td>
<td>11.41 (0.74)</td>
<td>11.85 (0.77)</td>
<td>10.88 (0.77)</td>
<td>7.34 (0.63)</td>
</tr>
<tr>
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<td>10.70 (0.75)</td>
<td>10.67 (0.72)</td>
<td>10.97 (0.71)</td>
<td>11.85 (0.77)</td>
<td>8.85 (0.60)</td>
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<tr>
<td></td>
<td>10.53 (0.70)</td>
<td>10.53 (0.95)</td>
<td>13.53 (0.95)</td>
<td>13.53 (0.95)</td>
<td>7.96 (0.59)</td>
</tr>
<tr>
<td></td>
<td>12.04 (0.81)</td>
<td>15.18 (1.09)</td>
<td>15.18 (1.09)</td>
<td>15.18 (1.09)</td>
<td>9.16 (0.68)</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>0.63</td>
<td>0.21</td>
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<tr>
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<td></td>
<td>0.18</td>
<td>0.18</td>
<td>0.77</td>
<td>4.46</td>
</tr>
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<td></td>
<td></td>
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<td>1.51</td>
<td>0.67</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.01</td>
<td>0.01</td>
<td>&lt;0.01</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
</tbody>
</table>

| Eating Variables<sup>+</sup> | DTE Post-Cyberball<sub>c</sub> | 47.02 (6.34) | 45.60 (6.06) | 38.33 (5.95) | 40.61 (6.82) | 1.15 | 0.01 | 0.01 | 0.01 | <0.01 | <0.01 |
| calorie                   | Calories<sub>d</sub>          | 13.94 (1.02) | 13.15 (0.97) | 13.53 (0.95) | 15.18 (1.09) | 0.63 | 0.18 | 1.51 | 0.01 | 0.02 | 0.02 |
| LOC<sub>d</sub>           | 78.85 (5.26)                  | 78.40 (5.03) | 85.50 (4.94) | 76.61 (5.69) | 0.21 | 0.77 | 0.67 | <0.01 | 0.01 | 0.01 |
| Food Amount<sub>d</sub>   | 28.81 (4.01)                  | 31.56 (3.83) | 25.41 (3.76) | 30.88 (4.31) | 0.25 | 1.03 | 0.12 | <0.01 | 0.01 | <0.01 |

<sup>Note.</sup> Transformed means reported for all Affect and Eating Variables. PA = Positive Affect; NA = Negative Affect; DTE = Desire to Eat; OQ = Ostracism Questionnaire; LOC = Loss of Control. Subscript a = Covariates include Age and Baseline Positive Affect; Subscript b = Covariates include age and Baseline Negative Affect; Subscript c = Covariates include Age and Baseline Desire to Eat. Subscript d = Covariate includes Age.  
<sup>+</sup> Tested against α = 0.022 per False Discovery Rate (FDR) corrections  
<sup>^</sup> Tested against α = 0.033 per False Discovery Rate (FDR) corrections  
<sup>#</sup> Tested against α = 0.05 per False Discovery Rate (FDR) corrections  
<sup>*</sup> Significant p value
<table>
<thead>
<tr>
<th>Group</th>
<th>Strategy</th>
<th>White / Caucasian</th>
<th>Black/African American</th>
<th>Asian</th>
<th>Multiracial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binge Eating</td>
<td>Cognitive Reappraisal</td>
<td>23</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Binge Eating</td>
<td>Expressive Suppression</td>
<td>22</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>No-Binge Eating</td>
<td>Cognitive Reappraisal</td>
<td>26</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>No-Binge Eating</td>
<td>Expressive Suppression</td>
<td>21</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Levels of Affect and Psychological Needs Post-Cyberball**

Two-way ANCOVAs were conducted to examine the effects of group and emotion regulation strategy on negative and positive affect and fundamental psychological needs after experiencing ostracism. Baseline measures were included as covariates when examining the corresponding outcome variable e.g., positive affect baseline was included as a control variable for analyses examining post-Cyberball positive affect. Age was included as a covariate for all analyses. An FDR correction for the outcome variables of affect and psychological needs was calculated as \( \alpha = \frac{4}{6} \times 0.05 = 0.033 \). Analyses did not reveal any significant main effects of group (Binge Eating and No Binge Eating) or strategy (Cognitive Reappraisal and Expressive Suppression), or any significant interaction effects, on levels of negative and positive affect after ostracism (i.e., Post-Cyberball PANAS) or on fundamental psychological needs of belongingness, self-esteem, and meaningful existence (i.e., Ostracism Questionnaire subscale scores) (See Table 2). The main effect of emotion regulation strategy on the psychological need
of control was trending towards significance \((p = 0.04)\), such that participants using Expressive Suppression reported higher levels of control compared to those using Cognitive Reappraisal.

**Levels of Caloric Intake and Desire to Eat Post-Cyberball**

Two-way ANCOVAs were also conducted to examine the effects of group, emotion regulation strategy, and their interaction on eating-related variables. Per FDR corrections\(^1\), hypotheses were tested against \(\alpha = (4 / 4) \times 0.05 = 0.05\). Analyses failed to reveal any significant main effects of group or strategy, or any interaction effects, on overall caloric intake during the taste test and desires to eat after completing Cyberball. There were also no significant effects of group or strategy on calories of M&Ms and pretzels consumed when analyzed separately. Finally, further analyses also failed to find any significant main effects of group or strategy, or any significant interaction effects, on self-reported loss of control and perceived amount of food consumed during the taste test (See Table 2).

**Exploratory Analyses**

Exploratory analyses were conducted using participants’ group membership based on objective binge eating episodes rather than self-reported binge eating, given the difficulties persons experience in accurately self-reporting binge eating. Diagnostic decisions based on information gathered from the modified EDE-17 were used to re-define participant groups. These exploratory analyses used the same FDR corrections for multiple comparisons that were applied to the original analyses (see Footnote 1). Of the 53 participants who were recruited for the study based on endorsement of binge eating on
the pre-screen questionnaire, 29 (54%) endorsed objective binge eating episodes over the past 3 months on the modified EDE-17. Of the remaining 24 participants, 13 reported subjective binge eating, and 11 denied both objective and subjective binge eating. All 51 participants who denied binge eating on the pre-screen questionnaire also denied both objective and subjective binge eating on the modified EDE-17.

Analyses of demographics and baseline measures for the redefined groups indicated that there continued to be statistically significant main effects of group and strategy for age of participants (results are presented in Table 4). Participants in the Interview-Binge Eating Group were significantly older than those in the Interview-No Binge Eating Group ($p = 0.017$). Participants assigned to the Cognitive Reappraisal Strategy were significantly older than those assigned to the Expressive Suppression Strategy ($p = 0.009$) (See Table 4). Age was thus included as a covariate when re-analyzing hypotheses. There also continued to be a statistically significant main effect of group on baseline negative affect, such that the Interview-Binge Eating Group reported significantly higher levels of baseline negative affect compared to the Interview-No Binge Eating Group ($p = 0.01$). As with prior analyses, baseline measures were included as covariates when examining the corresponding outcome variable e.g., positive affect baseline was included as a control variable for analyses examining post-Cyberball positive affect.

The results of the exploratory analyses that defined group memberships based on clinical interviews (i.e., EDE-17) were similar to the results of the original analyses that were based on screening measures of binge eating (See Table 4). There were no
significant main effects of group or strategy, or any interaction effects, for levels of positive affect after ostracism (i.e., Post-Cyberball PANAS Positive Affect) or for fundamental psychological needs (i.e., all Ostracism Questionnaire subscale scores). However, after controlling for age and baseline negative affect, a significant main effect of group for levels of negative affect after ostracism emerged (i.e., Post-Cyberball PANAS Negative Affect) \( (p = 0.028, \text{ tested against } \alpha = 0.033 \text{ based on the FDR corrections}^1 ; \text{Cohen’s } d = 0.65) \). In line with hypotheses, participants in the Interview-Binge Eating Group reported significantly higher levels of post-Cyberball negative affect compared to the Interview-No Binge Eating Group. There was no significant main effects of strategy or a significant interaction effect for negative affect after ostracism. Exploratory analyses also failed to find any significant main effects of group or strategy, or interaction effects, for desire to eat, caloric intake, and self-reported features of eating (loss of control and amount of food consumed).
Table 4. ANOVA Results Examining Group (Interview-Binge Eating; Interview-No-Objective Binge Eating) and Strategy (Cognitive Reappraisal; Expressive Suppression) and the Group by Strategy Interaction as Predictors of Demographic and Clinical Correlates, and Affect and Eating Behaviors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Objective Binge Eating</th>
<th>No-Objective Binge Eating</th>
<th>$F$ (1,73)</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cognitive Reappraisal</td>
<td>Expressive Suppression</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>($n = 16$)</td>
<td>($n = 13$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographic and Clinical Correlates^</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>19.44 (1.46)</td>
<td>18.85 (1.07)</td>
<td>18.89 (1.03)</td>
<td>18.27 (0.45)</td>
</tr>
<tr>
<td>Training Cycle</td>
<td>1.19 (0.09)</td>
<td>1.15 (0.10)</td>
<td>1.14 (0.07)</td>
<td>1.04 (0.07)</td>
</tr>
<tr>
<td>PA Baseline</td>
<td>2.49 (0.22)</td>
<td>2.59 (0.24)</td>
<td>2.80 (0.16)</td>
<td>2.62 (0.17)</td>
</tr>
<tr>
<td>NA Baseline</td>
<td>1.45 (0.09)</td>
<td>1.66 (0.10)</td>
<td>1.20 (0.07)</td>
<td>1.29 (0.07)</td>
</tr>
<tr>
<td>Hunger Baseline</td>
<td>47.75 (25.36)</td>
<td>41.00 (27.81)</td>
<td>49.04 (29.94)</td>
<td>38.09 (28.07)</td>
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<tr>
<td>DTE Baseline</td>
<td>50.44 (24.57)</td>
<td>50.92 (33.67)</td>
<td>44.54 (27.95)</td>
<td>40.63 (31.12)</td>
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<tr>
<td>Affect and Psychological Needs^</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA Post-Cyberball</td>
<td>2.32 (0.12)</td>
<td>2.08 (0.13)</td>
<td>2.22 (0.09)</td>
<td>2.23 (0.10)</td>
</tr>
</tbody>
</table>
Table 4: continued

<table>
<thead>
<tr>
<th>NA Post-</th>
<th></th>
<th></th>
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<tr>
<td>Cyberball&lt;sub&gt;b&lt;/sub&gt;</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belonging</td>
<td>10.72 (0.93)</td>
<td>9.29 (0.99)</td>
<td>11.43 (0.67)</td>
<td>11.96 (0.73)</td>
<td>3.62</td>
<td>0.28</td>
<td>1.42</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>10.98 (0.90)</td>
<td>10.45 (0.96)</td>
<td>12.32 (0.65)</td>
<td>11.82 (0.71)</td>
<td>2.70</td>
<td>0.39</td>
<td>0.00</td>
</tr>
<tr>
<td>Meaningful</td>
<td>11.27 (1.03)</td>
<td>10.19 (1.10)</td>
<td>11.14 (0.75)</td>
<td>12.89 (0.82)</td>
<td>1.82</td>
<td>0.12</td>
<td>2.37</td>
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<tr>
<td>Control</td>
<td>8.02 (0.82)</td>
<td>8.59 (0.87)</td>
<td>7.60 (0.60)</td>
<td>8.89 (0.65)</td>
<td>0.01</td>
<td>1.52</td>
<td>0.24</td>
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<table>
<thead>
<tr>
<th>Eating Variables&lt;sup&gt;#&lt;/sup&gt;</th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>DTE Post-</td>
<td>48.60 (8.16)</td>
<td>43.78 (8.70)</td>
<td>44.46 (5.94)</td>
<td>39.21 (6.44)</td>
<td>0.34</td>
<td>0.44</td>
<td>&lt;0.01</td>
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<tr>
<td>Cyberball&lt;sub&gt;c&lt;/sub&gt;</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calories&lt;sub&gt;d&lt;/sub&gt;</td>
<td>13.88 (1.42)</td>
<td>14.66 (1.51)</td>
<td>14.24 (1.03)</td>
<td>13.89 (1.12)</td>
<td>0.03</td>
<td>0.03</td>
<td>0.20</td>
</tr>
<tr>
<td>LOC&lt;sub&gt;d&lt;/sub&gt;</td>
<td>85.38 (5.13)</td>
<td>84.01 (5.56)</td>
<td>73.36 (7.04)</td>
<td>72.72 (7.51)</td>
<td>3.23</td>
<td>0.02</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Amount&lt;sub&gt;d&lt;/sub&gt;</td>
<td>27.75 (5.20)</td>
<td>31.65 (5.55)</td>
<td>28.34 (3.79)</td>
<td>27.31 (4.10)</td>
<td>0.15</td>
<td>0.09</td>
<td>0.29</td>
</tr>
</tbody>
</table>

Note. Transformed means reported for all Affect and Eating Variables. PA = Positive Affect; NA = Negative Affect; DTE = Desire to Eat; OQ = Ostracism Questionnaire; LOC = Loss of Control. Subscript a = Covariates include Age and Baseline Positive Affect; Subscript b = Covariates include Age and Baseline Negative Affect; Subscript c = Covariates include Age and Baseline Desire to Eat. Subscript d = Covariate includes Age. * Tested against $\alpha = 0.022$ per False Discovery Rate (FDR) corrections | Tested against $\alpha = 0.033$ per False Discovery Rate (FDR) corrections # Tested against $\alpha = 0.05$ per False Discovery Rate (FDR) corrections * Significant $p$ value
Post-hoc Examination of Experimental Manipulation

Given that the analyses did not support expectations regarding the effects of binge eating status and the use of adaptive or maladaptive emotion regulation strategies during Cyberball on emotions and eating behavior, post-hoc analyses were carried out to examine the efficacy of experimental manipulations. The first manipulation in this study was the use of Cyberball to create feelings of ostracism. Examination of the manipulation checks included in the Ostracism Questionnaire revealed that the participants perceived that they were being ignored ($M = 4.08; SD = 0.99$, using a Likert scale ranging from 1 (Not at all) to 5 (Extremely)). Participants also accurately estimated that the percentage of times they received the ball was low ($M = 9.37; SD = 6.30$). Despite the participants’ perception of being ignored by other players, and receiving few ball tosses, changes in state-based measures of affect from Pre-Cyberball to Post-Cyberball were not as robust as expected based on past research (Hartgerink et al., 2015). Paired t-tests revealed a significant decrease in positive affect after Cyberball ($p < 0.001; \text{Cohen’s } d = 0.91$), but only a small increase in the levels of negative affect after Cyberball ($p = 0.06; \text{Cohen’s } d = 0.18$; See Table 5). Unfortunately, interpretation of the minimal change in negative affect from pre-to post-Cyberball is confounded by the use of emotion regulation strategies while playing Cyberball. This issue is further addressed in the discussion section.
Table 5. Comparison of State Measures (Affect, Hunger, & Desire to Eat) Before and *After* Cyberball (N = 104)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Pre-Cyberball</th>
<th>Post-Cyberball</th>
<th>t (103)</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>PANAS Positive Affect</td>
<td>2.62</td>
<td>0.94</td>
<td>2.14</td>
<td>0.98</td>
</tr>
<tr>
<td>PANAS Negative Affect</td>
<td>1.23</td>
<td>0.28</td>
<td>1.27</td>
<td>0.30</td>
</tr>
<tr>
<td>Hunger</td>
<td>41.88</td>
<td>29.04</td>
<td>42.52</td>
<td>30.39</td>
</tr>
<tr>
<td>Desire to Eat</td>
<td>42.86</td>
<td>29.96</td>
<td>42.89</td>
<td>31.46</td>
</tr>
</tbody>
</table>

Note. PANAS = Positive and Negative Affect Scale

The second experimental manipulation was the assignment of participants to the use of either cognitive reappraisal or expressive suppression. Analyses examining the effect of being assigned to a use cognitive reappraisal or expressive suppression on state levels of cognitive reappraisal and expressive suppression during Cyberball are presented in Table 6. Despite being assigned to train on different emotion regulation strategies, the participants reported similar levels of cognitive reappraisal and suppression during Cyberball (see results in Table 6). The main effect of strategy on levels of cognitive reappraisal were trending towards significance (p = 0.08; Cohen’s d = 0.35) such that levels of cognitive reappraisal were somewhat higher in participants assigned to Cognitive Reappraisal compared to participants assigned to Expressive Suppression. However, there were no such main effects for strategy on levels of expressive suppression (p = 0.21; Cohen’s d = 0.24).
Another study procedure was the requirement of a two-hour period of fasting for participants prior to starting the study procedures. Consistent with other studies, the two-hour period of fasting was an attempt to ensure that all participants had similar levels of hunger prior to study participation (See Table 2). Although participants in the four groups endorsed similar levels of baseline hunger, it appears that overall levels of hunger were fairly low (means across the groups ranged from 37.89 – 48.40 on a 0 – 100-point rating bar; see Table 2). Participants continued to report low levels of hunger prior to the taste test (means across the groups ranged from 35.52 – 47.35; see Table 6). The low levels of hunger despite a two-hour period of fasting may have inadvertently contributed to reduced eating behaviors, thereby leading to little variability in desires to eat and caloric intake.

Taken together, the non-significant increase in negative affect after Cyberball, the lack of significant differences in state use of emotion regulation strategies, and the low levels of hunger may have made the experimental manipulations inadequate at creating the expected moderate to large effect sizes for Group and Strategy differences on the dependent variables.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Binge Eating</th>
<th>No-Binge Eating</th>
<th>F (1,98)</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cognitive</td>
<td>Expressive</td>
<td>Group</td>
<td>Strategy</td>
</tr>
<tr>
<td>Reappraisal</td>
<td>(n = 26)</td>
<td>(n = 27)</td>
<td>X</td>
<td>Strategy</td>
</tr>
<tr>
<td>Suppression</td>
<td>(n = 28)</td>
<td>(n = 23)</td>
<td></td>
<td>Strategy</td>
</tr>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>SRSQ- Reappraisal</td>
<td>3.06 (0.98)</td>
<td>2.74 (0.94)</td>
<td>3.12 (0.91)</td>
<td>2.81 (0.81)</td>
</tr>
<tr>
<td>SRSQ- Suppression</td>
<td>2.74 (1.11)</td>
<td>2.89 (1.07)</td>
<td>2.65 (0.94)</td>
<td>3.03 (0.90)</td>
</tr>
<tr>
<td>Pre-Taste Test Hunger</td>
<td>47.35 (5.99)</td>
<td>44.96 (5.88)</td>
<td>41.43 (5.76)</td>
<td>35.52 (6.37)</td>
</tr>
</tbody>
</table>

Note. SRSQ = State Reappraisal and Suppression Questionnaire
* Significant p value
Discussion

The current study examined whether training participants with and without binge eating in different emotion regulation strategies (i.e., cognitive reappraisal or expressive suppression), and having them use these techniques while being ostracized, differentially impacted emotions and eating behaviors. Prior studies with persons with clinical binge eating have shown that using cognitive reappraisal to regulate general negative affect is associated with better mood and fewer calories consumed, compared to using expressive suppression (Svaldi et al., 2014; Vohs & Heatherton, 2000). The current study hypotheses were modeled under the assumption that persons self-reporting binge eating would also endorse similar affect and eating behaviors compared to prior studies (Svaldi et al., 2010; Svaldi et al., 2014) when using different emotion regulation strategies to regulate negative affect from ostracism. Contrary to the study hypotheses, there were no significant differences in individuals with versus without binge eating, as well as individuals assigned to cognitive reappraisal versus expressive suppression, for negative affect, desires to eat, or calories consumed during the taste test. Further, no significant interaction effects were found between binge eating status and emotion regulation strategy for any outcome. The analyses were repeated after using structured interviews to identify participants with and without objective binge eating episodes. While there were no significant differences in desires to eat and calories consumed, participants with objective binge eating episodes did report significantly greater negative affect after being ostracized than participants without objective binge eating. Again, no significant main effects of strategy or interactions between group and strategy were detected. Thus,
emotion regulation strategies did not differentially impact the emotions and eating behavior of people with versus without binge eating after being ostracized, regardless of the definition of binge eating used. The overall lack of significant results in the current study could be due to several factors that are discussed in the following sections.

**Group Selection Criteria**

One possible reason for lack of significant results could be that the pre-screen criteria were not effective at selecting participants that were representative of a population with clinically significant binge eating. Initial analyses did find that participants in the binge eating group based on the pre-screen responses reported significantly higher levels of binge eating, emotional eating, and loss of control over eating than participants without binge eating. Associated correlates of depression and BMI were also found to be significantly higher for participants with binge eating compared to those without, which is in line with previous studies (Boujut & Gana, 2014; Cooke, Guss, Kissileff, Devlin, & Walsh, 1997). These differences suggest that the pre-screen criteria resulted in groups that were distinct in several aspects of binge eating behaviors as well as associated features.

However, an important aspect where the groups did not differ was with respect to trait levels of cognitive reappraisal and expressive suppression, assessed using the Emotion Regulation Questionnaire. Other studies that have also used the Emotion Regulation Questionnaire (Gross & John, 2003) have found lower use of cognitive reappraisal, and higher use of expressive suppression, in females with BN and BED, compared to healthy controls (Danner et al., 2014; Svaldi, Griebenstroh, Tuschen-Caffier,
Higher levels of suppression in women with BN and BED compared to healthy controls were also found when assessed with the Inventory of Cognitive Affect Regulation Strategies (Kamholz, Hayes, Carver, Gulliver, & Perlman, 2006; Svaldi et al., 2012). To the author’s knowledge, only one study has examined differences in emotion regulation strategies between persons with and without self-reported binge eating. Although groups differed on several aspects of emotion dysregulation assessed via the Difficulties in Emotion Regulation Scale, women with and without binge eating reported similar levels of trait cognitive reappraisal and expressive suppression (Racine & Horvath, in press). This suggests that using self-reported binge eating to screen participants results in a group that differs from persons with BN and BED in levels of trait cognitive reappraisal and expressive suppression. The current study hypotheses were based on the expectation that problems with emotion regulation in persons with BN and BED (i.e., increased use of suppression and decreased use of reappraisal) would also be found in persons self-reporting binge eating.

Although there were significant differences in aspects of binge eating between the two groups, the severity of binge eating symptoms in the binge eating group was much lower than in persons with BN and BED. Previous experimental laboratory studies that have examined the effects of emotion regulation on eating outcomes have recruited persons with BN and BED, rather than binge eating (Dingemans, Martijn, Jansen, & van Furth, 2009; Svaldi, Tuschen-Caffier, Trentowska, Caffier, & Naumann, 2014; Svaldi, Caffier, & Tuschen-Caffier, 2010). These diagnoses are associated with frequent binge eating episodes (i.e., at least once a week for three months) for persons with BN or BED,
as well as significant distress regarding binge eating for persons with BED. In the current study, only 29 of 53 (54%) participants in the binge eating group reported objective binge eating episodes on the structured interview. Of these participants, five reported no distress, and 11 reported sub-threshold distress about binge eating. More importantly, the average frequency of binge eating in the past three months was less than two objective binge eating episodes per month. Thus, regardless of the use of the pre-screen responses or structured interviews for assigning participants to binge eating versus no binge eating groups, the binge eating symptoms of participants in the current study were not as severe as those of clinical samples on which the hypotheses and effect sizes of the current study were based.

**Cyberball Induced Ostracism**

Another possible reason for the lack of significant results could be that Cyberball was not an effective manipulation for increasing negative affect. The manipulation check for the effects of Cyberball showed that the participants did report feelings of being excluded and ignored, and accurately estimated that they had received only a few ball-tosses. However, the increase in average levels of negative affect after completing Cyberball was minimal, corresponding to a small effect size change in negative affect. This is surprising given the documented robust effects of Cyberball in increasing negative affect (Hartgerink et al., 2015). Unfortunately, the current study design does not offer a straightforward way to examine the negative affect induced by Cyberball alone because participants were actively using emotion regulation strategies to manage negative affect while engaging in Cyberball. Thus, it is unclear if Cyberball did not induce significant
negative affect, or if the induced negative affect was effectively downregulated by both emotion regulation strategies.

Regardless of the cause, the minimal increase in negative affect after completing Cyberball makes it possible that negative affect was not sufficiently elevated prior to the taste test to create differences in eating behaviors, desires to eat, and feelings of being out of control between the two groups. Recent research suggests that a certain threshold of negative affect must be surpassed before binge eating is triggered, and negative affect levels below this threshold are unlikely to produce binge eating (Fuller-Tyszkiewicz et al., 2014). Therefore, this study may not have been effective at recreating the emotional circumstances under which binge eating behaviors typically occur.

In contrast to the minimal increase in negative affect after completing Cyberball, there were significant reductions in the participants’ positive affect from pre- to post-Cyberball. A recent meta-analysis by Cardi, Leppanen, & Treasure (2015) showed that, across 10 studies, significantly more food was consumed in laboratory studies when positive mood was induced compared to induction of neutral mood in healthy controls. Therefore, it is possible that the significant reduction in positive affect could have resulted in lower food consumption in the current study. However, out of the two studies with clinical samples included in the meta-analysis (one with persons with AN and one with BN), it was instead found that increased positive mood was associated with a decrease in food consumption. Consistent with this finding, EMA studies have found that positive mood decreased significantly before binge eating in women with BED (Munsch, Meyer, Quartier, & Wilhelm, 2012), and positive affect was significantly lower on binge
versus nonbinge days for women with subclinical binge eating behaviors (Wegner et al., 2002). As discussed earlier, participants in the binge eating group endorsed lower symptom severity compared to prior research with BN and BED participants. This could be a reason why the decrease in positive affect did not result in the expected increase in food consumption in the current study. Nonetheless, the limited number of studies examining the relationship between positive affect and food consumption, including two laboratory studies, suggests that the role of low positive affect in triggering binge eating is as yet an underdeveloped aspect of the literature (Cardi et al., 2015; Haedt-Matt & Keel, 2011).

**Emotion Regulation Strategies**

As previously mentioned, it was observed that participants reported using similar levels of state cognitive reappraisal and expressive suppression, regardless of the assigned emotion regulation strategy. One explanation could be that the measures used to assess the degree to which participants used the assigned strategy may not have been sensitive at capturing state emotion regulation. However, a prior study with university students who had either experienced major depression in the past or had never been depressed (Ehring, Tuschen-Caffier, Schnüll, Fischer, & Gross, 2010) used similar measures to successfully detect significant differences between participants assigned to use cognitive reappraisal and expressive suppression. Therefore, it is reasonable to assume that the measures were accurately capturing the degree to which participants in the current study used different emotion regulations strategies.
Analyses of the state emotion regulation measures revealed that participants reported using high levels of state cognitive reappraisal, and moderate levels of state expressive suppression, regardless of the assigned emotion regulation strategy. Given that similar training has been successfully used in other studies (Svaldi, Tuschen-Caffier, Trentowska, Caffier, & Naumann, 2014b), one possibility is that the use of emotion regulation during Cyberball may have lent itself to a preference for cognitive reappraisal. Compared to other mood induction procedures such as guided imagery, film excerpts, or recollection of past personal situations, Cyberball uses a basic computer interface to supposedly allow the participant to interact with other persons simply represented with nametags. In fact, participants are excluded from the game after only a few ball tosses, and become mere spectators, which may offer them the opportunity to maintain an objective distance from their feelings (i.e., engage in cognitive reappraisal). Further, the absence of the physical presence of people in Cyberball may reduce the incentive to use expressive suppression. Expressive suppression is typically used when interacting with others, where it is sometimes perceived as useful to hide one’s emotions (Gross, Richards, & John, 2006). Although Cyberball ostensibly involved interacting with others, it offered only a virtual social context, and the benefits of suppressing emotions may not have been apparent. To the author’s knowledge, this is the first study to have combined instructed emotion regulation with Cyberball induced ostracism. Thus, it is possible that the nature of Cyberball may have encouraged the use of cognitive reappraisal over expressive suppression, regardless of experimental condition.
Difficulty following the emotion regulation instructions may be another reason for the lack of adherence to the assigned strategy shown by participants in the current study. Demaree, Robinson, Pu, & Allen (2006) examined whether research participants were compliant with emotion regulation instructions and found that participants instructed to suppress their emotional expressions were significantly more likely to report using additional cognitive strategies, such as reappraisal, compared to participants who were instructed to exaggerate their emotional expressions. Demaree et al. (2006) suggested that, when instructed to use response-focused strategies (i.e., used after emotions are generated), such as suppression, participants also tend to incorporate antecedent-focused strategies (i.e., used prior to emotion generation), such as reappraisal. Likewise, it may be reasonable to assume that participants in the current study assigned to use expressive suppression also employed cognitive reappraisal.

The simultaneous use of reappraisal and suppression in participants who were only instructed to engage in suppression (Demaree et al., 2006) highlights an important aspect of the relationship between different emotion regulation strategies. Gross and John (2003) as well as Moore, Zellner, and Mollenholt (2008) demonstrated that measures of cognitive reappraisal and expressive suppression were independent, such that individuals who used cognitive reappraisal were no more or less likely to use expressive suppression or vice versa. It is possible that providing instructions regarding the use of one of these two independent strategies (e.g., increased cognitive reappraisal) may not lead to adherence to the instructions unless complemented by instructions on the other strategy (e.g., reducing expressive suppression). This may also explain why participants in the
current study reported using both strategies despite being instructed to use either cognitive reappraisal or expressive suppression.

**Additional Factors**

Prior research that has also failed to find the expected relationships between emotion regulation, negative affect, and food intake points to other factors that may have influenced the results of the current study. Dingemans et al., (2009) found no differences in food consumption by persons with BED who used suppression compared to those reacting naturally in response to negative mood induction. However, the severity of depression predicted food intake, such that those reporting moderate and greater levels of depression on the Beck Depression Inventory-II (Beck, Steer & Brown, 1996) were most affected by the negative mood induction, and consumed the most calories irrespective of their use of suppression. Compared to the participant sample in Dingemans et al. (2009), participants with binge eating in the current study reported only minimal to mild levels of depression on the Patient Health Questionnaire-9 (Spitzer, Kroenke, & Williams, 1999). The mild depression and subclinical binge eating reinforces the idea that sub-threshold depression in participants with binge eating might have contributed to the lack of significant difference in food consumption compared to participants without binge eating.

Some laboratory studies have also failed to replicate a pattern of increased food consumption after negative mood inductions. Telch & Agras (1996) assigned persons with and without BED to either negative or neutral mood induction, but failed to find any significant differences in caloric intake between persons with BED in the negative and neutral mood conditions. However, post-induction affect did predict whether persons
with BED characterized their food consumption as overeating or a binge episode. The current study only examined self-perceived loss of control while eating, and did not include an assessment of whether participants labeled their eating episode as a binge. Laessle & Schulz (2009) and Schulz & Laessle (2012) failed to find significant differences in food consumed when persons with and without BED were assigned to a stress or neutral mood condition, but did show that microstructural eating behaviors (e.g., initial and average eating rate) were significantly different for females with BED in the stress versus neutral mood condition. It is possible that the emotion regulation condition may have impacted microstructural eating behavior, but these were not assessed in the current study.

Other minor aspects of study design that might have impacted food consumption include levels of hunger and food amounts served. Although the study requirements included a two-hour fasting period prior to participation, similar to other studies (e.g., Dingemans et al., 2009), the participants only reported moderate levels of hunger, which could have led to reduced consumption of food. A longer fasting period might have yielded different results. In addition, Gosnell, Mitchell, Lancaster, Burgard, Wonderlich & Crosby (2001) found that the amount of food consumed by persons with and without BED increased significantly in association with the amount of food offered. Although none of the participants in the current study finished their food, they may have increased their consumption if presented with larger food portions. Finally, induced negative affect in laboratory settings may not replicate the impact of naturally occurring negative affect on binge eating, as binge eating behavior is secretive in nature and is usually carried out
in isolation due to fears of being negatively evaluated by others (Broussard, 2005; Munsch et al., 2008).

**Conclusion and Future Work**

In summary, several of the factors discussed may have contributed to the lack of support for the study hypotheses. The screening criteria may have inadvertently resulted in low symptom severity in persons with binge eating and unexpected similarity in trait levels of emotion regulation across participants with and without binge eating. Participants’ simultaneous use of cognitive reappraisal and expressive suppression, regardless of the assigned emotion regulation strategies, may have obscured the effects of the emotion regulation training. Additionally, the influence of Cyberball as a mood induction that could have promoted the use of specific emotion regulation strategies over others is unknown since this is the first study to instruct individuals to use specific emotion regulation strategies during Cyberball. Finally, regardless of the differences between the current study and prior studies on which the current study hypotheses were based, it is also possible that the hypotheses themselves may not have been correct. Some prior studies have also not found expected significant differences in food consumption. For example, Svaldi et al. (2010) found no significant changes in food cravings between female controls using suppression or reappraisal to regulate sadness. Additionally, Svaldi et al. (2014), which the current study hypotheses were most closely modeled after, did not find significant interaction effects between participant groups (females with BED and overweight females without BED) and emotion regulation strategy (reappraisal and
suppression). Future work may benefit from research such as the current study that provides some evidence for non-significant results.

To the best of the author’s knowledge, the current study is the first to examine the effects of ostracism, which is a specific interpersonal stressor, on food consumption in persons with binge eating. The four other studies that have examined the relationship between ostracism and food intake have used unselected participant samples (Hayman, McIntyre, & Abbey, 2014; Oaten, Williams, Jones, & Zadro, 2008; Salvy et al., 2011, 2012). The current study is also the first to examine the use of emotion regulation strategies to manage negative affect resulting from ostracism. Prior studies have typically used mood induction techniques to induce general negative affect (e.g., sadness, stress). In this way, the current study combined two different and novel design elements – examining the relationship between ostracism and food intake in persons with binge eating, and examining the utility of emotion regulation strategies in buffering the impact of ostracism. It would have been ideal to instead adopt a two-step process that would have included an initial verification of the association between ostracism and increased eating behaviors in persons with binge eating, followed by assigning individuals to use different emotion regulation strategies while being ostracized. These two steps were combined in the current study to manage the length of the study procedures, and to avoid issues related to multiple administrations of Cyberball.

Future studies can attempt to recruit participants endorsing clinically significant levels of objective binge eating and associated distress. Other interesting future research could include looking at the impact of different emotion regulation strategies such as
mindfulness and acceptance (Katterman, Kleinman, Hood, Nackers & Corsica, 2014; Naumann, Tuschen-Caffier, Voderholzer, Caffer & Svaldi, 2015; Svaldi & Naumann, 2014). Notably, the participants in the current study reported using both cognitive reappraisal and expressive suppression concurrently, regardless of being instructed to use one or the other. Examining if expressive suppression, when used in combination with cognitive reappraisal, can be beneficial in dealing with ostracism holds important clinical implications for interventions targeting negative affect and eating behaviors that occur in response to interpersonal stress. Approaches to the treatment of binge eating, such as interpersonal psychotherapy (IPT), may benefit by taking these complex relationships into account, and incorporating training in both antecedent and response based emotion regulation strategies simultaneously.

Persons with objective binge eating episodes in the current study did not exhibit differences in eating behaviors after Cyberball compared to those without objective binge eating episodes, yet experienced significantly greater negative affect. This suggests that patients with subclinical binge eating may appear to successfully manage brief interpersonal stress without resorting to increased eating. However, patients with subclinical binge eating may still be experiencing worsening mood which could increase vulnerability to future binge eating if levels of negative affect keep rising. Devising interventions to deescalate negative affect from interpersonal stress before it crosses a threshold that triggers binge eating may help in treatment.
Footnotes

1 According to the False Discovery Rate (FDR; Benjamini & Hochberg, 1995) approach, the following formula was used in the present study to correct for family-wise error rate: \( P \leq \frac{i}{m_{(x)}} \times q^* \), in which “\( P \)” = corrected \( p \) value (to be solved for, per family of hypotheses involving multiple comparison), “\( i \)” = the total number of families of hypotheses involving multiple \( p \) values to be tested in the present study (fixed for overall study), “\( m_{(x)} \)” = the number of hypotheses within a given family (\( x \)) to be tested (tailored to each family of hypotheses), and “\( q^* \)” = overall alpha correction level for the present study (i.e., \( \alpha = 0.05 \), fixed). For the present study, \( a \ priori \) FDR alpha values were calculated and used in testing whether the hypothesized effects were statistically significant. For the present study, there were four families of hypotheses.

The first family of hypotheses consisted of the preliminary analyses that explored group differences (Binge Eating vs. No Binge Eating Groups) on clinical correlates. Analyses were conducted on eating disorder symptoms (8 subscale scores of the EPSI and 1 EDEQ Global score), loss of control eating (1 LOCES total score), emotional eating (3 subscale scores of the EES for eating in response to anxiety, depression and anger/frustration), depression (1 PHQ-9 total score), trait emotion regulation (2 subscale scores of the ERQ for reappraisal and suppression), and body mass index (1 BMI value), resulting in \( m_{(x)} = 17 \) (8+1+1+3+1+2+1).

The second family of hypotheses consisted of differences in demographics and baseline measures. Analyses were conducted on age, ethnicity, training cycles, state reappraisal and suppression (2 subscale scores of the SRSQ for reappraisal and
suppression), affect (2 subscale scores of the PANAS for positive and negative affect), hunger, and desire to eat, resulting in $m_{(x)} = 9$. The third family of hypotheses consisted of the differences in outcome variables of affect (2 subscale scores of the PANAS for positive and negative affect) and psychological needs (4 subscale scores of the OQ for Belongingness, Self-Esteem, Meaningful Existence and Control) resulting in $m_{(x)} = 6$. Finally, the fourth family of hypotheses consisted of the differences in outcome variables of caloric intake, desires to eat and features of eating behaviors (self-perceived loss of control and amount eaten), resulting in $m_{(x)} = 4$.

Accordingly, $P \leq 4 / m_{(x)} \times 0.05$* for the overall study, yielded the following alpha correction values (tailored for each hypothesis): preliminary analyses $= 4/17 \times 0.05$; tests for differences in demographics and baseline measures $= 4/9 \times 0.05$; differences in outcome variables of affect and psychological needs $= 4/6 \times 0.05$; and differences in caloric intake, desires to eat and features of eating behaviors $= 4/4 \times 0.05$. The same corrections were applied to the exploratory hypotheses since the analyses were identical, and the only difference was in the criteria of group selection.
References


in a Clinical Sample: A Test of the Interpersonal Model. *European Eating Disorders Review*, n/a–n/a. doi:10.1002/erv.2344


Smyth, J., Wonderlich, S. a, Heron, K. E., Sliwinski, M. J., Crosby, R. D., Mitchell, J. E., & Engel, S. G. (2007). Daily and momentary mood and stress are associated with
binge eating and vomiting in bulimia nervosa patients in the natural environment.


## Appendix A: Study Description and Consent Forms

SONA Study Description for Participants being compensated 2 Credits

<table>
<thead>
<tr>
<th><strong>Study Name</strong></th>
<th>Examining the Impact of Attention on Cognitive Tasks, Social Tasks and Taste Preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study Type</strong></td>
<td><img src="image" alt="Standard (lab) study" /></td>
</tr>
<tr>
<td></td>
<td>This is a standard lab study. To participate, sign up, and go to the specified location at the chosen time.</td>
</tr>
<tr>
<td><strong>Credits</strong></td>
<td>2 Credits</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>120 minutes</td>
</tr>
<tr>
<td><strong>Sign-Up Restrictions</strong></td>
<td>You must NOT have signed up or completed ANY of these studies: Assessing Mood and Behavior Using Computer Games</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>The purpose of this study is to see how training in attention strategies affects cognitive skills, social skills and taste preferences. As part of the study procedures, you will be completing a social and cognitive task and will be asked to taste test some foods. You must also be willing and able to consume chocolate and pretzels, meaning you should not participate if you have food allergies or dietary restrictions that make you unable to consume these foods. You also need to avoid consuming any food two hours prior to study participation in order to accurately measure taste preferences. This study will take approximately 120 minutes to complete. The study will take place in Room 034 (on the ground floor) of Porter Hall.</td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>Akanksha Srivastav</td>
</tr>
<tr>
<td></td>
<td>☎ 740-707-0483</td>
</tr>
<tr>
<td><strong>Deadlines</strong></td>
<td>Sign-Up: 24 hour(s) before the appointment</td>
</tr>
<tr>
<td></td>
<td>Cancellation: 1 hour(s) before the appointment</td>
</tr>
</tbody>
</table>
Dear Participant,

I want to draw your attention to a study in which you can participate to earn research credit. This is a standard (lab) study that examines the impact of attention on cognitive skills, and social skills, and taste preferences among college students. The study also examines associations between personality differences and taste preferences; As part of study procedures, you will be completing a cognitive task and a social task. You also will be asked to taste test some foods. You must also be willing and able to consume chocolate and pretzels, meaning you should not participate if you have food allergies or dietary restrictions that make you unable to consume these foods. You also need to avoid which is why you need to avoid consuming any food two hours prior to study participation in order to accurately measure taste preferences. The study will take approximately 2 hours, and you will earn 2 research credits for participating. I hope you will consider it!

Best,

Akanksha Srivastav
Ohio University Consent Form – Binge Eating Group who were compensated $10.00 and 2 Research Credits.

Ohio University Consent Form

Title of Research: Examining the Impact of Attention on Cognitive Tasks, Social Tasks, and Taste Preferences

Researchers: Akanksha Srivastav, M.S. and Sarah Racine, Ph.D.

You are being asked to participate in research. For you to be able to decide whether you want to participate in this project, you should understand what the project is about, as well as the possible risks and benefits in order to make an informed decision. This process is known as informed consent. This form describes the purpose, procedures, possible benefits, and risks. It also explains how your personal information will be used and protected. Once you have read this form and your questions about the study are answered, you will be asked to sign it. This will allow your participation in this study. You should receive a copy of this document to take with you.

Explanation of Study

The purpose of the study is to examine the effect of attention training on cognitive tasks, social tasks, and taste preferences. As part of study procedures, you will be asked to undergo training in attention skills before completing a paper-pencil cognitive task, and a computerized social task – both of which will be video recorded. In order to assess taste preferences, you will also be asked to rate and taste different foods. **You can only take part in the study if you are willing and able to consume pretzels and chocolates, meaning that you should not participate if you have food allergies or other dietary restrictions that make you unable to consume these foods.** In addition, you will be asked to complete questionnaires that assess your emotional and behavioral health, as well as past and present medical conditions. Finally, you will be asked to complete an interview with a trained graduate student. You will be asked about your eating and exercise habits, and the interview will be recorded for the purposes of supervising study staff.

At the end of the study, you will be asked whether you agree to be contacted in case the graduate student interviewer has follow-up questions for you after the study has ended. In addition, you will be asked whether you are interested in being contacted about future research studies. Based on your responses during today’s study, you may be eligible for future studies for which you can earn course credit or monetary compensation. It is completely up to you whether you choose to provide contact information so that you can be contacted with follow-
up questions or for future study opportunities. This decision will not influence the assignment of course credit for today’s study.

You should not participate in this study if you are under 18 years old or if you are not comfortable reading and responding to questions in English. You also should not participate if you have consumed food in the past 2 hours.

This study will take approximately 120 minutes to complete. You may withdraw from the study at any time without fear of penalty.

Risks and Discomforts

There are minimal risks associated with participating in this study. Some individuals may experience mild, transient discomfort during some of the study activities like completing social and cognitive tasks or while answering questions about eating and exercise habits. You will be provided with resources for psychological services before leaving the laboratory, in the event that you are concerned about any of the study materials or wish to speak with a professional.

You should know that you have the right to opt out of any of the procedures, or withdraw from the study at any time without fear of penalty. However, if you withdraw during the first hour and a half of study participation, you will only receive partial credit (See “Compensation”).

Benefits

After completing the study, you will be provided with a debriefing of the hypotheses of the study, and you will learn about the procedures used in this psychological research study. You will also learn how studies like this one can provide researchers with important information regarding attention training and taste preferences. You will also receive feedback regarding the results of the interview, which many people find helpful.

Confidentiality and Records

All information that is collected from you during your participation in this study will be protected. Once you have consented to participate in the study, your responses will be assigned an arbitrary participant identification number. If you choose not to provide consent to be contacted regarding follow-up questions from the interview OR because you are interested in future research opportunities, your name (or other identifying information) will not be linked in any way to your study materials or audio recordings (see exceptions below). Your study responses will be stored separately from this consent form.

Your audio-recorded interview will be kept on a password-protected computer in a locked laboratory. Only people directly connected with the study will have access to these audio recordings. The audio-recorded interviews will be
destroyed approximately one year after data collection for the study is complete (~April, 2018).

If you provide consent to be contacted regarding follow-up questions from the interview OR because you are interested in future research opportunities, you will be asked to provide your name, phone number, and OU email address. This information will be stored separate from your study responses and linked only to your arbitrary participant identification number via a master list. This master list will be stored in password-protected files on secure study computers located in a locked laboratory. Only the researchers listed on this consent form will have access to this master list. If you only consent to being contacted regarding follow-up questions from the interview, any identifying information (i.e., the master list) will be deleted at the end of the semester. If you consent to being contacted regarding future research opportunities, your identifying information will be deleted in April 2022.

While every effort will be made to keep your study-related information confidential, there may be circumstances where this information must be shared with:

* Federal agencies, for example the Office of Human Research Protections, whose responsibility is to protect human subjects in research;
* Representatives of Ohio University (OU), including the Institutional Review Board, a committee that oversees the research at OU

**Compensation**

You will receive 2 research credits for completing this study. You may withdraw from this study at any time without fear of penalty. If you choose to withdraw in the first half hour of the study or decide not to consent to participate, you will receive 0.5 research credits for your time. If you choose to withdraw after half an hour, but before an hour, you will receive 1 research credit for your time. Finally, if you choose to withdraw after one hour, but before 1.5 hours, you will receive 1.5 research credits for your time.

In addition to receiving 2 research credits, you will also receive $10.00 for completing this study. In order to document payment, we will provide the OU Finance Office with your name, address, and signature. The OU Finance Office will not know the nature of this study.

**Contact Information**

If you have any questions regarding this study, please contact Akanksha Srivastav, M.S., Clinical Psychology Graduate Student, Ohio University at as844211@ohio.edu or Sarah E. Racine, Ph.D., Assistant Professor of Psychology, Ohio University at (740) 593-1086 at racine@ohio.edu or.
If you have any questions regarding your rights as a research participant, please contact Chris Hayhow, Director of Research Compliance, Ohio University, (740) 593-0664 (hayhow@oho.edu).

By signing below, you are agreeing that:

- you have read this consent form (or it has been read to you) and have been given the opportunity to ask questions and have them answered
- you have been informed of potential risks and they have been explained to your satisfaction.
- you understand Ohio University has no funds set aside for any injuries you might receive as a result of participating in this study
- you are 18 years of age or older
- your participation in this research is completely voluntary
- you may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you and you will not lose any benefits to which you are otherwise entitled.

Signature________________________________________ Date________________

Printed Name________________________________________

Version Date: [02/24/16]
Ohio University Consent Form

Title of Research: Examining the Impact of Attention on Cognitive Tasks, Social Tasks, and Taste Preferences

Researchers: Akanksha Srivastav, M.S. and Sarah Racine, Ph.D.

You are being asked to participate in research. For you to be able to decide whether you want to participate in this project, you should understand what the project is about, as well as the possible risks and benefits in order to make an informed decision. This process is known as informed consent. This form describes the purpose, procedures, possible benefits, and risks. It also explains how your personal information will be used and protected. Once you have read this form and your questions about the study are answered, you will be asked to sign it. This will allow your participation in this study. You should receive a copy of this document to take with you.

Explanation of Study

The purpose of the study is to examine the effect of attention training on cognitive tasks, social tasks, and taste preferences. As part of study procedures, you will be asked to undergo training in attention skills before completing a paper-pencil cognitive task, and a computerized social task – both of which will be video recorded. In order to assess taste preferences, you will also be asked to rate and taste different foods. You can only take part in the study if you are willing and able to consume pretzels and chocolates, meaning that you should not participate if you have food allergies or other dietary restrictions that make you unable to consume these foods. In addition, you will be asked to complete questionnaires that assess your emotional and behavioral health, as well as past and present medical conditions. Finally, you will be asked to complete an interview with a trained graduate student. You will be asked about your eating and exercise habits, and the interview will be recorded for the purposes of supervising study staff.

At the end of the study, you will be asked whether you agree to be contacted in case the graduate student interviewer has follow-up questions for you after the study has ended. In addition, you will be asked whether you are interested in being contacted about future research studies. Based on your responses during today’s study, you may be eligible for future studies for which you can earn course credit or monetary compensation. It is completely up to you whether you choose to provide contact information so that you can be contacted with follow-up questions or for future study opportunities. This decision will not influence the assignment of course credit for today’s study.
You should not participate in this study if you are under 18 years old or if you are not comfortable reading and responding to questions in English. You also should not participate if you have consumed food in the past 2 hours.

**This study will take approximately 120 minutes to complete.** You may withdraw from the study at any time without fear of penalty.

**Risks and Discomforts**

There are minimal risks associated with participating in this study. Some individuals may experience mild, transient discomfort during some of the study activities like completing social and cognitive tasks or while answering questions about eating and exercise habits. You will be provided with resources for psychological services before leaving the laboratory, in the event that you are concerned about any of the study materials or wish to speak with a professional.

You should know that you have the right to opt out of any of the procedures, or withdraw from the study at any time without fear of penalty. However, if you withdraw during the first hour and a half of study participation, you will only receive partial credit (See “Compensation”).

**Benefits**

After completing the study, you will be provided with a debriefing of the hypotheses of the study, and you will learn about the procedures used in this psychological research study. **You will also learn how studies like this one can provide researchers with important information regarding attention training and taste preferences.** You will also receive feedback regarding the results of the interview, which many people find helpful.

**Confidentiality and Records**

All information that is collected from you during your participation in this study will be protected. Once you have consented to participate in the study, your responses will be assigned an arbitrary participant identification number.-If you choose not to provide consent to be contacted regarding follow-up questions from the interview OR because you are interested in future research opportunities, your name (or other identifying information) will not be linked in any way to your study materials or audio recordings (see exceptions below). Your study responses will be stored separately from this consent form.

Your audio-recorded interview will be kept on a password-protected computer in a locked laboratory. Only people directly connected with the study will have access to these audio recordings. The audio-recorded interviews will be destroyed approximately one year after data collection for the study is complete (~April, 2018).
If you provide consent to be contacted regarding follow-up questions from the interview OR because you are interested in future research opportunities, you will be asked to provide your name, phone number, and OU email address. This information will be stored separate from your study responses and linked only to your arbitrary participant identification number via a master list. This master list will be stored in password-protected files on secure study computers located in a locked laboratory. Only the researchers listed on this consent form will have access to this master list. If you only consent to being contacted regarding follow-up questions from the interview, any identifying information (i.e., the master list) will be deleted at the end of the semester. If you consent to being contacted regarding future research opportunities, your identifying information will be deleted in April 2022.

While every effort will be made to keep your study-related information confidential, there may be circumstances where this information must be shared with:

* Federal agencies, for example the Office of Human Research Protections, whose responsibility is to protect human subjects in research;
* Representatives of Ohio University (OU), including the Institutional Review Board, a committee that oversees the research at OU

**Compensation**

You will receive **$10.00** for completing this study. You may withdraw from this study at any time without fear of penalty. In order to document payment, we will provide the OU Finance Office with your name, address, and signature. The OU Finance Office will not know the nature of this study.

**Contact Information**

If you have any questions regarding this study, please contact Akanksha Srivastav, M.S., Clinical Psychology Graduate Student, Ohio University at [as844211@ohio.edu](mailto:as844211@ohio.edu) or Sarah E. Racine, Ph.D., Assistant Professor of Psychology, Ohio University at (740) 593-1086 at [racine@ohio.edu](mailto:racine@ohio.edu).

If you have any questions regarding your rights as a research participant, please contact Chris Hayhow, Director of Research Compliance, Ohio University, (740) 593-0664 (hayhow@oho.edu).

By signing below, you are agreeing that:

- you have read this consent form (or it has been read to you) and have been given the opportunity to ask questions and have them answered
• you have been informed of potential risks and they have been explained to your satisfaction.
• you understand Ohio University has no funds set aside for any injuries you might receive as a result of participating in this study
• you are 18 years of age or older
• your participation in this research is completely voluntary
• you may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you and you will not lose any benefits to which you are otherwise entitled.

Signature__________________________________________ Date_________________
Printed Name___________________________________________

Version Date: [02/24/16]

Ohio University Consent Form – for Control Group

Title of Research: Examining the Impact of Attention on Cognitive Tasks, Social Tasks, and Taste Preferences

Researchers: Akanksha Srivastav, M.S. and Sarah Racine, Ph.D.

You are being asked to participate in research. For you to be able to decide whether you want to participate in this project, you should understand what the project is about, as well as the possible risks and benefits in order to make an informed decision. This process is known as informed consent. This form describes the purpose, procedures, possible benefits, and risks. It also explains how your personal information will be used and protected. Once you have read this form and your questions about the study are answered, you will be asked to sign it. This will allow your participation in this study. You should receive a copy of this document to take with you.

Explanation of Study

The purpose of the study is to examine the effect of attention training on cognitive tasks, social tasks, and taste preferences. As part of study procedures, you will be asked to undergo training in attention skills before completing a paper-pencil cognitive task, and a computerized social task – both of which will be video recorded. In order to assess taste preferences, you will also be asked to rate and taste different foods. You can only take part in the study if are willing and able to consume pretzels and chocolates, meaning that you should not participate if you have food allergies or other dietary restrictions that make you unable to consume these foods. In addition, you will be asked to complete questionnaires that assess your emotional and behavioral health, as well as past and present medical conditions. Finally, you will be asked to complete an interview with a trained graduate student. You will
be asked about your eating and exercise habits, and the interview will be recorded for the purposes of supervising study staff.

At the end of the study, you will be asked whether you agree to be contacted in case the graduate student interviewer has follow-up questions for you after the study has ended. In addition, you will be asked whether you are interested in being contacted about future research studies. Based on your responses during today’s study, you may be eligible for future studies for which you can earn course credit or monetary compensation. It is completely up to you whether you choose to provide contact information so that you can be contacted with follow-up questions or for future study opportunities. This decision will not influence the assignment of course credit for today’s study.

You should not participate in this study if you are under 18 years old or if you are not comfortable reading and responding to questions in English. You also should not participate if you have consumed food in the past 2 hours.

This study will take approximately 120 minutes to complete. You may withdraw from the study at any time without fear of penalty.

Risks and Discomforts

There are minimal risks associated with participating in this study. Some individuals may experience mild, transient discomfort during some of the study activities like completing social and cognitive tasks or while answering questions about eating and exercise habits. You will be provided with resources for psychological services before leaving the laboratory, in the event that you are concerned about any of the study materials or wish to speak with a professional.

You should know that you have the right to opt out of any of the procedures, or withdraw from the study at any time without fear of penalty. However, if you withdraw during the first hour and a half of study participation, you will only receive partial credit (See “Compensation”).

Benefits

After completing the study, you will be provided with a debriefing of the hypotheses of the study, and you will learn about the procedures used in this psychological research study. You will also learn how studies like this one can provide researchers with important information regarding attention training and taste preferences. You will also receive feedback regarding the results of the interview, which many people find helpful.

Confidentiality and Records

All information that is collected from you during your participation in this study will be protected. Once you have consented to participate in the study,
your responses will be assigned an arbitrary participant identification number. If you choose not to provide consent to be contacted regarding follow-up questions from the interview OR because you are interested in future research opportunities, your name (or other identifying information) will not be linked in any way to your study materials or audio recordings (see exceptions below). Your study responses will be stored separately from this consent form.

Your audio-recorded interview will be kept on a password-protected computer in a locked laboratory. Only people directly connected with the study will have access to these audio recordings. The audio-recorded interviews will be destroyed approximately one year after data collection for the study is complete (~April, 2018).

If you provide consent to be contacted regarding follow-up questions from the interview OR because you are interested in future research opportunities, you will be asked to provide your name, phone number, and OU email address. This information will be stored separate from your study responses and linked only to your arbitrary participant identification number via a master list. This master list will be stored in password-protected files on secure study computers located in a locked laboratory. Only the researchers listed on this consent form will have access to this master list. If you only consent to being contacted regarding follow-up questions from the interview, any identifying information (i.e., the master list) will be deleted at the end of the semester. If you consent to being contacted regarding future research opportunities, your identifying information will be deleted in April 2022.

While every effort will be made to keep your study-related information confidential, there may be circumstances where this information must be shared with:

* Federal agencies, for example the Office of Human Research Protections, whose responsibility is to protect human subjects in research;
* Representatives of Ohio University (OU), including the Institutional Review Board, a committee that oversees the research at OU

**Compensation**

You will receive 2 research credits for completing this study. You may withdraw from this study at any time without fear of penalty. If you choose to withdraw in the first half hour of the study or decide not to consent to participate, you will receive 0.5 research credits for your time. If you choose to withdraw after half an hour, but before an hour, you will receive 1 research credit for your time. Finally, if you choose to withdraw after one hour, but before 1.5 hours, you will receive 1.5 research credits for your time.

**Contact Information**

If you have any questions regarding this study, please contact Akanksha Srivastav, M.S., Clinical Psychology Graduate Student, Ohio
University at as844211@ohio.edu or Sarah E. Racine, Ph.D., Assistant Professor of Psychology, Ohio University at (740) 593-1086 at racine@ohio.edu or.

If you have any questions regarding your rights as a research participant, please contact Chris Hayhow, Director of Research Compliance, Ohio University, (740) 593-0664 (hayhow@oho.edu).

By signing below, you are agreeing that:
- you have read this consent form (or it has been read to you) and have been given the opportunity to ask questions and have them answered
- you have been informed of potential risks and they have been explained to your satisfaction.
- you understand Ohio University has no funds set aside for any injuries you might receive as a result of participating in this study
- you are 18 years of age or older
- your participation in this research is completely voluntary
- you may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you and you will not lose any benefits to which you are otherwise entitled.

Signature_________________________________________ Date________________

Printed Name_________________________________________

Version Date: [10/28/15]
Appendix B: Materials Used for Emotion Regulation Training

General Emotion Regulation Instructions

You will shortly be taught a strategy for how to focus your attention. We will instruct you on how to use this attention strategy and will then give you the opportunity to practice. You will be practicing this strategy using five different pictures. Please use the attention strategy while viewing each of the pictures. Once you have successfully used the attention strategy with one picture, you may move to the next picture by clicking. During this practice session, feel free to ask any questions that you may have. As soon as you are ready, you can begin.

Training Instructions for Cognitive Reappraisal

*Cognitive Reappraisal Training*. Participants randomly assigned to the Reappraisal condition will be provided the following instructions: “As you look at the pictures, please try to pay attention to what you are seeing objectively. Try to maintain an objective distance from any feelings or emotions that you are experiencing. Whenever you experience any feelings of emotions, try and create a distance between you and the picture. To create this distance it is sometimes helpful to focus attention on other details e.g., concentrating on technical aspects of the picture, or the role of the photographer. Try to take a step back from the picture and maintain an objective distance from your feelings. Now, please try now to develop a phrase that could help you to adopt this attention strategy as you are looking at the pictures. For example, you could tell yourself
‘This is just a picture’ or ‘This is just an experiment’. Experiment with your phrase, until you find one that really convinces you.” Participants were given the option of writing down their chosen phrase on a sheet to aid recall.

**Training Instructions for Expressive Suppression**

*Expressive suppression training.* Participants randomly assigned to the Expressive Suppression condition will then be provided the following instructions: “As you look at the pictures, please try to hide any feelings or emotions you experience. It is important to pay attention to your facial expression, and to try and hold a neutral facial expression at all times. Try to make sure that others do not know how you are feeling based on your facial expressions. Once again, pay attention to your facial expression, which should be neutral at all times. Do your best to hide your feelings from others. Now, please try to develop a phrase that could help you to adopt this attention strategy as you are looking at the pictures. For example, you could tell yourself ‘Nobody should see the way I feel’ or ‘I need to keep a neutral expression’. Experiment with your phrase, until you find one that really convinces you.” Participants were given the option of writing down their chosen phrase on a sheet to aid recall.
Pictures Used in Emotion Regulation Training

Dog – 1300

Soldier – 6212
Baby – 2660

Kittens – 1463
Basket – 7010
Appendix C: Debriefing Form

Debriefing Form – Final

Examining the Impact of Attention on Cognitive Tasks, Social Tasks and Taste Preferences

Thank you for taking part in this study.

The primary purpose of this study is to test how training in emotion regulation can affect mood and eating behavior. We expect that emotion regulation training may be helpful for coping with the impact of interpersonal stressors, such as being excluded by one’s peers. This study is interested in whether emotion regulation training is particularly helpful for individuals who experience episodes of overeating during which they feel out of control as well as individuals who are restricting their food intake (e.g., eating less than others around them). Thus, participants for this study include individuals who do and do not report these patterns of eating.

This study involved several elements of deception. First, you were told that this study was interested in the impact of attention training on cognitive tasks, social tasks, and taste preferences. The training that you received at the beginning of the study was designed to teach you a method to regulate your emotional responses rather than to focus your attention. We used the word “attention” instead of “emotion regulation” so that you were not expecting to experience a negative mood during the study.

Second, you were told that you were being videotaped while completing the cognitive and social tasks. However, you were not being videotaped. We wanted to ensure that you used the emotion regulation skills in which you were trained during the completion of the tasks.

Third, you were told that the letter-circling task was being used to assess your cognitive skills. This exercise was included so that you did not know that a main focus of the study was the computerized social task.

Fourth, you were told that you were playing the ball-tossing game against other students from Ohio University. However, you were actually playing the game against the computer, and the game was designed to exclude you. The reason that you were not informed of this part of the study is because we wanted you to fully experience the bad mood that would result from being excluded by your peers during the social task.

Finally, we presented the study as an examination of taste preferences. We were actually interested in how the emotion regulation training combined with the experience of being excluded by your peers would affect the amount of food you consumed during the taste test.

We ask that you please keep these details about the true purpose of this study to yourself, as it is possible that people that you know may participate in this study in the future. The results of the study depend on participants being unaware of, for example, the nature of the social task and the measurement of food consumption, and we greatly appreciate your assistance with this. If asked about the study, you can tell people that the study involved attention training, cognitive and social tasks, and a taste test.
We believe that research such as this can provide researchers and clinicians with much needed information about emotion regulation and eating problems. This information is valuable because it can ultimately inform the development of programs designed to prevent and treat psychological disorders characterized by poor emotion regulation, such as eating disorders.

Given that elements of deception were utilized in this study, and you were not informed of these elements when you provided informed consent, you have the right to refuse to allow your data to be used in any future analyses. There is no penalty for refusing to allow your data to be used. If you wish to allow the researchers to use your data after being fully informed of all study goals, please provide your signature below.

Signature:_______________________________ Date:________________

If you have any questions regarding this study, please contact Akanksha Srivastav, M.S., Clinical Psychology Graduate Student, Ohio University at as844211@ohio.edu or Sarah E. Racine, Ph.D., Assistant Professor of Psychology, Ohio University at (740) 593-1086 or racine@ohio.edu.

For your information, if you or someone you know is interested in learning more about, or receiving treatment for, eating disorder problems, or any other psychological problems, you may contact one of the offices below.

Personal Counseling Services at Ohio University:
Psychology and Social Work Clinic (002 Porter Hall) (740) 593-0902
Counseling and Psychological Services (Hudson Health Center, 3rd floor) (740) 593-1616
The following is a list of feelings people sometimes have. Please select the appropriate numbered response from the scale provided to indicate the extent to which you are currently experiencing each of the following feelings.

1 = Very slightly or not at all  
2 = A little  
3 = Moderately  
4 = Quite a bit  
5 = Extremely

<table>
<thead>
<tr>
<th>Enthusiastic</th>
<th>Scared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interested</td>
<td>Afraid</td>
</tr>
<tr>
<td>Determined</td>
<td>Upset</td>
</tr>
<tr>
<td>Excited</td>
<td>Distressed</td>
</tr>
<tr>
<td>Inspired</td>
<td>Jittery</td>
</tr>
<tr>
<td>Alert</td>
<td>Nervous</td>
</tr>
<tr>
<td>Active</td>
<td>Ashamed</td>
</tr>
<tr>
<td>Strong</td>
<td>Guilty</td>
</tr>
<tr>
<td>Proud</td>
<td>Irritable</td>
</tr>
<tr>
<td>Attentive</td>
<td>Hostile</td>
</tr>
</tbody>
</table>
Hunger Rating Bar

How hungry are you right now?

Not at all | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | Extremely

Hunger Rating

Desire to Eat Rating Bar

Rate your current desire to eat.

Not at all | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | Very Much

Desire to Eat

33

45
## Taste Test Questionnaire

Please indicate which snack you believed to be...

<table>
<thead>
<tr>
<th></th>
<th>M&amp;Ms</th>
<th>Pretzels</th>
<th>Undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweeter?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Saltier?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Crunchier?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Softer?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Taster?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### Which snack do you like better?

- ☐ M&Ms
- ☐ Pretzels
- ☐ Undecided
Final Perceived Food Intake and Loss of Control Scales

How much did you eat?

<table>
<thead>
<tr>
<th>Food amount</th>
<th>Very little</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 10 20 30 40 50 60 70 80 90 100</td>
<td></td>
</tr>
</tbody>
</table>

Did you have control over the amount you ate?

<table>
<thead>
<tr>
<th>Control</th>
<th>Not at all</th>
<th>Completely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 10 20 30 40 50 60 70 80 90 100</td>
<td></td>
</tr>
</tbody>
</table>
Ostracism Questionnaire

For each question, please circle the number to the right that best represents the feelings you were experiencing DURING the game.

**Belonging**
- I felt “disconnected” (R)
- I felt rejected (R)
- I felt like an outsider (R)
- I felt I belonged to the group
- I felt the other players interacted with me a lot

**Self esteem**
- I felt good about myself
- My self-esteem was high
- I felt liked
- I felt insecure (R)
- I felt satisfied

**Meaningful existence**
- I felt invisible (R)
- I felt meaningless (R)
- I felt non-existent (R)
- I felt important
- I felt useful

**Control**
- I felt powerful
- I felt I had control over the course of the game
- I felt I had the ability to significantly alter events
- I felt I was unable to influence the action of others (R)
- I felt the other players decided everything (R)

**MOOD**
- Good
- Bad
- Friendly
- Unfriendly
- Angry
- Pleasant
- Happy
- Sad

**Manipulation check**
For the next three questions, please circle the number to the right (or fill in the blank) that best represents the thoughts you had during the game.
- I was ignored
- I was excluded
Assuming that the ball should be thrown to each person equally (33% if three people; 25% if four people), what percentage of the throws did you receive? _____ %

Changes to Suppression and Reappraisal State Scale

Please use the rating scale below to indicate which strategy you used during the previous social task.
(0 = not at all to 5 = extremely).

1. I tried to see the situation as positively objectively as possible.
2. During the situation, I controlled my emotions.
3. I viewed the situation as a challenge social task as just part of the experiment.
4. I showed my emotions, I hid my emotions.
5. I thought of the situation in a way that made me stay calm.
6. One could see my feelings during the situation. Others could not see my feelings during the social task.

Final Reappraisal and Suppression Scales

<table>
<thead>
<tr>
<th>Please use the rating scale below to indicate which strategy you used during the social task.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I tried to see the situation as objectively as possible.</td>
</tr>
<tr>
<td>During the situation, I controlled my emotions.</td>
</tr>
<tr>
<td>I viewed the social task as just part of the experiment.</td>
</tr>
<tr>
<td>I hid my emotions.</td>
</tr>
<tr>
<td>I thought of the situation in a way that made me stay calm.</td>
</tr>
<tr>
<td>Others could not see my feelings during the social task.</td>
</tr>
</tbody>
</table>
Demographic Questionnaire

1. What is your age?
   a. 18        d. 21        g. 24
   b. 19        e. 22        h. 25
   c. 20        f. 23        i. Other (specify): __________

2. What is your current year in school?
   a. Freshman        d. Senior
   b. Sophomore       e. Graduate
   c. Junior          f. Other

3. What is your biological sex?
   a. Male
   b. Female
   c. Intersex

4. What is your gender identity?
   a. Male
   b. Female
   c. Transgender
5. What is your sexual orientation?
   a. Heterosexual
   b. Gay
   c. Lesbian
   d. Bisexual/Pansexual

6. What is your ethnicity?
   a. Hispanic or Latino
   b. Not Hispanic or Latino

7. What is your racial identity? (Please circle ALL that apply).
   a. White/Caucasian
   b. Black or African American
   c. Asian
   d. Middle Eastern
   e. Native Hawaiian or Other Pacific Islander
   f. American Indian or Alaska Native
   g. Multiracial
   h. Other (specify): ____________________

8. In what religion were you raised?
   a. Protestant (Christian)
   b. Jewish
   c. Catholic (Christian)
   d. Muslim
   e. No Affiliation
   f. Other (specify): ____________________
9. Approximately what is your parent’s combined yearly income?
   a. Unemployed or disabled  
   b. Under $10,000  
   c. $10,000-20,000  
   d. $21,000-30,000  
   e. $31,000-40,000  
   f. $41,000-50,000  
   g. $51,000-75,000  
   h. $76,000-100,000  
   i. $101,000-200,000  
   j. Over $200,000  
   k. I don’t know

10. What is your current relationship status (circle ALL that apply)?
   a. Never married  
   b. Divorced  
   c. Widowed  
   d. Separated  
   e. Married once  
   f. Divorced, remarried  
   g. Widowed, remarried  
   h. Living with significant other (not spouse)  
   i. Significant other, not living with partner  
   j. Single

11. What is your height? __________ ft ____________ inches

12. What is your current weight? ___________ pounds (lbs).

13. What is the highest weight you have reached at your current height (excluding pregnancy)? ___________ pounds (lbs)
14. What is the lowest weight you have reached at your current height?

____________ pounds (lbs)

15. Circle any of these conditions that you have had or currently have:
   a. alcoholism          h. bulimia nervosa
   b. agoraphobia         i. depression
   c. anorexia nervosa    j. obsessive-compulsive disorder
   d. attention problems/hyperactivity k. panic disorder
   e. social phobia       l. non-alcohol drug addiction
   f. bipolar disorder    m. post-traumatic stress disorder
   g. binge eating disorder n. Other (specify):

   ______________________
   h. generalized anxiety disorder. o. None of the above.

16. Are you currently taking medication for a mental health concern?

   Yes    No

   a. If yes, please select the class(es) of mental health medications that you are currently taking (select all that apply).

      i. Antidepressant medications (e.g., Prozac, Celexa, Wellbutrin, Paxil, Zoloft)
ii. Antianxiety medications (e.g., Ativan, Klonoin, Xanax, Buspar)

iii. Antipsychotic medications (e.g., Zyprexa, Risperdal, Seroquel, Clozaril)

iv. Mood Stabilizers (e.g., Lithium, Depakote)

v. Sleep Aids (e.g., Trazadone, Ambien)

vi. Anticonvulsants (e.g., Lamictal, Topomax, Tegretol)

vii. Narcotics (e.g., Oxycodone, Soma, MS-Contin)

viii. Triptans (e.g., Imitrex)

ix. Opiate Ana
tagontists (e.g., Naltrexone)

x. Other

17. Have you ever received psychotherapy for any behavioral or medical condition?

Yes    No

If yes, when? ______________________________________________________

For what condition? __________________________________________________

18. Have you ever had any treatment with psychological medicines

(examples: Prozac, Xanax,)?

Yes    No

If yes, when?

_____________________________________________________________
What medication?

For what condition?
Emotion Regulation Questionnaire

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1------------2------------3------------4------------5------------6------------7
Strongly Disagree Neutral Strongly Agree

1. When I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about.
2. I keep my emotions to myself.
3. When I want to feel less negative emotion (such as sadness or anger), I change what I’m thinking about.
4. When I am feeling positive emotions, I am careful not to express them.
5. When I’m faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
6. I control my emotions by not expressing them.
7. When I want to feel more positive emotion, I change the way I’m thinking about the situation.
8. I control my emotions by changing the way I think about the situation I’m in.
9. When I am feeling negative emotions, I make sure not to express them.
10. When I want to feel less negative emotion, I change the way I’m thinking about the situation.
Patient Health Questionnaire-9

Over the last 2 weeks, how often have you been bothered by any of the following problems. Use the following rating scale to provide appropriate responses.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not at all</td>
</tr>
<tr>
<td>1</td>
<td>Several Days</td>
</tr>
<tr>
<td>2</td>
<td>More than half the days</td>
</tr>
<tr>
<td>3</td>
<td>Nearly every day</td>
</tr>
</tbody>
</table>

1. Little interest or pleasure in doing things
2. Feeling down, depressed, or hopeless
3. Trouble falling or staying asleep, or sleeping too much
4. Feeling tired or having little energy
5. Poor appetite or overeating
6. Feeling bad about yourself or that you are a failure or have let yourself or your family down
7. Trouble concentrating on things, such as reading the newspaper or watching television
8. Moving or speaking so slowly that other people could have noticed. Or the opposite being so fidgety or restless that you have been moving around a lot more than usual
9. Thoughts that you would be better off dead, or of hurting yourself

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?
Not difficult at all____
Somewhat difficult____
Very difficult ______
Extremely difficult____
Eating Pathology Symptom Inventory

Below is a list of experiences and problems that people sometimes have. Read each item to determine how well it describes your recent experiences. Then select the option that best describes how frequently each statement applied to you during the past four weeks, including today.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>Rarely</td>
<td>Sometimes</td>
<td>Often</td>
<td>Very Often</td>
</tr>
</tbody>
</table>

1. I did not like how clothes fit the shape of my body  
2. I tried to exclude “unhealthy” foods from my diet  
3. I ate when I was not hungry  
4. People told me that I do not eat very much  
5. I felt that I needed to exercise nearly every day  
6. People would be surprised if they knew how little I ate  
7. I used muscle building supplements  
8. I pushed myself extremely hard when I exercised  
9. I snacked throughout the evening without realizing it  
10. I got full more easily than most people  
11. I considered taking diuretics to lose weight  
12. I tried on different outfits, because I did not like how I looked  
13. I thought laxatives are a good way to lose weight  
14. I thought that obese people lack self-control  
15. I thought about taking steroids as a way to get more muscular
16. I used diet teas or cleansing teas to lose weight
17. I used diet pills
18. I did not like how my body looked
19. I ate until I was uncomfortably full
20. I felt that overweight people are lazy
21. I counted the calories of foods I ate
22. I planned my days around exercising
23. I thought my butt was too big
24. I did not like the size of my thighs
25. I wished the shape of my body was different
26. I was disgusted by the sight of an overweight person wearing tight clothes
27. I made myself vomit in order to lose weight
28. I did not notice how much I ate until after I had finished eating
29. I considered taking a muscle building supplement
30. I felt that overweight people are unattractive
31. I engaged in strenuous exercise at least five days per week
32. I thought my muscles were too small
33. I got full after eating what most people would consider a small amount of food
34. I was not satisfied with the size of my hips
35. I used protein supplements
36. People encouraged me to eat more
37. If someone offered me food, I felt that I could not resist eating it
38. I was disgusted by the sight of obese people

39. I stuffed myself with food to the point of feeling sick

40. I tried to avoid foods with high calorie content

41. I exercised to the point of exhaustion

42. I used diuretics in order to lose weight

43. I skipped two meals in a row

44. I ate as if I was on auto-pilot

45. I ate a very large amount of food in a short period of time (e.g., within 2 hours)
## Loss of Control Over Eating Scale

In the last 4 weeks (28 days), how often have you had the following experiences during a time when you were eating? Use the rating scale below to determine the appropriate score.

<table>
<thead>
<tr>
<th>1 – Never</th>
<th>2 – Rarely</th>
<th>3 – Occasionally</th>
<th>4 – Often</th>
<th>5 – Always</th>
</tr>
</thead>
</table>

1. I felt I had lost control over eating.
2. I continued to eat past the point when I wanted to stop.
3. I ate until I was uncomfortably full.
4. I kept eating even though I was no longer hungry.
5. I felt like I had "blown it" and might as well keep eating.
6. I found myself eating despite negative consequences.
7. I felt helpless about controlling my eating.
8. While eating, I had feelings of shame.
9. While eating, I felt I was stuffing myself.
10. While eating, I felt disgusted.
11. While eating, I felt a sense of relief or release.
12. While eating, I felt a physical rush or high.
13. While eating, I felt like I was watching or looking at myself from "outside".
14. I felt like the craving to eat overpowered me.
15. My eating felt like a ball rolling down a hill that just kept going and going.
16. I lost track of what and how much I was eating.
17. While eating, I felt like I was not paying attention to what I was eating.
18. While eating, I felt like I was in my own little world.
19. I could not concentrate on anything other than eating.
20. I felt like I could not do anything other than eat.
21. I finished eating only to discover I had eaten more than I thought.
22. I felt I was eating faster than normal.
23. Eating as quickly as possible seemed to be the only thing that mattered.
24. While eating, it did not seem real.
Emotional Eating Scale

We all respond to different emotions in different ways. Some types of feelings lead people to experience an urge to eat. Please indicate the extent to which the following feelings lead you to feel an urge to eat by checking the appropriate box.

1 – No Desire to Eat
2 – A Small Desire to Eat
3 – A Moderate Desire to Eat
4 – A Strong Urge to Eat
5 – An Overwhelming Urge to Eat

1. Resentful
2. Discouraged
3. Shaky
4. Worn Out
5. Inadequate
6. Excited
7. Rebellious
8. Blue
9. Jittery
10. Sad
11. Uneasy
12. Irritated
13. Jealous
14. Worried
15. Frustrated
16. Lonely
17. Furious
18. On edge
19. Confused
20. Nervous
21. Angry
22. Guilty
23. Bored
24. Helpless
25. Upset
Eating Disorder Examination Questionnaire

Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully. Please answer all the questions. Thank you.

Questions 1 to 12: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only.

<table>
<thead>
<tr>
<th>Question</th>
<th>On how many of the past 28 days ...</th>
<th>No days</th>
<th>1-5 days</th>
<th>6-12 days</th>
<th>13-15 days</th>
<th>16-22 days</th>
<th>23-27 days</th>
<th>Every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Have you had a definite desire to have totally flat stomach?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Has thinking about food, eating, or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Have you had a definite fear of losing control over eating?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Have you had a definite fear that you might gain weight?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Have you felt fat?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Have you had a strong desire to lose weight?</td>
<td>0 1 2 3 4 5 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Questions 13-18: Please fill in the appropriate number in the boxes on the right. Remember that the questions only refer to the past four weeks (28 days).

Over the past four weeks (28 days)......

13 Over the 28 days, how many times have you eaten what other people
would regard as an unusually large amount of food (given the circumstances)?

14 …..On how many of these times did you have a sense of having lost control over your eating (at the time that you were eating)?

15 Over the past 28 days, on how many DAYS have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food and have had a sense of loss of control at the time)?

16 Over the past 28 days, how many times have you made yourself sick (vomit) as a means of controlling your shape or weight?

17 Over the past 28 days, how many times have you taken laxatives as a means of controlling your shape or weight?

18 Over the past 28 days, how many times have you exercised in a “driven” or “compulsive” way as a means of controlling your weight, shape or amount of fat, or to burn off calories?

Questions 19 to 21: Please circle the appropriate number. Please note that for these questions the term “binge eating” means eating what others would regard as an unusually large amount of food for the circumstances, accompanied by a sense of having lost control over eating.

<table>
<thead>
<tr>
<th>Question</th>
<th>Type of Eating</th>
<th>Days</th>
<th>1-5 days</th>
<th>6-12 days</th>
<th>13-15 days</th>
<th>16-22 days</th>
<th>23-27 days</th>
<th>Every day</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>No days</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>20</td>
<td>None of the times</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>21</td>
<td>Not at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Questions 22 to 28: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days).

<table>
<thead>
<tr>
<th>Question</th>
<th>Weight</th>
<th>Shape</th>
<th>Weight</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
<td>Markedly</td>
</tr>
<tr>
<td>23</td>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
<td>Markedly</td>
</tr>
<tr>
<td>24</td>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
<td>Markedly</td>
</tr>
<tr>
<td>25</td>
<td>Not at all</td>
<td>Slightly</td>
<td>Moderately</td>
<td>Markedly</td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>How dissatisfied have you been with your shape?</td>
<td>0-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?</td>
<td>0-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?</td>
<td>0-6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Participant ID: __________

MODIFIED EATING DISORDER EXAMINATION
Version 1
Copyright 2014 by Christopher G Fairburn, Zafra Cooper and Marianne O'Connor

VERSION EDITED FOR BEEP LAB AND STREAM LAB

<table>
<thead>
<tr>
<th>ORIENTATION TO THE TIME PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>What we are going to do is a partially structured interview in which I will ask you about your eating habits as well as your feelings towards your body weight and shape. Because a standard set of questions is going to be asked, please note that some may not apply to you.</td>
</tr>
<tr>
<td>Some questions focus on the past four weeks (that is, the last 28 days), others will cover the previous three months, and there also are questions that ask about your entire lifetime. I know this will test your memory because the weeks tend to blend together.</td>
</tr>
<tr>
<td>What I have done to help you is to make this calendar for the last 28 days [show the blank calendar – see Table 2]; it ends yesterday because today is not over yet. So it goes from yesterday [day and date] to [day and date].</td>
</tr>
<tr>
<td>And here are the dates for the two months before that, [date] to [date] and [date] to [date]. And to help you remember these periods, I have noted the holidays (e.g., Labor Day, Thanksgiving).</td>
</tr>
<tr>
<td>What I would like you to do now is tell me about any events that have happened in the past 28 days since this will help us discuss these four weeks. Have there been any events out of the ordinary, such as celebrations of any type (e.g., birthdays, social gatherings), vacations, or days off work? Then we can note these on the calendar.</td>
</tr>
<tr>
<td>How about in the previous month? From [date] to [date], were there any events out of the ordinary, such as celebrations, vacations, or days off work? We also will note these on the calendar to help your memory.</td>
</tr>
<tr>
<td>What about two months ago? From [date] to [date], were there any events out of the ordinary, such as celebrations, vacations, or days off work? Let's note these on the calendar too.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTRODUCTORY QUESTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>To begin, I would like to get a general picture of your eating habits over the last four weeks.</td>
</tr>
<tr>
<td>1. What has been your usual eating pattern?</td>
</tr>
<tr>
<td>______________________________</td>
</tr>
<tr>
<td>2. Have your eating habits varied much from day to day? YES ___ NO ___</td>
</tr>
<tr>
<td>______________________________</td>
</tr>
<tr>
<td>3. Have weekdays differed from weekends? YES ___ NO ___</td>
</tr>
<tr>
<td>______________________________</td>
</tr>
<tr>
<td>4. What about the previous two months? Specify months. (Were your eating habits pretty much the same or were they different?)</td>
</tr>
<tr>
<td>______________________________</td>
</tr>
</tbody>
</table>
Participant ID: 

<table>
<thead>
<tr>
<th>BINGE EATING AND RELATED EPISODES</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would like to ask you about any episodes of overeating, or loss of control over eating, that you might have had over the past four weeks.</td>
</tr>
<tr>
<td>Different people mean different things by overeating. I am interested in any times when you have felt that you have eaten, or might have eaten, too much at one time and times when you have felt as if your eating is out of control.</td>
</tr>
</tbody>
</table>

**Objective binge eating episodes (OBEs)**

1. In the past four weeks, did you have times when you ate a very large amount of food within one sitting, for example two hours? YES NO
   a. If NO: How about in the two months prior to this past month? YES NO
   b. If NO: Have you EVER had times where you ate a very large amount of food within one sitting, even if it wasn’t in the past 3 months? YES NO

   SKIP: IF NO to OBEs, skip to Subjective binge eating episodes (SBEs).

2. If YES to any of the above: Tell me about the most recent time when you ate a very large amount of food in one sitting. (What did you eat? How much of each food item did you have? After every item, ask: What else did you eat?)

   OR

   If participant cannot remember most recent time: That's ok. Tell me about a typical time when you ate a very large amount of food in a short period of time. (What did you eat? How much of each food item did you have? What else did you eat?)

   Use FOOD LOG to record specific foods and amounts eaten.

   a. Over what period of time did you consume this amount of food? Minutes: _____

   b. What were the circumstances? (Were you with other people? What were others eating at this time? Did you plan to eat as much as you did? Did you finish all of your food?)

   Use FOOD LOG to record circumstances.

   If amount of food described does not seem objectively large: Has there been a time when you have eaten more food than you have just described? (What did you eat? How much of each food item did you have? What else did you eat?)

3. Tell me about another recent or typical time when you ate a very large amount of food in a short period of time. (What did you eat? How much of each food item did you have? What else did you eat?)

   Use FOOD LOG to record specific foods and amounts eaten.

   a. Over what period of time did you consume this amount of food? Minutes: _____

   b. What were the circumstances? (Were you with other people? What were others eating at this time? Did you plan to eat as much as you did? Did you finish all of your food?)

   Use FOOD LOG to record circumstances

   | Objectively large amount of food: Current | -9 | -7 | 0 | 1 | 2 |
Participant ID: ___________

NOTE. If amount of food or circumstances do not indicate presence of current OBES, re-assess for past.

<table>
<thead>
<tr>
<th>Objective large amount of food: Past</th>
<th>-9</th>
<th>-7</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
</table>

4. Loss of control over eating when eating large amounts of food:

   During these times...
   a. Did you feel as though your eating was out-of-control?  
      YES  NO  YES  NO
   b. Did you feel like you couldn't stop yourself once you had started?
      YES  NO  YES  NO
   c. Did you feel that you were unable to control when, what, or the amount of food you were eating?
      YES  NO  YES  NO
   d. Did you feel driven or compelled to eat?
      YES  NO  YES  NO
   e. Did you feel like you were a ball rolling down a hill – like you just couldn't stop?
      YES  NO  YES  NO
   f. Did you keep going back to the cabinets or refrigerator to find more food?
      YES  NO  YES  NO
   g. Did you feel sad or upset after eating?
      YES  NO  YES  NO
   h. Did you feel guilty or ashamed after eating?
      YES  NO  YES  NO
   i. Did you feel disgusted or grossed out with yourself after eating?
      YES  NO  YES  NO

<table>
<thead>
<tr>
<th>Loss of control over objectively large amount of food: Current</th>
<th>-9</th>
<th>-7</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
</table>

5. If NO loss of control over eating (i.e., 4a-4i is NO): Have you EVER had times when you ate a very large amount of food within one sitting AND you felt as though your eating was out-of-control?  
   YES  NO

   *If YES: Ask questions 2, 3 and 4 again for past OBES.*

<table>
<thead>
<tr>
<th>Loss of control over objectively large amount of food: Past</th>
<th>-9</th>
<th>-7</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
</table>

**SKIP:** If NO loss of control over eating (i.e., 4a-4i is NO), skip to Objective Overeating Episodes

6. If current: Frequency of OBES in past 3 months (RECORD IN TABLE)

   a. Over the past 28 days, how many days (if any) did you have eating episodes, in which you ate a similar amount of food as you have described and you felt out of control over your eating? (Were there any days in which you had more than one episode?) How many total episodes did you have over the past 28 days?

   b. In Month 2, how many days (if any) did you have eating episodes, in which you ate a similar amount of food as you have described and you felt out of control over your eating? (Did they occur more or less often than in the past 28 days? Were there any days in which you had more than one episode?) How many total episodes did you have in Month 2?

   c. How about in Month 3? (Did they occur more or less often than in Month 2? How many days? Were there any days in which you had more than one episode?) How many total episodes did you have in Month 3?

<table>
<thead>
<tr>
<th>Current Frequency of OBES:</th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total # of OBE days per month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total # of OBE episodes per month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average # of OBE episodes per week</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Participant ID: __________

7. If current or past: Frequency of OBEs at their worst (RECORD IN TABLE)
   a. If current: Have these eating episodes been more frequent anytime in the past? (When most frequent, how often were they occurring? On average, how many episodes did you have per month?)
   b. If only in past: When your eating episodes were most frequent, how often were they occurring? On average, how many episodes did you have per month? (If not at least once a month, how often did these episodes occur?)
   c. How long did this period of eating last? When was this?
   d. If diagnostic frequency unclear: Have you ever had eating episodes where you ate a similar amount of food to what you described and felt out of control over your eating as often as once per week for 3 months? YES ___ NO ___

Frequency of OBEs at their worst:

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<th>Dates:</th>
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<tbody>
<tr>
<td>Average # of OBE episodes per month</td>
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<tr>
<td>Average # of OBE episodes per week</td>
<td></td>
</tr>
<tr>
<td>Total # of months</td>
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</tbody>
</table>

8. Age of onset/offset: (RECORD IN TABLE)
   a. Initial emergence of episodes: At what age did you first begin having episodes like this, when you ate a similar amount of food as you described and felt out of control over your eating?
   b. If regular episodes: When did you start having regular episodes like this, i.e., on average at least once per week for a 3 month period?
   c. If not current: At what age did you stop having episodes like this?
   d. If regular episodes in past: At what age did you stop having regular episodes, i.e., at least once per week?

Age of onset/offset for current and/or past OBEs:

<table>
<thead>
<tr>
<th></th>
<th>Initial Emergence of Episodes</th>
<th>Regular Episodes (1x/week for 3 months)</th>
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<tbody>
<tr>
<td></td>
<td>Age onset</td>
<td>Age offset</td>
</tr>
<tr>
<td>Current OBEs</td>
<td>G</td>
<td>N/A</td>
</tr>
<tr>
<td>Past OBEs</td>
<td>G</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Binge Eating Disorder Criteria:

9. If Current OBEs: Over the past 3 months, when you had an eating episode in which you ate a large amount of food and felt out of control over your eating, did you typically:
   a. Eat much more rapidly than normal? YES ___ NO ___
   b. Eat until you felt uncomfortably full? YES ___ NO ___
   c. Eat large amounts of food when you were not physically hungry? YES ___ NO ___
   d. Eat alone because you felt embarrassed about how much you were eating? YES ___ NO ___
   e. Feel disgusted with yourself, depressed, or very guilty? YES ___ NO ___

10. In general, over the past three months, does the fact that you have these eating episodes upset you or cause you distress? YES ___ NO ___
   a. How much do these episodes upset you? (Do you think about the fact that you have these episodes a lot? Do you think this is a big problem for you?)
Participant ID: ____________

b. Does having these episodes cause you to feel badly about yourself? YES NO

c. On a scale from 0-10, with 0 being not at all distressed and 10 being extremely distressed, how distressed are you about having these eating episodes? Rating: ___

<table>
<thead>
<tr>
<th>Marked distress over objective binge eating: Current</th>
<th>-9</th>
<th>-7</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
</table>

11. If OBEs were most frequent in past: Think of the time when your eating episodes were most frequent. When you had an eating episode in which you ate a large amount of food and felt out of control over your eating, did you typically:

a. Eat much more rapidly than normal? YES NO
b. Eat until you felt uncomfortably full? YES NO
c. Eat large amounts of food when you were not physically hungry? YES NO
d. Eat alone because you felt embarrassed about how much you were eating? YES NO
e. Feel disgusted with yourself, depressed, or very guilty? YES NO

12. In general, when your eating episodes were most frequent, did the fact that you had these eating episodes upset you or cause you distress?

a. How much did these episodes upset you? (Did you think about the fact that you had these episodes a lot? Did you think this was a big problem for you?) YES NO

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<tr>
<th>Marked distress over objective binge eating: Past</th>
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<th>-7</th>
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<th>2</th>
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</table>

Objective Overeating Episodes

1. If overeating but no loss of control in past 3 months: Frequency of Objective Overeating Episodes in past 3 months (RECORD IN TABLE)

a. Over the past 28 days, how many days (if any) did you have eating episodes, in which you ate a similar amount of food as you have described? (Were there any days in which you had more than one episode?) How many total episodes did you have over the past 28 days?

b. In Month 2, how many days (if any) did you have eating episodes, in which you ate a similar amount of food as you have described? (Did they occur more or less often than in the past 28 days? Were there any days in which you had more than one episode?) How many total episodes did you have in Month 2?

c. How about in Month 3? (Did they occur more or less often than in Month 2? How many days? Were there any days in which you had more than one episode?) How many total episodes did you have in Month 3?
Participant ID: ____________

Current Frequency of Objective Overeating:

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<th></th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
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<tbody>
<tr>
<td>Total # of Objective Overeating Days per Month</td>
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<tr>
<td>Total # of Objective Overeating Episodes per Month</td>
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<tr>
<td>Average # of Objective Overeating Episodes per week</td>
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</table>

Subjective Binge Eating Episodes (SBEs)

1. In the past four weeks, have there been any times when you felt that you have eaten too much, but others might not agree?  YES ____ NO ____
   a. If NO: How about in the two months prior to this past month?  YES ____ NO ____
   b. If NO: Have you ever had episodes when you felt that you ate too much, but others might not agree, even if it wasn’t in the past 3 months?  YES ____ NO ____

SKIP: If NO to SBEs, skip to Compensatory Behaviors (Exercise)

2. If YES to any of the above: Tell me about the most recent time when you ate an amount of food that you felt was too much but others might not agree. (What did you eat? How much of each food item did you have? After every item, ask: What else did you eat?)
   OR
   If participant cannot remember most recent time: That’s ok. Tell me about a typical time when you ate an amount of food that you felt was too much but others might not agree. (What did you eat? How much of each food item did you have? What else did you eat?)
   Use FOOD LOG to record specific foods and amounts eaten.
   a. Did you view this amount as excessive?  YES ____ NO ____
   b. Over what period of time did you consume this amount of food?  Minutes: _____
   c. What were the circumstances? (Was this a meal? Were you with other people? What were others eating at this time? Did you plan to eat as much as you did? Did you finish all of your food?)
   Use FOOD LOG to record circumstances.

3. Tell me about another recent or typical time when you felt that you had eaten a large amount of food in a short period of time but others might not agree. (What did you eat? How much of each food item did you have? What else did you eat?)
   Use FOOD LOG to record specific foods and amounts eaten.
   a. Did you view this amount as excessive?  YES ____ NO ____
   b. Over what period of time did you consume this amount of food?  Minutes: _____
   c. What were the circumstances? (Was this a meal? Were you with other people? What were others eating at this time? Did you plan to eat as much as you did? Did you finish all of your food?)
   Use FOOD LOG to record circumstances.

Subjectively large amount of food: Current  -9  -7  0  1  2
Participant ID: 

<table>
<thead>
<tr>
<th>Subjectively large amount of food: Past</th>
<th>-9</th>
<th>-7</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
</table>
4. Loss of control over eating when eating normal amount of food: 
   During these times...
   a. Did you feel as though your eating was out-of-control?  
      YES NO YES NO
   b. Did you feel like you couldn’t stop yourself once you had started?  
      YES NO YES NO
   c. Did you feel that you were unable to control when, what, or the 
      amount of food that you were eating?  
      YES NO YES NO
   d. Did you feel driven or compelled to eat?  
      YES NO YES NO
   e. Did you feel like you were a ball rolling down a hill—like you just 
      couldn’t stop?  
      YES NO YES NO
   f. Did you keep going back to the cabinets or refrigerator to find more 
      food?  
      YES NO YES NO
   g. Did you feel sad or upset after eating?  
      YES NO YES NO
   h. Did you feel guilty or ashamed after eating?  
      YES NO YES NO
   i. Did you feel disgusted or grossed out with yourself after eating?  
      YES NO YES NO

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<thead>
<tr>
<th>Loss of control over subjectively large amount of food: Current</th>
<th>-9</th>
<th>-7</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
</table>
5. If NO loss of control over eating (i.e., 4a-4i is NO): Have you EVER had times when you thought you 
   ate an excessive amount of food but others might not agree AND you felt as though your eating 
   was out-of-control?  
   YES ___ NO ___

   If YES: Ask questions 2, 3, and 4 again for past SBEs.

---

**Loss of control over subjectively large amount of food: Past**

| -9 | -7 | 0 | 1 | 2 |
---|----|---|---|---|
**SKIP:** If NO loss of control (i.e. 4a-4i is NO), skip to Subjective Overeating

6. If current: **Frequency of SBEs in past 3 months (RECORD IN TABLE)**
   a. Over the past 28 days, how many days (if any) did you have eating episodes, in which you ate a 
      similar amount of food as you have described and you felt out of control over your eating? 
      (Were there any days in which you had more than one episode?) How many total episodes did you 
      have over the past 28 days?
   b. In Month 2, how many days (if any) did you have eating episodes, in which you ate a similar 
      amount of food as you have described and you felt out of control over your eating? (Did they 
      occur more or less often than in the past 28 days? Were there any days in which you had more than 
      one episode?) How many total episodes did you have in Month 2?
   d. How about in Month 3? (Did they occur more or less often than in Month 2? How many days? Were 
      there any days in which you had more the one episode?) How many total episodes did you have in 
      Month 3?

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<th>Current Frequency of SBEs:</th>
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<tr>
<td>Total # of SBE days per month</td>
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<tr>
<td>Total # of SBE episodes per month</td>
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<tr>
<td>Average # of SBE episodes per week</td>
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</table>
Participant ID: ____________

7. If current or past: Frequency of SBEs at their worst (RECORD IN TABLE)
   a. If current: Have these eating episodes been more frequent anytime in the past? (When most frequent, how often were they occurring? On average, how many episodes did you have per month?)
   b. If only past: When your eating episodes were most frequent, how often were they occurring? On average, how many episodes did you have per month? (If not at least once a month, how often did these episodes occur?)
   c. How long did this period of eating last? When was this?
   d. **If diagnostic frequency unclear:** Have you ever had eating episodes where you ate a similar amount of food to what you described and felt out of control over your eating as often as once per week for 3 months?**

<table>
<thead>
<tr>
<th>Frequency of SBEs at their worst:</th>
<th>Dates:</th>
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<tbody>
<tr>
<td>Average # of OBE episodes per month</td>
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<tr>
<td>Average # of OBE episodes per week</td>
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<tr>
<td>Total # of months</td>
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</table>

8. Age of onset/offset: (RECORD IN TABLE)
   a. Initial emergence of episodes: At what age did you first begin having episodes like this, when you ate a similar amount of food as you described and felt out of control over your eating?
   b. If regular episodes: When did you start having regular episodes like this, i.e., on average at least once per week for a 3-month period?
   c. If not current: At what age did you stop having episodes like this?
   d. If regular episodes in past: At what age did you stop having regular episodes, i.e., at least once per week?

<table>
<thead>
<tr>
<th>Age of onset/offset for current and/or past SBEs:</th>
<th>Initial Emergence of Episodes</th>
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<tbody>
<tr>
<td>Age onset</td>
<td>Age offset</td>
<td>Age onset</td>
</tr>
<tr>
<td>Current SBEs</td>
<td>N/A</td>
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<tr>
<td>Past SBEs</td>
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</tr>
</tbody>
</table>

9. If current SBEs: In general, over the past three months, does the fact that you have these eating episodes upset you or cause you distress?
   a. How much do these episodes upset you? (Did you think about the fact that you have these episodes a lot? Did you think this is a big problem for you?)

   YES ___ NO ___

   b. Does having these episodes cause you to feel badly about yourself?    YES ___ NO ___

   c. On a scale from 0-10, with 0 being not at all distressed and 10 being extremely distressed, how distressed are you about having these eating episodes? Rating: ___

   Marked distress over subjective binge eating: Current  | -9 | -7 | 0 | 1 | 2
Participant ID: __________

10. If SBEs more frequent in past: Think of the time when your eating episodes were most frequent. During this time, did the fact that you had these eating episodes upset you or cause you distress? YES____ NO____
   a. How much do these episodes upset you? (Did you think about the fact that you had these episodes a lot? Did you think this was a big problem for you?)

   b. Did having these episodes cause you to feel badly about yourself? YES____ NO____

   c. On a scale from 0-10, with 0 being not at all distressed and 10 being extremely distressed, how distressed are you about having these eating episodes? Rating:____

Marked distress over subjective binge eating: Past

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<tr>
<th></th>
<th>-9</th>
<th>-7</th>
<th>0</th>
<th>1</th>
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</table>

Subjective Overeating Episodes

1. If subjective overeating but no loss of control in past 3 months: Frequency of Subjective Overeating Episodes in past 3 months (RECORD IN TABLE)

   a. Over the past 28 days, how many days (if any) did you have eating episodes, in which you ate a similar amount of food as you have described? (Were there any days in which you had more than one episode?) How many total episodes did you have over the past 28 days?

   b. In Month 2, how many days (if any) did you have eating episodes, in which you ate a similar amount of food as you have described? (Did they occur more or less often than in the past 28 days? Were there any days in which you had more than one episode?) How many total episodes did you have in Month 2?

   c. How about in Month 3? (Did they occur more or less often than in Month 2? How many days? Were there any days in which you had more than one episode?) How many total episodes did you have in Month 3?

Current Frequency of Subjective Overeating:

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<th></th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
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<tbody>
<tr>
<td>Total # of Subjective Overeating Days per Month</td>
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<tr>
<td>Total # of Subjective Overeating Episodes per Month</td>
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<tr>
<td>Average # of Subjective Overeating Episodes per week</td>
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COMPENSATORY BEHAVIORS

Exercise

1. Over the past four weeks have you exercised as a means of controlling your weight, altering your shape or amount of fat, or burning off calories? YES____ NO____

   a. If NO: How about in the two months prior to this past month? YES____ NO____

   b. If NO: Have you ever exercised as a means of controlling your weight, altering your shape or amount of fat, or burning off calories? YES____ NO____

SKIP: If NO to exercise, skip to Dietary Restriction
Participant ID: 

2. If YES to any of the above: Typically what type of exercise have you done?

Exercise: Cardio__ Strengthening__ Both__

a. On average, how long did you spend exercising on the days you did exercise? Minutes: ___

b. What are/were your reasons for exercising?

Compulsive Exercise:

3. Was your exercise pattern repetitive or on a routine schedule? (e.g., same number of days per week, same exercises)
   YES_NO__ YES_NO__

   a. If YES: Was there ever a time when you were unable to keep your normal exercise routine?
      YES_NO__ YES_NO__

   b. If YES: How did that make you feel (e.g., anxious, irritable, frustrated, guilty) ___

4. On a scale from 0-10, with 0 being not at all distressed and 10 being extremely distressed, rate your level of distress if you had to miss a planned exercise session.
   Rating:__ Rating:__

5. Did you exercise even when it might interfere with other commitments? (If YES: Tell me a little more about this.)
   YES_NO__ YES_NO__

6. Did you ever exercise even when it might do you harm—such as when sick or injured? (If YES: Tell me a little more about this.)
   YES_NO__ YES_NO__

7. If YES to any of the above (i.e., Compulsive Exercise Questions 3-6):
   a. Did you feel like you were unable to control when you exercised, or the frequency and intensity of your exercise?
      YES_NO__ YES_NO__

   b. Did you feel driven or compelled to exercise? (Did you feel like you were unable to prevent yourself from exercising?)
      YES_NO__ YES_NO__

   c. Did you ever feel addicted to exercise—like you just could not exercise enough?
      YES_NO__ YES_NO__

   d. Did you feel less anxious after you exercised? (After you exercised, did you feel relieved and less anxious because you got your exercise in for the day?)
      YES_NO__ YES_NO__

Compulsive Exercise: Current

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Compulsive Exercise: Past

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<th>-9</th>
<th>-7</th>
<th>0</th>
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<th>2</th>
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</thead>
</table>
Participant ID: ____________  
Compensatory Exercise:

8. Did the amount or intensity of your exercise routine vary much from day to day?  
   a. If YES: Did the amount or intensity of your exercise routine depend on what you ate?  
   b. If YES: Did you exercise for longer or at a greater intensity if you felt that you ate too much?  
   YES_NO__  YES_NO__  YES_NO__  YES_NO__  YES_NO__

9. Did you exercise specifically to counteract the effects of eating?  
   (When you exercised did you think about burning off the calories you just ate?)  
   YES_NO__  YES_NO__  YES_NO__  YES_NO__

10. Did you feel obligated to exercise after you ate too much or what you thought was too much?  
    YES_NO__  YES_NO__  YES_NO__

11. Did you exercise out of guilt from eating too much, or what you felt was too much?  
    a. If YES: Did you feel less guilty after you exercised?  
    YES_NO__  YES_NO__  YES_NO__

12. When you exercised, did you strive for a specific goal? (e.g., run a certain number of miles, burn a certain number of calories)  
    a. If Yes: Describe the goal.  
       ___________  ___________  ___________  ___________  ___________  ___________
    b. If YES: Did this goal vary depending on how much you ate or how much you were planning to eat?  
       YES_NO__

13. IF OBE/SBEs: Did you plan your exercise around your OBEs/SBEs?  
    (After an eating episode, did you make plans to exercise immediately after or the next day?)  
    YES_NO__  YES_NO__

| Compensatory Exercise: Current | -9 | -7 | 0 | 1 | 2 |
| Compensatory Exercise: Past   | -9 | -7 | 0 | 1 | 2 |

14. If current exercise not compulsive or compensatory: Have you ever had a time when you exercised more than you just described, exercised in a compulsive or driven way, or exercised specifically to counteract the effects of eating?  
   YES_NO__

   If YES: Ask exercise questions 2-13 again for past exercise.

15. If current: Frequency of Compulsive/Compensatory Exercise in past 3 months (Ask for BOTH compulsive and compensatory exercise, if present; RECORD IN TABLES)  
   a. How many days did you exercise in the way that you've just described over the past four weeks?
Participant ID: _____________

1. If OBEs or SBEs AND compensatory exercise present: How many of these episodes of exercise occurred outside of the times that followed (refer to OBEs and SBEs)? How many of these episodes of exercise occurred outside of the times that followed (refer to OBEs and SBEs)?

b. In Month 2, how many days (if any) did you engage in the pattern of exercise you just described as a means of controlling your shape and weight? (Did this occur more or less often than in the past 28 days?)

i. If OBEs or SBEs AND compensatory exercise present: How many of these episodes of exercise occurred outside of the times that followed (refer to OBEs and SBEs)? How many of these episodes of exercise occurred outside of the times that followed (refer to OBEs and SBEs)?

c. How about in Month 3? (Did they occur more or less often than in Month 2? How many days?)

i. If OBEs or SBEs AND compensatory exercise present: How many of these episodes of exercise occurred outside of the times that followed (refer to OBEs and SBEs)? How many of these episodes of exercise occurred outside of the times that followed (refer to OBEs and SBEs)?

Current Frequency of Compulsive Exercise:

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<th>Month 1</th>
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<tr>
<td>Total # of days per month</td>
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Current Frequency of Compensatory Exercise

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<th>Month 1</th>
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<tbody>
<tr>
<td>Total # of days per month</td>
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<tr>
<td># of days that followed OBEs/SBEs</td>
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<td># episodes outside of times that followed OBEs/SBEs</td>
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16. If current or past: Frequency of Compulsive/Compensatory Exercise at its worst (Ask for BOTH compulsive and compensatory exercise, if present; RECORD IN TABLES)

a. If current: Have you exercised more frequently anytime in the past? (When most frequent, how often were you exercising in the way you just described? On average, how many days of exercise did you have per month?)

b. If only past: When you were exercising most frequently, how often was this occurring? On average, how many days did you engage in this pattern of exercise per month?

c. How long did this period of exercise last? When was this?

d. **If diagnostic frequency unclear: Did you ever exercise in the way that you just described as often as once per week for 3 months?**

YES ___ NO ___

e. **If OBEs or SBEs AND compensatory exercise present: Did you exercise in the way that you just described following (refer to OBEs/SBEs)? Did this pattern of eating followed by exercising occur as often as once per week for 3 months?**

YES ___ NO ___

Frequency of Compulsive Exercise at its worst:

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<th>Dates:</th>
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<tr>
<td>Average # of days per month</td>
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<td>Average # of days per week</td>
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<td>Total # of months</td>
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</table>
Participant ID: 14

b. Did you get full after eating what others would consider a small amount of food? YES NO

c. Did you ever skip two meals or more in a row? YES NO

d. How many waking hours did you go without eating? Hours: 0

e. Did you lose any weight? (If so, how much?) lbs 0

Dietary Restriction: Current

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Dietary Restriction: Past

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3. If current diet not restrictive: Have you ever had a time when you restricted your food intake more than you just described? YES NO

If YES: Ask questions 2-2e again for past dietary restriction.

4. If current: Frequency of Dietary Restriction in past 3 months (RECORD IN TABLE)

a. How many days did you restrict your food intake in the way that you’ve just described over the past four weeks?

   i. If OBEs or SBEs present: How many of these episodes of dietary restriction followed (refer to OBEs/SBEs)? How many of these episodes of dietary restriction occurred outside of the times that followed (refer to OBEs and SBEs)?

b. In Month 2, how many days (if any) did you engage in the pattern of dietary restriction you just described as a means of controlling your shape and weight? (Did this occur more or less often than in the past 28 days?)

   i. If OBEs or SBEs present: How many of these episodes of dietary restriction followed (refer to OBEs/SBEs)? How many of these episodes of dietary restriction occurred outside of the times that followed (refer to OBEs and SBEs)?

c. How about in Month 3? (Did they occur more or less often than in Month 2? How many days?)

   i. If OBEs or SBEs present: How many of these episodes of dietary restriction followed (refer to OBEs/SBEs)? How many of these episodes of dietary restriction occurred outside of the times that followed (refer to OBEs and SBEs)?

<table>
<thead>
<tr>
<th>Current Frequency of Dietary Restriction:</th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total # of episodes per month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># of episodes that followed OBEs/SBEs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># episodes outside of times that followed OBEs/SBEs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. If current or past: Frequency of Dietary Restriction at its worst (RECORD IN TABLE)

a. When you were restricting your food intake most frequently, how often was this occurring? On average, how many days did you engage in this pattern of dietary restriction per month?

b. How long did this period of dietary restriction last? When was this?
Participant ID: __________

c. **If diagnostic frequency unclear: Did you ever restrict your food intake in the way that you just described as often as once per week for 3 months?**

YES ___ NO ___

d. **If OBEs or SBEs present: Did you ever restrict your food intake in the way that you just described following (refer to OBEs/SBEs)? Did this pattern of eating followed by dietary restriction occur as often as once per week for 3 months?**

YES ___ NO ___

Frequency of Dietary Restriction at its worst:

<table>
<thead>
<tr>
<th></th>
<th>Dates:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average # of episodes per month</td>
<td></td>
</tr>
<tr>
<td>Average # of episodes per week</td>
<td></td>
</tr>
<tr>
<td>Average # of episodes per week following OBEs/SBEs</td>
<td></td>
</tr>
<tr>
<td>Total # of months</td>
<td></td>
</tr>
</tbody>
</table>

6. **Age of onset/offset: (RECORD IN TABLE)**

a. **Initial emergence of restriction:** At what age did you first begin to restrict your food intake in the way that you've just described as a means of controlling your shape and weight?

b. **If regular restriction:** When did you start restricting your food intake in this way regularly, i.e., on average at least once per week for a 3 month period?

c. **If not current:** At what age did you stop restricting your food intake in this way?

d. **If regular restriction in past:** At what age did you stop regularly restricting your food intake, i.e., at least once a week?

<table>
<thead>
<tr>
<th>Age of onset/offset for Current and/or Past Dietary Restriction:</th>
<th>Initial Emergence of Episodes</th>
<th>Regular Episodes (1x/week for 3 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age onset</td>
<td>Age offset</td>
</tr>
<tr>
<td>Current dietary restriction</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Past history dietary restriction</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

END OF THE EDE INTERVIEW