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An Investigation Of Loss Of Control Eating Episodes And The Five Indicator Variables Of Loss Of Control Eating In A Non-Clinical Sample

Erica Goodman

AN INVESTIGATION OF LOSS OF CONTROL EATING EPISODES AND THE FIVE INDICATOR VARIABLES OF LOSS OF CONTROL EATING IN A NON-CLINICAL SAMPLE

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Erica L. Goodman
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This dissertation, submitted by Erica L. Goodman in partial fulfillment of the requirements for the Degree of Doctor of Philosophy in Psychology from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

Joelle Ruthig

Joelle Ruthig, Ph.D.

Richard Wise

Richard Wise, Ph.D.

Alan King

Alan King, Ph.D.

Richard Ferraro

Richard Ferraro, Ph.D.

Rob Stupnisky

Robert Stupnisky, Ph.D.

This thesis is being submitted by the appointed advisory committee as having met all of the requirements of the School of Graduate Studies at the University of North Dakota and is hereby approved.

Chris Nelson

Chris Nelson
Dean of the School of Graduate Studies

5/8/2020

Date

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ABSTRACT

Binge eating is common across both clinical and non-clinical populations; the diagnostic definition of binge eating has been scrutinized by extant literature in that findings have shown loss of control (LOC) to be more related to pathology than the amount of food consumed. The current study aimed to elucidate this notion further by investigating different types of LOC eating based on perception and amount of food consumed. College students (N = 227) completed self-report questionnaires assessing disordered eating, psychopathology, emotion regulation, impulsivity, quality of life, and self-esteem; 173 (76%) also completed an interview on typical and LOC eating in the past three months. Twenty-six participants endorsed three types of LOC eating episodes in the past three months: objective binge-eating episode (OBE) congruence, subjective binge-eating episode (SBE) discordance, SBE congruence; there were no differences in psychopathology between these groups. Higher levels of feeling out of control when eating were associated with greater frequency of LOC eating compared to non-LOC eaters. Higher levels of negative urgency predicted control group membership over SBE discordance membership. Five indicators of LOC eating (eating more rapidly, eating until uncomfortably full, eating when not physically hungry, eating alone because of feeling embarrassed, feeling disgusted with oneself afterward) all demonstrated predictive value, though eating alone because embarrassed was the most strongly associated with LOC eating. The current findings indicate the importance of assessing LOC eating in non-

clinical samples as well as highlighting the need to expand the diagnostic criteria of binge eating.

CHAPTER I

INTRODUCTION

Prevalence of Binge Eating

Binge eating is characterized by (1) eating a large amount of food in a short period of time (i.e., about two hours) and (2) having a sense of loss of control (LOC) during the eating episode (American Psychiatric Association [APA], 2013). Binge eating is one of the characterizing symptoms of Bulimia Nervosa and *the* characterizing symptom of Binge-Eating Disorder (BED). BN occurs in about 1-1.5% of female adolescents and young adults and BED occurs in about 1.6% of women; both of these disorders are more common in females, though BED occurs in males much more frequently than Bulimia Nervosa (gender ratios: 10 female: 1 male in BN; 2 female: 1 male in BED; APA, 2013). While the prevalence rates of binge-eating related disorders are relatively low, the prevalence of binge eating itself is quite high in adolescents and young adult populations. For example, Lipson and Sonneville (2017) found the prevalence rate of experiencing binge eating to be about 40.2% in college students in a population-based sample across 12 colleges in the United States. Prevalence rates of binge eating by gender in this study were 49.1% of female students, 30% of male students, and 36.3% of transgender students. While the prevalence of binge eating in community samples has been increasing over time (Katzman, Wolchik, & Braver, 1984), high prevalence rates of binge eating in college samples is not novel. An earlier study of college men and women yielded a 49% prevalence of lifetime binge eating (Katzman et

al., 1984). These high prevalence rates are particularly concerning given that research has uncovered numerous physical and psychological health concerns associated with binge eating such as: overweight/obesity (Napolitano & Himes, 2011; Saules et al., 2009; Sonneville et al., 2013), high depressive symptoms (Ross & Ivis, 1999; Saules et al., 2009; Sonneville et al., 2013), marijuana and other substance use (Ross & Ivis, 1999; Sonneville et al., 2013), anxiety (Napolitano & Himes, 2011; Saules et al., 2009), and cigarette smoking (Saules et al., 2009). Binge eating is also associated with non-suicidal self-injury (Yiu et al., 2015) and suicidal ideation (Ackard, Fulkerson, & Neumark-Sztainer, 2011) in non-clinical samples.

Traditionally, research involving binge-eating spectrum disorders as well as binge-eating episodes in both non- and clinical samples have used the DSM-5 (and, previously DSM-IV-TR and DSM-III) definition to measure binge-eating in terms of frequency of episodes and "large amounts" of food. "Large amount" of food in the DSM-5 is not explicitly defined by caloric amounts or other measurements; it is defined as "an amount of food that is definitely larger than what most individuals would eat in a similar period of time under similar circumstances" (p. 345). Thus, measuring this "large amount of food" varies across studies, with some investigating caloric amount and setting a limit (i.e., >1,000 kcal/episode; Keel, Wolfe, Liddle, De Young, & Jimerson, 2007) and others using more lenient examples such as in the Eating Disorder Examination (Fairburn & Cooper, 1993). In addition, clinicians and researchers discovered that individuals struggling with eating disorders were experiencing distress and LOC over eating amounts

of food that were not considered objectively large (despite the patients' perceptions that the amount of food was large). For example, many studies found large differences in caloric intake among individuals who reported DSM-defined binge-eating episodes, such as between 3,000-5,000 calories per episode in a study on BN feeding-lab studies (Mitchell, Crow, Peterson, Wonderlich, & Crosby, 1998) and <1,000 calories per episode in a BN treatment study (Rossiter & Agras, 1990). Such discrepancies led clinicians and researchers to question whether the amount of food needed to be "objectively large" to be considered a binge-eating episode if the client also characterized the episode as being out of control (Wolfe, Wood Baker, Smith, & Kelly-Weeder, 2009). Fairburn and Cooper (1993) distinguished between subjective binge-eating episodes (SBEs), episodes marked by a LOC and a *subjectively* large amount of food consumed, and objective binge-eating episodes (OBEs) characterized by a LOC and an *objectively* large amount of food consumed. Subsequently, many studies of clinical (Kerzhnerman & Lowe, 2002; Mond, Latner, Hay, Owen, & Rodgers, 2010; Watson et al., 2013) and non-clinical (Goossens, Soenens, & Braet, 2009; Latner, Hildebrandt, Rosewall, Chisholm, & Hayashi, 2007) samples have focused on whether subjective binge-eating episodes (SBEs) were associated with as much eating disorder psychopathology and related outcomes (e.g., levels of depression, distress, quality of life) as OBEs.

Objective versus Subjective Binge-Eating Episodes

Keel, Mayer, and Harnden-Fischer (2001) examined outcome differences in women who met criteria for BN compared to women who met all criteria for BN *except*

that they experienced SBEs instead of OBEs (i.e., the amount of food during their LOC eating episodes was large to them, but did not meet the objectively large criteria laid out in the DSM). Keel et al. discovered that there were no significant differences between groups on levels of restraint, disinhibition, hunger, depression, state and trait anxiety, alcoholism, and drug abuse. The groups did differ on levels of bulimia (measured by the Bulimia Test-Revised), binge-eating frequency, and purging frequency such that the BN group scored higher on all three of these outcomes compared to those with SBEs. Secondary analyses revealed no group differences in general psychopathology, but that diagnostic status (BN vs. those with SBEs) accounted for a significant amount of variance in impulse control, such that those with BN had less impulse control than those with SBEs. Thus, women with BN and undiagnosed BN due to experiencing SBEs vs. OBEs are similar in a number of ways related to psychopathology *and* that those with BN may experience greater food intake during LOC eating episodes (OBEs) due to having a more difficult time with impulse control versus those with SBEs. This suggests that some diagnostic distinction may be important depending on the valence that impulsivity carries in defining various "binge-eating spectrum" disorders/episodes.

A number of studies preceding Keel et al.'s (2001) concluded that the amount of food eaten during a LOC eating episode may not be diagnostically important as it has failed to differentiate those with OBEs and SBEs across a variety of outcomes: purging as a result of "binge-eating" episode size (Hay et al., 1996), psychopathology in those with BED (distress, depression, interpersonal difficulties; Niego, Pratt, & Agras, 1997), lack

of difference in pathology between BN with purging and only purging (i.e., Purging Disorder; Keel & Stiegel-Moore, 2009) (Tobin et al., 1997), and measures failing to differentiate between OBEs and SBEs in those who experience both types of episodes (Pratt et al., 1998). Keel et al.'s study replicated this notion and identified an area of distinction, namely impulsivity, between those who experienced OBEs and SBEs in a clinical sample. These results have led to a plethora of studies (Goossens et al., 2009; Kerzhnerman & Lowe, 2002; Latner et al., 2007; Mond et al., 2010; Watson et al., 2013) investigating outcome differences and similarities of OBEs and SBEs in a variety of samples.

In more recent studies based on clinical samples, Keel et al.'s (2001) overall findings have been replicated. For example, Watson et al. (2013) found no differences in eating pathology, depression, anxiety, quality of life, psychological disorder comorbidity, and psychiatric history between those who met criteria for BN but differed in OBEs versus SBEs. However, Watson et al. found no difference in levels of impulsivity between these groups whereas Keel et al. (2001) did. Latner, Vallance, and Buckett (2008) discovered that in a group of women with a range of eating disorders, unique variance in quality of life was accounted for by SBEs and not OBEs, which is in contrast to Watson et al. (2013) who found no differences in quality of life between the groups. Similar studies found no difference in general and eating psychopathology between OBEs and SBEs among women with a range of clinical eating disorders (Kerzhnerman & Lowe, 2002; Mond et al., 2010). Brownstone et al. (2013) yielded that individuals that

met criteria for BN compared to those that had SBEs vs. OBEs did not differ on levels of eating disorder psychopathology or negative affect, but did differ on the personality measures of cognitive distortion and attentional impulsivity.

Thus, it appears that, at least in clinical samples, OBEs and SBEs are largely similar on outcomes of general psychopathology and eating disorder psychopathology. However, the literature is mixed when it comes to particular differences between OBEs and SBEs in potential maintenance factors, such as levels of impulsivity, quality of life, and various personality facets. Thus, it may be a question of whether certain outcome differences between OBEs and SBEs warrant enough valance to keep SBEs and OBEs diagnostically separate, at least in the case of DSM criteria for BN and BED. However, if it is determined that levels of general and eating disorder psychopathology as outcomes of OBEs and SBEs trump other outcomes that have yielded differences, then perhaps the DSM criteria should move to encompass OBEs and SBEs in the diagnosis of BN and BED. The current study will examine this issue by assessing the outcomes of these previous studies in a non-clinical young adult population across binge-eating and related episodes.

Beyond diagnosis, it is known that OBEs commonly occur in non-clinical samples of both men and women (whereas the majority of clinical samples have only included women), as mentioned above (Katzman et al., 1984; Lipson & Sonneville, 2017), and are associated with a host of negative correlates and outcomes. Given that OBEs and SBEs have largely been shown to be associated with similar levels of psychopathology in

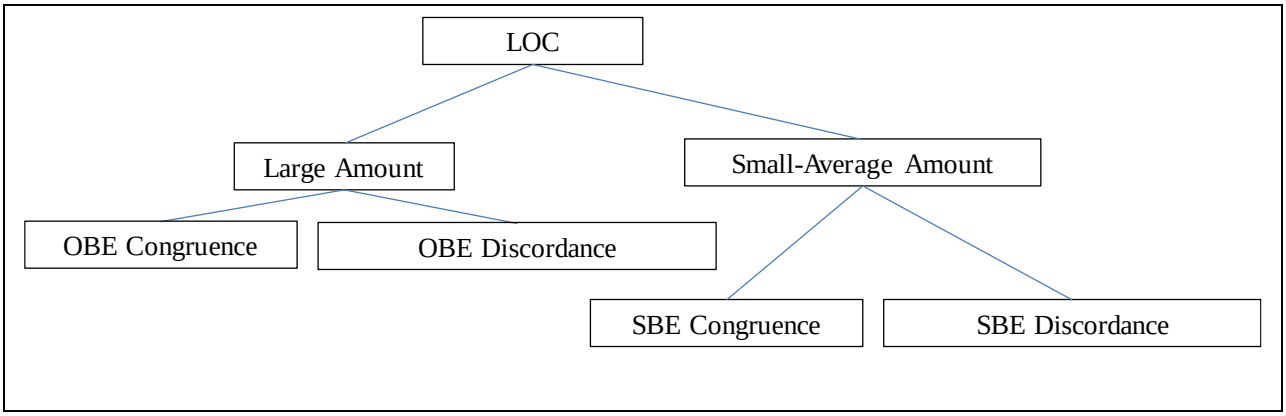
clinical samples (general and eating disordered), researchers have investigated the frequency of SBEs in non-clinical samples. Studies have shown that SBEs are more common than OBEs among female college students (SBEs: 16.7%, OBEs: 6.4%; Luce, Crowther, & Pole, 2008) and female and male adolescents (SBEs: 9.3%, OBEs: 4.8%, both: 2.6%; Goossens et al., 2009). Goossens et al. also found that there were no differences in levels of eating disorder psychopathology, global self-worth, or depression between adolescents who had experienced only OBEs compared to those who had experienced only SBEs. Similarly, Latner et al. (2007) found no SBEs vs. OBEs differences in the strength of association with eating and general psychopathology among women recruited from the community (ranging from diagnosable eating disorders to no eating disorder). OBEs and SBEs both significantly and independently predicted global eating disorder psychopathology. Thus, there is an empirical basis to further investigate SBEs and OBEs in non-clinical samples in order to elucidate causes and maintenance factors of the behaviors as well as uncover helpful intervention and prevention efforts.

Perception of Amount of Food Intake during LOC Eating

SBEs and OBEs are both characterized by LOC eating episodes. Extant literature has shown that the experience of LOC eating, regardless of amount of food, in both clinical and non-clinical samples is highly related to eating disorder psychopathology (Goossens, Braet, & Decaluwe, 2007; Hilbert, Hartmann, Czaja, & Schoebi, 2013; Latner et al., 2007), general psychopathology (Latner et al., 2007), depression (Colles, Dixon, & O'Brien, 2012; Goossens et al. 2007; Sonneville et al., 2013), and quality of life (Colles

et al., 2012). The literature comparing SBEs and OBEs in non-clinical and clinical samples have yielded that they are associated with similar levels of eating- and general psychopathology. What is unclear, however, is if the *perception* of the amount of food eaten is pathological. Within OBEs, there is not a question of perception of the amount of food consumed being large versus the objectivity of the amount of food consumed being large; though there is a distinction between those who *perceive* the amount of food they've eaten during an OBE as being large vs. small-average. Within SBEs, a client/participant may perceive the amount of food consumed as being small - large, while the objective amount of food they consumed may be different (e.g., they perceive they ate a large amount of food but they actually consumed only 300 calories). Thus, under the context of LOC, there are 4 possible eating episodes (Figure 1): 1) eating an objectively large amount of food and perceiving it as large (OBE congruence), 2) eating an objectively large amount of food and perceiving it as small-medium (OBE discordance), 3) eating an objectively small-average amount of food and perceiving it as large (SBE discordance), 4) eating an objectively small-average amount of food and perceiving it as small-average (SBE congruence). While traditionally defined OBEs (OBE congruence) and SBEs (SBE discordance) have been investigated in the literature and are found to be related to similar outcomes in terms of psychopathology, no literature to the author's knowledge has addressed these other types of LOC eating episodes and if they yield similar psychopathologic outcomes.

Figure 1. *Flow chart of LOC eating episodes and perceived amount of food consumed.*



Note. LOC = Loss of control; OBE = objective binge eating, SBE = subjective binge eating; Large Amount = large amount of food consumed; Small – Average Amount = small – average amount of food consumed; OBE Congruence = perceive the amount of food consumed to be large; OBE Discordance = perceive the amount of food consumed to be small – average; SBE Discordance = perceive the amount of food consumed as a large amount; SBE Congruence = perceive the amount of food consumed to be small – average.

The notion that perception of food intake size versus the actual amount of food consumed may be pathological stems from observations of patients with Anorexia Nervosa (AN). The DSM has long held subcategories for individuals with AN: restricting type and binge/purge type. The binge/purge type of AN in the DSM does not have specifications on what meets criteria for a "binge," compared to the two-part criteria given for a binge-eating episode in Bulimia Nervosa and Binge Eating Disorder. Many clinicians and researchers have noted that individuals with AN binge/purge type will often say they feel as though they had eaten a large amount of food and felt out of control during that episode when their amount of food consumed was objectively small-average in size (e.g., a snack or standard meal; Brownstone et al., 2013; Fairburn, 1997; Ricca et

al., 2012; Wolfe et al., 2009). In an ecological momentary assessment study of individuals with both types of AN, 9.3% of all eating episodes assessed (5,640) were characterized as LOC episodes, indicating that LOC eating, regardless of food size, is relatively common in those with AN; the LOC episodes also predicted purging behavior in the participants (Goldschmidt et al., 2015). Goldschmidt et al. (2014) discovered that LOC eating episodes in those with AN are associated with simultaneous high levels of negative affect, as well as eating alone and food avoidance. Interestingly, LOC eating was more associated with eating alone and food avoidance than overeating, which may imply that even though some individuals with AN perceive the amount of food consumed during LOC episodes as small-average, the LOC episodes still indicate pathology. It is unknown if non-clinical individuals experience these types of LOC eating episodes, to what frequency, and if the perception of amount of food consumed during a LOC eating episode is related to pathology. The current study will attempt to address this gap in the literature by identifying different types of LOC eating episodes that occur in non-clinical, young adult populations, and what psychopathological outcomes are associated with said identified eating episodes.

The Five Indicators of Binge Eating: Exploration and Expansion

Just as binge-eating episodes are defined in the DSM for BN and BED (OBEs), the DSM criteria for BED also contains five indicator variables of binge eating; the client is to meet at least three of these five criteria as related to their binge-eating episodes. These indicator variables were included in the DSM to get a sense of whether LOC eating

was occurring or not (White & Grilo, 2011). The five indicator variables are as follows: (1) eating much more rapidly than normal, (2) eating until feeling uncomfortably full, (3) eating large amounts of food when not feeling physically hungry, (4) eating alone because of feeling embarrassed by how much one is eating, (5) feeling disgusted with oneself, depressed, or very guilty afterward. Interestingly, even though the two-pronged binge-eating criteria are the same in BN and BED, the BN diagnostic criteria do not include the five indicator variables that BED does. The five indicator variables for BED were first described in Spitzer et al.'s publication of the diagnostic criteria for BED as a disorder worth considering for the DSM-IV in 1992. This multisite field study yielded that BED was relatively common among clinical and non-clinical samples, and more specifically, that the majority of those who indicated experiencing eating a large amount of food in a short period of time and feeling out of control indicated at least three of the five indicator variables of LOC eating. Adding the indicator criteria only had a small effect on the percentage of those in the sample diagnosed with BED once added to the two-pronged binge-eating definition (45.9% to 43.4% in weight-control site participants). Thus, Spitzer et al. discussed that keeping the indicator variables in the diagnostic criteria for BED "is largely a question of the value of having a fuller description of the disorder embedded in the criteria." (p. 202).

BED was included in the DSM-5 in 2013 as a diagnosable disorder; the criteria are the same as was first described by Spitzer et al. (1992). Thus, the five indicator variables of LOC eating are included in today's diagnostic criteria for BED, even though

these indicators appeared to have virtually no effect on the prevalence of BED when applied to a multisite sample. The indicator variables are also only part of BED diagnostic criteria and not of BN, even though the two-pronged criteria for binge-eating episodes is the same in each. Due to the seemingly arbitrary nature of the indicator variables as they were adapted into the DSM-5 BED criteria, researchers have begun investigating their statistical and clinical utility for diagnosing BED as well as in other eating disorder groups and controls.

White and Grilo (2011) investigated the efficiency of the five indicator variables in three groups of participants: BED, BN, and controls (no binge eating). They found that each of the five indicators had acceptable positive predictive power for the BED and BN groups; eating alone because embarrassed was the best overall inclusion criterion. They also found each of the five indicators to have acceptable negative predictive power, such that the absence of endorsing any of the indicators was associated with not endorsing binge eating; feeling disgust, guilt, or depression after binge eating performed as the best exclusion criteria. The best overall predictors of correctly predicting binge eating were eating large amounts of food when not hungry and eating alone due to embarrassment. Additionally, using ROC curves, White and Grilo discovered that the most accurate prediction of binge eating came from the "three-or-more level criteria," meaning that the criteria for having at least three of the five indicator variables as listed in the DSM is the most accurate criteria to use based on these data. These results suggest that the five indicator variables work just as well for binge eating as seen in BED and BN, yet only

BED requires at least three of these indicators for a diagnosis whereas BN does not; the BN criteria does not even mention the indicator variables. Due to the value these indicator variables seem to hold in correctly diagnosing OBEs within BED and BN according to this study, perhaps the indicator variables should also be included in the diagnosis of BN in the next DSM.

It is unknown whether the positive and negative predictive power of the five indicator variables exists in non-clinical samples of OBEs. Given that OBEs in non-clinical populations are quite common (Lipson & Sonneville, 2017), it may be beneficial to determine whether these indicator variables predict OBEs in non-clinical populations. This knowledge could elucidate early identification of disordered eating habits that, in turn, may inform early intervention and prevention efforts. In addition, SBEs yield similar levels of psychopathology, both general and eating-specific, as OBEs in non-clinical samples. The five indicator variables for LOC eating have not been applied to SBEs, to this author's knowledge, even though these episodes are also characterized by experiencing LOC over eating. As White and Grilo (2011) indicated, the five indicators were meant to assess the presence of LOC, thus it seems logical that the indicators should also be tested in SBEs. Furthermore, the indicators should be tested across all types of LOC eating episodes, as those laid out in Figure 1, in order to further test the validity of these indicators outside of the diagnostic realm.

Current Study

The primary aim of the current study is to examine the extent to which the perception of the size of LOC eating episodes and the actual size of LOC eating episodes are associated with binge eating psychopathology. Given that the literature has highlighted similar eating psychopathology outcomes for SBEs and OBEs, I predicted that there will be no difference in eating disorder psychopathology (as measured by Eating Disorder Exam – Questionnaire) between all four of the LOC eating groups: OBE congruence (perceived and actual large amount of food consumed), OBE discordance (perceived small and actual large amount of food consumed), SBE concordance (perceived and actual small amount of food consumed), and SBE discordance (perceived large amount and actual small amount of food consumed; see Figure 1). The second aim of the current study is to assess the predictability and strength of the five indicators as inclusion/exclusion criteria of binge-eating episodes (as outlined in the DSM-5 criteria for BED) in the various LOC episodes identified in this study (Figure 1). It is hypothesized that the five indicators of binge-eating episodes will be present in any eating episode that involves LOC (i.e., all 4 episode types presented in Figure 1) due to these indicators having been created for the purpose of assessing for LOC. Thus, all five of the indicator variables are expected to have similar predictability and strengths of inclusion/exclusion criteria across all four types of LOC episodes.

CHAPTER II

METHOD

Participants

Individuals were recruited through the University of North Dakota SONA system (students enrolled in various psychology courses who receive extra course credit for participating in research studies). Of the initial 236 participants (*n* = 1 graduate student; 0.4%) who completed Time 1 of the study, the data from 9 participants were excluded from subsequent analyses for the following reasons: missing age (*n* = 3), failing the validity check; *n* = 5), or missing a substantial amount of data (*n* = 1). These exclusions resulted in 227 remaining participants at Time 1. These participants were an average of 19.68 years old (*SD* = 2.84; 18-48) and the majority (71.4%) were female (28.2% male, 0.4% intersex) in terms of their biological sex, with 70.5% identifying as female (28.6% male, 0.4% male-to-female transgender, and 0.4% other, "questioning"). Regarding self-identified race and ethnicity, the sample was predominantly White (87.2%), with the remaining participants identifying as follows: 5.3% Asian, 3.5% Black, 1.3% Native American, 2.6% other; 95.6% non-Hispanic, 4.4% Hispanic. Half of the participants reported being in their first year of college, the other half was a combination of second, third, and fourth years, as well as one graduate student.

Materials

Demographics

Participants completed the Questionnaire on Eating and Weight Patterns—Revised (QWEP-R; Spitzer et al., 1992) which includes several demographic questions (i.e., age, gender), as well as body image, eating, and weight patterns. A number of questions from the original survey were removed such as those asking about specific eating patterns, LOC eating, and amounts of food during eating episodes. These questions were omitted from the current study because more specific and valid assessments of these constructs were used in their place (e.g., the EDE-Q in order to achieve an overall global score of eating disorder psychopathology and the EDE interview in order to get specific verbal information about eating episodes). Some questions about sexual orientation and dietary restrictions (vegetarian, vegan, gluten-free, or none; see Appendix A) were added to the questionnaire in order to increase participants' feelings of inclusivity and for future analyses apart from those proposed in the current study.

Predictor Variables

The variables derived from the following measures were used as predictors in the multinomial logistic regression in which the LOC episodes are the criterion variable.

Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994). The EDE-Q assesses past-month frequency of eating disorder behaviors (i.e., purging) and severity of eating disorder attitudes, which comprise the EDE-Q Global Score (see Appendix B). Higher scores indicate higher levels of eating disorder psychopathology.

Normative data on the Global Score has been calculated for a community sample of women (Fairburn & Beglin, 1994) as well as for a large general sample of young adult women (Mond, Hay, Rodgers, & Owen, 2006).

Kessler Psychological Distress Scale (K10; Kessler et al., 2002). The K10 is a 10-item self-report questionnaire that assess general level of distress in the past 30 days (e.g., "During the past 30 days, about how often did you feel hopeless?"; response options range from 1: "none of the time" – 5: "all of the time"). Responses to each item are summed to create an overall score and are categorized as follows: <20 likely to be well, 20-24 likely to have mild distress, 25-29 likely to have moderate distress, ≥30 likely to have severe distress (see Appendix C). The K10 is a widely used measure of general psychological health and has been translated and validated in numerous languages (Chan & Fung, 2014; Hajebi et al., 2018). It has excellent sensitivity (in the 90-99th percentile range of population distribution), strong discrimination in community samples and non-cases of DSM-IV disorders, and consistent levels of severity across demographic samples (Kessler et al., 2002).

Depression, Anxiety, Stress Scale - 21 (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a brief version of the DASS, which assesses depression, anxiety, and stress (see Appendix D). The DASS-21 is a 21-item self-report measure; participants indicate to what extent each statement (e.g., "I tended to over-react to situations") was true for them in the past week on a 4-point scale (0 = "did not apply to me" – 3 =

"applied to me very much or most of the time"). The DASS-21 has been shown to have acceptable to excellent internal consistency and concurrent validity (Antony, Bieling, Cox, Enns, & Swinson, 1998). The depression, anxiety, and stress subscales were used as predictors in the current study. Using the raw scores yielded positively skewed subscales (skewness: depression = 3.10, anxiety = 2.55, stress = 2.51; kurtosis: depression = 10.92, anxiety = 6.83, stress = 6.90); thus, a natural log transformation was performed for the scores of each subscale using the formula: ln(X+1), since there were raw scores of zero. This transformation yielded each subscale to become normally distributed (Table 1).

Urgency-Premeditation-Perseverance-Sensation Seeking-Positive Impulsive Behavior Scale (UPPS-P; Lynam, Smith, Cyders, Fischer, & Whiteside, 2007). The UPPS-P is a self-report measure that contains 59 items rated on a 4-pointscale (1 = "strongly agree" – 4 = "strongly disagree"). These items are used to assess 5 facets of impulsivity: Negative Urgency, Lack of Perseverance, Lack of Premeditation, Sensation Seeking and Positive Urgency, each of with acceptable – good Chronbach's alphas (α = .79-.93; Claes et al., 2015; see Appendix E). While participants answered all items, only negative urgency was used as an independent variable in the current study, as research has shown that acting impulsively in response to negative affect (i.e., negative urgency) is a common predictive and maintenance personality factor in binge eating (Racine et al., 2013).

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS, a 36–item self-report measure, was used to directly assess participants' overall level of emotion regulation. Participants rated each statement (e.g., "I am attentive to my feelings") on a 5-point scale (1 = "Almost never" – 5 = "Almost always"). The items comprise a total score and 6 factors: Nonacceptance of Emotional Responses, Difficulties Engaging in Goal-Directed, Impulse Control Difficulties, Lack of Emotional Awareness, Limited Access to Emotion Regulation Strategies, and Lack of Emotional Clarity (see Appendix F). The DERS has been shown to have adequate construct and predictive validity and high internal consistency in undergraduate samples (Gratz & Roemer, 2004). The total score was used as a predictor variable in the current study.

Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form (Q-LES-Q-SF; Endicott, Nee, Harrison, & Blumenthal, 1993). The Q-LES-Q-SF is a 14-item self-report measure that assesses how satisfied one has been over various aspects of life in the past week (e.g., "…how satisfied have you been with your social relationships?"). Individuals rated each item from 1 "Very Poor" – 5 "Very Good." The sum of the 14-item responses yields the total quality of life satisfaction score and can also be transformed into a percentage of maximum possible score. This measure has been shown to have good discriminant validity among clinical and non-clinical cases as well as acceptable internal consistency (Ritsner, Kurs, Ponizovsky, & Modai, 2002; Appendix G).

Rosenberg Self-Esteem Scale (Rosenberg, 1965). The Rosenberg Self-Esteem Scale is a 10-item self-report questionnaire that assesses one's global self-worth; individuals respond to each statement (e.g., "At times I think I am no good at all") with a 4-point scale (1 "Strongly Agree" – 4 "Strongly Disagree). Five items are reverse-coded and a sum of all 10 item responses was calculated; higher scores indicate higher self-esteem. The scale's single factor structure has been supported by psychometric analyses (Gray-Little, Williams, & Hancock, 1997; Appendix H).

Dependent Variables

The dependent variables were the four types of LOC eating episodes determined from the Eating Disorder Examination (EDE; Fairburn & Cooper, 1993; Appendix I) and two types of normative eating (a typical meal and a self-perceived large meal). The EDE is a semi-structured interview that assesses eating patterns and eating disorder psychopathology in the past 3 months; it has been noted as one of the most valid assessments of "binge-eating" episodes (Latner et al., 2007, p. 2205). In the current study, only aspects of the EDE pertaining to the current research questions will be used (typical eating episodes, LOC eating episodes). Certain parts of the EDE have been edited and tailored to fit the current research question, such as added questions about the five indicator variables of LOC eating after assessing each type of eating episode. The EDE has been shown to have good test-retest reliability (Rizvi, Peterson, Crow, & Agras, 2000). In the current study, the interviews were conducted by the author (67.6%), and

two undergraduate students, CY (17.3%) and ES (15%). The caloric amount of each reported meal was calculated using myfitnesspal.com as this software provides a variety of brand names for different types of foods in order to determine the most accurate caloric consumption per food item and, thus, per eating episode; Google searches for nutritional information from specific restaurants were also utilized. Next, the caloric amount of each episode was matched to the type of eating episode it was determined to be from the EDE (e.g., OBE congruent). Eating episodes with LOC and a caloric amount ≥ 1,500 calories were considered objectively large. This cut-off has been used as a caloric marker of "objectively large" eating episodes by numerous studies (Keel et al., 2018; Mitchell et al., 1998). Eating episodes with LOC and a caloric amount < 1,500 calories were considered as "objectively small-average" in size based on the criteria of previous studies (Keel et al., 2018).

Validator/Reference Variable

Loss of Control over Eating Scale (LOCES; Latner, Mond, Kelly, Haynes, & Hay, 2014). The LOCES is a 24-items self-report questionnaire in which participants rate how often (1 "Never" – 5 "Always; Appendix J) they endorse items assessing LOC eating (e.g., "I felt helpless about controlling my eating) over the past 28 days, with higher scores indicating greater loss of control pathology. All items were summed and then divided by the total number of items to create average LOCES scores for each participant (following the procedure of Bodell et al., 2018). The LOCES has been shown

to have acceptable convergent and discriminant validity (Latner et al., 2014). Scores on the LOCES were used as validators for the LOC eating episodes determined by the EDE phone interviews.

Covariates

Sex and BMI (calculated from self-reported current height and weight in the QEWP-R (using the formula: weight (lb) / [height (in)]2 x 703) served as covariates in all regression analyses.

Procedure

Participants were informed that the study was about eating patterns and habits; they provided online consent to participate in the study and then completed the online demographic and self-report measures via Qualtrics. Upon completion of the online survey, participants received .5 extra research credits for their participation. One to three weeks after completion of the online portion, the study investigator or trained research assistant contacted participants by phone to complete the second part of the study that entailed participants providing detailed information about various eating episodes they had experienced within the past three months (using the EDE). Participants who completed the 15-45 minute phone interview portion of the study received one extra research credit as compensation.

Statistical Analysis

In order to address the first study aim of similarities in eating and general psychopathology among the four types of LOC eating episodes, multinomial logistic regression models were run with EDE-Q global score, depression, anxiety, stress, general distress, negative urgency, emotion regulation, quality of life, and self-esteem as predictors and sex and BMI as covariates and with criterion variables of the four LOC eating episodes and typical meal eating episode for non-LOC participants, each coded with a different number (1-5; OBE congruent, OBE discordant, SBE congruent, SBE discordant, typical meal; Figure 1).

To assess the second study aim of similar rates of predictability and inclusion/exclusion of the five LOC indicator variables, the following diagnostic efficiency indices were run: base rate, specificity, sensitivity, positive predictive power (PPP), negative predictive power (NPP), and Cohen's kappa (consistent with White & Grilo, 2011). These were run for each of the five LOC indicators: eating much more rapidly than usual, eating until uncomfortably full, eating large amounts when not feeling physically hungry, eating alone because embarrassed, feeling disgusted, depressed, or very guilty afterward. Each of the LOC eating episodes were compared to typical eating episodes of controls (those who did not endorse LOC in the past 3 months) and large eating episodes of controls, respectively.

CHAPTER III

RESULTS

Of the 227 participants who completed the online survey of the study at Time 1, 173 (76.21%) went on to complete Time 2 of the study (telephone interview). Participants who completed the phone interview (n = 173) were compared to those who did not complete the interview (n = 54) in order to test whether attrition occurred at random. The two groups were not statistically different in age: completers: M = 19.65 (SD = 2.80) vs. non-completers: M = 19.78 (SD = 3.01); $t(225) = .294$, $p = .435$); sex (X^2 (2, 227) = .514, p = .773), gender (X^2 (3, 227) = .935, p = .817), race (X^2 (4, 227) = 5.851, p = .211), ethnicity (X^2 (1, 227) = 1.516, p = .218), or year in school (X^2 (4, 227) = 3.576, p = .466). The results of these analyses indicate that attrition at Time 2 was likely random. Thus, all 227 participants were retained for analyses focusing solely on Time 1 measures and the subset of 173 were included in all analyses that included interview measures.

Table 1 presents descriptive statistics (n = 227) for the predictor variables, BMI covariate, and LOCES reference variable. Overall, participants reported average levels of eating disorder symptomatology (M = 1.55); they indicated particularly low levels of feeling out of control while eating (M = 1.77). The current sample indicated elevated levels of emotion regulation difficulties (M = 84.07) and self-esteem (M = 29.83) based

on categorization of score ranges presented in the literature for each measure. All internal consistencies were in the good-excellent range.

Table 1. *Descriptive statistics for predictor, covariate, and reference variables (N = 227).*

Predictors	*M*	*SD*	Range	Possible Range	Skewness	Kurtosis	Internal Consistency
EDE-Q Global	1.55	1.22	.05-5.07	0-6	.803	-.195	.96
K10 Total	20.33	9.11	10-50	10-50	1.22	1.15	.94
DASS21 - Depression*	.43	.69	0-2.71	0-3.09	1.48	1.18	.90
DASS21 – Anxiety*	.44	.68	0-2.48	0-3.09	1.33	.563	.79
DASS21 – Stress*	.48	.725	0-2.71	0-3.09	1.26	.31	.86
UPPS-P – Negative Urgency	2.14	.62	1-3.75	1-12	.374	-.301	.90
DERS Total	84.07	22.73	44-146	36-180	.56	-.23	.94
Q-LES-Q-SF Total	51.79	8.82	14-70	14-70	-.59	1.24	.90
Rosenberg Self-Esteem Scale	29.83	5.64	13-40	10-40	-.23	-.28	.91
Covariates							
BMI (kg/m^2)	24.53	4.36	16.12-37.12	-	.98	.45	-

Table 1. *con't.*

References							
LOCES Total	1.77	.71	1-4.83	1-24	1.31	1.96	.97

* = natural log transformation was performed on these variables in order to normalize the data (ln(X+1)). EDE-Q = Eating Disorder Examination – Questionnaire; K10 = Kessler Psychological Distress Scale; DASS21 = Depression, Anxiety, and Stress Scale; UPPS-P = Urgency-Premeditation-Perseverance-Sensation Seeking-Positive Impulsive Behavior Scale; DERS = Difficulties in Emotion Regulation Scale; Q-LES-Q_SF = Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form; BMI = Body Mass Index; LOCES = Loss of Control over Eating Scale.

See Table 2 for characteristics of the eating episodes from the EDE. Of the 173 participants that reported self-perceived large meals in the past 3 months, most (n = 159 or 93.5%) indicated that they thought the meal they identified was a large amount of food. If participants said they did not have a large meal in the past 3 months, they were asked to report the largest meal they remembered eating in the past 3 months. Caloric amount for self-perceived large meals was not statistically different between those who said that it was not a large amount of food (M = 1007.45, SD = 575.67) compared to those who did think it was a large meal (M = 1270.09; SD = 43.29); $t(168) = -1.538$, p = .126. Accordingly, all 173 participants were retained in subsequent analyses for this variable.

Table 2. *Characteristics of the eating episodes from the Eating Disorder Exam (EDE) interview.*

Type of Eating Episode	*n*	Calories *M*(*SD*)	Calorie Range	*t(df), p*
Typical Meal	173	687.05(344.34)	120 – 2322	
Non-LOC	147	670.95(300.92)	120 – 2016	-1.467(171), .144
LOC	26	778.08(526.08)	126 – 2322	
Typical Snack	173	219.83(183.67)	43 – 1,264	
Non-LOC	147	219.93(182.54)	43 – 1264	0.17(171), .987
LOC	26	219.27(193.61)	80 – 1066	
Self-Perceived Large Meal	173	1256.99(548.45)	422.25 – 3720	
Non-LOC	147	1225.15(522.61)	422.25 - 3720	-1.828(171), .069
LOC	26	1437.00(659.41)	533 - 3290	
OBE Congruence	10	2424.80(276.29)	1612 - 4505	OBE Congruent > SBE Congruent, SBE Discordance, <.001
OBE Discordance	0	-	-	
SBE Congruence	4	790.89(281.04)	437 – 1115	SBE Congruence < SBE Discordance, <.001
SBE Discordance	12	1001.00(355.90)	331 - 1460	

Note. LOC = loss of control; OBE= objective binge eating; SBE = subjective binge eating. Of the 173 participants who completed the interview, 26 (15%) reported experiencing LOC over eating in the past 3 months. See Table 2 for calorie amount comparisons for non-LOC eating episodes between LOC and non-LOC participants; there were no significant differences between groups.

Although 26 participants reported LOC episodes, 37 LOC episodes were recorded due to participants reporting more than one type of LOC episode. The categorization of the 37 episodes was as follows: 17 OBE congruence, 0 OBE discordance, 7 SBE congruence, 15 SBE discordance. Due to multinomial logistic regression requiring just one episode per person for type of episode, and because the aim of the study was to investigate different *types* of LOC-eating episodes, the following decisions were made when classifying episode type per person who reported multiple types of episodes: prioritizing SBE congruence or discordance over OBE congruence due to OBE congruence being reported most frequently, and prioritizing SBE congruence over SBE discordance due to SBE discordance being reported second most frequently. This was done to maximize diversity in the types of episodes compared. Frequencies of the following 26 LOC episodes were: 10 OBE congruence, 4 SBE congruence, and 12 SBE discordance. A one-way ANOVA was performed to test for differences in caloric amount between the types of LOC episodes (see Table 2 for descriptive statistics). The overall ANOVA was significant ($F(2, 25) = 18.325$, $p < .001$). A Tukey HSD post-hoc analysis yielded that OBE congruence episodes had higher caloric amounts ($M = 2424.80$; SD = 873.71) than SBE congruence ($M = 790.88$; SD = 281.04) ($p < .001$) and SBE discordance ($M = 1001.00$; SD = 355.90) ($p < .001$); SBE congruence episodes were significantly less caloric than SBE discordance ($p < .001$).

Correlations

Bivariate correlations were computed for all predictor variables, BMI, LOCES (validator variable), and calories from the EDE eating episodes (Table 3). All of the predictor variables and LOCES were significantly correlated as detailed in Table 3. Of note, the EDE-Q global score was positively correlated with BMI ($r = .32$, $p < .01$), which in turn was associated with the LOCES ($r = .61$, $p < .01$) All of the predictor variables and LOCES were positively correlated, with the exception of quality of life, and self-esteem. The only calorie amount that was significantly associated with EDE-Q global was for the large eating episodes and this relationship was negative ($r = -.16$, $p < .05$): those that had higher levels of eating disorder psychopathology had lower caloric values for their large eating episodes. Overall, that was the only caloric value significantly associated with any predictor variables other than a significant negative association of calories from LOC eating episodes with anxiety ($r = -.43$, $p < .05$) and depression ($r = -.41$, $p < .05$).

Table 3. *Intercorrelations among predictor variables, covariates, validators, and calories.*

		2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. EOG	**1**														
2. K10	-.44**	**1**													
3. NU	.31**	.33**	**1**												
4. ER	.37**	.55*	.54**	**1**											
5. QOL	-.34**	-.53**	-.40**	-.59**	**1**										
6. SE	-.43**	-.61**	-.40**	-.70**	.61**	**1**									
7.	.61**	.40**	.39**	.36**	-.32**	-.37**	**1**								
8. BMI	.32**	.05	.01	.01	-.03	-.06	**.**17*	**1**							
9. Stress	.45**	.61**	.34**	.52**	-.45**	-.46**	.39**	.02	**1**						
10. Anx.	.48**	.61**	.34**	.46**	-.40**	-.45**	.44**	.10	.78**	**1**					
11. Dep.	.44**	.69**	.31**	.48**	-.52**	-.59**	.43**	.094	.64**	.69**	**1**				
12.TEE	-.12	-.15	.06	-.07	.13	.10	-.08	-.04	-.14	-.10	-.11	**1**			
13. SEE	.05	.04	.06	-.01	-.04	.05	.01	-.03	-.05	-.05	-.03	.12	**1**		
14. LEE	-.16*	-.09	-.05	-.11	.03	.12	.05	.13	-.12	-.05	-.02	.33**	.46	**1**	
15. LOC	-.18	-.31	.09	-.10	.31	.34	-.18	-.07	-.34	-.43*	-.41*	.21	.56**	.23	**1**

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

Note. EQG = Eating Disorder Examination Questionnaire – Global Score; K10 = Kessler 10 distress; NU = negative urgency; ER = emotion regulation; QOL = quality of life; SE = self-esteem; BMI = Body Mass Index (current); Anx. = anxiety; Dep. = depression; TEE = typical eating episode (calories); SEE = snack eating episode (calories); LEE = large eating episode (calories); LOC = loss of control eating episode (calories).

Modeling

In order to address the first main objective of the study, whether different types of LOC eating episodes were associated with similar types of pathology, quality of life, and self-esteem, a multinomial logistic regression model was computed with nine predictor variables (i.e., EDE-Q global score, depression, anxiety, stress, general distress, negative urgency, emotion regulation, quality of life, and self-esteem), 2 covariates (sex and current BMI), and LOCES as a validator variable with eating episode as the dependent variable (i.e., 1 = OBE congruence, 2 = SBE congruence, 3 = SBE discordance, or 4 = typical eating episode). OBE discordance was removed from the dependent variable because no participants reported experiencing this type of episode within the past three months. Typical eating episode was used as the reference group. The tested model provided a significantly improved fit over the null model (χ^2 (36, 217) = 60.74, Nagelkerke R^2 = .41, p = .006. The Pearson goodness-of-fit index indicated poor model fit (χ^2 (612) = 1529.685, p < .001), while the Deviance index indicated good model fit (χ^2 (612) = 139.344, p = 1.00). Partially in line with hypotheses, the only two predictors that made unique, significant contributions to the model were negative urgency (χ^2 (3, 217) = 8.588, p = .035) and LOCES (χ^2 (3, 217) = 15.956, p = .001). LOCES was the only significant predictor of the OBE congruence classification: b = 1.461, p = .049, OR = 4.309 (95% CI: 1.006, 18.462). There were no significant predictors of the

SBE congruence classification. Negative urgency (b = -2.301, p = .027, OR = .100 [95% CI: .013, .766]) and LOCES (b = 1.936, p = .003, OR = 6.932 [95% CI: 1.920, 25.032]) were the only significant predictors of the SBE discordant classification (Table 4).

A post-hoc exploratory MANOVA with EDE-Q global score, depression, anxiety, stress, general distress, negative urgency, emotion regulation, quality of life, and self-esteem as the independent factors and OBE congruent, SBE discordance, and SBE congruent as the dependent measures was computed to test whether there were differences in psychopathology among each type of LOC episode. Consistent with hypotheses, there was not a significant difference in overall psychopathology based on type of LOC episode endorsed (F (20, 24) = 1.09, p = .416; Wilk's Λ = .275, partial η^2 = .48).

Table 4. *Multinomial Logistic Regression predicting OBE congruent (N = 9), SBE congruent (N = 4), and SBE discordant (N = 11) episodes compared to typical eating episodes (N = 193).*

	β	*SE*	*p*	*OR*	95% CI
OBE congruent versus comparison group					
Sex	.86	.76	.26	2.36	.54 – 10.39
BMI	-.02	.10	.82	.98	.80 – 1.19
EDE-Q Global	-.04	.46	.93	.96	.39 – 2.37
General distress (K-10)	.03	.08	.73	1.03	.88 – 1.20
Stress (DASS)	-1.04	1.20	.39	.35	.03 – 3.74
Anxiety (DASS)	-1.79	1.45	.22	.17	.01 – 2.87
Depression (DASS)	1.13	1.06	.29	3.11	.39 – 24.80
Negative Urgency (UPPS-P)	.98	.72	.17	2.67	.66 - 10.87
Emotion Regulation (DERS)	.01	.03	.76	1.01	.95 – 1.07
Quality of Life (Q-LES-Q-SF)	.00	.07	.92	1.01	.88 – 1.15
Self-Esteem (Rosenburg)	.12	.13	.37	1.12	.87 – 1.44
Loss of control eating (LOCES)	1.46*	.74	.05	4.31	1.01 – 18.46
SBE congruent versus comparison group					
Sex	-.08	1.40	.96	.93	.06 - 14.28
BMI	-.10	.16	.54	.91	.66 – 1.24
EDE-Q Global	-.59	.80	.46	.55	.17 – 2.64
General distress (K-10)	.13	.13	.31	1.14	.89 – 1.47
Stress (DASS)	-.20	1.12	.86	.82	.09 – 7.38
Anxiety (DASS)	1.00	1.47	.50	2.72	.15 – 48.23
Depression (DASS)	.469	1.47	.75	1.60	.09 – 28.64
Negative Urgency (UPPS-P)	.63	1.29	.62	1.88	.15 – 23.48
Emotion Regulation (DERS)	-.05	.05	.30	.95	.87 – 1.05

Quality of Life (Q-LES-Q-SF)	-.19	.10	.06	.83	.68 – 1.01
Self-Esteem (Rosenburg)	.00	.21	.98	1.00	.67 – 1.50
Loss of control eating (LOCES)	1.20	1.08	.27	3.33	.40 – 27.80
SBE discordant versus comparison group					
Sex	-1.85	1.50	.22	.16	.01 – 3.02
BMI	-.03	.10	.76	.97	.80 – 1.18
EDE-Q Global	.78	.46	.09	2.19	.88 – 5.41
General distress (K-10)	.08	.09	.35	1.09	.91 – 1.30
Stress (DASS)	-1.27	.92	.17	.28	.05 – 1.71
Anxiety (DASS)	-.09	.88	.92	.92	.16 – 5.13
Depression (DASS)	1.69	.96	.08	5.40	.82 – 35.51
Negative Urgency (UPPS-P)	-2.30**	1.04	.03	.10	.01 - .77
Emotion Regulation (DERS)	.04	.03	.17	1.04	.98 – 1.10
Quality of Life (Q-LES-Q-SF)	-.01	.07	.84	.99	.86 – 1.13
Self-Esteem (Rosenburg)	.05	.12	.68	1.05	.83 – 1.34
Loss of control eating (LOCES)	1.934**	.66	.00	6.93	1.92 – 25.03

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

Note. OBE = objective binge episode; SBE = subjective binge episode; BMI = Body Mass Index; EDE-Q = Eating Disorder Examination – Questionnaire; K10 = Kessler Psychological Distress Scale; DASS = Depression, Anxiety, and Stress Scale; UPPS-P = Urgency-Premeditation-Perseverance-Sensation Seeking-Positive Impulsive Behavior Scale; DERS = Difficulties in Emotion Regulation Scale; Q-LES-Q_SF = Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form; LOCES = Loss of Control over Eating Scale.

Efficiency Indices

In order to address the second main study objective, that all five LOC indicators would be predictive and inclusionary/exclusionary for each LOC episode, diagnostic efficiency indices were computed for OBE congruence, SBE congruence, and

SBE discordance compared to typical eating episodes and large eating episodes of controls, respectively. Table 5 (typical) and Table 6 (large) display the base rate, specificity, sensitivity, PPP, NPP and Cohen's Kappa for each of the five LOC indicator variables per LOC episode and control episode comparison. The base rates for each of the three LOC episodes are as follows: OBE congruence (.10), SBE congruence (.03), and SBE discordance (.10). The base rates of each LOC indicator variable did not differ across typical and large control comparisons.

For OBE congruence, eating until uncomfortably full was the most frequently endorsed indicator (*n* = 16, 94.12%; base rate [BR] = .10); for SBE congruence, eating large amounts when not feeling physically hungry was the most frequently endorsed indicator (*n* = 5, 100%; BR = .03). Feeling disgusted, depressed, or guilty afterwards were the most frequently endorsed indicators for SBE discordance (*n* = 15, 93.75%; BR = .09). Eating alone because embarrassed was the least endorsed indicator for all three LOC episode types (OBE congruence: *n* = 5, 35.71%; SBE congruence: *n* = 2, 40%; SBE discordance: *n* = 8; 50%). When compared to typical eating episodes of controls, all five indicator variables in all three LOC episodes had high specificity (.88-.99) and NPP (all ≥ .92). While NPP remained high across all five indicators in all three LOC episodes when compared to large eating episodes of controls (all > .92), the specificity of eating much more rapidly than usual (.42) and eating until uncomfortably full (.77) were lower than when compared to typical control eating episodes; the other three LOC indicators had high specificity (.88 – 1.00). When compared to control typical and large eating

episodes, each LOC indicator had high sensitivity for OBE congruence and SBE discordance except for eating alone because embarrassed, .29 and .50 respectively. For SBE concordance, the sensitivity for all five LOC indicator variables was relatively low except for eating large amounts of food when not physically hungry, which was 1.00. In terms of PPP when compared to control typical eating episodes, each LOC indicator variable had some predictive power; eating alone because embarrassed was the most frequent and eating much more rapidly than usual was the least frequent for each type of LOC episode. When compared to control large eating episodes, each LOC indicator variable's PPP was decreased for each type of LOC episode except for eating alone because feeling embarrassed, which increased to 1.00 for all episode types.

Overall, all but one (*eating alone because embarrassed* for SBE congruence) Kappa values were higher for LOC - control typical eating episode comparisons versus LOC - control large eating episode comparisons. When compared to control typical eating episodes, the LOC indicator variables yielded the following Kappa ranges: OBE congruent (poor (.38) – good (.71)), SBE congruent (poor (.11) – moderate (.43)), SBE discordant (moderate (.55) – excellent (.76)). When compared to control large eating episodes, the LOC indicator variables yielded the following Kappa ranges: OBE congruent (poor (.11) – moderate (.43)), SBE congruent (poor (.00) – moderate (.56)), SBE discordant (moderate (.01) – excellent (.64)).

Table 5. *Base rate and diagnostic efficiency indices for the five indicators of LOC eating in OBE congruent (N = 17), SBE congruent (N = 5), and SBE discordant (N = 16) episodes compared to typical eating episodes (N = 147).*

Variable Criterion	BR	Sens	Spec	PPP	NPP	Kappa
OBE congruent versus comparison group Base rate for OBE congruent = .10						
Eating much more rapidly than usual	.09	.88	.88	.45	.98	.54
Eating until uncomfortably full	.10	.94	.93	.62	.99	.71
Eating large amounts when not physically hungry	.07	.65	.92	.48	.96	.49
Eating alone because embarrassed	.03	.29	.99	.71	.92	.38
Feeling disgusted, depressed, or guilty afterwards	.08	.76	.95	.65	.97	.67
SBE congruent versus comparison group Base rate of SBE congruent = .03						
Eating much more rapidly than usual	.01	.40	.88	.10	.98	.11
Eating until uncomfortably full	.02	.60	.93	.23	.99	.30
Eating large amounts when not physically hungry	.03	1.00	.92	.29	1.00	.43
Eating alone because embarrassed	.01	.40	.99	.50	.99	.43
Feeling disgusted, depressed, or guilty afterwards	.01	.40	.95	.22	.98	.25
SBE discordant versus comparison group Base rate of SBE discordant = .10						
Eating much more rapidly than usual	.09	.88	.88	.23	.98	.55
Eating until uncomfortably full	.09	.88	.93	.58	.99	.66
Eating large amounts when not physically hungry	.08	.81	.92	.52	.98	.58
Eating alone because embarrassed	.05	.50	.99	.80	.95	.58
Feeling disgusted, depressed, or guilty afterwards	.09	.94	.95	.68	.99	.76

Note. OBE = objective binge episode; SBE = subjective binge episode; BR = base rate; Sens = sensitivity; Spec = specificity; PPP = positive predictive power; NPP = negative predictive power.

Table 6. *Base rate and diagnostic efficiency indices for the five indicators of LOC eating in OBE congruent (N = 17), SBE congruent (N = 5), and SBE discordant (N = 16) episodes compared to large eating episodes (N = 146).*

Variable Criterion	BR	Sens	Spec	PPP	NPP	Kappa
OBE congruent versus comparison group Base rate for OBE congruent = .10						
Eating much more rapidly than usual	.09	.88	.77	.31	.98	.35
Eating until uncomfortably full	.10	.94	.42	.16	.98	.11
Eating large amounts when not physically hungry	.07	.65	.81	.28	.95	.29
Eating alone because embarrassed	.03	.29	1.00	1.00	.92	.43
Feeling disgusted, depressed, or guilty afterwards	.08	.76	.81	.32	.97	.35
SBE congruent versus comparison group Base rate of SBE congruent = .03						
Eating much more rapidly than usual	.01	.40	.77	.06	.97	.04
Eating until uncomfortably full	.02	.60	.42	.03	.97	.00
Eating large amounts when not physically hungry	.03	1.00	.81	.15	1.00	.22
Eating alone because embarrassed	.01	.67	1.00	1.00	.98	.56
Feeling disgusted, depressed, or guilty afterwards	.01	.40	.81	.07	.98	.06
SBE discordant versus comparison group Base rate of SBE discordant = .10						
Eating much more rapidly than usual	.09	.88	.77	.29	.90	.34
Eating until uncomfortably full	.09	.88	.42	.29	.97	.09
Eating large amounts when not physically hungry	.08	.81	.81	.32	.98	.37
Eating alone because embarrassed	.05	.50	1.00	1.00	.95	.64
Feeling disgusted, depressed, or guilty afterwards	.09	.94	.81	.35	.99	.42

Note. OBE = objective binge episode; SBE = subjective binge episode; BR = base rate; Sens = sensitivity; Spec = specificity; PPP = positive predictive power; NPP = negative predictive power.

CHAPTER IV

DISCUSSION

The current study focused on examining different types of LOC eating episodes based on the perception of amount of food eaten and actual amount of food eaten, in addition to feeling out of control when eating. The literature on binge eating has consistently shown that objective and subjective binge eating yield similar levels of psychopathology, indicating that experiencing LOC during eating is indicative, but not necessarily more so, than the amount of food eaten (Goossens et al. 2007; Latner et al., 2007). However, prior research has not examined whether the perception of the amount of food eaten is congruent or discordant with the actual amount of food eaten during a LOC episode. Thus, the current study investigated the presence of four different types of LOC eating episodes (Figure 1) in a community sample of undergraduate students and examined whether these eating episodes differed in both eating and general psychopathology.

Overall, participants in the current study showed low levels of eating disorder pathology and feelings of being out of control while eating, and they reported low levels of depression, anxiety, and stress, yet high levels of general distress. Only a small number of participants (n = 26) endorsed any type of LOC eating in the past 3 months. This rate is lower than anticipated as a priori power analyses were calculated based on previous literature suggesting that about 50% of US college females have experienced a “binge-

eating" episode (Lipson & Sonneville, 2017). The lower rate of LOC eating in this study may be due to only assessing for past 3-month binge eating (as opposed to since starting college or lifetime); sampling only a specific subset (psychology students) of the campus population may have also contributed.

In terms of LOC episodes, OBE congruence and SBE discordant episodes were reported at similar rates, while SBE congruence episodes were less common, and no participants reported OBE discordant episodes. The absence of OBE discordant episodes suggests that individuals may rarely report feeling as if they ate a small amount of food when they actually consumed 1500 calories or more during a meal that is characterized by feeling out of control. In terms of SBE episodes, it was less common to report feeling out of control when eating a perceived and objectively small-average amount of food than when eating a perceived large amount of food but an objectively small-average amount of food. In fact, those who reported subjectively and objectively eating a small-average amount of food (SBE congruence) ate, on average, about 210 less calories per LOC episode than those who thought they ate a large amount of food but ate a small-average amount of food (SBE discordance).

Contrary to the hypothesis that general eating disorder psychopathology, general distress, negative urgency, and general feelings of LOC when eating (LOCES), emotion regulation, anxiety, depression, stress, (decreased) self-esteem , and (decreased) quality of life would predict LOC eating over non-LOC eating, only negative urgency and

LOCES predicted LOC episodes compared to typical eating episodes. Interestingly, negative urgency only predicted SBE discordance episodes and not OBE congruence episodes, *and* this relationship was negative: higher levels of negative urgency predicted being in the control group (*not* the SBE discordance group). Existing literature has shown impulsivity to be indicative of OBEs but not SBEs (Keel et al., 2001). Results from the current study were unable to replicate this finding; however, the present results do suggest that those that experience SBEs may have less difficulties with impulsivity (specifically negative urgency) than controls. It may be that those that experience SBEs struggle with over-control, or rigidity, versus impulsivity. The tendency to be rigid may underlie the small-average amount of food eaten by individuals who experience SBEs, even if they feel out of control while eating. Of note, Keel et al. (2001) used a different measure of impulsivity than employed in the current study (Barratt Impulsiveness Scale – 11); Barratt's scale does not look at separate types of impulsivity. Thus, different types of impulsivity and/or rigidity may uniquely predict OBEs versus SBEs, warranting further research.

Although average LOCES was low in the current study, it was predictive of both OBE congruence and SBE discordance. The LOCES was a validator in the current study, meaning it was included in the analytic models in order to assess whether individuals in LOC groups reported feeling more LOC when eating compared to non-LOC eaters. However, LOCES was not uniquely predictive of SBE congruence. This may be due to the small sample size of the of the SBE congruence group. It may also indicate that

individuals who experience SBE congruence feel less out of control when eating than those who experience SBE discordance or OBE congruence.

As hypothesized, each type of LOC eating episode did not differ in amount of eating and general psychopathology. However, these results should be interpreted with caution as the MANOVA was underpowered due to low number of individuals endorsing LOC eating. Effect sizes were reported and interpreted: the Wilk's Λ was relatively low (.275), indicating that the variables do a fairly good job of contributing to the model, and the partial η^2 (.48) was in the high range. Given these parameters of the model, the findings suggest that subjective and objective size of a meal does not indicate pathology, whereas the experience of being out of control when eating does indicate pathology. This is in line with existing literature (Brownstone et al., 2013; Keel et al., 2001; Kerzhnerman & Lowe, 2002; Mond et al., 2010; Watson et al., 2013) suggesting that the definition of "binge-eating" should be revisited and potentially updated in future versions of the DSM. Specifically, future versions of the DSM may only include "feeling out of control when eating" as the criteria for a binge-eating episode. This revised definition would broaden the criteria for diagnosis of binge-eating spectrum disorders, potentially allowing more individuals to receive appropriate, insured treatment.

The second aim of this study was to examine the utility of the five LOC indicators of binge eating in the DSM. This investigation is important because the indicators are part of the BED diagnostic criteria, but not the BN criteria, even though both disorders

have the same definition of "binge eating." The LOC indicator variables were compared to typical eating episodes of controls as well as large eating episodes in order to assess if the LOC indicators maintained utility when compared to higher caloric, non-LOC eating episodes. In general, the sensitivity and NPP of the LOC episodes remained unchanged across indicators when compared to typical versus large eating episodes of controls. However, the specificity, PPP, and Kappa of the indicators were lower when compared to typical versus large eating episodes. The specificity of the indicator variables remained relatively high across all LOC episodes except for eating until uncomfortably full. This finding suggests that the ability of the LOC indicators to correctly identify non-LOC eaters is relatively good, except for when non-LOC eaters report subjectively larger than normal meals. Thus, eating until uncomfortably full may be a normative experience to some extent when LOC episodes are compared to larger non-LOC episodes.

In terms of PPP, eating alone because embarrassed was the best inclusion criteria across all types of LOC episodes. This finding is consistent with White and Grilo's (2011) study of clinical binge-eating spectrum eating disorders. Although White and Grilo (2011) identified feeling disgust, guilt, or depression afterwards has having the highest NPP, the current study indicated that all indicators across all LOC episodes were extremely high (.90-1.00) in both comparison groups. This suggests that in non-clinical samples the exclusion of any of the five indicator values would indicate the absence of LOC eating. According to Kappa values, the best indicator of LOC eating was feeling disgusted, guilt, or depression afterwards in SBE discordance and eating until

uncomfortably full in OBE congruence; the Kappa values were poor-moderate for SBE congruence, most likely due to lower base rate. This pattern of results differs from White and Grilo (2011) who found that the best indicators "were eating large amounts of food when not hungry and eating alone because embarrassed" (p. 7).

Together, the current findings suggest that all five LOC indicator variables have some utility in distinguishing LOC eaters from non-LOC eaters in non-clinical samples, though the amount of food eaten by non-LOC eaters may diminish the utility of some of the indicators. These data indicate that assessing the presence of the LOC variables may be beneficial in identifying LOC eating in non-clinical individuals. Although replication is needed, these findings may preliminarily inform disordered eating screenings such that assessing the LOC indicator variables may aid in determining the presence of LOC eating. Considering that brevity is often important in screenings, the current study and previous research (White & Grilo, 2011) suggest that asking about eating alone due to embarrassment may be the most important question when assessing LOC eating.

Strengths and Limitations

The current study is not without limitations. The sample size, especially after attrition from part 1 to part 2, limited the power of the analyses. For example, a MANOVA including the reference group, or non-LOC eaters, was not possible due to unequal sample sizes per group. Thus, additional research is warranted, particularly with stratified or targeted sampling across several schools to ensure sufficient power for

desired MANOVA analyses. A related limitation is that the number of LOC eaters was smaller than anticipated and contributed to lower power for analyses. Moreover, missing data of individuals who did endorse LOC eating contributed to this problem as they had to be omitted from subsequent analyses. In addition, the current sample was limited to non-clinical individuals and was homogenous in terms of demographic make-up. Although young female college students are at greater risk for disordered eating practices (Lipson & Sonneville, 2017), this study would have benefitted from greater power to enable gender comparisons to more fully replicate White and Grilo's (2011) findings regarding diagnostic utility analyses.

The current study relied heavily on self-report, which may have resulted in biased or inaccurate reports of food consumption, weight, and height used to calculate BMI. A related limitation is that food recall was retrospective up to 3 months, further contributing to recall error in terms of not only what food was eaten but also amounts of food that were eaten. Future research can address these limitations in various ways, such as by providing participants with a reference guide of what different amounts of foods may be (e.g., a handful of grapes is about one half cup). It would behoove future research in this area to utilize a 24-hour food recall system or perhaps ecological momentary assessment in order to increase response accuracy and, therefore, calorie calculation accuracy.

Another limitation of the current study pertains to the EDE utilized that was edited from the original measure in an attempt to better address study aims and

hypotheses. However, the original EDE is validated with years of research (Faiburn & Cooper, 1993; Latner et al., 2007; Rizvi et al., 2000), whereas the edited version used in the current study has not yet been validated. Future research should assess the utility and validity of the edited EDE used in this study. While this study assessed a number of potential predictive and maintenance factors of LOC eating as other studies (e.g., emotion regulation), there were a few instances were different measures were used in the current study than in previous studies (e.g., the UPPS-P versus the Barratt Impulsiveness Scale – 11). This limits the generalizability and replication interpretation of this study compared to existing literature. However, it may introduce novel areas of research, such as further investigating facets of impulsivity in SBEs and OBEs in order to clarify unique vulnerability and maintenance factors.

Despite these limitations, the current study has several strengths. One strength is that it was the first study to incorporate perception of amount of food eaten compared to actual amount of food eaten to classify different types of LOC eating. Thus, the current findings contribute to the literature of subjective versus objective binge eating by testing if discordance and/or congruence are indicative of psychopathology above and beyond the LOC feeling. Another strength of this study is that it utilized a non-clinical, yet at-risk sample, and results indicated that different LOC subtypes do not differ in psychopathology and that high negative urgency and feelings of LOC when eating predict that one engages in LOC eating episodes. These findings implicate potential risk and maintenance factors of disordered eating. Thus, assessing for these traits could enhance

early detection and subsequent intervention and/or prevention of disordered eating practices. Furthermore, this study was able to replicate some findings of the diagnostic utility of the five LOC indicator variables in a non-clinical sample (White & Grilo, 2011), which demonstrates the potential importance of assessing for LOC eating in at-risk populations (such as college students) in order to attempt to prevent the development of diagnosable eating disorders.

Conclusion

In conclusion, the current study indicated that perception of amount of food eaten, in addition to the objective amount of food eaten, may not account for much more variance, or capture many more episodes of LOC eating than the traditional ways of assessing OBEs and SBEs that have been presented in the literature (Brownstone et al., 2013; Keel et al., 2001). However, the current LOC indicators used yielded diagnostic utility across all types of LOC eating episodes, even though they had low base rates (especially SBE congruence). Although the current study highlights the importance of assessing for LOC eating in non-clinical samples, it necessitates replication with large non-clinical and clinical samples.

Appendix A

Demographics Questionnaire

Instructions: Please answer the following questions

1. How old are you? _____years
2. Biological sex:
    a. Female
    b. Male
    c. Intersex
3. Gender:
    a. Female
    b. Female to Male Transgender
    c. Male
    d. Male to Female Transgender
    e. Other (Please specify):_____
4. What is your race?
    a. Black
    b. White
    c. Asian
    d. Native American
    e. Other (Please specify): _____
5. What is your ethnicity?
    a. Non-Hispanic
    b. Hispanic
6. What year are you in school?
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
    e. Graduate Student
7. Are you involved in a Sorority or Fraternity?
    a. Yes
    b. No
8. How tall are you? ___feet ___inches
9. How much do you weight now? _____lbs

10. What has been your highest adult, non-pregnancy weight ever? _____lbs
11. What has been your lowest adult weight ever? _____lbs
12. Dietary restrictions. Select all that apply
    a. Vegetarian

Instructions: Please answer the following questions

    b. Vegan
    c. Gluten-free
    d. Other; explain:_____
    e. None
13. IF SELECTED A-D ABOVE: For what reasons do you have these dietary restrictions? Select all that apply
    a. Moral reasons (e.g., animal rights)
    b. Medical reasons (e.g., gluten intolerance)
    c. Clean/Healthy eating
    d. To lose weight
    e. Other; Explain:_____
    f. None of the above
14. What is your sexual orientation?
    a. Heterosexual
    b. Homosexual
    c. Bisexual
    d. Asexual
    e. Other; Explain:_____
15. Have you ever been overweight by at least 10 lbs as a child or 15 lbs as an adult (when not pregnant)? YES NO or NOT SURE
    a. **IF YES**: How old were you when you were first overweight (at least 10 lbs as a child or 15 lbs as an adult)? If you are not sure, what is your best guess? ___ ___years
16. How many times (approximately) have you lost 20 lbs or more—when you weren't sick—and then gained it back?
    a. Never
    b. Once or twice
    c. Three or four times
    d. Five times or more

17. During the past **six** months, how important has your weight or shape been in how you feel about or evaluate yourself as a person—as compared to other aspects of your life, such as how you do at work, as a parent, or how you get along with other people?
    a. Weight and shape were **not very important**
    b. Weight and shape **played a part** in how you felt about yourself
    c. Weight and shape **were among the main things** that affected how you felt about yourself
    d. Weight and shape **were the most important things** that affected how you felt about yourself

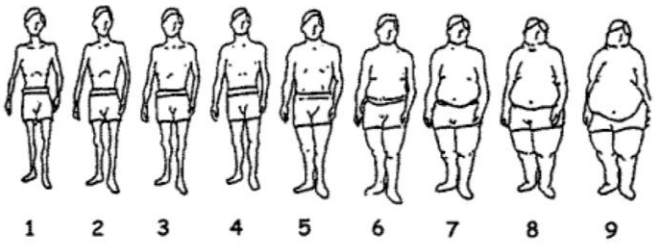
Instructions: Please answer the following questions

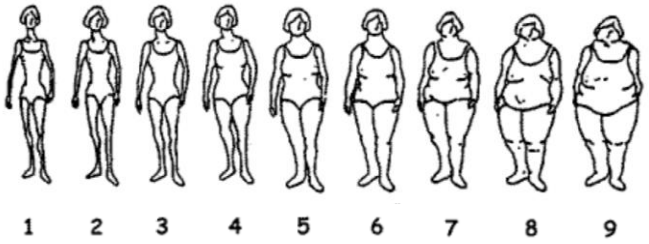
18. Since you have been an adult—18 years old—how much of the time have you been on a diet, been trying to follow a diet, or in some way been limiting how much you were eating in order to lose weight or keep from regaining weight you had lost? Would you say…?
    a. None or hardly any of the time
    b. About a quarter of the time
    c. About half of the time
    d. About three-quarters of the time
    e. Nearly all of the time

19. **SKIP THIS QUESTION IF YOU NEVER LOST AT LEAST 10 LBS BY DIETING:** How old were you the first time you lost at least 10 lbs by dieting, or in some way limiting how much you ate? If you are not sure, what is your best guess? ___ ___ years

20. Please take a look at these silhouettes.

    a. Which figure best characterizes your **current** body build? ____ (1-9)
    b. Which figure best characterizes your **ideal** body build? _____(1-9)
    c. Which figure best characterizes which body build you think you **should/ought to** be? _____(1-9)


1 2 3 4 5 6 7 8 9


1 2 3 4 5 6 7 8 9

Appendix B

Eating Disorder Examination – Questionnaire (EDE-Q)

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

On how many of the past 28 days…	**No days**	**1-5 days**	**6-12 days**	**13-15 days**	**16-22 days**	**23-27 days**	**Every day**
1. 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)?	0	1	2	3	4	5	6
2. 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?	0	1	2	3	4	5	6
3. 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)?	0	1	2	3	4	5	6
4. 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)?	0	1	2	3	4	5	6
5. Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?	0	1	2	3	4	5	6
6. Have you had a definite desire to have a totally flat stomach?	0	1	2	3	4	5	6
7. Has thinking about food, eating, or calories made it very difficult to concentrate on things you are interested in (e.g., working, following a conversation, or reading)?	0	1	2	3	4	5	6
8. Has thinking about shape or weight made it very difficult to concentrate on things you are interested in (e.g., working, following a conversation, or reading)?	0	1	2	3	4	5	6
9. Have you had a definite fear of losing control over eating?	0	1	2	3	4	5	6
10. Have you had a definite fear that you might gain weight?	0	1	2	3	4	5	6
11. Have you felt fat?	0	1	2	3	4	5	6
12. Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

Questions 13-18: Please enter the appropriate number for each question. Remember that each question only refers to the past four weeks (28 days).

13. Over the past 28 days, how many times have you eaten what other people would regard as an unusually large amount of food (give the circumstances)? _____
14. …On how many of these times did you have a sense of loss of control over your

eating (at the time you were eating)?)_____
15. Over the past 28 days, how many DAYS have such episodes of overeating occurred (i.e. you have eating 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 19-21: Please choose 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.

On how many of the past 28 days…	**No days**	**1-5 days**	**6-12 days**	**13-15 days**	**16-22 days**	**23-27 days**	**Every day**
19. Over the past 28 days, on how many days have you eaten in secret (i.e., furtively)?...Do not count episodes of binge eating.	0	1	2	3	4	5	6
	None of the times	**A few of the times**	**Less than half**	**Half of the times**	**More than half**	**Most of the time**	**Every time**
20. On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effects on your shape or weight?...Do not count episodes of binge eating.	0	1	2	3	4	5	6
	Not at all		**Slightly**		**Moderately**		**Markedly**
21. Over the past 28 days, how concerned have you been about other people seeing you eat?...Do not count episodes of binge eating.	0	1	2	3	4	5	6

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

On how many of the past 28 days…	**Not at all**		**Slightly**		**Moderately**		**Markedly**

22. Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
23. Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
24. How much would it have upset you if you had been asked to weight yourself once a week (no more, or less, often) for the next four weeks?	0	1	2	3	4	5	6
25. How dissatisfied have you been with your weight?	0	1	2	3	4	5	6
26. How dissatisfied have you been with your shape?	0	1	2	3	4	5	6
27. How uncomfortable have you felt seeing your body (e.g., seeing your shape in the mirror, in a shop window reflection, while undressing, or taking a bath or shower)?	0	1	2	3	4	5	6
28. How uncomfortable have you felt about others seeing your shape or figure (e.g., in communal changing rooms, when swimming, or wearing light clothes)?	0	1	2	3	4	5	6

29. IF FEMALE: Over the past 3-4 months, have you missed any of your menstrual periods? YES or NO
(If NO, skip to #31)

30. IF FEMALE: If yes, how many menstrual periods did you miss in the past 3-4 months?_____

31. IF FEMALE: Are you using a method of birth control? YES or NO
(If NO, skip out of survey)

32. If you are using a method of birth control, what are you using (list all types)?
_____(free response)_____

Appendix C

Kessler Psychological Distress Scale (K10)

Instructions: The following questions ask about how you have been feeling during the **past 30 days**. For each question, please choose the number that best describes how often you had this feeling.

	During that month, how often did you feel …	**All of the time**	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**
a.	… tired out for no good reason?	**1**	**2**	**3**	**4**	**5**
b.	…nervous?	**1**	**2**	**3**	**4**	**5**
c.	.so nervous that nothing could calm you down?	**1**	**2**	**3**	**4**	**5**
d.	…hopeless?	**1**	**2**	**3**	**4**	**5**
e.	…restless or fidgety?	**1**	**2**	**3**	**4**	**5**
f.	…so restless that you could not sit still?	**1**	**2**	**3**	**4**	**5**
g.	…depressed?	**1**	**2**	**3**	**4**	**5**
h.	.so depressed that nothing could cheer you up?	**1**	**2**	**3**	**4**	**5**
i.	…that everything was an effort?	**1**	**2**	**3**	**4**	**5**
j.	…worthless?	**1**	**2**	**3**	**4**	**5**

Appendix D

Depression, Anxiety, Stress Scale - 21 (DASS-21)

Instructions: Please read each statement and circle a number 0, 1, 2 or 3 that indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement. ***The rating scale is as follows:*** **0 Did not apply to me at all; 1 Applied to me to some degree, or some of the time; 2 Applied to me to a considerable degree, or a good part of time; 3 Applied to me very much, or most of the time**

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (eg, in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3

19	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

Appendix E

Urgency-Premeditation-Perseverance-Sensation Seeking-Positive Impulsive Behavior Scale (UPPS-P)

Instructions: Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement. If you **Agree Strongly** choose **1**, if you **Agree Somewhat** choose **2**, if you **Disagree somewhat** choose **3**, and if you **Disagree Strongly** choose **4**. Be sure to indicate your agreement or disagreement for every statement below.

		Strongly Agree	**Agree Some**	**Disagree Some**	**Strongly Disagree**
1.	I have a reserved and cautious attitude toward life.	1	2	3	4
2.	I have trouble controlling my impulses.	1	2	3	4
3.	I generally seek new and exciting experiences and sensations.	1	2	3	4
4.	I generally like to see things through to the end.	1	2	3	4
5.	When I am very happy, I can't seem to stop myself from doing things that can have bad consequences.	1	2	3	4
6.	My thinking is usually careful and purposeful.	1	2	3	4
7.	I have trouble resisting my cravings (for food, cigarettes, etc.).	1	2	3	4
8.	I'll try anything once.	1	2	3	4
9.	I tend to give up easily.	1	2	3	4
10.	When I am in great mood, I tend to get into situations that could cause me problems.	1	2	3	4
11.	I am not one of those people who blurt out things without thinking.	1	2	3	4
12.	I often get involved in things I later wish I could get out of.	1	2	3	4
13.	I like sports and games in which you have to choose your next move very quickly.	1	2	3	4
14.	Unfinished tasks really bother me.	1	2	3	4

15.	When I am very happy, I tend to do things that may cause problems in my life.	1	2	3	4
16.	I like to stop and think things over before I do them.	1	2	3	4
	Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement	**Strongly Agree**	**Agree Some**	**Disagree Some**	**Strongly Disagree**
17.	When I feel bad, I will often do things I later regret in order to make myself feel better now.	1	2	3	4
18.	I would enjoy water skiing.	1	2	3	4
19.	Once I get going on something I hate to stop.	1	2	3	4
20.	I tend to lose control when I am in a great mood.	1	2	3	4
21.	I don't like to start a project until I know exactly how to proceed	1	2	3	4
22.	Sometimes when I feel bad, I can’t seem to stop what I am doing even though it is making me feel worse.	1	2	3	4
23.	I quite enjoy taking risks.	1	2	3	4
24.	I concentrate easily.	1	2	3	4
25.	When I am really ecstatic, I tend to get out of control.	1	2	3	4
26.	I would enjoy parachute jumping.	1	2	3	4
27.	I finish what I start.	1	2	3	4
28.	I tend to value and follow a rational, "sensible" approach to things.	1	2	3	4
29.	When I am upset I often act without thinking.	1	2	3	4
30.	Others would say I make bad choices when I am extremely happy about something.	1	2	3	4
31.	I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional.	1	2	3	4
32.	I am able to pace myself so as to get things done on time.	1	2	3	4

33.	I usually make up my mind through careful reasoning.	1	2	3	4
34.	When I feel rejected, I will often say things that I later regret.	1	2	3	4
35.	Others are shocked or worried about the things I do when I am feeling very excited.	1	2	3	4
36.	I would like to learn to fly an airplane.	1	2	3	4
37.	I am a person who always gets the job done.	1	2	3	4
38.	I am a cautious person.	1	2	3	4
	Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement	**Strongly Agree**	**Agree Some**	**Disagree Some**	**Strongly Disagree**
39.	It is hard for me to resist acting on my feelings.	1	2	3	4
40.	When I get really happy about something, I tend to do things that can have bad consequences.	1	2	3	4
41.	I sometimes like doing things that are a bit frightening.	1	2	3	4
42.	I almost always finish projects that I start.	1	2	3	4
43.	Before I get into a new situation I like to find out what to expect from it.	1	2	3	4
44.	I often make matters worse because I act without thinking when I am upset.	1	2	3	4
45.	When overjoyed, I feel like I can’t stop myself from going overboard.	1	2	3	4
46.	I would enjoy the sensation of skiing very fast down a high mountain slope.	1	2	3	4
47.	Sometimes there are so many little things to be done that I just ignore them all.	1	2	3	4
48.	I usually think carefully before doing anything.	1	2	3	4
49.	When I am really excited, I tend not to think of the consequences of my actions.	1	2	3	4

50.	In the heat of an argument, I will often say things that I later regret.	1	2	3	4
51.	I would like to go scuba diving.	1	2	3	4
52.	I tend to act without thinking when I am really excited.	1	2	3	4
53.	I always keep my feelings under control.	1	2	3	4
54.	When I am really happy, I often find myself in situations that I normally wouldn't be comfortable with.	1	2	3	4
55.	Before making up my mind, I consider all the advantages and disadvantages.	1	2	3	4
56.	I would enjoy fast driving.	1	2	3	4
	Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement	**Strongly Agree**	**Agree Some**	**Disagree Some**	**Strongly Disagree**
57.	When I am very happy, I feel like it is ok to give in to cravings or overindulge.	1	2	3	4
58.	Sometimes I do impulsive things that I later regret.	1	2	3	4
59.	I am surprised at the things I do while in a great mood.	1	2	3	4

Appendix F

Difficulties in Emotion Regulation Scale (DERS)

Instructions: Please indicate **how often** the following 36 statements apply to you by selecting the appropriate number (1-5). Please refer to the scale below:

1 = Almost Never (0-10%); 2 = Sometimes (11-35%); 3 = About half the time (36-65%); 4 = Most of the time (66-90%); 5 = Almost Always (91-100%)

1. I am clear about my feelings	**1**	**2**	**3**	**4**	**5**
2. I pay attention to how I feel	1	2	3	4	5
3. I experience my emotions as overwhelming and out of control	1	2	3	4	5
4. I have no idea how I am feeling	1	2	3	4	5
5. I have difficulty making sense out of my feelings	1	2	3	4	5
6. I am attentive to my feelings	1	2	3	4	5
7. I know exactly how I am feeling	1	2	3	4	5
8. I care about what I am feeling	1	2	3	4	5
9. I am confused about how I feel	1	2	3	4	5
10. When I'm upset, I acknowledge my emotions	1	2	3	4	5
11. When I'm upset, I become angry with myself for feeling that way	1	2	3	4	5
12. When I'm upset, I become embarrassed for feeling that way	1	2	3	4	5
13. When I'm upset, I have difficulty getting work done	1	2	3	4	5
14. When I'm upset, I become out of control	1	2	3	4	5
15. When I'm upset, I believe that I will remain that way for a long time	1	2	3	4	5
16. When I'm upset, I believe that I'll end up feeling very depressed	1	2	3	4	5
17. When I'm upset, I believe that my feelings are valid and important	1	2	3	4	5
18. When I'm upset, I have difficulty focusing on other things	1	2	3	4	5
19. When I'm upset, I feel out of control	1	2	3	4	5
20. When I'm upset, I can still get things done	1	2	3	4	5
21. When I'm upset, I feel ashamed with myself for feeling that way	1	2	3	4	5
22. When I'm upset, I know that I can find a way to eventually feel better	1	2	3	4	5

23. When I'm upset, I feel like I am weak	1	2	3	4	5
24. When I'm upset, I feel like I can remain in control of my behaviors	1	2	3	4	5
25. When I'm upset, I feel guilty for feeling that way	1	2	3	4	5
26. When I'm upset, I have difficulty concentrating	1	2	3	4	5
27. When I'm upset, I have difficulty controlling my behaviors	1	2	3	4	5
28. When I'm upset, I believe that there is nothing I can do to make myself feel better	1	2	3	4	5
29. When I'm upset, I become irritated with myself	1	2	3	4	5
30. When I'm upset, I start to feel very bad about myself	1	2	3	4	5
31. When I'm upset, I believe that wallowing in it is all I can do	1	2	3	4	5
32. When I'm upset, I lose control over my behaviors	1	2	3	4	5
33. When I'm upset, I have difficulty thinking about anything else	1	2	3	4	5

Instructions: Please indicate **how often** the following 36 statements apply to you by selecting the appropriate number (1-5). Please refer to the scale below:

1 = Almost Never (0-10%); 2 = Sometimes (11-35%); 3 = About half the time (36-65%); 4 = Most of the time (66-90%); 5 = Almost Always (91-100%)

34. When I'm upset, I take time to figure out what I'm really feeling	**1**	**2**	**3**	**4**	**5**
35. When I'm upset, it takes me a long time to feel better	1	2	3	4	5
36. When I'm upset, my emotions feel overwhelming	1	2	3	4	5

Appendix G

Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form (Q-LES-Q-SF)

Instructions: Taking everything into consideration, during the past week how satisfied have you been with your……

	Very Poor	Poor	Fair	Good	Very Good
.....physical health?	1	2	β	4	5
.....mood?	1	2	3	4	5
.....work?	1	2	3	4	5
.....household activities?	1	2	3	4	5
.....social relationships?	1	2	3	4	5
.....family relationships?	1	2	3	4	5
.....leisure time activities?	1	2	3	4	5
.....ability to function in daily life?	1	2	3	4	5
.....sexual drive, interest and/or performance?*	1	2	3	4	5
.....economic status?	1	2	3	4	5
.....living/housing situation?*	1	2	3	4	5
.....ability to get around physically without feeling dizzy or unsteady or falling?*	1	2	3	4	5
.....your vision in terms of ability to do work or hobbies?*	1	2	3	4	5
.....overall sense of well being?	1	2	3	4	5

Appendix H

Rosenberg Self-Esteem Scale

Instructions: Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

1. On the whole, I am satisfied with myself.

Strongly Agree Agree Disagree Strongly Disagree

2. At times I think I am no good at all.

Strongly Agree Agree Disagree Strongly Disagree

3. I feel that I have a number of good qualities.

Strongly Agree Agree Disagree Strongly Disagree

4. I am able to do things as well as most other people.

Strongly Agree Agree Disagree Strongly Disagree

5. I feel I do not have much to be proud of.

Strongly Agree Agree Disagree Strongly Disagree

6. I certainly feel useless at times.

Strongly Agree Agree Disagree Strongly Disagree

7. I feel that I'm a person of worth, at least on an equal plane with others.

Strongly Agree Agree Disagree Strongly Disagree

8. I wish I could have more respect for myself.

Strongly Agree Agree Disagree Strongly Disagree

9. All in all, I am inclined to feel that I am a failure.

Strongly Agree Agree Disagree Strongly Disagree

10. I take a positive attitude toward myself.

Strongly Agree Agree Disagree Strongly Disagree

Appendix I

Eating Disorder Examination (EDE) – edited

TIME ORIENTATION. **Interviewer**: I would like you to think about the past 3 months. To orient you to the past three months, I would like you to tell me some events that were going on in your life during that time.

3 months ago: Tell me some things that were going on in your life 3 months ago, so from *start of 3 months ago* to *start of 2 months ago*

Write down events:

2 months ago: Tell me some things that were going on in your life 2 months ago, so from *start of 2 months ago* to *start of 1 months ago*

Write down events:

Past month: Tell me some things that were going on in your life this past month, so from *start of 1 months ago* to today.

Write down events:

INTRODUCTORY QUESTIONS. **Interviewer**: To begin with I would like to get a general picture of your eating habits over the last month (4 weeks). What has been your usual eating pattern?

Have your eating habits varied much from day to day?

Have weekdays differed from weekends?

Have there been days when you haven't eaten anything?

What about the previous two months (specify months)… were your eating habits much the same or were they different?

PATTERN OF EATING: Interviewer: I would like to ask about your pattern of eating. Over the past four weeks which of these meals or snacks have you eaten on a regular basis?

- Breakfast [ ]
- Mid-morning snack [ ]
- Lunch (mid-day meal) [ ]
- Mid-afternoon snack [ ]
- Evening meal [ ]

- Evening snack [ ]
- Nocturnal eating (i.e., an episode of eating after the participant has been to sleep) [ ]

Scoring the meals/snacks:

0 – meal/snack not eaten
1 – meal/snack eaten on 1-5 days
2 - meal/snack eaten on less than half the days (6 – 12 days)
3 - meal/snack eaten on half the days (13 - 15 days)
4 - meal/snack eaten on more than half the days (16 – 22 days)
5 - meal/snack eaten almost every day (23 to 27 days)
6 – meal/snack eaten every day

LOC EATING QUESTION. **Interviewer:** In the past 3 months have you had an eating episode where you felt out of control when you were eating? (if participant needs more clarification about LOC: a time when you felt driven or compelled to eat, like you couldn't stop eating once you had started even if you had wanted to, or unable to stop an eating episode from occurring even though you wanted to).

Interviewer determines YES or NO

TYPICAL EATING EPISODE. **Interviewer**: Think about a typical meal that you have eaten in the past 3 months. By typical, I mean an eating episode that consisted of a typical amount and of a typical type of food for you. This eating episode should also be one in which you did NOT feel out of control while eating.

(Interviewer writes down specific amounts and types of food consumed)

5-INDICATOR QUESTIONS: During this episode did you:

(1) eating much more rapidly than normal [ ]
(2) eating until feeling uncomfortably full [ ]
(3) eating large amounts of food when not feeling physically hungry [ ]
(4) eating alone because of feeling embarrassed by how much one is eating [ ]
(5) feeling disgusted with oneself, depressed, or very guilty afterward [ ]

Describe a typical snack that you have eaten in the past 3 months.

(Interviewer writes down specific amounts and types of food consumed)

5-INDICATOR QUESTIONS: During this episode did you:

(1) eating much more rapidly than normal [ ]
(2) eating until feeling uncomfortably full [ ]

(3) eating large amounts of food when not feeling physically hungry [ ]
(4) eating alone because of feeling embarrassed by how much one is eating [ ]
(5) feeling disgusted with oneself, depressed, or very guilty afterward [ ]

Now I want you to think about a time in the past 3 months when you ate a meal that you thought was large and you did NOT feel out of control while eating.

(Interviewer writes down specific amounts and types of food consumed)

Did you think this amount of food was a large amount of food? YES or NO

Do you think other people would think that this was a large amount of food? YES or NO

5-INDICATOR QUESTIONS: During this episode did you:

(1) eating much more rapidly than normal [ ]
(2) eating until feeling uncomfortably full [ ]
(3) eating large amounts of food when not feeling physically hungry [ ]
(4) eating alone because of feeling embarrassed by how much one is eating [ ]
(5) feeling disgusted with oneself, depressed, or very guilty afterward [ ]

Interviewer double checks whether the participant has or has not had LOC eating in the past 3 months. If not, the interview is done. Interviewer thanks them for their time and assigns SONA credit.

LOC EATING. **Interviewer**: Over the past 3 months, have you had a time when you felt your eating was out of control AND you had eaten what you thought was a large amount of food? [Subjectively large].

(Interviewer writes down specific amounts and types of food consumed)

Do you think other people would think this is a large amount of food? YES or NO

Do you think other people would think this is a small-average amount of food? YES or NO

5-INDICATOR QUESTIONS: During this episode did you:

(1) eating much more rapidly than normal [ ]
(2) eating until feeling uncomfortably full [ ]
(3) eating large amounts of food when not feeling physically hungry [ ]
(4) eating alone because of feeling embarrassed by how much one is eating [ ]
(5) feeling disgusted with oneself, depressed, or very guilty afterward [ ]

(If participant says that others thought it was large): Have you had a time in the past 3 months where you felt your eating was out of control, you thought you had eaten a large amount of food, and others would think it was a small-average amount of food? [OBE discordance]

(Interviewer writes down specific amounts and types of food consumed)

5-INDICATOR QUESTIONS: During this episode did you:

(1) eating much more rapidly than normal [ ]
(2) eating until feeling uncomfortably full [ ]
(3) eating large amounts of food when not feeling physically hungry [ ]
(4) eating alone because of feeling embarrassed by how much one is eating [ ]
(5) feeling disgusted with oneself, depressed, or very guilty afterward [ ]

(If participant says that others thought it was small-average): Have you had a time in the past 3 months where you felt your eating was out of control, you thought you had eaten a large amount of food and others think it was a large amount of food? [OBE congruent]

(Interviewer writes down specific amounts and types of food consumed)

5-INDICATOR QUESTIONS: During this episode did you:

(1) eating much more rapidly than normal [ ]
(2) eating until feeling uncomfortably full [ ]
(3) eating large amounts of food when not feeling physically hungry [ ]
(4) eating alone because of feeling embarrassed by how much one is eating [ ]
(5) feeling disgusted with oneself, depressed, or very guilty afterward [ ]

Interviewer: Over the past 3 months, have you had a time when you felt your eating was out of control AND you had eaten what you thought was a small-average amount of food? [Subjectively small-medium].

(Interviewer writes down specific amounts and types of food consumed)

Do you think other people would think this is a large amount of food? YES or NO

Do you think other people would think this is a small-average amount of food? YES or NO

5-INDICATOR QUESTIONS: During this episode did you:

(1) eating much more rapidly than normal [ ]
(2) eating until feeling uncomfortably full [ ]
(3) eating large amounts of food when not feeling physically hungry [ ]
(4) eating alone because of feeling embarrassed by how much one is eating [ ]
(5) feeling disgusted with oneself, depressed, or very guilty afterward [ ]

(If participant says that others thought it was large): Have you had a time in the past 3 months where you felt your eating was out of control, you thought you had eaten a small-average amount of food, and others would think it was a small-average amount of food? [SBE congruent]

(Interviewer writes down specific amounts and types of food consumed)

5-INDICATOR QUESTIONS: During this episode did you:

(1) eating much more rapidly than normal [ ]
(2) eating until feeling uncomfortably full [ ]
(3) eating large amounts of food when not feeling physically hungry [ ]
(4) eating alone because of feeling embarrassed by how much one is eating [ ]
(5) feeling disgusted with oneself, depressed, or very guilty afterward [ ]

(If participant says that others thought it was small-average): Have you had a time in the past 3 months where you felt your eating was out of control, you thought you had eaten a small-average amount of food and others think it was a large amount of food? [SBE discordance]

(Interviewer writes down specific amounts and types of food consumed)

5-INDICATOR QUESTIONS: During this episode did you:

(1) eating much more rapidly than normal [ ]
(2) eating until feeling uncomfortably full [ ]
(3) eating large amounts of food when not feeling physically hungry [ ]
(4) eating alone because of feeling embarrassed by how much one is eating [ ]
(5) feeling disgusted with oneself, depressed, or very guilty afterward [ ]

Interviewer thanks participant for their time and gives them appropriate SONA credit.

Appendix J

Loss of Control over Eating Scale (LOCES)

Instructions: In the last 4 weeks (28 days), how often have you had the following experiences during a time when you were eating? Please respond to each item using the following scale:

1	2	3	4	5
Never	Rarely	Occasionally	Often	Always

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.

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