Subjective and Objective Binge Eating in Relation to Eating Disorder Symptomatology, Negative Affect, and Personality Dimensions

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Abstract

Objective—The current study explored the clinical meaningfulness of distinguishing subjective (SBE) from objective binge eating (OBE) among individuals with threshold/subthreshold bulimia nervosa (BN). We examined relations between OBEs and SBEs and eating disorder symptoms, negative affect, and personality dimensions using both a group comparison and a continuous approach.

Method—Participants were 204 adult females meeting criteria for threshold/subthreshold BN who completed questionnaires related to disordered eating, affect, and personality.

Results—Group comparisons indicated that SBE and OBE groups did not significantly differ on eating disorder pathology or negative affect, but did differ on two personality dimensions (cognitive distortion and attentional impulsivity). Using the continuous approach, we found that frequencies of SBEs (not OBEs) accounted for unique variance in weight/shape concern, diuretic use frequency, depressive symptoms, anxiety, social avoidance, insecure attachment, and cognitive distortion.

Discussion—SBEs in the context of BN may indicate broader areas of psychopathology.

Keywords

subjective binge eating; objective binge eating; affect; personality; bulimia nervosa

Since the first recognition of bulimia nervosa (BN) as defined in the *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition[1], the binge eating component of BN has been defined by two criteria: 1) size of the eating episode is "objectively large," and 2) loss

of control is present during the eating episode. These same criteria have been consistently used to define binge eating in BN in each updated version of the DSM[2–3], as well as to define the binge eating that occurs as part of Binge Eating Disorder (BED), a diagnosis under study in DSM-IV that will likely be adopted into DSM-5. This definition is built on the assumption that both of these criteria (i.e., objectively large and loss of control) are clinically significant pieces of information and that both are required to constitute a conceptualization of binge eating as a problematic eating pattern.

The Eating Disorder Examination (EDE)[4], a widely used and validated semi-structured interview for determining eating disorder diagnoses, was designed based on this aforementioned assumption in that individuals are specifically asked to report the number of episodes over the past 28 days when both of these criteria (i.e., large amount of food and sense of loss of control) were met; such episodes can be referred to as objective binge eating episodes (OBEs). In addition to OBEs, the EDE also asks individuals to report the number of episodes over the past 28 days in which loss of control during eating was experienced *without* the individual having eaten an objectively large amount of food, even though the individual subjectively perceives the amount of food as being large; such episodes are understood as subjective binge eating episodes (SBEs). Of note, the EDE labels these two eating experiences as objective and subjective bulimic episodes; however, in the current paper, we use the terms objective binge eating episode and subjective binge eating episode in order to emphasize the binge eating component of bulimic behavior. The assessment of SBEs in the EDE was not indicated by the diagnostic criteria for BN and BED in the DSM. However, it was clearly considered clinically relevant to include an assessment of these eating experiences. One reason that SBE assessment may have been included in the EDE was Fairburn's[5] observation that SBEs were common among individuals with anorexia nervosa (AN). Recent work has begun to explicitly consider SBEs in relation to eating pathology and broader distress.[6] The current paper examines the clinical meaningfulness of distinguishing OBEs from SBEs in terms of eating pathology, negative affect, and personality dimensions. More specifically, by examining OBEs and SBEs jointly, we aim to better understand the nuanced ways in which the two behaviors operate among individuals with BN.

Multiple studies[7–11] have shown that objectively large binge eating is fairly common in nonclinical samples. For example, among a nonclinical, random sample of 1000 females, 122 (12.2%) were found to meet diagnostic criteria for binge eating, defined using OBE criteria.[12] Katzman, Wolchik, and Braver[13] found that 49% of a college sample including both males and females reported having engaged in objective binge eating at some point across the lifespan. Additionally, there is evidence that rates of weekly OBEs have increased in a general population sample of men and women from 3.1% of a sample drawn in 1995 to 7.2% of a sample drawn in 2005.[13]

Far less work has investigated the prevalence of SBEs, both on their own and in comparison to OBEs. Luce, Crowther, and Pole[15], however, explicitly assessed both OBE and SBE rates among a sample of undergraduate females, finding that SBEs were more common than OBEs: 16.7% of the sample reported engaging in SBEs regularly and 6.4% reported engaging in OBEs regularly, with "regularly" defined as occurring at least once per week over the past month. Goossens, Soenens, and Braet[16] also found a high occurrence of SBEs in their community sample of male and female adolescents, as 9.3% reported having engaged in SBEs only, 4.8% reported having engaged in OBEs only, and 2.6% reported having engaged in both behaviors (all of these behaviors were assessed over the past 28 days). Additionally, in a clinical sample of treatment seeking individuals with BN, anorexia nervosa binge/purge subtype, or eating disorder not otherwise specified involving bingeing and purging behaviors, Kerzhnerman and Lowe[17] reported that 5% of their sample engaged

in only SBEs, while 10% of their sample engaged in only OBEs, indicating that most engaged in both types of binge eating.

Other studies have examined prevalence of loss of control over eating, the feature shared by OBEs and SBEs. For example, Tanofsky-Kraff, Faden, Yanovski, Wilfley, and Yanovski[18] found that 29.5% of non-treatment seeking overweight youth between 6 and 14 years of age reported at least one episode of loss of control eating in their lifetime, while Eddy, Tanofsky-Kraff, Thompson-Brenner, Herzog, Brown, and Ludwig[19] found that over one-third of a treatment seeking sample of overweight youth between 8 and 18 years of age reported loss of control eating in the past three months. Additionally, Colles, Dixon, and O'Brien[20] found that 31% of a sample of adult pre-bariatric surgery patients reported uncontrolled eating experiences. Thus, when SBEs or loss of control as a characteristic of eating experiences are examined, findings suggest that they are relatively common, in both clinical and non-clinical samples, and in need of further study.

Researchers have begun to focus on SBEs in several ways. Using a clinical sample, Niego, Pratt, and Agras[21] collected daily diaries of food intake among a sample of women undergoing treatment for BED, and found that size of the binge (i.e., SBE or OBE) had no relation to psychopathology (i.e., depression, interpersonal problems, general psychological distress). Interestingly, they found that frequency of OBEs decreased with treatment faster than frequency of SBEs, suggesting a tenacious quality of SBEs that may make them more resistant to intervention. This finding could also be related to conversion from OBEs to SBEs across recovery.

Other studies have explored group differences between individuals who only engage in SBEs versus those who only engage in OBEs. Goossens and colleagues[16] found that when comparing adolescents from a community sample who had only engaged in SBEs with those who had only engaged in OBEs over the past month, no significant differences were found in terms of eating disorder psychopathology, depression, or global self worth. Mond et al.[6] also did not find group differences between individuals regularly experiencing OBEs (i.e., at least weekly) and individuals regularly experiencing SBEs when examining a wide array of variables including eating pathology, general psychological distress, and functional impairment in a sample with bulimic-type eating disorders. Keel, Mayer, and Harnden-Fischer[22] also examined OBEs and SBEs in the context of a bulimic presentation. They did not find differences between a group meeting criteria for BN (i.e., engagement in OBEs at a rate of at least 2x/week) and a group that would have met criteria except that they only engaged in SBEs, in terms of aspects of dietary restraint or general psychopathology (i.e., negative affect, substance abuse), but they did find that the SBE-only group had lower rates of purging and lower levels of impulsivity. These studies frequently conclude that it may be the loss of control component of binge eating, rather than the quantity of food consumed, that is most related to psychopathology.

One way to add to our understanding of the possible unique contributions of these eating behaviors is to consider OBEs and SBEs as continuous variables. Latner, Hildebrandt, Rosewall, Chisholm, and Hayashi[23] began examining this, finding that in a community sample of women, frequencies of both OBEs and SBEs accounted for unique variance in overall eating disorder psychopathology, but that only OBEs (and not SBEs) accounted for unique variance in a measure of general psychopathology focused on depressive and anxiety symptomatology. Using a similar approach, Latner, Vallance, and Buckett[24] found that SBEs (and not OBEs) accounted for unique variance in health-related quality of life in a sample of females with a range of eating disorders. To the authors' knowledge, these are the only studies that have examined these two types of binge eating jointly on a continuous level in relation to eating disorder symptoms, general psychopathology, and health-related quality

of life, and thus more research is needed to clarify the unique, continuous relations of OBEs and SBEs to psychopathology.

The current study explored the clinical meaningfulness of distinguishing SBEs from OBEs among individuals with threshold/subthreshold BN. In particular, we examined OBEs and SBEs in relation to eating disorder symptomatology, negative affect, and personality dimensions. As such, the current study expands upon the limited literature that has jointly examined OBEs and SBEs and further extends this research by investigating personality dimensions in our analyses. We also make a contribution by examining OBEs and SBEs using two analytic approaches. First, following the approach of Mond et al.[6], we examined group differences between those who regularly engaged in only SBEs and those who regularly engaged in only OBEs. Second, following the approach of Latner and colleagues[23–24], we explored whether frequencies of OBEs and SBEs as continuous variables uniquely accounted for variance in eating disorder symptoms, negative affect, and personality dimensions.

Based upon the findings of former studies, we hypothesized that there would be few (if any) significant differences in the SBE/OBE group comparisons in terms of the dependent variables of eating pathology, negative affect, and personality.[6, 22] With regard to the continuous approach, we hypothesized that frequencies of SBEs and OBEs would each uniquely account for variance in most eating pathology and that, in line with the findings of Latner et al.[23], frequency of OBEs would uniquely account for variance in negative affect. Further, we hypothesized that SBEs would account for greater unique variance in dietary restraint than OBEs given their representation in AN as noted by Fairburn.[5] Lastly, in the relatively unexplored realm of personality, we hypothesized that SBEs would account for unique variance in cognitive distortion (one of the personality dimensions of interest) and that cognitive distortion would be higher among the SBE-only group given the inaccurate perception of having eaten a large amount of food that characterizes SBEs.

Method

Participants

Participants were 204 adult women recruited through community advertising and eating disorder clinics in five Midwestern cities in 2002–2003. Inclusion criteria included female sex, age range of 18–65 years, and the presence of binge eating and purging behavior. Based upon a telephone interview, 144 (71%) met full diagnostic criteria for BN according to the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition[3], and 60 (29%) met criteria for subthreshold BN, defined as (a) objective binge eating (OBE) and compensatory behavior occurring at least once per week over the past three months, or (b) compensatory behavior occurring at least once per week along with subjective binge eating (SBE). Individuals with threshold versus subthreshold BN were similar in terms of severity of eating pathology as indicated by similar scores on subscales on the EDE-Q (besides the eating concern subscale).[25]

Mean age of participants was 25.7 years (SD = 8.8 years). The majority of participants were single and had never been married (75%), self-identified as Caucasian (n = 185, 90.7%; Asian: n = 7, 3.4%; Black: n = 5, 2.5%; Hispanic: n = 3, 1.5%; other races/ethnicities: n = 4, 2.0%), and had at least some college education (93%). Based upon self-reported weight and height, mean body mass index (BMI) was 22.90 kg/m^2 (SD = 5.23).

Procedure

Trained interviewers administered a telephone interview that included the eating disorder module from the Structured Clinical Interview for DSM-IV, Patient Edition (SCID-P)[26] in

order to screen for eligible participants. Interviewers used criteria for binge eating established in the EDE[27] to determine if reported food portions during binges were objectively large in amount. Participants who met current DSM-IV diagnostic criteria for threshold or subthreshold BN were invited to participate in the study and scheduled for an appointment where they provided informed consent, completed a set of questionnaires, and received $50 compensation for their participation. The Institutional Review Boards at each study site approved this study.

Measures

Diagnostic eligibility—The SCID-P Eating Disorder Module[26] was used during the phone screen in order to determine diagnostic eligibility. The SCID-P is a widely used semi-structured interview that assesses the presence of Axis I disorders.

Eating disorder symptoms—The Eating Disorder Examination Questionnaire (EDE-Q)[27] was used to assess eating disorder symptoms. The EDE-Q is a 36-item self-report survey adapted from the Eating Disorder Examination (EDE) interview.[4] It assesses psychological symptoms of eating disorders, yielding subscales of restraint, eating concern, weight concern, and shape concern, as well as a total score, which indicates level of global eating disorder psychopathology. The EDE-Q also includes questions about frequency of binge eating episodes (OBEs and SBEs) and compensatory behaviors (vomiting, laxative use, diuretic use, hard exercise) over the past 28 days. Construct validity has been demonstrated by high correlations between the EDE-Q and the EDE subscales ranging from 0.78 to 0.85.[27] In the present study, subscale coefficient alphas ranged from 0.72 to 0.83.

Negative affect—Negative affect was assessed using two measures. Anxiety was assessed using the Spielberger Trait Anxiety Inventory (STAI)[28], which is a 20-item inventory using a 4-point response scale ranging from *almost never* to *almost always*. The STAI has been found to have good convergent validity as demonstrated by moderate correlations with other measures of anxiety. [28–29] Further, the STAI has been found to differentiate between individuals with and without anxiety disorders.[30] The STAI has high internal consistency, as indicated by alphas greater than 0.90 in prior work.[31] In the current study, coefficient alpha for the STAI was 0.94.

Depression was assessed using the Inventory for Depressive Symptomatology–Self-Report (IDS-SR)[32], a 30-item self-report measure of depressive symptomatology with higher scores indicating a more severe presentation. The IDS has moderately high internal consistency (coefficient alpha of 0.85) in prior work, and construct validity has been demonstrated via scores of individuals in treatment for depression being significantly higher than scores for those in treatment for other diagnoses.[32] In the current study, coefficient alpha for the IDS-SR was 0.90.

Personality dimensions—Aspects of personality were assessed using two measures. The Dimensional Assessment of Personality Problems-Basic Questionnaire (DAPP-BQ)[33] is a 290-item self-report questionnaire with 18 factors. The factors of particular interest in the current study were cognitive distortion, social avoidance, affective lability, and insecure attachment. The cognitive distortion factor reflects a sense of things seeming unreal and/or imagined, the social avoidance factor reflects the tendency to be alone and to experience discomfort while with others, the affective lability factor reflects emotionality and fluctuating affect, and the insecure attachment factor reflects consistent worry of abandonment and loss of loved ones.

These factors were identified because of an interest in aspects of personality related to interpersonal functioning (i.e., social avoidance and insecure attachment) and emotion processing (i.e., affective lability), and an interest in how the misperception of having eaten a large amount of food might be related to cognitive distortion. The DAPP-BQ has acceptable psychometric properties with internal consistency coefficients ranging from 0.83 to 0.94, and test-retest reliability over a 3-week period from 0.81 to 0.93.[34] Good validity has been demonstrated by high convergence between the DAPP-BQ and the Schedule for Nonadaptive and Adaptive Personality (SNAP).[35] In the current study, these four factors had coefficient alphas ranging from 0.91 to 0.93.

The Barratt Impulsivity Scale (BIS-11)[36] is a 30-item scale measuring trait impulsivity as represented in three subscales: motor, non-planning, and attention. Validity of the BIS-11 has been demonstrated by clear differences in scores on the BIS-11 between healthy controls and individuals with current drug abuse; this indicates a relationship between scores on the measure and observable impulsive behavior.[37] A recent study of the BIS-11 found satisfactory internal consistency (Cronbach's alpha of 0.83) and test-retest reliability for a non-clinical sample.[38] In the current study, subscale coefficient alphas for the BIS-11 ranged from 0.65 to 0.75.

Data Analytic Plan

The current study used two analytic approaches to explore the clinical meaningfulness of distinguishing OBEs from SBEs. First, we examined group differences between those who regularly engaged in only OBEs and those who regularly engaged in only SBEs in terms of the dependent variables of eating disorder symptoms, negative affect, and personality dimensions. For this approach, we grouped study participants into one of four mutually exclusive groups: regular-OBE (but not regular SBE), regular-SBE (but not regular OBE), regular-OBE and SBE, and regular-neither. "Regular" was defined as engaging in the behavior at least one time per week over the past 28 days, resulting in at least four episodes of the behavior as reported on the EDE-Q for the past month. This grouping approach is equivalent to that used by Mond et al.[6] We then compared the regular-OBE and regular-SBE groups using multivariate analyses of variance (MANOVA) for each conceptual grouping of dependent variables: the four subscales of the EDE-Q for broad eating pathology; the frequencies of vomiting, laxative use, diuretic use, and hard exercise for compensatory behaviors; the STAI and IDS-SR as the two measures of negative affect; the two personality factors related to interpersonal functioning from the DAPP-BQ; and the three subscales of the BIS-11 for impulsivity. Significant multivariate findings were followed up with univariate analyses of variance (ANOVA) for each specific dependent variable of interest (e.g., attentional impulsivity, social avoidance, STAI). The personality dimensions of affective lability and cognitive distortion were investigated using ANOVA. The regular-OBE and SBE and regular-neither groups were not statistically compared to the other groups due to the nature of our research question and sample size differences; however, descriptive data for the regular-OBE and SBE and regular-neither groups are presented alongside the two groups of particular interest (regular-OBE and regular-SBE groups).

For the second approach, we explored whether frequencies of OBEs and SBEs, as continuous independent variables, accounted for unique variance in the dependent variables of eating disorder symptoms, negative affect, and personality dimensions. In this approach, we used multiple regression and, for each dependent variable, entered the continuous variables of OBEs and SBEs (i.e., frequencies in the past 28 days) as a set to determine variance accounted for by each eating episode above and beyond the other. Of note, the full sample ($N = 204$) was used in the analyses involving regression analyses.

Of note, controlling for BMI and age resulted in the same general pattern of findings for both analytic approaches and thus, results are reported without these covariates for parsimony.

Results

Descriptive Analyses

Categorizing participants by regular (i.e., at least weekly) OBEs and SBEs yielded the following groups: 40 meeting criteria for regular OBE only, 28 for regular SBE only, 117 for both regular OBE and regular SBE and 19 for neither regular OBE nor regular SBE. Individuals met criteria for the neither group for two possible reasons: 1) they reported engaging in OBEs or SBEs, but neither at the required frequency of once per week on average over the past 28 days ($n = 13$), or 2) they endorsed binge eating (OBE or SBE) during the SCID screening interview for inclusion into the study, but at the data collection that occurred at a different time point than the phone screen (e.g., two weeks later), when reporting over the past 28 days, they reported no episodes of binge eating ($n = 6$). No significant group differences were found for age, BMI, race, marital status, or education level between the OBE-only and SBE-only groups ($ps > .411$). For the OBE only group, mean frequencies of 12.90 ($SD = 12.86$) for OBEs and 0.95 ($SD = 1.20$) for SBEs were reported over the past 28 days. For the SBE only group, mean frequencies of 0.79 ($SD = 1.07$) for OBEs and 14.07 ($SD = 7.16$) for SBEs were reported over the past 28 days. The correlation between number of OBEs and SBEs across the whole sample was .45, indicating that they were clearly related, but also distinct constructs.

Approach One: Group Comparisons

Few significant differences were observed between the OBE-only and SBE-only groups (see Table 1). Regarding eating disorder symptoms, there were no significant differences in the total EDE-Q score, the EDE-Q subscale scores as a set, or the frequencies of compensatory behaviors. There was also no significant difference in overall negative affect between the two groups.

Regarding personality dimensions, there was no group difference in interpersonal difficulties (i.e., social avoidance and insecure attachment). However, there was a significant group difference in dimensions of impulsivity, $F(3,64) = 3.42$, Wilks' Lambda $= .862$, $p = .022$. This significant MANOVA finding was followed up with individual ANOVA tests to see which subscales of impulsivity were significantly different between the groups. Only attentional impulsivity emerged as significantly different across groups ($F(1, 66) = 6.06$, $p = .016$), with the SBE-only group reporting greater attentional impulsivity ($m = 2.62$) than the OBE-only group ($m = 2.35$). There was a trend toward groups differing in affective lability with the SBE-only group reporting greater affective lability ($m = 58.75$) than the OBE-only group ($m = 54.38$), $F(1, 66) = 3.28$, $p = .075$. Additionally, a significant group difference in cognitive distortion was found with the SBE-only group ($m = 58.75$) reporting greater cognitive distortion than the OBE-only group ($m = 53.47$), $F(1, 66) = 4.93$, $p = .030$.

Approach Two: Regression Analyses

Eating disorder symptoms—Overall, as a set, frequencies of OBEs and SBEs over the past 28 days significantly accounted for variance in global eating disorder psychopathology, $F(2, 200) = 7.33$, $p = .001$, $R^2 = .07$; however, only frequency of SBEs ($= .26$, $p = .001$), but not OBEs ($= .01$, $p = .894$), accounted for a significant amount of unique variance in global eating disorder psychopathology. Results of the unique contributions of frequencies of OBEs and SBEs in the regression analyses involving the EDE-Q subscales and compensatory behaviors are presented in Table 2. As a set, the frequencies of OBEs and

SBEs over the past 28 days significantly accounted for variance in both weight concern ($F(2, 201) = 5.95$, $p = .003$, $R^2 = .06$) and shape concern ($F(2, 201) = 5.96$, $p = .003$, $R^2 = .06$); however, in both cases, the frequency of SBEs, but not the frequency of OBEs, accounted for a significant amount of unique variance in these body dissatisfaction constructs. Frequencies of OBEs and SBEs over the past 28 days also accounted for a significant amount of variance in eating concern, $F(2, 200) = 11.21$, $p < .001$, $R^2 = .10$; in this case, both frequency of SBEs and OBEs significantly accounted for unique variance in eating concern. Frequencies of OBEs and SBEs did not account for a significant amount of variance in restraint, $F(2, 201) = 1.41$, $p = .248$.

Regarding compensatory behaviors, frequencies of OBEs and SBEs over the past 28 days accounted for a significant amount of variance in the number of vomiting episodes over the same time period, $F(2, 200) = 97.42$, $p < .001$, $R^2 = .49$, with both frequencies of SBEs and OBEs significantly accounting for unique variance in vomiting frequency. Frequencies of OBEs and SBEs did not account for significant variance in the frequencies of laxative use ($F(2, 201) = 1.32$, $p = .269$) or hard exercise ($F(2, 201) = .30$, $p = .743$). However, there was a trend toward the set of OBE and SBE frequencies accounting for significant variance in the number of diuretic use episodes over the past 28 days, $F(2, 200) = 2.62$, $p = .075$, $R^2 = .03$, with only SBEs, but not OBEs, accounting for a significant amount of unique variance in diuretic use frequency.

Negative affect—The frequencies of OBEs and SBEs over the past 28 days significantly accounted for variance in trait anxiety as measured by the STAI, $F(2, 201) = 4.80$, $p = .009$, $R^2 = .05$; however, only frequency of SBEs (= .19, $p = .015$), but not OBEs (= .05, $p = .560$), accounted for a significant amount of unique variance in trait anxiety. Similarly, frequencies of OBEs and SBEs over the past 28 days significantly accounted for variance in depression as measured by the IDS, $F(2, 200) = 5.46$, $p = .005$, $R^2 = .05$. Again, only frequency of SBEs (= .20, $p = .010$), but not OBEs (= .05, $p = .498$), accounted for a significant amount of unique variance in depression.

Personality dimensions—Results of the unique contributions of frequencies of OBEs and SBEs in the regression analyses involving personality dimensions are presented in Table 4. As a set, the frequencies of OBEs and SBEs over the past 28 days significantly accounted for variance in insecure attachment, $F(2, 200) = 6.60$, $p = .002$, $R^2 = .06$; however, only frequency of SBEs, but not OBEs, accounted for a significant amount of unique variance in insecure attachment. Frequencies of OBEs and SBEs over the past 28 days did not significantly account for variance in social avoidance ($F(2, 200) = 2.40$, $p = .093$, $R^2 = .02$), affective lability ($F(2, 200) = 1.02$, $p = .363$, $R^2 = .01$), or cognitive distortion ($F(2, 200) = 2.13$, $p = .121$, $R^2 = .02$). In spite of overall non-significance when OBE and SBE were considered jointly, frequency of SBEs individually accounted for a significant amount of unique variance in cognitive distortion and social avoidance.

The frequencies of OBEs and SBEs over the past 28 days did not account for unique variance in any of the impulsivity components as assessed by the BIS-11: motor ($F(2, 201) = .35$, $p = .704$), non-planning ($F(2, 201) = 1.09$, $p = .340$), and attention ($F(2, 201) = 1.31$, $p = .272$) (see Table 4).

Discussion

This study examined the clinical meaningfulness of distinguishing OBEs from SBEs. We did so using two approaches: one examining group differences between those who engage in only OBEs versus only SBEs, the other examining the unique contributions of these two

types of binge eating, as continuous constructs, on eating disorder symptoms, negative affect, and personality dimensions.

There were few significant differences between those who engaged in only OBEs versus only SBEs. We found that levels of eating disorder symptoms (restraint, eating concern, weight concern, and shape concern), frequencies of compensatory behaviors (vomiting, laxative use, diuretic use, and hard exercise), and levels of negative affect (anxiety and depression symptoms) were all comparable between the two groups. Thus, individuals with a bulimic-type eating disorder who present with only SBEs may exhibit similar levels of various types of pathology as those who present with only OBEs, highlighting the clinical severity of presentations that only include SBEs. The only significant group differences were in the domain of personality. Attentional impulsivity and cognitive distortion were both found to be significantly greater among the SBE-only group, while affective lability was found to be marginally greater in the SBE-only group.

Findings are consistent with our preliminary hypothesis that the distorted perception of having eaten a large amount of food during SBEs would likely be related to elevated cognitive distortion among the SBE-only group. Many of the cognitive distortion items relate to a sense of dissociation from reality. This component of cognitive distortion in relation to SBE-only presentations is perplexing, and warrants further investigation into the potential relation of dissociative experience to SBE occurrence.

The attentional impulsivity subscale of the BIS-11 includes items relating to task focus and intrusive/racing thoughts. It is possible that the SBE-only group's elevated scores on attentional impulsivity are particularly related to the intrusive, distracting, and bothersome nature of thoughts about the amount of food consumed being too large. For example, individuals who have problems focusing and ignoring intrusive thoughts may be less likely to attend to the exact amount of food consumed, which in turn may facilitate a distorted and subjective sense of having eaten a large quantity. In contrast to the current study, Keel et al. (2001) found that an OBE-only group had elevated overall impulsivity on the BIS-11 than an SBE-only group. This discrepancy can perhaps be explained by the fact that we examined each subscale of the BIS-11 separately, while Keel et al. (2001) examined total impulsivity (which may be a different and less nuanced construct). That said, when we re-ran our analyses using the total impulsivity score, we found no significant difference between the OBE-only and SBE-only groups, $F(1, 66) = 0.43$, $p = .514$. Thus, we suggest that future research should further examine the role of different dimensions of impulsivity in each type of binge eating, to provide more nuanced information about these relations.

From the continuous analytic approach, when considering frequencies of SBEs and OBEs jointly as independent variables, we found that SBEs more often accounted for significant unique variance in the dependent variables. For example, frequency of SBEs, but not OBEs, accounted for unique variance in weight concern, shape concern, anxiety, depression, and insecure attachment. There were also some indications that SBEs, rather than OBEs accounted for unique variance in diuretic use frequency, social avoidance, and cognitive distortion. Frequencies of both SBEs and OBEs accounted for significant unique variance in eating concern and vomiting frequency. Of note, there were no dependent variables for which frequency of OBEs, but not SBEs, accounted for significant unique variance. Overall, such results may suggest a uniquely problematic nature of SBEs in that they may be considered markers of broader and more diffuse psychopathology.

The fact that both frequency of SBEs and OBEs accounted for unique variance in vomiting frequency may suggest that SBEs (and, not surprisingly, OBEs) are often accompanied by vomiting as a compensatory behavior. This provides further support for the notion that SBEs

in women with BN or subthreshold BN are clinically problematic behaviors that are associated with similar compensatory behaviors as OBEs. It also supports prior work indicating that SBEs may be of interest to study among individuals with purging disorder.[39] The purging behavior among individuals with purging disorder may be in the absence of OBEs, but not necessarily in the absence of SBEs.

It is not surprising that both SBEs and OBEs accounted for unique variance in eating concern given that both behaviors are forms of eating that often bring about distress. On the other hand, it is surprising that frequency of SBEs, but not OBEs, uniquely accounted for variance in body dissatisfaction constructs (EDE-Q weight and shape concerns), while neither behavior accounted for unique variance in dietary restraint. We hypothesized that SBEs would account for variance in dietary restraint based upon the common occurrence of SBEs among individuals with anorexia nervosa. The current finding is perhaps preliminary evidence that among individuals with BN, SBEs may in fact more related to body image disturbance than dietary restraint. It is also interesting to note that, contrary to the findings of Latner et al.[23], frequency of SBEs, but not OBEs, uniquely accounted for variance in both depression and anxiety. The fact that the current findings differ from Latner et al.[23] can possibly be explained by sample and measurement differences across the two studies. More specifically, Latner et al.[23] used a community sample that included individuals with clinical and subclinical eating disorders (both BED and BN diagnoses), as well as individuals without an eating disorder, while the current study specifically recruited individuals with only subthreshold/threshold BN; perhaps SBEs among those with BN operate differently than among the general and/or mixed eating disorder population. These findings, together with the findings related to shape and weight concern, begin to suggest that OBEs and SBEs may have different psychological functions for the individual.

Prior work has found that OBEs can be understood as maladaptive emotion regulation techniques in the moment.[40, 41] As such, OBEs may be behaviors used in order to manage or control one's momentary distressing symptoms and experiences (but not his/her overall negative affect tendencies supported by the lack of relation between OBEs and overall depressive/anxious feelings), while SBEs may be markers of more general, chronic distress (e.g., trait-level depressed or anxious feelings, weight and shape concerns), but may not be used as in-the-moment emotion regulation techniques. Given the discrepancy between the current study and Latner et al.[23] as noted above, further research must be done to explore whether SBEs can be understood as markers of broader psychopathology. In particular, the use of experience sampling methodology to explore the immediate functions of both of these binge eating behaviors could shed light on the question of function of each behavior.

Regarding personality dimensions, we also found that frequency of SBEs, and not OBEs, accounted for significant unique variance in several dimensions (i.e., insecure attachment, social avoidance, and cognitive distortion). Both social avoidance and insecure attachment are forms of interpersonal difficulties suggesting that elevated frequencies of SBEs may be a marker of interpersonal concerns. The finding that frequency of SBEs uniquely accounts for variance in cognitive distortion is not surprising given the distorted perception of how much food was consumed. Exploration of SBEs and OBEs in relation to personality is a new direction of research. Results presented in the current study can be considered preliminary, but indicative that further research is needed in this area.

The use of a clinical sample, multiple sites of data collection, and subthreshold cases were all strengths of the present study. Because we were interested in the clinical meaningfulness of distinguishing between OBEs and SBEs among individuals who struggle with these behaviors on a regular basis, a clinical sample was necessary. Multiple sites of data collection increased the generalizability of the study by introducing additional geographic

diversity to the sample. The inclusion of subthreshold cases allowed us to investigate SBEs in the absence of OBEs and also increased the clinical diversity of the sample and generalizability of the findings. Methodologically, another strength of the current study was the use of two analytic approaches. This allowed us to both compare diagnostic presentations (OBE-only versus SBE-only) and examine the two binge eating behaviors from a continuous perspective.

Regarding limitations, one limitation is the low statistical power to find significant group differences due to the relatively small sample sizes of the SBE-only and the OBE-only groups. For this reason, one must keep in mind that null findings may have been impacted by low power rather than by meaningful group similarities. Our null findings, however, replicate the nonsignificant group differences found by Mond et al.[6] with respect to eating disorder symptoms and distress. Another limitation is that the EDE-Q does not appear to assess SBEs as well as it assesses OBEs[41]. This limitation is likely due to the self-report nature of the EDE-Q, which involves participants making their own judgment as to whether or not the binge eating episode is objectively large without the assistance of an interviewer. Future research examining SBEs would potentially be improved by using the EDE, which is the interview that the EDE-Q is based on, as well as by developing and using a new self-report assessment, perhaps with examples of objectively large amounts of food, that would better assess SBEs. The current version of the EDE-Q no longer assesses number of SBEs or whether or not SBEs have occurred over the past 28 days, which further suggests the need for an alternative self-report method for assessing SBEs.

As noted by Mond et al.[6], future research should continue to assess OBEs, SBEs, and their correlates, antecedents, and consequences, in an effort to replicate and extend the findings reported here and elsewhere. [6, 23, 24] Given the relatively recent attention to SBEs, more theoretical work is necessary to conceptualize the role of SBEs and their relation to other eating disorder pathology and broader distress. Additionally, future research may benefit from using experience sampling methods to provide more detailed information on these constructs, how they may influence each other, and the similar versus unique effects and functions of OBEs and SBEs. Additionally, by combining experience sampling and assessment of trait-level factors, we can further explore whether or not it is the case that OBEs are more related to in-the-moment factors, while SBEs are more related to trait-level factors.

Future research could also assess SBEs in relation to purging disorder, a disorder that is currently included under the Eating Disorder Not Otherwise Specified diagnostic category, characterized by purging behavior in the absence of OBEs[3], thus allowing for the presence of SBEs in the absence of OBEs. Keel et al.[39] found that among their sample of individuals meeting criteria for purging disorder, the average number of SBEs engaged in over the past 28 days was 4.6. Future research could further explore the potential role of SBEs in the maintenance of purging disorder. Additionally, we suggest that future research examine SBEs among individuals with binge eating disorder.

The current findings highlight the importance of specifically targeting SBEs in treatment. Prior research has indicated that SBEs respond to treatment more slowly than OBEs[42], tend to persist following treatment for BN[43, 44], and do not typically respond well to the treatment strategy of self-monitoring among women with BN or BED[45] even though this strategy has been found to be effective for reducing OBEs.[46] Thus, methods other than those used for targeting OBEs may need to be utilized. For example, in targeting SBEs, clinicians may need to work with their clients on thinking more realistically about food amounts and on targeting the maladaptive cognitions that may lead to a sense of loss of control over eating (e.g., "having one slice of pizza will make me obese").[23, 47] Additionally, focusing on

those episodes that may not meet criteria for objective binge eating but that are associated with client distress and feeling out of control will likely lead clients to feel heard and understood, potentially decreasing the likelihood of treatment dropout and increasing the likelihood of treatment success. Also, given the current findings that SBEs seem to coincide with broader psychopathology and concerns (i.e., negative affect and interpersonal difficulties), treatments for individuals who report regular SBEs may be improved by targeting some of these other domains. Clinicians may be able to better manage the occurrence of SBEs via the management of these other related phenomena or at least closely monitor clients who engage in regular SBEs for these other difficulties.

In sum, from the group comparison approach, we ascertained that individuals with regular SBEs in the absence of regular OBEs had similar levels of eating disorder symptoms and negative affect when compared to individuals with regular OBEs in the absence of regular SBEs. In the realm of personality dimensions, however, it appeared that, in some domains, the SBE-only group likely experienced more difficulties. Therefore, results from the current study provide support for the notion that SBE-only presentations of subthreshold BN are likely clinically significant conditions worthy of similar levels of treatment and attention as those who may meet full criteria for BN with only OBEs. From the continuous approach, we ascertained that SBEs accounted for unique variance above and beyond frequencies of OBEs across diverse domains (eating disorder symptoms, negative affect, and personality). OBEs may be most related to momentary shifts in affect, whereas SBEs may be more related to trait-level affect-related phenomena.

Thus, the current study replicated past findings[6,16,22] that there are few differences between those who report having engaged in only SBEs versus only OBEs, and further found that SBEs seem to indicate body image concerns, personality difficulties, and negative affect more so than OBEs. We, therefore, suggest that while the distinction between SBEs and OBEs is clinically useful information to facilitate adaptation of interventions, this distinction should not be as heavily emphasized in diagnosis. It is clear that given the clinical severity of SBEs as related to a wide range of difficulties, more clinical attention should be paid to SBEs, and a combination of SBEs and compensatory behaviors should not be dismissed as subthreshold eating pathology. Clinicians and researchers are encouraged to continue to explore the ways in which OBEs and SBEs differ in terms of behavioral function for the individual in order to adapt treatments that successfully reduce both behaviors.

Acknowledgments

References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 3rd ed. Washington, DC: Author; 1980. (DSM-IV)

2. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 3rd ed., rev.. Washington, DC: Author; 1987. (DSM-III)

3. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th ed. Washington, DC: Author; 1994. (DSM-IV)

4. Fairburn, CG.; Cooper, Z. The eating disorder examination. In: Fairburn, CG.; Wilson, GT., editors. Binge eating: nature, assessment, and treatment. 12th ed. New York: The Guilford Press; 1993. p. 317-360.

5. Fairburn C. The management of bulimia nervosa and other binge eating problems. Advances in Psychiatric Treatment. 1997; 3:2–8.

6. Mond JM, Latner JD, Hay PH, Owen CC, Rodgers BB. Objective and subjective bulimic episodes in the classification of bulimic-type eating disorders: Another nail in the coffin of a problematic distinction. Behavior Research and Therapy. 2010; 48:661–669.

7. Alegria M, Woo M, Cao Z, Torres M, Meng X, Striegel-Moore R. Prevalence and correlates of eating disorders in Latinos in the United States. International Journal of Eating Disorders. 2007; 40:515–521. [PubMed: 17607696]

8. Bruce B, Agras WS. Binge eating in females: A population-based investigation. International Journal of Eating Disorders. 1992; 7:115–119.

9. Decaluwe V, Braet C. Prevalence of binge eating in obese children and adolescents seeking weight-loss treatment. International Journal of Obesity. 2003; 27:404–409. [PubMed: 12629570]

10. de Freitas S, Appolinario J, de Moura Souza A, Sichieri R. Prevalence of binge eating and associated factors in a Brazilian probability sample of midlife women. International Journal of Eating Disorders. 2008; 41:471–478. [PubMed: 18433030]

11. Gorin AA, Niemeier HM, Hogan P, Coday M, Davis C, DiLillo VG, Gluck ME. Binge eating and weight loss outcomes in overweight and obese individuals with type 2 diabetes. Archives of General Psychiatry. 2008; 65:1447–1455. [PubMed: 19047532]

12. Kinzl JF, Traweger C, Trefalt E, Mangweth B, Biebl W. Binge eating disorder in females: A population-based investigation. International Journal of Eating Disorders. 1999; 25:287–292. [PubMed: 10191993]

13. Katzman MA, Wolchik SA, Braver SL. The prevalence of frequency binge eating and bulimia in a nonclinical college sample. International Journal of Eating Disorders. 1984; 3:53–62.

14. Hay PJ, Mond J, Buttner P, Darby A. Eating disorder behaviors are increasing: Findings from two sequential community surveys in South Australia. PLoS ONE. 2008; 3:e1541. [PubMed: 18253489]

15. Luce KH, Crowther JH, Pole M. Eating disorder examination questionnaire (EDE-Q): Norms for undergraduate women. International Journal of Eating Disorders. 2008; 41:273–276. [PubMed: 18213686]

16. Goossens L, Soenens B, Braet C. Prevalence and characteristics of binge eating in an adolescent community sample. Journal of Clinical Child and Adolescent Psychology. 2009; 38:342–353. [PubMed: 19437295]

17. Kerzhnerman I, Lowe MR. Correlates of subjective and objective binge eating in binge-purge syndromes. International Journal Of Eating Disorders. 2002; 31:220–228. [PubMed: 11920983]

18. Tanofsky-Kraff M, Faden D, Yanovski SZ, Wilfley DE, Yanovski JA. The perceived onset of dieting and loss of control eating behaviors in overweight children. International Journal of Eating Disorders. 2005; 38:112–122. [PubMed: 16134103]

19. Eddy KT, Tanofsky-Kraff M, Thompson-Brenner H, Herzog DB, Brown TA, Ludwig DS. Eating disorder pathology among overweight treatment-seeking youth: Clinical correlates and cross-sectional risk modeling. Behaviour Research and Therapy. 2007; 45:2360–2371. [PubMed: 17509523]

20. Colles SL, Dixon JB, O'Brien PE. Grazing and loss of control related to eating: Two high-risk factors following bariatric surgery. Obesity. 2008; 16:615–622. [PubMed: 18239603]

21. Niego SH, Pratt EM, Agras WS. Subjective of objective binge: Is the distinction valid? The International Journal of Eating Disorders. 1997; 22:291. [PubMed: 9285266]

22. Keel PK, Mayer SA, Harnden-Fischer JH. Importance of size in defining binge eating episodes in bulimia nervosa. The International Journal of Eating Disorders. 2001; 29:294. [PubMed: 11262508]

23. Latner JD, Hildebrandt T, Rosewall JK, Chisholm AM, Hayashi K. Loss of control over eating reflects eating disturbances and general psychopathology. Behaviour, Research, and Therapy. 2007; 45:2203–2211. [PubMed: 17229399]

24. Latner JD, Vallance JK, Buckett G. Health-related quality of life in women with eating disorders: Association with subjective and objective binge eating. Journal of Clinical Psychology in Medical Settings. 2008; 15:148–153. [PubMed: 19104979]

25. Le Grange D, Binford R, Peterson C, Crow S, Crosby R, Klein M, Wonderlich S, et al. DSM-IV threshold versus subthreshold bulimia nervosa. International Journal of Eating Disorders. 2006; 39:462–467. [PubMed: 16715488]

26. First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JB. Structured clinical interview for the DSM-IV Axis I Disorders-Patient edition (SCID-I/P, version 2). New York: State Psychiatric Institute, Biometrics Research Department; 1995.

27. Fairburn CG, Beglin SJ. Assessment of eating disorders: Interview or self-report questionnaire? International Journal of Eating Disorders. 1994; 16:363–370. [PubMed: 7866415]

28. Spielberger, CD.; Gorsuch, RL.; Lushene, RE. STAI manual for the State-Trait Anxiety Inventory. Palo Alto, CA: Consulting Psychologists Press; 1970.

29. Spielberger, CD.; Reheiser, EC.; Ritterband, LM.; Sydeman, SJ.; Unger, KK. Assessment of emotional states and personality traits: Measuring psychological vital signs. In: Butcher, JN., editor. Clinical personality assessment: Practical approaches. New York: Oxford; 1995. p. 42-58.

30. Taylor S, Koch WJ, McNally RJ. How does anxiety sensitivity vary across the anxiety disorders? Journal of Anxiety Disorders. 1992; 6:249–259.

31. Ramanaiah NV, Franzen M, Schill T. A psychometric study of the State-Trait Anxiety Inventory. Journal of Personality Assessment. 1983; 47:531–535. [PubMed: 6644527]

32. Rush AJ, Giles DE, Schlesser MA, Fulton CL, Weissenburger J, Burns C. The inventory for depressive symptomatology (IDS): Preliminary findings. Psychiatry Research. 1986; 18:65–87. [PubMed: 3737788]

33. Livesley WJ, Jackson DN, Schroeder ML. Factorial structure of traits delineating personality disorders in clinical and general populations. Journal of Abnormal Psychology. 1992; 101:432–440. [PubMed: 1500600]

34. Livesley, WJ.; Larstone, RM. The Dimensional Assessment of Personality Pathology (DAPP). In: Boyle, GJ.; Matthews, G.; Saklofske, DH., editors. The Sage handbook of personality theory and assessment. Thousand Oaks, California: SAGE Publications Ltd; 2008.

35. Clark LA. Personality disorder diagnosis: Limitations of the five factor model. Psychological Inquiry. 1993; 4:100–104.

36. Barratt E. Anxiety and impulsiveness related to psychomotor efficiency. Perceptual and Motor Skills. 1959; 9:191–198.

37. Allen TJ, Moeller FG, Rhoades HM, Cherek DR. Impulsivity and history of drug dependence. Drug and Alcohol Dependence. 1998; 50:137–145. [PubMed: 9649965]

38. Stanford MS, Mathias CW, Dougherty DM, Lake SL, Anderson NE, Patton JH. Fifty years of the Barratt Impulsiveness Scale: An update and review. Personality and Individual Differences. 2009; 47:385–395.

39. Keel PK, Haedt A, Edler C. Purging disorder: An ominous variant of bulimia nervosa. International Journal of Eating Disorders. 2005; 38:191–199. [PubMed: 16211629]

40. Anestis MD, Smith AR, Fink EL, Joiner TE. Dysregulated eating and distress: Examining the specific role of negative urgency in a clinical sample. Cognitive Therapy and Research. 2008; 33:390–397.

41. Heatherton TF, Baumeister RF. Binge eating as escape from self-awareness. Psychological Bulletin. 1991; 110:86–108. [PubMed: 1891520]

42. Reas DL, Grilo CM, Masheb RM. Reliability of the eating disorder examination questionnaire in patients with binge eating disorder. Behaviour Research and Therapy. 2006; 44:43–51. [PubMed: 16301013]

43. Loeb KL, Wilson G, Gilbert JS, Labouvie E. Guided and unguided self-help for binge eating. Behaviour Research And Therapy. 2000; 38:259–272. [PubMed: 10665159]

44. Walsh B, Fairburn CG, Mickley D, Sysko R, Parides MK. Treatment of bulimia nervosa in a primary care setting. The American Journal of Psychiatry. 2004; 161:556–561. [PubMed: 14992983]

45. Hildebrandt T, Latner J. Effect of self-monitoring on binge eating: Treatment response or 'binge drift'? European Eating Disorders Review. 2006; 14:17–22.

46. Latner JD, Wilson G. Self-monitoring and the assessment of binge eating. Behavior Therapy. 2002; 33:465–477.

47. Stice E, Fisher M, Lowe MR. Are dietary restraint scales valid measures of acute dietary restriction? Unobtrusive observational data suggest not. Psychological Assessment. 2004; 16:51–59. [PubMed: 15023092]

Table 1

Group Comparison Findings Using MANOVA and ANOVA Between OBE-only and SBE-only Groups

	OBE-only	SBE-only	*Both*	*Neither*	Significance
Eating Disorder Symptoms					
EDE-Q Total Score	15.45	16.45	17.41	13.47	$F(1,66) = .96, p = .332$
EDE-Q Subscales					**$F(4,62) = 1.93$, Wilks' Lambda = 0.89, $p = .117$, Partial $\eta^2 = .11$**
Restraint	3.68	3.97	4.11	3.22	
Eating Concern	3.31	3.23	3.97	2.33	
Weight Concern	4.11	4.39	4.50	3.78	
Shape Concern	4.43	4.86	4.83	4.15	
Compensatory behavior frequency					**$F(4,63) = 0.90$, Wilks' Lambda = 0.95, $p = .471$, Partial $\eta^2 = .05$**
Vomiting	14.65	20.18	28.31	5.28	
Laxative use	2.33	2.18	3.35	0.74	
Diuretic use	0.45	1.82	1.29	0.44	
Hard exercise	6.45	8.18	6.72	7.00	
Negative Affect					**$F(2,64) = 2.25$, Wilks' Lambda = 0.93, $p = .114$, Partial $\eta^2 = .07$**
Anxiety	50.30	56.43	56.58	46.47	
Depression	26.08	28.79	32.15	22.53	
Personality dimensions					
Interpersonal difficulties					**$F(2,65) = 2.11$, Wilks' Lambda = 0.94, $p = .129$, Partial $\eta^2 = .06$**
Social avoidance	54.48	58.43	58.75	54.47	
Insecure attachment	53.05	57.43	54.87	50.37	
Impulsivity					**$F(3,64) = 3.42$, Wilks' Lambda = 0.86; $p = .022$, Partial $\eta^2 = .14$**
Motor	2.40	2.39	2.51	2.35	$F(1,66) = 0.01, p = .941$
Non-planning	2.13	2.10	2.30	2.04	$F(1,66) = 0.05, p = .833$
Attention	2.35	2.62	2.57	2.43	$F(1,66) = 6.06, p = .016$
Affective Lability	54.38	58.75	56.85	55.05	$F(1,66) = 3.28, p = .075$
Cognitive Distortion	53.47	58.75	57.56	52.53	$F(1,66) = 4.93, p = .030$

Note. OBE = Objective Binge Eating. SBE = Subjective Binge eating. EDE-Q = Eating Disorder Examination- Questionnaire. Data for those who reported *both* (*n*=117) and *neither* (*n*=19) regular OBEs or SBEs are presented for descriptive purposes only. Group comparisons only involve the OBE-only and SBE-only groups. Results from multivariate tests are indicated in bold.

Table 2

Multiple Regression Analyses with Number of Objective Binge Eating Episodes and Subjective Binge Eating Episodes Entered Jointly as Independent Variables and Eating Disorders Symptoms as Dependent Variables

	EDE-Q Subscales											
	Restraint			Eating Concern			Weight Concern			Shape Concern		
		p	t		p	t		p	t		p	t
OBE	−.02	.789	−.27	.19*	.014	2.49	−.09	.259	−1.13	−.06	.435	−.78
SBE	.13	.111	1.60	.19*	.013	2.50	.26**	.001	3.42	.26**	.001	3.36

	Frequency of Compensatory Behaviors											
	Vomiting			Laxative Use			Diuretic Use			Hard Exercise		
		p	t		p	t		p	t		p	t
OBE	.47***	<.001	8.35	.13	.109	1.61	−.09	.235	−1.19	−.06	.451	−.76
SBE	.35***	<.001	6.30	−.04	.606	−.52	.18*	.023	2.28	.04	.635	.48

Note. *p < .05.

**p < .01.

***p < .001

Table 3

Multiple Regression Analyses with Number of Objective Binge Eating Episodes and Subjective Binge Eating Episodes Entered Jointly as Independent Variables and Personality Dimensions as Dependent Variables

	Personality Dimensions from DAPP											
	Social Avoidance		**Insecure Attachment**			**Affective Lability**			**Cognitive Distortion**		
		p	*t*		*p*	*t*		*p*	*t*		*p*	*t*
OBE	−.05	.490	−.69	−.10	.186	−1.33	−.08	.334	−.97	−.03	.675	−.42
SBE	.17*	.031	2.17	.28***	<.001	3.62	.11	.172	1.37	.16*	.047	1.99

	Impulsivity								
	Motor		Non-Planning			Attention		
		p	*t*		*p*	*t*		*p*	*t*
OBE	.04	.644	.46	.10	.230	1.21	.02	.832	.21
SBE	.03	.676	.42	.02	.826	.22	.11	.182	1.34

Note. *p < .05.

***
 p < .001.