

A Preliminary Evaluation of the Validity of Binge-Eating Disorder Defining Features in a Community-Based Sample

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ABSTRACT

Objective: Little empirical attention has been paid to the DSM-5 definition of binge-eating disorder (BED), particularly to the associated features of binge episodes. The present study sought to determine how the associated features and undue influence of weight/shape on self-evaluation contribute to evidence of a clinically significant eating disorder.

Method: Secondary analyses were conducted on data ($N = 80$; 76.3% women, 76.3% Caucasian, ages 18–43) collected through an epidemiological study of eating patterns. Descriptive statistics were used to report the sample prevalence of the features, independently and in combination. Correlations and alpha reliability were employed to examine relationships among associated features, distress regarding bingeing, and clinical diagnosis. Regression models and receiver-operating characteristic (ROC) curves were used to determine the utility

of the features for explaining variance in distress.

Results: Internal consistency reliability for indicators was low, and several features demonstrated low or nonsignificant associations with distress and diagnosis. Feeling disgusted/depressed/guilty was the only unique predictor of distress ($p = 0.001$). For the ROC curves, three features was the best threshold for predicting distress.

Discussion: Results support the need to refine the features to ensure better detection of clinically significant eating pathology for research inclusion and treatment of the illness. © 2015 Wiley Periodicals, Inc.

Keywords: binge-eating disorder; distress; associated features; undue influence

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Few studies^{1–3} have examined the validity of the five associated features of binge-eating episodes, three of which, along with distress regarding bingeing, are required for a *Diagnostic and Statistical Manual of Mental Disorders* (DSM) diagnosis of Binge-Eating Disorder (BED).⁴ Further, limited data exist regarding prevalence of these features, and it remains unclear how many features are central to defining BED. Additionally, controversy exists regarding if and how a body image disturbance criterion, namely, “the undue influence of body weight or shape on self-evaluation,”⁴ should be incorporated in the BED diagnosis.

The present study sought to describe the prevalence of the associated features and determine how those features and undue influence relate to distress regarding binge eating and clinical diagnosis. Overall, we aimed to conduct a preliminary examination of the DSM-5 BED criteria, given that research conducted on BED populations rests on the assumption that the criteria accurately capture the abnormal eating behaviors they are intended to describe.

Methods

Participants

The present study used data collected in 2002 from college cohorts established in 1982, 1992, and 2002 ($N = 2060$, 71% participation rate); inclusion and exclusion criteria are found in Table 1, and the larger epidemiological study is described in detail elsewhere.^{9–11} Participants were also excluded if they were missing data needed to assess the main study variables. This yielded a sample size of $N = 80$ (76.3% women, mean [SD]

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TABLE 1. Binge-eating disorder (BED) criteria as defined in the present study

BED Criteria	Survey Questions
Binge-eating episodes at a frequency of at least once per week for 3 months (assessed using Eating Disorder Diagnostic Scale (EDDS) questions) ¹²	1) "During the past 6 months have there been times when you felt you have eaten what other people would regard as an unusually large amount of food (e.g., a quart of ice cream) given the circumstances?" [yes or no question] 2) "During the times when you ate an unusually large amount of food, did you experience a loss of control (feel you couldn't stop eating or control what or how much you were eating)?" [yes or no question] 3) "How many times per week on average over the past 3 months have you eaten an unusually large amount of food and experienced a loss of control?" [0–14 scale]
Absence of compensatory behaviors (score of zero endorsed for all behaviors; assessed with EDDS) [all asked on 0–14 scale]	1) "How many times per week on average over the past 3 months have you made yourself vomit to prevent weight gain or counteract the effects of eating?" 2) "How many times per week on average over the past 3 months have you used laxatives or diuretics to prevent weight gain or counteract the effects of eating?" 3) "How many times per week on average over the past 3 months have you fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating?" 4) "How many times per week on average over the past 3 months have you engaged in excessive exercise specifically to counteract the effects of overeating episodes?"
Associated features of binge-eating episodes (assessed with EDDS; not required for inclusion) [all asked as yes or no questions]	"During these episodes of overeating and loss of control did you... –Eat much more rapidly than usual? –Eat until you felt uncomfortably full? –Eat large amounts of food when you didn't feel physically hungry? –Eat alone because you were embarrassed by how much you were eating? –Feel disgusted with yourself, depressed, or very guilty after overeating?"
Distress regarding binge eating (assessed with EDDS; not required for inclusion)	"During these episodes of overeating and loss of control did you feel very upset about your uncontrollable overeating or resulting weight gain?" [yes or no question]
Undue influence (not required in the DSM-5; considered present if score of five or above; assessed with EDDS)	"Has your weight influenced how you think about (judge) yourself as a person?" [0 to 6 scale]
Body mass index (BMI; kg/m ²) greater than 18.5 (<i>M</i> (<i>SD</i>) = 26.06 (4.74))	–How much do you weigh? If uncertain, please give your best estimate. –How tall are you?

A full Diagnostic and Statistical Manual of Mental Disorders, fifth edition (4) BED diagnosis was not required for inclusion.

TABLE 2. Prevalence of associated features, distress, and clinical diagnosis in the study sample

Variable	Prevalence in Sample <i>N</i> (%)
Eating more rapidly than normal	<i>N</i> = 58 (72.5%)
Eating until uncomfortably full	<i>N</i> = 66 (82.5%)
Eating large amounts when not hungry	<i>N</i> = 71 (88.8%)
Eating alone because of embarrassment	<i>N</i> = 37 (46.3%)
Feeling disgusted, depressed, or guilty	<i>N</i> = 61 (76.3%)
Undue influence on self-evaluation	<i>N</i> = 34 (42.5%)
Distress regarding binge eating	<i>N</i> = 62 (77.5%)
Believe have an eating disorder	<i>N</i> = 16 (20%)
Interviewer-rated presence of current eating disorder ^a	<i>N</i> = 11 (13.8%)
Endorsement of one associated feature	<i>N</i> = 6 (7.5%)
Endorsement of two associated features	<i>N</i> = 5 (6.25%)
Endorsement of three associated features	<i>N</i> = 24 (30%)
Endorsement of four associated features	<i>N</i> = 20 (25%)
Endorsement of five associated features	<i>N</i> = 25 (31.25%)

^aValues for this variable only found in a subset of participants (*N* = 21).

age = 28.26 (8.22)) that was 76.3% Caucasian, 7.5% African American or Black, 1.3% Native Hawaiian or Pacific Islander, 11.3% Asian, and 3.8% Other.

Procedures

All procedures were approved by the Institutional Review Boards at the universities where work was conducted, and participants provided informed consent. To maximize participation, surveys were mailed up to three times, and an online survey option was offered.^{10,11} Interview participant selection and data collection is described elsewhere.⁹

Measures

Table 1 includes information about the present study measures. The Eating Disorder Diagnostic Scale (EDDS)¹² assessed BED criteria, including distress. The EDDS demonstrated good psychometrics in a BED sample.¹² Undue influence was assessed independently of binge episodes and was coded dichotomously to match the likely method of clinical assessment. The survey diagnosis measure ("Do you believe that you have an eating disorder?") was assessed dichotomously. The Structured Clinical Interview for DSM-IV¹³ was administered to a subset of participants (*n* = 21) to determine

TABLE 3. Correlations between the endorsement of the individual binge-eating disorder (BED) associated features, undue influence criterion, body mass index (BMI), gender, distress, and clinical diagnosis

Feature	1	2	3	4	5	6	7	8	9	10	11
1. Distress	—	0.27*	0.36	0.20	0.07	0.28*	0.32**	0.54***	0.28*	0.14	0.19
2. Believe have an eating disorder		—	0.47*	0.17	0.15	0.18	0.35**	0.28*	0.14	−0.04	0.21
3. Presence of a current eating disorder			—	−0.18	0.24	0.34	0.34	0.51*	0.05	0.45*	0.02
4. Eating more rapidly than normal				—	0.01	0.14	0.18	0.05	0.08	−0.07	0.18
5. Eating until uncomfortably full					—	0.15	0.16	0.05	0.06	−0.02	0.13
6. Eating large amounts when not hungry						—	0.17	0.17	0.07	−0.07	0.17
7. Eating alone because of embarrassment							—	0.46***	0.32**	0.12	0.28*
8. Feeling disgusted, depressed, or guilty								—	0.24*	0.06	0.17
9. Undue influence on self-evaluation									—	0.26*	0.30**
10. BMI										—	−0.11
11. Gender											—

BMI = body mass index.

* $p < .05$; ** $p < .01$; *** $p < .001$.**TABLE 4.** Multivariable logistic regression analyses examining the unique contribution of the associated features in predicting distress regarding binge eating

Feature	<i>B</i>	SE(<i>B</i>)	Wald χ^2	OR	95% CI OR
Eat when not hungry	1.63	0.86	3.60	5.12	0.95–27.69
Eat alone due to embarrassment	0.34	0.87	0.15	1.41	0.26–7.70
Feel disgusted/depressed/guilty	2.40	0.75	10.10	10.98**	2.51–48.12
Undue influence	1.37	0.85	2.58	3.94	0.74–20.94

B = regression coefficient; SE(*B*) = standard error of the regression coefficient.Wald χ^2 = Wald χ^2 value; OR = odds ratio; CI = confidence interval; BMI = body mass index.* $p < .05$; ** $p < .01$; *** $p < .001$.

interviewer-rated current eating disorder status (presence/absence).

Data Analyses

IBM SPSS Version 23 software was used for analyses. Phi or point biserial correlations were calculated between the associated features (individually), undue influence, gender, body mass index (BMI), and clinical significance measures. Significant correlates were included in a logistic regression model predicting distress. Based upon the sample size, we could detect a medium effect size for the logistic regression at power = 0.86.¹⁴ Cronbach's alpha indexed reliability among the features because the DSM-5 conceptualizes these features as interchangeable measures of the same construct. We calculated ROC curves to determine a threshold for the number of features, including undue influence, needed to predict the presence of distress. Thresholds were chosen that maximized sensitivity and specificity and the area under the curve (AUC) was used as an effect size index. We also calculated positive (PPV) and negative (NPV) predictive value, using distress prevalence estimates from our sample.

Results

59 participants (73.75%) met full criteria for a DSM-5 BED diagnosis (Table 2). The endorsement of only one or two features was uncommon (13.75%). Distress was correlated with feeling disgusted/depressed/guilty, eating alone due to embarrassment, eating when not hungry, and undue influence * (Table 3). Participant-rated eating disorder status was associated with feeling disgusted/depressed/guilty and eating alone due to embarrassment, and interviewer-rated eating disorder status was correlated with feeling disgusted, depressed, or guilty. Cronbach's alpha was 0.48, indicating that the associated features were not measuring the same construct. Feeling disgusted, depressed, or guilty ($p = 0.001$) was the only unique predictor of distress regarding binge eating and demonstrated a large effect size ^{†, ‡} (Table 4). When sex and BMI were included as covariates, feeling disgusted, depressed, or guilty (OR = 12.05, 95% CI = 2.63–55.23, $p = 0.001$) and eating when not hungry (OR = 6.24, 95% CI = 1.06–36.83, $p = 0.04$) were significant predictors.

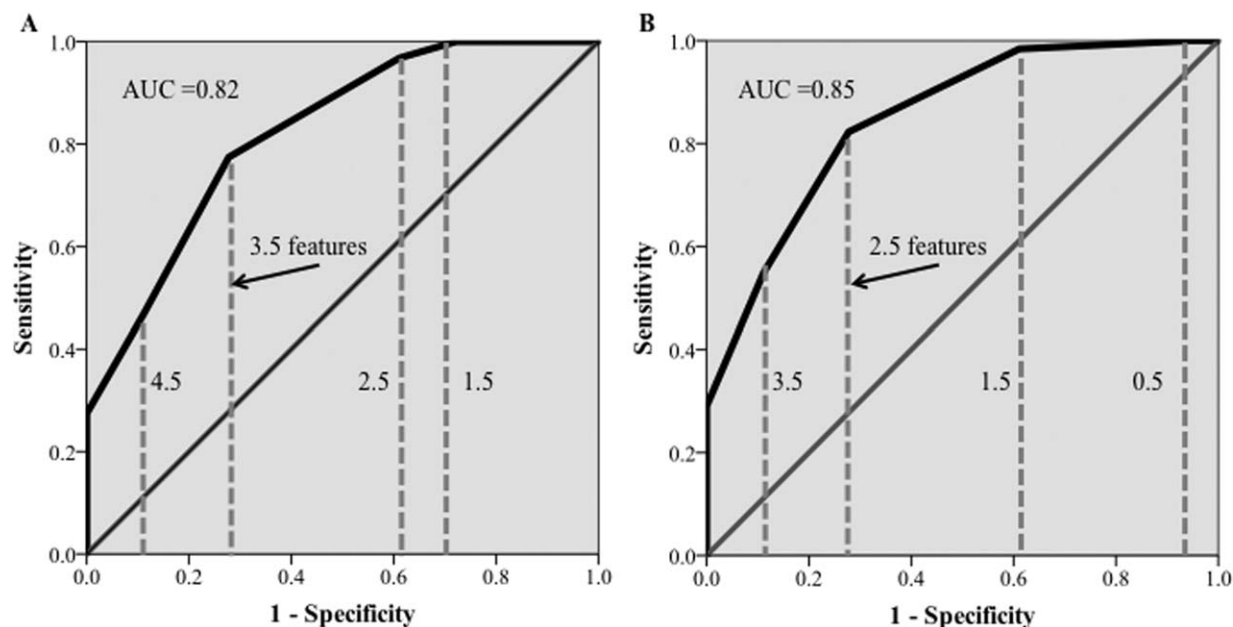
The first ROC curve combined all five features and undue influence (Fig. 1A). The resulting curve had a significant AUC (95% CI) of moderate accuracy [0.82 (0.71–0.93), $p < 0.001$],¹⁵ and a threshold

*When undue influence was included as a continuous variable, this yielded a correlation of .50 ($p < .001$) with distress and .27 ($p = 0.02$) with participant-rated eating disorder status. The regression model predicting distress had the following significant predictors: eating when not hungry ($p = 0.03$), feeling disgusted, depressed, guilty ($p = 0.02$), and undue influence ($p = 0.007$).

[†]When the regression model was run using a $p = 0.20$ inclusion criterion for the predictors, eating more rapidly and sex were added, but the pattern of results was unchanged.

[‡]Only distress was used as the predictor in the regression model due to the pattern of correlations between the clinical diagnosis variables and the associated features (i.e., only one or two features were significantly correlated with diagnosis).

FIGURE 1. Receiver-operating characteristic (ROC) curves. Dotted lines depict sensitivity and specificity for different thresholds of features needed to predict distress regarding bingeing. The gray diagonal line depicts the null (chance levels of predictive ability). The area under the curve (AUC) is listed on the individual panels. A. Curve based on all five associated features plus undue influence. B. Curve with eating until uncomfortably full excluded.



of 3.5 features (half features arise from ROC curve calculations and can be rounded to a threshold of 4 features) based on an acceptable¹⁵ sensitivity of 0.77 and 1 – specificity of 0.28. PPV was 0.90 and NPV was 0.48; the prevalence of distress was 77.5%. As an exploratory analysis (see Supporting Information for further exploratory analyses), we eliminated the poorly performing indicator, “eating until feeling uncomfortably full,”⁴ consistent with studies using ROC curves to characterize surveys.^{16,17} After eliminating this item (**Fig. 1B**), the AUC (95% CI) retained a moderate accuracy level [0.85 (0.75–0.95), $p < 0.001$], and the new threshold decreased to 2.5 features, or a suggested minimum of 3 features (sensitivity of 0.82 and 1 – specificity of 0.28; PPV = 0.91, NPV = 0.54). Therefore, the curves are largely comparable on key parameters.

Discussion

The present study sought to examine how the associated features and undue influence are associated with distress and clinical diagnosis. The distress criterion was used because it is important in determining if eating behavior is pathological.^{1,6,18,19} We chose the clinical diagnosis variables because for treatment to be sought and administered, patient and clinician must acknowledge the presence of clinically significant behavior. Our results suggest

feeling disgusted/depressed/guilty was the best predictor of distress, which aligns with the literature.^{3,20} One concern is that this item overlaps with distress, yet the variance it explained in distress did not exceed 30%. This suggests that feeling disgusted, depressed, or guilty may contribute to distress regarding bingeing without being the same entity. Our findings preliminarily do not support the inclusion of an undue influence criterion, given that it was not a unique predictor of distress and was uncorrelated with diagnosis. Lastly, the features had low internal consistency, suggesting they do not tap a single construct. However, ROC curve findings support that multiple indicators are needed, and the majority of the sample endorsed three or more features. Therefore, while the definition of BED would benefit from the inclusion of multiple associated features, more work must be done to refine those criteria.

Strengths of the present study include participants with a broad age range, diverse ethnic/racial backgrounds, and both genders from a randomly selected sample. Also, participants were not seeking treatment, reducing concern about Berkson’s bias and allowing for variability in our clinical significance items. However, there are limitations to note. First, single, dichotomous indicators that were eating disorder specific were used, which may impact reliability. Also, reflecting the wording of the EDDS items,¹² the distress criterion was focused on

distress *during* bingeing rather than *overall* distress regarding binge eating and referenced concerns over resulting weight gain. Future research should include a general distress item and impairment items and evaluate course and outcome. Additionally, the study largely relied on self-report data. Lastly, data were collected in 2002, and secular changes in eating behavior may have since occurred. In conclusion, the present study underscores the necessity of understanding which symptoms signal that binge eating behavior has reached the threshold for being part of a mental disorder and suggests the need for further refinement of BED criteria given the inclusion of poorly performing indicators among the associated features.

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