Evaluation of the DSM-5 Severity Indicator for Binge Eating Disorder in a Community Sample

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Abstract

Research has examined various aspects of the diagnostic criteria for binge-eating disorder (BED) but has yet to evaluate the *DSM-5* severity criterion. This study examined the *DSM-5* severity criterion for BED based on binge-eating frequency and tested an alternative severity specifier based on overvaluation of shape/weight. 338 community volunteers categorized with *DSM-5* BED completed a battery of self-report instruments. Participants were categorized first using *DSM-5* severity levels and second by shape/weight overvaluation and were compared on clinical variables. 264 (78.1%) participants were categorized as mild, 67 (19.8%) as moderate, 6 (1.8%) as severe, and 1 (0.3%) as extreme. Analyses comparing mild and moderate severity groups revealed no significant differences in demographic variables or BMI; moderate severity group had greater eating-disorder psychopathology (**small effect-sizes**) but not depression than mild group. Participants with overvaluation (N=196; 60.1%) versus without (N=130; 39.9%) did not differ significantly in age, sex, BMI, or binge-eating frequency. Overvaluation group had significantly greater eating-disorder psychopathology and depression than non-overvaluation group. The greater eating-disorder and depression levels (medium-to-large effect-sizes) persisted after adjusting for ethnicity/race and binge-eating severity/frequency, without attenuation of effect-sizes. Findings **from this non-clinical community sample** provide support for overvaluation of shape/weight as a specifier for BED as it provides stronger information about severity than the *DSM-5* rating based on binge-eating. Future research should include treatment-seeking patients with BED to test the utility of *DSM-5* severity specifiers and include broader clinical validators.

Keywords

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Binge-eating disorder (BED), a new formal diagnosis in the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (*DSM-5;* APA, 2013), is defined by recurrent binge eating (i.e., eating unusually large quantities of food accompanied by subjective feelings of loss of control) occurring an average of once-weekly during the past three months, the presence of at least three of five behavioral indicators signaling a loss of control over eating, marked distress about the binge eating, and the absence of extreme weight compensatory behaviors (e.g., purging) that characterize bulimia nervosa (BN). Following the inclusion of BED in Appendix B of the *DSM-IV* (APA, 1994) as a research criteria set requiring further study, research produced empirical support for the clinical utility and validity of this diagnostic construct (Wilfley, Bishop, Wilson, & Agras, 2007; Wonderlich, Gordon, Mitchell, Crosby, & Engle, 2009) including its distinctiveness from obesity and other eating disorders (Grilo, Crosby, Masheb, et al., 2009; Grilo, Masheb, & White, 2010).

Leading up to *DSM-5*, there were questions about whether revisions or additions to its criteria would improve the construct (Masheb & Grilo, 2000; Wilfley et al., 2007). Research examined aspects of the *DSM-IV* research criteria for BED including, for example, the frequency and duration stipulation requirements for binge-eating. Research indicated that a once-weekly frequency of binge-eating signaled a clinically relevant problem (Wilson & Sysko, 2009) and *DSM-5* adopted a once-weekly frequency of binge-eating as the new criterion for both BED and BN with a similar duration requirement of three months. Research examining the "unusually large amount" requirement for determining binge-eating received limited support (Mond, Hay, Rodgers, & Owen, 2010) and was not changed in the *DSM-5*. Other components of the BED diagnosis received very little empirical attention although they were supported: one study documented the diagnostic efficiency of the behavioral indicators of impaired control used to determine the loss of control aspect of binge-eating (White & Grilo, 2011), one study showed the diagnostic utility of the "marked distress" criterion requirement (Grilo & White, 2011), and one study reported improved test-retest reliability for proposed DSM-5 vs DSM-IV research criteria for BED (Sysko, Roberto, Barnes, Grilo, Attia, & Walsh, 2012).

The *DSM-5*, in addition to changing the binge-eating frequency and duration requirements for BED (i.e., from a weekly average of two days with binge-eating episodes during the past six months to an average of once weekly binge-eating episodes during the past three months), made one more change which involved a new "severity specifier" based on the frequency of binge eating. The *DSM-5* proposed four severity groups based on the frequency of binge eating episodes: mild (1-3 episodes/week), moderate (4-7 episodes/week), severe (8-13 episodes/week), and extreme (14 or more episodes/week). Although the literature supported the new minimum criterion of once-weekly frequency of binge eating for the diagnosis of BED (Wilson & Sysko, 2009), we are unaware of empirical research supporting the proposed severity specifier for BED.

Although other eating disorder diagnoses include a cognitive criterion pertaining to body image (e.g., in the case of BN, the presence of "undue influence of body weight or shape on self-evaluation) a body-image criterion was not included as part of the BED diagnosis in either *DSM-IV* (see Masheb & Grilo, 2000) or *DSM-5*. Despite consistent empirical findings that the cognitive body-image construct - referred to as "overvaluation of shape/weight"

(Grilo, 2013) – should serve as a diagnostic severity specifier for BED (Goldschmidt et al., 2010; Grilo, Crosby, et al., 2009; Grilo, Hrabosky et al., 2008; Grilo, Masheb, & White, 2010; Grilo, White, Gueorguieva, Wilson, & Masheb, 2013; Grilo, White, & Masheb, 2012; Hrabosky et al., 2007), the DSM-5 did not include a body-image component for BED.

Thus, research has examined various aspects of the validity of the diagnostic criteria for BED but has yet to evaluate the utility of the *DSM-5* severity criterion. This study examined the DSM-5 severity criterion for BED based on the frequency of binge eating and tested an alternative severity specifier based on overvaluation of shape/weight.

Methods

Participants

Participants were 338 community volunteers drawn from a larger series of 3283 respondents to online advertisements seeking volunteers aged 18 years or older for a research study about eating and dieting. Participants were selected from the larger sample per criteria used to define our study group of persons with BED. Advertisements with a link to a web survey were placed on Craigslist internet classified ads in various US cities **in order to enhance geographic generalizability.** The participant group of N=338 consisted of 39 (11.5%) males and 299 (88.5%) females and the racial/ethnic distribution was: 83.7% (n=282) White, 5.6% (n=19) Hispanic, 3.6% (n=12) Black, 4.7% (n=16) Asian, and 2.4% (n=9) reported "other" or missing. Geographically, 22.2% (n=75) of participants were from the Northeast, 30.5% (n=103) from the South, 25.1% (n=85) from the Midwest, 19.5% (n=66) from the West, 1.5% from the Pacific, and 1.2% (n=4) unknown.

Procedures and Assessments

Participants provided basic demographic information, self-reported height and current weight, and completed self-report questionnaires through SurveyMonkey, a secure online data gathering website server. Participants were required to give informed consent but provided no personal identifying information. The study was approved by the Yale IRB.

The Questionnaire for Eating and Weight Patterns - Revised (QEWP-R; Yanovski, 1993) assesses specific diagnostic criteria for BED and BN. This measure, used in the DSM-IV field trials for BED (Spitzer et al., 1992), has received psychometric support in diverse eating-disordered groups (Barnes, Masheb, White, & Grilo, 2011; Celio, Wilfley, Crow, Mitchell, & Walsh, 2004; Nangle, Johnson, Carr-Nangle, & Engler, 1994). The *Eating Disorder Examination Questionnaire* (EDE-Q; Fairburn & Beglin, 1994), which focuses on the past 28 days, assesses the frequency of objective bulimic episodes (OBEs; defined as feeling a loss of control while eating unusually large quantities of food; this definition corresponds to the DSM-5 criteria for binge eating episodes), inappropriate weight control and purging methods, and comprises four subscales (Dietary Restraint, Eating Concern, Shape Concern, and Weight Concern) and a global total score. The EDE-Q has demonstrated good test-retest reliability (Reas, Grilo, & Masheb, 2006), convergence with the EDE interview (Grilo, Masheb, & Wilson, 2001a, Grilo, Masheb, & Wilson, 2001b; Mond, Hay, Rodgers, & Owen, 2007), and good performance in community studies (Mond

et al., 2007). The *Beck Depression Inventory* (BDI; Beck & Steer, 1987) assesses depressive symptoms and levels; it has strong psychometric support (Beck, Steer, & Garbin, 1988) and performs well as a marker for severity and distress (Grilo, Masheb, & Wilson, 2001b).

Creation of Binge Eating Disorder Severity Groups

The BED study group was created based on responses to the QEWP-R and EDE-Q per *DSM-5* (APA, 2013) criteria. The BED study group was created first using a minimum frequency of once-weekly binge-eating (QEWP-R) without any purging (self-induced vomiting, laxative misuse, or diuretics) behaviors. The BED study group also required at least 3 of the 5 behavioral indicators for loss of control along with marked distress about binge eating.

Subgroups based on DSM-5 Severity. BED severity subgroups were created using DSM-5 severity definitions based on the frequency of binge eating episodes (i.e., OBE episodes on the EDE-Q): mild (defined as 1-3 episodes/week), moderate (4-7 episodes/week), severe (8-13 episodes/week), and extreme (14 or more episodes/week).

Subgroups based on Overvaluation of Shape/Weight. Overvaluation of shape/weight was measured using two specific items from the EDE-Q: "Over the past four weeks, has your *shape* influenced how you feel about (judge, think, evaluate) yourself as a person?" and "Over the past 4 weeks has your *weight* influenced how you feel about (judge, think, evaluate) yourself as a person?" The two overvaluation items are rated on a 7-point forced-choice scale anchored with 0 (No importance) to 6 (Supreme importance: nothing is more important in the subject's scheme for self-evaluation) in reference to the past 28 days. Following prior studies with BED using the EDE-Q (Grilo, Masheb, & White, 2010), the overvaluation group included participants who reported that their shape and/or weight are high on the list of things that influence their self-evaluation (i.e., score 5 on either overvaluation item). Although the suggested clinical cutoff score is four (i.e., moderate importance) when using the EDE interview to assess overvaluation (Grilo, Hrabosky et al., 2008), since we used the EDE-Q – which consistently yields higher scores than the EDE interview on those questions (Barnes, Masheb, White, & Grilo, 2011; Grilo et al., 2001a; Grilo et al., 2001b) – we used a cutoff score of five per the Grilo et al (2010) study.

Statistical Analysis

General linear model (GLM) analysis of variance (ANOVA) was used to compare the severity categories for BED (i.e., DSM-5 severity based on binge eating frequency and "alternative" severity based on overvaluation of shape/weight) on the demographic and clinical measures. In addition, partial η^2, an effect size (ES) measure, was calculated; these values represent the proportion of variation in the criterion measure accounted for by group membership. In the case of testing the "alternative" severity method (i.e., by overvaluation of shape/weight), two sets of additional ANCOVAs were performed that co-varied for binge-eating severity category and for binge-eating frequency, respectively (i.e., in order to determine the significance and magnitude of the alternative specifier even after controlling for the *DSM-5* binge-eating frequency specifier).

Results

Binge Eating Disorder: DSM-5 Severity Groups

In the overall participant group of N=338 with BED, the following DSM-5-defined severity groups (based on frequency of binge eating episodes) were observed: 264 (78.1%) categorized as mild (defined as 1-3 episodes/week), 67 (19.8%) as moderate (4-7 episodes/week), 6 (1.8%) as severe (8-13 episodes/week), and 1 (0.3%) as extreme (14 or more episodes/week). Thus, analyses compared mild versus moderate severity groups; the low frequency of severe and extreme severity groups precluded their inclusion in analyses.

Table 1 summarizes demographic and physical variables for participants with BED based on the DSM-5 mild and moderate severity groups. The severity groups did not differ significantly in age, sex, ethnicity/race, or BMI. **Table 2** summarizes descriptive statistics and statistical analyses for participants with BED comparing DSM-5 severity groups on the clinical measures. ANOVAs revealed that the groups differed significantly on binge eating frequency (per the study method to create the severity categories) as well as on all four EDE subscales and EDE Global score; the groups did not differ significantly on depression (BDI scores). Overall, partial eta squared ranged from .014 (Restraint) to .108 (Eating Concern) for the clinical variables that differed significantly (other than binge eating) suggesting generally small effect sizes.

Binge Eating Disorder: Overvaluation Groups

Of the N=326 participants with overvaluation data, 196 (60.1%) were characterized with overvaluation of shape/weight and 130 (39.9%) without overvaluation. **Table 3** summarizes demographic and physical variables for participants with BED categorized with and without overvaluation. BED participants with versus without overvaluation did not differ significantly in age, sex, or BMI; the overvaluation group had a significantly higher proportion of white participants than the without overvaluation group (87.2% vs 77.7%).

Table 4 summarizes descriptive statistics and statistical analyses for participants with BED categorized with and without overvaluation of shape/weight on the clinical measures. Note that Table 4 includes findings for the EDE-Q weight and shape concern subscales calculated as usual as well as calculated without the weight and shape overvaluation items, respectively, since the "alternative" severity categories were created based on those items. ANOVAs revealed that the two groups differed significantly with the overvaluation group having higher scores reflecting greater severity on nearly every clinical variable; the one notable exception was that the overvaluation groups did not differ significantly in frequency of binge eating. Partial eta squared values indicated medium to large effect sizes for three of the EDE-Q scales and global score and medium effect (.123) for depression (BDI) scores. ANCOVA, covarying for ethnicity/race, revealed essentially an identical pattern of significant findings without any attenuation of effect sizes. Two sets of ANCOVAs, co-varying for binge-eating severity category and for binge-eating frequency, respectively, revealed essentially an identical pattern of significant findings as the ANOVAs: the partial eta squared values for the specific ANCOVAs were not attenuated or reduced when adjusting for binge-eating frequency or severity.

Discussion

This study yielded two primary findings. First, the findings provide new, **albeit limited**, support for the *DSM-5* severity criterion for BED. In this non-clinical study group of community volunteers, nearly no participants were categorized with either severe or extreme severity of BED based on their self-reported binge-eating frequency. Participants with BED categorized with moderate severity had significantly greater eating-disorder psychopathology but not depression than participants categorized as mild; the magnitude of differences between the two severity groups, however, reflected small effect sizes. Second, the findings provide support for overvaluation of shape/weight as a severity specifier for BED. Participants with BED categorized with overvaluation of shape/weight had significantly greater eating-disorder psychopathology and depression levels than participants with BED without overvaluation. Importantly, the magnitude of differences on the clinical measures between the two overvaluation groups – which reflected medium to large effect sizes – persisted after adjusting for binge-eating severity category and binge-eating frequency, without any attenuation of effect sizes. Collectively, these findings provide further support for overvaluation of shape/weight as a severity specifier for BED (Grilo, 2013) as it provides stronger information about severity than the *DSM-5* rating based on binge-eating frequency. It is possible that overvaluation provides different information about severity since it is not correlated with binge-eating frequency.

We note our study's strengths and limitations as context for interpreting the findings. Our study relied on self-report which may be unreliable or biased and cannot be used to arrive at formal diagnoses which would require clinical diagnostic interviewing. Our self-report measures (QEWP-R and EDE-Q), however, are widely-used (e.g., the QEWP-R was used in *DSM-IV* field trials) and have received psychometric support including acceptable convergence with EDE interview methods in patients with BED (Barnes et al., 2011; Celio et al., 2004; Grilo et al., 2001; Nangle et al., 1994). Self-report methods may facilitate honest disclosure of sensitive material by eliminating interpersonal embarrassment which is well known to characterize persons with eating disorders and excess weight. Our study group was a sample of convenience comprising self-selected persons who volunteered for a research study via the internet **representing diverse US regions.** The anonymity afforded by the internet, which may have further facilitated honest disclosure of sensitive material, must be balanced against the possibility of other associated biases. The internet is increasingly used by many people for health-related issues **and activities**; although **historically** the internet was used most by women, those with higher education, and among persons aged less than 65 (Rice, 2006), it is increasingly and heavily used by all demographic groups (Smith, 2014) and rapidly being adopted by the US population independent of education, race/ethnicity, and health-care access (Chou, Hunt, Beckjord, Moser, & Hesse, 2009). Thus, the generalizability of our findings based on the internet method should be considered within this **broad** context; it is possible, for example, that our findings may not generalize to males or to certain ethnic/racial minority groups who may have been under-represented in our study (11.5% men and 16.3% non-white, respectively). Unfortunately, we did not obtain education data for these participants. Generalizability of our findings to clinical samples is also uncertain. Very few participants with BN met the

criteria for the severe and extreme groups; it is possible, for example, that more individuals meeting those severity thresholds would only be found in treatment-seeking samples. Indeed, in a Dutch community cohort study of DSM-5 eating disorders among adolescents, the severity of most cases was mild or moderate but treatment rates were associated with severity (Smink, van Hoeken, Oldehinkel, & Hoek, 2014). Our findings require replication and extension to treatment-seeking patients with BED to establish the utility of the *DSM-5* severity specifier. Future research should utilize semi-structured interviews and also test additional and broader clinical and functional validators.

Acknowledgments

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Highlights

- Binge eating disorder (BED) included as formal diagnosis in DSM-5.

- Examined DSM-5 severity specifier based on frequency of binge eating episodes.

- Findings provide new, but limited, support for DSM-5 severity specifier for BED.

- Shape/weight overvaluation supported as **an alternative** severity specifier for BED.

- Further research is needed with treatment-seeking clinical samples with BED.

Table 1

Demographic and physical characteristics of participants with binge eating disorder across *DSM-5* mild and moderate severity groups.

	Mild[a] N=264	Moderate N=67	Test Statistic	*P* value	Effect size
Age, mean (SD)	35.7 (11.8)	37.5 (12.1)	F(1, 285)=1.12	.290	.004
Female, No (%)	235 (89.0%)	57 (85.1%)	χ^2 (1, n=331)=0.80	.372	−.049
White, No (%)[b]	221 (84.0%)	54 (80.6%)	χ^2(1, n=330)=0.45	.501	−.037
Body Mass Index	33.6 (9.5)	33.7 (11.5)	F(1, 328)=0.00	.948	.000

[b]Chi-square analysis for White versus Non-White.

Table 2

Comparison of clinical characteristics of participants with binge eating disorder across *DSM-5* mild and moderate severity groups.

	Mild N=264		Moderate N=67		ANOVA	Significance	Effect Size
	M	**sd**	**M**	**sd**	**F**	*p* value	η^2
OBE Past Month	6.5	(2.6)	19.3	(4.6)	F(1, 329)=907.50	.0001	.734
Restraint	2.3	(1.5)	2.7	(1.7)	F(1, 329)=4.67	.031	.014
Eating Concern	2.8	(1.4)	3.9	(1.3)	F(1, 328)=39.77	.0001	.108
Shape Concern	4.6	(1.1)	5.0	(1.1)	F(1, 324)=7.81	.006	.024
Weight Concern	4.0	(1.1)	4.3	(1.2)	F(1, 325)=5.17	.024	.016
EDE-Q Global	3.4	(1.0)	4.0	(1.0)	F(1, 323)=18.71	.0001	.055
BDI	18.2	(9.8)	19.3	(10.3)	F(1, 294)=0.64	.424	.002

Note. OBE = objective bulimic episodes (binge eating frequency); EDE-Q = eating disorder examination - questionnaire; BDI = beck depression inventory.

Table 3

Demographic and physical characteristics of participants with binge eating disorder between overvaluation groups.

	No Overvaluation N=130	Overvaluation N=196	Test Statistic	*p* value	Effect size
Age, mean (SD)	35.6 (12.2)	36.4 (11.8)	$F(1, 281)=0.34$	.561	.001
Female, No (%)	114 (87.7%)	173 (88.3%)	$\chi^2 (1, n=326)=0.02$	.876	.009
White, No (%)	101 (77.7%)	170 (87.2%)	$\chi^2 (1, n=325)=5.07$	.024	.125
Body Mass Index	33.1 (10.9)	34.0 (9.2)	$F(1, 323)=0.52$	.474	.002

Table 4

Comparison of clinical characteristics of participants with binge eating disorder between overvaluation groups.

	No Overvaluation N=130		Overvaluation N=196		ANOVA		ANCOVA Covary Ethnicity/Race	ANCOVA Covary OBE frequency	ANCOVA Covary Severity
	M	**sd**	**M**	**sd**	**F**	**η²**	**η²**	**η²**	**η²**
OBE Past Month	8.4	(5.5)	9.6	(6.3)	3.10	.009	.012	--	--
Restraint	2.0	(1.3)	2.6	(1.6)	14.20*	.042	.036	.038	.041
Eating Concern	2.4	(1.3)	3.4	(1.4)	41.53*	.114	.110	.108	.120
Shape Concern[a]	4.0	(1.3)	5.1	(0.9)	77.33*	.209	.200	.203	.210
Weight Concern[a]	3.3	(1.2)	4.3	(1.1)	65.13*	.182	.171	.175	.180
Shape Concern	3.9	(1.2)	5.2	(0.8)	141.52*	.305	.299	.299	.307
Weight Concern	3.3	(1.0)	4.6	(0.9)	152.61*	.320	.313	.314	.320
EDE-Q Global[b]	2.9	(0.9)	3.9	(0.9)	105.67*	.247	.238	.244	.255
BDI	14.0	(7.4)	21.1	(10.3)	41.02*	.123	.114	.116	.122

Note. OBE = objective bulimic episodes (binge eating frequency); EDE-Q = eating disorder examination - questionnaire; BDI = beck depression inventory.

[a] Subscale without relevant overvaluation item.

[b] EDE-Q Global includes overvaluation items.

* $p < .0001$. df ranged from (1,292) to (1,324) for ANOVAs, from (1,290) to (1,322) for ANCOVA adjustmg for ethmcity/race, and from (1,291) to (1,323) for ANCOVAs adjusting for binge eating frequency and for binge eating severity.