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The validity of DSM-5 severity specifiers for anorexia nervosa, bulimia nervosa, and binge-eating disorder

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Abstract

Objective—The DSM-5 includes severity specifiers (i.e., mild, moderate, severe, extreme) for anorexia nervosa (AN), bulimia nervosa (BN), and binge-eating disorder (BED), which are determined by weight status (AN) and frequencies of binge-eating episodes (BED) or inappropriate compensatory behaviors (BN). Given limited data regarding the validity of eating disorder (ED) severity specifiers, this study examined the concurrent and predictive validity of severity specifiers in AN, BN, and BED.

Method—Adults with AN (n = 109), BN (n = 76), and BED (n = 216) were identified from previous datasets. Concurrent validity was assessed by measures of ED psychopathology, depression, anxiety, quality of life, and physical health. Predictive validity was assessed by ED symptoms at the end of the treatment in BN and BED.

Results—Severity categories did not differ in baseline validators, though the mild AN group evidenced greater ED symptoms compared to the severe group. In BN, greater severity was related to greater end of treatment binge-eating and compensatory behaviors, and lower likelihood of abstinence; however, in BED, greater severity was related to lower ED symptoms at the end of the treatment.

Discussion—Results demonstrated limited support for the validity of DSM-5 severity specifiers. Future research is warranted to explore additional validators and possible alternative indicators of severity in EDs.

Keywords

anorexia nervosa; binge-eating disorder; bulimia nervosa; DSM-5; severity

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1. Introduction

The publication of the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (American Psychiatric Association, 2013) introduced severity specifiers for anorexia nervosa (AN), bulimia nervosa (BN), and binge-eating disorder (BED). For AN, severity is determined by weight status: mild (BMI ≥ 17), moderate (BMI: 16–16.99), severe (BMI: 15–15.99), and extreme (BMI < 15). For BN, severity is based on the average frequency of inappropriate compensatory behaviors (i.e., self-induced vomiting, laxative use, diuretic use, excessive exercise): mild (1–3 episodes per week), moderate (4–7 episodes per week), severe (8–13 episodes per week), and extreme (≥14 episodes per week). BED severity is determined by the average frequency of binge-eating episodes (i.e., consumption of an objectively large amount of food accompanied by a sense of loss of control over eating): mild (1–3 episodes per week), moderate (4–7 episodes per week), severe (8–13 episodes per week), and extreme (≥14 episodes per week). However, limited research has assessed the validity of the newly introduced DSM-5 severity specifiers across ED diagnoses.

With respect to AN, two studies found no differences between DSM-5 severity groups in ED psychopathology (Machado, Grilo, & Crosby, 2016; Sysko et al., 2016). While one study found DSM-5 severity was associated with prior hospitalizations, duration of illness, and pain, DSM-5 severity was not related to impairment, health status, or depression (Sysko et al., 2016). Mustelin et al. (2016) also found individuals with extreme AN severity had lower short-term—but not long-term—likelihood of recovery.

Among studies that have examined the validity of the BN severity specifier (i.e., frequency of inappropriate compensatory behaviors), there is some evidence of concurrent validity, suggesting that severity specifiers are related to levels of ED and non-ED psychopathology in clinical and nonclinical samples (Dakanalis, Clerici, Riva, & Clerici, 2017; Grilo, Ivezaj, & White, 2015a; Jenkins, Luck, Cardy, & Staniford, 2016). Consistent with BN findings, clinical and nonclinical studies of BED have found differences in ED psychopathology and health status across DSM-5 severity groups, though there is inconsistent evidence for differences in depression (Grilo, Ivezaj, & White, 2015b, 2015c; Sysko et al., 2016).

Taken together, there is limited research examining the validity and utility of DSM-5 severity specifiers for ED diagnoses. There is some support for BN and BED specifiers, in that more severe groups evidence greater ED and related psychopathology. However, evidence appears more inconsistent in AN samples, and thus far no studies have examined predictive validity of specifiers in BN or BED samples. Therefore, this study sought to assess the concurrent and predictive validity of DSM-5 severity specifiers among AN, BN, and BED samples, as both concurrent and predictive validities provide meaningful evidence to inform classification systems (Kendell, 1989).

Concurrent validity was assessed by the relationships between DSM-5 severity groups and ED psychopathology, depression, anxiety, indices of quality of life, and physical health. Given that depression and anxiety are related to poorer prognosis in EDs (Vall & Wade, 2015), these domains may be relevant validators of ED severity. In addition, quality of life and physical health convey clinical significance and may be expected to correspond with ED

severity (Agh et al., 2016; Winkler et al., 2014). Predictive validity was assessed by the relationships between DSM-5 severity groups and clinical outcomes in two samples from treatment studies (i.e., BN, BED). While findings from these data-sets have been published previously (Engel et al., 2013; Mitchell et al., 2008; Peterson, Mitchell, Crow, Crosby, & Wonderlich, 2009), thus far no study has examined DSM-5 severity specifiers.

2. Method

Participants were identified from three databases. The AN sample was drawn from a study that has been described previously (Engel et al., 2013). Measures included the Eating Disorder Examination (EDE; Fairburn & Cooper, 1993), the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), the State Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), and the Eating Disorder Quality of Life Scale (EDQOL; Engel et al., 2006).

BN participants were identified from a study that assessed the efficacy of cognitive behavioral therapy (CBT); see Mitchell et al. (2008). Measures included the EDE, the BDI, and the Medical Outcomes Study Health Status Survey Physical Health Component score (SF-36 PHC; Ware, Kosinski, & Keller, 1994); the SF-36 PHC score was standardized to a T-score with a mean of 50 and an SD of 10.

Participants with BED were drawn from a study that assessed the efficacy of CBT (Peterson et al., 2009). Measures included the EDE, the Inventory of Depressive Symptomatology (IDS; Rush, Gullion, Basco, Jarrett, & Trivedi, 1996), the Impact of Weight on Quality of Life-Lite Questionnaire (IWQOL-Lite; Kolotkin, Crosby, Kosloski, & Williams, 2001), and the SF-36 PHC.

2.1. Statistical analyses

In each sample, EDE responses were recoded based on the DSM-5 algorithm (Fairburn, Cooper, & O'Connor, 2014) to establish DSM-5 ED diagnoses. Participants who met criteria for DSM-5 AN, BN, or BED were then grouped according to the DSM-5 severity specifier that corresponded to their diagnosis. Due to the nature of EDE items, only frequencies of vomiting, laxative, and diuretic use were available to define BN severity groups, though the DSM-5 also includes excessive exercise and fasting as inappropriate compensatory behaviors. Generalized linear models (GLM) compared severity groups on outcome variables. Main effects of severity grouping were assessed with Wald χ^2 tests; significant effects were followed up with pairwise comparisons. Treatment outcomes in the BN and BED samples were assessed by end of treatment EDE global scores, behavioral frequencies (BN: OBEs and compensatory behaviors; BED: OBEs), and abstinence from ED behaviors, which was defined as the absence of OBEs and compensatory behaviors in BN and absence of OBEs in BED. Each GLM included severity grouping as a predictor; GLMs assessing end of treatment global scores and behavioral frequencies included baseline levels of outcome variables as covariates. Negative binomial distributions were specified for count data (i.e., behavioral frequencies); binary logistic models were used for dichotomous data (i.e., abstinence). As not all participants completed all assessments, each analysis was based on available data, treating incomplete data as missing.

3. Results

3.1. Demographics

The AN sample (n = 109) comprised four DSM-5-based severity groups: mild (n = 70, 64.2%), moderate (n = 26, 23.9%), severe (n = 9, 8.3%), and extreme (n = 4, 3.7%). The BN sample (n = 76) included mild (n = 17, 22.4%), moderate (n = 23, 30.3%), severe (n = 16, 21.1%), and extreme (n = 20, 26.3%) groups. The BED sample (n = 216) consisted of mild (n = 79, 36.6%), moderate (n = 85, 39.4%), severe (n = 44, 20.4%), and extreme (n = 8, 3.7%) severity groups. All samples were predominantly Caucasian (AN: 91.7%; BN: 88.2%; BED: 88.4%) and were mostly, if not exclusively, female (AN: 100%; BN: 89.5%; BED: 88.5%). Age and BMI across diagnoses are shown in Table 1. Across samples, there were no significant differences between severity groups in age; BN and BED samples had no differences in BMI between severity groups.

3.2. Clinical characteristics

Descriptive statistics and GLM results are shown in Table 1. Among those with AN, the mild group evidenced significantly higher EDE global scores compared to the moderate and severe groups. In the BN sample, the extreme, severe, and moderate groups reported more end of treatment OBE and compensatory behaviors and were less likely to evidence abstinence from these behaviors compared to the mild group at end of treatment; additionally, the extreme group reported more frequent end of treatment compensatory behaviors than the moderate group. In the BED sample, the mild, moderate, and severe groups reported higher end of treatment EDE global scores than the extreme group. There were no other significant effects.

4. Discussion

This study examined the validity of DSM-5 severity specifiers in AN, BN, and BED. In the AN and BED samples, most participants were classified as mild or moderate in severity, whereas there was a more equal distribution across severity groups in the BN sample. In general, results did not provide robust support for DSM-5 specifiers as indicators of concurrent severity. Across diagnoses, specifiers did not differentiate levels of co-occurring depression (AN, BN, BED), anxiety (AN), quality of life (AN, BED), or physical health (BN, BED), and in BN and BED samples, there were no associations between severity groups and ED psychopathology. These findings could suggest that other domains may be more accurate markers of severity, as suggested previously (Grilo et al., 2015b,c; Hartmann, Zeeck, & van, 2009; Sullivan, Bulik, Carter, & Joyce, 1996). It is also possible that the DSM-5 severity specifiers perform better with other variables that were not assessed in this study (e.g., neurocognitive or biological domains) but which would be useful to examine in future studies.

Interestingly, a reversed effect was observed with AN, in that higher BMI (i.e., low severity) was associated with greater ED psychopathology. One possible explanation is that individuals with AN who have higher BMI experience greater concerns about weight and shape, which are core factors of the measure (EDE) that assessed ED psychopathology.

Thus, ED psychopathology may be more elevated on this measure among the “less severe” AN group due to cognitive features related to body image. Alternatively, individuals low in weight (i.e., higher severity) may have been more likely to minimize symptom severity.

Regarding predictive validity, the mild BN group evidenced lower OBE and compensatory frequencies and was more likely to be abstinent from such behavior compared to other groups after a course of structured treatment. Thus, there is some support for DSM-5 severity specifiers predicting behavioral outcomes in BN, though this finding was based on a small sample size. Given the lack of differences in end of treatment EDE global scores in BN, it may be that differences in end of treatment OBEs and compensatory behaviors were related to correspondence with baseline differences in compensatory behaviors that defined severity groups. However, the end of treatment behavioral frequency findings took into account baseline frequencies and thus reflected a true change in behaviors, which would not be simply explained by baseline levels. Additionally, in BED sample, the extreme group evidenced lower end of treatment EDE global scores compared to other groups. While greater distress experienced by the extreme severity group may have motivated greater reductions in overall ED symptoms, reflected by EDE global scores, we interpret these results cautiously due to the small sample size and potential of regression to the mean.

It is important to note the limitations of this study, which relied on pre-existing samples of convenience that were limited to adults and predominantly Caucasian women. Thus, it is not clear to what extent these findings are generalizable to other demographic groups. The sample sizes in some of the severity groups were small, and thus there may not have been sufficient statistical power to detect meaningful differences with these groups. In the BN sample, we were not able to include excessive exercise and fasting as inappropriate compensatory behaviors, and applying a more narrow definition of inappropriate compensatory behaviors could have resulted in a smaller number of individuals categorized as severe and extreme in severity.

In sum, the present findings do not provide strong support for the concurrent or predictive validity of DSM-5 severity specifiers for EDs. While some studies have supported the validity of these specifiers, the lack of support in this study could be related to small sample sizes of some severity groups, and differences in measures used in this study. Nevertheless, results highlight the need for continued study, and the investigation of additional domains that have not been examined comprehensively in the literature. For instance, limited data exist regarding predictive validity of severity specifiers, and extant evidence has been inconclusive (Mustelin et al., 2016; Smink, van Hoeken, Oldehinkel, & Hoek, 2014). It is yet unclear whether the frequency of a single symptom or weight status alone are sufficient indices by which to characterize ED severity, as severity dimensions based on cognitive, affective, social, and biological domains may also yield clinically useful information (Grilo et al., 2008; Keel, Crosby, Hildebrandt, Haedt-Matt, & Gravener, 2013). It may be worth considering a multifaceted approach to characterize illness severity, and notably, the DSM-5 does not preclude the importance of other factors in determining severity (American Psychiatric Association, 2013; pp. 339, 345, 350). Future study of relevant domains across diagnoses could improve the utility and prognostic value of severity specifiers.

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Table 1

Descriptive statistics and comparisons of outcome measures across DSM-5 severity groups

		Mild[1]			Moderate[2]			Severe[3]			Extreme[4]					
Sample		***M***	***SD***	***n***	***M***	***SD***	***n***	***M***	***SD***	***n***	***M***	***SD***	***n***	**Wald χ^2**	***p***	**Pairwise comparisons**
AN	Age	24.10	7.40	68	27.31	9.18	26	26.63	13.16	8	32.75	6.29	4	6.52	.089	
	BMI	17.72	.47	70	16.57	.28	26	15.71	.24	9	14.44	.29	4	–	–	
	EDE-G	3.19	1.21	70	2.60	1.37	26	1.78	1.03	9	2.78	1.04	4	13.31	.004	1>2,3
	STAI-T	56.15	11.56	67	55.13	13.68	23	54.50	13.72	8	58.50	8.19	4	.43	.935	
	BDI	23.54	14.77	67	22.96	14.69	23	22.25	12.56	8	28.75	9.91	4	.64	.866	
	EDQOL	1.65	.70	44	1.34	.38	11	1.49	.55	6	1.72	.66	4	2.50	.476	
BN	Age	29.81	11.91	16	30.61	11.36	23	23.93	5.85	14	28.63	11.87	16	3.87	.276	
	BMI	24.38	5.08	16	23.98	5.70	22	23.83	5.79	15	22.26	3.99	20	1.97	.580	
	Baseline EDE-G	3.24	.85	17	2.84	1.14	23	3.46	.75	16	3.46	1.15	20	5.49	.139	
	BDI	16.53	7.00	17	14.77	10.77	22	14.88	9.27	16	21.00	13.72	19	4.55	.208	
	SF-36 PHC	57.07	7.62	17	54.87	7.10	22	53.58	7.83	16	52.54	10.12	19	6.28	.099	
	EOT EDE-G[a]	1.64	.926	9	1.59	.80	18	1.73	1.37	9	1.96	1.20	10	.30	.959	
	EOT OBE frequency[a]	.78	1.09	9	5.89	8.94	18	8.22	12.60	9	17.40	24.90	10	9.91	.019	4,3,2 > 1
	EOT purging frequency[a]	.11	.33	9	6.78	9.63	18	11.22	14.51	9	26.10	31.76	10	31.23	<.001	4>2>1; 3 > 1
		n	%		*n*	%		*n*	%		*n*	%				
	EOT abstinence[b]	8	88.9		6	33.3		1	11.1		3	30.0		8.49	.037	1 > 2,3,4
BED	Age	46.08	11.23	79	47.71	10.10	85	45.32	9.65	44	51.57	5.69	8	3.58	.278	
	BMI	38.54	7.22	79	39.09	8.33	85	38.99	7.27	44	41.04	12.13	8	.82	.845	
	Baseline EDE-G	2.50	.93	79	2.55	.78	85	2.78	.86	44	2.97	.82	8	4.77	.190	
	IDS	23.58	10.92	77	24.95	10.85	82	27.43	13.42	44	21.00	11.92	8	4.14	.246	
	SF-36 PHC	44.78	11.39	73	42.98	12.41	74	43.85	9.87	40	36.75	13.37	7	3.52	.318	
	IWQOL	86.26	27.68	65	91.00	20.70	72	97.74	23.07	38	87.43	20.32	7	5.80	.122	
	EOT EDE-G[a]	1.87	1.01	56	1.97	.68	61	2.21	.89	32	1.16	.54	6	13.38	.004	1,2,3 >4
	EOT OBE frequency[a]	4.88	6.12	56	7.15	11.00	61	12.19	16.11	32	12.17	19.29	6	1.80	.615	
		n	%		*n*	%		*n*	%		*n*	%				

	Mild[1]			Moderate[2]			Severe[3]			Extreme[4]					
Sample	***M***	***SD***	***n***	***M***	***SD***	***n***	***M***	***SD***	***n***	***M***	***SD***	***n***	**Wald χ^2**	***p***	**Pairwise comparisons**
EOT abstinence[b]	21	37.5		22	36.1		9	28.1		4	66.7		3.05	.384	

Note. AN = anorexia nervosa; BN = bulimia nervosa; BED = binge-eating disorder; BMI = body mass index; EDE-G = Eating Disorder Examination-Global score; STAI-T = State Trait Anxiety Inventory-Trait subscale; BDI = Beck Depression Inventory; EDQOL = Eating Disorder Quality of Life Total Score; SF-36 PHC = 36-Item Short Form Survey Physical Health Component; EOT = end of treatment assessment; OBE = objective binge episode; IDS = Inventory of Depressive Symptomatology; IWQOL = Impact of Weight on Quality of Life-Lite Questionnaire. Post-hoc pairwise comparisons indicate significant differences at $p < .05$.

[a]End of treatment analyses co-varied for baseline levels of outcome variables; behaviors represent frequency over the last 28 days. Purging frequency was calculated as the sum of self-induced vomiting, laxative, and diuretic use episodes.

[b]EOT abstinence was defined as no OBEs or purging episodes over the last 28 days in the BN sample, and no OBEs over the last 28 days in the BED sample. Abstinence percentages represent the proportion of the sample within each severity group.