REGULAR ARTICLE

The Use of Multiple Purging Methods as an Indicator of Eating Disorder Severity

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ABSTRACT

Objective: Previous studies indicate a distinction between those who use one versus multiple methods of purging, but these studies have not controlled for differences in purging frequency. The current study examined whether purging frequency or the use of multiple purging (MP) methods provides more information about eating disorder severity.

Method: Existing data were reanalyzed to examine associations between facets of purging and psychological measures among women with bulimia nervosa, purging disorder, and controls. Analyses compared the use of MP methods and purging frequency as indicators of eating pathology.

Results: MP methods demonstrated associations with greater eating disorder severity; purging frequency was associated with increased binge frequency and general psychopathology.

Conclusion: The presence of MP methods provides more information about eating disorder severity than purging frequency, which seems to be a marker of related psychopathology. ©2007 by Wiley Periodicals, Inc.

Keywords: bulimia nervosa; purging; severity

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Introduction

Since publication of the DSM-IV,[1] the presence of purging has been used to distinguish diagnostic subtypes of anorexia nervosa (AN) and bulimia nervosa (BN). Subtypes were based on research showing differences in eating disorder severity, prognosis, and comorbid psychopathology between individuals who purge versus those who do not.[2–4] Previous research also suggests that the number of purging methods used may provide important information about eating disorder severity[5–7] and related psychopathology.[5,6,8,9] For example, those using multiple purging (MP) methods report significantly more depression,[8] self-injurious behavior, and suicide attempts than those using a single method of purging (SP).[9] In a recent longitudinal study of female college students, MP showed increased eating disorder severity compared with SP at baseline, and groups maintained significant differences over time.[7] However, this study was based on lifetime symptom patterns and thus, did not control for purging frequency. Indeed, to our knowledge, no previous study has established whether the severity associated with the use of MP methods can be attributed to increased purging frequency. Purging frequency is commonly used as a marker of eating disorder severity.[10–12] Thus, the current study compares the use of multiple methods of purging versus purging frequency as markers of eating disorder severity.

Method

Women (n = 111), ages 18–45 with a Body Mass Index (BMI) between 19 and 25 kg/m^2, were originally recruited from the community for a study on the clinical significance and distinctiveness of purging disorder (PD), described in detail elsewhere.[13] Existing data collected among women with PD, women with DSM-IV BN-purging subtype, and noneating disorder controls were reanalyzed for the current study. Of relevance to the current study, inclusion criteria for PD were the same as criteria for DSM-IV BN purging subtype, with the exception that PD participants did not have objectively large binge episodes. Thus, all participants endorsed purging, on average, at least twice per week over the previous 3 months. Participants who reported using more than one method of purging (self-induced vomiting, laxative, or diuretic

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abuse) in the last 3 months were included in the MP group (n = 28), and those using only one method of purging were included in the SP group (n = 48). Although it is likely that number of purging methods and purging frequency are associated, MP status did not require a greater purging frequency. For example, an MP participant could self-induce vomiting once per week and abuse laxatives once per week, while an SP participant could self-induce vomiting twice per week. Thus, MP and SP participants could have equivalent purging frequencies.

There was no significant difference between MP and SP with regard to eating disorder diagnosis (BN vs. PD; $\chi^2(1) = 0.60$, $p = 0.44$). Of SP women, 83% (n = 40) reported self-induced vomiting, 15% (n = 7) reported abusing laxatives, and 2% (n = 1) reported abusing diuretics. Among MP women, 96% (n = 27) reported self-induced vomiting, 86% (n = 24) reported abusing laxatives, and 39% (n = 11) reported abusing diuretics. Thus, the most common method of purging was self-induced vomiting. Among MP women, 79% (n = 22) used two purging methods and 21% (n = 6) used three purging methods. There were no significant differences between MP, SP, and controls in age ($F(2,108) = 1.05$, $p = 0.35$), BMI ($F(2,105) = 0.85$, $p = 0.43$), ethnicity ($\chi^2(8) = 12.08$, $p = 0.15$), or educational background ($\chi^2(4) = 1.73$, $p = 0.79$).

Participants completed the following interviews and self-report measures: Barratt Impulsiveness Scale (BIS-11),[14] Beck Depression Inventory (BDI),[15] Body Shape Questionnaire (BSQ),[16] Eating Disorder Examination (12th edition) (EDE),[17] State-Trait Anxiety Inventory (STAI),[18] Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I),[19] Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II),[20] and Three Factor Eating Questionnaire (TFEQ).[21] Height and weight were measured using a digital scale and wall-mounted ruler. This study was reviewed and approved by institutional review boards at Harvard University and the University of Iowa, and participants provided written informed consent prior to participation.

Pearson's partial correlations were used to examine associations between frequency of purging and dimensional measures of eating and general psychopathology, controlling for number of purging methods, among women who purged. Purging frequency was defined as the number of behavioral occurrences of purging per week. MANOVA's were used to compare MP and SP on measures of eating pathology (EDE, TFEQ, BSQ), general psychopathology (BDI, STAI), and impulsiveness (BIS-11). ANCOVA's controlling for frequency of purging were used for post-hoc comparisons of MP and SP.[a] To determine the incremental validity gained by examining MP versus purging frequency, the results of analyses were converted to a common metric (Cohen's d), and the significance of the difference between effect sizes was directly tested using methods described in Meng, Rosenthal, and Rubin.[22] All post-hoc comparisons were Bonferroni-corrected to control for family-wise error rate. T-tests were used to examine differences in purging frequency between those with and without Axis I and Axis II disorders, and chi-square analyses were used to examine differences in rates of Axis I and Axis II diagnoses among groups.

[a]Results of analyses comparing MP and SP women did not change when binge frequency was also added as a covariate.

Results

Eating Disorder Severity

Among those with eating disorders, increased purging frequency was significantly associated with objective and subjective binge frequencies, controlling for multiple methods of purging (see **Table 1**). However, there were no other significant associations between purging frequency and indicators of eating disorder severity. As expected, both MP and SP participants had higher scores on all measures of eating pathology than controls (see **Table 1**). In addition, MP reported a higher purging frequency than SP despite reporting statistically equivalent objective and subjective binge frequencies. Post-hoc analyses controlling for purging frequency showed that MP had higher total EDE scores, as well as higher Restraint, Eating Concern, Weight Concern, and Shape Concern scores than SP. Consistent with findings from interview assessments, MP reported significantly higher BSQ scores and higher TFEQ Cognitive Restraint than SP. However, the MP and SP groups did not differ significantly on TFEQ Disinhibition or Hunger. Direct comparison of effect sizes from analyses of EDE total scores, a measure of global eating disorder severity, revealed that the association between multiple methods of purging and eating disorder severity (d = 0.81) was significantly greater than the association between purging frequency and eating disorder severity (d = 0.21) ($Z = 2.01$, $p = 0.04$).

Severity of Related Psychopathology

Results of analyses for measures of general psychopathology are presented in **Table 2**. Purging frequency was positively correlated with depressive symptoms, impulsiveness, and trait anxiety. Participants with current mood, anxiety, impulse control, or personality disorders, and lifetime histories of impulse control disorders had higher purging frequencies than those without. As expected, both MP

TABLE 1. Associations between purging frequency, multiple purging methods, and eating pathology

	Purging Frequency	MP (n = 28)		SP (n = 48)		Controls (n = 35)		
Measure	r	M	SD	M	SD	M	SD	F (df = 2,108)
Eating Disorder Examination	0.11	4.4^a	0.7	3.6^b	0.9	0.3^c	0.3	303.0***
Restraint	−0.02	4.7^a	0.6	3.8^b	1.4	0.1^c	0.5	200.4***
Eating Concern	0.07	3.1^a	1.3	2.5^b	1.1	0.05^c	0.2	94.4***
Weight Concern	0.12	4.8^a	1.2	3.9^b	1.2	0.5^c	0.5	165.1***
Shape Concern	0.18	4.6^a	1.0	3.9^b	1.0	0.4^c	0.5	224.1***
								$t^§$ (df = 46.9–73)
OBE frequency	0.50***	3.8	5.0	3.2	4.3	—	—	−0.6
SBE frequency	0.36**	2.9	3.3	3.9	5.3	—	—	0.9
Purging frequency	—	10.6^a	8.6	6.7^b	4.4	—	—	−2.2*
Vomiting	—	6.4	6.9	5.9	5.0	—	—	−0.4
Laxative use	—	2.1^a	2.5	0.7^b	2.0	—	—	−2.7*
Diuretic use	—	2.0^a	5.0	0.1^b	0.8	—	—	−2.0*
								F (df = 2,108)
Body Shape Questionnaire	0.19	159.9^a	31.1	132.7^b	30.2	50.8^c	13.1	141.9***
TFEQ	0.01	35.2^a	6.9	34.2^a	7.6	10.1^b	4.9	160.0***
Cognitive Restraint	−0.27	17.7^a	2.5	15.8^b	3.7	3.4^c	2.9	206.6***
Disinhibition	0.11	10.5^a	4.2	10.5^a	3.9	3.3^b	1.6	52.6***
Hunger	0.14	7.0^a	3.9	7.8^a	3.6	3.4^b	2.5	17.5***

Note: MP = participants using multiple methods of purging; SP = participants using a single method of purging.

Superscripts that differ represent significant differences of $p < 0.05$ between groups. ANOVA's controlling for purging frequency were used for post-hoc comparisons of MP and SP.

§These analyses were completed comparing only the MP and SP groups because controls were required to have no behavioral symptoms for study inclusion.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

TABLE 2. Associations between purging frequency, multiple purging methods, and general psychopathology

	Purging Frequency	MP (n = 28)		SP (n = 48)		Controls (n = 35)		
Measure	r	M	SD	M	SD	M	SD	F (df = 2,108)
Beck Depression Inventory	0.37**	18.5^a	13.0	12.3^a	9.0	1.9^b	2.4	27.0***
Barratt Impulsiveness Scale	0.28*	68.3^a	12.6	63.3^a	11.9	56.4^b	7.2	9.4***
State-Trait Anxiety Inventory	0.13	99.4^a	25.6	88.2^a	22.2	61.6^b	14.6	26.1***
State	−0.03	47.2^a	14.1	41.5^b	12.2	29.0^c	7.5	21.4***
Trait	0.30*	52.2^a	13.2	47.0^a	12.5	32.7^b	8.0	24.2***
	$t^§$ (df = 31–72)	%	n	%	n	%	n	$\chi^2(2)$
Current Axis I diagnosis								
Mood disorders	2.3*	44.4^a	12	29.2^a	14	0.0^b	0	18.12***
Substance use disorders	−0.8	3.6	1	8.3	4	0.0	0	3.43
Anxiety disorders	2.5*	35.7^a	10	36.2^a	17	5.7^b	2	11.28**
Impulse control disorders	−2.4*	28.6^a	8	20.8^a	10	0.0^b	0	10.67**
Lifetime Axis I diagnosis								
Mood disorders	1.7	85.7^a	24	75.0^a	36	22.9^b	8	32.62***
Substance use disorders	0.9	42.9^a	12	52.1^a	25	17.1^b	6	10.68**
Anxiety disorders	1.8	42.9^a	12	43.8^a	21	14.3^b	5	9.04*
Impulse control disorders	−3.1**	42.9^a	12	29.2^a	14	0.0^b	0	17.48***
Personality disorders								
Cluster A	−0.9	9.5^a	2	0.0^b	0	0.0^b	0	6.82*
Cluster B	−0.5	3.6	1	4.2	2	0.0	0	1.44
Cluster C	−2.1	10.7	3	10.4	5	0.0	0	3.97
Any personality disorder	−2.6*	26.1^a	6	19.5^a	8	0.0^b	0	8.95*

Note: MP = participants using multiple methods of purging; SP = participants using a single method of purging.

Superscripts that differ represent significant differences of $p < .05$ between groups. Correlations between purging frequency and self-report measures control for multiple methods of purging. ANOVA's controlling for purging frequency were used for post-hoc comparisons of MP and SP.

§Analyses test differences in purging frequency between those with and without a history of current or lifetime DSM-IV diagnoses.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

and SP showed significantly greater anxiety, depression, and impulsiveness than controls. MP and SP also had higher rates of current and lifetime mood, anxiety, and impulse control disorders, current substance use disorders, and personality disorders compared with controls. Post hoc comparisons controlling for purging frequency showed that MP had significantly higher levels of state anxiety and Cluster A personality disorder diagnoses than SP. However, there were no other significant differences in general psychopathology between MP and SP, including no differences in current comorbid mood or anxiety disorders. To compare effect sizes from analyses of general psychopathology, a composite variable was computed by summing the number of current Axis I disorders for each participant. The association between purging frequency and Axis I psychopathology represents a large effect size ($d = 0.80$), whereas the association between MP methods and Axis I psychopathology represents a small effect size ($d = 0.05$). Direct comparison of effect sizes revealed that the association of Axis I psychopathology with purging frequency was significantly larger than its association with MP methods ($Z = 2.54$, $p = 0.01$).

Conclusion

This study sought to examine whether the use of MP methods (after controlling for purging frequency) or purging frequency (after controlling for MP methods) provides a better index of eating disorder severity. Although higher purging frequency was associated with greater binge frequency, MP was associated with increased body image disturbance, measured by the BSQ and EDE Shape and Weight Concern subscales, greater restraint, measured by the EDE Dietary Restraint and TFEQ Cognitive Restraint subscales, and eating concern, measured by the EDE Eating Concern subscale, compared with SP. Further, only MP was significantly associated with a global measure of eating disorder severity, the EDE total score. Thus, data support the use of multiple methods of purging as a better indicator of eating disorder severity than purging frequency.

While the use of multiple methods of purging is a better marker of eating disorder severity, analyses suggest that purging frequency serves as a better indicator of general psychopathology. Purging frequency was associated with greater depression, impulsiveness, anxiety, and personality disorder diagnoses. In contrast, MP women only reported greater Cluster A personality disorders compared with SP women. Results of the current study suggest that the association between the use of multiple methods of purging and general psychopathology found in previous studies[5,6,8,9] may be attributable to differences in purging frequency between MP and SP.

Data from this reanalysis comparing MP and SP may be compared with analyses from the original study of the distinctiveness of PD and BN[13] to examine the psychological correlates of purging versus binge eating, respectively. The use of MP methods was associated with significantly increased dietary restraint and body image disturbance, but not hunger or disinhibition. In contrast, the presence of objectively large binge episodes among those who purge was associated with increased hunger, disinhibition, and concern over eating, but not dietary restraint or body image disturbance. Moreover, the use of multiple methods of purging was associated with elevated EDE total scores whereas the presence of objectively large binge episodes was not. These results suggest unique correlates for the core behavioral features of BN, binge eating and purging, and suggest that, between the two, purging is associated with eating disorder severity.

Strengths of this study address limitations of previous comparisons of MP and SP. Self-report measures and structured clinical interviews with excellent psychometric properties were employed, including the EDE.[23] Participants with current eating disorders were recruited from the community and assessed for severity of eating pathology and related psychopathology. To our knowledge, this is the first study to control for purging frequency to rule out the possibility that MP is simply a proxy for increased purging frequency.

While this study had important strengths, it also had limitations. First, participants were designated to MP and SP groups based on purging methods used in the 3 months prior to assessment, and lifetime histories of purging methods were not assessed. Thus, women included in the SP group may have used multiple methods of purging in the past. This may have diminished our ability to detect differences between MP and SP in lifetime rates of Axis I and II disorders. Second, inclusion criteria for the eating disorder groups required that participants purged at least twice per week. Thus, although findings suggest that purging frequency is associated with a limited range of indicators of eating disorder severity, the full range of purging frequency across bulimic disorders was not included. Therefore, results cannot inform decisions about altering the minimum purging frequency in DSM

criteria for BN in terms of the impact this would have on the severity or clinical significance of the illness. Third, MP and SP differed with regard to laxative abuse. Thus, greater eating disorder severity in MP may be due to increased laxative use in the MP group.[24] However, results from Haedt et al.[7] indicate that it is the use of MP methods rather than the use of any given type of purging method that is associated with increased eating disorder severity. Fourth, the study includes women with DSM-IV BN and PD. The number of participants in the current study does not provide adequate power to examine differences between MP and SP within each diagnostic group. However, results from Haedt et al. support the distinction between MP and SP in a separate community sample. Finally, analyses imposed a dichotomous distinction between those who use one versus multiple methods of purging. Number of purging methods may exist along a continuum such that an increased number of purging methods is associated with increased eating disorder severity. In the current study, only a small number of participants used more than two purging methods, preventing examination of number of purging methods as a continuous variable. Future studies should examine the number of purging methods as a dimensional rather than categorical construct.

In conclusion, results suggest that the use of MP methods is a better indicator of eating disorder severity than purging frequency. The use of MP methods was associated with general eating pathology, while purging frequency was not. In addition, the use of multiple methods of purging was associated with several specific indices of eating disorder severity including restraint, weight concern, and body image disturbance. Purging frequency, although correlated with binge frequency, appears to be a better indicator of comorbid psychopathology. Of interest, purging frequency is commonly used as an indicator of eating disorder severity in psychotherapy treatment trials.[12,25] Results of the current study suggest that examining the use of multiple methods of purging provides incremental validity for predicting eating disorder severity. Indeed, after controlling for purging frequency, 18% of the variance in EDE total scores was explained by the use of multiple versus single purging methods.

The distinction between MP and SP found in this study supports findings of a recent latent class analysis study of eating pathology.[6] Importantly, results of the latent class analysis showed that MP is distinguished from SP, in part, by more severe eating pathology. Thus, the distinction between MP and SP has important implications for the nosology of eating disorders. Specifically, using MP methods as a marker of eating disorder severity could provide more meaningful distinctions among women who purge than our current diagnostic system. Improving diagnostic classifications of eating disorders that are characterized by purging may lead to advances in etiological research and treatment. Future studies should examine how the use of MP methods affects treatment response and remission.

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