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Examining a Psychosocial Interactive Model of Binge Eating and Vomiting in Women with Bulimia Nervosa and Subthreshold Bulimia Nervosa

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Abstract

The current study tested a psychosocial interactive model of perfectionism, self-efficacy, and weight/shape concern within a sample of women with clinically significant bulimic symptoms, examining how different dimensions of perfectionism operated in the model. Individuals with bulimia nervosa (full diagnostic criteria or subthreshold) completed measures of bulimic symptoms, multidimensional perfectionism, self-efficacy, and weight/shape concern. Among those who were actively binge eating ($n = 180$), weight/shape concern was associated with binge eating frequency in the context of high perfectionism (either maladaptive or adaptive) and low self-efficacy. Among those who were actively vomiting ($n = 169$), weight/shape concern was associated with vomiting frequency only in the context of high adaptive perfectionism and low self-efficacy. These findings provide support for the value of this psychosocial interactive model among actively binge eating and purging samples and for the importance of considering different dimensions of perfectionism in research and treatment related to bulimia nervosa.

Keywords

Perfectionism; Self-efficacy; Body dissatisfaction; Binge eating; Vomiting

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1. Introduction

A relation between perfectionism and bulimic symptoms has been supported in meta-analytic work, along with the suggestion that perfectionism might operate in interaction with other variables in predicting disordered eating (Stice, 2002). In order to better understand under which circumstances perfectionism is associated with bulimic symptoms, an interactive model of perfectionism, self-efficacy, and body dissatisfaction has been proposed (Bardone, Vohs, Abramson, Heatherton, & Joiner, 2000). Here, we test this theoretically-driven interactive model for the first time in a sample of women with bulimia nervosa (full diagnostic criteria or subthreshold). We also add to the literature by examining different dimensions of perfectionism in the interactive model and by separately examining binge eating and purging behaviors.

As initially conceptualized, this interactive model posits that the combination of the vulnerabilities of *high* perfectionism and *low* self-efficacy and the stress of *high* body dissatisfaction identifies individuals with bulimic symptoms in non-clinical populations (Bardone et al., 2000). A person with this combination of variables would be in the position of having high standards and/or feeling like a failure if she does not live up to standards (high perfectionism), being aware that she is not meeting one of her standards (body dissatisfaction), and doubting that she could reach her standards (low self-efficacy). Theoretically, this confluence of variables would generate aversive self-awareness and negative affect which may motivate binge eating as temporary relief according to escape theory and mood modulation theory (Fairburn, Cooper, & Shafran, 2003; Heatherton & Baumeister, 1991), and as suggested by ecological momentary assessment data (Engelberg, Steiger, Gauvin, & Wonderlich, 2007).

To date, only one study has tested these three factors, finding support for their interaction in predicting binge eating but not purging in a non-clinical sample (Bardone-Cone, Abramson, Vohs, Heatherton, & Joiner, 2006). Specifically, the combination of high perfectionism, low self-efficacy, and feeling overweight was associated prospectively with greater number of weeks of binge eating. Work on a related model using self-esteem in place of self-efficacy has also found support (Holm-Denoma et al., 2005; Vohs, Bardone, Joiner, Abramson, & Heatherton, 1999; Vohs et al., 2001). Two studies using self-esteem have not replicated these interactive findings (Shaw, Stice, & Springer, 2004; Steele, Corsini, & Wade, 2007). Given conceptual work suggesting that self-efficacy, rather than self-esteem, is the better fit in interaction with failing to meet high standards (Bardone et al., 2000), and given empirical work demonstrating that increases in bulimic symptoms are associated with the self-efficacy component of self-esteem (Bardone, Perez, Abramson, & Joiner, 2003), the more robust interactive model may require self-efficacy rather than self-esteem as a key construct.

Whether perfectionism, self-efficacy, and body dissatisfaction combine meaningfully in a clinical sample is unknown. While in unselected non-clinical samples there is some support for this model predicting presence of bulimic symptoms, the question is different in samples where all individuals are exhibiting bulimic symptoms. We propose that the more appropriate question in clinical samples is: Does the model demonstrate the expected pattern of moderation, namely, that among women with the joint vulnerabilities of high perfectionism and low self-efficacy, it is those experiencing higher levels of body dissatisfaction who will demonstrate higher binge eating and purging frequencies?

Although most eating disorder research, including all but one of the prior studies of this interactive model, have used a unidimensional assessment of perfectionism, there is substantial theoretical and empirical support for multidimensional perfectionism (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991). Factor analyses of the most well-established multidimensional measures of perfectionism support an underlying structure of “maladaptive”

perfectionism (e.g., interpreting mistakes as failures) and “adaptive” or “benign” perfectionism (e.g., having very high standards), with maladaptive perfectionism having stronger associations with psychopathology and distress (Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000; Frost, Heimberg, Holt, Mattia, & Neubauer, 1993). Interestingly, among individuals with bulimia nervosa there is evidence that both maladaptive and adaptive perfectionism are elevated compared to healthy controls (Lilenfeld et al., 2000),

The one study of the interactive model testing maladaptive and adaptive dimensions of perfectionism did not find an interactive effect with maladaptive perfectionism in their non-clinical sample (Steele et al., 2007). Unexpectedly, they found that high adaptive perfectionism, high self-esteem, and feeling overweight was associated with elevated bulimic symptoms, which the authors interpreted as suggesting that self-esteem does not serve as a buffer in the context of perfectionistic standards and feeling overweight. How these perfectionism dimensions operate in conjunction with self-efficacy and in clinical samples warrants investigation.

This work expands upon prior work involving an interactive model of perfectionism, self-efficacy/self-esteem, and body dissatisfaction in several important ways. It is the first study to test the relation between the confluence of perfectionism, self-efficacy, and body dissatisfaction and bulimic symptoms in a sample with clinically significant bulimic symptoms. It also contributes to the understanding of multidimensional perfectionism and bulimia nervosa by examining both maladaptive and adaptive dimensions of perfectionism. Additionally, it is only the second study of the interactive model to separately examine binge eating and purging and to focus on self-efficacy. Based on the existing literature and theory, it is predicted that the impact of body dissatisfaction (indexed in the current work by weight/shape concern) on both binge eating and purging will be greatest among individuals with the vulnerabilities of high perfectionism and low self-efficacy.

2. Method

2.1. Participants

Participants were 204 adult women recruited through community advertising and eating disorder clinics in five Midwestern cities. Based on a telephone interview, 143 (70%) met diagnostic criteria for bulimia nervosa according to the *Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV; APA, 1994)*, and 61 (30%) met criteria for subthreshold bulimia nervosa, defined as 1) binge eating and compensatory behavior occurring at least once per week over the past three months, or 2) compensatory behavior occurring at least once per week along with subjective binge eating (i.e., eating episodes that are not objectively large but involve loss of control). Individuals with bulimia nervosa and those with subthreshold bulimia nervosa are similar in terms of severity of eating pathology and general psychiatric comorbidity, highlighting the clinical significance of subthreshold levels (Fairburn et al., 2007). Participants had a mean age of 25.67 years ($SD=8.85$), were mostly single, never-married (75%), self-identified as Caucasian (91%), and had at least some college education (92%). Per self-reported weight and height, mean body mass index (BMI) was 22.90 kg/m² ($SD=5.23$).

2.2. 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; First, Spitzer, Gibbon, & Williams, 1995) and used criteria for binge eating established in the Eating Disorder Examination (EDE; Fairburn & Cooper, 1993) to determine if food portions reported were objectively large. Interested women who met current *DSM-IV* diagnostic criteria for

bulimia nervosa or had subthreshold bulimia nervosa as described above provided written informed consent, completed a set of questionnaires privately, and received fifty dollars for their involvement. This study was approved by Institutional Review Boards at each study site.

2.3. Measures

2.3.1. The Structured Clinical Interview for DSM-IV, Patient Edition (SCID-P) - Eating Disorder Module (First et al., 1995)—The SCID-P is a widely used semi-structured interview with well-established reliability and validity (Segal, Hersen, & Van Hasselt, 1994). The eating disorder module was administered in order to determine study eligibility.

2.3.2. Frost Multidimensional Perfectionism Scale (MPS; Frost et al., 1990)—The two MPS subscales used in this report are Concern Over Mistakes (CM-9 items; reflecting the tendency to react negatively to mistakes and interpret mistakes as failures) and Personal Standards (PS-7 items; reflecting holding extremely high standards for oneself). Items are rated on a 5-point scale. CM is arguably the most related of the MPS subscales to other maladaptive perfectionism measures and has the most consistent and strongest relations with a variety of forms of distress, while PS has clearly demonstrated the strongest link to perfectionism measures generally construed as adaptive (Enns & Cox, 2002). The MPS has demonstrated high subscale reliabilities ($\alpha=.77-.93$) and high correlations with other measures of perfectionism (Frost et al., 1990). In this sample, $\alpha=.91$ for CM and $\alpha=.86$ for PS.

2.3.3. Self-efficacy Scale (SES; Sherer et al., 1982)—The General Self-efficacy subscale (GSES; 17 items, 5-point scale) of the Self-efficacy Scale was used to assess general self-efficacy, which reflects one's general level of confidence in one's abilities. The GSES has adequate reliability ($\alpha=.86$) and validity (Bosscher & Smit, 1998; Sherer et al., 1982). In this sample, $\alpha=.89$ for GSES.

2.3.4. Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994)—The EDE-Q was used to assess body dissatisfaction and bulimic symptoms. This scale is a 36-item self-report measure of the prior 28 days adapted from the EDE interview (Fairburn & Cooper, 1993), and has been used with increasing frequency in assessing eating disorder symptoms in clinical and community populations (Anderson & Williamson, 2002). Body dissatisfaction was operationalized by combining the Weight Concern and Shape Concern subscales (12 items total) to capture multiple aspects of body dissatisfaction. Furthermore, factor analytic work supports the items from these two subscales generally loading on one factor (Peterson et al., 2007). The EDE-Q subscales have good internal consistency ($\alpha=.78-.93$) and test-retest reliability (Luce & Crowther, 1999). In this sample, $\alpha=.88$ for Weight/Shape Concern.

To measure objective binge eating, participants were asked on how many occasions in the past 28 days they ate “what other people would regard as an unusually large amount of food given the circumstances” *and* had a “sense of having lost control over your eating” in that eating episode. To measure purging via vomiting, participants were asked on how many occasions in the past 28 days they self-induced vomiting as a means of controlling shape or weight. Due to low base rates, the purging behaviors of laxative use and diuretic use were not included in analyses.

3. Results

3.1. Data analytic strategy

To test the interaction of perfectionism self-efficacy, and body dissatisfaction, we conducted hierarchical multiple regression analyses with binge eating frequency and vomiting frequency as the dependent variables (Baron & Kenny, 1986; Cohen, Cohen, West, & Aiken, 2003). In Step 1: the three main effects (perfectionism dimension, self-efficacy, and weight/shape concern); Step 2: the two-way interactions between main effects; and Step 3: the three-way interaction: perfectionism dimension $\times$ self-efficacy $\times$ weight/shape concern. Independent variables were mean-centered prior to regression analyses, as recommended for analyses involving higher order interactions (Cohen et al., 2003), and the nature of significant interactions was determined via simple slope analyses (Aiken & West, 1991). Because the distributions of the dependent variables were positively skewed, a logarithmic ($\log_{10}$) transformation was applied to them (Tabachnick & Fidell, 2001), resulting in reasonably symmetric distributions. Analyses were run with and without BMI as a covariate; the same pattern of results emerged and we report results without BMI here.

Given our interest in the levels of bulimic behaviors within an actively bulimic sample, binge eating analyses were restricted to those who reported objective binge eating in the past month ($n=180$; 88% of the full sample), and purging analyses were restricted to those who reported vomiting in the past month ($n=169$; 83%).¹ To examine how the model operates among those with active bulimic symptoms, in contrast to prior work on this model with non-clinical samples with high rates of non-bingers and non-vomiters, focusing on actively bingeing and actively vomiting subsamples was important. Of those who binged in the past month, 85% also reported vomiting in the past month, and of those who vomited in the past month, 90% also reported bingeing in the past month; thus, there was substantial overlap between groups.

3.2. Descriptive statistics

Table 1 provides the means, standard deviations, and intercorrelations for the study variables. Despite the substantial overlap in groups, descriptive statistics are provided separately for the binge eating and vomiting subsamples to parallel the separate interactive analyses. Of note, the correlations between maladaptive and adaptive perfectionism show that these perfectionism dimensions are related but distinct. Neither the factors in the interactive model (perfectionism, self-efficacy, weight/shape concern) nor BMI were strongly related to binge eating frequency or vomiting frequency.²

3.3. Interactive model with Maladaptive Perfectionism

The three-way interaction with maladaptive perfectionism was significant for binge eating (see Table 2). Simple slope analyses indicated that, as predicted, weight/shape concern was significantly associated with binge eating frequency at high CM (1 *SD* above the mean) and low self-efficacy (1 *SD* below the mean) ($\beta=.45$, $t(172)=2.30$, $p=.023$), such that, in the context of these vulnerabilities, higher weight/shape concern was significantly associated with more binge eating. Weight/shape concern was not significantly associated with binge eating at high

¹A participant could have met full bulimia nervosa criteria by, for example, having binged 2 $\times$ /week over the past three months, and having vomited at a rate of 3 $\times$ /week for the first two months, but not vomited at all in the past month.

²Interestingly, the ranges and the standard deviations of the variables that compose the interactive model were generally similar to those found in non-clinical college women. For example, using the full sample ($N=204$), the range was 10-45 ($SD=7.25$) for CM, 9-35 ($SD=5.54$) for PS, 26-85 ($SD=11.46$) for self-efficacy, and .92-6.00 ($SD=1.12$) for weight/shape concern. In an unselected sample of 179 Caucasian college women, the range was 9-39 ($SD=6.39$) for CM, 11-34 ($SD=4.93$) for PS, 41-83 ($SD=9.23$) for self-efficacy, and .08-6.00 ($SD=1.48$) for weight/shape concern (Bardone-Cone, 2007). The variability in the predictors in the current sample avoids concerns about restriction of range. Note that since there are multiple pathways to bulimic symptoms, it would not be expected that all individuals with bulimia nervosa would score at only one extreme on each of these variables.

CM/high self-efficacy ($\beta = -.26$, $t(172) = -1.66$, $p = .099$), low CM/low self-efficacy ($\beta = -.06$, $t(172) = -.29$, $p = .776$), or low CM/high self-efficacy ($\beta = -.13$, $t(172) = -1.05$, $p = .296$).

The three-way interaction with maladaptive perfectionism was non-significant for vomiting ($\beta = -.14$, $t(161) = -1.35$, $p = .181$).

3.4. Interactive model with Adaptive Perfectionism

The three-way interaction with adaptive perfectionism was significant for binge eating (see Table 3). Weight/shape concern was marginally significantly associated with binge eating frequency at high PS and low self-efficacy ($\beta = .40$, $t(172) = 1.91$, $p = .058$), such that, in the context of these vulnerabilities, higher weight/shape concern was associated with more binge eating. Additionally, weight/shape concern was marginally significantly associated with binge eating frequency at high PS and high self-efficacy ($\beta = -.30$, $t(172) = -1.94$, $p = .054$), but in the opposite direction (i.e., lower binge eating frequency). Weight/shape concern was not significantly associated with binge eating frequency at low PS/low self-efficacy ($\beta = -.02$, $t(172) = -.14$, $p = .890$), and low PS/high self-efficacy ($\beta = .15$, $t(172) = 1.04$, $p = .302$).

The three-way interaction with adaptive perfectionism was also significant for vomiting (see Table 4). As predicted, weight/shape concern was significantly associated with vomiting frequency at high PS and low self-efficacy ($\beta = .59$, $t(161) = 2.74$, $p = .007$), such that, in the context of these vulnerabilities, higher weight/shape concern was significantly associated with more vomiting. Weight/shape concern was not significantly associated with vomiting frequency at high PS/high self-efficacy ($\beta = -.26$, $t(161) = -1.67$, $p = .098$), low PS/low self-efficacy ($\beta = .03$, $t(161) = .15$, $p = .878$), or low PS/high self-efficacy ($\beta = .10$, $t(161) = .73$, $p = .467$).

4. Discussion

This study examined how an interactive model of perfectionism, self-efficacy, and weight/shape concern relates to binge eating and purging in a sample of women with clinically significant bulimic symptoms. The current findings further support the importance of both maladaptive and adaptive dimensions of perfectionism in relation to bulimic symptoms among those with bulimia nervosa (Bardone-Cone et al., 2007; Lilenfeld et al., 2000). Thus, a more descriptive term like “high personal standards” or “achievement striving” rather than a value-laden term may be appropriate for the “adaptive” dimension. Of note, the focus on self-imposed, personally demanding standards in PS reflects the concept of “clinical perfectionism” that Shafran and colleagues (2002) have proposed to be detrimental.

The nature of the interactive findings for binge eating was consistent with the other test of the interaction of perfectionism, self-efficacy, and body dissatisfaction (Bardone-Cone et al., 2006). Weight/shape concern was associated with higher binge eating frequency in the context of high levels of perfectionism (CM and, to a lesser degree, PS) and low levels of self-efficacy. In contrast, weight/shape concern was not related to binge eating in the context of other combinations of levels of perfectionism and self-efficacy with one marginally significant exception: high PS and high self-efficacy. It is possible that women with elevated weight/shape concern who also have high PS and high self-efficacy are more motivated and able to engage in more effective means of weight loss via healthy eating and exercise, and thus are lower in binge eating.

Only Bardone-Cone and colleagues (2006) have tested whether the interactive model is associated with purging, finding no interactive effect in their non-clinical sample. In contrast, the current study found that, when “adaptive” perfectionism was used in the model, weight/shape concern was associated with elevated vomiting frequency among those with high PS and low self-efficacy. Some researchers have suggested that vomiting may be initiated as a

seemingly pragmatic attempt to counter the effects of a binge, but, over time as symptoms get more entrenched, becomes more reinforcing on its own and becomes a habitual means of mood modulation (Fairburn et al., 2003; Johnson, Lewis, & Hagman, 1984; Tachi, Murakami, Murotsu, & Washizuka, 2001). This hypothesis may help explain the different findings in the non-clinical and clinical samples.

The interactive findings found in this study were less consistent for vomiting than for binge eating – in particular, the interactive findings for vomiting emerged when using adaptive perfectionism but not maladaptive perfectionism. It may be that the extreme striving present in high personal standards perfectionism (i.e., going to whatever lengths necessary to achieve a high standard, such as a thin body) helps explain why only this dimension of perfectionism operated in the model for vomiting. Interestingly, Forbush, Heatherton, and Keel (2007) found that unidimensional perfectionism (the perfectionism subscale of the Eating Disorder Inventory; Garner, Olmsted, & Polivy, 1983) was more strongly associated with self-induced vomiting than binge eating in a female college sample, and there is some evidence for this unidimensional measure being more strongly related to PS ($r=.68$) than CM ($r=.54$) (Bardone-Cone, 2007). Future work is needed to replicate the interactive effect for vomiting and elaborate on the theoretical underpinnings for purging.

This study builds on prior work involving a theoretically-derived interactive model, but with different operationalizations of constructs (perfectionism, body dissatisfaction) and, for the first time, a clinical sample. A particular strength is the inclusion of multidimensional perfectionism, since the eating disorder field has largely assessed perfectionism unidimensionally despite strong evidence for the value of perfectionism dimensions (Bardone-Cone et al., 2007). Other strengths include the relatively large number of individuals with clinically significant bulimic symptoms, the data collection across five sites, and the separate assessment of binge eating and vomiting.

Limitations of this study include the cross-sectional design, which leaves open questions about temporal ordering, and the largely well-educated and Caucasian sample, which limits generalizability. Also, although the EDE-Q is psychometrically sound and commonly used, some studies report poorer validity for binge eating than purging (Black & Wilson, 1996). Whereas the variance explained by the three-way interactions is small (3-4%), it should be understood in the context of the difficulty of detecting higher order moderator effects, with higher order interaction effects typically accounting for 1-3% of unique variance (McClelland & Judd, 1993). Finally, although prior work on this interactive model has focused on general self-efficacy (i.e., overall evaluation of one's competence), the literature on domain-specific self-efficacy suggests that self-efficacy related to eating patterns warrants examination.

The current study's interactive findings suggest that having extremely high standards ("adaptive" perfectionism) as well as being very self-critical in response to mistakes (maladaptive perfectionism) are relevant forms of perfectionism that should be examined in treatment. This is important since having very high standards has generally been considered adaptive or benign. The interactive findings suggest that, once individuals are actively engaged in bulimic behavior, then among those with the high perfectionism/low self-efficacy combination, targeting reductions in weight/shape concern should be associated with decreased binge eating and purging. Experiencing a decrease in bulimic behaviors would be expected to increase self-efficacy which appears to be a mediator for change in bulimia nervosa (Wilson, Fairburn, Agras, Walsh, & Kraemer, 2002). It would be interesting to see if a media literacy or feminist psychology component to treatment would be helpful in reducing weight/shape concern – for example, discussing and critiquing the media's influence in communicating sociocultural expectations regarding what women should look like and devote time and energy to (i.e., the body) (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Regarding the

vulnerabilities of high perfectionism and low self-efficacy, we note that the extended cognitive-behavioral theory of bulimia nervosa proposed by Fairburn et al. (2003) implicates these two constructs as key maintenance factors that deserve attention in treatment.

In sum, in the subgroup of actively binge eating women, weight/shape concern was associated with binge eating frequency in the context of high perfectionism (either maladaptive or, less so, “adaptive” dimensions) and low self-efficacy. In the overlapping subgroup of actively vomiting women, weight/shape concern was associated with vomiting frequency in the context of high “adaptive” perfectionism and self-efficacy. Future research should include longitudinal examinations of clinical samples to see whether the interactive model acts as a maintenance model, perhaps predicting chronicity of bulimic behaviors. Future work should also assess whether, as theorized, aversive self-awareness and negative affect are intermediary to the confluence of high perfectionism/low self-efficacy/body dissatisfaction and bulimic behaviors (Bardone et al., 2000). A better understanding of perfectionism and self-efficacy in relation to bulimic symptoms is warranted given that high perfectionism and low self-efficacy appear to be important conditions under which body dissatisfaction, arguably normative among women in Western cultures, may predispose or maintain binge eating and purging.

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Table 1
Means and Standard Deviations of and Intercorrelations Among Measures

	1	2	3	4	5	6	7	Binge Eating Subsample	Vomiting Subsample
1. Concern Over Mistakes		.52***	-.30***	.43***	-.06	.12	.15	31.40 (7.22)	31.09 (7.06)
2. Personal Standards	.55***		.10	.29***	-.07	.08	-.01	26.52 (5.36)	26.18 (5.42)
3. Self-efficacy	-.30***	.13		-.32***	-.11	-.09	-.11	56.32 (11.84)	56.39 (11.44)
4. Weight/Shape Concern	.43***	.29***	-.31***		.21**	.04	.07	4.68 (1.08)	4.59 (1.11)
5. Body Mass Index	-.03	-.08	-.16*	.23**		-.01	-.12	23.00 (5.40)	22.73 (5.22)
6. Binge Eating Frequency	.09	-.07	-.14	.04	-.05		.43***	17.85; 4.5×/week (24.33)	16.88; 4.2×/week (25.30)
7. Vomiting Frequency	.07	.004	-.05	-.07	-.15*	.42***		23.34; 5.8×/week (38.02)	26.97; 6.7×/week (38.32)

Note. Correlations between variables for the binge eating subsample are below the diagonal; correlations for the vomiting subsample are above the diagonal. Means and standard deviations (in parentheses) are in the two right-hand columns, listed separately for the binge eating and vomiting subsamples.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 2

Concern Over Mistakes, Self-Efficacy, and Weight/Shape Concern, and the Three-way Interaction with Binge Eating Frequency as the Dependent Measure

Order of entry of predictors	F change for set	β for within set predictors	t for within set predictors	p	df for each test	ΔR^2
1. Main effects						
Concern Over Mistakes (CM)	1.44	.06	.74	.459	3, 176	.02
Self-Efficacy		-.14	-1.72	.088	176	
Weight/Shape Concern		-.04	-.44	.662	176	
2. Two-way interactions	1.36				3, 173	.02
CM $\times$ Self-Efficacy		.16	1.65	.100	173	
CM $\times$ Weight/Shape Concern		.02	.25	.800	173	
Self-Efficacy $\times$ Weight/Shape Concern		-.18	-1.81	.072	173	
3. Three-way interaction	5.27				1, 172	.03
CM $\times$ Self-Efficacy $\times$ Weight/Shape Concern		-.24	-2.30	.023	172	

Table 3
Personal Standards, Self-Efficacy, and Weight/Shape Concern, and the Three-way Interaction with Binge Eating Frequency as the Dependent Measure

Order of entry of predictors	F change for set	β for within set predictors	t for within set predictors	p	df for each test	ΔR^2
1. Main effects						
Personal Standards (PS)	1.42	-.06	-.71	.482	3, 176	.02
Self-Efficacy		-.13	-1.66	.098	176	
Weight/Shape Concern		.01	.09	.932	176	
2. Two-way interactions	.67				3, 173	.01
PS $\times$ Self-Efficacy		.04	.49	.627	173	
PS $\times$ Weight/Shape Concern		-.03	-.42	.677	173	
Self-Efficacy $\times$ Weight/Shape Concern		-.11	-1.29	.198	173	
3. Three-way interaction	6.33				1, 172	.03
PS $\times$ Self-Efficacy $\times$ Weight/Shape Concern		-.20	-2.52	.013	172	

Table 4

Personal Standards, Self-Efficacy, and Weight/Shape Concern, and the Three-way Interaction with Vomiting Frequency as the Dependent Measure

Order of entry of predictors	F change for set	β for within set predictors	t for within set predictors	p	df for each test	ΔR^2
1. Main effects						
Personal Standards (PS)	.91	-.01	-.13	.901	3, 165	.02
Self-Efficacy		-.11	-1.28	.202	165	
Weight/Shape Concern		.04	.51	.614	165	
2. Two-way interactions	1.66				3, 162	.03
PS $\times$ Self-Efficacy		.11	1.28	.203	162	
PS $\times$ Weight/Shape Concern		.01	.14	.890	162	
Self-Efficacy $\times$ Weight/Shape Concern		-.17	-2.06	.041	162	
3. Three-way interaction	6.36				1, 161	.04
PS $\times$ Self-Efficacy $\times$ Weight/Shape Concern		-.20	-2.52	.013	161	