REGULAR ARTICLE

The Relationship of Weight Suppression and Dietary Restraint to Binge Eating in Bulimia Nervosa

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ABSTRACT

Objective: Recent research has raised important questions about the relationships between weight suppression (WS) (discrepancy between highest-ever and current weight), dietary restraint, and binge eating in bulimia nervosa (BN).

Method: In the current study, these variables were studied cross-sectionally through secondary analyses of baseline data collected in a multi-site treatment study. Participants ($N = 182$) were treatment-seeking women diagnosed with BN. Dietary restraint and binge eating were measured via the Eating Disorders Examination.

Results: WS was directly and dietary restraint was inversely related to frequency of binge eating. The inverse relationship between dietary restraint and binge eating may be explained in part by the fact that the most restrained patients with BN had the greatest desire to lose weight.

Conclusion: Implications of these findings for future research on the perpetuation and treatment of BN are discussed.

Keywords: bulimia nervosa; binge eating; dietary restraint

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Introduction

There is growing evidence that weight suppression (WS), the discrepancy between a patient's highest-ever and current weight, plays an important role in bulimia nervosa (BN). Drawing on data from a multisite study of predictors of outcome in cognitive behavior therapy (CBT) for BN[1], Butryn et al. (2006) found that WS at pretreatment was a powerful predictor of drop out from treatment, and among those completing treatment, of an inability to attain abstinence from binge eating and purging. In two other recent studies, WS prospectively predicted the amount of weight gained by patients with BN during a psychiatric hospitalization[3] as well as the amount of weight gained by female freshmen during their first year of college.[4]

The evidence that WS predicts treatment outcome and weight gain suggests that WS might contribute not only to the development of BN[2,5,6] but also to its perpetuation. If WS does contribute to the maintenance of bulimic symptoms, then it would raise questions about the role of current dieting (or dietary restraint) in the maintenance of bulimic symptoms. According to the CBT model, dietary restraint is a proximal cause of binge eating and bulimic pathology.[7] Evidence supporting this theory includes the finding by Wilson et al.[8] that reductions in dietary restraint by Week 4 among patients receiving CBT for BN mediated post treatment improvement in both binge eating and purging. In addition, Shah et al.[9] showed that the probability of achieving abstinence from binge eating and purging among patients with BN receiving CBT was greatest for those who came closest to the CBT treatment prescription of stopping dieting and normalizing the pattern of eating (e.g. eating 3 meals and 2 snacks per day). Specifically, patients eating 80 or more meals and 21 or more mid-afternoon snacks over a 28 day period had a 70% probability of achieving abstinence at treatment end compared to a 4% probability for those consuming 72–79 meals combined with 11 or more evening snacks.

Evidence questioning the influence of dietary restraint on binge eating and bulimic pathology include a study by Lowe et al.[10], who found that intensity of recent dieting was inversely related to binge eating frequency in two samples of individuals with BN. Similarly, in studies of overweight and obese individuals, those placed on low-calorie diets as part of nonrandomized[11,12] and randomized[13,14] trials showed decreased binge eating. In an experimental study of dieting in nonobese individuals,

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Presnell and Stice[15] reported that individuals who lost weight in a brief weight loss intervention showed significant reductions in bulimic symptomatology relative to a nondieting control group.

The aim of the current study is twofold. First, the relationship between WS and frequency of objective binge eating in outpatients with BN will be investigated with cross-sectional analyses. Since a high level of WS is a negative prognostic indicator,[2] it is hypothesized that WS will be positively related to binge eating frequency. Second, because a previous study that found an inverse relationship between dieting intensity and binge eating frequency used nonstandard measures of both dieting and binge eating,[10] the relationship between dietary restraint and binge eating is reexamined here. Dietary restraint was assessed using the EDE-restrained eating scale (EDE-RE).[16] An additional item from the EDE (assessing desire for weight loss) was also investigated for two reasons. First, Lowe et al. have noted that the assessment of dietary restraint does not identify the nature of the motivation behind restrained eating, i.e., the extent to which restraint may be motivated by the desire to lose weight (DLW) or to prevent weight gain[17] (Thomas, J. G., Wallaert, M., & Lowe, M. R. (2007). What motivates restrained eating in normal weight women? Manuscript submitted for publication.) and that the nature of the motivation for restraint might be important in understanding its effects. Second, Lowe et al.[10] hypothesized that intensity of current weight loss dieting was responsible for the inverse dieting-binge eating relationships they found. Examining the correlates of the EDE item assessing desire for weight loss provided an opportunity to reassess the inverse relationship between weight loss dieting and binge eating previously reported by Lowe et al.[10] We predicted that scores on both the EDE-RE scale and the desire for weight loss item will be inversely related to objective binge eating frequency. We will also determine whether any inhibitory effects of dietary restraint on binge eating depends on WS level (i.e., we will test whether dietary restraint and WS interact to influence binge eating).

Method

Participants

The original article reporting on predictors of outcome in this sample[1] provides additional data on exclusion criteria and descriptive information on the sample. Participants were 194 women enrolled in a multi-site study of predictors of outcome in treatment for bulimia nervosa (BN). Six of these participants were subsequently withdrawn from the study because of pregnancy or the development of a severe mood disorder. A further six participants were excluded from the analysis because of incomplete data. Participants met *Diagnostic and Statistical Manual of Mental Disorders-III*[18] diagnostic criteria for BN. Participants had a mean age of 28.1 years (SD = 7.9) and mean body mass index (BMI) of 23.5 kg/m^2 (SD = 4.5). Most participants (88%) were Caucasian; 5% were African–American, 3% were Hispanic, and 3% were Asian. The research was reviewed and approved by an institutional review board.

Assessment

Participants completed several assessments relevant to the current study.

Body Mass Index. Body mass index (BMI) was calculated using current weight and height, which were measured.

Weight Suppression. Information on participants' previous highest weight at their current height, not due to pregnancy or illness, was gathered by self-report to calculate weight suppression (WS). The validity of recalled past weights has been supported by a study that found a correlation of .85 between measured body weight at age 25 and recalled weights for age 25 that were collected an average of 20 years later.[19] The mean error of recalled weights in these participants was just 1.28 kg, suggesting that the absolute size of the error in recalled weights was small. Also, Swenne[20] retrieved historical measured weights in girls before they developed an eating disorder and found, in line with the data on highest previous weights reported here, that these girls' premorbid relative weights were higher than those of age-matched girls in the general population. In the current study, WS was defined as the difference between participants' previous highest self-reported weight and pretreatment measured weight.

Restraint. At pretreatment, participants completed the EDE,[16] a semistructured interview that assesses eating-related pathology. This measure has demonstrated acceptable reliability and validity[21–23] (for additional details, see the original report of this study by Agras et al.[1]). Pretreatment scores on the Restraint subscale of the EDE were examined in this study.

Binge Eating. The EDE also was used to measure the number of objective bulimic episodes that participants reported in the previous 28 days. An objective bulimic episode is defined in the EDE as an episode of overeating in which the individual experiences a loss of control and an unequivocally large amount of food is eaten.

Desire to Lose Weight. Pretreatment desire to lose weight (DLW) was assessed with the following EDE item: "Over the past 4 weeks have you wanted to weigh less than [current weight]?" The examiner then rates the number of days on which there has been a strong DLW and assigns a score ranging from 0 to 6 with higher scores representing a greater frequency of a strong DLW. Although this item has not been validated as an independent measure of DLW, similar single-item assessments of dieting have been shown to be powerfully related to behavior. Lowe et al. and others have examined differences between restrained eaters who indicate that they are (restrained dieters or RDs) or are not (restrained nondieters or RNDs) currently on a diet to lose weight using a single item to measure dieting status. Two of these studies found that RDs show a pattern of eating regulation opposite to that shown by RNDs.[24,25] Lowe and Timko[26] found that RDs score higher than RNDs on two measures of restrained eating and reported a much greater history of weight cycling. Green and Rogers[27] found that RDs displayed greater deficits on two measures of cognitive processing relative to RNDs. Stice[28] showed that individuals with high scores on dietary restraint scales gained weight over time whereas self-labeled dieters lost weight (Stice et al. 1998). The foregoing findings suggest that single-item measures of dieting status are fairly robust predictors of behavior in a variety of domains.

Results

Descriptive Statistics

Table 1 presents the means, standard deviations, minima, and maxima for all variables used in the analyses. **Table 2** presents a correlation matrix of all the variables included in the following analyses.

Predicting Objective Binge Eating at Baseline

A standard least squares multiple linear regression was conducted to determine whether a combination of WS, the EDE-RE scale, and their interaction predicted EDE objective binge eating (OBE). All continuous variables were mean-centered for this and all subsequent regression analyses. A normal probability plot of the residuals indicated that the error was normally distributed. A plot of the standardized residuals against the standardized predicted values suggested that the assumptions of linearity and equality of variances were upheld. BMI and the weight and shape concern subscales from the EDE were considered as potential covariates, but were ultimately excluded from the analysis because they were not significantly correlated with OBE.

TABLE 1. Descriptive statistics

Variable	Mean	SD	Minimum	Maximum
Weight suppression (kg)	9.4	9.5	0	53.6
EDE restraint	3.4	1.4	0	6
EDE desire to lose weight	4.0	2.5	0	6
EDE weight concern	3.5	1.5	0	6
EDE shape concern	4.0	1.2	.25	6
EDE objective binge eating	27.0	19.6	0	94.0

Notes: EDE, eating disorders examination.

TABLE 2. Bi-variate correlations of primary variables

Variable	Weight Suppression	EDE-Restraint	Desire to Lose Weight	Objective Binge Eating
Weight suppression	—			
EDE-restraint	.12	—		
Desire to lose weight	−.05	.47*	—	
Objective binge eating	.14	−.13	−.28*	—

Notes: Desire to lose weight scored 0 (no strong desire to lose weight) versus 6 (strong desire to lose weight every day).
*$p < .001$.

TABLE 3. Results of the regression analysis

	Criterion: Objective Binge Eating	
Predictors	*b*	SE
EDE-restraint	−2.03*	1.02
Weight suppression	.319*	.15
EDE-restraint x weight suppression	−.085	.097
	Adjusted $R^2 = .03$	

*$p < .05$.

Our results indicated that both WS and EDE-RE predicted OBE when entered into the model simultaneously. No interaction effect was found. Summary results of the model are shown in **Table 3**. A positive relationship was found between WS and OBE, whereas an inverse relationship was found between EDE-RE and OBE.

Desire to Lose Weight

We modeled this analysis after a similar one conducted by Lowe et al.,[10] who compared extreme groups of individuals with BN who dieted frequently and infrequently. Participants who endorsed the highest ($n = 96$) and lowest ($n = 35$) response options (6 and 0) on the EDE question pertaining to DLW were selected for inclusion in a *t*-test on OBE. Individuals with a low DLW exhibited significantly higher OBE ($M = 35.6$, SD = 24.4) than those with a high DLW ($M = 23.6$, SD = 15.7; $t(129) = 2.7$, $p = .009$).

Conclusion

The results of this study were consistent with predictions. When examined together in a regression analysis, WS was directly related—and dietary restraint was inversely related—to binge eating frequency in patients diagnosed with BN. These results are consistent with the view that large discrepancies between patients' highest and current body weights produce biological and/or psychological pressures that help drive binge eating.[2] This suggests that significant weight loss is influential in both the initiation[5,6,29] and in the perpetuation[2] of binge eating episodes. These results are also consistent with findings indicating that WS is a negative prognostic indicator of response to cognitive-behavioral therapy[2] and a predictor of weight gain during an inpatient hospitalization for BN.[3]

The inverse relationship found between the EDE-RE scale and binge eating frequency is consistent with some past research[10,15,30] but appears to be inconsistent with the CBT model of the maintenance of BN.[7,31] In this model, strict dietary restrictions are viewed as a proximal cause of binge eating. According to this perspective, greater dietary restraint should be associated with increased, rather than decreased, frequency of binge eating. There is also considerable evidence consistent with the CBT model, including research showing that dieting predicts the development of bulimic symptoms,[32–35] that reduction in restrained eating mediates improvement in bulimic symptoms,[8] and that increased frequency of meal taking during treatment is associated with a greater reduction of bulimic symptoms.[9]

The discrepancy between these two sets of findings cannot be definitively reconciled with the cross-sectional data reported on here. However, one plausible explanation is that the high level of restrained eating seen in those diagnosed with BN (e.g., as reflected in their EDE-Restraint scale scores) reflects an (at least) temporarily successful effort to inhibit an underlying predisposition toward binge eating, rather than the stimulus driving the binge eating. Two aspects of the current results are consistent with this view—the inverse relationship between EDE-RE and binge eating frequency and the finding that patients who consistently had a "strong DLW" binged significantly less than patients who did not experience this drive as often. That is, if we consider only the role of variables related to dieting, then WS level may partially determine the severity of binge eating but co-occurring restrained eating may simultaneously influence the extent to which underlying psychobiological pressures toward binge eating will manifest themselves, with those most intent on restraining their eating to lose weight bingeing the least.

These suppositions must be tempered by the limitations of the study design. Since only cross-sectional data were used in these analyses, no inferences can be drawn about causal relationships among the variables studied. Future investigations would ideally measure the relevant variables prospectively. This would permit firmer conclusions to be reached about the temporal relationships among WS, restrained eating and binge eating. At the same time, the novelty of the current findings, and their potentially significant implications for the cognitive-behavioral model of BN, suggests that the role of WS and current dieting in BN should be investigated in future research.

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