The Prognostic Significance of Regular Binge Eating in Extremely Obese Gastric Bypass Patients: 12-Month Postoperative Outcomes

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Objective: The prognostic significance of binge eating for extremely obese patients who undergo bariatric surgery is uncertain. We examined the relation of preoperative binge eating to preoperative presentation and 12-month postoperative outcomes.

Methods: 139 extremely obese gastric bypass surgery patients completed assessments of binge eating and eating disorders (Eating Disorder Examination–Questionnaire version), body dissatisfaction (Body Shape Questionnaire), depression (Beck Depression Inventory), and self-esteem (Rosenberg Self-Esteem Scale) before surgery and again 12 months postsurgery.

Results: At baseline, 60% of patients denied binge eating, 16% reported binge eating infrequently (less than once weekly), and 24% reported binge eating at least weekly. At 12 months postsurgery, 8.8% reported infrequent binge eating and only 0.7% reported binge eating weekly. At baseline, infrequent binge eaters and regular binge eaters differed little from each other but had significantly elevated eating and psychosocial problems relative to non–binge eaters. Statistically significant and clinically robust improvements in weight and in all measures of functioning were observed at 12 months postsurgery across all groups. At 12-month follow-up, patients who reported regular binge eating at baseline had significantly higher levels of eating-specific concerns (but not psychosocial concerns) than the infrequent binge eaters and non–binge eaters; the infrequent and non–binge eaters did not differ from each other. Significant time-by–binge eating interactions indicated that the regular versus infrequent binge-eating groups improved differently over time; infrequent binge eaters had sharper improvements than regular binge eaters and non–binge eaters.

Conclusion: Binge eating is common in extremely obese bariatric surgery candidates and is associated with heightened eating and psychological problems. Regular binge eating preoperatively, however, does not appear to be a potent negative prognostic indicator for gastric bypass surgery. Our findings, which are limited to 12 months postsurgery, highlight substantial improvements in weight and psychosocial functioning, and these robust improvements differ little by binge-eating status.

(J Clin Psychiatry 2006;67:1928–1935)

Received March 15, 2006; accepted May 1, 2006. From the Department of Psychiatry, Yale University School of Medicine, New Haven (Drs. White, Masheb, Rothschild, and Grilo); and St. Francis Hospital and Medical Center, Hartford, Conn. (Dr. Rothschild and Ms. Burke-Martindale).

Supported by grants from the Donaghue Medical Research Foundation (Dr. Grilo) and the National Institutes of Health (K24 DK070052 [Dr. Grilo] and K23 DK071646 [Dr. White]).

The authors report no financial affiliation or relationship relevant to the subject of this article.

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In recent decades, there has been a marked increase in the frequency of bariatric surgery, reflecting both the increase in prevalence of extreme obesity and the impressive outcomes that are typical for modern surgical methods. Bariatric surgery is the most effective treatment for morbid obesity, resulting in substantial weight losses for people who have been unsuccessful in multiple nonsurgical interventions.[1,2] Research has found that, in addition to improving weight status and associated medical morbidities, gastric bypass surgery appears to result in broad psychosocial benefits.[3–9] The number of bariatric surgeries performed in the United States increased by 450% from 1998 to 2002.[10] Thus, due to the growing need for and utilization of bariatric surgeries, mental health professionals are frequently called upon to conduct screenings and to provide recommendations regarding the appropriateness of potential candidates for surgery.[11] The American Society for Bariatric Surgery suggests that presurgical psychological evaluations include assessment of behavioral factors related to eating and dieting history, cognitive/emotional factors such as coping skills, and motivation and social support.[12] Because of the potential influence on postsurgical safety, current standards of patient selection for bariatric surgery in terms of psychiatric status require screening for untreated psychosis, severe depression, suicidal ideation, and active substance abuse or bulimia nervosa.[1,12] These clinical guidelines reflect primarily clinical judgment and await empirical studies.

Although estimates vary, a substantial proportion of severely obese gastric bypass surgery candidates report

problems with binge eating.[13] Presurgery, patients who binge eat do not differ in weight status[14] from non–binge-eating obese (NBO) patients, but are generally characterized by greater psychosocial problems[15–18] and significantly greater psychiatric comorbidity.[19] Research investigating the prognostic value of preoperative binge eating on bariatric surgical outcomes has mostly focused on changes in weight. To date, findings regarding the prognostic significance of preoperative binge eating are mixed, with some reports of baseline binge eating predicting less weight loss[9,20] and other reports of the opposite pattern[21] or no relationship.[17,22] In terms of psychosocial functioning, Malone and Alger-Mayer[23] reported that patients with more severe binge-eating problems before surgery benefited the most in terms of improved quality of life postsurgery. Although both binge eaters and NBO patients had substantial improvements in depression postsurgery, the binge-eating group continued to report higher levels of depression than the NBO group 12-months postsurgery. In contrast, Green and colleagues[7] reported that although binge eaters reported heightened depression and deflated self-esteem presurgically, they did not differ from NBO individuals at 6-months postsurgery.

Overall, while these findings suggest that binge eating may not be a potent negative indicator, further research with larger samples and longer follow-up periods, using more comprehensive characterization of psychosocial outcomes, is needed. Such research might ultimately inform empirically supported algorithms for treatment prescriptions to address the psychosocial needs of this patient group. The present study examined psychosocial and eating-specific variables both presurgery and 12 months postsurgery in a group of severely obese individuals who underwent gastric bypass surgery. On the basis of preoperative binge-eating status, individuals were classified as "non–binge eaters," "infrequent binge eaters," or "regular binge eaters." Binge-eating groups were compared on weight loss, depression, self-esteem, body-dissatisfaction, and eating disorder–specific features before surgery and at 12 months postsurgery.

METHOD

Participants

Participants were 139 (15 male and 124 female) extremely obese patients who underwent gastric bypass surgery at a general medical center. Mean age was 42.4 years (SD = 10.2). Of the 139 participants, 70.5% (N = 98) were white, 16.5% (N = 23) were African American, 11.5% (N = 16) were Hispanic American, and 1.4% (N = 2) were of other ethnicity. Educationally, 63.8% (N = 88; data on education were missing for 1 participant) attended at least some college. Weight and height were measured at assessments and used to calculate body mass index (BMI). Overall, mean BMI presurgery was 51.7 (SD = 7.9; range, 36.6 to 71.8).

Informed Consent Procedures

Institutional review board approval was received for this study, and written informed consent was obtained from all participants. Patients were informed that they were participating in a research study to learn about the effects of bariatric surgery over time on weight, eating behaviors, psychological functioning, and general quality of life. Patients were informed that their participation would not influence the type of care provided by the surgical team. Patients were told there would be no direct medical benefit to them, although it was hoped that the knowledge gained might ultimately benefit other bariatric patients in the future. Patients were also informed that the findings would only be shared with the treatment team if they so desired and provided consent. No compensation was provided.

Assessment of Binge Eating and Features of Eating Disorders

Binge eating was assessed using the Eating Disorder Examination–Questionnaire version (EDE-Q)[24] prior to surgery. The EDE-Q is the self-report version of the EDE Interview[25] and assesses the features of eating disorders, including the frequency of various forms of overeating and binge eating. The EDE-Q also yields a global score and assesses 4 features of eating disorders: dietary restraint, eating concerns, weight concerns, and shape concerns. Items are rated on 7-point scales (0 to 6), with higher scores reflecting greater severity or frequency. The EDE-Q has received psychometric support, including adequate test-retest reliability[26] and good convergence with the EDE Interview[24,27–31] Further, the EDE-Q has been shown to adequately identify binge eating in bariatric surgery candidates.[15]

Assessment of Psychological Functioning

The Body Shape Questionnaire (BSQ),[32] a 34-item measure of body dissatisfaction, assesses the frequency of preoccupation with and distress about body size/shape. Subjects rate items on a scale from 1 (never) to 6 (always); higher scores reflect greater body dissatisfaction. The BSQ has demonstrated reliability and validity[33] and is a widely used instrument for assessing body image dissatisfaction in diverse clinical samples of obese patients,[34] including bariatric surgery candidates.[35] Body dissatisfaction is a complementary, not redundant, psychosocial realm to the shape/weight concern scales of the EDE-Q.[36]

The Beck Depression Inventory (BDI)[37] 21-item version assesses current depression level and symptoms of depression. It is a widely used and established measure with demonstrated reliability and validity.[38] Higher

Table 1. Frequency of Binge Eating Preoperative and 12 Months Postoperative in Gastric Bypass Surgery Patients

	Preoperative (N = 139)		12 Months Postoperative (N = 137[a])	
Binge-Eating Frequency	N	%	N	%
None	84	60.4	124	90.5
Infrequent (< 4 times in the last mo)	22	15.8	12	8.8
Regular (≥ 4 but < 8 times per mo)	19	13.7	1	0.7
BED research threshold (≥ 8 times per mo)	14	10.1	0	0

[a]Sample size at 12 months postoperative was N = 137 due to missing data for 2 participants.
Abbreviation: BED = binge-eating disorder.

scores reflect higher levels of depression and, more broadly, negative affect.[39,40]

The Rosenberg Self-Esteem Scale (RSES)[41] is a 10-item well-established and widely used measure of global self-esteem. Subjects rate the items on a scale from 1 (strongly agree) to 4 (strongly disagree); higher scores reflect higher self-esteem.

RESULTS

Rates of Binge Eating

Table 1 summarizes the frequency of binge eating among this patient group. A substantial portion of the sample (39.6%) reported binge eating at least once during the previous 28 days. For this study, we defined "regular binge eating" as binge eating at least once weekly. This definition was chosen given increasing—and consistent—findings that the once-weekly binge-eating threshold identifies a clinically meaningful group that differs substantially from infrequent binge eaters but not from the twice-weekly DSM-IV-TR[42] threshold.[15,43] To provide a thorough description of the distribution of binge frequency in our sample, Table 1 provides the rates for the once-weekly and twice-weekly binge-eating categories separately for the preoperative and postoperative assessment points.

Preoperative Binge Eating and Presurgery Levels of Outcomes

Table 2 summarizes the comparison of the 3 patient study groups (i.e., those who reported no binge eating, infrequent binge eating, or regular binge eating) on the battery of measures. Univariate analyses of variance (ANOVAs) revealed overall group differences for all measures, except for BMI and EDE-Q restraint. Post hoc tests showed an overall consistent pattern of group differences between the non–binge-eating and regular binge-eating groups. In each instance, the regular binge-eating group was significantly more distressed than the non–binge-eating group. Although attenuated, the pattern of differences held in comparisons between the non–binge-eating group and the infrequent binge-eating group. The infrequent binge-eating group was significantly more distressed in terms of body dissatisfaction and EDE-Q global score as well as EDE-Q eating concern, shape concern, and weight concern. The infrequent binge-eating and non–binge-eating groups did not differ in the more global measures of psychosocial functioning, i.e., depression and self-esteem. The infrequent binge-eating group did not significantly differ from the regular binge-eating group on any eating disorder or psychosocial variable.

Preoperative Binge Eating and Outcomes 12 Months Postsurgery

Table 3 provides a descriptive summary of the 12-month postoperative outcomes for the 3 patient study groups (i.e., classified based on preoperative binge-eating status) on the battery of measures. ANOVAs revealed that the groups differed in terms of EDE-Q eating concern and shape concern and EDE-Q global score, with the non–binge-eating group reporting significantly lower scores than the regular binge-eating group for each of these variables. The infrequent binge-eating group also reported significantly lower eating concern than did the regular binge-eating group. Table 4 summarizes our primary analysis, which involved repeated-measures ANOVAs; these provide statistical tests for time effects, binge-eating group effects, and interaction effects (time by binge eating). Significant time effects (reflecting substantial improvements) were observed from presurgery to 12 months postsurgery for all measures. Repeated-measures ANOVAs confirmed significant differences among the binge-eating groups for depression, self-esteem, body dissatisfaction, EDE-Q global score, and EDE-Q eating concern, shape concern, and weight concern subscale scores. Except for shape concern and self-esteem, there were also significant time-by–binge eating interactions for each of these variables.

Inspection of the means (Tables 2 and 3) across the presurgical and 12-month outcomes for each group reveals several important clinical patterns, and these are therefore shown graphically. Figure 1 shows how patients who reported binge eating preoperatively had statistically higher levels of depression at baseline (i.e., presurgery) than the non–binge-eating group, while the infrequent group did not differ significantly from either group. The postsurgery depression levels represented significant reductions ($p < .001$) from presurgery, and the mean BDI score fell within the nondepressed range for all binge groups (i.e., patients who score less than 10 on the BDI are considered nondepressed). The significant time-by–binge eating interaction indicates that although the groups differed at presurgery, the binge-eating groups improved to a sharper degree than the non–binge-eating group, such that there were no significant group differences at follow-up.

Table 2. Values for Outcome Measures at Baseline (presurgery) for 139 Gastric Bypass Surgery Patients

Measure	No Binge Episodes (N = 84) Mean	SD	Infrequent Binge Episodes (< 1/wk) (N = 22) Mean	SD	Regular Binge Episodes (≥ 1/wk) (N = 33) Mean	SD	F[a]	p[b]	None vs Infrequent, p	None vs Regular, p	Infrequent vs Regular, p
Body mass index	51.7	8.6	51.5	6.9	51.9	6.9	0.01	.99	NS	NS	NS
Depression (BDI score)	11.4	6.5	14.7	6.9	19.6	9.9	14.32	.00	NS	.000	NS
Self-esteem (RSES score)	30.7	4.7	29.3	6.1	26.8	5.3	7.19	.00	NS	.001	NS
Body dissatisfaction (BSQ score)	113.2	35.4	139.2	24.3	140.5	30.6	11.11	.00	.003	.000	NS
Eating disorder features											
EDE-Q subscale scores											
Restraint	2.8	1.3	2.9	1.4	2.4	1.2	1.29	.28	NS	NS	NS
Eating concern	1.5	1.3	3.0	1.1	3.1	1.3	24.03	.00	.000	.000	NS
Shape concern	4.0	1.3	4.8	0.8	4.9	0.8	10.86	.00	.004	.000	NS
Weight concern	3.2	1.1	4.0	0.9	4.0	1.2	9.42	.00	.003	.002	NS
EDE-Q global score	2.9	1.0	3.7	0.8	3.6	0.9	11.49	.00	.001	.001	NS

[a]Analysis of variance.
[b]For 2-tailed tests.
Abbreviations: BDI = Beck Depression Inventory, BSQ = Body Shape Questionnaire, EDE-Q = Eating Disorder Examination–Questionnaire version, NS = not significant, RSES = Rosenberg Self-Esteem Scale.

Table 3. Values for Outcome Measures at 12 Months Postsurgery for 139 Gastric Bypass Surgery Patients

Measure	No Binge Episodes (N = 84) Mean	SD	Infrequent Binge Episodes (< 1/wk) (N = 22) Mean	SD	Regular Binge Episodes (≥ 1/wk) (N = 33) Mean	SD	F[a]	p[b]	None vs Infrequent, p	None vs Regular, p	Infrequent vs Regular, p
Body mass index	33.3	6.6	33.9	5.3	32.9	5.7	0.19	.83	NS	NS	NS
Depression (BDI score)	5.4	5.8	4.0	4.6	7.5	7.8	2.29	.11	NS	NS	NS
Self-esteem (RSES score)	36.1	5.2	36.8	3.9	33.9	5.5	2.87	.06	NS	NS	NS
Body dissatisfaction (BSQ score)	72.1	30.9	74.3	20.3	83.4	27.2	1.85	.16	NS	NS	NS
Eating disorder features											
EDE-Q subscale scores											
Restraint	2.1	1.5	1.8	1.5	2.4	1.5	0.97	.38	NS	NS	NS
Eating concern	0.6	1.0	0.7	0.8	1.4	1.1	6.41	.00	NS	.002	.033
Shape concern	2.1	1.3	2.2	1.1	3.0	1.3	5.36	.01	NS	.004	NS
Weight concern	1.5	1.1	1.5	1.0	1.9	1.2	1.59	.21	NS	NS	NS
EDE-Q global score	1.6	1.0	1.5	0.9	2.2	1.0	4.06	.02	NS	.021	NS

[a]Analysis of variance.
[b]For 2-tailed tests.
Abbreviations: BDI = Beck Depression Inventory, BSQ = Body Shape Questionnaire, EDE-Q = Eating Disorder Examination–Questionnaire version, NS = not significant, RSES = Rosenberg Self-Esteem Scale.

For each of the interactions displayed in Figure 2, a consistent pattern is evident: the infrequent binge-eating group, while reporting levels of distress comparable to the regular binge-eating group at baseline, improved at a rate to make it equivalent with the non–binge-eating group by 12-month follow-up. The regular binge-eating group also improved markedly in each measured domain, but reported significantly higher levels of eating concerns than the other groups, as well as higher shape concerns and global EDE-Q scores than the non–binge-eating group.

As a more conservative test of the prognostic significance of binge eating, we repeated the analyses using a criterion of 8 or more episodes in the past 28 days to define "regular" binge eating. This frequency cutoff matches the research criterion for binge-eating disorder as defined by the DSM-IV-TR,[42] i.e., binge episodes occurring at least twice weekly. A total of 14 participants (10.1%) reported binge eating at least twice weekly. Results indicated no differences between those participants reporting twice-weekly binge eating as compared with those reporting between 1 and 2 binge episodes per week.

DISCUSSION

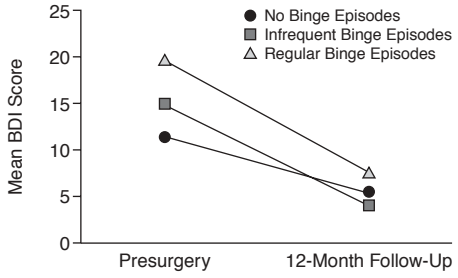
Much of the research on binge eating and weight loss surgery has been limited by small sample sizes, varying measures of binge eating, and limited characterization of eating disorder and psychosocial functioning.[13] Using a large sample, a psychometrically sound and specific instrument to assess the presence and frequency of binge

Table 4. Results of Repeated-Measures Analyses of Variance on the Effects of Time, Binge-Eating Group, and Interaction of Time and Binge-Eating Group[a]

	Time		Binge-Eating Group		Time × Binge-Eating Group	
Measure	F	p	F	p	F	p
Body mass index	1423.45	< .001	0.02	.980	0.52	.590
Depression (BDI score)	159.66	< .001	9.70	< .001	8.84	< .001
Self-esteem (RSES score)	151.62	< .001	6.16	.003	2.05	.130
Body dissatisfaction (BSQ score)	248.58	< .001	7.94	.001	5.33	.006
Eating disorder features						
EDE-Q subscale scores						
Restraint	10.50	.002	0.10	.900	2.48	.087
Eating concern	124.33	< .001	22.28	< .001	10.62	< .001
Shape concern	211.92	< .001	11.05	< .001	2.19	.120
Weight concern	245.58	< .001	6.25	.003	4.13	.020
EDE-Q global score	191.55	< .001	9.03	< .001	5.01	.008

[a]p Values are for 2-tailed tests.
Abbreviations: BDI = Beck Depression Inventory, BSQ = Body Shape Questionnaire, EDE-Q = Eating Disorder Examination–Questionnaire version, RSES = Rosenberg Self-Esteem Scale.

Figure 1. Levels of Depression (indicated by BDI scores) Presurgery and at 12-Month Postsurgery Follow-Up in Gastric Bypass Surgery Patients Categorized by Frequency of Binge Episodes



Abbreviation: BDI = Beck Depression Inventory.

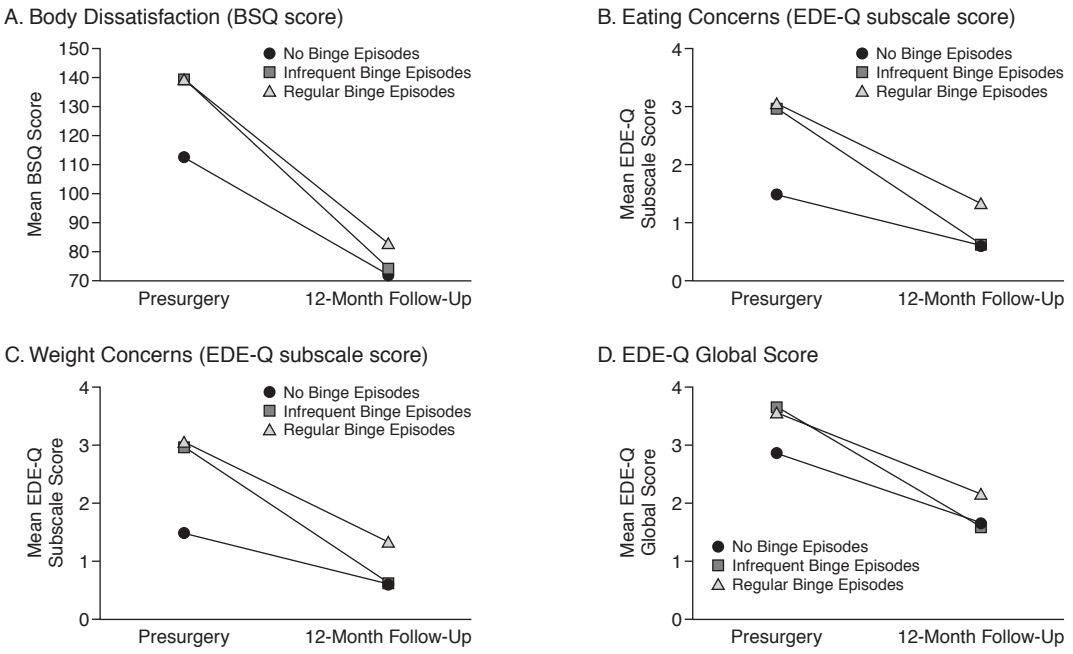
eating, and a 12-month follow-up period, this study investigated the prognostic significance of preoperative binge eating in a group of obese gastric bypass surgery patients. A substantial portion (40%) of the sample reported at least occasional binge eating preoperatively, with nearly 25% reporting binge eating on a regular (i.e., weekly) basis. At 12 months postsurgery, none of the patients reported binge eating at the diagnostic threshold frequency specified by the DSM-IV-TR; only 8.8% reported infrequent binge eating (less than once weekly), and only 1 patient (0.7%) reported binge eating weekly. These substantial improvements in binge eating support previous reports of a near remission of binge-eating symptoms following surgery.[17,44]

As predicted, the binge-eating groups significantly differed at baseline, with regular binge eaters reporting greater eating-specific and psychosocial distress than NBO patients. These findings for extremely obese bariatric surgery candidates are in line with those consistently documented for obese binge eaters versus NBO individuals.[45] Infrequent binge eaters reported levels of distress similar to those of the regular binge eaters presurgery. At 12 months postsurgery, all groups had improved substantially in all domains measured. Significant interactions indicated that the infrequent binge-eating group showed sharper improvements than the NBO and regular binge-eating groups, making them indistinguishable from the NBO group postsurgery. At 12 months postsurgery, the regular (preoperative) binge-eating group reported elevated eating concerns compared to the other 2 groups, but did not differ from the other groups in terms of global psychosocial functioning. Collectively, these findings indicate that extremely obese patients with binge-eating problems, although more distressed than their NBO counterparts presurgery, benefit substantially psychosocially as well as physically from gastric bypass surgery. Thus, regular binge eating preoperatively does not appear to be a negative prognostic indicator for gastric bypass surgery.

The pattern of findings observed across different levels of binge eating is especially relevant to nosological questions pertaining to this research diagnosis. The DSM-IV-TR[42] specifies a twice-weekly research criterion but also encourages study of varying criteria. Our findings indicate the predictive validity of a once-weekly criterion of binge eating. Our baseline findings are consistent with the position that the presence of any binge eating is a useful signal for associated distress,[46] but our outcome data provide impressive support (predictive validity) for a threshold of once weekly signifying a clinically meaningful entity. Once-weekly binge eaters differed from infrequent binge eaters but not from twice-weekly binge eaters in terms of predicting 12-month outcomes.

This study has some potential limitations. Although the questionnaire we used to assess binge eating elicits spe-

Figure 2. Outcome Measure Values Presurgery and at 12-Month Postsurgery Follow-Up in Gastric Bypass Surgery Patients Categorized by Frequency of Binge Episodes



Abbreviations:BSQ = Body Shape Questionnaire, EDE-Q = Eating Disorder Examination–Questionnaire version.

cific estimates in terms of the number of binge episodes, the volume and quantity of food consumed are not specified and rely on subjective self-report. Therefore, it is not known how many of the episodes would be considered true "objective overeating" episodes by observers or interviewers. Recent research suggests that interview-based diagnoses of binge eating may be more stringent (and therefore result in lower estimates of prevalence) than those achieved via self-report.[47] Available research, however, suggests acceptable convergence between the EDE-Q and EDE Interview for binge eating.[28,48] It is worth noting that a recent study by Goldfein and colleagues[49] found that the convergence of the EDE-Q to the EDE Interview can be improved by adding a thorough set of instructions with a detailed description and examples of binge episodes. Nonetheless, while our measures of the features of eating disorders have received some empirical support for use with bariatric patient groups,[15,48] it is possible that different measures could produce somewhat different findings.

Another potential limitation is the possibility that extremely obese patients seeking bariatric surgery may minimize the existence of certain problems (e.g., distress level, binge eating) in order to appear psychologically healthy and appropriate for the surgery. Indeed, research has shown that patients undergoing psychological evaluation for surgery have elevated scores for social desirability and commonly deny active problems.[50] Although this possibility must be considered, we emphasize that our research study procedures and informed consent methods should have served to minimize this likelihood. Specifically, participants completed the assessments as part of a research study and were informed that the results would not be shared with the clinical treatment team unless they specifically requested it. Further, it was stressed that the assessments would have no medical benefit to them, but were intended solely to advance knowledge regarding psychosocial needs and outcomes of bariatric surgery patients.

Relatedly, the optimal way to assess psychopathology in this patient group still remains uncertain, and it is possible that different areas of psychosocial functioning not tapped by our diverse measures might be negatively influenced by binge eating.[19] Our findings pertain to extremely obese patients who seek bariatric surgery at an urban general medical center and undergo gastric bypass procedures. The findings may not generalize to obese patients who seek different (nonsurgical) forms of treatment and may not generalize to other forms of bariatric surgery methods, although this is unlikely. Lastly, longer-term follow-up studies are needed, since, for example, the significance of preoperative binge eating on postsurgical outcomes may emerge several years postsurgery, after the rate of weight loss has slowed. Indeed previous research employing longer follow-up intervals indicates that outcomes at 1 to 3 years postsurgery are not equivalent to

longer-term (i.e., 10-year) outcomes for both weight loss and associated cardiovascular risk factors and that many patients experience substantial weight regain during the 2- to 10-year interval postsurgery.[2]

It is possible that the emergence of binge eating postoperatively may have prognostic significance. It is important to consider that following surgery, binge eating—defined as eating unusually large amounts of food—may not be physically possible. Indeed, consumption of either too-large portions or rich or high-fat foods following bariatric surgery typically results in vomiting and/or dumping syndrome. These unpleasant events would likely occur before, and effectively prevent, the consumption of an objectively large amount of food (i.e., an amount sufficient to meet the diagnostic level of a "binge episode"). Unfortunately, data on gastric dumping were not available. Future research should investigate the relationship between preoperative binge eating and postoperative dumping syndrome as well as the prognostic significance of disordered eating that emerges postoperatively.

In summary, we examined preoperative binge eating in relation to preoperative presentation and to 12-month postoperative outcomes in gastric bypass patients. Our findings suggest that preoperative binge eating does not appear to be a negative prognostic indicator for gastric bypass surgery. Longer-term follow-up is needed to determine the durability of these outcomes and whether binge eating has any prognostic significance for eventual outcomes. Finally, our findings suggest that a once-weekly frequency criterion for binge-eating episodes may be a more appropriate threshold than the DSM-IV-TR criterion of twice-weekly episodes for identifying a clinically significant level of binge-eating pathology.

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