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## Frequency of Binge Eating Episodes in Bulimia Nervosa and Binge Eating Disorder: Diagnostic Considerations

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### Abstract

**Objective**—In DSM-IV, to be diagnosed with Bulimia Nervosa (BN) or the provisional diagnosis of Binge Eating Disorder (BED), an individual must experience episodes of binge eating is “at least twice a week” on average, for three or six months respectively. The purpose of this review was to examine the validity and utility of the frequency criterion for BN and BED.

**Method**—Published studies evaluating the frequency criterion were reviewed.

**Results**—Our review found little evidence to support the validity or utility of the DSM-IV frequency criterion of twice a week binge eating; however, the number of studies available for our review was limited.

**Conclusion**—A number of options are available for the frequency criterion in DSM-V, and the optimal diagnostic threshold for binge eating remains to be determined.

The frequency criterion in DSM-IV (1) for the diagnosis of Bulimia Nervosa (BN) is “at least twice a week,” on average, for three months (criterion C). Similarly, in the provisional criteria for Binge Eating Disorder (BED), the frequency criterion is the occurrence of “binge eating, on average, at least two days a week for 6 months” (criterion D). The DSM-IV Work Group voiced concern with this twice-a-week frequency criterion for BN that was introduced in DSM-III-R, noting unpublished data that indicated no difference between once a week or greater frequency (2). Unless there was substantial empirical evidence favoring change the operational philosophy guiding the development of DSM-IV was to make no alterations to DSM-III-R criteria. Research is now available, however, to document the limitations inherent in this criterion and the need for change in DSM-V. The purpose of this review was to examine the validity and utility of the frequency criterion for BN and BED and to consider possible options for change.

### Method

A literature review was conducted to identify relevant articles by searching computer databases (e.g., MEDLINE, ISI Web of Science) and reviewing the reference sections of studies of the frequency criterion. Search terms included, but were not limited to, bulimia nervosa, binge eating disorder, binge eating frequency, and diagnostic criteria. Articles were reviewed if they included a comparison of individuals primarily based on the frequency of binge eating or purging behaviors.

## Results

### Bulimia Nervosa

Our review identified a total of 10 studies examining the frequency criterion among patients with BN (3–12). We first present research evaluating differences in eating disorder symptoms and comorbid psychopathology (n= 6 studies; 3–8), with basic descriptive information about these studies provided in Table 1. Studies addressing the prognostic validity of the frequency criterion (n= 4 studies; 9–12) are subsequently described.

Using a structured interview in a Canadian community sample of women and men, Garfinkel and colleagues (3) compared participants who met DSM-III-R criteria for BN and those missing only the twice-a week frequency criterion (partial BN). Overall, the two groups were indistinguishable in terms of compensatory weight behaviors, childhood experiences (e.g., sexual abuse), and comorbidity for depression and anxiety disorders. Moreover, both groups had similarly high levels of parental psychopathology. Although the partial-syndrome BN group tended to score midway between BN and normal controls, the difference between the two bulimic groups was not statistically significant. The authors concluded that the frequency criterion in DSM-IV “remains an arbitrary threshold that excludes from diagnosis subjects who in every other way resemble women with bulimia nervosa” (p.1057).

In a well-controlled study, Sullivan, Bulik, and Kendler (1998; 4) examined the classification of bulimic behaviors in a population sample of 1897 female twins (n= 31 with a lifetime history of BN). The authors systematically varied the diagnostic threshold of binge eating from one to eight times per month. These different thresholds were evaluated against several external validators, including familial aggregation (risk to co-twin), eating disorder symptoms, psychiatric comorbidity, and personality measures of neuroticism and extraversion. For most validators, “there was no suggestion of a point at which there was a qualitative change” (p.604). The single exception was for risk to the co-twin. In this case the data indicated that the most informative threshold was once-a-week binge eating.

Crow and colleagues (2002; 5) completed a large, multicenter study of the diagnostic features of full and partial syndrome eating disorders. Partial BN was defined as meeting criteria for BN on the Structured Clinical Interview for DSM-IV (13) with two exceptions: the shape and weight criterion, and the frequency criterion. Participants were required to have experienced binge eating episodes a minimum of once a month, on average, over the previous six months. Total score of the Yale-Brown-Cornell Eating Disorders Scale (14) discriminated between full and partial-BN, with full BN showing more severe eating disorder symptoms. No differences were observed on the Eating Disorder Examination (EDE; 15) and impairment of self-esteem and social adjustment were comparable across groups. Importantly, as patients in the partial BN group could deny the body shape and weight concern criterion, this study is not a pure assessment of the utility of the frequency criterion.

Another large multisite study compared women who met full BN criteria with those who met all criteria with the exception that their binge eating frequency was once-a-week (6). Scores on the Eating Disorder Examination Questionnaire (EDE-Q; 16) showed more similarities than differences. The two groups of women were indistinguishable in terms of subjective bulimic episodes, dietary restraint, body shape and weight concerns, and associated personality/psychiatric comorbidity.

In contrast, Rockert, Kaplan, and Olmsted (2007; 7) found that patients who met the full criteria for BN reported significantly higher scores on the subscales of the Eating Disorder

Inventory (EDI; 17), the Beck Depression Inventory (18), and Rosenberg Self-Esteem Scale (19) than those who engaged in binge eating once a week. The EDI provides a more limited clinical evaluation than other measures reported here, such as the EDE. Moreover, it should be noted that those patients who binged no more than once-a-week showed clinical levels of disturbance on the EDI. The authors themselves concluded that “these findings support lowering the frequency of binge eating episodes for BN to once per week...” (p. 503).

Spoor, Stice, Burton, and Bohon (2007; 8) assessed the binge eating frequency criterion in a large sample of 1,231 adolescent and adult females of which only 194 reported any binge eating or purging. Those who met full DSM-IV criteria for BN (n=136) were compared with a sub-threshold group (n=58) binge eating or engaging in compensatory behaviors for weight control less than twice a week [once a week on average], and a comparison group without binge eating or purging (n=774). No significant differences in psychosocial impairment were found between the two BN groups, and both the full and sub-threshold groups had significantly more impairment than the comparison group. With regard to health care utilization, the full-threshold group reported higher scores than the comparison females, and the sub-threshold group did not differ from either the full-threshold or comparison groups. The authors concluded that the DSM-IV frequency criterion may be too stringent to identify all individuals with functional impairment. Interpretation of these results is complicated by the fact that the lowered frequencies were combinations of the co-occurrence of binge eating and compensatory behaviors (e.g., compensatory behaviors without binge eating)

Evidence on the prognostic utility of the binge eating frequency criterion is largely lacking. However, based on a small, clinical sample of women, Wilson and Eldredge (1991; 9) found no difference in concurrent psychopathology or treatment response between patients with BN (full DSM-III-R criteria, n=17) and those who met all criteria except for binge eating frequency (once a week on average, n=5). Walsh and colleagues (2004; 10) evaluated guided self-help (GSH) in combination with fluoxetine or pill placebo for the treatment of patients with BN or sub-threshold BN in a primary care setting. No significant differences were observed in treatment response between patients with DSM-IV BN (n=76) and a small comparison group of patients with binge eating or purging less than twice per week (n=15; average number of objective bulimic episodes=  $4.6 \pm 2.4$ ) on the Beck Depression Inventory (18), Brief Symptom Inventory (20), or the Restraint, Shape Concern, or Weight Concern subscales of the EDE-Q (16).

Two additional studies, described below, examined treatment response among patients who failed to meet the frequency criterion (11; 12). However, as these studies included patients who were sub-threshold on other DSM-IV BN criteria (e.g., frequency of purging, duration of symptoms and size of binge episodes), it is not possible to conclude whether these studies support altering the frequency criterion.

Schmidt et al. (2008; 11) compared full-syndrome BN (n=61) with Eating Disorder Not Otherwise Specified (EDNOS, n=24) in a sample of treatment-seeking adolescents. EDNOS was defined as: (1) binge eating or purging less than twice a week, or (2) experiencing symptoms for less than three months, or (3) use of extreme compensatory behaviors without binge eating. At baseline, the EDNOS group reported more comorbid psychopathology while adolescents with BN had significantly more severe eating disorder psychopathology. At the one year follow-up, adolescents with BN were less likely to have ceased binge eating and purging, but no differences were observed on other measures of treatment response to family therapy and guided self-help respectively. In a similar design, Krug et al. (2008; 12) compared treatment outcome among adult women with full-syndrome BN and sub-threshold BN (EDNOS). The sub-threshold patients (n=39) met criteria for BN but reported no

objective binge eating or purging (45.5%, n=18, without objective binge eating; 21.6%, n=8, without purging), or did not meet the twice-a-week frequency criterion (n=13). Binge eating frequencies for the two groups were 6.9 and 1.2 per week respectively, and overall the groups did not differ significantly in terms of personality and clinical characteristics at baseline or for remission rates from binge eating and purging after a brief outpatient psychoeducational treatment.

The DSM-IV criteria for BN require the same frequency for “inappropriate compensatory behavior to prevent weight gain” such as purging. Less is known about the unique contribution of different frequencies of purging compared with binge eating. The limited available data do not support the DSM-IV threshold for vomiting (4).

### Binge Eating Disorder

Our review identified a total of nine studies examining the frequency criterion among patients with BED (5; 21–28). As above, research evaluating differences in eating disorder symptoms and comorbid psychopathology is presented first (n=6 studies (5; 21–25) and are listed in Table 1, followed by studies of the impact of the frequency criterion on weight loss treatment (n= 3 studies; 26–28). The provisional DSM-IV criteria for BED defined the frequency threshold in terms of days rather than episodes, and therefore, any evaluation of this criterion must consider the utility of retaining this distinction.

### Days versus Episodes of Binge Eating

The use of binge days rather than binge episodes relates to the phenomenology of binge eating for patients with BED, and in particular, observations of chaotic eating, frequent loss of control over eating, and binge episodes that began in the context of a meal but are not punctuated by compensatory behaviors. Spitzer et al. (1992) described individuals with BED as having “difficulty separating binge episodes during a given day” (p. 193; 29) based on a small study of 22 “nonpurging bulimic subjects” (30). The patients with nonpurging BN recalled significantly fewer binge episodes a week by calendar recall than by prospective self-monitoring, which was the opposite from what had been observed in similar research on BN. Rossiter et al. (1992; 30) suggested that the absence of purging, which would punctuate or anchor specific binge eating episodes, resulted in less accurate estimates of the number of specific episodes. Accordingly, they recommended using days on which binge eating occurred instead of binge eating episodes to improve the accuracy of self-report. In response to these early data, DSM-IV proposed that “future research should address whether the preferred method of setting a frequency threshold is counting the number of days on which binges occur or counting the number of episodes of binge eating” (p. 731). Yet, surprisingly, this recommendation has generated little research on the topic.

Of all the studies including patients with sub-threshold or full-threshold BED summarized above, only one used the formal DSM-IV frequency criterion of two days of binge eating a week as an entry criterion (5). The rest reported results using the frequency of binge eating episodes. Some treatment outcome studies have reported results in terms of binge days rather than episodes based on the EDE (31; 32). It is clear that the two measures are highly correlated. For example, Wilson and colleagues (2008; 32) found positive correlations of 0.83, and 0.97 for binge eating days and episodes at post-treatment and two year follow-up, respectively. In addition, the inter-rater reliability for the EDE in coding objective binge episodes and days on which one or more OBEs occurred is essentially the same. For example, Grilo et al. (2005; 33) reported a correlation of 0.98, Grilo et al. (2006; 34) observed a correlation of 0.98, and Wilson et al. (2008; 32) a correlation of 0.96 for these items on the EDE. Another means of comparing the clinical utility of using episodes versus days of binge eating is to examine the correlation between self-report and interview-based

measures. As self-report questionnaires are more likely to be used in clinical practice, it is important to evaluate the relationship between days or episodes of binge eating on these measures. Celio and colleagues (2004; 35) observed significant associations between the frequency of binge eating days and episodes as measured by the EDE-Q and EDE. Although a stronger association was observed between the measures for binge days than episodes, estimates for binge eating episodes on the EDE and EDE-Q were not significantly different, and on average, diverged by only 0.65 episodes per week.

### Frequency Criterion

The first study of the frequency criterion in BED identified for this review included 170 treatment-seeking obese women and men, and demonstrated that recurrent binge eaters differed significantly from non-binge eaters across a broad range of eating and weight-related characteristics assessed by EDE-Q (21). The pattern of differences remained the same whether or not a frequency criterion of binge eating once or twice a week was used to classify recurrent binge eaters.

Another study of a large sample of obese women and men in the community compared individuals without binge eating, individuals meeting DSM-IV criteria for Binge Eating Disorder (BED) and sub-threshold counterparts who reported binge eating episodes at least once but less than twice per week on average over the previous six months (23). The results indicated “greater similarities than differences” (p. 33) between the two binge eating groups, with no differences in dieting and weight history, or body image disturbance. The major difference was that the BED group reported more sadness and lower self-esteem than the sub-threshold group; however, the sub-threshold group experienced more body dissatisfaction, greater sadness, and lower self-esteem than normal controls. Striegel-Moore and colleagues (1998; 23) concluded that there “exists a continuum of vulnerability, with a higher frequency of binge eating reflecting greater severity” (p. 34).

In a subsequent study, comparisons were made between women in the community with BED, sub-threshold BED, and healthy controls using the EDE (22). The sub-threshold BED group did not differ significantly from women with BED on dietary restraint, body shape and weight concerns, associated psychiatric distress, or history of seeking treatment for an eating or weight problem. In comparison to healthy controls, women with sub-threshold BED demonstrated significantly higher scores on the restraint, shape concern, and weight concern subscales of the EDE-Q and associated psychiatric distress.

The multicenter study of the diagnostic criteria for eating disorders by Crow et al. (2002; 5), discussed above, also compared full BED with partial-syndrome BED, in which binge eating frequency was at least one day a month over the previous six months. As with the Striegel-Moore et al. (2000) study (22), a strength of this research was the use of the EDE as a measure of eating disorder psychopathology. The two groups did not differ on measures of specific eating disorder psychopathology (with the exception of the shape concern subscale of the EDE), or levels of self-esteem, social adjustment, and depression.

Fitzgibbon et al. (2003; 24.) categorized women seeking treatment at an outpatient eating disorders clinic into different diagnostic categories including DSM-IV defined BED and sub-threshold BED, namely, any objective bulimic episode within the previous six months. They conducted a discriminant function analysis using six predictor variables, namely, drive for thinness, current body image, ideal body image, body dissatisfaction, interoceptive awareness, and depression to predict group membership. Overall the results supported the continuity hypothesis for the bulimic and binge eating groups according to which eating disorders are on a continuum ranging from normal to pathological eating that differ



quantitatively but not qualitatively. More specifically, BED represents a more severe form of sub-threshold BED, and there should not be categorical distinctions between the groups.

Elder and colleagues (2006) examined differences among a sample of individuals presenting for bariatric surgery, including three groups derived from pre-surgery EDE-Q scores: no or infrequent binge eating, once-weekly binge eating, and binge eating at least twice weekly. The no/infrequent binge eating group reported significantly less pathology than the once and twice weekly groups for eating disorder symptoms, self-esteem, and depressive symptoms. No differences were observed between the once and twice weekly groups for any variable analyzed.

Research has also examined the impact of different frequencies of binge eating on weight loss in overweight and obese individuals. In an analysis of a self-help behavior modification program for weight loss in obese men and women, Delinsky, Latner, and Wilson (2006; 26) compared participants who reported binge eating eight or more times a month (n=27) with those who binged one to four times a month (n=39). The former showed significantly more eating, weight, and shape concern on the EDE-Q than the latter, but there were no differences in weight loss after 12 months. White and colleagues (2006; 27) compared three frequencies of binge eating in a sample of gastric bypass patients: twice-a-week (n=14), once-a-week (n= 19), and less than once a month (n= 22). Pretreatment data showed that all levels of binge eating were associated with distress. But the “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 twice-weekly binge eaters in predicting 12-month outcomes” (p. 1932, 27). Using a structured clinical interview based on the SCID, 216 obese patients were categorized into three groups based on lifetime binge eating symptoms: no binge eating (n = 43); sub-threshold binge eating (fewer than 2 episodes of binge eating per week; n = 129); and BED (at least 2 episodes of binge eating a week; n = 44; 28). At a two year follow-up the non-binge eating group showed a significantly greater percent excess BMI loss than either the sub-threshold binge eating or BED groups. The latter two groups did not differ on weight loss outcomes, results that were maintained at a 3 year follow-up.

## Discussion

Our review found little if any evidence of the validity or utility of the DSM-IV frequency criterion of twice a week binge eating for BN or BED, which is consistent with a recent meta-analysis of studies relevant to the relationship between BN and EDNOS (36). However, as noted in several of the papers summarized above, the optimal diagnostic threshold for binge eating remains to be determined. During the development of the DSM-IV criteria, Wilson and Walsh (1991; 2) noted that few studies examined the utility of thresholds lower than once a week. In our review, we could find relatively few studies that reported frequencies below once a week (5; 7; 9; 11; 22; 24–26). The available data do not establish a specific diagnostic threshold for binge eating frequency. Our review only identified seven studies that address the impact of the frequency criterion on treatment outcome, and therefore, limited data are available to inform the development of an optimal cut-point for clinical utility.

Drawing comparisons across the different studies summarized above, and trying to integrate the findings is complicated by the use of diverse measures, ranging from self-report questionnaires to standardized interviews. Another significant limitation of the available evidence is the variability in sample sizes. For studies of BN, the average sample size of sub-threshold patients for studies of frequency and associated psychopathology was 54.8 (range of 22–127), and the average sample size was 20.8 patients for studies examining

prognosis or treatment response (range of 5–239). For BED, the average sample of sub-threshold patients was 51.2 (range of 12–119) and 63.3 (range of 22–129) in studies of frequency and associated psychopathology and treatment response, respectively. In the absence of effect size estimates, it is difficult to determine whether the lack of significant differences between full and sub-threshold cases reflects inadequate power to detect differences rather than the absence of “true differences.”

Some of the studies described above included a comparison group of individuals without an eating disorder along with full and sub-threshold eating disorder cases. These studies offer some information about whether the failure to detect differences based on the frequency criterion is explained by sample size or statistical power. Only one of the studies identified for BN utilized a comparison group (8), and the results were mixed, with sub-threshold patients differing from controls on a measure of psychosocial impairment, but not healthcare utilization. More studies of BED included individuals without binge eating episodes (21–23; 25), and more consistent differences were observed between individuals with sub-threshold BED and individuals without an eating disorder. Thus, as individuals with sub-threshold binge eating (BN or BED) can be distinguished from individuals without an eating disorder, the failure to identify meaningful differences between full and sub-threshold cases may not result solely from methodological limitations of studies evaluating the frequency criterion.

From this review of the extant literature addressing the frequency criterion for binge eating, a number of options can be considered for DSM-V. First, as the existing data suggest that binge eating episodes can be measured reliably, we recommend that episodes be used in the diagnostic criteria for all DSM-V eating disorders to increase uniformity and consistency in assessing binge eating. For the number of episodes required, the first option is to retain the twice weekly binge eating threshold in DSM-V for both BN and BED. This option would preserve continuity with DSM-IV, and allow the accumulated literature about DSM-IV BN and BED with regard to course, outcome, and treatment response to be applied to patients diagnosed using DSM-V. The obvious objection to this option is the lack of specific empirical support for the twice per week frequency criterion. The same argument applies to inappropriate compensatory behavior.

A second option is to use a conservative standard for change, and to relax the frequency criterion by adopting a once a week frequency threshold. Several of the papers summarized above advocate this threshold (e.g., 4; 7; 27). This option for altering the frequency criterion has the most empirical support. Using a once-weekly threshold is suggested by evidence on family history, history of treatment-seeking for weight or eating problems (22), clinical characteristics, personality, and predictive validity, namely response to treatment. Further, few differences in either clinical characteristics or personality have been shown between individuals who binge once a week compared with twice a week. Data are currently available on response to treatments as diverse as group psychoeducation (12); behavioral weight loss treatment (26); and bariatric surgery (27). No significant differences have emerged. Ideally, research could examine whether increasing binge frequency predicts or even moderates treatment outcome to provide a more rigorous evaluation of this option for DSM-V. The same case can be made for inappropriate compensatory behavior.

An advantage of adopting the once-weekly binge eating option would be to capture a greater number of individuals with clinically significant levels of binge eating/eating disorder psychopathology who are currently arbitrarily excluded based on the DSM-IV criterion (3). Ideally, this would serve to reduce the unacceptably high number of patients who are currently included in the EDNOS category. However, Fairburn et al. (2007; 37) found that as an isolated change, reducing the frequency criterion to once a week might have

relatively little impact on the total number of treatment-seeking patients who are diagnosed with EDNOS.

A third option, which would be a more significant change to the current DSM-IV categories of BN and BED, would be to adopt a criterion of "recurrent" binge eating over the past three months. Clinicians would be required to rate whether the binge eating should be considered mild, moderate or severe. An additional criterion of functional impairment or clinically significant distress related to the binge eating behaviors would also be required, thereby ensuring that the individual was experiencing symptoms consistent with an eating disorder (38). For example, if the third option were adopted, clinicians could use the following scheme: mild binge eating consists of binge eating twice a month to once a week; moderate binge eating occurs once to twice a week; severe binge eating occurs daily. This option for DSM-V would be consistent with using a more dimensional approach for defining eating pathology, whereby binge eating is described on a continuum, rather than cut at an arbitrary frequency (twice per week).

The dimensional nature is a major advantage of this third option, as a number of the studies reviewed here have identified a continuum of binge eating with a higher frequency reflecting greater severity. Another advantage is that the definition of recurrent binge eating is inclusive and captures the widest range of individuals with clinically significant binge eating/eating disorder psychopathology. This criterion could be refined further by adding a specifier of dysfunctional body shape and weight concerns (e.g., 39).

Finally, we recommend that the time period over which binge eating (and inappropriate compensatory behavior in BN) be assessed be the same for both BN and BED. In DSM-IV, in contrast to BN, the provisional diagnostic criteria for BED stipulate assessment of binge eating over the prior six months. The empirical basis for the latter recommendation is lacking. For consistency and clinical utility we recommend a three month assessment period of binge eating across all diagnoses.

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Table 1

## Studies Relevant to the Frequency Criterion for Bulimia Nervosa (BN) and Binge Eating Disorder (BED)

<b>Bulimia Nervosa: Frequency and Associated Psychopathology</b>			
<b>Authors</b>	<b>Population</b>	<b>Method</b>	<b>Conclusion</b>
Garfinkel et al. (1995; 3)	62 women with DSM-III R BN, 22 women with partial BN (binge eating episodes less than twice weekly), and 4208 women without eating disorders from an epidemiological study in Canada	Comparisons were made between patients with BN, partial BN patients, and the women without eating disorders on rates of psychiatric comorbidities, sexual abuse, family background and parental psychopathology, and social and interpersonal functioning.	Few differences were observed between groups on measures of associated psychopathology.
Sullivan, Bulik, and Kendler (1998; 4)	31 twins from the Virginia Twin Registry with a lifetime history of recurrent binge eating and vomiting episodes at least once per month over the prior 3 months, 10 of whom had DSM-IV BN	Examined validators, including: risk to co-twin, symptom duration, comorbidity, and personality symptoms. Varied threshold of binge eating and assessed the impact on the validators described above.	The analyses found once weekly binge eating to be the most appropriate cut point.
Crow, Agras, Halmi, Mitchell, & Kraemer (2002; 5)	Participants were recruited at three specialist centers, and included: 87 patients with BN, 57 with partial BN (denied shape/weight criterion or binge eating/purging < 2 episodes/week and 1 episode/month) 104 with BED, and 45 with partial BED (binge eating < 2 days/week and 1 day/month)	Patients with full and subthreshold eating disorders were compared on eating disorder symptoms and other psychopathology. Patients with BN and subthreshold BN could be discriminated on the Yale Brown Cornell Eating Disorder Scale (kappa= 0.46) and patients with BED and partial BED were discriminated by shape concern (kappa= 0.05).	Evidence supporting a distinction between full and subthreshold patients was stronger between BN and partial BN than for BED and partial BED.
Le Grange et al. (2006; 6)	Five specialist eating disorder centers recruited 138 women with BN (purging or non-purging), 57 women with subthreshold BN (n=34; binge eating/purging 1 episode/week and < 2 episodes/week and n=23 binge episodes not objectively large)	Patients with DSM-IV and subthreshold BN were compared, and differences were noted between groups for eating disorder symptoms, specifically for eating concern, binge eating and vomiting, but not for general measures of psychopathology.	Patients with BN and subthreshold BN were not significantly different on most measures.
Rockert, Kaplan, and Olmsted (2007; 7)	127 patients treated in a tertiary care center in Toronto with subthreshold BN (objective bulimic episodes 1-7x/month, vomiting and laxatives < 8 times/month), 47 patients with subthreshold binge eating (1-7x/month) and threshold purging, and 425 patients with BN	Comparisons were made between patients with BN and subthreshold patients, and separately between subthreshold binge eaters and patients with BN on demographic variables, eating disorder symptoms, depressive symptoms, and self-esteem.	Patients with BN had higher levels of psychopathology than subthreshold patients, but subthreshold patients still had scores within the clinical range.
Spoor, Stice, Burton, and Bohon (2007; 8)	Adolescent and adult women from one of four studies, including: 58 subthreshold BN (binge eating and purging between 1 and 7 times per month), 136 patients with BN, and 774 individuals without binge eating or purging	Evaluated whether symptom free women, women with BN, and women with subthreshold BN experienced different rates of psychosocial impairment or health care utilization.	Patients with BN and subthreshold BN did not differ on psychosocial impairment, and both scored higher than the comparison group. For health care utilization, only the full-threshold group scored significantly higher than the control group.
<b>Binge Eating Disorder: Frequency and Associated Psychopathology</b>			
<b>Authors</b>	<b>Population</b>	<b>Method</b>	<b>Conclusion</b>
Wilson, Nonas, & Rosenblum (1993; 21)	170 obese individuals in a weight-loss treatment program, including 139 non-binge eaters and 31 binge eaters ( 1 episodes/week). Binge eaters were further subdivided to classify individuals with 2 binge episodes per week (n=19; 11.2% of	Non-binge eaters and binge eaters were evaluated on measures of eating disorder symptoms, figure rating tests, and addictive tendencies.	Individuals with binge eating differed from non-binge eaters on a number of eating and weight-related characteristics, but few differences were observed when binge eating was defined as either more than one episode per week,

	the sample), and subthreshold binge eaters (n=12)		or more than two episodes per week.
Striegel-Moore, Wilson, Wilfley, Elder, & Brownell (1998; 23)	Community sample of 53 individuals with BED, 119 with subthreshold BED (binge eating 1 day per week and < 2 days per week), 60 overeaters (denied loss of control over eating), and 160 controls	Individuals responding to a Consumer Reports survey were compared.	Individuals with subthreshold BED reported more severe symptoms than controls, but were also less symptomatic than patients with BED.
Striegel-Moore et al. (2000; 22)	44 women with subthreshold BED (binge eating 1x/month for the prior 6 months), 44 women with BED, and 44 healthy controls from a community sample	The three groups were compared for eating disorder and associated psychological symptoms.	With one exception, there were no significant differences between patients with BED and subthreshold BED. Women with sub-threshold BED scored significantly higher than healthy controls on measures of eating disorder pathology and associated psychiatric distress.
Crow et al. (2002; 5)	Please see above.		
Fitzgibbon, Sánchez-Johnsen, & Martinovich (2003; 24)	Enrolled 24 obese non-binge eaters, 59 subthreshold BED (binge eating during prior six months), 64 BED, 105 subthreshold bulimia nervosa (binge eating and purging no more than once per week), and 123 BN	Six predictor variables were examined using a discriminant function analysis, including: drive for thinness, current body image, ideal body image, body dissatisfaction, interoceptive awareness, and depressive symptoms.	Support was found for the continuity hypothesis, with subthreshold BED and BED existing on a continuum, rather than as categorically distinct disorders.
Elder et al. (2006; 25)	Sample of bariatric surgery candidates, including 249 men and women, with 191 individuals with no or infrequent binge episodes, 28 classified as once-weekly binge eaters, and 22 as 2 binge episodes weekly by EDE-Q	Comparisons were made for eating disorder symptoms and associated psychopathology between the three groups	The once and twice weekly binge eating group reported significantly more pathology than the no/infrequent group, but there were no differences on any measure between the binge eating groups.

BED=binge eating disorder; BDI=Beck Depression Inventory; BMI=body mass index ( $\text{kg}/\text{m}^2$ ); BN=bulimia nervosa; LOC=loss of control; EDE-Q=Eating Disorder Examination Questionnaire