



## Social anxiety and self-consciousness in binge eating disorder: associations with eating disorder psychopathology

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### Abstract

**Objective:** Research has consistently shown that anxiety disorders are common among individuals with eating disorders. Although social phobia has been found to be highly associated with eating disorders, less is known about social anxiety in individuals with binge eating disorder (BED). The present study examined associations between social anxiety and self-consciousness with body mass index (BMI) and eating disorder psychopathology in BED.

**Methods:** Participants were 113 overweight or obese treatment-seeking men and women with BED. Participants were administered semistructural diagnostic clinical interviews and completed a battery of self-report measures.

**Results:** Social anxiety was positively and significantly correlated with shape and weight concerns and binge eating frequency. After accounting for depressive levels, social anxiety and self-consciousness accounted for significant variance in eating, shape, and weight concerns and overall eating disorder global severity scores (Eating Disorder Examination). Social anxiety also accounted for significant variance in binge eating frequency after covarying for depressive levels. Social anxiety and self-consciousness were not significantly associated with BMI or dietary restraint.

**Discussion:** Our findings suggest that greater social anxiety and heightened self-consciousness are associated with greater eating disorder psychopathology, most notably with greater shape and weight concerns and binge eating frequency in patients with BED. Social anxiety and self-consciousness do not appear to be merely functions of excess weight, and future research should examine whether they contribute to the maintenance of binge eating and associated eating disorder psychopathology.

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### 1. Introduction

Research has consistently shown that anxiety disorders are common among individuals with eating disorders [1–3]. The prevalence of anxiety disorders is significantly higher in people with anorexia nervosa or bulimia nervosa (BN) than in nonclinical populations [1]. Although fewer research has examined anxiety disorders in people with binge eating disorder (BED), a disorder characterized by recurrent episodes of binge eating without the regular use of extreme weight control behaviors, available findings suggest similarly

high incidence rates [2,3]. Schwalberg et al [4] compared obese individuals who regularly binge eat, normal-weight persons with BN, and those with either social phobia or panic disorder on measures of anxiety and depression. They found similarities among the 4 groups with respect to levels of anxiety and depression, as well as incidence, prevalence, and clinical severity of anxiety disorders [4]. Of the anxiety disorders, social phobia is one of the most commonly diagnosed among obese individuals who binge eat [4]. Social phobia is marked by high levels of social anxiety [5], which is defined as a lack of confidence in social situations, difficulty interacting with other people, and fear of negative evaluations from others. Despite findings connecting social phobia to binge eating, little work has explored social anxiety in BED.

Clinically, social anxiety has long been thought to be common in people who binge eat [6,7], although it has received relatively little empirical attention. Striegel-Moore

This research was supported, in part, by NIH grants (R01 DK49587 and K24 DK070052).

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et al [8] found that specific aspects of social anxiety and high public self-consciousness (ie, concerns about the opinions of others regarding the self) were significantly associated with body dissatisfaction in individuals with BN. Striegel-Moore et al [8] posited that individuals with BN are extremely sensitive to the evaluations others make of them and are particularly attuned to their physical appearance, thus making social anxiety and self-consciousness important influences on how they feel about their bodies. We hypothesize that associations similar to those found by Striegel-Moore et al [8] for BN may also be present among those with BED, given that individuals with BED also exhibit sensitivity to the evaluations of others [9] and heightened body image concerns as reflected in behavioral [10] and cognitive-evaluative [11,12] manifestations. Social anxiety and self-consciousness, therefore, may be related to the shape and weight concerns of people with BED.

Social anxiety and self-consciousness are also associated with depression [13], which is important because depressive levels account for some of the variance in body dissatisfaction in individuals with BED [14,15] as well as for variations in other features of eating disorder psychopathology in BED [14,16–19]. However, among the disordered eating behaviors associated with BED psychopathology, dietary restraint was not expected to be associated with social anxiety and self-consciousness due to low levels of incidence and variability of dietary restraint in BED patients [12]. Thus, the present study sought to specifically examine associations between social anxiety and heightened self-consciousness with broader aspects of eating disorder psychopathology in BED than previously considered for BN [8] and whether observed associations exist after controlling for depressive affect. We hypothesized that social anxiety and self-consciousness would be significantly associated with greater binge eating and eating disorder psychopathology (notably greater eating, weight, and shape concerns) but not with restraint (which tends to be low and not very variable [12]) in patients with BED.

## 2. Methods

### 2.1. Participants

Participants were 113 men and women with BED who responded to newspaper advertisements seeking overweight and obese men and women who binge eat for treatment studies at a medical school-based program in an urban setting. Study inclusion criteria required meeting full *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* research criteria for BED [20]. Exclusion criteria included pregnancy, current treatment for eating or weight problems, specific medical problems (eg, diabetes, thyroid disease), and certain severe psychiatric conditions (eg, bipolar disorder, psychosis, current substance dependence). Participants' ages ranged from 23 to 59 years old (mean = 45.03,  $SD = 8.30$ ), 77.9% ( $n = 88$ ) were female,

and 22.1% ( $n = 25$ ) were male. With regards to ethnicity, 86.7% ( $n = 98$ ) were white, not Hispanic, 1.8% ( $n = 2$ ) were white, Hispanic, 8.0% ( $n = 9$ ), were African American, and 3.5% ( $n = 4$ ) were of other or unspecified minority/ethnic groups. The mean body mass index (BMI) was 37.1 kg/m<sup>2</sup> ( $SD = 7.3$ ) and ranged from 25.1 to 57.7 kg/m<sup>2</sup>.

### 2.2. Procedures

Experienced doctoral-level research clinicians trained in the administration of the study instruments performed the assessments. All participants provided written informed consent and study protocols were approved by Institutional Review Board. Participants' heights and weights were measured by trained clinicians using a calibrated medical balance beam scale. Participants completed a battery of self-report questionnaires (described below) and following completion of the questionnaires were assessed with the Eating Disorder Examination (EDE) [21].

### 2.3. Measures

EDE [21] is a semistructured interview that measures current levels of disordered eating psychopathology. The EDE focuses on the past 28 days, except for the diagnostic items that are rated for the durations stipulated in the *DSM-IV* [20]. The EDE assesses the frequency of different forms of overeating, including objective bulimic episodes (OBEs, ie, binge eating defined as unusually large quantities of food with a subjective sense of loss of control), which was used as our measure of binge eating frequency. The EDE also comprises 4 subscales, dietary restraint, eating concern, weight concern, and shape concern, and an overall global score. The items assessing the features of eating disorders for the 4 EDE subscales are rated on a 7-point forced-choice format (0–6), with higher scores reflecting greater severity or frequency. The EDE interview is a well-established valid measure for assessing BED and eating disorder psychopathology [22,23], and its scores have demonstrated adequate internal consistency and test-retest reliability in this patient group [24].

The Self-Consciousness Scale (SCS) [25] measures how participants experience and reflect on the self. The scale contains 23 items, each rated on a 5-point Likert scale ranging from 0 (extremely uncharacteristic) to 4 (extremely characteristic). The SCS comprises 3 subscales: public self-consciousness pertains to concerns about the actions and opinions of others that relate to the self (eg, “I usually worry about making a good impression”); private self-consciousness involves concerns about the “inner self” and is associated with awareness of one's inner thoughts, feelings, and impulses (eg, “I constantly scrutinize myself”); and social anxiety is relevant to one's confidence in social situations and ease in interacting with other people (eg, “Large groups make me nervous”). Test-retest reliability at 2 weeks ranged from .73 to .84 [25]. SCS scores are reliable [26] and have demonstrated construct validity in assessing social anxiety and self-consciousness in nonclinical [27,28]

Table 1  
Correlations among depressive symptoms, social anxiety, public and private self-consciousness, and eating disorder psychopathology

Measure	Social anxiety	Public SCS	Private SCS
BDI	.27**	.33**	.31**
BMI	.02	−.09	−.08
Global EDE	.23*	.39**	.45**
Dietary restraint	.02	.08	.17
Eating concern	.07	.30**	.29**
Shape concern	.37***	.37***	.41***
Weight concern	.22*	.27**	.35***
Binge frequency <sup>a</sup>	.19*	.13	.07

Note. BDI = Beck Depression Inventory; EDE = Eating Disorder Examination; SCS = Self-Consciousness.

<sup>a</sup> Average number of OBEs per week in the past 6 months.

\*  $P < .05$ .

\*\*  $P < .01$ .

\*\*\*  $P < .001$ .

and clinical populations [29]. Higher scores on each subscale of the SCS indicate heightened private self-consciousness, public self-consciousness, and social anxiety. For the purposes of this study, the public and private self-consciousness subscales were our measures of high self-consciousness and the social anxiety subscale was our measure of social anxiety.

The Beck Depression Inventory (BDI) [30] is a 21-item inventory of the symptoms of depression and serves as an excellent proxy for depressive/negative affect [14]. Each item is scored on a scale value of 0 to 3. The BDI is psychometrically well established and widely used, its scores having demonstrated evidence of reliability as well as content, concurrent, discriminant, construct, and factorial validity in assessing depressive symptoms in clinical and nonclinical populations [30,31]. Higher scores reflect higher levels of depressive symptoms.

#### 2.4. Data analysis

Two-tailed Pearson's  $r$  correlations were performed to assess for associations between social anxiety, self-con-

sciousness (as measured by public and private self-consciousness), and the following variables: depressive symptoms, BMI, EDE global and subscale scores, and binge eating frequency. As depressive symptoms were significantly correlated with social anxiety and public and private self-consciousness, analyses of covariance were conducted to test for differences on the clinical variables between those high and low on social anxiety and self-consciousness, with depression as a covariate. We split participants into high and low social anxiety and self-consciousness groups according to methodologies used by Fenigstein et al [25] in a nonclinical population. Specifically, we placed those who scored above 16 on the social anxiety subscale in the high social anxiety group, those who scored above 22 on the public self-consciousness subscale in the high public self-consciousness group, and those who scored above 29 on the private self-consciousness subscale in the high private self-consciousness group. Based on the results of the correlations, hierarchical regressions were employed to determine which variables were the strongest predictors of eating disorder psychopathology.

### 3. Results

Table 1 summarizes the correlations between social anxiety and self-consciousness (ie, public and private self-consciousness) and depressive symptoms, BMI, EDE (global score, dietary restraint, eating concern, shape concern, weight concern), and binge eating frequency. Social anxiety was correlated with both public ( $r = .41$ ,  $P < .001$ ) and private ( $r = .25$ ,  $P < .01$ ) self-consciousness. Social anxiety was also significantly and positively correlated with depressive symptoms, global EDE score, shape and weight concerns, and binge eating frequency. Public and private self-consciousness were significantly and positively correlated with depressive symptoms, global EDE score and eating, shape, and weight concerns. Social anxiety, public self-consciousness, and private self-consciousness were not significantly correlated with BMI or dietary restraint.

Table 2  
Analyses of covariance comparing individuals with low and high social anxiety or self-consciousness, controlling for depressive levels

	High SA, mean (SD) ( $n = 53$ )	Low SA, mean (SD) ( $n = 60$ )	$F$	High public SCS, mean (SD) ( $n = 54$ )	Low public SCS, mean (SD) ( $n = 59$ )	$F$	High private SCS, mean (SD) ( $n = 33$ )	Low private SCS, mean (SD) ( $n = 80$ )	$F$
BMI	37.88 (7.39)	36.49 (7.12)	.12	36.44 (7.61)	37.78 (6.92)	2.86	36.68 (7.99)	37.33 (6.97)	.91
Global EDE	2.96 (1.00)	2.60 (1.08)	.24	3.10 (1.07)	2.47 (0.95)	5.50*	3.37 (1.19)	2.52 (0.89)	12.55**
Dietary restraint	1.68 (1.30)	1.73 (1.15)	.14	1.83 (1.32)	1.59 (1.11)	.87	2.07 (1.12)	1.56 (1.23)	3.83
Eating concern	2.43 (1.23)	2.27 (2.91)	.57	2.85 (2.94)	1.78 (1.24)	3.59	3.27 (3.58)	1.89 (1.26)	6.38*
Shape concern	4.37 (1.71)	3.42 (1.13)	5.51*	4.30 (1.60)	3.46 (1.30)	4.08*	4.55 (1.87)	3.58 (1.23)	6.28*
Weight concern	3.46 (1.08)	3.00 (1.01)	.92	3.42 (0.97)	3.03 (1.11)	.63	3.61 (0.96)	3.05 (1.06)	3.20
Binge frequency <sup>a</sup>	3.87 (0.83)	3.60 (0.87)	1.85	3.87 (0.85)	3.59 (0.85)	2.11	3.76 (0.87)	3.71 (0.86)	.00

Note: SA = Social Anxiety; EDE = Eating Disorder Examination; SCS = Self-Consciousness.

<sup>a</sup> Average number of OBEs per week in the past 6 months.

\*  $P < .05$ .

\*\*  $P < .01$ .

Table 2 presents the results of the analyses of covariance comparing those high vs low in social anxiety, public self-consciousness, and private self-consciousness with respect to BMI and EDE subscales, with depressive symptoms as a covariate. Individuals with high social anxiety reported significantly higher shape concern than those with low social anxiety. Individuals with high public self-consciousness reported significantly higher global EDE score and shape concern than those with low public self-consciousness. Individuals with high private self-consciousness reported significantly higher global EDE score and weight and shape concerns than those with low private self-consciousness.

Table 3 presents the results of a series of hierarchical regressions performed to examine which social anxiety and self-consciousness (i.e., public and private self-consciousness) variables contributed most to eating disorder psychopathology. To control for the effects of depressive symptoms, BDI scores were entered into the first step. Social anxiety and public and private self-consciousness were entered into the second step for all regressions except the regressions for eating concern and binge eating frequency. Social anxiety was not entered as a predictor of eating concern, as the correlation between social anxiety and eating concern was not significant. Depressive symptoms and public and private self-consciousness were not entered as predictors for binge eating

frequency, as the correlations between these variables and binge eating frequency were not significant.

Depressive symptoms (BDI) accounted for a significant portion of the variance in each dependent variable except binge eating frequency. After accounting for BDI, private self-consciousness also accounted for significant variance in the global EDE score. After accounting for BDI, public and private self-consciousness did not independently account for any significant variance in eating concerns, but the combination of these two measures did account for significant variance in eating concerns. Social anxiety and private self-consciousness accounted for significant variance in shape concern after controlling for depressive symptoms. Private self-consciousness accounted for significant variance in weight concern after controlling for depressive symptoms. Finally, social anxiety accounted for significant variance in binge eating frequency.

#### 4. Discussion

This study examined correlates of social anxiety and self-consciousness in overweight and obese men and women with BED. Social anxiety was significantly associated with higher levels of overall eating disorder psychopathology,

Table 3

Regression analyses examining the ability of social anxiety and self-consciousness to predict eating disorder psychopathology after accounting for depressive levels

Dependent variable	Step/independent variables	$R^2$ adjusted	$R^2$ change	$F$ change	$\beta$	$t$
Global EDE	Step 1	.20	.20	29.13***		
	BDI				.44	5.40***
	Step 2	.31	.11	13.65***		
	Social anxiety				-.02	-.01
	Public SCS				.15	1.36
Eating concern	Step 1	.07	.07	9.38**		
	BDI				.28	3.06**
	Step 2	.13	.06	6.33**		
	Public SCS				.16	1.56
	Private SCS				.17	1.66
Shape concern	Step 1	.21	.21	30.43***		
	BDI				.46	5.52***
	Step 2	.32	.11	14.01***		
	Social anxiety				.18	2.07*
	Public SCS				.07	.68
Weight concern	Step 1	.23	.23	34.53***		
	BDI				.49	5.88***
	Step 2	.27	.04	11.08***		
	Social anxiety				.03	.36
	Public SCS				.01	.05
Binge frequency <sup>a</sup>	Step 1	.03	.03	4.33*		
	Social anxiety				.19	2.08*
	Private SCS				.23	2.47*
	Public SCS				.01	.05
	Social anxiety				.03	.36

Note: BDI = Beck Depression Inventory; EDE = Eating Disorder Examination; SCS = Self-Consciousness.

<sup>a</sup> Average number of OBEs per week in the past 6 months.

\*  $P < .05$ .

\*\*  $P < .01$ .

\*\*\*  $P < .001$ .

including shape and weight concerns and binge eating frequency. Social anxiety accounted for significant variance in shape concern and binge eating frequency after controlling for depressive symptoms. Private self-consciousness was significantly associated with higher global EDE, eating, shape, and weight concerns, and accounted for significant variance in global EDE and shape and weight concerns after controlling for depressive symptoms. Public self-consciousness also was significantly associated with higher global EDE, eating, shape, and weight concerns but did not account for significant variance in these measures.

The present findings corroborate past research highlighting the importance of examining anxiety in relation to eating disorder psychopathology [1-3] but extended the literature by investigating specific dimensional components of social anxiety. Our findings support earlier studies suggesting that high social anxiety is associated with heightened shape and weight concerns and binge eating [4,8]. However, although Striegel-Moore et al [8] found that only public self-consciousness was associated with body dissatisfaction in BN, we found that both public and private self-consciousness were strongly positively associated with elevated shape and weight concerns in patients with BED. These results suggest that the shape and weight concerns of individuals with BED may be more strongly related to a tendency to self-examine one's own thoughts and feelings, not merely to concerns of what others might be thinking. Importantly, by controlling for depression levels, given their well-known associations with both anxiety and eating disorder psychopathology [14], we reduced the potential impact of a potent confound. Clinically, these findings highlight the importance of shape and weight concerns in patients with BED [11,12] despite the fact that the DSM-based BED diagnosis does not include a body image criterion (ie, reflecting shape or weight concerns) previously supported by research [32]. Clinicians may wish to follow empirically supported CBT methods [33] that include specific techniques to address both negative cognitions about the self and shape or weight concerns.

The associations among social anxiety, self-consciousness, and eating disorder psychopathology in BED appear complex. Although significant variance in eating and shape concerns were accounted for by the combination of private self-consciousness and social anxiety or public self-consciousness, significant variance in weight concern was accounted for only by private self-consciousness. Although one's eating and shape are observed publicly, one's weight (ie, the number on the scale) is not. Thus, it is possible that a lack of confidence in social situations (social anxiety) and concern about the opinions of others regarding the self (public self-consciousness) are associated only with those measures reflecting features that are readily visible to other people. The "stronger" association of private self-consciousness and social anxiety with shape concern as compared to eating concern may be because of the fact that while individuals' shapes are always publicly observable to some extent, they are not always eating in public. It is therefore

possible that concerns about one's own and others' thoughts about the self may be more relevant for how one evaluates shape than for eating behaviors. Importantly, since social anxiety and self-consciousness were not significantly associated with BMI, this suggests that they are not merely functions of excess weight in patients with BED.

We note several strengths and limitations of our study as context for interpreting the findings. Strengths include the consecutive and rigorous assessment of overweight and obese patients with BED. Limitations include our reliance on self-reported symptoms of social anxiety and self-consciousness and the cross-sectional nature of the study that precludes any speculations about causality or directionality. We note that some research suggests that social anxiety precedes the onset of BED [34] and that binge eating reduces anxiety in BN [35], which supports the idea that binge eating serves to escape aversive emotions. Indeed, some researchers have posited that anxiety and self-consciousness may play an etiological role in binge eating behaviors [16]. However, experimental and prospective longitudinal studies are needed to determine whether social anxiety and self-consciousness do indeed play roles in either the development or maintenance of BED psychopathology. Another possible limitation is that several items in the EDE subscales may overlap conceptually with social anxiety and self-consciousness (eg, EDE items "eating in secret," "social eating," and "avoidance of exposure"), which may have inflated correlations between the EDE and SCS. Lastly, our findings may not generalize to non-treatment-seeking obese persons with BED who may differ from our participants in demographic or clinical (eg, different levels of anxiety or body image concerns) factors [36]. With this context in mind, collectively our results suggest that social anxiety and self-consciousness do not appear to be merely functions of excess weight and that they are associated with heightened levels of eating disorder psychopathology in overweight or obese patients with BED, even after controlling for depressive levels.

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