Symmetry Concerns as a Symptom of Body Dysmorphic Disorder

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Abstract

Symmetry obsessions are a common symptom of obsessive-compulsive disorder (OCD) and have several demographic and clinical correlates. Appearance-related symmetry concerns appear common in body dysmorphic disorder (BDD); however, no published studies have examined this topic. This study examined the clinical features, prevalence, and correlates of symmetry concerns involving physical appearance in two BDD samples (*N*=160 and *N*=115). More than 25% of participants in each sample reported symmetry concerns for a body part with which they were preoccupied (total of 18 body parts in sample 1 and 18 in sample 2). In sample 1, BDD participants with appearance-related symmetry concerns were older than those without appearance-related symmetry concerns. In sample 2, those with appearance-related symmetry concerns reported poorer mental health-related quality of life, were more likely to have experienced lifetime suicidal ideation, had better BDD-related insight, and were less likely to have a lifetime eating disorder. In both samples, participants with appearance-related symmetry concerns were more likely to have lifetime OCD but *not* OCD-related symmetry obsessions. Thus, symmetry is a common appearance concern in BDD that is associated with comorbid OCD but not with OCD symmetry concerns specifically, suggesting that symmetry concerns may have a different mechanism/pathophysiology in BDD versus OCD.

Keywords

body dysmorphic disorder; symmetry; obsessive-compulsive disorder; clinical features

1. Introduction

Body dysmorphic disorder (BDD) is defined in *DSM-IV as* a distressing or impairing preoccupation with nonexistent or slight defects in physical appearance (American Psychiatric Association, 1994). In recent years, substantial efforts have been made to better understand the phenomenology of BDD and to identify its clinical features, including body areas of excessive concern, repetitive behaviors such as compulsive grooming and skin picking, and level of insight (e.g., Fontenelle et al., 2006; Grant, Menard, & Phillips, 2006;

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Phillips, Menard, Fay, & Weisberg, 2005). One feature of BDD that has not received empirical attention is appearance-related symmetry concerns. Our clinical observations suggest that appearance-focused symmetry concerns are common in BDD; for example, patients may report distressing and/or impairing preoccupation with supposedly "uneven" or "asymmetrical" eyebrows, eyes, hair, or other body areas, which appear normal to others. To our knowledge, no published reports have examined preoccupation with appearance-related symmetry as a symptom of BDD.

Whereas symmetry concerns have received virtually no empirical attention in BDD, symmetry obsessions are a well-known and common symptom of obsessive-compulsive disorder (OCD; see Coles & Pietrefesa, 2008), with prevalence rates ranging from 36% to 50% in adult OCD samples (Mataix-Cols, Rauch, Manzo, Jenike, & Baer, 1999; Pinto, Mancebo, Eisen, Pagano, & Rasmussen, 2006; Pinto et al., 2008). Symmetry obsessions in OCD are commonly accompanied by ordering and arranging compulsions (Radomsky & Rachman, 2004), and a symmetry/ordering factor or cluster has been consistently identified in studies attempting to create symptom-based OCD subgroups using the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS) Symptom Checklist (Abramowitz, Franklin, Schwartz, & Furr, 2003; Bloch, Landeros-Weisenberger, Rosario, Pittenger, & Leckman, 2008; Calamari et al., 2004; Goodman et al., 1989a, b; Mataix-Cols et al., 2005).

In OCD, symmetry obsessions have been linked to several notable demographic and clinical features. OCD symmetry symptoms have been found to occur more frequently in men than in women with OCD and to be associated with earlier age at OCD onset (Hasler et al., 2005; Jaisoorya, Reddy, & Thennarasu, 2009; Leckman et al., 1997; Lensi et al., 1996; Mataix-Cols et al., 1999; Stein, Anderson, & Overo, 2007; Torresan et al., 2009). OCD symmetry obsessions have also been found to be associated with comorbid obsessive-compulsive personality disorder (OCPD) and tic disorders (Baer, 1994; Jaisoorya, Reddy, Srinath, & Thennarasu, 2008; Labad et al., 2008). In a large outpatient OCD sample, Hasler et al. (2005) found that the OC symptom dimension that included symmetry obsessions (as well as repeating, counting, and ordering/arranging compulsions) was significantly related to comorbid diagnoses of panic disorder, agoraphobia, and alcohol and substance abuse/ dependence. In a subsequent study of 418 participants from the OCD Collaborative Genetics study, the symmetry, ordering/arranging, repeating, and counting symptom dimension from the Y-BOCS Symptom Checklist was associated with comorbid diagnoses of ADHD, alcohol dependence, and bulimia (Hasler et al., 2007). In a prospective follow-up study of treated OCD patients, symmetry/ordering was the only symptom dimension from the Y-BOCS Symptom Checklist that was more common among those who attempted or committed suicide, and it was independently associated with suicidal behaviors (Alonso et al., 2010).

BDD and OCD have similarities across multiple domains (for a review, see Phillips et al., 2010). Like OCD, BDD is characterized by recurrent, time-consuming, and intrusive thoughts that cause anxiety or distress. To reduce these negative feelings or prevent an unwanted event (e.g., being rejected by others or looking "ugly"), BDD patients engage in repetitive, time-consuming behaviors (e.g., frequent mirror checking, excessive grooming) that resemble OCD compulsions (Phillips, Gunderson, Mallya, McElroy, & Carter, 1998). Three studies that directly compared OCD and BDD across a broad range of clinical features found that the disorders are similar in terms of sex ratio and lifetime comorbidity for many (but not all) associated disorders (Frare, Perugi, Ruffolo, & Toni, 2004; Phillips et al., 1998, 2007). Two of these studies (Phillips et al., 1998, 2007) also found no differences between OCD and BDD with regard to age of onset and illness severity. Family studies have revealed elevated rates of BDD in first-degree relatives of individuals with OCD, suggesting a shared genetic contributions (Bienvenu et al., 2000, 2012). Because of these disorders' shared

features, BDD is widely considered an obsessive-compulsive spectrum disorder (e.g., Brady, Austin, & Lydiard, 1990; Hollander & Benzaquen, 1997; Jaisoorya, Reddy, & Srinath, 2003; Phillips, McElroy, Hudson, & Pope, 1995), and BDD will be included in an obsessive-compulsive and related disorders category in *DSM-5* (Phillips et al., 2010).

Nonetheless, OCD and BDD have some clinically important dissimilarities. For example, rates of lifetime suicidal ideation and attempts, lifetime major depressive disorder, and lifetime substance use disorders have all been found to be higher in BDD than in OCD (Frare et al., 2004; Phillips et al., 1998, 2007). Insight into disorder-specific beliefs is also poorer in BDD than in OCD (Phillips et al., 2007, 2012). The two disorders also require somewhat different treatment approaches (American Psychiatric Association, 2007; Wilhelm, Phillips, Fama, Greenberg, & Steketee, 2011). Thus, because OCD and BDD appear to be different disorders (Phillips & Kaye, 2007; Phillips et al., 2010), it is important to elucidate their shared versus distinct features.

This study examined the clinical features, prevalence, and demographic and clinical correlates of appearance-related symmetry preoccupations in BDD. Based on clinical experience, we hypothesized that preoccupation with appearance-related symmetry would be reported by a sizable subset of individuals with BDD. Extrapolating from the literature on symmetry obsessions in OCD, we hypothesized that appearance-related symmetry concerns would be significantly more common among men than women with BDD and associated with earlier age at BDD onset. Additionally, we hypothesized that appearance-related symmetry concerns in BDD would be associated with suicidality and with comorbid diagnoses of tic disorders, OCPD, and substance use disorders. Although the above-noted studies by Hasler and colleagues (2005, 2007) did not find a significant association between the Y-BOCS OCD symptom factor that includes symmetry obsessions and a comorbid diagnosis of BDD, we hypothesized that because symmetry is a common symptom of OCD, a lifetime diagnosis of OCD would be more common in individuals with BDD-related symmetry concerns than in those without BDD-related symmetry concerns. In addition, we hypothesized that symmetry as a symptom of OCD would be associated with symmetry as a symptom of BDD, based on the theory that such concerns have shared descriptive features and thus may also have shared underlying mechanisms/pathophysiology.

2. Methods

2.1 Participants

This study examined appearance-related symmetry concerns in two separate samples of individuals with *DSM-IV BDD*. We chose to analyze the samples separately because they differed in several ways, including how participants were ascertained, use of primarily *DSM-III-R* versus *DSM-IV* criteria for comorbid Axis I and II disorders, and number of different body parts assessed as the focus of BDD preoccupation and potentially involving symmetry concerns (see details below). Each of the two samples in this report is a subset of larger, previously described samples because data on appearance-related symmetry concerns were not available for the full samples (questions about appearance-related symmetry concerns were added or removed during the course of the studies). Although other papers have previously reported various characteristics of the larger samples from which the samples in this report were obtained, data pertaining to symmetry concerns in BDD have not previously been reported for either sample. In this report, study participants younger than 18 years of age were included in analyses, as we did not have reason to believe that appearance-related symmetry concerns would differ in children versus adults. The studies from which data for each sample were obtained were approved by the hospital's Institutional Review Board. All participants provided written informed consent (or assent plus parental consent for adolescents).

Sample 1 consisted of 160 individuals with current *DSM-IV BDD* (41% male, mean age = 28.80 ° 11.04, age range = 11 to 73, *n* = 131 adults [18 years]) who were referred from a variety of sources for clinical evaluation or treatment of BDD in a BDD research and clinical specialty program. Other papers have previously reported on various characteristics of the larger BDD sample from which this sample was derived (e.g., Gunstad & Phillips, 2003; Phillips & Diaz, 1997). They participated in a phenomenology study of the clinical features of BDD that had no exclusion criteria (*n* = 75;Phillips & Diaz, 1997; Phillips, McElroy, Keck, Pope, & Hudson, 1993) or in one of five pharmacotherapy studies of BDD (*n* = 85; Phillips, 2005; Phillips & Menard, 2009; Phillips & Najjar, 2003; Phillips, Albertini, & Rasmussen, 2002; Phillips, Dwight, & McElroy, 1998). The medication studies excluded individuals with a current substance use disorder, past or curent bipolar disorder, current clinically significant suicidality, or current inpatient or residential treatment status. Data examined from the five pharmacotherapy studies was obtained from participants prior to initiation of psychotropic medication.

Sample 2 is a more broadly ascertained sample of 115 individuals (30% male, mean age = 32.93 ° 11.83, age range = 14 to 63, *n* = 108 adults [18 years]) who participated in an observational prospective interview study of the course of BDD. The larger sample from which this subset of participants was derived consisted of 200 BDD participants, and various characteristics of this sample have been previously reported (e.g., Phillips et al., 2005; Phillips, Menard, & Fay, 2006). Recruitment sources consisted of mental health professionals (50%), advertisements (36%), the BDD program's brochures and program website (7.0%), friends and relatives of the participant (3%), nonpsychiatrist physicians (1%), and other sources (3%). Inclusion criteria were *DSM-IV* BDD or its delusional variant (delusional disorder, somatic type), age 12 or older, and ability to be interviewed in person. The only exclusion criterion was the presence of an organic mental disorder that would interfere with the collection of valid interview data. In the sample of 115 BDD participants used in this report, 87% (*n* = 100) met current criteria (during the past month) for BDD; the rest of the sample met full criteria for BDD at some point in their life (10% were in partial remission, and 3% were in full remission at the time of the intake interview). 65% percent (*n* = 75) of participants were currently receiving mental health treatment (most in the community). All data reported for this sample are from the initial (intake) interview.

2.2 Assessments

In both samples, appearance-related symmetry concerns were assessed with two questions on the *BDD Data Form* (Phillips, KA, unpublished), a semi-structured rater-administered measure used in previous BDD studies (e.g., Phillips & Diaz, 1997; Phillips et al., 1993). Normal-appearing body parts about which participants had excessive, clinically significant concern were first assessed. Participants were then asked whether their preoccupation with any of the identified body parts involved symmetry and if so, which part(s). The studies that constituted sample 1 varied in the total number of body parts that were assessed for excessive, clinically significant concern, from 33 parts to 42 parts. The studies also varied in the maximum number of body parts that could be reported as involving symmetry concerns, with earlier studies allowing only one body part to be identified as involving symmetry concerns and later studies allowing for up to 7 body parts to be identified. For all participants in sample 2, a total of 42 body parts were assessed for clinically significant concern, and a maximum of 7 body parts could be identified as involving symmetry concerns. The BDD Data Form also obtained information on demographic features and clinical characteristics of BDD, including age at onset of BDD, BDD-related compulsive behaviors, lifetime suicidality, and history of psychiatric hospitalization.

In sample 1, BDD was diagnosed with a reliable, semi-structured interview based on *DSM-IV* criteria for BDD (Phillips, 1996). Comorbid Axis I disorders were assessed with the

Structured Clinical Interview for DSM-III-R Axis I Disorders (Spitzer, Williams, Gibbon, & First, 1992; Williams et al., 1992) or the *Structured Clinical Interview for DSM-IV Axis I Disorders-Patient Edition* (SCID-I/P; First, Spitzer, Gibbon, Williams, 2002) when it became available. In sample 2, BDD and comorbid disorders were diagnosed with the *Structured Clinical Interview for DSM-IV Axis I Disorders, Non-Patient Edition* (SCID-I/ NP; First, Spitzer, Gibbon, & Williams, 1996).

In sample 1, personality disorders were assessed in adults with the *Structured Clinical Interview for DSM-III-R Personality Disorders* (SCID-II; First, Spitzer, Gibbon, & Williams, 1995a, b) or with the *Structured Clinical Interview for DSM-IV Axis II Personality Disorders* (First, Gibbon, Spitzer, Williams, & Benjamin, 1997) when it became available. In sample 2, personality disorders were assessed only in adult participants with the *DSM-IV* version of the SCID-II.

Severity of BDD symptoms was assessed with the *Yale-Brown Obsessive-Compulsive Scale Modified for Body Dysmorphic Disorder* (BDD-YBOCS; Phillips et al., 1997), a 12-item, reliable and valid semi-structured interview with scores ranging from 0 to 48. Higher scores indicate greater BDD symptom severity.

Current insight/delusionality of BDD appearance beliefs (e.g., "I look ugly") was assessed with the *Brown Assessment of Beliefs Scale* (BABS; Eisen et al., 1998), a 7-item, reliable and valid, semi-structured, interviewer-administered questionnaire. Scores range from 0 to 24, with higher scores indicating more delusional BDD beliefs.

In four of the medication studies in sample 1 ($n = 66$) and in all of sample 2, current symptoms of depression were assessed with the *25-item Modified Hamilton Rating Scale for Depression* (Miller, Bishop, Norman, & Maddever, 1985), a reliable and valid, interviewer-administered measure with scores ranging from 0 to 72. Higher scores indicate greater depressive symptom severity.

In sample 2, current OCD severity was assessed using the *Yale-Brown Obsessive-Compulsive Scale* (Y-BOCS; Goodman et al., 1989a, b), a 10-item, reliable and valid, semi-structured interview. Scores range from 0 to 40, with higher scores indicating more severe OCD symptoms. The clinician-administered version of the Y-BOCS Symptom Checklist (Goodman et al., 1989a, b) assessed the lifetime content of obsessions and compulsions.

In both samples, global symptomatology and psychosocial functioning was assessed using the *Global Assessment of Functioning Scale* (GAF; American Psychiatric Association, 1994). GAF scores range from 1 to 100, with lower scores reflecting greater symptom severity/poorer functioning.

Quality of life was assessed with the *Medical Outcomes Study 36-Item Short-Form Health Survey* (SF-36; Ware, 1993), a reliable, valid, and widely used self-report measure of health status and health-related qualify of life. Scores for each of the eight subscales range from 0 to 100, with lower scores reflecting poorer quality of life. The relevent SF-36 subscales examined in this report were General Mental Health, Role Limitations Due to Emotional Problems, and Social Functioning.

2.3 Procedure

The second author of this report collected all data in sample 1 via in-person interview. For sample 2, interviewers received careful and rigorous training and were closely supervised by the second author. All sample 2 interviews were thoroughly edited both clinically and clerically by senior staff, including the second author. Interrater reliability data was

previously reported for the larger sample from which sample 2 was derived (see Phillips et al.s, 2006). Intraclass correlation coefficients for several rater-administered measures in sample 2, including the BDD-YBOCS, BABS, and GAF, ranged from 0.97 to 1.0. Percent agreement was 100% for the diagnosis of BDD and was above 90% for the most common comorbid diagnoses (drug abuse/dependence, alcohol abuse/dependence, and major depressive disorder).

2.4 Statistical Analysis

Data were analyzed with SPSS Version 18. Means, standard deviations, and frequencies were calculated for each of the two samples. Within each sample, between-group differences for participants with appearance-related symmetry concerns versus those without appearance-related symmetry concerns were analyzed using chi square for categorical variables and t tests for continuous variables. In sample 1, there was a statistically significant difference in age for participants with versus without appearance-related symmetry concerns. Thus, we controlled for this variable in all analyses for sample 1 and report effect sizes as odds ratios for logistic regressions and adjusted R^2 for linear regressions. For sample 2, we report effect size estimates using Cohen's d $(d = .2$ is a small effect size, .5 is medium, and .8 is large) for continuous variables and the φ coefficient (Cramer´s V) for categorical variables (V = .2 is a small effect size, .5 is medium, and .8 is large). Given the exploratory nature of the analyses, we used an alpha level of .05; significant results should be interpreted with caution, as some of them may represent chance associations due to the number of between-group comparisons conducted.

Given the above-described exclusion criteria for sample 1 participants from the pharmacotherapy studies, we included only participants from the phenomenology study ($n = 75$), which had no exclusion criteria, in analyses of bipolar disorder, substance use disorders, and suicidality. Data were available for more disorders in sample 2 than in sample 1 because different versions of the SCID were used for sample 1; in addition, sample 2 included modules for trichotillomania, tic disorder, and post-traumatic stress disorder. For both samples, the sample size for analyses of a particular variable is at times less than the total sample N as a result of occasional missing data or because some measures were added later to the studies. For both samples, we included only participants with current BDD (sample 1: $n = 160$; sample 2: $n = 100$) when comparing current BDD severity (BDD-YBOCS score), depression symptom severity (HAM-D score), insight/delusionality of BDD beliefs (BABS score), current symptom severity/psychosocial functioning (GAF score), and quality of life (SF-36).

3. Results

In sample 1, 34.4% ($n = 55$) of participants (40.9% of men and 29.8% of women) reported a symmetry concern for at least one body part with which they were preoccupied. In sample 2, this was the case for 26.1% ($n = 30$) of participants (34.3% of men and 22.5% of women). In samples 1 and 2, respectively, participants identified an average of 4.68 ($SD = 3.43$) and 6.89 ($SD = 5.42$) body parts about which they were preoccupied. Among the 30 sample 2 participants with appearance-related symmetry preoccupations, symmetry concerns were reported for an average of 27% of the total number of body parts with which they were preoccupied. Across the full sample, symmetry concerns were reported for a total of 23 different body parts (18 body parts in sample 1 and 18 body parts in sample 2 (Table 1).

Of the 30 participants in sample 2 with a symmetry concern, 9 (30%) reported that their body part of greatest concern involved symmetry. Two-thirds ($n = 20$) identified only 1 body part involving symmetry concerns, 23% ($n = 7$) identified 2 body parts, 3% ($n = 1$) identified 3 body parts, 3% ($n = 1$) identified 4 body parts, and 3% ($n = 1$) identified 5 body parts; no

participants identified more than 5 body parts as involving symmetry concerns. The most common BDD behaviors among those reporting symmetry concerns in samples 1 and 2, respectively, were camouflaging the disliked body areas (93% and 100%), mirror checking (95% and 93%), and comparing one's perceived flaws with the same body parts of other people (91% and 93%).

There were relatively few differences in demographic and clinical features for participants with versus without BDD-related symmetry concerns (Table 2). Contrary to hypotheses, symmetry concerns were not significantly more common among men than women, and the average age at BDD onset was not significantly earlier for those with BDD symmetry concerns than those without BDD symmetry concerns; effect sizes for group differences were small. In sample 1, participants with BDD-related symmetry concerns were older (31.44 ± 12.32 vs. 27.42 ± 10.10, $p = .028$). In sample 2, those with BDD-related symmetry concerns had significantly poorer quality of life with regard to general mental health (34.48 ± 21.03 vs. 44.89 ± 19.41, $p = .037$). Consistent with hypotheses, a significantly greater proportion of participants with BDD-related symmetry concerns had lifetime suicidal ideation in sample 2 (93.3% vs. *74.1%, $p = .026$*). Also in sample 2, those with appearance-related symmetry concerns had significantly lower BABS scores, reflecting better insight regarding BDD beliefs (14.78 ± 4.99 vs. 17.86 ± 5.16, $p = .014$).

There were also few differences in comorbidity between the two groups (Table 2). Contrary to hypotheses, participants with BDD-related symmetry concerns were not significantly more likely to have OCPD, a substance use disorder, or a tic disorder in either sample (although statistical power was limited for analyses of OCPD and tic disorders due to low base rates). In sample 2, participants with BDD symmetry concerns were significantly less likely to have a lifetime eating disorder (20.0% vs. 41.2%, $p = .037$). As predicted, participants with BDD-related symmetry concerns were significantly more likely to have lifetime OCD in both samples 1 (46.8% vs. 21.8%, $p = .007$) and 2 (50.0% vs. 29.4%, $p = .048$). Significant differences were not found for any other individual Axis I disorder or for the number of comorbid Axis I and II disorders.

In sample 2, Y-BOCS data were available for 28 of the 29 BDD participants who had current OCD (see Table 2) (a total of 47 BDD participants in the larger sample of 200 from which sample 2 was derived had current OCD). Of those with current OCD in sample 2, 12 (42.9%) endorsed current OCD symmetry obsessions on the Y-BOCS. Participants with appearance-related symmetry concerns and current OCD ($n = 10$) did not have more severe OCD symptoms than those without symmetry concerns ($n = 18$; 22.80 ± 8.22 vs. 23.39 ± *5.20, $p = .818$*). Y-BOCS data were available for 38 of the 40 BDD participants who had lifetime OCD (66 BDD participants in the larger sample of 200 from which sample 2 was derived had current OCD). Those with lifetime OCD and appearance-related symmetry concerns were not more likely than those without appearance-related symmetry concerns to endorse lifetime OCD symmetry obsessions (36% vs. 38%, $X^2(1, N = 38) = .01$, $p = .912$, $V = .02$).

4. Discussion

To our knowledge, this is the first published report of appearance-related symmetry concerns and their clinical correlates in BDD. Appearance-related symmetry concerns were reported in more than 25% of each of the two BDD samples. Thus, excessive concern about symmetry is a relatively common feature of BDD and is not specific to OCD; when this concern focuses exclusively on perceived defects in one's own physical appearance, it reflects BDD.

It is notable that symmetry concerns involved a broad range of body areas (23 different body parts across the two BDD samples), most commonly hair, breasts/chest, eyes, eyebrows, nose, and lips. Individuals with BDD-related symmetry concerns did not significantly differ from those without symmetry concerns across most variables that were examined. Although BDD-related symmetry concerns were associated with a few clinical features reflecting greater morbidity, these findings were not consistent across the two samples. Consistent with our hypothesis, in both samples, BDD participants with symmetry concerns were more likely to have a lifetime OCD diagnosis. This finding contrasts with studies finding that OCD symptoms involving symmetry are not associated with comorbid BDD (Hasler et al., 2005, 2007).

These findings suggest that the frequency and correlates of symmetry concerns differ in OCD and BDD, although we did not directly compare these disorders. Symmetry obsessions were reported by 48% of adults with OCD in a large prospective, naturalistic course study of OCD (Pinto et al., 2006); in the current report's sample 2, which was derived from a very similar naturalistic course study of BDD, 26% of BDD participants reported appearance-related symmetry concerns. OCD symmetry symptoms have consistently been associated with male gender, earlier age of OCD onset, and comorbid OCPD and tic disorders (e.g., Baer, 1994; Hasler et al., 2005; Labad et al., 2008; Leckman et al., 1997; Lensi et al., 1996), which we did not find for BDD, although statistical power was limited for analyses of OCPD and tic disorders. An OCD symptom factor involving symmetry has also been linked to comorbid diagnoses of panic disorder, agoraphobia, substance use disorders, ADHD, and bulimia (Hasler et al., 2007, 2005). These associations were not found for BDD in the current study, although data were not available for ADHD in either sample, and statistical power was limited by low base rates, particularly for agoraphobia. In contrast, BDD participants with appearance-related symmetry concerns in sample 2 were *less* likely to have a lifetime eating disorder. Also in sample 2, BDD participants with appearance-related symmetry concerns had better insight regarding their BDD beliefs, whereas in OCD, symmetry obsessions have not been related to level of insight (Alonso et al., 2008; Elvish, Simpson, & Ball, 2010; Jakubovski et al., 2011). Symmetry/ordering symptoms were independently associated with suicidal behaviors in treated OCD patients (Alonso et al., 2010); in sample 2 but not sample 1, BDD symmetry concerns were associated with lifetime suicidal ideation (but not attempts). Thus, BDD symmetry concerns do not appear to share demographic or clinical correlates with OCD symmetry obsessions, although additional research is needed.

Interestingly, BDD participants with lifetime OCD who had BDD-related symmetry concerns were *not* more likely to endorse OCD symmetry obsessions than those without BDD-related symmetry concerns (36% versus 38%). We had expected an association between BDD symmetry concerns and OCD symmetry concerns because of their similarity from a descriptive, symptom topography perspective. The lack of such an association suggests that symmetry concerns in BDD and OCD may have a different underlying mechanism or pathogenesis. From an evolutionary perspective, appearance-related symmetry concerns (like all BDD preoccupations) may be related to mate selection (Phillips, 2009). Fluctuating asymmetry, or subtle deviation from perfect symmetry in bilaterally symmetrical traits, is thought to provide an index of an organism's developmental stability (i.e., reproductive fitness), reflecting inability to cope with environmental and genetic perturbations during development (Polak, 2008). Fluctuating asymmetry is associated with mating/reproductive success in some species (see Polak, 2008), and there is some evidence that it may play a role in sexual selection in humans (Thornhill & Gangestad, 1994). In contrast, in OCD, symmetry obsessions and associated ordering/arranging compulsions may represent a pathological variant of normal preferences for symmetry and order that are present from early childhood (Evans et al., 1997), or a disordered manifestation of the

human disposition to perform culturally prescribed rituals that ordinarily function to integrate the individual into social systems but that have lost their social linkage (Fiske & Haslam, 1997; see Coles & Pietrefesa, 2008).

This study has several limitations. Assessment of symmetry concerns was limited to one interview item in each sample, data for some variables) were available for only some participants in sample 1 (e.g., Modified HAM-D, SF-36), and *n*'s for analyses of certain clinical features and comorbid disorders (e.g., tic disorders and trichotillomania) were small; thus, there was little power to detect group differences. Data on BDD rituals that may have been specifically linked to symmetry concerns were not collected, and the study did not have an OCD control group. The study also has several strengths, including the use of two large BDD samples that were evaluated on a number of clinically important variables with psychometrically sound self-report and interview measures.

5. Conclusions

Appearance-related symmetry concerns are a common symptom of BDD. Clinicians should assess patients with BDD for preoccupation with symmetry and should not assume that such concerns are a symptom of OCD. Clinicians should also be aware that appearance-related symmetry concerns in BDD may be associated with suicidal ideation and poorer mental health-related quality of life, although replication of these findings is needed. Research is needed to further examine the relationship between symmetry concerns as a symptom of BDD versus OCD and to explore distinct versus shared risk factors for the development of symmetry concerns in these disorders. In addition, studies should explore the relationship of appearance-related symmetry concerns to treatment outcome in BDD, as this topic has not been examined.

Acknowledgments

References

Abramowitz JS, Franklin ME, Schwartz SA, Furr JM. Symptom presentation and outcome of cognitive-behavioral therapy for obsessive-compulsive disorder. Journal of Consulting and Clinical Psychology. 2003; 71:1049–1057. [PubMed: 14622080]

Alonso P, Menchon JM, Segalas C, Jaurrieta N, Jimenez-Murcia S, Cardoner N, Vallejo J. Clinical implications of insight assessment in obsessive-compulsive disorder. Comprehensive Psychiatry. 2008; 49:305–312. [PubMed: 18396191]

Alonso P, Segalas C, Real E, Pertusa A, Labad J, Jimenez-Murcia S, Menchon JM. Suicide in patients treated for obsessive-compulsive disorder: A prospective follow-up study. Journal of Affective Disorders. 2010; 124:300–308. [PubMed: 20060171]

American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-IV). 4th. Washington, DC: American Psychiatric Association; 1994.

American Psychiatric Association. Practice guideline for the treatment of patients with obsessive-compulsive disorder. 2007 Retrieved from http://psychiatryonline.org/content.aspx?bookid=28&sectionid=1678180.

Baer L. Factor analysis of symptom subtypes of obsessive-compulsive disorder and their relation to personality and tic disorders. Journal of Clinical Psychiatry. 1994; 55:18–23. [PubMed: 8077163]

Bienvenu OJ, Samuels JF, Riddle MA, Hoehn-Saric R, Liang KY, Cullen BA, Nestadt G. The relationship of obsessive-compulsive disorder to possible spectrum disorders: Results from a family study. Biological Psychiatry. 2000; 48:287–293. [PubMed: 10960159]

Bienvenu OJ, Samuels JF, Wuyek LA, Liang K-Y, Wang Y, Grados MA, Nestadt G. Is obsessive-compulsive disorder an anxiety disorder, and what, if any, are spectrum conditions? A family study perspective. Psychological Medicine. 2012; 42:1–13. [PubMed: 21733222]

Bloch MH, Landeros-Weisenberger A, Rosario MC, Pittenger C, Leckman JF. Meta-analysis of the symptom structure of obsessive-compulsive disorder. American Journal of Psychiatry. 2008; 165:1532–1542. [PubMed: 18923068]

Brady KT, Austin L, Lydiard RB. Body dysmorphic disorder: The relationship to obsessive-compulsive disorder. Journal of Nervous and Mental Disease. 1990; 178:538–540. [PubMed: 2380703]

Calamari JE, Wiegartz PS, Riemann BC, Cohen RJ, Greer A, Jacobi DM, Carmin C. Obsessive-compulsive disorder subtypes: An attempted replication and extension of a symptom-based taxonomy. Behaviour Research and Therapy. 2004; 42:647–670. [PubMed: 15081882]

Coles, ME.; Pietrefesa, AS. Symmetry, ordering, and arranging. In: Abramowitz, JS.; McKay, D.; Taylor, S., editors. Obsessive-compulsive disorder: Subtypes and spectrum conditions. New York, NY: Elsevier; 2008. p. 36-52.

Eisen JL, Phillips KA, Baer L, Beer DA, Atala KD, Rasmussen SA. The Brown Assessment of Beliefs Scale: Reliability and validity. American Journal of Psychiatry. 1998; 155:102–108. [PubMed: 9433346]

Elvish J, Simpson J, Ball LJ. Which clinical and demographic factors predict poor insight in individuals with obsessions and compulsions? Journal of Anxiety Disorders. 2010; 24:231–237. [PubMed: 20018476]

Evans DW, Leckman JF, Carter A, Reznick JS, Henshaw D, King RA, Pauls D. Ritual, habit, and perfectionism: The prevalence and development of compulsivelike behavior in normal young children. Child Development. 1997; 68:58–68. [PubMed: 9084125]

First, MB.; Gibbon, M.; Spitzer, RL.; Williams, JBW.; Benjamin, LS. Structured Clinical Interview for DSM-IV Axis II personality disorders (SCID-II). Washington, DC: American Psychiatric Press; 1997.

First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. Structured Clinical Interview for DSM-IV-TR Axis I disorders, research version, patient edition (SCID-I/P). New York, NY: Biometrics Research; 2002.

First MB, Spitzer RL, Gibbon M, Williams JBW. The Structured Clinical Interview for DSM-III-R personality disorders (SCID-II). I: Description. Journal of Personality Disorders. 1995a; 9:83–91.

First MB, Spitzer RL, Gibbon M, Williams JBW. The Structured Clinical Interview for DSM-III-R personality disorders (SCID-II): II. Multi-site test-retest reliability study. Journal of Personality Disorders. 1995b; 9:92–104.

First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. Structured Clinical Interview for DSM-IV Axis I disorders: Non-patient edition (SCID-N/P). New York, NY: New York State Psychiatric Institute; 1996.

Fiske AP, Haslam N. Is obsessive-compulsive disorder a pathology of the human disposition to perform socially meaningful rituals? Evidence of similar content. Journal of Nervous and Mental Disease. 1997; 185:211–222. [PubMed: 9114806]

Fontenelle LF, Telles LL, Nazar BP, De Menezes GB, Do Nascimento AL, Mendlowicz MV, Versiani M. A sociodemographic, phenomenological, and long-term follow-up study of patients with body dysmorphic disorder in Brazil. International Journal of Psychiatry in Medicine. 2006; 36:243–259. [PubMed: 17154152]

Frare F, Perugi G, Ruffolo G, Toni C. Obsessive-compulsive disorder and body dysmorphic disorder: A comparison of clinical features. European Psychiatry. 2004; 19:292–298. [PubMed: 15276662]

Goodman WK, Price LH, Rasmussen SA, Mazure C, Fleischmann RL, Hill CL, Charney DS. The Yale-Brown Obsessive Compulsive Scale: I. Development, use, and reliability. Archives of General Psychiatry. 1989a; 46:1006–1011. [PubMed: 2684084]

Goodman WK, Price LH, Rasmussen SA, Mazure C, Delgado P, Heninger GR, Charney DS. The Yale-Brown Obsessive Compulsive Scale: II. Validity. Archives of General Psychiatry. 1989b; 46:1012–1016. [PubMed: 2510699]

Grant JE, Menard W, Phillips KA. Pathological skin picking in individuals with body dysmorphic disorder. General Hospital Psychiatry. 2006; 28:487–493. [PubMed: 17088164]

Gunstad J, Phillips KA. Axis I comorbidity in body dysmorphic disorder. Comprehensive Psychiatry. 2003; 44:270–276. [PubMed: 12923704]

Hasler G, LaSalle-Ricci VH, Ronquillo JG, Crawley SA, Cochran LW, Kazuba D, Murphy DL. Obsessive-compulsive symptom dimensions show specific relationships to psychiatric comorbidity. Psychiatry Research. 2005; 135:121–132. [PubMed: 15893825]

Hasler G, Pinto A, Greenberg BD, Samuels J, Fyer AJ, Pauls D, Murphy DL. Familiality of factor-derived Y-BOCS dimensions in OCD-affected sibling pairs from the OCD collaborative genetics study. Biological Psychiatry. 2007; 61:617–625. [PubMed: 17027929]

Hollander E, Benzaquen SD. The obsessive-compulsive spectrum disorders. International Review of Psychiatry. 1997; 9:99–110.

Jaisoorya TS, Reddy YC, Srinath S. The relationship of obsessive-compulsive disorder to putative spectrum disorders: Results from an Indian study. Comprehensive Psychiatry. 2003; 44:317–323. [PubMed: 12923710]

Jaisoorya TS, Reddy YC, Srinath S. Sex differences in Indian patients with obsessive-compulsive disorder. Comprehensive Psychiatry. 2009; 50:70–75. [PubMed: 19059517]

Jaisoorya TS, Reddy YC, Srinath S, Thennarasu K. Obsessive-compulsive disorder with and without tic disorder: A comparative study from India. CNS Spectrums. 2008; 13:705–711. [PubMed: 18704026]

Jakubovski E, Pittenger C, Torres AR, Fontenelle LF, do Rosario MC, Ferrão YA, Bloch MH. Dimensional correlates of poor insight in obsessive-compulsive disorder. Progress in Neuro-Psychopharmacology and Biological Psychiatry. 2011; 35:1677–1681. [PubMed: 21640153]

Labad J, Menchon JM, Alonso P, Segalas C, Jimenez S, Jaurrieta N, Vallejo J. Gender differences in obsessive-compulsive symptom dimensions. Depression and Anxiety. 2008; 25:832–838. [PubMed: 17436312]

Leckman JF, Grice DE, Boardman J, Zhang H, Vitale A, Bondi C, Pauls DL. Symptoms of obsessive-compulsive disorder. American Journal of Psychiatry. 1997; 154:911–917. [PubMed: 9210740]

Lensi P, Cassano GB, Correddu G, Ravagli S, Kunovac JL, Akiskal HS. Obsessive-compulsive disorder: Familial-developmental history, symptomatology, comorbidity and course with special reference to gender-related differences. British Journal of Psychiatry. 1996; 169:101–107. [PubMed: 8818377]

Mataix-Cols D, Rauch SL, Manzo PA, Jenike MA, Baer L. Use of factor-analyzed symptom dimensions to predict outcome with serotonin reuptake inhibitors and placebo in the treatment of obsessive-compulsive disorder. American Journal of Psychiatry. 1999; 156:1409–1416. [PubMed: 10484953]

Mataix-Cols D, Rosario-Campos MC, Leckman JF. A multidimensional model of obsessive-compulsive disorder. American Journal of Psychiatry. 2005; 162:228–238. [PubMed: 15677583]

Miller IW, Bishop SB, Norman WH, Maddever H. The Modified Hamilton Rating Scale for Depression: Reliability and validity. Psychiatry Research. 1985; 14:131–142. [PubMed: 3857653]

Phillips, KA. The broken mirror: Understanding and treating body dysmorphic disorder. New York, NY: Oxford University Press; 1996.

Phillips KA. Placebo-controlled study of pimozide augmentation of fluoxetine in body dysmorphic disorder. American Journal of Psychiatry. 2005; 162:377–379. [PubMed: 15677604]

Phillips, KA. Understanding body dysmorphic disorder: An essential guide. New York, NY: Oxford University Press; 2009.

Phillips KA, Diaz SF. Gender differences in body dysmorphic disorder. Journal of Nervous and Mental Disease. 1997; 185:570–577. [PubMed: 9307619]

Phillips KA, Kaye WH. The relationship of body dysmorphic disorder and eating disorders to obsessive-compulsive disorder. CNS Spectrums. 2007; 12:347–358. [PubMed: 17514080]

Phillips KA, Menard W. A prospective pilot study of levetiracetam for body dysmorphic disorder. CNS Spectrums. 2009; 14:252–260. [PubMed: 19407724]

Phillips KA, Najjar F. An open-label study of citalopram in body dysmorphic disorder. Journal of Clinical Psychiatry. 2003; 64:715–720. [PubMed: 12823088]

Phillips KA, Albertini RS, Rasmussen SA. A randomized placebo-controlled trial of fluoxetine in body dysmorphic disorder. Archives of General Psychiatry. 2002; 59:381–388. [PubMed: 11926939]

Phillips KA, Dwight MM, McElroy SL. Efficacy and safety of fluvoxamine in body dysmorphic disorder. Journal of Clinical Psychiatry. 1998; 59:165–171. [PubMed: 9590666]

Phillips KA, Gunderson CG, Mallya G, McElroy SL, Carter W. A comparison study of body dysmorphic disorder and obsessive-compulsive disorder. Journal of Clinical Psychiatry. 1998; 59:568–575. [PubMed: 9862601]

Phillips KA, Hollander E, Rasmussen SA, Aronowitz BR, DeCaria C, Goodman WK. A severity rating scale for body dysmorphic disorder: Development, reliability, and validity of a modified version of the Yale-Brown Obsessive Compulsive Scale. Psychopharmacology Bulletin. 1997; 33:17–22. [PubMed: 9133747]

Phillips KA, McElroy SL, Hudson JI, Pope HG. Body dysmorphic disorder: An obsessive-compulsive spectrum disorder, a form of affective spectrum disorder, or both? Journal of Clinical Psychiatry. 1995; 56:41–51. [PubMed: 7713865]

Phillips KA, McElroy SL, Keck PE, Pope HG, Hudson JI. Body dysmorphic disorder: 30 cases of imagined ugliness. American Journal of Psychiatry. 1993; 150:302–308. [PubMed: 8422082]

Phillips KA, Menard W, Fay C. Gender similarities and differences in 200 individuals with body dysmorphic disorder. Comprehensive Psychiatry. 2006; 47:77–87. [PubMed: 16490564]

Phillips KA, Menard W, Fay Cs, Weisberg R. Demographic characteristics, phenomenology, comorbidity, and family history in 200 individuals with body dysmorphic disorder. Psychosomatics. 2005; 46:317–325. [PubMed: 16000674]

Phillips KA, Pagano ME, Menard W, Stout RL. A 12-month follow-up study of the course of body dysmorphic disorder. American Journal of Psychiatry. 2006; 163:907–912. [PubMed: 16648334]

Phillips KA, Pinto A, Hart AS, Coles ME, Eisen JL, Menard W, Rasmussen SA. A comparison of insight in body dysmorphic disorder and obsessive-compulsive disorder. Journal of Psychiatric Research. 2012; 46:1293–1299. [PubMed: 22819678]

Phillips KA, Pinto A, Menard W, Eisen JL, Mancebo M, Rasmussen SA. Obsessive-compulsive disorder versus body dysmorphic disorder: A comparison study of two possibly related disorders. Depression and Anxiety. 2007; 24:399–409. [PubMed: 17041935]

Phillips KA, Stein DJ, Rauch SL, Hollander E, Fallon BA, Barsky A, Leckman JF. Should an obsessive-compulsive spectrum grouping of disorders be included in DSM-V? Depression and Anxiety. 2010; 27:528–555. [PubMed: 20533367]

Pinto A, Greenberg BD, Grados MA, Bienvenu OJ, Samuels JF, Murphy DL, Nestadt G. Further development of Y-BOCS dimensions in the OCD Collaborative Genetics study: Symptoms vs. categories. Psychiatry Research. 2008; 160:83–93. [PubMed: 18514325]

Pinto A, Mancebo MC, Eisen JL, Pagano ME, Rasmussen SA. The Brown Longitudinal Obsessive Compulsive Study: Clinical features and symptoms of the sample at intake. Journal of Clinical Psychiatry. 2006; 67:703–711. [PubMed: 16841619]

Polak M. The developmental instability-sexual selection hypothesis: A general evaluation and case study. Evolutionary Biology. 2008; 35:208–230.

Radomsky AS, Rachman S. Symmetry, ordering and arranging compulsive behavior. Behaviour Research and Therapy. 2004; 42:892–913.

Spitzer RL, Williams JBW, Gibbon M, First MB. The Structured Clinical Interview for DSM-III-R (SCID): I. History, rationale, and description. Archives of General Psychiatry. 1992; 49:624–629. [PubMed: 1637252]

Stein DJ, Anderson EW, Overo KF. Response of symptom dimensions in obsessive-compulsive disorder to treatment with citalopram or placebo. Revista Brasileira de Psiquiatria. 2007; 29:303–307. [PubMed: 18200396]

Thornhill R, Gangestad SW. Human fluctuating asymmetry and sexual behavior. Psychological Science. 1994; 5:297–302.

Torresan RC, Ramos-Cerqueira ATA, de Mathis MA, Diniz JB, Ferrão YA, Miguel EC, Torres AR. Sex differences in the phenotypic expression of obsessive-compulsive-disorder: An exploratory study from Brazil. Comprehensive Psychiatry. 2009; 50:63–69. [PubMed: 19059516]

Ware, JE. SF-36 health survey manual and interpretation guide. Boston, MA: New England Medical Center; 1993.

Wilhelm S, Phillips KA, Fama JM, Greenberg JL, Steketee G. Modular cognitive-behavioral therapy for body dysmorphic disorder. Behavior Therapy. 2011; 42:624–633. [PubMed: 22035991]

Williams JBW, Gibbon M, First MB, Spitzer RL, Davies M, Borus J, Wittchen H. The Structured Clinical Interview for DSM-III-R (SCID). II. Multisite test-retest reliability. Archives of General Psychiatry. 1992; 49:630–636. [PubMed: 1637253]

Highlights

- Appearance-related symmetry concerns were common in two BDD samples.

- BDD symmetry concerns involved a broad range of body areas.

- These concerns were associated with comorbid OCD but not OCD symmetry concerns.

- Clinicians should not assume that preoccupation with symmetry is a symptom of OCD.

Table 1

Focus of Appearance-Related Symmetry Concerns in BDD

Body areas	Sample 1		Sample 2	
	n	*%*	*n*	*%*
Hair	9	16.4	6	20.0
Breasts/chest	9	16.4	4	13.3
Eyes	4	7.3	7	23.3
Nose	4	7.3	3	10.0
Face	3	5.4	2	6.7
Jaw	3	5.4	1	3.3
Eyebrows	2	3.6	6	20.0
Body build	2	3.6	2	6.7
Ears	2	3.6	1	3.3
Stomach	2	3.6	1	3.3
Lips	1	1.8	5	16.7
Skin	1	1.8	2	6.7
Arm/wrist	1	1.8	1	3.3
Legs	1	1.8	0	0
Teeth	1	1.8	0	0
Chin	1	1.8	0	0
Weight	1	1.8	0	0
Other body part	1	1.8	0	0
Back	0	0	1	3.3
Cheeks	0	0	1	3.3
Forehead	0	0	1	3.3
Mouth	0	0	1	3.3
Testicles	0	0	1	3.3
Total number of body areas	18	--	1	--

Note. Data represent the number of participants reporting a symmetry concern for each body area and percent of participants who identified each body part as the focus of symmetry concerns. Percentages do not sum to 100 because of missing data in sample 1 and because participants could report more than one body part as being the focus of their symmetry concerns in sample 2.

Table 2

Demographic and Clinical Characteristics and Lifetime Comorbidity of BDD Participants With vs. Without Appearance-Related Symmetry Concerns

Variable[a]	Sample 1					Sample 2				
	BDD symmetry concerns absent (n=105)	BDD symmetry concerns present (n=55)	Wald or t	p	Effect size[b]	BDD symmetry concerns absent (n=85)	BDD symmetry concerns present (n=30)	Chi square or t	p	Effect size[b]
Demographics										
Gender (% female)	66 (62.9)	28 (50.9)	1.38	.130	1.02	62 (72.9)	18 (60.0)	1.75	.185	.12
Age	27.42 ± 10.10	31.44 ± 12.32	2.21	.028	.02	32.00 ± 12.03	35.57 ± 11.00	−1.43	.157	.27
Minority (non-white or Hispanic)	6 (13.6)	2 (7.7)	.45	.502	1.78	6 (7.1)	4 (13.3)	*c	.285	.10
Single	88 (83.8)	42 (76.4)	.00	.982	.99	63 (74.1)	26 (86.7)	2.00	.158	.13
Education (at least some college)	63 (64.9)	39 (73.6)	.06	.803	.90	58 (68.20)	23 (76.7)	.76	.384	.08
Currently employed (full or part time)	32. (57.1)	26 (74.3)	2.25	.133	.49	54 (63.5)	18 (60.0)	.12	.731	.03
Age at onset of BDD	16.07 ± 6.84	15.95 ± 7.08	−.61	.542	.04	16.85 ± 6.70	17.10 ± 8.17	−.17	.867	.03
Symptom severity (current)[d]										
BDD-YBOCS	31.41 ± 5.52	30.85 ± 5.57	−.33	.745	.00	30.40 ± 6.14	29.03 ± 7.73	.91	.365	.18
BABS[e]	16.69 ± 4.93	15.81 ± 5.67	−.44	.118	.01	17.86 ± 5.16	14.78 ± 4.99	2.51	.014	.52
Y-BOCS (OCD)	---[f]	---	---	---	---	23.39 ± 5.20	22.80 ± 8.22	.23	.818	.09
Modified HAM-D (25-item)	18.83 ± 6.89	22.52 ± 8.96	1.89	.063	.02	16.53 ± 10.73	18.72 ± 11.78	−.87	.386	.18
Quality of life (current)[d]										
SF-36[g]										
Mental health	38.97 ± 18.98	34.00 ± 18.54	−1.27	.210	.03	44.89 ± 19.41	34.48 ± 21.03	2.12	.037	.44
Role Emotional	30.34 ± 39.71	30.43 ± 38.81	.00	1.00	−.03	28.31 ± 36.71	16.67 ± 32.12	1.34	.184	.28
Social Functioning	40.06 ± 26.47	33.85 ± 24.02	−.96	.343	−.02	44.69 ± 25.76	38.10 ± 32.47	.97	.333	.20
Functional impairment										
GAF[d, h]	48.48 ± 9.52	53.88 ± 11.13	1.91	.060	.07	47.49 ± 10.34	43.08 ± 11.60	1.81	.073	.37
Psychiatric Hospitalization (lifetime)	29 (34.9)	14 (29.2)	.59	.444	1.36	30 (35.3)	15 (50.0)	2.01	.156	.13
Suicidality (lifetime)										
Suicidal ideation	39 (78.0)	17 (70.8)	.52	.471	1.51	63 (74.1)	28 (93.3)	4.96	.026	.21
Suicidal ideation due to BDD	29 (59.2)	14 (58.3)	.02	.896	1.07	36 (42.4)	17 (56.7)	1.83	.176	.13

Variable[a]	Sample 1					Sample 2				
	BDD symmetry concerns absent (n=105)	BDD symmetry concerns present (n=55)	Wald or t	p	Effect size[b]	BDD symmetry concerns absent (n=85)	BDD symmetry concerns present (n=30)	Chi square or t	p	Effect size[b]
Attempted suicide	15 (29.4)	5 (20.8)	.52	.472	1.53	24 (28.2)	11 (36.7)	.74	.388	.08
Attempted suicide due to BDD	6 (12.2)	4 (16.7)	.17	.682	73	6 (7.1)	4 (13.3)	*c	.285	.10
Number of comorbid Axis I disorders[i]	2.66 ± 1.52	3.06 ± 1.86	1.20	.231	00	4.09 ± 1.78	4.53 ± 1.89	−1.14	.256	.21
Mood disorders	69 (86.3)	40 (85.1)	.02	.874	1.09	68 (80.0)	26 (86.7)	.66	.416	.08
Major Depressive disorder	65 (82.3)	39 (83.0)	.04	.842	91	58 (68.2)	24 (80.0)	1.50	.221	.11
Bipolar disorder	2 (3.9)	0	.00	1.00	00	8 (9.4)	1 (3.3)	*c	.442	.10
Anxiety disorders	44 (55.0)	31 (66.0)	1.41	.236	63	57 (67.1)	23 (76.7)	.97	.325	.09
Panic disorder	14 (17.7)	6 (12.8)	.76	.384	1.60	13 (15.3)	5 (16.7)	.03	.859	.02
Agoraphobia	0	0	---	---	---	1 (1.2)	1 (3.3)	*c	.455	.07
Social phobia	24 (30.4)	21 (44.7)	3.06	.080	.50	31 (36.5)	12 (40.0)	.12	.731	.03
Specific phobia	9 (11.5)	5 (10.6)	.11	.734	1.23	13 (15.3)	8 (26.7)	1.92	.166	.13
Generalized anxiety disorder	3 (3.8)	0	0	1.00	00	2 (2.4)	1 (3.3)	.08	.772	.03
Posttraumatic- Stress disorder	--[f]	---	---	---	---	12 (14.1)	3 (10.0)	*c	.756	.05
Obsessive- compulsive disorder	17 (21.8)	22 (46.8)	7.35	.007	.33	25 (29.4)	15 (50.0)	4.14	.048	.19
Substance use disorders	10 (34.5)	8 (47.1)	.65	.420	.60	35 (41.2)	16 (53.3)	1.33	.249	.11
Alcohol use disorders	8 (27.6)	4 (23.5)	.07	.788	1.21	32 (36.7)	16 (53.3)	2.24	.134	.14
Non-alcohol substance use disorders	6 (21.4)	5 (29.4)	.33	.563	.67	35 (41.2)	16 (53.3)	1.33	.249	.11
Eating disorders[j]	7 (8.8)	4 (8.5)	.02	.897	.92	35 (41.2)	6 (20.0)	4.33	.037	.19
Anorexia nervosa	2 (2.6)	1 (2.1)	.01	.936	1.11	8 (9.4)	3 (10.0)	*c	1.00	.01
Bulimia nervosa	5 (6.4)	3 (6.4)	.02	.884	.90	7 (8.2)	0	*c	.187	.15
Other disorders										
Tic disorder	--[f]	---	---	---	---	0	1 (3.3)	*c	.261	.16
Trichotillomania	--[f]	---	---	---	---	3 (3.5)	1 (3.3)	*c	1.00	.01
Number of comorbid Axis II disorders	.74 ± 1.20	1.30 ± 1.63	1.44	.158	00	.90 ± 1.32	.93 ± 1.17	−.10	.924	.02
Obsessive-compulsive personality disorder	1 (5.9)	1 (6.7)	.00	.953	.92	10 (12.7)	1 (3.7)	*c	.283	.13

[a] Results are presented as n (%) or mean ± standard deviation.

[b]Effect sizes for sample 1 are presented as odds ratio for logistic regressions or adjusted R^2 for linear regressions. Effect sizes for sample 2 are presented as the φ coefficient (Cramer's V) for chi square analyses (.2 = small effect, .3 = medium effect and .5 = large effect) and Cohen's d for t-tests (.2 = small effect, .5 = medium effect, .8=large effect).

[c]Fishers exact test

[d]For both samples, data are reported only for those with current BDD.

[e]Mean BABS scores reflect poor BDD-related insight.

[f]Data for this variable was not available for sample 1.

[g]For the SF-36, lower scores indicate poorer quality of life.

[h]For the GAF, lower scores indicate greater symptom severity/poorer functioning.

[i]There were more disorders assessed in sample 2 than in sample 1; therefore, number of comorbid disorders in the two studies should not be directly compared.

[j]Lifetime diagnoses of Binge Eating Disorder and other forms of Eating Disorder-Not Otherwise Specified were not included in sample 1 but were included in sample 2.