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Delusional versus nondelusional body dysmorphic disorder: Clinical features and course of illness

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Abstract

DSM-IV's classification of body dysmorphic disorder (BDD) is controversial. Whereas BDD is classified as a somatoform disorder, its delusional variant is classified as a psychotic disorder. However, the relationship between these BDD variants has received little investigation. In this study, we compared BDD's delusional and nondelusional variants in 191 subjects using reliable and valid measures that assessed a variety of domains. Subjects with delusional BDD were similar to those with nondelusional BDD in terms of most variables, including most demographic features, BDD characteristics, most measures of functional impairment and quality of life, comorbidity, and family history. Delusional and nondelusional subjects also had a similar probability of remitting from BDD over 1 year of prospective follow-up. However, delusional subjects had significantly lower educational attainment, were more likely to have attempted suicide, had poorer social functioning on several measures, were more likely to have drug abuse or dependence, were less likely to currently be receiving mental health treatment, and had more severe BDD symptoms. However, when controlling for BDD symptom severity, the two groups differed only in terms of educational attainment. These findings indicate that BDD's delusional and nondelusional forms have many more similarities than differences, although on several measures delusional subjects evidenced greater morbidity, which appeared accounted for by their more severe BDD symptoms. Thus, these findings offer some support for the hypothesis that these two BDD variants may constitute the same disorder. Additional studies are needed to examine this issue, which may have relevance for other disorders with both delusional and nondelusional variants in DSM.

Keywords

Body dysmorphic disorder; dysmorphophobia; delusional disorder; somatoform disorder; psychotic disorder

DSM-IV's classification of body dysmorphic disorder (BDD) (also known as dysmorphophobia) was debated for DSM-IV (Phillips & Hollander, 1996) and remains controversial. BDD, a distressing or impairing preoccupation with an imagined or slight defect in physical appearance, is classified as a somatoform disorder (American Psychiatric Association, 1994). In contrast, its psychotic (delusional) variant is classified separately as a psychotic disorder (a type of delusional disorder, somatic type). However, DSM-III-R noted that it is unclear whether BDD and its delusional disorder variant can be distinguished by whether or not the belief is a delusion or "whether they are merely two variants of the same

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disorder” (American Psychiatric Association, 1987). In recognition of the latter possibility, DSM-IV allows these two variants to be double-coded, so that delusional patients may be diagnosed with both BDD and delusional disorder. While applying two different diagnoses to the same symptoms has drawbacks, double coding has the advantage of implying that BDD’s delusional and nondelusional variants may actually constitute the same disorder rather than being distinct. However, the relationship between these variants has received little investigation, making it unclear how they should optimally be classified in DSM (Phillips, 2004).

Clinical observations over the past half a century have suggested that these two variants of BDD substantially overlap and in fact may be the same disorder (e.g., Korkina, 1965; Stekel, 1949). For example, de Leon and colleagues (1989) stated that “...dysmorphophobic ideas are continuous beliefs and it does not seem appropriate to divide them into delusional and nondelusional categories.” Subsequently, Phillips & McElroy (1993) suggested that delusional and nondelusional BDD may be variants of the same disorder, based in part on clinical observations that delusional patients (like nondelusional patients) appear to respond to serotonin-reuptake inhibitors (SRIs). These observations suggested that delusionality (i.e., insight) is a dimensional construct that occurs on a continuum, ranging from good through poor to absent (i.e., delusional) (Phillips & McElroy, 1993). The relationship between BDD’s delusional and nondelusional variants – and how they should be classified in future editions of DSM -- will not be clear until their underlying etiology and pathophysiology are elucidated (Hyman, 2003; Phillips et al., 2003). However, comparisons of their clinical features can shed useful light on their similarities and differences. To our knowledge, the only previous study that has compared delusional to nondelusional BDD across numerous domains (n=50 and n=100 in an expanded sample) found that these variants had many more similarities than differences (McElroy et al., 1993; Phillips, et al., 1994). Delusional and nondelusional subjects were similar in terms of most variables examined, including demographic characteristics, clinical features, Axis I comorbidity, and response to pharmacotherapy. However, in the expanded sample of 100 subjects, a higher proportion of delusional subjects had experienced interference in work or academic functioning, and they had more severe BDD symptoms (Phillips et al., 1994). Thus, this study suggested that delusional and nondelusional BDD may constitute the same disorder, but that the delusional variant may be associated with greater functional impairment and illness severity. These findings led to suggestions that consideration be given to classifying BDD’s delusional and nondelusional variants together in DSM, perhaps using a psychotic subtype designation, similar to how psychotic depression is classified. This debate touches on the complex issue of how a categorical classification system such as DSM can accommodate what may be a dimensional construct, such as delusionality, and it has relevance to other “nonpsychotic” disorders with separate psychotic disorder variants in DSM-IV (e.g., hypochondriasis and obsessive compulsive disorder [OCD]).

In the present study, we examined this topic in a larger (n=191) and more diverse BDD sample than previously studied (for example, one third of subjects were not seeking or receiving mental health treatment at the time of the intake evaluation, unlike those in the previous study). The present study also differs from the previous study in several additional ways: 1) we examined some new variables (e.g., quality of life and additional functioning variables); 2) we classified subjects as delusional or nondelusional using a reliable and valid measure that is suitable for assessing delusionality in BDD (the Brown Assessment of Beliefs Scale [Eisen et al., 1998]), which had not been developed when the previous study was done; and 3) we present prospective longitudinal data on the course of delusional versus nondelusional BDD; to our knowledge, this is the first prospective course of illness study in BDD. We hypothesized that delusional subjects would have a more chronic course of BDD than nondelusional subjects based on previous findings suggesting that delusional BDD may be a more severe variant of the illness

(Phillips et al., 1994), as well as findings on other disorders suggesting that the presence of psychotic features may denote a more chronic course of illness (Coryell et al., 1996).

METHODS

Subjects

Subjects were 191 participants with DSM-IV BDD from an ongoing prospective study of the course of BDD. This report includes data from both the baseline (intake) assessment and 1-year course data. Study inclusion criteria were very broad: DSM-IV BDD or its delusional variant (delusional disorder, somatic type), age 12 or older, and able to be interviewed in person. The presence of an organic mental disorder was the only exclusion criterion. The sample's age range was 14–64, and 8.4% (n=16) of the sample were adolescents (age 14–17). 48% of subjects were referred by professionals, and 52% were self-referred. At the time of the intake assessment, 89.0% (n=178) of subjects currently met full DSM-IV criteria for BDD (i.e., during the past month), 7.5% (n=15) were currently in partial remission, and 3.5% (n=7) were currently in full remission (subjects in the latter two groups had met full BDD criteria in the past). 78% of the sample considered BDD their most problematic disorder (compared to any comorbid disorder). The study was carried out in accordance with the latest version of the Declaration of Helsinki, the study design was approved by the hospital Institutional Review Board, and all subjects signed statements of informed consent after the procedures had been fully explained (assent plus parental consent for adolescents).

Assessments

The following measures were administered at the intake interview. The current delusionalism of appearance beliefs was assessed with the 7-item semi-structured *Brown Assessment of Beliefs Scale (BABS)* (Eisen et al., 1998), which assesses insight (delusionalism) during the past week in a variety of psychiatric disorders. The BABS assesses degree of insight dimensionally and also provides a cutpoint to differentiate delusional from nondelusional beliefs. A BDD belief might be “I am hideous looking” or “I look like a monster.” Individual BABS items assess the following components of delusionalism/insight: 1) conviction (how convinced the person is that his/her belief is accurate), 2) perception of others' views (how certain the person is that most people think the belief makes sense); 3) explanation of differing views (the person's explanation for the difference between his/her and others' views of the belief), 4) fixity (whether the person could be convinced that the belief is wrong), 5) attempt to disprove the belief (how actively the person tries to disprove his/her belief), 6) insight (whether the person recognizes that the belief has a psychiatric/psychological cause), and 7) referential thinking (an optional item that assesses ideas/delusions of reference). Each item is rated from 0 to 4, with higher scores indicating poorer insight. The first 6 items are summed to create a total score (range=0 to 24) (the seventh item is not included in the total score because referential thinking is characteristic of some disorders but not others). Beliefs are classified as delusional based on a total score ≥ 18 plus a score of 4 on item 1 (conviction). The BABS has excellent interrater and test-retest reliability (ICC =.96 and .95, respectively), internal consistency (Cronbach's $\alpha=.87$), convergent validity ($r's=.56-.85$) with other measures of delusionalism, and is sensitive to change (Eisen et al., 1998; Phillips et al., 2001). Previous sensitivity and specificity calculations showed that use of the above-noted cutpoint to determine whether beliefs are delusional or nondelusional had 100% sensitivity and 86% specificity in subjects with BDD (Eisen et al., 1998).

The *BDD Form*, a semi-structured instrument (Phillips KA, unpublished; available from the first author upon request) used in previous studies (e.g., Phillips et al., 1994) obtained information on demographic characteristics, BDD's clinical features (e.g., body areas of concern, associated behaviors, suicidality) and treatment history. Current occupational status

(excluding employed subjects who were primarily students) was assessed with the *Hollingshead Occupational Index* (two factor version; scores range from 1-7, with higher scores indicating lower occupational status) (Hollingshead, 1965). We also used the following measures, each of which has established reliability and validity. The primary measure of current BDD severity was the *Yale-Brown Obsessive Compulsive Scale Modified for Body Dysmorphic Disorder (BDD-YBOCS)*, a 12-item semi-structured measure which assesses appearance preoccupations, BDD-related behaviors, insight, and avoidance (scores range from 0 to 48) (Phillips et al., 1997). In addition, the *Psychiatric Status Rating for BDD*, which mirrors DSM-IV criteria for BDD (see description below), assessed BDD severity during the past week, and the *Body Dysmorphic Disorder Examination (BDDE)* (Rosen & Reiter, 1996) assessed BDD symptoms and severely negative body image during the past month (in the first 93 subjects). The *Global Assessment of Functioning Scale (GAF)* (Spitzer, et al., 1992) assessed global symptomatology and functioning (scores range from 0-100), and the *LIFE-RIFT (Range of Impaired Functioning Tool)*, a semi-structured measure, assessed current functional impairment and employment status (Leon et al., 1999). We do not include inability to be employed, or to be in school due to psychopathology, in the total LIFE-RIFT score, and we report these percentages separately. The *Social Adjustment Scale-Self Report (SAS-SR)*, a 54-item self-report measure, assessed current social functioning (this measure was added later in the study and was completed by 122 subjects) (Weissman et al., 1978). The self-report *Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36)* measured current mental health status and mental health-related quality of life on 3 subscales: Mental Health (psychological distress and well-being), Role Limitations due to Emotional Problems, and Social Functioning (Ware, 1993). Subscale scores range from 0 to 100. The *Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q)* also assessed current quality of life (this measure was added later in the study and was completed by 119 subjects; the Short Form transformed score is reported) (Endicott et al., 1993). On the above symptom measures, higher scores reflect greater illness severity; on the functioning and quality of life measures (except for the LIFE-RIFT and SAS-SR), lower scores are poorer.

The 17-item *Hamilton Rating Scale for Depression* assessed depressive symptoms for subjects with current major depression (scores range from 0-50) (Hamilton, 1960). Axis I and II disorders were assessed with the *Structured Clinical Interview for DSM-IV—Non-Patient Version (SCID-I/NP)* (Spitzer et al., 1992) and the *Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II)* (First et al., 1997). The edition of the SCID-I/NP used in this study contains screening questions about psychotic symptoms but does not diagnose individual psychotic disorders. Except for eating disorders, NOS diagnoses were not made because of their subjective nature. The prevalence of a tic disorder, trichotillomania, and olfactory reference syndrome, which are not in the SCID, were assessed using SCID-like modules based on DSM-IV criteria. Family history for first-degree relatives was obtained using the family history method (making probable diagnoses) and SCID-I/NP. Family history of BDD was obtained for 188 subjects and their 827 first-degree relatives; data for selected other Axis I disorders were obtained for the first 98 subjects and their 464 first-degree relatives.

Follow-up interviews were conducted 1 year after the intake interview using the *Longitudinal Interval Follow-Up Evaluation (LIFE)*, a reliable and valid semi-structured interview and rating system for assessing the longitudinal course of mental disorders (Keller et al., 1987; Warshaw et al., 1994). The LIFE obtains information on symptom severity, diagnostic status, and treatment received. It evaluates course of illness with *Psychiatric Status Ratings (PSRs)*, which are assigned for each week of follow-up, providing summaries of course and allowing calculation of time to remission. PSRs are disorder-specific, global ratings of disorder severity that map onto DSM-IV criteria and have cutpoints for full DSM-IV criteria, partial remission, and full remission (Warshaw et al., 1994). A BDD-PSR of 1 or 2 = none or minimal BDD symptoms, a score of 3 or 4 reflects less than full DSM-IV criteria, and a score of 5-7 reflects

full BDD criteria. *A priori* definitions pertaining to BDD's course were: *continuous BDD symptoms* = full DSM-IV BDD criteria (PSR of 5-7) over the entire follow-up period, *partial remission* = less than full criteria (PSR of 3 or 4) for at least 8 consecutive weeks, and *full remission* = minimal or no BDD symptoms (PSR of 1 or 2) for at least 8 consecutive weeks. Shrout-Fleiss inter-rater reliabilities for the maximum and minimum BDD-PSR values during the first 8 weeks and the last 8 weeks of a year for each subject were calculated, as in previous studies (Warshaw et al., 1994). Eight-week spans were used because this time period corresponds to our definition of remission. Reliabilities ranged from .91-1.0, with a mean reliability of .96. The test-retest reliability for the BDD-PSR over 1 year yielded a correlation for maximum BDD-PSRs of 0.79 ($p < .0001$) and for minimum BDD-PSRs of 0.78 ($p < .0001$).

Statistical Analysis

Intake (baseline) analyses include the 191 subjects who were assessed with the BABS. Nine of the 200 subjects enrolled in the study could not be assessed with this measure (4 had clearly visible physical defects [i.e., skin lesions] secondary to BDD-related skin picking, and thus their beliefs could not be assessed for delusionality, and 5 cases did not have usable BABS data (e.g., a belief could not be clearly ascertained)). Means, standard deviations, and frequencies were calculated. For measures of current symptom severity or functioning (e.g., BDD symptoms), only the 170 subjects who currently met full BDD criteria (i.e., during the past week) were included in those analyses. Between-group differences for delusional vs nondelusional subjects were explored using chi-square analysis or Fisher's exact test for categorical variables and t-tests for continuous variables. Because delusional subjects had significantly higher scores on the primary measure of BDD severity (the BDD-YBOCS), we performed secondary analyses, using analysis of covariance for continuous variables or logistic regression for categorical variables and controlling for BDD-YBOCS score, to further examine significant between-group differences. Tests were two tailed; the alpha level was .05. Because this study is largely exploratory, we did not correct for multiple comparisons. Thus, there is possible inflation of Type I error rates, and some findings, particularly those of only modest significance, may reflect chance associations. Effect size estimates for t-tests were determined with Cohen's d ($d = .2$ is a small effect size, $.5$ is a medium effect size, and $.8$ is a large effect size) and for chi square analyses with Cramer's V ($V = .1$ is a small effect size, $.3$ is a medium effect size, and $.5$ is a large effect size). Pearson correlation coefficients were calculated for selected variables. For prospective course analyses ($n = 156$ subjects who met full BDD criteria at intake and had 1-year interview data), Kaplan-Meier life tables were constructed for time to partial or full remission. Cox proportional hazards regression was used to estimate the relative hazard for delusionality as a predictor of BDD full or partial remission (Cox, 1972) (full and partial remissions were combined because few subjects experienced full remission).

RESULTS

On the BABS, 35.6% ($n = 68$) of subjects were classified as currently delusional and 64.4% ($n = 123$) as nondelusional. Among the 170 subjects with current BDD, the mean BABS score for the entire sample was 16.5 ± 5.6 , reflecting poor insight. For delusional subjects, the mean BABS score was 21.5 ± 2.0 (delusional range), and for nondelusional subjects it was 13.3 ± 4.7 (poor insight range) ($t = -15.92$, $df = 151.9$, $p < .001$, $d = 1.49$). Scores for delusional and nondelusional subjects significantly differed on all 7 BABS items (all $p < .001$), including BDD-related referential thinking (thinking that people take special notice of the individual because of how they look). 62.5% ($n = 10$) of the 16 adolescents (age 14-17) were delusional compared to 33.1% ($n = 58$) of the 175 adults ($\chi^2 = 5.5$, $df = 1$, $p = .02$, $v = .17$), although these two groups did not significantly differ in terms of mean BABS score (17.9 ± 6.7 for adolescents vs 15.1 ± 6.6 for adults; $t = -1.64$, $df = 189$, $p = .10$, $d = .42$).

As shown in Table 1, delusional and nondelusional subjects did not significantly differ on any demographic characteristics, except that delusional subjects had significantly lower educational attainment. Delusional subjects had significantly more severe BDD on the BDD-YBOCS, with a medium to large effect size (Table 2). When the one BDD-YBOCS item that assesses delusionality/insight was excluded, the between-group difference remained significant (29.0 ± 5.8 vs 26.6 ± 6.3 , $t=-2.53$, $df=168$, $p=.01$, $d=.39$). Delusional subjects also had more severe BDD at a trend level on the intake BDD-PSR, with a small to medium effect size; however, BDD severity did not significantly differ on the BDDE. BABS scores correlated $r=.44$ ($p<.001$) with BDD-YBOCS scores, $r=.33$ ($p<.001$) with BDD-YBOCS scores excluding the delusionality/insight item, $r=.19$ ($p=.01$) with intake BDD-PSR scores, and $r=.20$ ($p=.07$) with BDDE scores.

There were far more similarities than differences between delusional and nondelusional subjects on most clinical variables and comorbidity (Tables 2 and 3). However, a significantly higher proportion of delusional subjects had attempted suicide and reported making at least one suicide attempt attributed primarily to BDD symptoms. Delusional subjects had poorer scores on nearly all functioning and quality of life variables, although the difference was statistically significant on only the Social Adjustment Scale-Self Report (SAS-SR) and the SF-36 Social Functioning subscale. (Functioning and quality of life measures were highly correlated with one another in subjects with current BDD; for example, for the GAF and SAS-SR, $r=-.56$ ($p<.001$), and the mean correlation between the Q-LES-Q and SF-36 subscales was $r=.52$, $p<.001$). Delusional subjects were significantly less likely to currently be receiving mental health treatment. As shown in Table 3, delusional and nondelusional subjects did not significantly differ in terms of any lifetime comorbidity except that a higher proportion of delusional subjects had lifetime drug abuse or dependence. The mean number of Axis I disorders did not significantly differ between the two groups (4.6 ± 1.8 for delusional subjects vs 4.2 ± 1.8 for nondelusional subjects, $t=-1.34$, $df=189$, $p=.18$, $d=.22$). Nor did the two groups significantly differ in terms of the mean number of Axis II disorders (0.9 ± 1.2 for delusional subjects vs 0.8 ± 1.2 for nondelusional subjects, $t=-0.49$, $df=170$, $p=.63$, $d=.09$).

Although a higher proportion of delusional subjects reported having at least one first-degree relative with probable BDD, the difference was not significant (25.4% [$n=17$] for delusional subjects vs 16.5% [$n=20$] for nondelusional subjects ($\chi^2=2.13$, $df=1$, $p=.14$, $v=.11$). Nor did the two groups significantly differ in terms of the proportion of all first-degree relatives with probable BDD (7.2% [$n=22$] for delusional vs 4.6% [$n=24$] for nondelusional subjects, chi square=2.51, $df=1$, $p=.11$, $v=.06$). There were no significant differences for other Axis I disorders that were examined.

Because delusional subjects had significantly higher scores on the primary BDD severity measure (the BDD-YBOCS), we performed secondary analyses controlling for BDD-YBOCS score to further examine the significant between-group differences in Tables 1-3. The only difference that remained statistically significant was educational level (odds ratio=.32, 95% confidence interval, 0.15-0.71, for having attended college).

In prospective course analyses, subjects had only a .09 probability of fully remitting from BDD over 1 year of follow-up, and a .21 probability of partially remitting from BDD, even though 83.2% ($n=134$) of subjects reported receiving mental health treatment during this year. Contrary to our hypothesis, intake BABS score did not predict full or partial remission from BDD over 1 year (hazard ratio=.98, $p=.49$), and delusional subjects were not significantly less likely to remit from BDD over 1 year than nondelusional subjects (hazard ratio=.86, $p=.61$).

DISCUSSION

This study found that individuals with BDD tend to have poor insight. The mean BABS score for the entire sample (16.5 ± 5.6), which reflects poor insight, was very similar to that in a different sample of 85 BDD subjects (16.8 ± 5.2) in a study comparing insight in BDD versus OCD (Eisen et al., 2004). The proportion of currently delusional subjects in the present study (36%) was also very similar to that in the previous study (38%) (Eisen et al., 2004). It is interesting that in the present study a higher proportion of adolescents than adults were delusional; however, there were few adolescents in the sample ($n=16$), and this finding is therefore preliminary and requires replication. Subjects with delusional BDD were similar to those with nondelusional BDD in terms of most clinical features, including most demographic variables, BDD characteristics, most measures of functioning and quality of life, comorbidity, probability of remitting from BDD over 1 year of prospective follow-up, and family history (our finding that 5.6% of all first-degree relatives had probable BDD, which appears approximately 5-8 times higher than in the general population, suggests that BDD is a familial disorder). However, delusional subjects had significantly lower educational attainment and more severe BDD symptoms, were more likely to have attempted suicide, had poorer social functioning/quality of life on several measures, and were more likely to have drug abuse or dependence. They were also less likely to currently be receiving mental health treatment, although they did not significantly differ in terms of whether they had received lifetime treatment. Thus, on some measures, delusional subjects had greater morbidity. However, when controlling for BDD symptom severity, the two groups differed only in terms of educational attainment.

These findings are similar to those of the previous study on this topic ($n=100$), even though that study classified subjects according to whether they had ever been delusional (i.e., completely convinced of their belief) for a significant period of time (without use of a reliable and valid measure), whereas the present study classified subjects on the basis of current delusionality using the BABS. Like the present study, the previous study found few significant differences between delusional and nondelusional subjects. However, the previous study found that a significantly higher proportion of delusional subjects had experienced impairment in work or academic performance; although the present study did not find a significant difference on this particular variable, it did find that delusional subjects had significantly lower educational attainment. The present study also found that delusional subjects had poorer social functioning and quality of life on the SAS-SR and SF-36, similar to a previous smaller study ($n=62$) which also found that delusional BDD subjects had lower SF-36 social functioning scores (33.5 ± 22.7 vs 47.1 ± 21.9 , $p=.03$) (Phillips, 2000). (In the latter study, delusional subjects also had significantly poorer scores on the SF-36 mental health subscale [$p=.008$], unlike the present study.) However, that study did not control for BDD symptom severity. Two other studies found that delusional BDD subjects had significantly higher levels of perceived stress ($n=78$), and that greater delusionality was significantly positively correlated with depression ($r=.49$, $p<.001$), anxiety ($r=.24$, $p=.047$), and anger-hostility ($r=.34$, $p=.004$) ($n=75$), although neither study controlled for BDD symptom severity (DeMarco et al., 1998; Phillips et al., 2004).

The present study also concurred with the previous study of 100 subjects in finding that delusional subjects have more severe BDD symptoms on the BDD-YBOCS (Phillips et al., 1994). In addition, the correlation of $r=.44$ ($p<.001$) between BABS score and BDD-YBOCS score in the present study is very similar to that previously reported in a smaller BDD sample ($r=.46$, $n=85$, $p<.001$) (Eisen et al., 2004). Our finding is also consistent with a study which found that in subjects with OCD plus comorbid BDD, poorer insight was significantly correlated with more severe BDD symptoms (Simeon et al., 1995). In the present study, the BABS' correlation with the intake BDD-PSR ($r=.19$) and with the BDDE ($r=.20$) was lower

than with the BDD-YBOCS, for unclear reasons. However, these correlations are for the subset of 170 subjects who currently met full DSM-IV criteria for BDD (which restricted the range of scores), and BABS correlations are higher and more similar across BDD severity measures if subjects currently in partial or full remission from BDD are included: BDD-YBOCS: $r=.62$, BDD-YBOCS excluding the insight item: $r=.55$, BDD-PSR: $r=.46$, and BDDE: $r=.51$ (all p 's < .001).

It is worth noting that a very high proportion of delusional subjects had attempted suicide (36.8%) and reported attempting suicide primarily because of BDD symptoms (19.1%). In fact, the lifetime suicide attempt rate in individuals with delusional BDD is approximately 14 times higher than in the general U.S. population (Moscicki, 1997). However, the rate of suicide attempts was not significantly higher in delusional subjects than in nondelusional subjects when controlling for BDD severity. This finding is consistent with previously reported data from this sample, in which a logistic regression analysis indicated that BDD severity as well as comorbid post-traumatic stress disorder and a substance use disorder, but not delusional, significantly predicted a history of attempting suicide (Phillips et al., 1995a). It is also worth noting that functioning and quality of life in our sample is extremely poor (for example, mean SF-36 scores are approximately 1.7-1.9 standard deviation units poorer than norms for the general U.S. population) (Ware, 1993).

It is interesting that delusional subjects were significantly less likely to be receiving mental health treatment at the time of the intake interview, as previously reported in a paper that cross-sectionally examined similarities and differences between treated and untreated BDD subjects (Phillips et al., 1995-b). The reason for this is unclear, but it is possible that delusional subjects are less likely to seek mental health treatment because they are convinced that they have an actual physical deformity and are less likely to attribute their appearance concerns to a psychiatric illness. Alternatively, mental health treatment may have improved insight, as has been found in several treatment efficacy studies (Hollander et al., 1999; Phillips et al., 2002).

This study has several possible implications for BDD's classification. Our finding that delusional subjects were similar in nearly all domains to nondelusional subjects supports classifying these disorders together rather than separately in different sections of DSM. Consistent with this suggestion, treatment studies to date indicate that BDD's delusional and nondelusional variants respond similarly to pharmacotherapy. In particular, delusional patients appear as likely to respond to SRI monotherapy as nondelusional patients (Hollander et al., 1999; Phillips et al., 2001; Phillips et al., 2002), and a preliminary study of the typical neuroleptic pimozide found that pimozide was similarly ineffective for both delusional and nondelusional patients (Phillips, 2005). However, the treatment outcome of delusional and nondelusional BDD needs further investigation, as does the response of these BDD variants to psychosocial treatment.

One possible approach is to classify BDD's delusional variant as a "psychotic" subtype of BDD, as is done for major depression (McElroy et al., 1993; Phillips, 2004). Indeed, psychotic and non-psychotic major depression are classified together in DSM's mood disorders' section despite evidence of meaningful differences between them – for example, in clinical features, treatment response, familial transmission, and underlying neurobiology (such as hypothalamic-pituitary-adrenal axis functioning, brain imaging findings, and neuropsychological functioning) (e.g., Belanoff JK, et al., 2001; Fleming et al., 2004; Kim et al., 1999; Schatzberg et al., 2000; Schatzberg & Rothschild, 1992). To best determine how BDD's delusional and nondelusional variants should be classified in DSM, additional studies are needed in domains such as these, which will elucidate these variants' underlying etiology and pathophysiology -- arguably the most valid indicators of disorders' relatedness (Hyman, 2003; Phillips et al., 2003).

This study has a number of limitations. Even though our sample is more diverse than the previous study that examined this topic, it is nonetheless a sample of convenience and may have unknown biases. It is therefore unclear how generalizable our results are to individuals in the community. In addition, we did not confirm treatment data via chart review. Our family history data has limitations inherent in the family history method, which may underestimate actual rates of psychopathology in family members (Andreason et al., 1986). Although we used a reliable and valid measure of delusionalality, it appears that delusionalality may sometimes vary over time or improve with treatment (Hollander et al., 1999; Phillips & McElroy, 1993; Phillips et al., 2001), which raises the possibility that subjects might be classified differently at different time points. In our ongoing prospective study, future analyses will examine the extent to which delusionalality varies or remains stable over time. However, if delusionalality may fluctuate over time, this would offer some support for the theory that delusionalality is a dimensional construct that may vary by degree. Our study also has a number of strengths, including a large and relatively diverse sample, assessment of a broad range of clinically relevant domains, and prospective examination of BDD's course. The study also used reliable and valid measures, including a measure developed to assess delusionalality in BDD with strong psychometric properties.

Future studies are needed to examine delusionalality in BDD, which has received little empirical investigation. Research is needed to determine whether separating BDD's delusional and nondelusional variants truly "carves nature at its joints" or whether this approach incorrectly imposes an arbitrary cutpoint on a continuous, or dimensional, construct. Studies that shed light on BDD's etiology and pathophysiology will be particularly valuable in determining the relationship between BDD's delusional and nondelusional variants, and how DSM should classify them. In the meantime, it is important for clinicians to be aware that insight in BDD is usually poor and that a substantial proportion of patients are delusional. Delusional and nondelusional patients have many similarities, including a similarly low probability of remitting over 1 year from BDD. However, delusional patients tend to have lower educational attainment and poorer social functioning and quality of life, and they appear at higher risk for attempting suicide, which in turn appears accounted for by their more severe BDD symptoms.

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Table 1
Demographic Characteristics of Delusional Versus Nondelusional BDD Subjects

Variable ^a	Delusional subjects (n=68)	Nondelusional subjects (n=123)	Chi square or t-test ^b	p	Effect size
Gender (% female)	49 (72.1)	81 (65.9)	$\chi^2 = 0.78$	.38	$v = .06$
Age	31.6 $\pm$ 12.8	33.1 $\pm$ 11.6	$t = 0.82$	.41	$d = .13$
Race (% white) ^c	55 (80.9)	108 (89.3)	$\chi^2 = 2.57$	.11	$v = .12$
Ethnicity (% Hispanic)	3 (4.5)	11 (9.5)	$\chi^2 = 1.44$	.23	$v = .09$
Marital status ^d			$\chi^2 = 2.50$	.29	$v = .12$
Single (never married)	34 (58.6)	71 (60.7)			
Married	19 (32.8)	28 (23.9)			
Divorced/separated	5 (8.6)	18 (15.4)			
Education ^d			$\chi^2 = 13.88$	< .001	$v = .28$
High school/GED or less	23 (39.7)	100 (85.5)			
At least some college	35 (60.3)	76 (65.0)			
Employed ^{d,e}	35 (60.3)	76 (65.0)	$\chi^2 = .36$	.55	$v = .05$
Occupational level ^{d,f}	4.2 $\pm$ 1.5	3.6 $\pm$ 1.4	$t = -1.79$	.08	$d = .36$
Living situation ^d			$\chi^2 = 4.10$	.25	$v = .15$
Alone	10 (17.2)	33 (28.2)			
Roommate/spouse	34 (58.6)	62 (53.0)			
Parent	14 (24.1)	2 (1.7)			
Supervised living	0 (0.0)	2 (1.7)			

^aResults are presented as n (%) of subjects or mean $\pm$ standard deviation.

^bdf=1 except for age (189), marital status (2), occupation (97), and living situation (3).

^cNon-white races (for entire sample): Black (7.3%), American Indian (5.2%), Asian (1.0%), Alaskan Native (0.5%) and Native Hawaiian/Pacific Islander (0.5%).

^dThese analyses include only the adults in the sample (n=175).

^e41.7% (n=73) of the 175 adults in the entire sample worked full-time, and 21.7% (n=38) worked part-time; an additional 3.4% (n=6) were currently on leave of absence for psychiatric or medical reasons.

^fMean score of 4.2 reflects level of clerical/sales worker, technician, or little business owner. Mean score of 3.6 reflects level of administrative personnel, owner of small business, or minor professional.

Table 2

Clinical Characteristics of Delusional Versus Nondelusional BDD Subjects

Variable ^a	Delusional subjects (n=68)	Nondelusional subjects (n=123)	Chi square or t-test ^b	p	Effect size
Body areas (lifetime)					
	6.3 ± 4.5	6.6 ± 5.0	t = 0.35	.72	d = .06
BDD behaviors (lifetime number) ^c	6.9 ± 2.3	6.9 ± 2.2	t = 0.14	.89	---
BDD severity (current) ^d					
BDD-YBOCS	33.0 ± 5.8	29.0 ± 6.6	t = -3.92	<.001	d = .62
BDD-PSR	5.9 ± 0.7	5.7 ± 0.7	t = -1.91	.06	d = .29
BDDE	97.5 ± 23.6	94.9 ± 20.5	t = -0.51	.61	d = .12
Course					
Age at onset of BDD	16.4 ± 7.2	16.5 ± 7.1	t = 0.16	.88	d = .03
Duration of illness (years)	15.0 ± 12.4	16.1 ± 12.2	t = 0.63	.53	d = .09
Suicidality					
Suicidal ideation	48 (70.6)	100 (81.3)	$\chi^2 = 2.88$	.09	v = .12
Suicidal ideation due to BDD ^e	35 (51.5)	70 (56.9)	$\chi^2 = 0.52$	.47	v = .05
Suicide attempt	25 (36.8)	27 (22.0)	$\chi^2 = 4.85$	.03	v = .16
Suicide attempt due to BDD ^e	13 (19.1)	11 (8.9)	$\chi^2 = 4.13$	.04	v = .15
Functional Impairment/Quality of Life (lifetime)					
Social interference due to BDD ^e	68 (100)	123 (100)	---	---	---
Job/academic interference due to BDD ^e	66 (97.1)	122 (99.2)		.29	v = .08
Days missed from work or school due to BDD ^e	110.6 ± 207.1	81.3 ± 166.1	t = -1.06	.29	d = .16
Housebound ≥ 1 week due to BDD ^e	20 (29.4)	32 (26.2)	$\chi^2 = 0.22$	.64	v = .03
Functional Impairment/Quality of Life (current)					
Not working due to psychopathology	26 (38.2)	37 (30.1)	$\chi^2 = 1.32$	.25	v = .08
Not in school due to psychopathology	22 (32.4)	35 (28.5)	$\chi^2 = 0.32$	.57	v = .04
Receiving disability for BDD ^e	7 (10.3)	6 (4.9)	$\chi^2 = 2.03$	.16	v = .10
GAF ^d	44.6 ± 10.6	46.2 ± 10.7	t = 0.93	.36	d = .15
LIFE-RIFT ^d	14.1 ± 3.7	13.7 ± 3.4	t = -0.71	.48	d = .11
SAS- SR ^d	2.5 ± 0.6	2.3 ± 0.5	t = -2.24	.03	d = .40

Variable ^a	Delusional subjects (n=68)	Nondelusional subjects (n=123)	Chi square or t-test ^b	p	Effect size
SF-36 Mental Health ^d	38.3 ± 17.9	42.2 ± 18.7	t = 1.29	.20	d = .21
SF-36 Role Emotional ^d	22.0 ± 33.7	27.8 ± 37.0	t = 0.97	.33	d = .16
SF-36 Social Functioning ^d	38.6 ± 24.9	48.5 ± 26.2	t = 2.31	.02	d = .38
QLESQ ^d	46.9 ± 17.4	51.7 ± 14.9	t = 1.60	.11	d = .30
Depression severity (Hamilton score) ^f	15.8 ± 4.8	15.7 ± 5.8	t = -0.03	.98	d = .01
Treatment received (lifetime)					
Mental health treatment received	64 (94.1)	118 (95.9)	---	.72	v = .04
Mental health treatment received (current)	39 (57.4)	89 (72.4)	$\chi^2 = 4.46$	.04	v = .15
Psychiatric hospitalization	28 (41.2)	45 (36.6)	$\chi^2 = 0.39$	.53	v = .05
Hospitalization for BDD	11 (16.2)	16 (13.0)	$\chi^2 = 0.36$	.55	v = .04
Nonpsychiatric treatment received	38 (55.9)	83 (67.5)	$\chi^2 = 2.54$	.11	v = .12

^aMean ± SD or n (%) of subjects

^bdf = 1 for χ^2 analyses and 184-189 for t-tests except for the BDD-YBOCS (168), BDD-PSR (168), BDDE (79), GAF (168), LIFE-RIFT (167), SF-36 Mental Health (152), SF-36 Role Emotional (153), SF-36 Social Functioning (153), SAS-SR (120), QLESQ short form (117), HAM-D (55)

^cAll subjects had at least one BDD-related behavior (e.g., mirror checking, excessive grooming, skin picking, reassurance seeking).

^dFor the 170 subjects who currently met full criteria for DSM-IV BDD

^eDue primarily to BDD, in both the subject's and interviewer's judgment.

^fScores are for subjects with current comorbid major depression

Table 3
Lifetime Comorbid Disorders in Delusional Versus Non-Delusional BDD Subjects

Lifetime DSM-IV diagnosis ^a	Delusional subjects (n=68)	Nondelusional subjects (n=123)	Chi square ^b	p	Effect size (Cramer's V)
Mood Disorders^c	59 (86.8)	102 (82.9)	0.49	.49	.05
Major depression	56 (82.4)	86 (69.9)	3.55	.06	.14
Bipolar disorder	3 (4.4)	12 (9.8)	1.73	.19	.10
Dysthymia	4 (5.9)	11 (8.9)	0.57	.45	.05
Psychotic Disorder^d	2 (2.9)	3 (2.4)	---	1.0	.02
Anxiety Disorders^c	49 (72.1)	84 (68.3)	0.29	.59	.04
Panic disorder	14 (20.6)	25 (20.3)	< 0.001	.97	.00
Agoraphobia	2 (2.9)	1 (0.8)	---	.29	.08
Social phobia	32 (47.1)	42 (34.1)	3.08	.08	.13
Specific phobia	17 (25.0)	22 (17.9)	1.36	.24	.08
OCD	21 (30.9)	41 (33.3)	0.12	.73	.03
PTSD	6 (8.8)	12 (9.8)	0.05	.83	.02
GAD	2 (2.9)	4 (3.3)	---	1.00	.10
Substance Use Disorders^c	37 (54.4)	55 (44.7)	1.65	.20	.09
Alcohol	30 (44.1)	51 (41.5)	0.13	.72	.03
Other drug	30 (44.1)	35 (28.5)	4.79	.03	.16
Eating Disorders^c	22 (32.4)	42 (34.1)	0.06	.80	.02
Anorexia nervosa ^e	8 (11.8)	9 (7.3)	1.07	.30	.08
Bulimia nervosa	5 (7.4)	8 (6.5)	---	1.00	.02
Binge eating disorder	3 (4.4)	8 (6.5)	---	.75	.04
Eating disorder NOS	7 (10.3)	17 (13.8)	0.50	.48	.05
Somatiform Disorders	0 (0.0)	2 (1.6)	---	.54	.08
Somatization Disorder	0 (0.0)	0 (0.0)	---	---	---
Pain disorder	0 (0.0)	0 (0.0)	---	---	---
Hypochondriasis	0 (0.0)	2 (1.6)	---	.54	.08
Other Axis I Disorders					
Adjustment disorder	0 (0.0)	0 (0.0)	---	---	---

Lifetime DSM-IV diagnosis ^a	Delusional subjects (n=68)	Nondelusional subjects (n=123)	Chi square ^b	p	Effect size (Cramer's V)
Tic disorder ^e	2 (2.9)	3 (2.4)	---	1.00	.02
Trichotillomania	1 (1.5)	4 (3.3)	---	.66	.05
Olfactory reference syndrome	4 (5.9)	4 (3.3)	---	.46	.06
Any Personality Disorder	28 (48.3)	49 (43.8)	0.32	.57	.04

^aResults are presented as n (%) of patients

^bdf = 1 for all analyses

^cThe total is less than the sum of the individual disorders because some subjects had more than one disorder in a given category.

^dExcluding delusional BDD

^eAs required by the DSM-IV criteria for BDD, all subjects with anorexia nervosa met full criteria for BDD when their weight concerns were excluded from consideration (i.e., all had additional non-weight concerns that fulfilled BDD diagnostic criteria).

^f4 subjects had motor tics, and 1 subject had Tourette's disorder