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Psychometric Evaluation of the Brown Assessment of Beliefs Scale In Body Dysmorphic Disorder

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Abstract

The Brown Assessment of Beliefs Scale (BABS) is a widely used measure that assesses insight/delusionality – an important dimension of psychopathology – both dimensionally and categorically (e.g., delusional vs nondelusional). The BABS has been shown to have good psychometric properties in a number of disorders, but sample sizes were small. In the present study, 327 subjects with body dysmorphic disorder (BDD) were interviewed with the BABS to assess insight regarding appearance beliefs. Other measures were administered. ICCs demonstrated excellent interrater reliability and test-retest reliability; internal consistency was strong. Principal components factor analysis identified one factor accounting for 60% of the variance. Analyses with measures of severity of BDD, depressive symptoms, and general psychopathology indicated good discriminant validity. Among treated subjects, the BABS was sensitive to change but not identical to improvement in symptom severity. These findings provide further evidence that the BABS is a reliable and valid measure of insight/delusionality.

Keywords

Body dysmorphic disorder; assessment; scales; insight; delusionality

Insight/delusionality of beliefs is an important dimension of psychopathology in many psychiatric disorders. Delusions are a core aspect of psychosis; in addition, insight/delusionality has diagnostic and prognostic value and can have important treatment implications (e.g., Amador et al, 1994; Neziroglu et al., 2001; Phillips et al, 2002). This construct is receiving increasing research attention, as it is increasingly recognized to be important not only in psychotic disorders but also in mood disorders (Keller et al., 2007), body dysmorphic disorder (BDD; Phillips, 2004; Phillips et al., 1994), obsessive-compulsive disorder (OCD; Eisen et al., 2001; Kozak and Foa, 1994), eating disorders (Konstantakopoulos et al, 2011; Steinglass et al., 2007), hypochondriasis (Neziroglu et al, 2000), and other disorders, such as hoarding disorder (Mataix-Cols et al., 2010). For example, it has been proposed that the upcoming DSM-5 include a new broad “insight

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Conflicts of Interest:

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specifier” within the diagnostic criteria for OCD, BDD, and several other disorders (Feusner et al., 2010; Leckman et al., 2010; Mataix-Cols et al., 2010; Phillips et al., 2010).

The Brown Assessment of Beliefs Scale (BABS) is a semi-structured, rater-administered scale that assesses insight/delusionality in a variety of disorders both dimensionally (as a continuum of insight) and categorically (i.e., dichotomously – for example, delusional vs. nondelusional). This scale was developed because at the time no existing measures were suitable for use in a broad range of psychiatric disorders (Eisen et al., 1998). The BABS is now the most widely used measure of insight/delusionality in studies of OCD and BDD. This scale has been shown to have strong psychometric properties, including good interrater and test-retest reliability, internal consistency, convergent validity with other insight measures, and divergent validity with measures of disorder severity in OCD, BDD, and psychotic depression, as well as sensitivity to change in OCD (Eisen et al., 1998). Small studies additionally found that the BABS has strong reliability and validity in schizophrenia/schizoaffective disorder (Kaplan et al., 2006) and good interrater reliability in anorexia nervosa (Steinglass et al., 2007). However, sample sizes in these studies were relatively small (total $n=50$ for the report on OCD, BDD, and psychotic depression [Eisen et al., 1998], $n=16$ for schizophrenia/schizoaffective disorder [Kaplan et al., 2006], and $n=5$ for anorexia nervosa [Steinglass et al., 2007]). Given the field’s increasing interest in insight/delusionality, especially in “non-psychotic” disorders, and increasing use of the BABS, it seems warranted to further examine this scale’s psychometric properties in a larger sample. This report examines the BABS’s psychometric properties in a much larger, broadly ascertained sample of 327 individuals with BDD.

Methods

Subjects

The sample consisted of 327 subjects from several BDD studies that were conducted in a research and clinical BDD specialty program. All subjects met DSM-IV criteria for BDD, a distressing or impairing preoccupation with imagined or slight defect(s) in appearance; appearance concerns were not better accounted for by another mental disorder such as an eating disorder. Individuals with BDD’s delusional variant (which may be double coded with BDD according to DSM-IV) were included because available data indicate that these two forms of BDD constitute the same disorder (Phillips et al., 1994; Phillips et al., 2006). Subjects in the present report were obtained from the following studies, which are described in greater detail elsewhere. 191 subjects participated in a study of the course of DSM-IV BDD; study participants were obtained from a broad range of sources (Phillips et al., 2005). Of these subjects, 172 met criteria for current BDD; 19 subjects had past BDD. At study intake, 67% ($n=128$) of participants in the course study were currently receiving mental health treatment (psychotropic medication or psychotherapy), primarily in the community. The remaining 136 subjects were obtained from five BDD medication studies: four studies of serotonin reuptake inhibitors and one study of the antiepileptic medication levetiracetam (Phillips, 2006; Phillips et al., 2002; Phillips et al., 1998; Phillips and Menard, 2009; Phillips and Najar, 2003). Subjects in these studies were not taking any psychotropic medications at study baseline, and they met standard inclusion and exclusion criteria for medication efficacy studies. Prior reports from these studies examined change in BABS score with treatment, but they did not present the percentage by which the BABS score decreased or examine the relationship between change in BABS score and change in BDD symptom severity. The present report combined data from the four SRI treatment samples to examine these constructs as well as the BABS’s sensitivity to change. The sample sizes for some of the medication studies are slightly smaller than in previously published reports of these studies because occasional subjects could not be evaluated with the BABS (for example, because of clearly noticeable skin lesions or scarring as a result of BDD-related skin

picking). An Institutional Review Board approved the above studies, and subjects signed statements of informed consent after study procedures were fully explained.

Assessments

The *BABS* is a 7-item semi-structured rater-administered scale that assesses insight/delusionality both dimensionally and categorically during the past week in a variety of disorders (Eisen et al., 1998). BABS items assess the person's conviction that their belief is accurate, perception of others' views of the belief, explanation for any difference between the person's and others' views of the belief, whether the person could be convinced that the belief is wrong, attempts to disprove the belief, insight (recognition that the belief has a psychiatric/psychological cause), and ideas/delusions of reference related to the belief. The first six items are summed to create a total score that ranges from 0 to 24; higher scores indicate poorer insight. Item 7 is not included in the total score, because referential thinking is characteristic of some but not all disorders. Regarding use of the BABS as a categorical measure, this scale provides cutpoints for classifying the total score according to different categories of insight (delusional, poor, fair, good, and excellent) (Eisen et al., 1998; Phillips et al., 2012). Subjects were assessed with the BABS at study intake (course study) or study baseline (medication studies) to examine insight regarding the appearance of the "defective" body areas (e.g., "I look deformed"). Raters ensured that the belief being rated was false and therefore could be assessed with the BABS.

In all studies, the reliable *Structured Clinical Interview for DSM-IV (SCID)* (First et al., 2002) or the *BDD Diagnostic Module*, which is based on DSM-IV criteria and was available prior to the DSM-IV SCID, was used to diagnose BDD (Phillips, 2005). The 12-item semi-structured rater-administered *Yale-Brown Obsessive Compulsive Scale Modified for Body Dysmorphic Disorder (BDD-YBOCS)* (Phillips et al., 1997) assessed current BDD severity. Scores range from 0 to 48, with higher scores reflecting more severe symptoms. The BDD-YBOCS has strong reliability and validity (Phillips et al., 1997). The 17-item or 24-item *Hamilton Depression Rating Scale (HAM-D)* (Hamilton, 1960) is a reliable and valid clinician-administered measure of current severity of depressive symptoms that was used in the BDD course study and all medication studies ($n = 325$). The *Brief Psychiatric Rating Scale (BPRS)* (Gorham et al., 1960) assessed severity of overall psychopathology in the fluoxetine study ($n = 63$).

Data Analysis

Intraclass correlation coefficients (ICCs) were used to examine interrater and test-retest reliability. For analyses of interrater reliability, audiotaped interviews from the course study ($n = 23$) were independently rated by another interviewer; scoring was done blind to the other interviewer's ratings. For test-retest reliability, ratings from the placebo arm of the fluoxetine study were used; study baseline ratings were compared to ratings obtained by the same rater after one week of treatment with placebo ($n = 32$). Cronbach's alpha coefficient evaluated internal consistency. Pearson's correlation coefficient examined the relationship between each BABS item and the total BABS score minus that item. Principal components factor analysis was conducted using varimax rotation and all seven BABS items. The number of factors was based on an examination of eigenvalues greater than 1. Pearson's correlation coefficient was also used to examine discriminant validity (the relationship between total BABS score and total scores on other scales); all ratings were obtained on the same day. Sensitivity of the BABS to change with treatment was examined by comparing pre-treatment and post-treatment scores with t-tests for the 88 subjects who received active SRI treatment. The percentage change in BABS total score with SRI treatment, and the relationship of change in BABS total score to change in BDD-YBOCS total score with SRI treatment (Pearson's correlation coefficient), were also determined.

Results

Mean BABS total score reflected poor insight: 15.7 ± 6.0 for the full sample; 16.4 ± 5.3 for the 308 subjects with current BDD. ICCs demonstrated strong interrater reliability across two raters for the BABS total score and individual item scores (Table 1). For individual items, interrater reliability ICCs ranged from 0.68 to 0.99 (all p 's < .001), with a median of 0.96. ICCs also demonstrated good test-retest reliability over one week for the BABS total score and individual item scores (Table 1). Test-retest ICCs for individual item scores ranged from 0.63 to 0.93 (all p 's < .001), with a median of 0.77. Cronbach's alpha coefficient was 0.87, indicating good internal consistency. Correlations between each item and the total score minus that item were all positive and significant (all p 's < .001), ranging from 0.40 to 0.83 (median = .69; Table 1). Factor analysis identified one factor, which accounted for 60% of the variance. Results of the scree test were consistent with the Kaiser criterion (i.e., eigenvalues > 1) in suggesting a one-factor solution. All seven items loaded strongly on the identified factor, with factor loadings ranging from 0.51 to 0.91 (median = 0.80).

Regarding discriminant validity, BABS total score was significantly and positively correlated with BDD-YBOCS total score ($r = 0.59$, $p < .001$) and with HAM-D total score ($r = .25$, $p < .001$); however, BDD severity and depression severity accounted for only 35% and 6% of the variance in BABS total score, respectively. BABS total score was not significantly correlated with BPRS total score ($r = 0.22$, $p = 0.08$).

Among medication study subjects who received SRI treatment ($n = 88$), the mean BABS total score decreased significantly, by 32.5%, from baseline (15.7 ± 4.9) to post-treatment (10.6 ± 6.8 ; $t(86) = 8.74$, $p < .001$), indicating sensitivity to change. The mean BDD-YBOCS total score decreased significantly, by 43.4%, from baseline (30.9 ± 5.3) to post-treatment (17.5 ± 10.3 , $t(85) = 13.67$, $p < .001$). The correlation between mean change in BDD-YBOCS total score and mean change in BABS total score was significant and positive ($r = 0.67$, $p < .001$), indicating that improvement in degree of insight/delusionality as measured by the BABS was associated with but not identical to improvement in BDD symptom severity.

Discussion

This report on the BABS's psychometric properties in a large sample of individuals with BDD provides further evidence that the BABS is a reliable and valid measure of insight/delusionality. This report's findings are similar to those in prior reports of much smaller samples of subjects with OCD, BDD, or psychotic depression (*total* $n = 50$), schizophrenia/schizoaffective disorder ($n = 16$), and anorexia nervosa ($n = 5$) (Eisen et al., 1998; Kaplan et al., 2006; Steinglass et al., 2007). In the largest of these three reports, findings were very similar to those in the present report: interrater reliability for the total score (ICC) was 0.96, and test-retest reliability over one week ranged from 0.79 to 0.98 (median = 0.95). Cronbach's alpha coefficient was 0.87, correlations between each item and the total score minus that item were $r = 0.38$ to 0.85 (p 's = < 0.01 to < 0.001), and the scale demonstrated good discriminant validity (Eisen et al., 1998). Similar to the present report, the Eisen et al. report identified one factor, with loadings ranging from 0.48 to 0.92, which accounted for 56% of the variance (Eisen et al., 1998).

The present study also indicates that the BABS is sensitive to change in insight/delusionality in BDD with treatment. In the only prior report on the BABS's psychometric properties that examined sensitivity to change, the BABS was sensitive to change in 38 subjects with OCD who were treated with the SRI sertraline, with a statistically significant decrease in mean

BABS score of 51% (Eisen et al., 1998). While the BABS appears sensitive to change in both OCD and BDD, it is interesting that improvement in insight was somewhat greater in the OCD study than in the present report for BDD (33%). The reason is unclear, but one possible explanation is that BDD is characterized by poorer insight than is OCD. Prior to treatment, average insight in OCD patients is in the good or fair range (Alonso et al., 2008; Eisen et al., 2004), whereas average insight in BDD patients is poor, with a majority of BDD patients having poor or absent insight (i.e., delusional beliefs) (Phillips, 2004). Additional research is needed to further examine this issue.

Study strengths include the large sample size, broad ascertainment of subjects, and examination of numerous aspects of reliability and validity. Limitations include the relatively small sample sizes for analyses of interrater and test-retest reliability, and examination of the BABS's psychometric properties only in BDD. Another limitation is that because interrater reliability ratings were based on audiotaped interviews conducted by only one rater, rather than separate interviews conducted by each rater, they provide an upper-bound estimate of reliability. Additional studies of the BABS's psychometric properties are needed across a range of disorders, including OCD, eating disorders, mood disorders, hypochondriasis, and schizophrenia, as this scale is potentially useful across disorders in studies of many clinically important topics. For example, clarification of the relationship between delusional and nondelusional variants of disorders is needed to further refine the psychiatric nosology (i.e., DSM). The BABS is also potentially useful in studies of the relationship of delusionality to prognosis and treatment outcome. For example, some studies have found that poor insight or denial of illness in anorexia nervosa may be associated with poor treatment outcome (e.g., Greenfeld et al., 1991; Saccomani et al., 1998), but studies are limited. As another example, to our knowledge no studies have examined whether antipsychotic augmentation of SRIs in OCD is differentially efficacious based on level of insight before treatment. And whether poor or absent insight predicts poorer outcome with cognitive behavioral therapy in various disorders is another important issue that requires further study using a reliable and valid measure. The BABS is also potentially useful in clinical settings, given the scale's brevity and the importance of delusionality/insight to patient care.

Conclusions

The BABS demonstrated strong interrater and test-retest reliability, internal consistency, discriminant validity, and sensitivity to change. One factor was identified, which accounted for 60% of the variance. These findings provide further evidence that the BABS is a reliable and valid measure of insight/delusionality.

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TABLE 1
Means, Correlations, and Reliability Data for Individual Item Scores and Total Score on the BABS

Scale Item	Item Score ^a		Correlation of Item Score With Total Score ^b		<i>p</i>	Interrater Reliability ICC (<i>n</i> = 23)	Test-Retest Reliability ICC (<i>n</i> = 32)
	Mean	SD	<i>r</i>				
Conviction	3.11	1.08	0.80		<.001	0.99	0.90
Perception of others' views of belief	2.28	1.32	0.69		<.001	0.99	0.91
Explanation of differing views	2.79	1.21	0.83		<.001	0.97	0.77
Fixity of ideas	2.76	1.12	0.81		<.001	0.96	0.74
Attempt to disprove belief	2.59	1.27	0.61		<.001	0.95	0.63
Insight	2.15	1.42	0.57		<.001	0.92	0.77
Ideas/delusions of reference ^c	1.76	1.53	0.40		<.001	0.68	0.91
Total score	15.7	6.0	--		--	0.97	0.93

^aEach item is rated on a 5-point scale on which 0 = nondelusional and 4 = delusional.

^bCorrelation coefficient for correlation between item score and total scale score minus the item score.

^cNot included in BABS total score.