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Predictors of Response to Cognitive-Behavioral Therapy for Body Dysmorphic Disorder

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Abstract

Body dysmorphic disorder (BDD) is a common and distressing or impairing preoccupation with a perceived defect in physical appearance. Individuals with BDD engage in time-consuming rituals to check, hide, or “fix” their appearance or alleviate distress. BDD is associated with substantial psychosocial impairment and high rates of depression, hospitalization, and suicidality. Cognitive-behavioral therapy (CBT) is the treatment of choice for BDD, but not everyone benefits. We examined predictors of CBT-related improvement, an important topic that has received very

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limited investigation. Treatment was delivered in weekly individual sessions over 18–22 weeks. Results indicated that greater motivation/readiness to change (University of Rhode Island Change Assessment Questionnaire), greater treatment expectancy (Treatment Credibility/Expectancy Questionnaire), and better baseline BDD-related insight (Brown Assessment of Beliefs Scale) significantly predicted better CBT response at post-treatment. Baseline BDD symptom severity and depression did not predict outcome, suggesting that even patients with more severe BDD and depressive symptoms can benefit from CBT for BDD. Efforts should be aimed at enhancing readiness to change and confidence in the treatment at treatment onset as well as addressing the poor insight that often characterizes BDD.

Keywords

body dysmorphic disorder; BDD; cognitive behavioral therapy; predictors; treatment

Body dysmorphic disorder (BDD) is a common, severe disorder characterized by distressing or impairing preoccupation with perceived imperfections in one's physical appearance and time-consuming rituals (e.g., excessive mirror checking, cosmetic surgery seeking) aimed at checking, hiding, or fixing "flaws." BDD is associated with substantial impairment in psychosocial functioning, and high rates of depression, hospitalization, and suicidality (Phillips & Menard, 2006; Phillips, Menard, Fay, & Pagano, 2005; Phillips, Quinn, & Stout, 2008).

Six randomized controlled trials have demonstrated the efficacy of cognitive-behavioral therapy (CBT) for BDD in adults, with response rates ranging from 48% to 82% (Enander et al., 2016; Rabiei, Mulkens, Kalantari, Molavi, & Bahrami, 2012; Rosen, Reiter, & Orosan, 1995; Veale, Anson, Miles, Pieta, & Costa, 2014; Veale et al., 1996; Wilhelm et al., 2014). Thus, while CBT for BDD is effective, not everyone improves or improves fully. Additionally, BDD often requires a longer treatment (e.g., 22 sessions) than do many other conditions, thus utilizing significant resources. Identifying predictors of CBT response could inform important targets to address prior to or at the onset of treatment to optimize outcome. Very little research has evaluated predictors of treatment response for BDD. Therefore, our research questions were informed by (a) the few studies that have examined this topic, (b) predictors of CBT for obsessive compulsive disorder (OCD), and (c) clinical experience.

BDD has similarities to OCD (Phillips et al., 2007; Phillips et al., 2010) and is classified as an obsessive-compulsive and related disorder in the Diagnostic and Statistical Manual for Mental Disorders (DSM-5; American Psychiatric Association, 2013), thus findings on predictors of CBT response in OCD may be informative. Several studies have examined predictors of outcome for OCD. More severe OCD was the most consistent predictor of poorer CBT outcomes for OCD (see Keijsers, Hoogduin, & Schaap, 1994; Knopp, Knowles, Bee, Lovell, & Bower, 2013; Kyrios, Hordern, & Fassnacht, 2015; Öst, Havnen, Hansen, & Kval, G, 2015; Steketee et al., 2011), but has not reliably predicted outcome (Olatunji, Davis, Powers, & Smits, 2013; Steketee, Siev, Yovel, Lit, & Wilhelm, in press). Other clinical variables, including comorbid depression (Abramowitz, Franklin, Street, Kozak, & Foa, 2000; Keijsers et al., 1994; Thiel et al., 2014) and anxiety (Steketee et al., 2011),

insight (Himle, Van Etten, Janeck, & Fischer, 2006; Raffin et al., 2009) and greater functional impairment (Steketee et al., 2011; Steketee et al., in press) have also been shown to predict poorer outcome, but these findings have not been consistently replicated (Olatunji et al., 2013). Finally, patient and treatment factors have been implicated as predictors of treatment outcome. Several studies have found that higher motivation predicted better outcome to both CBT and pharmacotherapy for OCD (de Haan et al., 1997; Keijsers et al., 1994; Pinto, Pinto, Neziroglu, & Yaryura-Tobias, 2007; Steketee et al., 2011). Patient expectancy about treatment has also been highlighted as a potential source of variance in treatment effects, although it did not predict outcome in five studies of CBT for OCD (Basoglu et al., 1988; Freeston et al., 1997; Lax, Basoglu, & Marks, 1992; Steketee et al., 2011; Vogel, Hansen, Stiles, & Götestam, 2006). Thus, overall, results of studies of predictors of outcome are largely equivocal.

Although OCD and BDD share many similarities, they also have important differences, such as poorer insight and more frequent comorbidity with depression and substance use disorders in BDD (Phillips et al., 2007). From a clinical perspective, many individuals with BDD are ambivalent about receiving CBT due to such factors as low insight and depression. BDD-related insight is usually poor or absent, with about 70% currently reporting poor insight or delusional BDD-related beliefs (e.g., complete conviction that “I look like a monster”; Eisen, Phillips, Coles, & Rasmussen, 2004; Phillips, 2004; Phillips, McElroy, Keck, Pope, & Hudson, 1994). This can make it difficult for individuals with BDD to engage in a psychological treatment in which the focus is on changing one’s perception of appearance rather than on changing actual physical appearance. Major depressive disorder is the most common comorbid disorder in BDD (lifetime rates of 75–82%), and depressive symptoms (e.g., anhedonia, low energy, difficulty concentrating, hopelessness) can thwart one’s motivation or engagement in CBT (Gunstad & Phillips, 2003; Phillips, Menard, Pagano, Fay, & Stout, 2006). BDD is also associated with significant psychosocial impairment, with many patients avoiding activities, stopping work, dropping out of school, and even becoming housebound (Phillips et al., 2005).

To our knowledge, only two prior studies have examined predictors of response to CBT in BDD. One small study showed that poor BDD-related insight predicted poorer outcome with behavior therapy for BDD (Neziroglu, Stevens, McKay, & Yaryura-Tobias, 2001). In a randomized controlled trial of CBT versus anxiety management for BDD, none of the baseline predictor variables examined (duration of BDD, depression, and BDD-related insight) significantly predicted outcome (Veale e al., 2014). In addition, a recent meta-analysis of seven randomized controlled trials of CBT for BDD (six studies with an adult sample, including Veale et al., 2014, and one with an adolescent sample; Harrison, Fernández de la Cruz, Enander, Radua, & Mataix-Cols, 2016) found no reliable predictors of CBT outcome for BDD in a meta-regression that included pre-treatment BDD severity, comorbidities, insight, number of CBT sessions and therapy hours, use of medication, previous cosmetic procedures, gender, age, and duration of BDD). Equivocal findings may be attributed to methodological differences across studies, including the treatment mode (i.e., individual vs. group, in-person vs. internet-based), content, duration, or intensity (e.g., weekly vs. daily intensive) or perhaps to primary (i.e. Yale-Brown Obsessive Compulsive Scale Modified for BDD [BDD-YBOCS] vs. Body Dysmorphic Disorder Examination- Self

Report [BDDE-SR]) and assessment of potential predictive features (e.g., depressive symptoms, insight).

The aim of the current report is to identify predictors of CBT for BDD using data from two studies: 1) an uncontrolled pilot trial of CBT and 2) a subsequent randomized waiting-list controlled trial of CBT for BDD (Wilhelm et al. 2011; Wilhelm et al., 2014). Based on clinical experience and previous research on outcome predictors for BDD and OCD, we examined BDD symptom severity, BDD-related insight, depressive symptoms, functional impairment, and motivational factors as potential predictors of improvement at post-treatment. Given the limited and largely equivocal findings on predictors in BDD or OCD, this investigation is considered exploratory.

Understanding how individuals differentially respond to treatment will increase understanding of whether CBT for BDD may be more or less efficacious for subgroups of BDD patients, ultimately permitting clinicians to provide more personalized treatment. CBT may not be the optimal treatment for all individuals with BDD (Harrison et al., 2016). CBT for BDD is relatively long (e.g., 22 sessions) and can be challenging. Understanding who would most likely benefit might provide a basis for future treatment development efforts for various subgroups of individuals with BDD who may require supplemental pre-treatment strategies to optimize CBT preparedness and outcome.

Methods

Participants

Participants for this secondary data analysis came from an uncontrolled pilot trial (n=12; Wilhelm et al., 2011) and a subsequent waiting list-controlled trial (n=36; Wilhelm et al., 2014) of CBT for BDD. Because the pilot and waitlist-controlled trial samples were very similar in recruitment methods, inclusion/exclusion criteria, and demographic characteristics, they were combined to increase power. Participants were 48 adults (age 18 or older) with a primary DSMIV diagnosis of BDD or its delusional variant and a score on the BDD-YBOCS (Phillips et al., 1997) greater than or equal to 24 at enrollment. Exclusion criteria included active and clinically significant suicidality as determined by a clinician and/or score on the suicide item (#9) of the Beck Depression Inventory (Beck, Steer, & Brown, 1996) > 1, a psychotic disorder (excluding delusional BDD), bipolar disorder, borderline personality disorder, substance abuse or dependence within the past three months, cognitive impairment that could interfere with one's ability to participate fully in CBT (e.g., estimated IQ <80 on the Wechsler Abbreviated Scale of Intelligence [WASI, Wechsler, 1999]), self-reported dementia or brain damage, body image/weight concerns accounted for primarily by an eating disorder, concurrent psychotherapy, or a history of at least 10 sessions of CBT for BDD that resembled treatment provided in this study. Participants taking psychotropic medication were included if they reported a stable dose for at least two months prior to the initial evaluation and agreed to not change their medication during the study. For participants assigned to the waiting list, data from the CBT treatment that they received following the waiting list period were used in the analyses. Of the 48 participants enrolled in either study, four were excluded from the current analyses because they dropped out of the

study before treatment and baseline assessment (n=3) or before their first assessment after starting treatment (n=1), resulting in a final sample size of 44.

Measures

All participants attended an initial assessment with a doctoral-level independent evaluator (IE) to obtain informed consent and confirm eligibility. The initial assessment included a standardized semi-structured interview with an IE and completion of self-report measures. Scales were administered before, during (monthly), and after treatment (post-treatment and at three- and six-month follow up), unless otherwise noted below. To minimize dropout, participants received $25 for follow-up assessments.

The Structured Clinical Interview for DSM-IV-Patient Version (SCID-I/P, First, Spitzer, Gibbon, & Williams, 1995) is a widely-used clinician-administered, semi-structured interview used to assess the presence of DSM-IV Axis I psychiatric disorders.

The BDD-YBOCS is a 12-item semi-structured clinician-administered measure of BDD symptom severity that has demonstrated good internal consistency, high test-retest reliability, and good convergent validity (Phillips et al., 1997; Phillips, Hart, & Menard, 2014). The scale's maximum score is 48, with higher scores indicating more severe BDD symptoms. The BDDYBOCS was the primary measure of treatment outcome. Internal consistency in the current sample was α=.79 for total scores at baseline, and the inter-rater reliability for participants in the wait-list controlled trial was r=.93 for 15% of taped interviews rated independently (Wilhelm et al., 2014). Responder status was classified using the empirically defined cut-point of a BDD-YBOCS reduction ≥ 30% (Phillips et al., 1997; Phillips et al., 2014) at post-treatment (week 24).

The Brown Assessment of Beliefs Scale (BABS; Eisen et al., 1998) is a valid, reliable 7-item semi-structured clinician-administered measure that assesses insight regarding BDD-related beliefs (e.g., "I look deformed"). The first 6 items of the BABS are summed to obtain a total score ranging from 0 to 24, with higher scores reflecting poorer insight. The BABS has been shown to have high internal consistency, interrater reliability, and test-retest reliability (Eisen et al., 1998; Phillips, Hart, Menard, & Eisen, 2013). The internal consistency for baseline total scores in the current sample was α=.77, and inter-rater reliability for participants in the wait-list controlled trial was r=.90 for 15% of taped interviews rated independently. The BABS can also be used to derive a categorical classification of delusionality (yes/no), with delusional beliefs versus non-delusional beliefs indicated by a total score ≥18 plus a score of 4 on item 1 (conviction).

The Beck Depression Inventory (BDI-II; Beck et al., 1996) is a widely used 21-item self-report scale that assesses the severity of depressive symptoms during the past two weeks. Total scale scores range from 0 to 63, with higher scores indicating greater symptom severity. The BDI-II has high internal consistency, test–retest reliability, and construct validity (Beck et al., 1988; Beck et al., 1996). Internal consistency for baseline scores in the current sample was α=.94.

The Sheehan Disability Scale (SDS; Sheehan, 1983) is a self-report measure of functional impairment/disability. Items 1–3 (disability in work, social life/leisure, and family life/home responsibilities) are scored from 0 (not at all) to 10 (extreme). The three items can be summed to yield a total SDS score, ranging from 0 (unimpaired) to 30 (highly impaired). The SDS has been shown to have good internal consistency, and mental disorder diagnoses are consistently associated with higher SDS scores (Leon et al., 1992). In the current sample, the internal consistency at baseline among the three measures of disability was α=0.77

The University of Rhode Island Change Assessment Questionnaire (URICA) is a 32-item self-report questionnaire that measures motivation and readiness to change (McConnaughy, DiClemente, Prochaska, & Velicer, 1989; McConnaughy, Prochaska, & Velicer, 1983) on four 5-point Likert scales (from 1= “strongly disagree” to 5= “strongly agree”). The URICA has demonstrated acceptable to good internal consistency and construct validity (e.g., Carey, Purnine, Maisto, & Carey, 1999; Field, Adinoff, Harris, Ball, & Carroll, 2009; Field, Duncan, Washington, & Adinoff, 2007; McConnaughy et al., 1983). In the current sample, the internal consistency of the four sub-scales (precontemplation, contemplation, action, and maintenance) at baseline ranged from α=0.70 (pre-contemplation) to α=0.87 (maintenance). The four sub-scales can be combined to yield a single readiness-to-change (RTC) score by subtracting the mean precontemplation score from the sum of the mean scores for the other three subscales (score range: −2 – 14; McConnaughy et al., 1983, 1989). Higher URICA-RTC scores indicate a greater readiness to change.

The Treatment Credibility/Expectancy Questionnaire is a widely-used measure of a patient’s judgements of the credibility of the treatment and their expectations of change due to treatment (Borkovec & Nau, 1972; Devilly & Borkovec, 2000), reported as a mean credibility score (items 1–3; range 1= “not at all” to 10 = “very” as assessed, re-scaled to 1–9 to match previously published scores) and a single item expectancy score (“By the end of therapy, how much improvement in your anxiety do you think will occur?”, range: 0–100%). The credibility sub-scale has been shown to have good internal consistency, both scores have good test-retest reliability, and the expectancy score, as part of a 3-item extended instrument, has also demonstrated good predictive validity for treatment outcomes (Devilly & Borkovec, 2000). Higher scores indicate higher credibility or expectation for improvement. The Treatment Credibility/Expectancy Questionnaire was administered at baseline (week 0).

Treatment

CBT for BDD (Wilhelm, Phillips, & Steketee, 2013) is a modular CBT designed to address the core symptoms of BDD (e.g., preoccupation with perceived appearance flaws, BDD-based rituals) as well as symptoms experienced by some but not all individuals with BDD (e.g., skin picking, surgery seeking). Participants received 18–22, 60-minute individual sessions of CBT for BDD that included: psychoeducation, case formulation, setting valued goals, motivational enhancement as needed, cognitive restructuring, exposure and ritual prevention, mindfulness and attentional retraining, and advanced strategies to modify self-defeating beliefs about the importance of appearance and to enhance self acceptance, self-esteem, and self-compassion. Clinicians used optional treatment modules with participants who had symptoms requiring specific strategies (e.g., cosmetic treatment seeking, depressive

symptoms). All participants received relapse prevention (final two sessions) to learn how to prevent and react effectively to setbacks. Sessions were weekly, except for the last two sessions (relapse prevention), which were spaced two weeks apart. See Wilhelm et al. (2011, 2013, 2014) for a more detailed description of the treatment.

Statistical Methods

We used univariate logistic regression models to identify significant baseline predictors of BDD-YBOCS treatment response at post-treatment (week 24). For participants who dropped out during treatment (n=3 (7%), one each after week 4, 8, and 16 assessments), we used their last post-baseline BDD-YBOCS assessment to evaluate their post-treatment response status; two more participants dropped out during treatment (after session 7 and 8, respectively) but provided week 24 assessment data. To assess the sensitivity of model outcomes to our missing data assumption, we also ran two alternative models: one assuming all people with missing data at week 24 were non-responders, and one assuming they were responders. Baseline predictors examined included: BDD-YBOCS total score; BABS total score and delusionality (yes/no); current major depressive episode (yes/no); BDI-II total score; SDS total score, as well as SDS Work, Social, and Family subscale scores; URICA readiness-to-change index; treatment credibility and expectancy scores; baseline psychiatric medication use; and baseline selective serotonin reuptake inhibitors (SSRI) use. We then combined the significant univariate predictors identified into multiple logistic regression models with no more than 2 predictors to stay within the recommended lower limit of 5–9 events per variable that is still likely to produce adequate model performance (Vittinghoff and McCulloch, 2007). We identified the best predictive model using the concordance index c (Steyerberg et al., 2010)), which can indicate whether model fit is poor (c<0.5), good (c>0.7), or strong (c>0.8). Scale scores were calculated if fewer than 20% of questions were unanswered, in which case missing values were set to the mean of all questions in that (sub-)scale. Cronbach's alphas were reported as unstandardized coefficients. Significance was evaluated at a two-tailed p<0.05, and means are presented as raw means with standard deviations unless otherwise noted. All analyses were performed using SAS (Version 9.4 of the SAS System for Windows).

Results

Descriptive Characteristics at Study Baseline

Table 1 summarizes the demographics and clinical characteristics of the study participants at baseline. The sample was 61% women, predominantly Caucasian, and had a mean age of 34.8 (SD=10.1). Study participants reported moderate-severe BDD symptoms, had experienced BDD for many years, and exhibited significant functional impairment, particularly in their social lives; almost a quarter (22%) of the participants currently had BDD beliefs that were classified as delusional (absent insight) (Table 1). Thirty-two participants (73%) had at least one current comorbid axis I disorder, and 34% of participants (n=15) had two or more Axis I disorders. The most common (>10%) current Axis I comorbidities were major depressive disorder (n=17, 39%), social anxiety disorder (n=9, 20%), dysthymia (n=7, 16%), generalized anxiety disorder (n=6, 14%), and specific phobia

(*n*=6, 14%). Further sample characteristics are detailed in the primary outcome papers of each study (Wilhelm et al., 2011; Wilhelm et al., 2014).

Treatment response by Post-Treatment

Out of 44 participants who started CBT-BDD and provided at least one post-baseline assessment, 73% (32/44) were treatment responders. Among the 14 baseline predictors we tested, three were significantly associated with treatment response at post-treatment: BABS total score, URICA-RTC score, and treatment expectancy (Table 2). For every unit of increase in BABS total score (i.e., poorer BDD-related insight), the odds of being a treatment responder at post-treatment were 15% lower (*OR*=0.846, 95% CI: [0.718, 0.996]; Table 2). Interestingly, neither BABS delusionality as a categorical variable (yes/no) nor BDD symptom severity at baseline nor depression severity at baseline were significant predictors of post-treatment response, even though each of these predictors was significantly correlated with BABS total scores (BABS delusionality: $r = 0.77$; BDD-YBOCS: $r = 0.45$; BDI-II totals scores: $r = 0.46$).

For every unit increase in the URICA-RTC index, the odds of being a post-treatment responder were 145% greater (*OR*=2.451, 95% CI: [1.278, 4.699]; Table 2). URICA-RTC scores were significantly negatively correlated with BABS total scores ($r = -0.57$) and BABS delusionality ($r = -0.32$), such that higher levels of motivation were associated with better insight. They were not significantly correlated with any other potential predictor ($-0.25 < r < 0.25$).

Higher scores for treatment expectancy (confidence in the treatment) also increased the odds of treatment response, such that for every 10-point increase on the treatment expectancy scale, the odds of treatment response increased by 40% (10-units *OR*=1.411, 95%CI: [1.034, 1.924]; 1-unit *OR*=1.035, 95%CI: [1.003, 1.068]; Table 2). Treatment expectancy was positively correlated with the URICA-RTC ($r = 0.45$) and treatment credibility ($r = 0.75$) but not with any other predictor examined. Indicators of symptom severity, comorbidity, social functioning, or stable concurrent psychiatric medication use did not predict treatment response in this sample.

Changing the missing data assumptions resulted in BABS total scores no longer being a significant predictor of treatment response (change from *OR*=0.846, 95%CI: [0.718–0.996] to *OR*=0.870, 95%CI: [0.746–1.015] when imputing all missing outcomes as non-responders, and to *OR*=0.894, 95%CI: [0.761–1.052] when imputing all missing outcomes as responders). Missing data assumptions also affected the significance of treatment credibility as a predictor of treatment response, which became a significant predictor in the model assuming all missing outcomes were treatment non-responses (change from OR=1.664, 95%CI: [0.953–2.905] to *OR*=1.790, 95%CI: [1.017–3.152]), but not if missing outcomes were assumed to be responders (*OR*=1.821, 95%CI: [0.987–3.361]). All other predictors remained either significant or non-significant as before.

Combining the three significant univariate predictors into three multiple logistic regressions with all combinations of 2 predictors indicated that the best predictive model of treatment response (*c*=0.81) used URICA-RTC (*OR*=2.180, 95%CI: [1.083, 4.390]) and treatment

expectancy (1-unit *OR*=1.013, 95%CI: [0.978, 1.048]) as predictors. The models with URICA-RTC and BABS totals scores (*c*=0.79) and BABS total scores and treatment expectancy (*c*=0.77) had worse predictive accuracy, and only URICA-RTC remained a significant predictor of treatment response when combined with any other predictor.

Discussion

CBT is the best-supported psychosocial treatment for BDD. However, not all patients benefit. We found that greater baseline motivation/readiness to change and greater treatment expectancy were significant predictors of better post-treatment CBT for BDD response. Poorer BDD-related insight at baseline significantly predicted a lower chance of treatment response; however, insight was no longer significant in post-hoc sensitivity analyses using alternative assumptions about missing data. Our main model finding that poor BDD-related insight predicts poorer outcome is consistent with one prior study in BDD (Neziroglu et al., 2001); two studies of OCD (Raffin et al., 2009; Himle et al.,2006) also found this. However, another study of CBT for BDD did not find that poorer insight predicted CBT response, although statistical power was limited (n=46, 13 responders; Veale et al., 2014). Thus, the relationship between BDD-related insight and treatment outcome is not entirely clear.

Readiness/motivation to change was a particularly powerful predictor of treatment outcome; a single unit of increase in the URICA-RTC more than doubled the odds of treatment response. This variable and treatment expectancy have not yet been examined in relation to CBT outcome in BDD. However, our results align with several studies of OCD, which showed that motivation to change predicted better treatment outcome (de Haan et al., 1997; Keijsers et al., 1994; Pinto et al., 2007; Steketee et al., 2011). Whereas studies of OCD suggest that treatment expectancy does not predict outcome (Basoglu et al., 1988; Freeston et al., 1997; Lax et al., 1992; Steketee et al., 2011; Vogel et al., 2006), in the current study greater baseline expectations of treatment effectiveness predicted better outcome. It is interesting that greater readiness/motivation to change scores were significantly negatively correlated with insight ($r = -0.57$; BABS total score) and delusionality ($r = -0.320$); this finding is consistent with clinical observations that patients who cannot acknowledge that their appearance beliefs are inaccurate or that they might have BDD are often less motivated or ready to participate in a psychological treatment that requires them to invest substantial effort in the treatment; many prefer cosmetic treatments instead, which are usually ineffective (Crerand, Sarwer, & Ryan, 2017).

Clinical implications of these findings are that at treatment onset efforts to enhance readiness/motivation to change and confidence in the treatment may be particularly helpful. For patients with low readiness to change, particularly those with poor insight, employing strategies such as motivational interviewing or pharmacotherapy with a serotonin reuptake inhibitor prior to initiating CBT may help to optimize outcome. In addition, the role of pre-treatment expectancy as predictor of improvement may point to helpful educational strategies to deploy prior to initiating treatment, for example, by providing patients with positive treatment outcome data from prior studies and a compelling rationale for the use of specific CBT treatment elements..

Initial BDD symptom severity, depression, and impairment in psychosocial functioning were not significant predictors of post-treatment outcome, consistent with the results from a recent meta-analysis (Harrison et al., 2016) and the Veale et al. (2014) trial, in which baseline depression did not predict response. These results suggest that even individuals with severe BDD, severe depression, and high levels of functional impairment can be treated successfully with CBT for BDD. This is encouraging, given the frequency of comorbid major depressive disorder and often high levels of depression, as well as substantial functional impairment, in individuals with BDD. Our results support previous findings that depression and psychosocial impairment improve in response to a targeted CBT for BDD, without requiring additional treatment (Enander et al., 2016; Veale et al., 2014; Wilhelm et al., 2011; Wilhelm et al., 2014). However, it should be noted that the treatment manual used in the studies in this report includes an optional treatment module for individuals with more severe depressive symptoms, which can be used at any point during treatment if indicated. It is recommended that clinicians use similar strategies (i.e., activity scheduling incorporating valued goals and cognitive restructuring of depressive thoughts) when treating individuals with BDD who have moderate or severe depressive symptoms. As individuals with more severe depressive symptoms may be more likely to drop out of treatment (Wilhelm et al., 2014), the use of such strategies may potentially enhance treatment retention.

Taken together, CBT for BDD is often efficacious even for those who are severely ill, depressed, and functionally impaired (none of which significantly predicted treatment outcome). However, because these patients may be at greater risk for dropping out of treatment early, specific strategies, such as behavioral activation, in addition to motivational enhancement, may be needed early and often to ensure these individuals receive the full treatment.

Limitations of the current study include the exploratory nature of the analyses and the relatively small sample, which limited statistical power. Given the small sample size and low number of non-responders (12/44), we did not control for multiple comparisons in analyses, which may have resulted in an inflated Type I error. We intended this secondary analysis to be hypothesis-generating rather than hypothesis-testing, so the predictors identified herein should be interpreted with caution. Replication in a larger sample is necessary. Thus far, most studies examining predictors of treatment response in BDD and related disorders have relied on relatively small samples and often examine different variables as putative predictors. Larger studies using a standardized pool of variables and assessment tools would help to elucidate any potential reliable predictors of treatment outcome. Eligibility in the parent studies (Wilhelm et al., 2011; Wilhelm et al., 2014) was broader than in previous studies of CBT for BDD (e.g., including both male and female participants and those with poor insight or passive suicidal ideation). Nonetheless, individuals with active suicidality were excluded. Given the markedly high rates of suicidal ideation and attempts in BDD (Phillips & Menard, 2006), it would be useful to explore in future studies how suicidality influences and is impacted by CBT for BDD. In addition, self-esteem is often notably poor in BDD (Hartmann, Thomas, Greenberg, Matheny, & Wilhelm, 2014; Phillips, Pinto, & Jain, 2004) and has predicted treatment response in some studies in eating disorders (Cooper et al., 2016; Wild et al., 2016), which overlap somewhat with BDD. The role of self-esteem on BDD treatment outcome has not been examined and could be considered in future studies.

Finally, clinical experience and some empirical data suggest that the presence of personality disorders can thwart CBT response. For example, schizotypal and obsessive compulsive personality disorders have been shown to predict poor outcome of CBT for OCD (Fricke et al., 2006; Moritz et al., 2004; Minichiello, Baer, & Jenike, 1987; Pinto et al., 2011) or symptom recurrence at one-year follow-up (Steketee et al., 2011), one study found that a diagnosis of OCPD predicted *better* CBT for OCD outcome (Gordon, Salkovskis, & Bream, 2016). The occurrence of OCPD and schizotypal PD was too rare in the current sample (n=4 and n=0, respectively) to model the impact of their presence on treatment response. Future studies should examine the potential impact of Axis II comorbidity on BDD treatment outcome.

BDD is an often severe and debilitating disorder. Effective treatments are available; however, response rates vary, and common symptoms of BDD (e.g., poor insight) may preclude individuals from engaging fully in the treatment. Thus, there is room to improve outcomes and deliver more individually tailored treatment approaches. For example, treatment developers could amplify and further enhance motivational enhancement strategies and include strategies to enhance readiness and expectations for change in the treatment -- strategies that therapists can also employ in clinical settings prior to initiation of treatment. Technology-based solutions may provide a brief, inexpensive, scalable opportunity to enhance individuals' preparedness for CBT, for example by increasing cognitive flexibility (Jalal et al., 2018) and motivation (e.g. Albright,Adam, Serri, Bleeker, & Goldman, 2016). Largely equivocal findings on predictors of outcome for BDD to date may also highlight a need to look beyond typical demographic and clinical variables. Interestingly, a recent neuroimaging study found that baseline functional connectivity patterns within the default mode and visual networks predicted CBT response in OCD, explaining up to 67% of the variance, and were stronger predictors than clinical scores (Reggente et al., 2018). Such work is needed in BDD to determine whether non-clinical factors, such as a resting state scan, might predict treatment outcome and thus facilitate optimal treatment planning. Replication of the current findings in larger samples and further exploration of other putative predictors would facilitate clinical decision-making and help optimize outcomes for individuals suffering from BDD.

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Highlights

- Examined predictors of response to cognitive-behavioral therapy for BDD
- Readiness to change, treatment expectancy, and BDD-related insight predicted outcome
- BDD symptom severity and depression did not predict outcome

Table 1

Baseline characteristics

Variables	*n(%)*	*M(SD)*
Demographics		
Age, years		34.8 (10.1)
Men, %	17 (39)	
Race		
White, %	38 (88)	
Black, %	3 (7)	
Other, %	2 (5)	
Education, years		16.8 (2.6)
BDD characteristics		
BDD age of onset, years, *M(SD)*		18.1 (8.9)
BDD duration, years, *M(SD)*		16.8 (9.4)
BDD-YBOCS total score, *M(SD)*		30.6 (5.7)
BABS total score, *M(SD)*		14.0 (4.6)
BABS delusionality, %	10 (23)	
Psychiatric comorbidities		
Axis I comorbidity, %	32 (73)	
Current major depressive disorder, %	17 (39)	
BDI-II total, *M(SD)*		20.9 (13.8)
Psychiatric medication use		
Current use of psychiatric medications, %	14 (31.8)	
Antidepressant use, %	11 (25.0)	
Benzodiazepine use, %	4 (9.1)	
SSRI use, %	8 (18.2)	
Functioning		
SDS total score, *M(SD)*		17.5 (6.9)
SDS family sub-scale mean, *M(SD)*		5.0 (3.1)
SDS social sub-scale mean, *M(SD)*		7.2 (2.2)
SDS work sub-scale mean, *M(SD)*		5.2 (2.9)
Treatment expectations and experience		
URICA-RTC, *M(SD)*		10.0 (1.7)
Treatment credibility mean score, *M(SD)*		6.1 (1.3)
Treatment expectancy score, *M(SD)*		62.4 (23.8)
Responder status		
BDD-YBOCS Responder, post-treatment, *M(SD)*	32 (73)	
BDD-YBOCS Responder, 6-month follow-up, *M(SD)*	30 (86)	

Note. BDD = body dysmorphic disorder; BDD-YBOCS = Yale-Brown Obsessive Compulsive Scale Modified for BDD; BABS = Brown Assessment of Beliefs Scale; BDI-II = Beck Depression Inventory-II; SDS = Sheehan Disability Scale global functioning score; URICA-RTC = University of Rhode Island Change Assessment Questionnaire readiness-to-change score.

Table 2

Univariate logistic regression predictors of treatment response at post-treatment (week 24), as measured by a ≥30% reduction in BDD-YBOCS scores

	Post-treatment (*n*=44)				
Baseline predictors	**Wald X^2**	***p***	***OR***	**95% LCL**	**95% UCL**
BDD-YBOCS total score	0.38	0.54	0.961	0.847	1.090
BABS total score	4.04	0.04	0.846	0.718	0.996
BABS delusionality	0.05	0.83	0.840	0.178	3.967
BDI-II total score	1.56	0.21	0.969	0.922	1.018
Current major depressive episode	2.59	0.11	0.325	0.083	1.277
SDS total score	0.64	0.42	0.960	0.868	1.061
SDS family sub-scale mean	0.51	0.47	0.923	0.740	1.150
SDS social sub-scale mean	0.70	0.40	0.869	0.625	1.207
SDS work sub-scale mean	0.45	0.50	0.922	0.726	1.171
URICA-RTC	7.29	0.01	2.451	1.278	4.699
Treatment credibility mean score	3.20	0.07	1.664	0.953	2.905
Treatment expectancy score	4.72	0.03	1.035	1.003	1.068
Current psychiatric medication use	1.65	0.20	3.000	0.560	16.070
Current SSRI use	0.99	0.32	3.080	0.337	28.130

Note. BDD = body dysmorphic disorder; BDD-YBOCS = Yale-Brown Obsessive Compulsive Scale Modified for BDD; BABS = Brown Assessment of Beliefs Scale; BDI-II = Beck Depression Inventory-II; SDS = Sheehan Disability Scale global functioning score; URICARTC = University of Rhode Island Change Assessment Questionnaire readiness-to-change score; SSRI = selective serotonin reuptake inhibitors.