Empirical Article

Specificity of Implicit-Shame Associations: Comparison Across Body Dysmorphic, Obsessive-Compulsive, and Social Anxiety Disorders

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Abstract
In this study, we investigated the specificity of implicit-shame associations across individuals diagnosed with body dysmorphic disorder (n = 30), obsessive-compulsive disorder (n = 30), and social anxiety disorder (n = 29) and individuals in a mentally healthy control group (n = 33). All participants completed a series of Implicit Association Tests that tapped into shame associated with each disorder. Planned contrasts indicated that compared with individuals in the other groups, individuals in the body dysmorphic disorder group had greater body-relevant implicit shame and those in the obsessive-compulsive disorder group had greater implicit shame tied to obsessive thoughts. The social anxiety disorder group did not differ significantly from the other groups on implicit performance-relevant shame, although in comparison with the other clinical groups, means were in the expected direction. Our comparative design adds to existing cognitive-behavioral conceptualizations of body dysmorphic, obsessive-compulsive, and social anxiety disorders that have traditionally focused on strategic forms of cognition within a single disorder.

Keywords
body dysmorphic disorder, obsessive-compulsive disorder, social anxiety disorder, implicit associations, shame

Received 6/26/13; Revision accepted 1/30/14

Body dysmorphic disorder (BDD), obsessive-compulsive disorder (OCD), and social anxiety disorder (SAD) are conceptualized as three distinct forms of psychopathology (Bögels et al., 2010; Craske et al., 2009; Phillips et al., 2010; Stein et al., 2010). BDD is characterized by extreme preoccupation with perceived flaws in one’s physical appearance and body; OCD is associated with obsessive, unwanted thoughts and corresponding compulsions; and SAD is defined by debilitating fear of negative evaluation by others and avoidance of social or performance situations (American Psychiatric Association, 2013). In spite of these meaningful differences, it is clear that these disorders share important similarities as well (see Allen & Hollander, 2004). For instance, individuals with BDD are often plagued with painful obsessions and compulsions related to their bodies. Likewise, all three clinical groups often engage in significant social isolation as a result of their perceived deficits in their bodies (BDD), their character or thoughts (OCD), or their social or performance abilities (SAD). It is not surprising that frequent comorbidity also exists between BDD, OCD, and SAD (Allen & Hollander, 2004; Veale, 2004) and that the theoretical models associated with these disorders overlap (e.g., Veale, 2004; Wilhelm & Neziroglu, 2002; Wilhelm, Phillips, & Steketee, 2013). For instance, Wilhelm and Neziroglu’s (2002) cognitive-behavioral model of BDD is directly adapted from cognitive models of OCD (e.g., Freeston, Rhéaume, & Ladouceur, 1996; Rachman, 1997; Salkovskis, 1989; Wilhelm & Steketee, 2006).

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The current project builds on existing cognitive-behavioral models by investigating the similarities and differences in relatively automatic (in the sense of being less consciously controllable) cognitive processing across BDD, OCD, and SAD. Specifically, we used a version of the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998), a task designed to measure the relative strength of associations between concepts in a person's memory. The evaluation of these memory-based links is based on reaction time and is thought to indicate associations that reside mostly outside one's conscious control. Thus, using the IAT, we assessed implicit shame in the sense of shame associations that are less consciously controllable. This is distinct from self-reported, explicit, or more strategic forms of processing.

Shame and Its Association With BDD, OCD, and SAD

Shame, guilt, and embarrassment can be conceptualized as members of a family of negatively valenced, “self-conscious” emotions that arise as a result of perceived personal transgressions or failures (see excellent reviews in Kim, Thibodeau, & Jorgensen, 2011; Tangney, Miller, Flicker, & Barlow, 1996; Tangney, Stuewig, & Mashek, 2007). In spite of their similarities, empirical research has repeatedly demonstrated that there are meaningful and significant differences between these three emotions (see Tangney et al., 1996; Tangney et al., 2007). In the present study, we focused on shame, given the evidence for its role across BDD, OCD, and SAD (see later discussion), as well as research that has suggested that shame is rated as more intense and aversive than either guilt or embarrassment. As described by Tangney et al. (2007), “Shame is the more painful emotion because one’s core self—not simply one’s behavior—is at stake” (p. 5). In other words, shame involves a negative appraisal of the overarching self in response to a perceived transgression or flaw. Perhaps not surprisingly, shame is more likely than are the other emotions to be implicated in psychopathology (Tangney et al., 2007).

Empirical research and clinical case studies have highlighted the role of shame across BDD, OCD, and SAD, although empirical research in this area has been limited, which further points to the need for the current research. Among patients with BDD, shame is often considered a “core aspect” of the disorder. According to Phillips (2005), “Feelings of deep shame make sense because BDD preoccupations involve strongly negative feelings about oneself—thoughts of being unappealing and defective” (p. 73). In fact, shame has been identified as one of the key treatment barriers for BDD (e.g., Grant, Kim, & Crow, 2001; Marques, Weingarden, Leblanc, & Wilhelm, 2011).

Clinical case studies of OCD also have pointed to the pronounced feelings of shame that OCD sufferers have with respect to their unwanted, intrusive thoughts (e.g., McDermott, 2006). Although there is minimal empirical research specifically evaluating shame in OCD, researchers in one study found that compulsive behaviors were highest among individuals who were prone to experience shame and who also experienced heightened obsessions and thought-action fusion morality (the belief that one’s thoughts are morally equivalent to one’s actions; Valentiner & Smith, 2008). Researchers in another study found that during treatment, changes in shame proneness, or the tendency to experience shame across a variety of situations (Tangney, 1990), were associated with changes in symptoms of OCD (Fergus, Valentiner, McGrath, & Jencius, 2010).

Finally, in support of the theory that shame may play a role in SAD (Gilbert, 2000; Gilbert & Miles, 2000), a recent study showed that patients with SAD who were being treated with cognitive-behavioral therapy had significant reductions in shame after treatment (Hedman, Ström, Stünkel, & Mörter, 2013). Results from the Hedman et al. (2013) study also suggested that when compared with an age- and sex-matched healthy control group, patients with SAD had significantly elevated levels of shame (although this difference was not significant when the SAD group was compared with a healthy control sample of individuals who were not matched on age or sex). Other research has demonstrated that a measure of social anxiety symptoms was associated with several measures of shame in both a sample of students and a sample of individuals undergoing treatment for depression (Gilbert, 2000). Finally, Fergus et al. (2010) found that changes in shame proneness during treatment were significantly associated with changes in SAD symptoms; furthermore, shame proneness was significantly related to SAD symptoms, even after symptoms of other anxiety disorders were controlled for.

Although there is some overlap in cognitive-behavioral models regarding the expected role of shame in the psychopathology underlying BDD, OCD, and SAD, the triggers of this shame are thought to differ across disorder categories. In the context of BDD, individuals feel extreme shame related to their physical appearance and bodies (e.g., Buhlmann, 2011; Phillips, 1998); in OCD, the shame is associated with “harmful” or “disgusting” obsessive thoughts (e.g., Rachman, 1997); and in the context of SAD, individuals feel ashamed when they believe they have failed to socially interact or perform at an adequate level (e.g., Fergus et al., 2010).

Evaluating Implicit Shame

Although there are currently excellent cognitive-behavioral conceptualizations for BDD (Veale, 2004; Wilhelm &
Neziroglu, 2002), OCD (Salkovskis, 1999; Taylor, Abramowitz, & McKay, 2007), and SAD (e.g., Amir, Bomyea, & Hofmann, 2010; Clark & Wells, 1995; Rapee & Heimberg, 1997), certain elements of these theoretical models have not been carefully tested. In addition, investigations that directly compare across disorders are sparse. This lack of comparative research leaves unanswered critical questions about the disorders’ common and distinct features. In fact, Western conceptualizations separate BDD from SAD (American Psychiatric Association, 2013), whereas Eastern cultures conceptualize BDD as a subtype of SAD (see the discussion in Coles et al., 2006).

Elements of cognitive-behavioral models related to cognition that occurs at a more automatic level have been a particularly understudied research area, although the available evidence suggests that the relatively automatic, uncontrollable nature of disorder-linked distorted beliefs may be critical for understanding the psychopathology driving these disorders. In support of this notion, researchers have used versions of the IAT across a series of studies designed to evaluate relatively automatic cognition in the context of BDD, OCD, and SAD. For instance, Buhlmann, Teachman, and Kathmann (2011) found that individuals with BDD, compared with individuals with a dermatological condition and individuals in a mentally healthy control group, were more likely to implicitly associate attractiveness with importance. Related research has suggested that relatively automatic beliefs about attractiveness may also uniquely predict a behavioral form of mirror avoidance among individuals diagnosed with BDD (Buhlmann, Teachman, Naumann, Fehlinger, & Rief, 2009), as well as among individuals high in BDD symptoms (Clerkin & Teachman, 2009). Although less research has been conducted in the context of OCD symptoms, one study has shown that hearing information about the personal significance of unwanted thoughts led to stronger automatic evaluations of the self as dangerous (relative to harmless), particularly for individuals who were already high in endorsement of OCD-related beliefs (Teachman, Woody, & Magee, 2006; see also Teachman & Clerkin, 2007).

Finally, in the context of social anxiety, Glashouwer, Vroling, de Jong, Lange, and de Keijser (2013) found that compared with a mentally healthy control group, individuals diagnosed with SAD had lower implicit self-esteem (see also de Jong, 2002). In a separate study, researchers found not only that it was possible to experimentally manipulate implicit-rejection associations among people with elevated social anxiety symptoms but also that weaker postintervention implicit-rejection associations predicted greater likelihood of completing a public-speaking, social-stressor task (Clerkin & Teachman, 2011).

Assessments of relatively automatic cognition, including implicit shame, may be particularly helpful in the context of BDD, OCD, and SAD, given the elevated levels of shame that are associated with these disorders. In fact, there are two types of shame that potentially affect individuals: (a) shame associated with having the disorder that biases one’s self-report (e.g., shame about reporting symptoms; thus, the need for a more indirect assessment measure, such as the IAT, that is less vulnerable to social-desirability concerns); and (b) shame associated with the target of one’s concern. For instance, individuals with BDD may avoid talking about their body-relevant concerns because they are ashamed and worried that they will be perceived as vain or shallow and may isolate themselves as a result of shame about their supposed ugliness. Similarly, individuals with OCD are often horrified by what they consider to be alarming, personally meaningful obsessive thoughts that allegedly reveal an underlying character deficit. Finally, some individuals with SAD experience difficulties with opening up and being vulnerable to potential judgment from others, difficulties particularly tied to shame about perceived deficits in social or performance skills. More generally, it may be valuable to assess shame using a less controllable measure to mitigate reporting biases, such as after treatment, when a patient may feel pressured to present in a certain way. Furthermore, lack of conscious insight or introspection might lead to distorted conscious representations of shame constructs.

Finally, it is worth highlighting that although there is little research in this area, some work has suggested that measuring the construct of “shame” at an implicit level is clinically meaningful. For instance, Rüscher et al. (2007) found that women with borderline personality disorder, compared with healthy control and SAD groups, had stronger shame-plus-self (vs. anxiety-plus-best-friend) implicit associations. Moreover, when levels of depression were controlled for, implicit shame was negatively associated with measures of general self-esteem and quality of life (see also Rüscher, Todd, Bodenhausen, Olschewski, & Corrigan, 2010), and there is evidence for unique prediction of mental-illness stigma outcomes by implicit shame (vs. self-reported beliefs; Rüscher et al., 2010). Consistent with dual-process models (e.g., Wilson, Lindsey, & Schooler, 2000), it is possible that implicit versus self-reported shame would predict different disorder-relevant symptoms and associated problems. For instance, researchers have found that shyness assessed with an IAT uniquely predicted more spontaneous, implicit forms of shy behaviors, whereas ratings of explicit shyness were better at predicting more controlled, explicit shy behaviors (Asendorpf, Banse, & Mucke, 2002; see also Teachman & Allen, 2007).

In sum, the use of the IAT or a similar tool may be particularly valuable because it can assess a construct, such as implicit shame, that may be difficult to report as a result of self-presentation concerns, less consciously.
controllable, or challenging to consciously introspect on (see related discussion in Roefs et al., 2011). Furthermore, implicit and explicit measures may show differential predictive validity.

Summary and Study Aims

In the current project, we investigated the specificity of disorder-relevant implicit-shame evaluations in the context of individuals suffering from BDD, OCD, and SAD and a mentally healthy control group. All participants completed a series of IATs, thereby allowing us to compare across the three clinical groups and the control group. To our knowledge, this study is the first to (a) empirically evaluate relatively automatic cognition across these three disorders within the same study and (b) investigate disorder-relevant targets of implicit shame within BDD, OCD, or SAD. In fact, there are few examples of any cross-disorder comparisons to examine the specificity of implicit associations (although see Glashouwer & de Jong, 2010, for an example contrasting depression and general anxiety associations). The series of different IATs tested shame associated with each disorder-relevant target (body, obsessive thoughts, or speech performance). Disorder-relevant targets were compared with either a different disorder-relevant target or a neutral target, which resulted in six different IATs.

Our primary goal in the present study was to determine whether disorder-relevant implicit-shame associations differed across the groups. Our expectation was that disorder-relevant implicit associations would be most elevated when the shame target matched a given person's disorder. Specifically, compared with individuals in the other groups, individuals in the BDD group were expected to have stronger associations about bodies as shameful (vs. acceptable), individuals in the OCD group were expected to have stronger associations about obsessive thoughts as shameful (vs. acceptable), and individuals in the SAD group were expected to have stronger associations about speech performance as shameful (vs. acceptable). We also evaluated whether disorder-relevant implicit associations were significantly correlated with continuous measures of disorder-relevant, self-reported symptoms. These tests are valuable because they allow for examination of implicit-explicit relationships along a continuous dimension of disorder severity, rather than relying on only the diagnostic categorical groupings.

Method

Participants

Participants in this study were part of a larger project evaluating cognitive and physiologic correlates of BDD, OCD, and SAD. Research participants, including healthy control participants, were recruited primarily through flyers posted throughout the greater Berlin area, as well as advertisements and interviews in local newspapers. Individuals with OCD were also recruited through the OCD outpatient unit at Humboldt-Universität in Berlin. Finally, participants were recruited through Internet Web sites (e.g., U. Buhlmann's BDD Web site; SAD forums).

Potential participants were prescreened over the phone by trained research assistants. General inclusion criteria included 18 to 65 years of age and no history of self-reported neurological problems (e.g., any head injury that affected their memory or thinking). In addition, although comorbid current and past eating disorders were not an a priori exclusion criterion, a very small subset of individuals (n = 3) were not invited to the study after prescreening because of current diagnoses of an eating disorder. We decided to keep the non-BDD clinical groups free of any body-image disorders, given the high overlap of symptoms among body-image disorders such as BDD, anorexia nervosa, and bulimia nervosa. Criteria for the clinical populations were as follows: (a) a primary diagnosis, based on symptom severity, of current BDD, OCD, or SAD, as assessed with the German translation of the Structured Clinical Interview for DSM-IV (SCID; First et al., 1995; Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1997); (b) no current comorbid diagnoses of any of the disorders of interest (e.g., for participants diagnosed with BDD, no current diagnosis of OCD or SAD, although some symptoms were permissible) so that we could investigate the specificity of implicit associations; and (c) a self-reported stable course of psychotropic medication use for at least 8 weeks prior to testing.

In addition, participants meeting criteria for BDD needed to receive a score of 18 or higher on the BDD modification of the Yale-Brown Obsessive-Compulsive Scale (YBOCS; Phillips et al., 1997), participants meeting criteria for OCD needed to receive a score of 18 or higher on the YBOCS (Goodman, Price, Rasmussen, Mazure, Delgado, et al., 1989; Goodman, Price, Rasmussen, Mazure, Fleischmann, et al., 1989), and participants meeting criteria for SAD needed to receive a score of 30 or higher on the Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987; Stangier & Heidenreich, 2005). Appearance concerns in the BDD group, as reported on the German version of the Body Dysmorphic Symptoms Inventory (Fragebogen Körper dysmorpher Symptome, FKS; Buhlmann, Wilhelm, Glaesmer, Brähler, & Rief, 2009), were as follows: 36.7% hair, 3.5% ears, 36.7% nose, 13.3% eyes, 46.7% skin, 26.7% mouth, 20% breasts, 23.3% hands, 20% genitals, 16.7% muscle shape, and 50% other body features (e.g., stomach, cellulite). Finally, mentally healthy control participants, who also were assessed with the German translation of the SCID, could not have a lifetime diagnosis of any Axis I
psychological disorder (Axis II psychological disorders were not assessed). The disorder of interest was the primary diagnosis in all cases (e.g., for participants diagnosed with BDD, the primary diagnosis was BDD).

Given our interest in evaluating disorder-relevant implicit-shame associations, only participants who completed the IATs were included in the present study, thereby resulting in a final sample of 122 participants (additional details are available from the corresponding author). Of the participants, 30 had a primary diagnosis of BDD (mean age = 32.73 years, SD = 10.93; 66.7% female, 33.3% male), 30 had a primary diagnosis of OCD (mean age = 38.40 years, SD = 9.97; 46.7% female, 53.3% male), 29 had a primary diagnosis of SAD (mean age = 31.21 years, SD = 9.07; 69% female, 31% male), and 33 were included in the healthy control group (mean age = 32.85 years, SD = 11.27; 63.6% female, 36.4% male).

Materials

Disorder-relevant symptom measures. Only the key symptom measures that were administered to all participants, as well as measures used to determine eligibility status, are reported here.1

BDD symptoms. The German translation of the clinician-administered BDD version of the YBOCS (Phillips et al., 1997; Stangier, Hungerbühler, Meyer, & Wolter, 2000) was administered only to those participants who met SCID criteria for BDD to determine eligibility for the BDD group based on the symptom severity criterion. The scale demonstrated adequate reliability in the current sample (α = .74). The FKS (Buhlmann, Wilhelm, et al., 2009) was administered to the full sample to assess BDD symptoms during the past week. The scale demonstrated excellent reliability in the current sample (α = .95).

OCD symptoms. The German translation of the clinician-administered YBOCS (Büttner-Westphal & Hand, 1991; Goodman, Price, Rasmussen, Mazure, Delgado, et al., 1989; Goodman, Price, Rasmussen, Mazure, Fleischmann, et al., 1989) was administered only to those participants who met SCID criteria for OCD to determine eligibility for the OCD group. The scale demonstrated excellent reliability in the current sample (α = .92). The Obsessive-Compulsive Inventory–Revised (OCI-R; Foa et al., 2002) is a self-report scale that was administered to the full sample to assess distress due to OCD symptoms during the past month. The scale demonstrated adequate reliability in the current sample (α = .87).

SAD symptoms. The German translation of the clinician-administered LSAS (Liebowitz, 1987; Stangier & Heidenreich, 2005) was administered to all participants and was used to verify eligibility for the SAD group that had met diagnostic SCID criteria for SAD. The LSAS demonstrated excellent reliability in the current sample (α = .97).

Additional symptom measures. To help further characterize the sample, we also included measures of general depression and anxiety symptoms. The German translation of the Beck Depression Inventory–II (BDI-II; Beck & Steer, 1987; Hautzinger, Bailer, Worall, & Keller, 1995) was administered to assess for comorbid symptoms of depression. The scale demonstrated adequate reliability in the current sample (α = .93). The German translation of the State-Trait Anxiety Inventory (STAI; Laux, Glanzmann, Schaffner, & Spielberger, 1981; Spielberger, Gorsuch, & Lushene, 1970) was administered to evaluate state (situational) and trait (long-standing) symptoms of anxiety. Both versions of the scale demonstrated good reliability in the current sample (State: α = .94; Trait: α = .95).

Implicit associations. A series of six IATs (Greenwald et al., 1998) was completed by each participant to allow for multiple comparisons across disorders. The IAT is a relative measure in that it contrasts the comparative association of two target categories with two descriptor categories. For instance, a comparison of BDD and SAD implicit-shame associations involves comparing associations about the targets “body” and “social performance” with the descriptors “shame” and “acceptable.” Interpretation of the task is thus body-plus-shame (vs. acceptable) associations relative to performance-plus-shame (vs. acceptable) associations. The task provides an indirect measure of associations in that, for example, participants are not directly asked whether they believe that their body is shameful. Instead, participants are asked to categorize stimuli into superordinate categories as quickly and accurately as possible.

During the two critical blocks of each IAT, one target category and one descriptor category were paired on the left side of the computer screen (e.g., body and shame) while the other target category and descriptor category were paired on the right side of the computer screen (performance and acceptable in this example). Stimuli that fit into each of the four categories appeared in the center of the screen one at a time, and participants were instructed to classify any stimulus that fit in either the category “body” or the category “shame” on the left (via pressing the “e” key) and any stimulus that fit in either the category “performance” or the category “acceptable” on the right (via pressing the “i” key). In a subsequent block, participants repeated the classification task with the categories swapped, such that the category “body” was paired with “acceptable” and “performance” was paired with “shame.” The difference in average time to classify the items in one category-pairing condition versus the other constituted the
primary outcome of interest on the basis of the idea that speed of classification indexes the extent the categories are automatically associated in memory. Thus, if participants were ashamed of their body, they would be expected to classify items more quickly if “body” and “shame” were paired together on the screen, because this would match their automatic associations, than if “body” and “acceptable” were paired together.

Across all six IATs, the descriptor categories were “shame” and “acceptable,” but the tasks varied which target categories were being contrasted. First, three IATs were created that compared each disorder-relevant target (body, obsessive thoughts, or speech performance) with a different disorder-relevant target. To compare BDD-relevant associations with SAD-relevant associations, we contrasted body and social performance (referred to as performance); to compare BDD with OCD, we contrasted body and obsessive thoughts; and finally, to compare OCD with SAD, we contrasted obsessive thoughts and performance. Second, three IATs were created that compared each target (body, obsessive thoughts, or speech performance) with the same neutral target category furniture (selected given its neutral valence and irrelevance to the disorder-specific target categories of real interest).

Implicit-shame composite variables. Three primary composite variables were derived from the IATs to create a more reliable indicator of disorder-relevant shame than is likely with a single IAT indicator and to mitigate the impact of a given comparison category. An IAT composite variable was created for each disorder that comprised each of the IATs with that disorder target. For example, the body-plus-shame composite variable to capture BDD concerns was computed by taking an average of the body-plus-shame (vs. performance-plus-acceptable) IAT, and the body-plus-shame (vs. furniture-plus-acceptable) IAT.

Design. The series of IATs began with a practice block of 20 trials in which participants practiced classifying items into only the descriptor categories “shame” and “acceptable.” Next, participants completed the 12 critical IAT blocks in random order (2 for each of the 6 IATs). For example, for the body-versus-furniture IAT, category pairs of body (with shame) versus furniture (with acceptable) would be presented in one block, whereas body (with acceptable) versus furniture (with shame) would be presented in the other block. Each block included 4 practice trials followed by 16 trials that were used for analyses. The number of trials was in line with recommendations for a Brief IAT (Sriram & Greenwald, 2009) and was selected given the large number of tasks to be completed, but the structure of the task (i.e., two explicitly labeled target categories) was consistent with a regular IAT. Four stimuli were selected to represent each category. See Table 1 for category labels and associated stimuli (translated from German to English).

### Table 1. Implicit Association Test Category Labels and Associated Stimuli

<table>
<thead>
<tr>
<th>Category label</th>
<th>Stimuli to be classified</th>
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<tr>
<td>Acceptor (Akzeptabel)</td>
<td>Acceptor (Akzeptabel)</td>
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<td>Shame (Scham)</td>
<td>Shame (Scham)</td>
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<td>Body (Körper)</td>
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<tr>
<td>Obsessive thoughts (Zwangsgedanken)</td>
<td>Obsessive thoughts (Zwangsgedanken)</td>
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<tr>
<td>Speech Performance (Vortrag)</td>
<td>Talk (Vortrag)</td>
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<tr>
<td>Furniture (Möbel)</td>
<td>Table (Tisch)</td>
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Note: German translations are listed in parentheses. For the variables relevant to social anxiety disorder, there is no exact translation for *social performance*. Here, *vortrag* refers to performance in the context of giving a speech or a talk; *rede* refers to performance in the context of giving a speech or a lecture; *ansprache* refers to performance in the context of giving a speech; and *präsentation* refers to performance in the context of giving a presentation or a speech.
reported elsewhere. At the end of the second visit, participants filled out the majority of the questionnaires (including the demographic data, BDI-II, FKS, and STAI). During the third visit, participants completed a practice IAT task, to familiarize themselves with the paradigm, followed by the six IAT tasks (the critical blocks were presented in random order). Finally, participants completed the OCI-R.

Results

Data scoring and reduction

Data were scored following recommendations from the scoring algorithm developed by Greenwald, Nosek, and Banaji (2003). In particular, data were excluded if more than 10% of trials had an unusually fast response rate (less than 300 ms). In addition, trials with reaction times of more than 10,000 ms were dropped, whereas trials with reaction times of less than 400 ms were set to 400 ms and those with reaction times between 2,000 and 9,999 ms were set to 2,000 ms (following Nosek, Bar-Anan, Sriram, & Greenwald, 2013). Together, these procedures help to minimize error due to overly fast or slow responding and outliers. The D scores, which are conceptually similar to a Cohen’s d (see Greenwald et al., 2003), were calculated by averaging the mean reaction time across critical blocks divided by the standard deviation across critical blocks. Higher scores indicated stronger implicit-shame (vs. acceptable) associations.

Symptom measures and sample characteristics

As anticipated, groups differed significantly on the primary symptom measures in the expected directions—FKS, to assess BDD symptoms: \( F(3, 118) = 74.13, p < .001, \eta^2_p = .65 \); OCI-R, to assess OCD symptoms: \( F(3, 118) = 37.68, p < .001, \eta^2_p = .49 \); LSAS, to assess SAD symptoms: \( F(3, 115) = 28.31, p < .001, \eta^2_p = .43 \). Groups also differed significantly on measures of general symptoms, including depression, state anxiety, and trait anxiety—BDI-II: \( F(3, 118) = 20.07, p < .001, \eta^2_p = .34 \); STAI-State: \( F(3, 118) = 23.45, p < .001, \eta^2_p = .37 \); STAI-Trait: \( F(3, 118) = 50.45, p < .001, \eta^2_p = .56 \). Follow-up least significant difference tests revealed that for each measure, the control group experienced significantly fewer symptoms than did the clinical groups (all \( p < .01 \); see Table 2 for comparisons of symptom measures across groups).

In terms of demographic characteristics, there were no significant group differences in level of education, \( F(3, 118) = 1.34, p = .26, \eta^2_p = .03 \), marital status (coded as single/divorced/widowed vs. in a relationship/married), \( \chi^2(3, N = 122) = 3.63, p > .10 \), or sex, \( \chi^2(3, N = 122) = 3.87, p > .10 \). All participants except 1 reported their race as Caucasian (1 participant reported race as Caucasian and Asian). There was an unexpected significant group difference in age, \( F(3, 118) = 2.77, p = .045, \eta^2_p = .07 \); participants in the OCD group were significantly older than were participants in all the other groups (all \( p < .05 \), which did not differ significantly from one another (all \( p > .10 \)). Finally, when we evaluated only the clinical groups, there

<table>
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<tr>
<th>Table 2. Symptom Measures</th>
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<td>Symptom measure</td>
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Note: The table presents means for each measure. Standard deviations are shown in parentheses. Within each row, values with different subscripts are significantly different, and all are significant (\( p < .05 \) or less). BDD = body dysmorphic disorder; OCD = obsessive-compulsive disorder; SAD = social anxiety disorder; BDD YBOCS = BDD version of the Yale-Brown Obsessive-Compulsive Scale; FKS = Fragebogen Körperdysmorpher Symptome; YBOCS = Yale-Brown Obsessive-Compulsive Scale; OCI-R = Obsessive-Compulsive Inventory–Revised; LSAS = Liebowitz Social Anxiety Scale; BDI-II = Beck Depression Inventory-II; STAI = State-Trait Anxiety Inventory.
was a significant group difference in current psychotherapy, $\chi^2(2, N = 89) = 15.90, p < .001$, and pharmacotherapy, $\chi^2(2, N = 89) = 11.72, p = .003$; individuals in the OCD group reported higher use of both (see Table 3 for characteristics of the full sample). For between-subjects analyses, we controlled for age but not for treatment variables or symptom measures (because these latter variables were thought to include variance that is meaningfully tied to the disorder groupings).

**Implicit-shame composite comparisons**

To evaluate the implicit associations specific to each clinical group, we conducted a repeated measures analysis
of variance with one between-subjects factor (group: BDD, OCD, SAD, healthy control), one within-subjects, three-level factor (IAT type: body-plus-shame composite, obsessive-thoughts-plus-shame composite, performance-plus-shame composite), and one covariate (age). There was not a significant between-subjects effect for group, *F*(3, 117) = 0.51, *p* = .68, *η*^2^ = .01, nor was there a significant within-subjects effect for IAT type, *F*(2, 234) = 0.33, *p* = .72, *η*^2^ = .003. However, as reflected in Figure 1, and consistent with expectations, our analysis revealed a significant IAT Type × Group interaction, *F*(6, 234) = 2.24, *p* = .04, *η*^2^ = .05.

**Between-subjects differences**

To unpack the interaction, we conducted a series of planned weighted contrasts based on the hypothesis that relative to the other groups, the BDD group would be elevated on the body-plus-shame composite, the OCD group would be elevated on the obsessive-thoughts-plus-shame composite, and the SAD group would be elevated on the performance-plus-shame composite. The decision to focus on the planned contrasts was based on the desire to limit the number of tests conducted and to present only the more focused tests tied to our central hypotheses.

Consistent with expectations, results showed that when we evaluated the difference between the BDD group and the other groups (BDD: +3; OCD: −1; SAD: −1; Control: −1) on the body-plus-shame composite (controlling for age), individuals with BDD had significantly greater implicit body-relevant shame, *F*(1, 119) = 4.93, *p* = .03, *η*^2^ = .04. Furthermore, as hypothesized, when we evaluated the difference between the OCD group and the other groups (OCD: +3; BDD: −1; SAD: −1; Control: −1) on the obsessive-thoughts-plus-shame composite (controlling for age), individuals with OCD had significantly greater implicit shame tied to obsessive thoughts, *F*(1, 119) = 7.93, *p* = .006, *η*^2^ = .06. (We performed a secondary analysis to check whether the control group was driving the group differences; results indicated that for both BDD and OCD, the disorder-specific shame associations were also significantly higher for the corresponding diagnostic group compared with the other two clinical groups.) Contrary to expectations, when we evaluated the difference between the SAD group and the other groups (SAD: +3; BDD: −1; OCD: −1; Control: −1) on the performance-plus-shame composite (controlling for age), there was not a significant group difference, *F*(1, 119) = 1.39, *p* = .24, *η*^2^ = .01.

Inspection of the data revealed that the SAD and control groups were similar to one another, whereas the BDD and OCD groups were similar to each other on implicit performance-relevant shame. Error bars represent standard errors. BDD = body dysmorphic disorder; OCD = obsessive-compulsive disorder; SAD = social anxiety disorder.

**Fig. 1.** Implicit Association Test (IAT) mean *D* scores for disorder-specific composite variables (body plus shame, obsessive thoughts plus shame, and performance plus shame) as a function of group. Higher IAT scores indicate greater disorder-relevant implicit shame. Error bars represent standard errors. BDD = body dysmorphic disorder; OCD = obsessive-compulsive disorder; SAD = social anxiety disorder.
Implicit Shame Associations Across Disorders

groups on implicit performance-relevant shame, an exploratory test revealed that compared with the BDD and OCD groups, the SAD and control groups had higher implicit levels of shame tied to performance.

Implicit associations and trait symptoms

We examined correlations among the primary explicit symptom measures (that were administered to all participants, thereby permitting full-sample analyses) and the implicit measures (see Table 4). Results indicated that the FKS (assessing explicit BDD symptoms) was significantly associated with the body-plus-shame composite in the anticipated direction. This indicated that stronger BDD symptoms were associated with stronger implicit evaluations of bodies as shameful. None of the other relationships were significant, except for a negative correlation between the OCI-R (assessing explicit OCD symptoms) and the performance-plus-shame composite.

Given that the IAT variables were composites composed of relative comparisons (e.g., evaluating the body relative to obsessive thoughts), whereas the trait symptom measures were single indices of absolute, disorder-relevant symptoms, we also conducted a follow-up analysis evaluating relative explicit-symptom composites for each disorder to enable a more direct implicit/explicit comparison. Specifically, we created three explicit composite variables by taking an average of the z scores of the measure of disorder-relevant explicit symptoms and the measure of non-disorder-relevant explicit symptoms (which were reverse-scored). For instance, the explicit BDD composite consisted of the FKS, OCI-R (reverse-scored), and LSAS (reverse-scored). As expected, the explicit BDD-, OCD-, and SAD-symptom composite variables showed small, positive relationships with their implicit composite counterparts in each case (although the relationships reached significance only for the OCD indicators; see Table 4).

Discussion

Our purpose in the current study was to examine the specificity of disorder-relevant implicit shame across three disorders—BDD, OCD, and SAD. Results were largely consistent with study hypotheses and bolster cognitive-behavioral conceptualizations of BDD and OCD (and, to a lesser extent, SAD). In particular, our findings build on previous work that highlights the importance of explicit cognitions across anxiety and obsessive-compulsive spectrum disorders and emphasizes the potential role of implicit cognitions. Moreover, results suggest that the focus of implicit shame meaningfully differs across disorders. Compared with individuals in the other groups, individuals with BDD exhibited elevated body-relevant implicit shame and individuals with OCD exhibited elevated implicit shame tied to obsessive thoughts. Contrary to predictions, we did not find that individuals with SAD had stronger performance-relevant implicit shame than did individuals in the other groups. However, when we compared the performance of the combined SAD and control groups with the performance of the combined BDD and OCD groups, we did find that the combined SAD/control group exhibited greater performance-relevant implicit shame than did the combined BDD/OCD group.

Assessing a self-conscious emotion with an IAT

At first glance, the goal of the present study—to evaluate a member of the self-conscious emotion family at a relatively automatic level—may seem strange. Nonetheless, in their critical review on “moral” emotions and behaviors, Tangney et al. (2007) noted, “This self-evaluation may be implicit or explicit, consciously experienced or transpiring beneath the radar of our awareness” (p. 4). In addition, a variety of automaticity features exist (e.g., a process can be unconscious, uncontrollable, unintentional, and/or efficient). It is notable that although the

Table 4. Correlations Among Implicit Measures and Trait Symptoms for the Full Sample

<table>
<thead>
<tr>
<th>Measure</th>
<th>Implicit Association Test composite</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Appearance + Shame</td>
</tr>
<tr>
<td>FKS (BDD symptom)</td>
<td>.25***</td>
</tr>
<tr>
<td>OCI-R (OCD symptom)</td>
<td>.01</td>
</tr>
<tr>
<td>LSAS Fear and Avoidance (SAD symptom)</td>
<td>−.02</td>
</tr>
<tr>
<td>Explicit BDD-symptom composite</td>
<td>.15</td>
</tr>
<tr>
<td>Explicit OCD-symptom composite</td>
<td>−.14</td>
</tr>
<tr>
<td>Explicit SAD-symptom composite</td>
<td>−.23**</td>
</tr>
</tbody>
</table>

Note: FKS = Fragebogen Körperdysmorpher Symptome; BDD = body dysmorphic disorder; OCI-R = Obsessive Compulsive Inventory–Revised; OCD = obsessive-compulsive disorder; LSAS = Liebowitz Social Anxiety Scale; SAD = social anxiety disorder.

*p < .10. **p < .05. ***p < .01.
IAT (the measure used in the current study to assess implicit shame) can sometimes indicate unconscious associations, it most clearly taps into uncontrollable processing of emotional stimuli (see the discussion in Teachman, Joormann, Steinman, & Gotlib, 2012). Thus, it is possible that participants in the present study may have some awareness into their conscious levels of shame, but they may nevertheless find it difficult to control their shame once it is activated. In other words, they may have difficulty avoiding, altering, or stopping their shame associations.

Clinical and theoretical implications

A number of important clinical and theoretical implications stem from these results. Clinically, these results could inform interventions that address shame. Given that it can be difficult for clients to disclose the nature of their shame, therapists could use the results of this study to broach discussions regarding the experience of shame. For instance, the results of this study could be shared with individuals suffering from BDD as a way to normalize their experience of body-related shame. This could be particularly beneficial given that individuals with BDD often experience such extreme shame that they might have difficulty even talking about their bodies and appearance concerns in psychotherapy and instead choose to focus on less “shameful” aspects of their mental health (e.g., poor mood or relationship issues; Phillips, 2005). Related to this point, it may be normalizing for patients with OCD to discuss the shame they feel regarding their obsessive thoughts. Evaluations of the direction and function of the shame-symptom relationships among individuals with BDD, OCD, and SAD will be important in future research and can help clients recognize the harmful nature of their shame response (as well as counter unhealthy beliefs that feeling shame is somehow morally right).

With regard to theory, these findings augment models that highlight the importance of relatively automatic processing in anxiety and obsessive-compulsive spectrum disorders (see Teachman, Cody, & Clerkin, 2010). Moreover, they provide key support to the theorized role of unhealthy beliefs and interpretations in these disorders. For instance, cognitive models of OCD stress the importance of the interpretations made about obsessive thoughts as central to the pathology (e.g., interpreting obsessive thoughts as important and personally significant is thought to lead to the distress that follows the thoughts and their punishing recurrence; Obsessive Compulsive Cognitions Working Group, 2005). The current study suggests that these thoughts are even interpreted as shameful at a relatively automatic level, which may help explain why the thoughts are deemed so personally significant at an explicit level.

It is critical that future research determine whether disorder-specific implicit shame has predictive validity with respect to future behavior and treatment outcomes, as well as the extent to which changes in relatively automatic beliefs are causally related to symptom development. This dovetails nicely with some of the ongoing research that uses cognitive-bias-modification procedures to directly shift cognitive-processing biases, including biases that are relatively automatic. In particular, recent research has suggested that the modification of implicit-rejection associations (in the context of social anxiety symptoms; Clerkin & Teachman, 2010) using computer-based conditioning procedures that provide repeated practice endorsing healthier associations meaningfully predicts disorder-relevant symptoms. A focus on disorder-relevant shame, including implicit shame, as a modifiable target could provide a valuable target for prevention and treatment of BDD, OCD, and SAD. More generally, findings from the present study can be integrated into existing cognitive-behavioral conceptualizations (e.g., Beck & Clark, 1997), which stress that a primary goal when treating anxiety disorders is to deactivate relatively automatic biased processing while simultaneously activating more strategic, healthier forms of cognition. Therefore, a goal of treatment could be to weaken one’s implicit-shame associations, perhaps by strengthening competing, adaptive associations (e.g., associations tied to one’s resilience or self-acceptance).

Finally, our evaluation of implicit/explicit relationships suggested that the relationships tended to be small and were not always reliable. Specifically, we found significant convergence with respect to the implicit and explicit measures for BDD (as assessed by the FKS), and the correlation between the obsessive-thoughts/shame composite and the OCI-R was in the expected direction. The correlation between performance-related implicit shame and social anxiety symptoms was not significant and, instead, was in the opposite direction to that predicted. Given that these correlations used IAT composites composed of relative indicators, whereas the symptom measures were indices of absolute, disorder-relevant symptoms, we also examined a relative explicit-symptom composite for each disorder and found that the disorder-relevant implicit and explicit composite variables were each related to one another in the anticipated direction. Again, however, the magnitude of effects was small, and the effect reached significance only for the OCD indicators.

The finding of small implicit-explicit relationships is not unusual and is consistent with large meta-analyses and reviews that have investigated the average magnitude of relationships between the IAT and corresponding explicit indicators (e.g., Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005; Roefs et al., 2011). More generally, we expect that implicit and explicit indicators of a construct
will frequently share some variance (thus, we often see small correlations) as well as reflect unique elements of the construct, with the exact strength of the relationship varying considerably across domains and as a function of different moderators, such as self-presentation concerns (see Nosek, 2005).

In sum, although there was some evidence that implicit and explicit measures were associated with one another, the small effects suggest that the implicit and explicit variables may capture mostly distinct elements of the disorders and, thus, may show unique predictive validity (see the discussion in Clerkin & Teachman, 2009). For instance, it is possible that self-reported shame may better predict more strategic outcomes, such as one’s reported level of distress, and implicit shame may better predict more spontaneous or uncontrollable outcomes, such as psychophysiological reactivity in response to a threat cue. If true, clinicians will want to monitor not only what clients self-report but also aspects of their cognitions and behavior that are relatively more automatic.

Limitations and conclusions

The present study findings should be considered in light of several weaknesses. The first relates to methodological issues inherent to the use of the IAT (see Buhlmann et al., 2011; Buhlmann, Teachman, Gerbershagen, Kikul, & Rief, 2008). Specifically, null findings (in this case, for our SAD group) could be due to our choice of contrast categories, given that the interpretation of the IAT finding depends on the evaluation of one category pairing (e.g., performance-shame; see Buhlmann et al., 2008). In the present study, the performance-plus-shame association was contrasted against associations with body, obsessive thoughts, and furniture. Thus, it is possible that associations tied to performance at an absolute level would be experienced as more shameful among participants with SAD compared with participants in the other groups, but this was obscured in the relative comparisons.

Meanwhile, the finding that the combined SAD/control group exhibited greater implicit shame toward performance than did the combined BDD/OCD group may underscore the normative nature of social anxiety that people experience when giving a social performance, such as a speech. We suspect that the OCD and BDD groups did not show this elevation because of the comparison targets used in the composite variable that were contrasted with performance; namely, the composite included their disorder-specific shame targets, which they evaluated as even more shameful. In particular, although many people may feel uncomfortable with their speech performance, persons with OCD and BDD find obsessive thoughts and appearance, respectively, even more shame indulging. Thus, the relative comparisons that make up an IAT effect produce lower performance-shame associations for these groups. Nonetheless, it is important to clarify that this finding does not suggest that individuals with SAD had abnormally elevated levels of performance-relevant implicit shame. Instead, compared with the BDD and OCD groups, the SAD group individuals’ performance-relevant implicit shame was relatively stronger than their implicit shame toward their bodies or obsessive thoughts (but equivalent to the control group’s).

In the future, researchers examining implicit associations of shame in SAD may wish to consider a go/no-go association task (Nosek & Banaji, 2001) or another “single-category” implicit-association task, given that this type of task does not require an explicitly labeled, relative contrast category. Moreover, although there is some empirical support for the notion that shame is relevant for SAD (e.g., Fergus et al., 2010; Hedman et al., 2013), future researchers may want to consider evaluating related self-conscious emotions, such as embarrassment, which may be equally or even more relevant for SAD (for research that investigates embarrassment in SAD, see Blair et al., 2011; Gerlach, Wilhelm, & Roth, 2005). Finally, more careful consideration of IAT category labels and stimuli will be critical. For instance, obsessive thoughts are characteristic of a variety of disorders, including BDD (e.g., Phillips et al., 2010); thus, the use of “obsessive thoughts” as the category label for obsessive-compulsive-relevant implicit shame may be problematic for distinguishing among the disorders. In addition, given that shame indicates perceived personal transgressions/failures, it may be important to use stimuli (e.g., blushing in the context of SAD) that more clearly tap into the perceived transgressions associated with the disorders. Finally, the IAT stimuli did not match each individual’s unique concerns within the disorder categories (e.g., an individual with BDD may be particularly concerned about his or her nose or hair).

Furthermore, a strength of the study—the carefully screened and selected samples—could be considered a weakness. Although the lack of comorbidity with respect to the disorders of interest allowed us to examine disorder-specific implicit associations with shame, these results may not generalize to individuals who have both BDD and OCD, for example. Conversely, participants were able to have other comorbidities, such as depression and substance-use disorders, and they could have subclinical symptoms of the other disorders, even though they did not meet full diagnostic criteria (see Table 2). Together, this helps increase the ecological validity of the results. Finally, although groups were carefully matched across a
variety of indicators (e.g., years of education, marital status), participants in the OCD group (vs. the other clinical groups) were more likely to be seeking current psychotherapy and medication treatment.

In spite of these limitations, our comparative design allowed us to contrast relatively automatic cognition across disorders, thereby adding to existing cognitive-behavioral conceptualizations of BDD, OCD, and SAD that have traditionally focused on strategic, explicit forms of cognition within a single disorder. We saw clear evidence of disorder-specific implicit-shame associations within the BDD and OCD groups, such that the former evidenced more body-relevant implicit shame than did the other clinical groups and the latter demonstrated more implicit shame with respect to obsessive thoughts than did the other clinical groups. Given that shame may be a maintaining factor for the symptoms associated with these disorders, therapeutic interventions and assessments may benefit from targeting these specific types of shame within the clinical groups. This study ultimately highlights points of similarity and differentiation between BDD, OCD, and SAD concerning their shared emphasis on implicit shame but differing shame triggers. Future work that clarifies the extent to which implicit shame is causally related to behavior and treatment outcomes is warranted.

**Author Contributions**

E. M. Clerkin oversaw the execution of the manuscript, performed the primary data analyses, and drafted initial versions of the introduction and the Method and Results sections. B. A. Teachman and U. Buhlmann developed the initial study concept and design as part of a larger study evaluating cognitive and physiologic correlates of BDD, OCD, and SAD. U. Buhlmann oversaw study recruitment and data collection. B. A. Teachman provided guidance on scoring and computing the implicit-association scores. A. R. Smith drafted the initial version of the Discussion section. All authors critically revised the manuscript and approved the final version of the manuscript for submission.

**Declaration of Conflicting Interests**

B. A. Teachman has a significant financial interest in Project Implicit, Inc., which provided services in support of this project under contract with the University of Virginia.

**Funding**

This project was partially supported by a grant awarded to U. Buhlmann (BU 1814/7-2) by the German Research Society, a National Institute on Alcohol Abuse and Alcoholism grant awarded to E. M. Clerkin (R21AA021151), and a National Institute on Aging grant awarded to B. A. Teachman (R01AG033033).

**Notes**

1. Given the central focus of this article, only the primary explicit symptom measures that were administered to all participants are included here. As part of a larger study, after performing the IAT tasks, participants also completed a series of behavioral avoidance tasks to tap into emotional vulnerability tied to mirror gazing (BDD relevant; Buhlmann, Teachman, et al., 2009), thought-action fusion (OCD relevant; Clerkin & Teachman, 2011), and public speaking (SAD relevant; Clerkin & Teachman, 2010). Using Pearson correlation coefficients, we found no significant relationships between the implicit composite variables and the outcomes on the behavioral avoidance tasks: peak task anxiety reported, time to indicate avoidance, ritual urges, or rituals completed (all ps > .05). More information about these measures and analyses, as well as details on additional measures included in the larger study, is available from the corresponding author.

2. We also investigated whether groups differed on the three IATs evaluating disorder-specific targets as shameful (vs. furniture as acceptable). A repeated measures analysis of variance revealed that for these disorder-specific (vs. neutral) comparisons, there was not a significant effect for group, IAT type, or IAT Type × Group (all ps > .10). This result was not altogether surprising given that “furniture” is not a very comprehensible contrast category for the disorder-specific targets (see a detailed discussion regarding the challenges of choosing an appropriate contrast category in Buhlmann et al., 2011). Thus, these findings are not discussed in detail here.

**References**


