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Probabilistic reasoning in patients with body dysmorphic disorder

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ABSTRACT

Background and Objectives: Many patients with body dysmorphic disorder (BDD) have poor insight into their condition. Indeed, their conviction in their ugliness is often delusional. Perhaps the most robust information-processing abnormality associated with delusions is a jumping to conclusions (JTC) reasoning bias such that delusional individuals request significantly less information before making a decision relative to healthy controls. We investigated whether patients with BDD ($n = 20$) demonstrate a JTC reasoning style relative to patients with OCD ($n = 20$) and healthy controls ($n = 20$).
Methods: Participants completed a clinician-rated measure of delusionality and two tests of probabilistic reasoning: the beads task and the survey task.
Results: Patients with BDD did exhibit higher delusionality than the patients with OCD. They did not, however, exhibit a JTC reasoning bias relative to the patients with OCD or the healthy controls. Patients with poor insight BDD requested significantly less information before making a decision than did patients with fair insight BDD.
Limitations: The clinical groups were characterized by multiple comorbidities and concomitant medications. The BDD group had relatively good insight as compared to other studies examining delusionality in BDD.
Conclusions: Taken together, our results suggest that although a JTC reasoning bias was not present in all patients with BDD, a modest JTC reasoning bias may be present among patients with poor insight BDD. Future studies could provide additional information on this hypothesis.

1. Introduction

Body Dysmorphic Disorder (BDD) is characterized by a preoccupation with imagined or slight defects in physical appearance (American Psychiatric Association, 2000). The preoccupation can be about any area of the body, but most frequently concerns the skin, hair, and nose (Phillips, Menard, Fay, & Weisberg, 2005). Individuals with BDD are often overwhelmed by intrusive and persistent thoughts and images related to their physical appearance. They also frequently perform ritualistic behaviors such as excessive grooming, mirror checking, applying makeup, or camouflaging their appearance with clothing or jewelry. BDD often causes marked social, educational, and occupational impairment. Sufferers may experience difficulty remaining in school, retaining jobs, or developing relationships as a result of their appearance concerns. For example, a study of 200 individuals with BDD revealed that 36% had missed at least one week of work in the prior month because of these concerns, and 11% had terminated their schooling because of BDD (Phillips et al., 2005). More than 25% reported attempting suicide at some point in their lives.

Many individuals with BDD also have very poor insight into their disorder (Phillips, 2004; Phillips, McElroy, Keck, Hudson, & Pope, 1994). They often do not recognize that they suffer from a mental disorder. Rather, they consider their problem to be cosmetic. For example, in one study, 52 of 100 individuals with BDD said that for a significant period of time during the course of their disorder they were convinced of their ugliness (Phillips et al., 1994). Another study of 129 patients with BDD revealed that 84% ($n = 108$) were either delusional ($n = 68$) or had poor insight ($n = 40$) into their primary disorder-related belief (e.g., "I am ugly"; Phillips, 2004).

Higher levels of delusionality among BDD patients are associated with less educational attainment, poorer social functioning, greater symptom severity, increased likelihood of drug abuse or dependence, and greater frequency of suicide attempts (Phillips, Menard, Pagano, Fay, & Stout, 2006). Thus, a better understanding

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of the factors that may contribute to this feature of BDD could significantly contribute to our understanding of the disorder and inform our treatment approaches.

Researchers have begun investigating the cognitive processes that may contribute to the development and maintenance of BDD. Biases in interpretation (Buhlmann, Wilhelm et al., 2002), attention (Buhlmann, McNally, Wilhelm, & Florin, 2002), visual processing (Feusner et al., 2010; Feusner, Townsend, Bystritsky, & Bookheimer, 2007), emotion recognition (Buhlmann, Etcoff, & Wilhelm, 2006) and memory (Deckersbach et al., 2000) have emerged. However, none of these abnormalities appear to explain the delusional features of the disorder. In the present study, we sought to examine whether individuals with BDD might exhibit cognitive biases that have been linked to delusion formation in other disorders.

Although a number of cognitive processes have been linked to delusion formation, probabilistic reasoning is perhaps the most robust information-processing bias associated with delusional beliefs (for review, Bell, Halligan, & Ellis, 2006; Garety & Freeman, 1999). Individuals with delusions (i.e., delusional disorder or delusions in the context of schizophrenia) demonstrate a "jumping to conclusions" (JTC) reasoning style or data-gathering bias in which they make judgments based on less information than do healthy controls, they are more confident in these judgments, but generally do not commit significantly more errors (for review Fine, Gardner, Craigie, & Gold, 2007). Such biases occur in individuals who are exhibiting attenuated psychotic symptoms (Broome et al., 2007), individuals in the general population with high levels of delusional ideation (Colbert & Peters, 2002; Warman & Martin, 2006), and in first-degree relatives of individuals with schizophrenia (Van Dael et al., 2006), suggesting that this reasoning style may signify vulnerability for developing delusional beliefs. Indeed, Van Dael et al. (2006) found a dose–response relationship between level of risk for psychosis and a JTC reasoning style.

In this study, we investigated whether patients with BDD demonstrate a JTC reasoning style relative to patients with OCD and healthy controls. We chose individuals with OCD as a clinical comparison group because although the two disorders share many features (for reviews, see Chosak et al., 2008; Phillips et al., 2007; Simeon, Hollander, Stein, Cohen, & Aronowitz, 1995), they differ with regard to insight. For example, a study directly comparing level of insight in patients with BDD to those with OCD found that thirty-nine percent of the BDD patients were delusional, whereas only 2% of the OCD patients met such criteria (Eisen, Phillips, Coles, & Rasmussen, 2004). Additionally, in previous studies of probabilistic reasoning, individuals with OCD required more information than did healthy controls (Fear & Healy, 1997; Volans, 1976) and non-anxious controls (Pelissier & O'Connor, 2002).

To assess reasoning, we followed the procedures of Warman, Lysaker, Martin, Davis, and Haudenschield (2007), and administered a neutral probabilistic reasoning task (the beads task; Phillips & Edwards, 1966), and a self-relevant probabilistic reasoning task (the survey task; Dudley, John, Young, & Over, 1997). The beads task is the most widely-used method of assessing probabilistic reasoning in the literature on delusions (for review, Fine et al., 2007). The survey task is identical to the beads task except that it asks participants to reason about socially-relevant stimuli (e.g., self-descriptive adjectives). Because BDD patients have social evaluative concerns, we hypothesized that they would be especially likely to exhibit a bias on the survey task. Moreover, delusional and delusion-prone individuals exhibit a heightened JTC bias with self-relevant stimuli (Dudley et al., 1997; Warman et al., 2007). Finally, we used easy and hard versions of each task because one study (Broome et al., 2007) found that a probabilistic reasoning bias emerged among individuals exhibiting attenuated psychotic symptoms only when the task was difficult.

We hypothesized that individuals with BDD would require significantly less information (i.e., make fewer draws to decision) and be more confident in their decisions in the reasoning tasks than would individuals with OCD or healthy controls. For the reasons mentioned above, we hypothesized that group differences might be most pronounced in the hard version of the survey task. Finally, given evidence suggesting a linear relationship between delusionality and the JTC bias (Colbert & Peters, 2002; Van Dael et al., 2006; Warman et al., 2007), we hypothesized that degree of focal delusionality (delusionality in the primary disorder-related belief, e.g., "I am ugly"), as measured by the Brown Assessment of Beliefs Scale (BABS; Eisen et al., 1998) would negatively predict the amount of information that a participant gathers before making a decision.

2. Method

2.1. Participants

We recruited 20 patients with a primary DSM-IV diagnosis of BDD and 20 patients with a primary DSM-IV diagnosis of OCD from the OCD and Related Disorders Clinic and Research Unit at the Massachusetts General Hospital. Participants learned about the study from advertisements posted in the clinic or from their treating clinician. We recruited 20 healthy controls from the community via online postings. All participants provided informed consent and all were 18 years of age or older. Patients in the BDD group met DSM-IV criteria for a primary diagnosis of BDD, never met diagnostic criteria for OCD, and scored 20 or higher on the 12-item Yale-Brown Obsessive Compulsive Scale modified for BDD (BDD-YBOCS; Phillips, Hollander, Rasmussen, & Aronowitz, 1997). Patients in the OCD group, met DSM-IV criteria for a primary diagnosis of OCD, never met diagnostic criteria for BDD, and scored 16 or higher on the 10-item Yale-Brown Obsessive Compulsive Scale (YBOCS; Goodman, Price, Rasmussen, & Mazure, 1989a,b). Individuals in the healthy control group could not meet diagnostic criteria for any current or past Axis I disorder with the exception of past alcohol/substance abuse or specific phobia. In total, 67 individuals provided consent to participate in the study. Seven individuals were ineligible due to either insufficient symptom severity ($n = 2$) or comorbid OCD and BDD ($n = 5$). One patient in the OCD group was unable to complete the reasoning task. This participant was excluded from analyses pertaining to this task. Twelve of the patients with BDD met diagnostic criteria for at least one current comorbid Axis I disorder including: Major Depressive Disorder ($n = 5$), Social Anxiety Disorder ($n = 3$), Specific Phobia ($n = 2$), Substance Abuse and Dependence ($n = 1$), Post Traumatic Stress Disorder ($n = 1$), Agoraphobia ($n = 1$), and Bulimia ($n = 1$). Ten of the patients with OCD met diagnostic criteria for at least one current comorbid Axis I disorder including: Specific Phobia ($n = 6$), Social Anxiety Disorder ($n = 3$), Agoraphobia ($n = 2$), Panic Disorder ($n = 1$), Major Depressive Disorder ($n = 1$), Bipolar Disorder ($n = 1$), and Post Traumatic Stress Disorder ($n = 1$). Only one individual in the healthy control group met diagnostic criteria for a current or past Axis I disorder: current height phobia. Fourteen of the patients with BDD were taking at least one psychotropic medication at the time of participation including: antidepressants ($n = 14$), antipsychotics ($n = 3$), benzodiazepines ($n = 3$), anticonvulsants ($n = 1$), stimulants ($n = 2$), and NMDA antagonists ($n = 1$). Fifteen of the patients with OCD were taking at least one psychotropic medication at the time of participation including: antidepressants ($n = 14$), antipsychotics ($n = 2$), benzodiazepines ($n = 8$), anticonvulsants ($n = 2$), stimulants ($n = 1$), and NMDA antagonists ($n = 4$). No healthy control was taking any psychotropic medications. Participants received $100 for participating. The groups did