



## Superior face recognition in Body Dysmorphic Disorder

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### ABSTRACT

**Introduction:** Individuals with Body Dysmorphic Disorder (BDD) may have a propensity for viewing faces differently from healthy controls. In an attempt to explore these processing changes in more detail, we investigate face processing in BDD using two facial recognition tasks; one testing the recognition of facial characteristics, the other testing the recognition of facial expressions of emotion. **Method:** Participants with BDD ( $n=12$ ) and healthy controls ( $n=16$ ) were tested for inverted face recognition using the Famous Faces Task (FFT) and the Facial Expression of Emotions Stimulus and Test emotion recognition task (FEEST). The groups were matched for age, IQ and education.

**Results:** Participants with BDD showed a significant ability to correctly recognise inverted famous faces compared to well-matched controls. In contrast, participants with BDD showed a specific deficit in recognising fearful facial emotions. BDD participants excel over controls at performing the FFT.

**Conclusions:** These findings may represent a cognitive marker for BDD. The specific deficit within the BDD group for recognising fearful expressions may be another feature of the disorder and may implicate abnormal processing of negatively valenced emotional material. The specificity of these findings for BDD merit further investigation using other clinical groups and a larger sample size.

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### 1. Introduction

Body Dysmorphic Disorder (BDD), the obsessive preoccupation with perceived defects in appearance, has been estimated to affect 1–2% of the population (Rief, Buhlmann, Wilhelm, Borkenhagen, & Brähler, 2006). Individuals with BDD are concerned they have a bodily imperfection that they consider unsightly, and they fear subsequent negative evaluation by others. In some cases, they exaggerate a trivial flaw; in other cases they are troubled by an imaginary defect. The symptoms of BDD are associated with considerable distress, and in one study (Eisen, Phillips, Coles, & Rasmussen, 2004), as many as 39% of BDD individuals appeared to lack insight into their fixed, false beliefs. Moreover, in an attempt to minimise or hide the defect, or to disconfirm their fears, individuals with BDD engage in time-consuming compulsive behaviours, such as mirror checking (Veale, 2001), applying makeup (camouflaging) and seeking reassurance about their appearance (Goodman et al., 1989). In an attempt to reduce distress, they often engage in social avoidance.

The most common preoccupation in BDD patients is with facial appearance (Phillips, 1996), frequently focusing on specific facial features with which they are unhappy, but also checking the appearance and facial features of others to make comparisons with their own. Grochowski, Kliem, and Heinrichs (in press) examined eye tracking in individuals with BDD, social anxiety and healthy controls when looking at their own and others' faces. Only patients with BDD showed heightened fixation to an imagined defect in their own face, but also to corresponding regions in unfamiliar faces, supporting the notion of a specific attentional bias in BDD.

Imaging studies point to greater left hemisphere activity thought indicative of greater encoding and analysis of detail as opposed to more holistic and configural processing of faces in BDD (Feusner, Townsend, Bystritsky, & Bookheimer, 2007). Imaging has also documented visual processing and fronto-striatal differences when individuals with BDD are viewing their own face (Feusner et al., 2010c) and that the brain activity in these systems correlates with symptom severity.

Obviously, facial expressions are a key way through which we express positive or negative thoughts, feelings and attitudes. Given the fear of negative evaluation and the frequent ideas of reference (e.g., that others are staring at them), individuals with BDD might be especially sensitive to facial expressions. For example, they might misinterpret a neutral facial expression as negative (Buhlmann, McNally, Etcoff, Tuschen-Caffier, & Wilhelm, 2004;

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Buhlmann, Etcoff, & Wilhelm, 2006). Research examining aspects of facial emotion recognition suggests that compared with controls, individuals with BDD have poorer recognition of negatively valenced facial emotions, especially when viewed from their own 'perspective' (Williams, Watts, MacLeod, & Mathews, 1997; Buhlmann, McNally, Wilhelm, & Florin, 2002). According to Buhlmann et al. (2004), compared with healthy controls and patients with obsessive-compulsive disorder (OCD), those with BDD show a bias toward misinterpreting facial expressions as angry, including neutral but also disgusted expressions. A later study by Buhlmann et al. (2006) found that individuals with BDD misinterpreted expressions as angry in "self-referent" situations (imagining themselves in a situation) but not in "other-referent" situations. Buhlmann, Gleiss, Rupf, Zschenderlein, and Kathmann (2011) also found that compared to healthy controls and individuals with dermatological conditions, BDD patients were more likely to misinterpret neutral expressions as negative emotions. These findings suggest that individuals with BDD believe other people share their own negative appraisal of their appearance; which might serve to maintain the disorder.

In a thematic analysis, which included a qualitative analysis of conversation guided by self-portraits, Silver, Reavey, and Fineberg (2010) found a tendency for individuals with BDD to focus on facial detail rather than view the face as a whole. The most common theme was a heightened threat perception characterised by the participants being very sensitive to comments made by others that they interpreted as being critical of themselves. In addition, the majority of the participants expressed a wish for facial symmetry, possibly indicating a tendency to view the face in separate parts as opposed to as a whole. Consistent with this finding, Stangier, Adam-Schwebe, Müller, and Wolter (2008) reported that BDD patients were significantly more accurate than controls in detecting changes in photographs that are manipulated with regard to facial features (hair loss, scars size of the nose, etc.).

A recently published study (Feusner et al., 2010b) investigated inverted face identification in individuals with BDD compared with healthy controls. Participants viewed upright photographs of unfamiliar faces (judged to be of average attractiveness) for 5000 ms, 3000 ms or 500 ms and were then asked to select from two photographs the picture that was the same as the target face. Compared with the control group, the BDD group was significantly faster when given 5000 ms; however, no group difference emerged for shorter viewing times. No evidence of a significant accuracy difference emerged between the two groups for any trial. The authors suggested that the extra time taken to view the image may allow a partial 'decomposition' of the face into constituent parts that is processed particularly well by BDD sufferers. Recognition of emotional expressions was also recently studied by Feusner, Bystritsky, Helleman, and Bookheimer, (2010a) in which individuals with and without BDD were asked to match identities of faces to their emotional expressions. Participants also completed a control task matching ovals and circles instead of faces. The BDD group made twice as many errors as control subjects when matching faces to their emotional expressions, irrespective of the nature of the expression, but did not differ on the control task. This result suggests a rather general impairment in the processing of facial expressions.

A high incidence of comorbidity exists within the BDD population and most commonly in the form of depression and social anxiety disorder (SAD: Phillips, & Diaz, 1997; NezirogluMcKay, Todaro, & Yaryura-Tobias, 1996; Veale et al., 1996). SAD is a disorder characterised by intense avoidance of social situations owing to the fear of negative evaluation by others. In this respect, SAD may be difficult to distinguish from BDD in the clinical scenario. Patients with SAD also show an abnormality in recognising facial expressions. Moriya and Tanno (2011) conducted a

task in which individuals with SAD with high anxiety, low anxiety and healthy controls were asked to view neutral and angry faces. Individuals with high anxiety had difficulty disengaging with the angry stimulus, suggesting a bias for and misinterpretation of threatening faces. Other research using dynamic stimuli (pictures of faces slowly morphing from neutral to a full expression of happiness, sadness, fear, etc.) suggests that individuals with SAD misinterpret threatening faces and show an inability to disengage from the image when they have to identify them quickly and efficiently.

The present study examined facial emotion recognition and familiar face recognition for both upright and inverted faces in individuals with and without BDD. The research reviewed above leads to the hypothesis that individuals with BDD would show a bias toward misinterpreting facial expressions depicting negative emotions, and a tendency toward more effective identification of facial characteristics than controls that would become more evident with increasing difficulty i.e. when the image is inverted.

## 2. Method

### 2.1. Participants

Twenty-eight individuals participated in this study: 12 diagnosed with BDD (7 female) and 16 healthy controls (10 female) who were closely matched (see Table 1) with regard to age and IQ (National Adult Reading Test, NART; Nelson, 1982). Seven BDD participants were taking medication at the time of testing. All were taking one selective serotonin reuptake inhibitor (SSRI; Paroxetine [ $n=1$ ], Citalopram [ $n=1$ ], Escitalopram [ $n=3$ ] and Sertraline [ $n=2$ ]). Five were also taking one adjunctive antipsychotic medication (Risperidone [ $n=1$ ], Aripiprazole [ $n=1$ ], Quetiapine [ $n=3$ ]). None of the control participants were receiving psychotropic medication.

Individuals in the BDD group were recruited from the OCD and BDD specialty outpatient clinic of one of the authors (NAF). All received a diagnosis of BDD from a senior clinician and OCD/BDD expert (NAF) using an extended clinical interview complemented by assessment using clinical scales such as the Yale Brown Obsessive Compulsive Scale for Body Dysmorphic Disorder (BDD-YBOCS; Rasmussen & Goodman, 2000), the Montgomery-Åsberg Depression Rating Scale (MADRS, Montgomery & Åsberg, 1979) and the Hamilton Anxiety Scale (HAM-A, Hamilton, 1959). All of the BDD participants fulfilled DSM IV criteria for this condition, and BDD was their primary diagnosis. All also had at least one comorbid disorder, with most participants having two or more of the following comorbidities: Obsessive Compulsive Disorder (OCD), Major Depressive Disorder, Obsessive Compulsive Personality Disorder (OCPD), Social Anxiety Disorder (SAD), Tourette's and Gender Identity Disorder, all of which were diagnosed using DSM-IV criteria. None of the participants in the control group had any psychological disorders.

The mean duration of illness for the 12 BDD patients was 11.13 years. BDD severity was measured using the BDD-YBOCS. All participants were also administered the MADRS and the HAM-A to assess depression and anxiety. As expected (see Table 1), the BDD group showed a significantly higher level of depression and anxiety as compared to the controls. We therefore ran all statistical analyses with and without covarying for both anxiety and depression; however the overall patterns of results did not differ.

**Table 1**

Means and standard deviations for demographic details.

	BDD		Control		F	p	Cohen's d
	Mean	SD	Mean	SD			
Age (years)	30.08	(8.92)	35.80	(12.10)	1.87	0.18	0.51
NART IQ	113.80	(2.95)	115.00	(3.34)	0.22	0.64	0.37
Education (years)	14.08	(1.88)	14.41	(1.99)	0.23	0.64	0.16
HAM-A	8.08	(6.75)	3.94	(3.04)	4.76	0.03	0.81
MADRS	7.50	(5.98)	2.50	(4.29)	6.66	0.01	0.96
BDD-YBOCS	13.25	(4.88)	2.38	(3.40)	48.40	< 0.001	2.58

Note: HAM-A—Hamilton Anxiety Test, MADRS—Montgomery-Åsberg Depression Rating Scale, YBOCS—Yale Brown Obsessive Compulsive Scale for BDD, IFFT—Inverted Famous Faces Task.

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