Visual selective attention in body dysmorphic disorder, bulimia nervosa and healthy controls

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A B S T R A C T

Objective: Cognitive behavioral models postulate that selective attention plays an important role in the maintenance of body dysmorphic disorder (BDD). It is suggested that individuals with BDD overfocus on perceived defects in their appearance, which may contribute to the excessive preoccupation with their appearance.

Methods: The present study used eye tracking to examine visual selective attention in individuals with BDD (n = 19), as compared to individuals with bulimia nervosa (BN) (n = 21) and healthy controls (HCs) (n = 21). Participants completed interviews, questionnaires, rating scales and an eye tracking task: Eye movements were recorded while participants viewed photographs of their own face and attractive as well as unattractive other faces.

Results: Eye tracking data showed that BDD and BN participants focused less on their self-rated most attractive facial part than HCs. Scanning patterns in own and other faces showed that BDD and BN participants paid as much attention to attractive as to unattractive features in their own face, whereas they focused more on attractive features in attractive other faces. HCs paid more attention to attractive features in their own face and did the same in attractive other faces.

Conclusion: Results indicate an attentional bias in BDD and BN participants manifesting itself in a neglect of positive features compared to HCs. Perceptual retraining may be an important aspect to focus on in therapy in order to overcome the neglect of positive facial aspects. Future research should aim to disentangle attentional processes in BDD by examining the time course of attentional processing.

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1. Introduction

Body dysmorphic disorder (BDD) is characterized by a preoccupation with a perceived defect or flaw in one’s appearance that is either unobservable by others or appears to be only slight [1]. The most common body parts of concern are the skin, hair, or nose, but any part of the body may be included and often the preoccupation involves several body parts [29]. BDD affects an estimated 1–2% of the general population [31]. Prevalence rates in student populations are reported to be even higher [5]. Individuals with BDD suffer from severe distress and substantial impairment in psychosocial functioning [9].

Several cognitive behavioral (CBT) models aim to explain BDD etiology and maintenance [12,29,33]. According to CBT models, one crucial factor in BDD is selective attention. It is suggested that individuals with BDD selectively attend to certain aspects of their appearance and make maladaptive interpretations about their appearance [12]. Other models emphasize self-focused attention as one type of selective attention that results in awareness of self-referent, internally generated information [33]. Excessive attention on perceived defects, emotions and cognitions is considered a key factor in maintaining BDD.

Indirect empirical evidence for selective attention comes from studies using psychophysiological/behavioral measures such as the study by Deckersbach et al. [10], which implicates a detail-focused processing style in BDD. Further indirect evidence comes from neuroimaging studies such as the study by Feusner et al. [13], which suggests imbalances in detailed versus global processing in BDD, marked by abnormalities in primary and secondary visual cortical, temporal and prefrontal systems.

So far, there are only two studies that used eye tracking as a direct measure of visual selective attention. Grochulewski et al. [16] instructed participants to look at photographs of their own face and of several other faces of average attractiveness. In comparison to healthy controls (HCs), individuals with BDD showed heightened selective attention to the perceived defect in their own face, as well as to corresponding regions in other faces. In a recent study by Greenberg et al. [15], participants were instructed to look at photographs of their own face and of a gender-matched face of average attractiveness. Results suggested...
that individuals with BDD overfocused on negative attributes, whereas HCs had a more balanced focus on their traits.

In the present study, we examined visual selective attention in individuals with BDD and attempted to expand upon previous eye tracking studies. According to the self-discrepancy theory [19], discrepancies between the actual self and ideal and ought selves are associated with negative emotions. Empirical evidence indicates that individuals with BDD often compare their own appearance with that of others [2]. They exhibit perfectionistic thinking and maladaptive attractiveness beliefs [7] and experience discrepancies between their own perceived attractiveness and their ideal and ought appearance [32]. Thus, individuals with BDD may tend to engage in unfavourable appearance comparisons and they may allocate their attention differently based on the attractiveness of other people’s faces, which may result in negative emotions and dysfunctional cognitive processes. To account for this, we used photographs of control faces that varied in their attractiveness.

BDD shares similarities with eating disorders (EDs) such as high body dissatisfaction [23] and frequent appearance concerns related to facial features [24]. In order to determine whether any observed attentional biases were specific to BDD or shared by individuals with other body image concerns, we included individuals with bulimia nervosa (BN) as clinical control group. In an analogous study, Jansen et al. [22] found that in eating symptomatic individuals there was a decreased attentional focus on their own attractive body parts and an increased attentional focus on their unattractive body parts. Such a lack of self-serving bias may also be prevalent in individuals with BN when scanning pictures of their own face.

Consistent with CBT models of BDD and previous findings, we expected that BDD and BN participants would focus more on self-rated unattractive aspects of their own face compared to HCs. We also expected that BDD and BN participants would focus less on self-rated attractive aspects of their own face compared to HCs.

Concerning patterns of attention allocation in own face and control faces, we expected that BDD participants would focus more on self-rated unattractive aspects of their own face than on attractive aspects, while for control faces they would focus more on self-rated attractive aspects than on unattractive aspects. Considering the results in eating symptomatic participants, we expected this pattern of attention allocation would also be present in BN. Due to processes of upward comparison in BDD [2] and BN [4], we expected that this pattern of attention allocation would be even stronger in the comparison of own and attractive control faces than in the comparison of own and unattractive control faces. We further hypothesized that HCs would focus more on self-rated attractive than on unattractive aspects in their own face, and for control faces they would do the opposite.

2. Method

2.1. Participants

The sample consisted of 19 women with BDD, 21 women with BN and 21 female HCs. Participants were recruited from the community through newspaper announcements and flyers. Participants received €5 for study participation.

Eligibility criteria for all groups were age 18 or older, female gender and normal or corrected to normal vision. We only included BDD participants with primary facial concern. Exclusion criteria were a current or lifetime diagnosis of BN for the BDD group, a current or lifetime diagnosis of BDD for the BN group, and a current or lifetime diagnosis of any mental disorder for the HC group.

Differences in viewing behavior between male and female participants were found in a study involving full body stimuli [18]: young women showed reduced attention to the face as compared with men. To control for such gender effects and due to the fact that BN is more frequent among females we decided to include only female participants in our study.

78 individuals signed informed consent. After the in-person diagnostic session, 8 individuals were excluded for the following reasons: a) subthreshold BDD/BN (n = 3), b) current/lifetime BN diagnosis in the BDD group (n = 1), c) current/lifetime BDD diagnosis in the BN group (n = 1), d) current/lifetime diagnosis of a mental disorder in the HC group (n = 2), e) no interest in further participation (n = 1). After the experimental session, another 9 participants were excluded due to technical difficulties during the recording and insufficient eye tracking data quality.

2.2. Measures

The Mini-DIPS [28] is a structured diagnostic interview to assess current and lifetime DSM-IV diagnoses of the most frequent clinical disorders. Interrater reliability (Cohen’s $\kappa$) is reported to range between 0.84 and 1.0.

The Body Dysmorphic Disorder Diagnostic Module (BDDDM) [29] is a semi-structured diagnostic interview to assess DSM-IV diagnostic criteria for BDD. Excellent interrater reliability (Cohen’s $\kappa = 0.96$) has been reported.

The SCID module for EDs is part of the Structured Clinical Interview for DSM-IV (SCID) [38]. It assesses DSM-IV criteria for anorexia nervosa, BN and EDs not otherwise specified. Fair agreement has been reported for the assessment of EDs (Cohen’s $\kappa = 0.61$ to 0.77) [27,39].

The Yale-Brown Obsessive Compulsive Scale Modified for BDD (BDD-YBOCS) [30] is a semi-structured interview to assess BDD symptom severity. Internal consistency was sufficient in the current sample (Cronbach’s $\alpha = 0.77$).

The Beck Depression Inventory (BDI) [3] is a widely used self-report measure to assess the severity of depression. Internal consistency was high in the current sample (Cronbach’s $\alpha = 0.93$).

The Eating Disorder Examination Questionnaire (EDE-Q) [11] is a widely used self-report measure to assess eating disorder symptomatology. Internal consistency was high for the global score and for the subscores in the current sample (Cronbach’s $\alpha = 0.89$ to 0.96).

Affect ratings were used to assess the extent of following emotions: sadness, disgust, anxiety, insecurity, tension, anger, shame, and frustration [25,34]. Participants were asked to rate the extent of each emotion on rating scales ranging from 1 (not at all) to 6 (very much).

Attractiveness ratings were used to assess the attractiveness of the own face and control faces. For each face, participants were asked to rate the attractiveness of the whole face, as well as the attractiveness of the least and most attractive facial part. Rating scales ranged from 0 (very unattractive) to 10 (very attractive) [22].

2.3. Procedure

After a telephone screening, eligible participants were invited to an in-person diagnostic session during which the following interviews were conducted: Mini-DIPS, BDDDM, SCID module for EDs, and BDD-YBOCS. Before the diagnostic session, participants were informed about the study procedures, which were reviewed and approved by the local institutional ethics committee.

Photographs were taken of participants’ faces by a professional photographer. Participants were instructed to pose with a neutral expression and without make-up, jewellery or any fashion accessories. Background and lighting conditions were standardized. Photographs were taken from the front as well as side views and equalized for color, brightness and contrast. While photographs were being prepared, participants completed the questionnaires.

Participants then attended the experimental session involving the eye tracking task. After calibration of the eye tracker, participants viewed 3 pictures of their own face (front view and both side views) and 30 pictures of other female faces (5 attractive and 5 unattractive faces, each from front and side views) on a computer screen. Each picture was presented for 10 s followed by a 2 s inter-trial interval, during
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