Scandinavian Journal of Psychology, 2024 DOI: 10.1111/sjop.13043

Empirical Article

The nature and functions of appearance-related comparisons in body dysmorphic disorder

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Turner, M. A., Veale, D. & Anson, M. (2024). The nature and functions of appearance-related comparisons in body dysmorphic disorder. *Scandinavian Journal of Psychology.*

Appearance-related comparisons (A-RCs) in body dysmorphic disorder (BDD) are under researched despite their probable role in disorder maintenance. The present study therefore aimed to explore the nature (frequency, direction and automaticity), and functions of A-RCs in BDD. $N = 43$ including people with BDD ($n = 23$) and controls ($n = 20$) matched approximately on age and sex were recruited. A mixture of standardized and devised questionnaires on body image and A-RCs were completed. A-RCs were significantly more frequent, generally more upward (to more attractive standards of comparison), and more automatic in people with BDD relative to the control group. People with BDD also held significantly stronger agreement with beliefs about A-RCs as serving functions of: self-evaluation, self-improvement, self-enhancement, and in particular, self-loathing (a way to confirm beliefs about physical unattractiveness) and social threat management. This research presents evidence that the nature and functions of A-RCs in BDD have a role in this disorder's maintenance. Clinical implications, limitations, and future directions for research are discussed.

Key words: Body dysmorphic disorder (BDD), functions, appearance-related comparisons (A-RCS).

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INTRODUCTION

Body dysmorphic disorder

Body dysmorphic disorder (BDD) is defined as a preoccupation with one or more perceived defects or flaws in physical appearance that are not observable or appear slight to others, with associated repetitive behaviors or mental acts. The preoccupation causes clinically significant distress or impairment in functioning and must not be better explained by symptoms of an eating disorder (American Psychiatric Association, 2000). Parts of the face and head are the most commonly reported sources of preoccupation (Phillips, McElroy, Keck, Pope & Hudson, 1993). It has been posited that a felt impression of a distorted mental image of appearance is central to this disorder driving cognitive and behavioral maintenance factors (Veale & Neziroglu, 2010).

Appearance-related comparisons

A behavior often reported in BDD is that of comparing one's own physical appearance to that of others (Anson, Veale & Miles, 2015) herein referred to as appearance-related comparisons (A-RCs). Indeed, a lifetime history of A-RCs has been reported in over 93% of participants with BDD (Phillips, Menard & Fay, 2006). They are an example of what Festinger (1954) called a social comparison process and it has been posited that they involve a frame of reference integrating a mental representation of one's own appearance with that of one or more other people selected as a comparison standard (Morina, 2021). Anson *et al.* (2015) found more frequent A-RCs in BDD than in controls. This study also found more frequent A-RCs in BDD for the specific feature(s) of appearance that participants were most concerned about as compared to overall appearance, while controls showed the opposite pattern. This study also found that A-RCs in BDD increased with the attractiveness of the selected comparison standard. These authors also found that those with BDD rated themselves as markedly less attractive than selected comparison standards and felt much less satisfied with their appearance after comparing. However, their study is the only one so far examining A-RCs in BDD which are purported to maintain negative appraisals of appearance in this disorder (Veale, 2004). Replication of initial findings on the nature of A-RCs in BDD in terms of their frequency and to what comparison standards of attractiveness is therefore warranted.

Frequency of A-RCs. Festinger's (1954) theory proposed that in the general population social comparison would be less frequent when the selected comparison standards were judged as significantly discrepant from oneself in terms of an ability or opinion. However, he proposed that exceptions would apply when the domain was perceived as important. Therefore, given the idealized values attached to physical appearance in BDD (Veale, 2002) and initial findings by Anson *et al.* (2015) we expected to replicate a higher frequency of A-RCs in BDD relative to controls. Furthermore, the frequency of A-RCs was expected to differ between BDD and controls according to the attractiveness of comparison standards selected, referred to as their direction.

Direction of A-RCs. A-RCs, like social comparisons more generally (Gibbons & Buunk, 1999), can place the self in better or worse perceived standing relative to the selected standard of comparison. People with body image concerns are purported to choose inappropriate comparison standards with unrealistic ideals (Thompson, Heinberg, Altabe & Tantleff-Dunn, 1999) and so appear to be more likely to make upward A-RCs that are inherently aversive (Morina, McCarthy, Meyer & Schlechter, 2023). Evidence also suggests that people with BDD have a selective attentional bias for looking at the facial area that they perceive to be defective in themselves during observations of unfamiliar faces (Grocholewski, Kliem & Heinrichs, 2012) which may be central to forming an upward A-RC. People with BDD were therefore expected to report making more upward A-RCs relative to a control group, in keeping with Anson *et al.* (2015). Furthermore, given that more frequent repetitions of A-RCs were expected in BDD relative to controls, it made sense to investigate if they were also relatively more automatic in this disorder.

Automaticity of A-RCs. Research has also shown that A-RCs can take place without awareness and non-deliberately as automatic processes resulting in more body dissatisfaction than when A-RCs are engaged in more explicitly (Want, 2009). Higher frequencies of more automatic A-RCs might therefore be expected in people with BDD relative to a control group. However, for a more comprehensive understanding of what drives this behavior further extending investigation to the functions of A-RCs in BDD is necessary.

Functions of A-RCs. There is currently no published data on the functions of A-RCs in BDD although extant literature on comparing highlights that they may be driven by several key self-motives (e.g., Morina, 2021). One possibility is that they serve as a means of self-evaluation (Festinger, 1954), perhaps for ascertaining social ranking (e.g., Allan & Gilbert, 1995). Rosen (1995) suggested that A-RCs in BDD serve a function of reassurance-seeking about the person's perceived defect. However, this is likely to be counterproductive (e.g., Salkovskis, 1999).

In keeping with social comparisons more generally, other possible functions of A-RCs include attempts at self-improvement and self-enhancement (Gibbons & Buunk, 1999). A self-enhancement function of A-RCs in BDD might involve unhelpful attempts at trying to satisfy internal feeling-based criteria similar to in compulsive mirror-gazing (Baldock, Anson & Veale, 2012). It is also interesting that a self-evaluation function in comparing appears to increase body-focused anxiety whereas a self-improvement function does not (Halliwell & Dittmar, 2005). Some functions of A-RCs might therefore have a larger role than others in BDD due to their tendency to trigger more anxiety about physical appearance. For example, Veale & Gilbert (2014) proposed that A-RCs in BDD are likely to function as a means of managing perceived threat through monitoring and social avoidance, with unintended consequences that maintain BDD phenomena.

The present study had the primary aim of investigating the nature (frequency, direction and automaticity), and functions of A-RCs in BDD as a way of exploring replication and extension of Anson *et al.* (2015). The first hypothesis (Hypothesis 1) was that A-RCs in BDD would be more frequent and generally more upward (to more attractive standards of comparison) as well as more automatic relative to the control group. There was no hypothesis regarding the functions of A-RCs although there was an interest in which of the studied functions would emerge as particularly important in BDD.

METHODS

Participants

Participants comprised 23 individuals with BDD (13 men), and 20 controls (10 men). BDD participants were recruited from two UK National Health Service (NHS) sites and an independent hospital in the UK. Participants with BDD included six outpatients, two inpatients, nine people attending a BDD support group, five people recruited from advertisements on websites, and one individual previously assessed and treated at one of the NHS sites as an inpatient. Participants had a mean age of 32.11 years (8.28). People with BDD were diagnosed using DSM-IV criteria (APA, 2000).

Inclusion criteria for people with BDD included the presence of a face, hair, or head-related concern (visible from anterior view),[1] a Yale–Brown obsessive compulsive scale modified for BDD (BDD-YBOCS) score equal to or above 24 (Phillips, Hollander, Rasmussen, Aronowitz, DeCaria & Goodman, 1997), and BDD being reported as their primary diagnosis/most distressing current mental health concern. Exclusion criteria included any current co-morbidity with eating disorders, psychosis, substance use disorders, or borderline personality disorder, so that study of body image disturbance was confined to BDD.

Nineteen (82.6%) BDD participants reported that their face, head hair, or head-related concern was the area/feature of their body that they found the most disturbing. Four (17.4%) reported that their face, head hair, or head-related concern was secondary to some other reported area/feature of concern. These areas/features of concern were the skin (n = 3), and the knees (n = 1). The mean age of onset of BDD was 15.30 years (4.92). Nine (39.1%) BDD participants reported being currently prescribed psychotropic medication, six (26.1%) reported having been on medication in the past and eight (34.8%) reported never having been on medication for mental health.

Controls were recruited from a database managed by the Institute of Psychiatry Psychology and Neuroscience (n = 5), a circular email sent to King's College London staff (n = 11) and convenience sampling (n = 4). Controls had a mean age of 30.98 years (7.33). Exclusion criteria for controls included all axis 1 current mental health problems, borderline personality disorder, and histories of psychosis, major depression, BDD, eating disorders and substance use disorders. Those working as academics, researchers or clinical staff or studying in the fields of science, medicine, or psychology were also excluded.

Inclusion criteria for all participants were being at least 18 years of age and being able to understand the materials and instructions used in the study. The controls were approximately matched to the group of people with BDD according to both age and sex.

Measures

Screening. The psychiatric diagnostic screening questionnaire (PDSQ; Zimmerman & Mattia, 2001a, 2001b) is a self-report questionnaire with 125 items allowing screening of 13 DSM-IV axis 1 psychiatric disorders, from five areas most frequently found in outpatient mental health settings in addition to a six-item psychosis screen. The measure was used to ascertain if BDD was the primary disorder in the clinical group. It was also used to screen the control group for axis 1 disorders. The PDSQ has good to excellent levels of reliability and validity in psychiatric outpatients (Zimmerman & Mattia, 2001a).

The body dysmorphic disorder questionnaire (BDDQ) is a brief self-report screening questionnaire for BDD (Phillips, 1996). The measure was used to ensure that controls did not have BDD. It was also used to ascertain features of appearance concern in people with BDD. The BDDQ has been shown to have a sensitivity of 100% and a specificity of at least 89% (Grant, Kim & Crow, 2001; Phillips, Atala & Pope, 1995).

The borderline personality disorder (BPD) section of the structured clinical interview for DSM-IV axis II personality disorders (SCID II, version 2.0; First, Spitzer, Gibbon, Williams & Benjamin, 1994) was used to screen all participants for BPD.

Brief separate questionnaires for people with BDD and controls included further screening questions regarding mental health. For the control group, questions to exclude participants with previous episodes of psychosis, major depressive disorder, bulimia/binge-eating disorder, anorexia nervosa (AN), BDD, and substance use disorders were used. A question to assist with the exclusion of participants with a current episode of AN was included on this questionnaire for all participants.

Demographics. The questionnaires mentioned in the mental health history section above also included items collecting general demographic details.

Measures of BDD. The following measures of BDD were used: to obtain BDD history a brief researcher-administered BDD history interview was conducted with the participants with BDD. The purpose was to gather information regarding the features/areas of body concern, including the feature experienced as the most disturbing, as well as the onset of the disorder, including the age and background to the onset. The interview also collected information about service contact and treatment received. A copy of this interview is available in Appendix S3.

For BDD symptom severity, the BDD-YBOCS, a 12-item semi-structured, clinician-administered measure, which is based on the Yale–Brown obsessive compulsive scale (Phillips *et al*., 1997; Y-BOCS; Goodman, Price, Rasmussen, *et al*., 1989a; Goodman, Price, Rasmussen, *et al*., 1989b) was used. It assesses the severity of BDD symptoms over the past week covering preoccupations (items 1–5), compulsive behaviors (items 6–10), insight (item 11), and avoidance behaviors (item 12). Each item uses a scale from 0 to 4. Higher scores indicate a greater extent of BDD symptomatology. The total score ranges from 0 to 48. The BDD-YBOCS was included to assess the severity of BDD. The BDD-YBOCS has been reported to have adequate inter-rater reliability, good test–retest reliability, and good internal consistency (Phillips *et al*., 1997). The scale has also demonstrated acceptable convergent and discriminant validity (Phillips *et al*., 1997). In the present study, the BDD-YBOCS for the BDD group showed a good level of internal consistency (Cronbach's $\alpha = 0.70$).

Anxiety and depression. The hospital anxiety and depression scale (HADS; Zigmond & Snaith, 1983) is a widely used 14-item self-report measure with subscales assessing depression (HADS-D) and anxiety (HADS-A) symptom severity over the past week. Each item uses a four-point scale from 0 (*not at all*) to 3 (*most of the time*). Total scores for each subscale range from 0 to 21. Higher scores indicate a greater extent of anxiety and depression. The scale was used to measure anxiety and depression symptoms in people with BDD and the control group. The HADS had acceptable reliability in a large non-clinical adult sample (Crawford, Henry, Crombie & Taylor, 2001). The internal consistencies in the current sample were as follows: Cronbach's alpha = 0.92 (BDD: $\alpha = 0.79$; controls: $\alpha = 0.70$) for anxiety; $\alpha = 0.87$ (BDD: $\alpha = 0.71$; controls: $\alpha = 0.59$) for depression.

Body image. The multidimensional body-self relations questionnaire – appearance scales (MBSRQ-AS; Cash, 2000) is a 34 item standardized self-report questionnaire measuring the cognitive, affective, and behavioral components of an individual's body image. The MBSRQ-AS has five subscales: appearance evaluation (AE); appearance orientation (AO; relating to investment in, and importance attached to appearance); body areas satisfaction scale (BASS); overweight preoccupation (OWP); and self-classified weight (SCW). Participants respond to item statements using a 5 point scale from 1 (*definitely disagree*/*very dissatisfied*) to 5 (*definitely agree*/*very satisfied*) depending on the item. Subscale scores are calculated by dividing the sub-total by the number of subscale items, with the scores ranging from 1 to 5. The MBSRQ-AS was used to measure body image attitudes in people with BDD relative to the control group. The MBSRQ-AS (Cash, 2000) has been found to have adequate psychometric properties with various samples for these subscales (Brown, Cash & Mikulka, 1990). The subscales have been found to have acceptable levels of internal consistency and test–retest reliability, and the full scale has demonstrated high levels of convergent, discriminant and construct validity (Cash, 2000; Cash, Counts, Hangen & Huffine, 1989). The internal consistencies (Cronbach's alpha) in the current sample, for each subscale, were as follows: AE, $\alpha = 0.92$ (BDD: $\alpha = 0.81$; controls: $\alpha = 0.78$); AO, $\alpha = 0.89$ (BDD: $\alpha = 0.86$; controls: $\alpha = 0.82$); BASS, $\alpha = 0.86$ (BDD: $\alpha = 0.80$; controls: $\alpha = 0.62$); OWP, $\alpha = 0.71$ (BDD: $\alpha = 0.70$; controls: $\alpha = 0.70$); SCW, $\alpha = 0.76$ (BDD: $\alpha = 0.72$; controls: $\alpha = 0.82$).

The body comparison scale (BCS; Fisher & Thompson, 1998) was used to look at the frequency of A-RCs in people with BDD relative to the control group. The BCS is a 36-item self-report questionnaire assessing the frequency of A-RCs to same-sex individuals. Each item uses a five-point scale from 1 (*never*) to 5 (*always*). The first 25 items require responses for comparisons of specific body sites to the same body sites of same-sex individuals. The last 11 items require responses regarding general tendencies to engage in various specified A-RCs. The total score ranges from 36 to 180. The scale was found to have good internal consistency (Fisher & Thompson, 1998). The internal consistency in the current sample was Cronbach's alpha = 0.93 (BDD: $\alpha = 0.92$; controls: $\alpha = 0.92$).

The physical appearance-related comparisons scale (PA-RCS) is a measure that was devised for the present study to further test its main hypothesis about the nature (frequency, direction, and automaticity) of A-RCs. A copy of the PA-RCS is available in Appendix S4. The PA-RCS has nine items that ask about A-RCs to same-sex others divided across four sections. Section 1 includes two items asking about the frequency of A-RCs in terms of overall physical appearance and the specific facial or body features of most concern. Section 2 includes three questions asking about the frequency of A-RCs to those perceived as physically attractive, average, and unattractive, in order to cover both upwards and downwards comparisons that are aversive and appetitive, respectively. Section 3 includes a question asking how participants generally rate/judge the physical attractiveness of others in comparison to their own to cover perceived discrepancy in A-RCs. The second question in section 3 asks how satisfied participants generally are with their own physical appearance after comparing to that of others to cover an engendered affect of A-RCs. The items in sections 1 to 3 were based on the questionnaire developed by Anson *et al*. (2015) and are consistent with a new assessment measure of A-RCs (Morina *et al*., 2023). Section 4 includes two questions asking about the frequency of automatic comparing.

Each item in the PA-RCS uses a scale from 0% (*none of the time/ much less attractive than me/ much less satisfied*) to 100% (*all of the time/ much more attractive than me/ much more satisfied*). Item 7 regarding satisfaction after comparing was reversed for analyses due to its direction of anchor wording contrasting to all other items of the measure. The total score was calculated as an average of its nine items. The internal consistency of the PA-RCS in the current sample, was Cronbach's alpha = 0.94 (BDD: $\alpha = 0.85$; controls: $\alpha = 0.92$). Indication of adequate concurrent validity for the PA-RCS was found in a significant correlation with the BCS ($r = 0.52$, $p < 0.001$, 2-sided).

The beliefs about appearance-related comparisons subscales (BA-RCS) measure was newly devised based on empirical evidence and theory on comparing and BDD, together with experiences of working clinically with people with BDD. Adapted items from the mirror questionnaire (Veale & Riley, 2001) were incorporated. The aim of the measure was to explore the functions of A-RCs in BDD. A copy of the BA-RCS is available in Appendix S2. Twenty items were generated relating to plausible beliefs about the functions of A-RCs. Each item used a scale from 0% (*no agreement*) to 100% (*complete agreement*). The items fit into five subscales. Subscale 1 outlined A-RCs as *comparing to check/verify for*

self-evaluation (Festinger, 1954). Subscale 2 outlined A-RCs as *comparing to put something right through self-improvement* (Halliwell & Dittmar, 2005). Subscale 3 covered the use of *comparing to put something right through self-enhancement* (e.g., Franzoi, Vasquez, Sparapani, Frost, Martin & Aebly, 2012). Subscale 4 was called *comparing as self-loathing* (a way to confirm beliefs about physical unattractiveness). This subscale was developed from the theory that A-RCs in people with BDD involve fewer attempts to disconfirm negative beliefs about their own physical appearance resulting from their selective attentional bias for looking at the facial area that they perceive to be defective in themselves during observations of others' faces (Grocholewski *et al*., 2012). This function is also in keeping with research on self-directed emotions such as disgust and anger in BDD (Veale & Gilbert, 2014).

Subscale 5 was *comparing as social threat management* in keeping with functions proposed by Veale & Gilbert (2014). It was produced to tap into the possibility that people with BDD use A-RCs to manage social-evaluative anxieties (e.g., Anson, Veale & De Silva, 2012) by informing and regulating their camouflaging, checking and avoidance behaviors, similar to in their mirror-gazing (Veale & Riley, 2001).

Each subscale had four items and was scored using their mean (i.e., with a maximum of 100). Higher scores indicate a greater extent of agreement with the corresponding belief about the function of A-RCs. After conducting reliability analysis, one item (Item 6) was excluded from the analysis due to poor correlation with the other scale items. The internal consistency of the BA-RCS in the current sample, excluding item 6, was Cronbach's alpha = 0.94 (BDD: $\alpha = 0.89$; controls: $\alpha = 0.91$).

Procedure

The following measures were first administered in person: BDD history (people with BDD only); general details form; PDSQ; SCID-II (BPD section only); and BDD – YBOCS (people with BDD only). The following battery of self-completion measures was then administered: HADS; MBSRQ-AS; BCS; PA-RCS and BA-RCS. All participants received monetary compensation for their participation. A NHS National Research Ethics Committee (London – Camberwell St Giles) and Research and Development at the Institute of Psychiatry, Psychology, and Neuroscience gave approval of this research.

Analysis

The distribution of data was assessed to test if assumptions of normality inherent to parametric statistical tests were met. For each analysis the deviation of the data from normality (using the Shapiro–Wilk test) and homogeneity of variance (standard deviations not >2:1 between groups; Howell, 2002) were tested in addition to assessing for case outliers given that they can be misleading in data analyses (Osborne & Overbay, 2004). Outliers were defined as scores above and below 2 and −2 on de-trended normal Q-Q plots, respectively. Where data did not meet all of the above assumptions transformations were not conducted, as this is not considered a useful approach by all (Glass, Peckham & Sanders, 1972). Before using the Pearson chi-square (χ^2) test a minimum expected cell frequency of >5 was assessed. Choice of statistical tests for the analysis were therefore made based on results of this data screening plan and consistency for the overall dataset. Exact probability values are reported. Alpha adjustments were not made.

RESULTS

Distribution of data

Between groups (BDD, controls) analyses showed that the large majority of data did not meet data screening criteria and so non-parametric analyses were used. For purposes of consistency in data analysis, the AE subscale of the MBSRQ-AS, the total score of the PA-RCS, and the self-enhancement and self-improvement subscales of the BA-RCS were also analyzed using non-parametric analyses even though data screening criteria had been met.

For data from the PA-RCS, data screening criteria were met for the use of a mixed (2 × 3) analysis of variance (ANOVA) with participant group (BDD, controls) as the between groups factor and attractiveness of selected comparison standards (unattractive, average, attractive) as the within groups factor. Data screening criteria were also met for post hoc one-way repeated measures ANOVAs used when testing the hypothesis regarding the direction of A-RCs for each group. Mauchly's test of sphericity was not significant and the Greenhouse–Geisser epsilon score was above 0.7 suggesting that the sphericity assumptions of the repeated measurement ANOVA were fulfilled (Howell, 2002). Sphericity assumptions were violated only for the control group's one-way repeated measures ANOVA and so a Greenhouse–Geisser correction was used in that analysis.

The χ^2 test could be used in testing for associations between the categorically defined demographic details and participant group (BDD, controls) because the minimum expected cell frequency of >5 assumption of this test was not violated in any instance.

Demographics

Demographic details of the people with BDD and the control group are shown in Table 1. The groups did not differ significantly in terms of gender (χ^2 [1] = 0.18, $p = 0.764$, exact, 2 sided, Cramer's $V = 0.07$), age ($U = 214.50$, $P = 0.713$, exact, 2-sided, $d = -0.16$), marital status (single vs. relationship) (χ^2 [1] = 1.69, $p = 0.219$, exact, 2 sided, Cramer's $V = 0.20$), ethnicity (white, non-white) (χ^2 [1] = 0.49, $P = 0.53$, exact, 2 sided, Cramer's $V = 0.11$) or occupation (employed vs. unemployed) (χ^2 [1] = 8.67, $p = 0.004$, exact, 2 sided, Cramer's $V = 0.45$). There was however a trend towards significance for the BDD group to be educated to a less high level than the control group (non-degree, degree) (χ^2 [1] = 4.74, $p = 0.056$, exact, 2 sided, Cramer's $V = 0.33$).

Mental health and body image

Data on both mental health and body image for people with BDD and the control group are shown in Table 2.

BDD symptom severity. The BDD group reported a mean score of 33.74 (*SD*: 5.01) on the BDD-YBOCS in keeping with a moderate level of severity (Phillips *et al*., 1997).

Anxiety and depression. The BDD group had significantly higher levels of depression and anxiety compared to the control group according to the HADS.

Body image attitudes. The BDD group had significantly lower appearance-evaluations and satisfaction with discrete aspects of appearance relative to the control group according to the AE and BASS subscales of the MBSRQ-AS, respectively. The BDD group had a significantly greater investment in their appearance relative to the control group according to the AO subscale of the MBSRQ-AS. In contrast, there was no significant difference in

Table 1. *Demographic details as a function of participant group*

	BDD		Controls	
	n (%)		*n* (%)	
Gender				
Male	13 (56.5)		10 (50.0)	
Female	10 (43.5)		10 (50.0)	
Marital status				
Single	17 (73.9)		11 (55.0)	
Single (never married)	15 (65.2)		11 (55.0)	
Separated/divorced	2 (8.7)		0 (0.0)	
Relationship	6 (26.1)		9 (45.0)	
Married	1 (4.3)		4 (20.0)	
Cohabiting/living together	2 (8.7)		4 (20.0)	
Other	3 (13.0)		1 (5.0)	
Ethnicity				
White (European/Anglo-American)	15 (65.2)		15 (75.0)	
Non-white	8 (34.8)		5 (25.0)	
Black – Caribbean	1 (4.3)		0 (0.0)	
Black – African	0 (0.0)		1 (5.0)	
South Asian	3 (13.0)		0 (0.0)	
East Asian	0 (0.0)		0 (0.0)	
Hispanic	0 (0.0)		1 (5.0)	
Other	4 (17.4)		3 (15.0)	
Occupation				
Employed	11 (47.8)		18 (90.0)	
Job	9 (39.1)		15 (75.0)	
Student	2 (8.7)		3 (15.0)	
Unemployed	12 (52.2)		2 (10.0)	
Education				
Non degree	12 (52.2)		4 (20.0)	
Primary	1 (4.3)		1 (5.0)	
Secondary	1 (4.3)		0 (0.0)	
O-levels/GCSEs	1 (4.3)		0 (0.0)	
A-levels (or equivalents)	7 (30.4)		2 (10.0)	
Tertiary (non-degree)	2 (8.7)		0 (0.0)	
Other	0 (0.0)		1 (5.0)	
Degree	11 (47.8)		16 (80.0)	
Tertiary (degree level)	8 (34.8)		10 (50.0)	
Postgraduate	3 (13.0)		6 (30.0)	
	M	*SD*	*M*	*SD*
Age				
Years	32.11	8.28	30.98	7.33

Note: BDD = body dysmorphic disorder; *n* = number; *M* = mean; *SD* = standard deviation.

Table 2. *Mental health and body image data as a function of participant group*

	BDD	Controls	Group[a]		
	Median	Median	*U*	*r*	*P*
HADS					
HADS – D	10.00	1.00	6.00	0.80	<0.001
HADS – A	12.00	2.00	7.00	0.81	<0.001
MBSRQ-AS					
Appearance evaluation	1.86	3.71	8.50	0.83	<0.001
Appearance orientation	4.33	3.08	80.00	0.55	<0.001
Body areas satisfaction	2.33	3.67	49.00	0.50	<0.001
Overweight preoccupation	2.00	1.75	187.00	0.15	0.298
Self-classified weight	3.00	3.00	262.00	0.19	0.414

Notes: BDD = body dysmorphic disorder; HADS = hospital anxiety and depression scale; HADS –D = depression subscale (range: 0–21); HADS – A = anxiety subscale (range: 0–21); MBSRQ-AS = multidimensional body-self relations questionnaire – appearance subscales, range: 1–5 each.
[a]A Mann–Whitney was performed.

preoccupation with becoming overweight or in perceptions of actual weight between the BDD group and the control group according to the overweight preoccupation and self-classified weight subscales of the MBSRQ-AS, respectively.

Appearance-related comparisons

Data on social comparing for people with BDD and the control group are shown in Table 3.

The frequency, direction and automaticity of A-RCs in BDD. On the BCS, the BDD group reported a significantly higher frequency of body comparisons to other individuals of the same sex relative to the control group. The BDD group also reported a significantly higher frequency of A-RCs in terms of both overall appearance and the specific facial or body features that they are most concerned about to others of the same sex relative to the control group on the PA-RCS. These findings were in keeping with Hypothesis 1.

On the PA-RCS, the results of the attractiveness of selected comparison standards (direction of A-RCs) in people with BDD and the control group are shown in Fig. 1. A two-way participant group (people with BDD, control group) × attractiveness of selected comparison standards (unattractive, average, attractive) mixed ANOVA showed that there was a significant main effect of the participant group ($F[1, 41] = 23.25$, $p < 0.001$, $\eta_p^2 = 0.36$). There was also a significant main effect of attractiveness of selected comparison standards ($F[2, 82] = 10.04$, $p < 0.001$, $\eta_p^2 = 0.20$), and a significant interaction effect between participant group and attractiveness of selected comparison standards ($F[2, 82] = 3.08$, $p = 0.051$, $\eta_p^2 = 0.07$).

The interaction was investigated further with one-way (attractiveness of selected comparison standards (unattractive, average, attractive) repeated measures ANOVA post hoc analyses for each participant group. For people with BDD there was a significant main effect of attractiveness of selected comparison standards ($F[2, 44] = 8.35$, $p < 0.001$, $\eta_p^2 = 0.28$). Pairwise comparison contrasts showed that this effect was driven by a significantly lower frequency of body comparisons to unattractive selected comparison standards relative to both average and attractive selected comparison standards in people with BDD ($p = 0.03$; $p = 0.005$, respectively). Frequencies of body comparisons to average and attractive selected comparison standards were not significantly different in people with BDD ($P = 0.746$). For the control group the main effect of attractiveness of selected comparison standards was not significant ($F[1.37, 26.01] = 2.82$, $p = 0.094$, $\eta_p^2 = 0.129$). These findings were in keeping with Hypothesis 1.

Furthermore, the PA-RCS showed that the BDD group, in contrast to controls, generally rated/judged the physical attractiveness of others of the same sex (*in general*) with a significantly higher level of physical attractiveness compared to their own physical attractiveness.

Table 3. *Appearance – related comparisons data as a function of participant group*

	BDD		Controls		Group[a]		
	Median		Median		*U*	*r*	*P*
BCS							
Total	91.00		67.00		103.00	0.47	0.002
PA-RCS							
Total scale	76.72		28.86		30.00	0.75	<0.001
Comparison of overall appearance	80.00		37.25		49.50	0.67	<0.001
Comparison of specific features	92.50		22.50		30.50	0.77	<0.001
	M	*SD*	*M*	*SD*			
Comparison to attractive others	77.41	27.31	34.25	25.53	–	–	–
Comparison to average others	70.83	29.51	29.90	24.07	–	–	–
Comparison to unattractive others	51.48	38.44	26.05	23.52	–	–	–
Physical attractiveness rating of other compared to own physical attractiveness	90.50		47.00		33.50	0.76	<0.001
Satisfaction after comparing	87.50		50.00		31.50	0.79	<0.001
Comparing without at first realizing	75.00		19.25		75.50	0.58	<0.001
Automatic comparing without clear aim	70.00		19.75		79.50	0.56	<0.001
BA-RCS							
Total Scale	63.16		24.22		38.00	0.72	<0.001
Comparing to check/verify for self-evaluation	73.63		33.31		47.00	0.68	<0.001
Comparing to put something right through self- improvement	60.00		32.50		131.00	0.38	0.015
Comparing to put something right through self-enhancement	62.5		41.56		148.00	0.24	0.046
Comparing as self-loathing	74.00		8.88		18.00	0.77	<0.001
Comparing as threat management	59.88		10.00		36.50	0.71	<0.001

Notes: BDD = body dysmorphic disorder; BCS = body comparison scale, (range: 36–180); PA-RCS = physical appearance-related comparisons scale, (item range: 0–100); BA-RCS = beliefs about appearance-related comparisons subscales, (range: 0–100).
[a]A Mann–Whitney was performed.

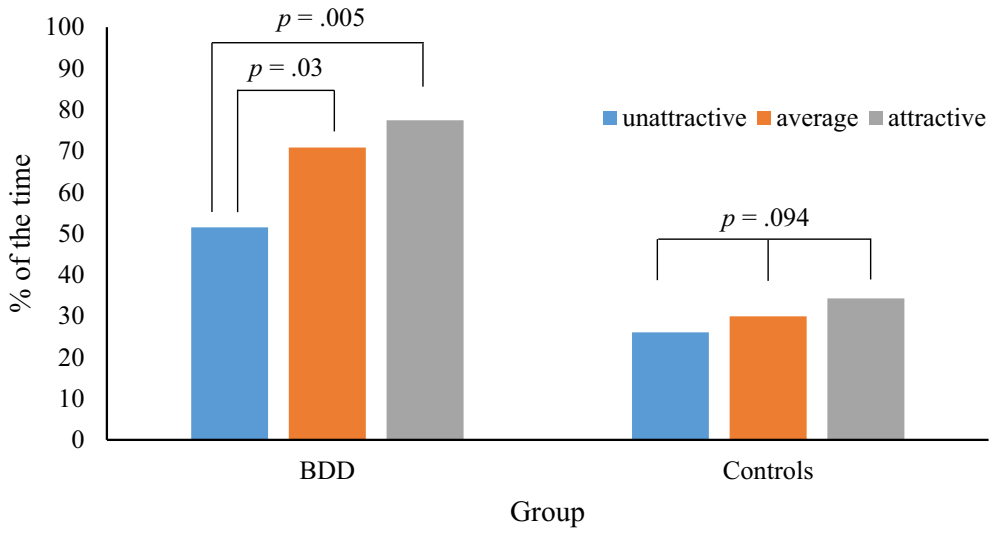

Fig. 1. The attractiveness of selected comparison standards (direction of A-RCs) in people with BDD and controls. BDD = body dysmorphic disorder.

The BDD group reported finding themselves both comparing their physical appearance to someone of the same sex for a while without at first realizing, and comparing their physical appearance to someone of the same sex automatically without a clear aim, significantly more frequently than controls. These results from the PA-RCS again supported Hypothesis 1.

Beliefs about the functions of A-RCs. On the BA-RCS the BDD group, relative to the control group, reported significantly stronger agreement with items indicating that A-RCs are a means of the following: checking or verifying for self-evaluation; putting something right through self-improvement and self-enhancement; and in particular self-loathing and social threat management, based on a comparison of effect sizes.

DISCUSSION

The present research had the aim of investigating the nature (frequency, direction and automaticity), and functions of A-RCs in BDD as a way of exploring replication and extension of Anson

et al. (2015). It is the first published study to investigate the functions of A-RCs in BDD. A mixture of devised and established measures was used to address this aim.

Confirming the hypothesis, A-RCs in BDD were found to be more frequent, generally more upward (to more attractive standards of comparison), and more automatic relative to the control group. Differences between groups were also found regarding the functions of A-RCs. The BDD group endorsed items indicating that A-RCs are a means of self-evaluation, self-improvement, self-enhancement, self-loathing, and social threat management, significantly more than the control group. However, effect sizes showed that the latter two functions were particularly important in BDD.

Frequency and direction of A-RCs in BDD

The higher frequency and more upward nature of A-RCs in people with BDD relative to the control group is in keeping with social comparison theory (Festinger, 1954). Indeed, it seems that appearance is so overvalued in people with BDD (Veale, 2002) that A-RCs continue at frequencies well above those found in controls, whilst simultaneously showing a more upward nature. The present study found significantly more frequent A-RCs directed to attractive and average relative to unattractive selected comparison standards in BDD. However, Anson *et al*. (2015) found significantly more frequent A-RCs directed to attractive relative to average and also average relative to unattractive selected comparison standards. Nonetheless, both studies found a more upwards nature of A-RCs in BDD relative to controls; this is consistent with both studies finding that people with BDD, in contrast to controls, tend to judge others in general as significantly more physically attractive than themselves. A-RCs in BDD are therefore more aversive and so it makes sense that the present study and Anson *et al*. (2015) corroborate in finding that people with BDD report being less satisfied with their appearance after comparing relative to controls. The more upward nature of A-RCs in people with BDD relative to controls may be driven by a choice of more inappropriate comparison standards (e.g., to unrealistic ideals) and/or by other differences in how or why they go about making their appearance comparisons. It is understanding these aspects of A-RCs that may help provide the answer to their modification and reduction of body dissatisfaction in cognitive behavioral therapy (CBT) for BDD.

Automaticity of A-RCs in BDD

The current study's finding that A-RCs are more automatic in BDD relative to controls is important as this is likely to be contributing to the higher levels of dissatisfaction with appearance after comparing has taken place (Want, 2009). Furthermore, the habitual component of negative thinking about appearance has also been found to predict body dissatisfaction over and above the negative content of such thinking (Verplanken & Tangelder, 2011). It is therefore suggested that the highly automatic nature of A-RCs in people with BDD is adding to the maintenance of their body image disturbance. Targeting the automatic nature of A-RCs in BDD using concurrent frequency monitoring may increase awareness of this behavior and in turn help reduce it in CBT.

The function of A-RCs in BDD

The present research also explored beliefs about the functions of engaging in A-RCs in BDD compared to controls. People with BDD reported significantly stronger agreement that A-RCs were a means of checking/verifying for self-evaluation relative to the control group. However, A-RCs were also found to be highly frequent in BDD and it is known that when behaviors designed for checking or reassurance-seeking are excessively repeated, ambiguity and reduced confidence in their feedback often ensues (e.g., Radomsky, Shafran, Coughtrey & Rachman, 2010). It is therefore proposed that excessive repetition of A-RCs for self-evaluative reasons in BDD will have the unintended consequence of increasing feelings of ambiguity about appearance. In turn, this is likely to generate a higher need to compare for self-evaluation and more preoccupation with appearance.

It is interesting that the BDD group endorsed A-RCs as a way to put something right through self-improvement significantly more than controls. It might be that people with BDD tend to use A-RCs to gather information about how they might attempt to alter their appearance, even though the consequences frequently include feeling less satisfied, hence perpetuating a sense that it needs to be improved. However, the effect size was relatively small for this function of A-RCs.

The present study also found that the BDD group endorsed A-RCs as a way of comparing to put something right through self-enhancement significantly more than the control group. A self-enhancement function of A-RCs in BDD may therefore be used in attempts to try and satisfy internal criteria (such as an attempt to feel right or better about appearance) feeding into an unhelpful felt impression of a distorted mental image of how people with this disorder feel they appear to others (Veale & Neziroglu, 2010). Furthermore, following Morina's (2021) general comparative model, the use of distorted imagery of the self as a mental representation integrated against such representations of others used as comparison standards in A-RCs would help explain the finding of a more upward nature of A-RCs in BDD relative to controls. However, similarly to the self-improvement function of A-RCs the effect size for the self-enhancement function was relatively small. A self-enhancement function may be more important in understanding prolonged compulsive mirror-gazing rather than A-RCs in BDD (Baldock *et al*., 2012).

The present study also found that people with BDD had significantly stronger agreement with A-RCs as a means of self-loathing relative to the control group and indeed the effect size for this difference was particularly large. People with BDD might therefore drive their preponderance of generally more upward A-RCs by engaging in self-loathing A-RCs in which they selectively attend to the body area of their own perceived defect during observations of others' faces (Grocholewski *et al*., 2012). If this were the case, it would make sense that self-loathing A-RCs would have a very strong role in maintaining unhelpful beliefs about perceived defects in BDD. This function of A-RCs is in keeping with mention of a motivation of self-scrutiny of perceived flaws for mirror-gazing in BDD (Silver & Farrants, 2016).

People with BDD also had significantly stronger agreement with items indicating that A-RCs are a means of social threat management, by informing and regulating use of safety seeking

behaviors/checking and avoidance, relative to the control group. The effect size for this result was also particularly large. It is proposed that this function of A-RCs contributes to maintaining the social-evaluative concerns that are commonly found in this disorder (Anson *et al*., 2012) due to it driving the use of a variety of behaviors that prevent the disconfirmation of threat-related cognitions (e.g., Salkovskis, 1991). It may also be because this function plays a role in the formation of appearance-based rejection sensitivity, which has been found to contribute to BDD severity (Kelly, Didie & Phillips, 2014). CBT for BDD might therefore include functional analyses of A-RCs to elicit their unhelpful functions and unintended consequences as a rationale for modification and frequency reduction.

Limitations

There are limitations of the present research related to its sample, design, and methods of measurement. The overall sample size was small and there was no clinical control group included, making it difficult to ascertain the extent to which group differences were driven by an effect of BDD symptomatology as opposed to psychopathology per se. Another limitation of the present research is its reliance on self-report. The highly automatic nature of A-RCs in BDD may have been better studied using experimental manipulation and exposure to appearance-related stimuli used as comparison standards, similar to as outlined in Want (2009).

In addition, Morina (2021) proposes that people may select one or multiple mental representations of others' appearance as a comparison standard for that of their own during comparing. The present study cannot describe the number of mental representations used in forming a comparison standard during comparing and the extent to which this may differ in BDD relative to controls.

Future directions for research

The present study suggests some important directions for future research. Using an experimental design, it would be of benefit to investigate whether manipulating the area of focus in A-RCs either to include or exclude the participant's most disturbing feature, significantly influences the appraisal of the direction of A-RCs and self-evaluated physical attractiveness. Research might also investigate the extent to which beliefs about a self-loathing function of A-RCs in BDD relates to an attentional bias for looking at the facial area perceived to be the most disturbing in themselves during A-RCs. Research might also look at how endorsement of beliefs about the functions of A-RCs as social threat management relate to in vivo reports of safety seeking behaviors, avoidance, and appearance-based rejection sensitivity.

This study represents independent research part funded by the National Institute for Health Research (NIHR) Biomedical Research Centre at South London and Maudsley NHS Foundation Trust and King's College London. The study represents independent research part funded by the National Institute for Health Research (NIHR) Biomedical Research Centre at South London and Maudsley NHS Foundation Trust and King's College London. An NHS National Research Ethics Committee (London – Camberwell St Giles) and Research and Development at the Institute of Psychiatry, Psychology, and Neuroscience gave approval of this research. All participants read information leaflets for this research approved by the ethics committee and then gave their informed consent. Data available upon request from the corresponding author.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ENDNOTE

[1] This criterion was used as the same participants took part in an unpublished experimental study that required this inclusion criterion.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article:

Appendix S1. Additional psychometric properties of the PA-RCS and BA-RCS.

Appendix S2. BA-RCS arranged in subscales.

Appendix S3. BDD history interview.

Appendix S4. PA-RCS.

Received 18 September 2023, Revised 31 March 2024, accepted 21 May 2024