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# Accepted Manuscript

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Dr. David Veale, Sarah Miles, Natasha Valiallah, Saira Butt, Martin Anson, Ertimiss Eshkevari, Lucinda J. Gledhill, Emma Baldock



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The Effect of Self-Focused Attention and Mood on Appearance

Dissatisfaction after Mirror-Gazing: An Experimental Study

David Veale <sup>1</sup>, Sarah Miles <sup>1</sup>, Natasha Valiallah <sup>2</sup>, Saira Butt <sup>2</sup>, Martin Anson <sup>1</sup>, Ertimiss Eshkevari <sup>1</sup>, Lucinda J. Gledhill <sup>1</sup>, Emma Baldock <sup>1</sup>

<sup>1</sup> The Institute of Psychiatry, Psychology and Neuroscience, King's College London and the South London and Maudsley NHS Foundation Trust, 16 De Crespigny Park, London, SE5 8AF

<sup>2</sup> King's College Medical School, King's College London Hospital, Denmark Hill, London, SE5 9RS

Correspondence: Dr. David Veale, Centre for Anxiety Disorders and Trauma, The Maudsley Hospital, 99 Denmark Hill, London, SE5 8AZ, UK.

Email: david.veale@kcl.ac.uk. Telephone: +44 203 228 2101

### Abstract

**Background and objectives:** Self-focused attention is hypothesized to be a maintenance factor in body dysmorphic disorder (BDD). The aim of this study was to use an experimental paradigm to test this hypothesis by studying the effect of self-focused attention during mirror-gazing on appearance dissatisfaction. **Methods:** An experimental group design was used, in which 173 women were randomly allocated to one of three conditions before mirror-gazing for two minutes: (a) external focus of attention, (b) self-focus of attention, and (c) self-focus of attention with a negative mood induction. **Results:** After mirror-gazing, participants across all groups rated themselves as being more dissatisfied with their appearance. In both the self-focus conditions, there was an increase in sadness from pre to post mirror gazing, and there was a significant difference in focus of attention for participants in the self-focused, mood-induced group from pre to post manipulation, suggesting mood induction had more of an effect than focus of attention. **Limitations:** (1) there was no condition involving an external focus with a negative mood induction, and (2) due to the level of information provided to patients on the nature of the task, we cannot rule out demand characteristics as an influencing factor on our results. **Conclusions:** Self-focused attention during mirror-gazing may act indirectly to increase appearance dissatisfaction via the effect of negative mood. Further studies are required to establish the relative contribution of self-focused attention and negative mood to increases in appearance dissatisfaction as a function of mirror-gazing.

**Keywords:** body dysmorphic disorder; self-focused attention; mirror gazing; mood induction

## The Effect of Self-Focused Attention and Mood on Appearance Dissatisfaction after Mirror-Gazing: An Experimental Study

People with body dysmorphic disorder (BDD) are excessively preoccupied with a perceived defect or ugliness in their appearance (American Psychiatric Association, 2013). The most common areas of preoccupation are on the face, although any part of the body may be the focus of attention, and indeed more than one feature commonly occurs (Phillips, McElroy, Keck, Pope, & Hudson, 1993; Veale, Boocock, et al., 1996). The 'flaw' is not noticeable to others, or appears only slight, yet causes enormous shame, depression, or interference in life and is associated with a high risk of suicide (Phillips, Coles, et al., 2005).

Self-focused attention is a core process in a cognitive behavioral model of BDD (Neziroglu, Khemlani-Patel, & Veale, 2008; Veale, 2004; Veale, Gournay, et al., 1996) and refers here to a preoccupation with appearance-related sensations, thoughts, images, feelings and memories and ultimately preoccupation with a (distorted) body image or 'felt sense' of how one looks (Osman, Cooper, Hackmann, & Veale, 2004). Within this model, BDD is understood in terms of an objectification of the self in aesthetic terms, whereby the individual's worth is evaluated in terms of how they look. Self-focused attention is then used to monitor and evaluate the self in these terms. The model proposes that self-focused attention may generate distortions in body image especially where internal stimuli are negative, for example involving anxious or sad feelings and memories of appearance-related teasing. The model further proposes that self-focused attention interferes with the processing of more objective and potentially corrective information from the external environment, such as visual cues from others or from what they see in their reflection. A self-focus of attention accesses one's thoughts, feelings, images and memories (that is about one's self) which may

relate to past aversive experiences of teasing or being rejected (Buhlmann, Cook, Fama, & Wilhelm, 2007; Osman et al., 2004). People with BDD may experience this form of self-focused attention more or less constantly, but the model proposes that it is likely to characterize the way in which people with BDD look in the mirror. Mirror-gazing is one of the most commonly reported repetitive behaviors in BDD (Phillips, Menard, Fay, & Weisberg, 2005) and is hypothesized to be an important maintenance factor in itself within a cognitive behavioural model of BDD (Veale, Gournay, et al., 1996). Windheim, Veale, and Anson (2011) found that BDD patients were more self-focused than healthy controls at the start and end of a mirror session, and that both groups became more self-focused over time. Further, a questionnaire study found that when people with BDD look in the mirror they report using more internal criteria (relating to internal thoughts, images and feelings) to determine when to stop gazing, whereas healthy controls use more external criteria. i.e., what they see (Baldock, Anson, & Veale, 2012). In addition, people with BDD typically feel more dissatisfied with their appearance after looking in the mirror (Veale & Riley, 2001; Windheim et al., 2011). This effect has also been observed in healthy controls as discussed below. In the current study we sought to probe the relationship between focus of attention (self-focus, versus external-focus) and the change in appearance dissatisfaction after mirror-gazing.

We know from existing mirror-gazing studies that mirror-gazing can lead to increases in appearance dissatisfaction in controls as well as in people with BDD. Baseline appearance satisfaction and selective attention for liked versus disliked parts may inform this relationship. In a study by Mulken and Jansen (2009) investigating non-clinical participants, it was the sub-sample of study participants who were dissatisfied with their appearance at baseline that experienced increases in dissatisfaction after mirror-gazing. However, Jansen et

al. (2008) found that describing the body in a neutral way during mirror exposure reduces body dissatisfaction. This process of neutral describing may assist an external focus of attention. Kollei and Martin (2014) instructed healthy controls, BDD patients, and depressed patients to look accurately at their whole bodies in the mirror and *to focus on and verbalize everything that entered their minds*. This latter instruction overlaps partially with our self-focus condition, but the process of verbalizing and the instruction to look accurately at their whole bodies relates to adopting a more external focus. They found that all participants, including healthy controls, experienced an equally strong increase in negative body-related cognitions after the mirror task. The changes specific to BDD were a lack of positive body-related cognitions and a significantly greater increase in sadness and anger.

To our knowledge, there has not to date been a study looking at the relationship between mirror-gazing and body dissatisfaction in the context of an experimental manipulation of self, versus an external focus of attention. In the present study we manipulated attention according to specific instructions to focus either internally on one's thoughts, feelings, images and memories (that is self-focus) or externally on one's reflection in the mirror as if viewed by an observer. We were additionally interested to study the contribution of negative mood. Negative mood is prevalent in BDD (Kollei & Martin, 2014) and there is evidence of a reciprocal relationship between negative mood and self-focused attention (Mor & Winkvist, 2002). Finally, negative mood itself increases body dissatisfaction (Haedt-Matt, Zalta, Forbush, & Keel, 2012). We therefore included a group who were given instructions to focus internally and who in addition had a negative mood induction to enhance the ability to access any negative thoughts and feelings.

The primary hypothesis was that mirror-gazing with self-focused attention on appearance-related thoughts, feelings, images and memories would lead to a greater increase

in appearance dissatisfaction compared to mirror-gazing with an external focus of attention in the mirror. The subsidiary hypothesis was that mirror-gazing with an internal focus of attention and a negative mood induction would lead to the greatest increase in appearance dissatisfaction between groups.

## **1. Method**

### **1.1 Design**

This was a between subjects design. Participants were randomised to one of three conditions during mirror gazing: external focus of attention; self-focused attention; and self-focused attention with a negative mood induction. The aim of the study was to compare the three conditions in terms of appearance dissatisfaction before and after mirror gazing.

### **1.2 Participants**

A convenience sample of 173 female students and staff was recruited by email and poster campaigns informing potential recruits of the aim of the study. Only female participants were recruited in order to remove sex as a confounding factor. *Inclusion criteria:* Participants were included in the study if they were: (a) female, (b) aged between 18 and 40 years old, (c) understood written English and were able to complete questionnaires. *Exclusion criteria:* Participants were excluded from the study if they had: (a) previous participation in research of a similar nature, (b) visual impairment diagnosis, (c) neurological disorder, head injury or epilepsy diagnosis, (d) learning disability diagnosis, and (e) were currently pregnant.

### **1.3 Materials**

Each participant completed the following questionnaires:

#### **(1) Demographic information**



All participants were asked their age, first language, ethnicity, marital status, and questions to screen whether or not they met the inclusion and exclusion criteria.

**(2) Multidimensional Body-Self Relations Questionnaire - Appearance Scales (MBSRQ-AS; Cash (2000))**

The MBSRQ-AS is a 34-item validated self-report scale measuring body image. We used only the Appearance Evaluation subscale (7 items) to compare the conditions at baseline. Previous studies of undergraduate females suggest mean Appearance Evaluation scores range from 2.93 (SD 0.50; Hollander, Cohen, and Simeon (1993)) to 3.17 (SD 0.82; Grøtte et al. (2015)). The Cronbach's alpha in this sample was .95.

**(3) Hospital Anxiety and Depression Rating Scales (HADS; (Zigmond & Snaith, 1983))**

This scale consists of 14 items (7 items to each subscale) that were used to compare the severity of anxiety and depression symptoms in participants in the three conditions at baseline. The total range is 0 to 21. Higher scores represent increased severity of anxiety and or depression. Cronbach's alpha for the total HADS score in this sample was .84, while for the anxiety and depression subscales it is .81 and .77 respectively.

**(4) Mirror-gazing: Cognition and Affect Rating Scale (MG-CARS; Windheim et al. (2011))**

The MG-CARS is composed of a series of visual analogue scales that consist of a horizontal line with anchor points at each end. Scales had numerical labels at each scaling point. Participants were asked to rate the item by placing a cross anywhere on the line.

The first sub-scale, Mood, contains 7 items. We used the sadness item, as a manipulation check for the mood induction ("At this moment how sad do you feel?"). The range was 0-100 where 100 represented the most sadness.

The second sub-scale, Appearance Dissatisfaction contains 3 items: (i) Degree of distress about appearance (“At this moment, how distressed are you feeling about your appearance?”). The range was 0-100, where 0 was not at all and 100 very severe distress; (ii) Dissatisfaction with appearance (“At this moment, how dissatisfied are you with your appearance?”). The range was 0-100 where 0 was not at all dissatisfied and 100 was extremely dissatisfied; (iii) Degree of attractiveness (“At this moment, how attractive do you feel?”). The range was -50 to +50 where -50 was not all physically attractive to +50 extremely physically attractive with a mid-point of 0. The scoring was reversed and converted to 0-100 so that 100 represented being unattractive.

We used a composite of all 3 items as our outcome measure for Appearance Dissatisfaction of 0-100 so that 100 represented the most dissatisfaction with one’s appearance. The Cronbach’s alpha for the Appearance Dissatisfaction scale was .79 at pre-rating and .82 at post-rating.

Lastly we used one item that measures the focus of attention (internal to external) as a manipulation check for the focus of attention induction (“At this moment, is your attention focused internally on how you *feel* or externally on what you can see and hear?”). The range was -50 to +50 where -50 represented an internal focus of attention and +50 represented an external focus of attention. The scoring was converted to 0-100 so that 100 represented the most external focus of attention.

#### **1.4 Procedure**

Participants were blindly and randomly allocated to one of three conditions by picking numbers out of an envelope. Numbers 1, 2 and 3 represented the external focus, self-focus and self-focus with negative mood induction conditions, respectively. Participants were

provided with different instructions according to the condition to which they were randomized:

(1) External focus of attention condition (EFA)

Participants were instructed to focus their attention on what they saw in the mirror as if they were looking at another person. If their attention wandered to thoughts or feelings about their self, they were told they should refocus their attention on what they “saw” in the mirror.

(2) Self focus of attention without mood induction condition (SFA)

Participants were instructed to focus their attention on what they “felt” by looking in the mirror. They were asked to focus their attention on any thoughts, feelings, images or memories that they experienced and not on what they “saw”. If their attention wandered to what they “saw”, they were told that they should refocus their attention on what they thought and felt.

(3) Self focus of attention with negative mood induction condition (SFA + mood)

Participants were instructed as above, but under a negative mood induction technique. They were asked to watch short film clip from “Shadowlands” which depicts a dying woman saying farewell to her son and husband. The clip lasts about 2 minutes. It was selected because in a previous study it provided the highest negative score on the Positive and Negative Affective Schedule (PANAS) after being viewed by 20 people without any mental disorder (Davies, Schmidt, Stahl, & Tchanturia, 2011).

All participants took part in an individual testing session, which lasted approximately 30 minutes. Upon arrival they were asked to complete all the written measures. The participants were then asked to sit in front of a dressing table mirror at a standardized distance of 40 cm. This distance was determined through a previous study (Windheim et al.,

2011) in which volunteers were asked to indicate the distance at which they would position themselves if they were checking the overall appearance of their face and hair. Participants were asked to gaze into the mirror for two and half minutes.

In order to standardize the lighting, one experimenter positioned a photographic lighting stand with reflector and a 150 Watt light bulb behind the mirror and eliminated all other sources of light in the room. A white translucent umbrella was placed in front of the light bulb to diffuse and soften the light and prevents it from shining into the participants' eyes. At the end of mirror-gazing, participants were asked to repeat the MG-CARS. Positive mood induction in the form of a validated piece of music, Delibes' Coppelias, was offered to those participants in the negative mood induction condition on completion of the experiment. This was used to counteract the effects of the negative mood previously induced.

## **2.5 Statistical Analysis**

Data were normally distributed, allowing parametric statistical analyses to be performed. Demographic variables and baseline measures were compared between conditions using ANOVAs where outcomes were continuous and Fisher's Exact tests where outcomes were categorical. Mixed 3 x 2 ANOVAs were run to investigate main effects of intervention condition and time and any significant interactions between the two for predicting outcome scores. Post hoc pairwise comparisons, both within and between groups, were used to explore any significant interactions in more depth.

## **2. Results**

### **2.1 Demographic comparisons at baseline**

Table 1 shows the comparisons of demographic variables between intervention conditions at baseline. There were no significant differences between the conditions for any

of the demographic variables, HADS-Anxiety, HADS-Depression, or MBSRQ Appearance Evaluation. The means of the questionnaires were similar to non-clinical populations.

## **2.2 Appearance Dissatisfaction**

Table 2 shows comparisons of scores between intervention conditions and pre-post mirror-gazing (time). A significant main effect of time and time by intervention was found. Post hoc pairwise comparisons revealed there was a significant difference between pre and post appearance dissatisfaction ratings. However, there was no significant main effect of intervention (group) condition on appearance dissatisfaction, with post hoc comparisons (table 3) showing that the only difference between groups was found at post intervention between the externally focused group and the self-focus mood-induced group. There was also a significant interaction effect between time and group, with further comparisons (table 6) revealing that appearance dissatisfaction ratings significantly increased from pre to post mirror gazing in the externally focused and both self-focused groups.

## **2.3 Sadness**

Table 2 also shows outcome of sadness from pre to post mirror gazing. The mixed model ANOVA revealed a significant effect of time (pre to post) on sadness, but no significant effect of group alone. Results also showed a significant interaction between time and group, with post hoc comparisons revealing that all groups rated sadness similarly at pre intervention (table 4). However, at post intervention, a significant difference was found in sadness ratings of participants in the externally-focused group and the self-focused mood-induced group, and between the two self-focused groups. Further comparisons (table 7) also showed that there was no significant difference in sadness at pre and post mirror gazing for participants in the externally focused group, however there was a significant pre-post difference in both the self-focused groups (both with and without mood induction). There

was a greater mean difference in sadness ratings from pre to post mirror gazing in participants in the mood induced self-focused group, compared to the self-focused group without mood induction, however both these groups rated themselves as significantly more sad post mirror gazing.

## **2.4 Focus of Attention**

Results of the ANOVA for focus of attention (table 2) showed a similar pattern: a significant effect of time (pre-post mirror gazing), no significant effect of group (intervention), and a significant interaction effect between time and group. Post hoc comparisons (table 5) revealed that there was a significant difference in focus of attention at pre-intervention between those in the externally focused group and those in the self-focused group without mood induction. At post intervention, this same difference was not evident, and instead a significant difference in focus of attention was found for those in the externally focused group and those in the self-focused mood-induced group, and also between participants in the two self-focused groups (both with and without mood induction). Further pairwise comparisons within groups (table 8) showed that the only group with a significant difference in focus of attention from pre- to post- mirror gazing, was the self-focused mood-induced group.

## **3. Discussion**

### **3.1 Appearance Dissatisfaction**

Our primary hypothesis was that mirror-gazing with a self-focused attention on appearance-related thoughts, feelings, images and memories would lead to a greater increase in appearance-related dissatisfaction compared to mirror-gazing with an external focus of attention on what could be seen in the mirror. However, a significant increase in appearance

dissatisfaction from pre to post mirror gazing was seen for participants in all three groups. Participants in the self-focused mood-induced group did appear to be significantly different from those in the externally focused group at post intervention however, therefore suggesting that there was a greater change in appearance dissatisfaction for subjects who experienced negative mood induction. This was not the case for participants in the self-focused group without mood induction, which might therefore suggest that negative mood is a more effective moderator of appearance dissatisfaction than self-focus of attention. Overall, then, results on appearance dissatisfaction are consistent with the notion that simply staring in the mirror may be somewhat hazardous in inducing appearance dissatisfaction, regardless of focus of attention, even for non-clinical individuals instructed to focus externally in a mirror, and even for short period of time (duration of gazing was just 2.5 minutes compared with 10 minutes in Windheim et al. (2011), 5 minutes in Kollei and Martin (2014) and 3.5 minutes in Mulkens and Jansen (2009)).

The finding that increases in appearance dissatisfaction were equally strong between the self-focused and externally focused groups in the absence of mood induction may be because the manipulation of attention was not optimal. There was no significant difference in focus of attention between the two groups post mirror-gazing.

#### **4.2 Sadness**

Both self-focused groups (with and without mood induction) rated themselves as feeling increasingly sad from pre to post mirror gazing, while those in the externally focused group did not reveal any difference in sadness after mirror gazing. This was not expected, as it had been anticipated that only the self-focused group with negative mood induction would feel significantly sadder after mirror gazing, as this was the only group whose mood had been specifically manipulated. However, the significant difference between the post-intervention

sadness of the two self-focused groups shows that the group who received negative mood induction were more sad than the group who didn't. This would therefore suggest that not only does looking at oneself in the mirror with a self-focus attention induce sadness, but that this effect is intensified when the mood of the subject is manipulated to be negative.

### **3.3 Focus of Attention**

Results suggest that the manipulation of focus of attention was not optimal, as there was only a significant difference in focus of attention from pre to post intervention for participants in the self-focused mood-induced group. If focus of attention had been optimal, we would have expected significant differences across all three groups. While evidence from the tables suggest that participants in each group did not begin the task with similar natural focus of attention (with a significant difference in focus of attention between externally focused participants and self-focused participants without mood induction at pre intervention), we would still expect a significant pre-post intervention difference in focus of attention in line with instructions given to participants. Unfortunately, this was not the case and may be even more difficult for clinical participants, who may struggle to switch their attention externally.

### **3.4 Future Research**

In terms of future designs, it might be possible to strengthen the manipulation of an external focus of attention, for example by including a training phase in which participants are instructed to attend to everyday objects in the mirror which are positioned alongside their face, and then instructing them to focus on their face in the same way – as if it is another object, for the mirror-gazing session. Another consideration is that it may be too difficult to adopt a sufficiently external focus of attention in a task that involves staring at oneself in the mirror without any other activity. An alternative study task would be to ask participants to



carry out a task in the mirror such as washing their face with face-wash, with either an internal or external focus of attention. Finally, instructing participants to describe features of their whole face neutrally (as per Kollei and Martin (2014) or as if looking at another person might help to elicit a more external focus of attention.

Consistent with the subsidiary hypothesis, the group instructed to focus internally and who were given a negative mood induction showed the greatest increases in appearance-related dissatisfaction and were significantly more dissatisfied with their appearance post mirror-gazing than either of the other two groups. They were also significantly more internally focused post mirror-gazing than either of the other two groups and the mean score was comfortably in the internal range for the scale (mean score of 34.19 / 100). These results cannot be interpreted conclusively in the absence of a fourth condition involving an external focus of attention and negative mood induction. However, this was not part of our original hypothesis as we had not anticipated that a negative mood induction would by itself increase self-focused attention. It is not possible to rule out that the differential increase in appearance dissatisfaction in this condition in an analogue population is a result of negative mood rather than self-focus of attention or an interaction between the two. It is unlikely to be necessary to induce a negative mood in a clinical population. Future study designs in analogue populations should permit testing of the independent impact of negative mood and self-focused attention as well as these hypothesized interaction effects and have a more powerful intervention in ensuring an external focus of attention.

Further research is also required to compare experimentally the impact of self and external focus of attention in a clinical sample, where a negative mood induction is unlikely to be necessary. Such a study would be especially important given that the clinical practice of

alternating between an external and self-focus of attention is often used in mirror retraining or in behavioral experiments, but has never been tested empirically.

### 3.5 Limitations

The study has some limitations. First, the absence of an external focus of attention and negative mood condition means that the differential increase in appearance dissatisfaction in participants with an internal focus and negative mood induction cannot be interpreted definitively in the present study. However, in this study we wanted to enhance the self-focus of attention in an analogue population enough for them to access any negative appearance-related images or memories.

A second limitation of the study is that even after the manipulation, participants in the external focus of attention group remained slightly internally focused and were no more externally focused than the internal group. Differential increases in appearance satisfaction between internal and external groups might have resulted if the manipulation of attention had been more successful. In addition, there is no known objective measure of self, versus external attention and we therefore relied on a self-report visual analogue scale as a manipulation check.

Previous research had indicated that watching the film was successful in inducing a depressed mood. We did not test this immediately after the film. In addition, self-focused attention led to an increase in negative mood. The mood induction amplified this negative mood so that the levels of sadness increased more over time for those who were self-focused with negative mood induction in comparison to those who were self-focused without the mood induction.

A more general limitation is that participants were women only. Finally, our participants were not debriefed at the end of the study to ask them what they thought the study was about.

#### **4.6 Conclusions**

The results of this study suggest that mirror use without a specified goal may lead to increases in appearance dissatisfaction even in non-clinical participants. This effect may be exacerbated by the adoption of self-focused attention and when there is negative mood induction. However, this requires further study to determine whether an external focus of attention and a negative mood induction will lead to appearance dissatisfaction. This research should be extended in people with BDD and to develop a clinical intervention of improving mood and reducing self-focused attention during mirror gazing.

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### References

- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition*. Washington, DC: American Psychiatric Association.
- Baldock, E., Anson, M., & Veale, D. (2012). The stopping criteria for mirror-gazing in body dysmorphic disorder. *British Journal of Clinical Psychology, 51*, 323-344.  
doi:10.1111/j.2044-8260.2012.02032.x
- Buhlmann, U., Cook, L. M., Fama, J. M., & Wilhelm, S. (2007). Perceived teasing experiences in body dysmorphic disorder. *Body Image, 4*(4), 381-385.  
doi:10.1016/j.bodyim.2007.06.004
- Cash, T. F. (2000). User's manuals for the Multidimensional Body-Self Relations Questionnaire, the Situational Inventory of Body-Image Dysphoria, and the Appearance Schemas Inventory. Available from: <http://www.body-images.com>.
- Davies, H., Schmidt, U., Stahl, D., & Tchanturia, K. (2011). Evoked facial emotional expression and emotional experience in people with anorexia nervosa. *International Journal of Eating Disorders, 44*(6), 531-539. doi:10.1002/eat.20852
- Grøtte, T., Solem, S., Vogel, P. A., Güzey, I. C., Hansen, B., & Myers, S. G. (2015). Metacognition, responsibility, and perfectionism in obsessive-compulsive disorder. *Cognitive Therapy and Research, 39*(1), 41-50. doi:10.1007/s10608-014-9635-7

- Haedt-Matt, A. A., Zalta, A. K., Forbush, K. T., & Keel, P. K. (2012). Experimental evidence that changes in mood cause changes in body dissatisfaction among undergraduate women. *Body Image*, 9(2), 216-220. doi:10.1016/j.bodyim.2011.11.004
- Hollander, E., Cohen, L. J., & Simeon, D. (1993). Body dysmorphic disorder. *Psychiatric Annals*, 23(7), 359-364.
- Jansen, A., Bollen, D., Tuschen-Caffier, B., Roefs, A., Tanghe, A., & Braet, C. (2008). Mirror exposure reduces body dissatisfaction and anxiety in obese adolescents: a pilot study. *Appetite*, 51(1), 214-217. doi:10.1016/j.appet.2008.01.011
- Kollei, I., & Martin, A. (2014). Body-related cognitions, affect and post-event processing in body dysmorphic disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, 45(1), 144-151. doi:10.1016/j.jbtep.2013.09.005
- Mor, N., & Winquist, J. (2002). Self-focused attention and negative affect: A meta-analysis. *Psychological Bulletin*, 128(4), 638-662. doi:10.1037/0033-2909.128.4.638
- Mulkens, S., & Jansen, A. (2009). Mirror gazing increases attractiveness in satisfied, but not in dissatisfied women: A model for body dysmorphic disorder? *Journal of Behavior Therapy and Experimental Psychiatry*, 40, 211-218. doi:10.1016/j.jbtep.2008.10.001
- Neziroglu, F., Khemlani-Patel, S., & Veale, D. (2008). Social learning theory and cognitive behavioral models of body dysmorphic disorder. *Body Image*, 5(1), 28-38. doi:10.1016/j.bodyim.2008.01.002
- Osman, S., Cooper, M., Hackmann, A., & Veale, D. (2004). Spontaneously occurring images and early memories in people with body dysmorphic disorder. *Memory*, 12(4), 428-436. doi:10.1080/09658210444000043

- Phillips, K. A., Coles, M., Menard, W., Yen, S., Fay, C., & Weisberg, R. B. (2005). Suicidal ideation and suicide attempts in body dysmorphic disorder. *Journal of Clinical Psychiatry*, 66 (6), 717-725.
- Phillips, K. A., McElroy, S. L., Keck, P. E., Jr., Pope, H. G., & Hudson, J. I. (1993). Body dysmorphic disorder: 30 cases of imagined ugliness. *American Journal of Psychiatry*, 150(2), 302-308.
- Phillips, K. A., Menard, W., Fay, C., & Weisberg, R. B. (2005). Demographic characteristics, phenomenology, comorbidity, and family history in 200 individuals with body dysmorphic disorder. *Psychosomatics*, 46(4), 317-325. doi:10.1176/appi.psy.46.4.317
- Veale, D. (2004). Advances in a cognitive behavioural model of body dysmorphic disorder. *Body Image*, 1(1), 113-125. doi:10.1016/s1740-1445(03)00009-3
- Veale, D., Boockock, A., Gournay, K., Dryden, W., Shah, F., Willson, R., & Walburn, J. (1996). Body dysmorphic disorder. A survey of fifty cases. *The British Journal of Psychiatry*, 169(2), 196-201. doi:10.1192/bjp.169.2.196
- Veale, D., Gournay, K., Dryden, W., Boockock, A., Shah, F., Willson, R., & Walburn, J. (1996). Body dysmorphic disorder: A cognitive behavioural model and pilot randomised controlled trial. *Behaviour Research and Therapy*, 34, 717-729. doi:10.1016/0005-7967(96)00025-3
- Veale, D., & Riley, S. (2001). Mirror, mirror on the wall, who is the ugliest of them all? The psychopathology of mirror gazing in body dysmorphic disorder. *Behaviour Research and Therapy*, 39(12), 1381-1393. doi:10.1016/S0005-7967(00)00102-9
- Windheim, K., Veale, D., & Anson, M. (2011). Mirror gazing in body dysmorphic disorder and healthy controls: Effects of duration of gazing. *Behaviour Research and Therapy*, 49(9), 555-564. doi:10.1016/j.brat.2011.05.003

Zigmond, A., & Snaith, R. P. (1983). The Hospital Depression and Anxiety Scale. *Acta Psychiatrica Scandinavica*, 67, 361-370. doi:10.1111/j.1600-0447.1983.tb09716.x



Table 1.  
Demographic comparisons between conditions at baseline

Variable	Intervention				Comparisons
	Total group	External-focus of attention	Self-focus without mood induction	Self-focus with mood induction	
<i>N</i>	173	63	54	56	
<i>Mean age (SD) in years</i>	23.45 (4.31)	23.73 (4.74)	23.63 (3.72)	22.96 (4.36)	$F(2,170) = .533, p = .588$
<i>Marital status, n (%)</i>	100 (57.8)	36 (57.1)	35 (64.8)	29 (51.8)	Fisher's Exact Test $p = .400$
Single / separated	73 (42.2)	27 (42.9)	19 (35.2)	27 (48.2)	
Married / In a relationship					
<i>Ethnicity, n (%)</i>					Fisher's Exact Test $p = .502$
White British	103 (59.5)	34 (54.0)	33 (61.1)	36 (64.3)	
Other	70 (40.5)	29 (46.0)	21 (38.9)	20 (35.7)	
<i>Mean HADS Anxiety score (SD)</i>	6.83 (3.92)	6.69 (3.99)	7.11 (4.16)	6.70 (3.65)	$F(2,170) = .205, p = .815$
<i>Mean HADS Depression score (SD)</i>	2.70 (2.77)	2.97 (3.25)	2.78 (2.60)	2.32 (2.31)	$F(2,170) = .838, p = .434$
<i>Mean Appearance Evaluation score (SD)</i>	3.04 (0.88)	3.09 (0.91)	3.08 (0.82)	2.94 (0.92)	$F(2,170) = .526, p = .592$

Table 2.

*Comparisons of sadness, focus of attention and appearance dissatisfaction outcomes between groups*

Outcome item	Intervention conditions						Comparisons of main effects and interactions
	External-focus of attention		Self-focus without mood induction		Self-focus with mood induction		1. Time 2. Intervention 3. Time x Intervention
	Pre Mean (SD)	Post Mean (SD)	Pre Mean (SD)	Post Mean (SD)	Pre Mean (SD)	Post Mean (SD)	(df); <i>F</i>
Appearance dissatisfaction	36.71 (18.67)	44.65 (19.41)	39.56 (21.58)	46.67 (22.48)	39.25 (20.71)	52.87 (22.14)	1. $F(1, 170) = 77.96^{***}$ 2. $F(2, 170) = 1.13$ 3. $F(2, 170) = 3.50^*$
Sadness	19.55 (22.27)	24.36 (23.07)	16.30 (18.32)	27.01 (28.16)	13.43 (17.88)	39.13 (28.46)	1. $F(1, 170) = 67.79^{***}$ 2. $F(2, 170) = 0.89$ 3. $F(2, 167) = 14.07^{***}$
Internal or external focus of attention	42.75 (24.60)	48.89 (26.29)	52.37 (25.91)	45.53 (25.20)	49.22 (28.28)	34.19 (24.48)	1. $F(1, 170) = 4.59^*$ 2. $F(2, 170) = 1.78$ 3. $F(2, 170) = 6.62^{**}$

*Note:* \* Statistic is significant at the .05 level. \*\* Statistic is significant at the .01 level. \*\*\* Statistic is significant at the .001 level.

Table 3.

*Post-hoc pairwise comparison of the interaction between time and group for appearance dissatisfaction*

Time	Group	Comparison group	Mean difference	95% CI
Pre intervention	External-focus	Self-focus without mood	-2.86	[-10.28, 4.57]
		Self-focus with mood	-2.55	[-9.89, 4.81]
	Self-focus without mood	Self-focus with mood	0.31	[-7.32, 7.94]
Post intervention	External-focus	Self-focus without mood	-2.02	[-9.81, 5.78]
		Self-focus with mood	-8.22*	[-15.94, -0.50]
	Self-focus without mood	Self-focus with mood	-6.20	[-14.22, 1.81]

*Note:* \* Statistic is significant at the .05 level. \*\* Statistic is significant at the .01 level. \*\*\* Statistic is significant at the .001 level.

Table 4.

*Post-hoc pairwise comparison of the interaction between time and group for sadness*

Time	Group	Comparison group	Mean difference	95% CI
Pre intervention	External-focus	Self-focus without mood	3.26	[-10.28, 4.57]
		Self-focus with mood	6.11	[-9.89, 4.81]
	Self-focus without mood	Self-focus with mood	2.86	[-7.32, 7.94]
Post intervention	External-focus	Self-focus without mood	-2.65	[-9.81, 5.78]
		Self-focus with mood	-14.77**	[-15.94, -0.50]
	Self-focus without mood	Self-focus with mood	-12.12*	[-14.22, 1.81]

*Note:* \* Statistic is significant at the .05 level. \*\* Statistic is significant at the .01 level. \*\*\* Statistic is significant at the .001 level.

Table 5.

*Post-hoc pairwise comparison of the interaction between time and group for internal/external focus of attention*

Time	Group	Comparison group	Mean difference	95% CI
Pre intervention	External-focus	Self-focus without mood	-9.63*	[-19.24, -0.02]
		Self-focus with mood	-6.47	[-15.99, 3.04]
	Self-focus without mood	Self-focus with mood	3.15	[-6.73, 13.03]
Post intervention	External-focus	Self-focus without mood	3.37	[-5.92, 12.66]
		Self-focus with mood	14.70**	[5.50, 23.90]
	Self-focus without mood	Self-focus with mood	11.34*	[1.78, 20.89]

*Note:* \* Statistic is significant at the .05 level. \*\* Statistic is significant at the .01 level. \*\*\* Statistic is significant at the .001 level.

Table 6.

*Post-hoc pairwise comparison of the interaction: group by time, for appearance dissatisfaction*

Group	Time	Comparison	Mean difference	95% CI
External focus	Pre	Post	-7.98 <sup>***</sup>	[-11.55, -4.41]
Self-focus without mood	Pre	Post	-7.08 <sup>***</sup>	[-10.93, -3.23]
Self-focus with mood	Pre	Post	-13.62 <sup>***</sup>	[-17.38, -9.85]

*Note:* \* Statistic is significant at the .05 level. \*\* Statistic is significant at the .01 level. \*\*\* Statistic is significant at the .001 level.

Table 7.

*Post-hoc pairwise comparison of the interaction: group by time, for sadness*

Group	Time	Comparison	Mean difference	95% CI
External focus	Pre	Post	-5.07	[-10.56, 0.42]
Self-focus without mood	Pre	Post	-10.48 <sup>***</sup>	[-16.40, -4.57]
Self-focus with mood	Pre	Post	-25.62 <sup>***</sup>	[-31.40, -19.83]

*Note:* \* Statistic is significant at the .05 level. \*\* Statistic is significant at the .01 level. \*\*\* Statistic is significant at the .001 level.

Table 8.

*Post-hoc pairwise comparison of the interaction: group by time, for focus of attention*

Group	Time	Comparison	Mean difference	95% CI
External focus	Pre	Post	-6.15	[-14.13, 1.83]
Self-focus without mood	Pre	Post	6.85	[-1.78, 15.47]
Self-focus with mood	Pre	Post	15.03***	[6.56, 23.49]

*Note:* \* Statistic is significant at the .05 level. \*\* Statistic is significant at the .01 level. \*\*\* Statistic is significant at the .001 level.

**Highlights**

- Investigation of self-focused attention in mirrors on appearance dissatisfaction
- Negative-mood induced participants became significantly more self-focused
- Appearance dissatisfaction was highest in self-focused attention with negative mood
- Results partially support the role of self-focused attention but only in a negative mood