



Brief research report

Attentional and interpretative biases in appearance concern: An investigation of biases in appearance-related information processing

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ABSTRACT

The present study examined associations between high levels of appearance concern and information processing biases in interpretation and attention. An opportunity sample ($N = 79$) categorised ambiguous stimuli as related or unrelated to appearance. Participants then responded to the same stimuli in a modified visual dot-probe task assessing attentional bias. Participant responses were assessed in relation to level of appearance concern. The results indicated a valence specific bias towards interpretation of ambiguous stimuli as negative and appearance-related in individuals with higher levels of concern. There was also evidence of attentional bias towards information perceived as appearance-related in participants with higher levels of appearance concern. The study findings suggest that association between appearance-orientated information processing biases and level of appearance concern; this association may lead to mutually reinforcing bias and concern.

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Introduction

Associations between processing styles and psychological disorders such as anxiety (e.g., Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007) and depression (e.g., Mogg & Bradley, 2005; Strunk & Adler, 2009) are relatively established. Associations between information processing and appearance concerns, however, have received less extensive research. Investigation of appearance-related cognitive biases has suggested individuals with high levels of concern demonstrate increased discrimination (Markus, Hamill, & Sentis, 1987) and recall of appearance-related information (Altabe & Thompson, 1996). Increased Stroop task interference has also been exhibited, although attentional bias was contingent on pre-task appearance priming (Labarge, Cash, & Brown, 1998). Requirement of priming may suggest that appearance-related attentional biases do not occur automatically at a pre-conscious stage of processing; rather, conscious direction of attention towards appearance information may be required as a trigger. More recently however, employment of the visual dot-probe task (Maner, Holm-Denoma, Van Orden, Gailliot, Gordon, & Joiner, 2006; Shafran, Lee, Cooper, Palmer, & Fairburn, 2007) and eye-tracking (Hewig, Cooper, Trippe, Hecht, Straube, & Miltner, 2008) in individuals with eating disorders has demonstrated preferential attention towards specific bodily features and negative appearance stimuli without pre-task

priming. The discrepancy between stage of activation and bias automaticity between these studies may reflect the complexity of appearance concern. Mogg and Bradley (2005) suggested anxiety-related attentional biases are observable at an earlier stage of processing than depression-related biases. Appearance concern can be characterised in part by both anxiety and depression (Carr, Harris, & James, 2000), thus the conflicting evidence may reflect these differences.

In addition to attention, appearance issues have been associated with biased interpretation. Increased interpretation of ambiguous situations as negative and appearance-related has been demonstrated in obese individuals (Jansen, Smeets, Boon, Nederkoorn, Roefs, & Mulken, 2007), and those with eating disorders (Cooper, 1997). Similarly, increased negative interpretation of appearance information has been associated with body dissatisfaction in student samples (Altabe, Wood, Herbozo, & Thompson, 2004). Processing biases, such as preferential interpretation and attention, may lead to a perception of the world that is dominated by the subject of the individual's concern. Highly anxious individuals can exhibit hypervigilance – a self-reinforcing perception of threatening stimuli (Mathews, 1990). A comparable appearance-orientated perceptual cycle may develop in individuals with high levels of appearance concern.

Previous research has predominantly focused on weight/shape-related processing. Evaluation of general appearance concerns, characterised within this article as concern with any aspect of an individual's external image, remains relatively unexplored. Appearance concerns aside from weight are commonplace and can reach alarming severity (Harris & Carr, 2001). These concerns can be complex and debilitating, contributing to feelings of inadequacy

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and have been shown to influence a range of processes including beliefs about the impressions formed by others and perceptions of the self (Rumsey & Harcourt, 2005). There is a need to understand the impact of appearance concerns on cognitive processes outside of the boundaries of weight and shape. Knowledge concerning processing biases may inform the development of interventions (see Mobini & Grant, 2007).

The aim of the present research was to investigate processing differences in general appearance concern. It was proposed that individuals with higher levels of concern would exhibit processing that has the potential to reinforce and exacerbate concern. Two features of processing were selected due to their contribution to perception and associations with biased processing in other fields, such as depression and anxiety: (1) interpretation and (2) attention. It was predicted that individuals with higher levels of concern would be more likely to perceive ambiguous stimuli as appearance-related, especially when also interpreting negative associations, and would demonstrate attention biased towards appearance stimuli over nonappearance stimuli. The stage of processing at which attentional biases became observable also received preliminary investigation.

Method

Participants

Eighty-two UK university psychology students were recruited and awarded credit for participation. Participants were 18 years of age or older, and literate in English. Three participants were excluded as outliers during data screening. Participant age range was 18–49 years old ($M = 22$; $SD = 6.40$), and 79% of the sample were women.

Apparatus

Visual dot-probe task. A modified version of the visual dot-probe task (VDP; MacLeod, Mathews, & Tata, 1986) was employed. The task involved presenting word pairs that represented different types of stimuli (e.g., appearance and nonappearance-related) and assessment of attention to each word.

A fixation point was presented for 500 ms. Words were presented 1.5 cm above and below the central point (visual angle $< 2^\circ$). Words were 8 mm tall, and presented in capitals. Word pairs were presented for 500 ms, after which time one word was replaced by a dot, the other remained. Participants were required to identify dot location via button box.

Continued presentation of one word alongside the probe was incorporated to evaluate whether prolonged stimuli presentation influenced attentional bias. This modification of the traditional paradigm was designed to provide preliminary assessment of the processing stage of bias activation. If any bias observed was related to the remaining word only, this may suggest that its activation requires prolonged presentation, thus deeper processing. General attentional bias towards appearance stimuli regardless of presentation time was also assessed by calculating an Attention Bias Index.

Word pair presentation was randomised by the computer programme SuperLab (Cedrus Corporation; San Pedro, CA). Each pair was presented four times. Word location was counterbalanced by presenting words on both halves of the computer screen twice. One hundred trials were conducted. A short practice trial using neutral words was conducted prior to the recorded trials.

Pilot research was conducted to select appropriate word pairs. Twenty-five word pairs were selected by their ambiguous relevance to appearance as classified by 99 pilot study participants. Word pairs were matched on word length, and frequency in

written and spoken language – e.g., ANXIOUS-NERVOUS, FELLOW-STEADY, ETHNIC-MODEST. Threat levels were matched to decrease confounding effects of anxiety on attention.

Word categorisation task. Participants categorised the 50 words used in the VDP as either ‘appearance-related’ or ‘nonappearance-related’. The same words were presented a second time and categorised as ‘negative’, ‘neutral’ or ‘positive’. Presentation order was randomised by SuperLab. The task assessed perceived valence of each stimulus and whether it was considered appearance-related.

Psychometric measures. Mood was appraised using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) – a 20-item Likert scale design assessing the relevance of valenced words to present mood. The measure provides evaluation of positive (PA) and negative affects (NA) respectively. The authors report convergence validity with a number of measures of affective disorder and adequate internal consistency, $\alpha = .80$ (PA) and $\alpha = .85$ (NA).

The short form, 24-item, version of Derriford Appearance Scale (DAS24; Moss, Harris, & Carr, 2004) was employed to assess level of appearance concern. The measure assesses the negative emotional aspects of concern as well as the behavioural impact. The measure was selected because of its focus on general appearance concern, categorised as distress and dysfunction related to the perception and experience of one’s outward appearance associated with any feature of concern. Participants ideographically categorise features of concern; consequently, measurement was not limited to weight-related concern. The DAS24 has been evaluated within clinical and general populations. It has adequate internal consistency ($\alpha = .92$) and convergent validity with measures of anxiety, depression, social avoidance, social distress, fear of negative evaluation, negative affect, and shame ($r \geq .45$). Appearance concern scores reported within the present study were generated utilising the DAS24 composite score.

Procedure

Participants completed all study components in isolation on a computer. Task content was randomized using SuperLab. Tasks were presented in a fixed sequence to prevent priming effects. The VDP preceded the categorisation task and psychometric measures to prevent priming appearance-biased attention. The psychometric measures followed completion of all other tasks.

Analyses

Shapiro–Wilk tests demonstrated non-normal distributions for DAS24 scores, NA, and response latencies ($p < .05$). Data were converted to z scores for analyses. The standardised data still did not meet parametric assumptions of normality. Consequently, nonparametric analyses were favoured. A nonparametric equivalent of ANCOVA analysis was not feasible; thus data were inversely transformed so that they met parametric assumptions of normality. Correlation analyses were Spearman’s and one-tailed.

Analysis of the VDP data was twofold. Firstly, in accordance with the traditional method employed by MacLeod et al. (1986), an Attention Bias Index was calculated by subtracting participant reaction time when the probe appeared in place of nonappearance words from when it appeared in place of appearance words. Negative scores indicate a quicker response to appearance stimuli. The categorisation task was used to identify appearance-related and nonappearance-related words for each participant. Correlation analysis between Bias Index and appearance concern was conducted. Secondly, a 2×2 within-subjects ANCOVA was conducted with VDP reaction time as the dependent variable, and stimulus type (appearance/nonappearance) and word activity

(remain/remove) as independent variables. Appearance concern was employed as a covariate. The analyses were primarily conducted to explore interactions between level of appearance concern, and stimulus type and presentation duration.

Results

Data screening

Data were screened based on VDP reaction times and number of error responses – i.e., misidentification of dot location. Two outliers were identified and excluded. In the analyses exploring attention bias one additional participant's data were excluded as their word interpretation did not allow for combinations of appearance and nonappearance word pairs. A gender comparison was conducted before compiling the sample. Based on a box plot comparison of DAS24 scores between genders, one high outlier was removed ($N = 79$). Mann–Whitney U -tests demonstrated no significant difference between the genders on the assessed variables (all $ps > .05$). The sample was compiled for analyses.

Descriptive statistics

The average level of appearance concern reported was higher ($M = 40.99$, $SD = 11.31$) than found in previous use of the DAS24 ($M = 37.09$, $SD = 15.13$) by Carr, Moss, and Harris (2005). The samples may not, however, be directly comparable as the present sample was predominantly comprised of women, and 77% of participants were aged between 18 and 20 years.

Regression analysis confirmed convergence validity between the DAS24 and the PANAS measures, $F(2, 76) = 6.99$, $p < .001$, $R^2 = .21$, for both PA ($\beta = -.29$) and NA ($\beta = .37$). Affect therefore accounted for a significant, although modest, amount of variance in DAS24 score. These results are to be expected given that affect contributes only partially to appearance concern as characterised by the DAS24.

Word interpretation

On average participants categorised 18 words as appearance-related ($SD = 8$). Of those words, an average of 56.7% were categorised as positive, 34.0% neutral, and 8.6% as negative. Level of appearance concern was not significantly associated with number of words interpreted as appearance-related, $r(77) = -.01$, $p = .45$, even when considering valence ($ps > .05$). Affect has been related to attentional bias, and partial correlation analysis accounting for PA and NA revealed a significant relationship between number of words categorised as negative appearance words and appearance concern, $r(72) = .23$, $p = .03$. No significant relationship was found between appearance concern and number of neutral or positive valence appearance words ($p > .3$).

Attentional bias

A negative correlation of small to medium effect size was found between Attentional Bias Index and appearance concern, $r(77) = -.21$, $p = .03$. Thus, individuals with higher levels of appearance concern demonstrate increased attentional bias towards appearance stimuli.

The ANCOVA demonstrated no significant main effects for stimulus type (appearance/nonappearance) for either remaining or removed word (all $ps > .05$). Furthermore, no significant interaction was found between appearance concern and stimulus type, regardless of whether the stimulus remained, $F(1, 67) = 1.33$, $p = .25$, $n^2 = .02$, or was removed, $F(1, 67) = 0.64$, $p = .43$, $n^2 = .01$.

Discussion

The aim of the investigation was to assess whether associations exist between appearance-related information processing and level of appearance concern. The results indicate support for such association.

Interpretation of ambiguous stimuli as appearance-related was associated with level of appearance concern. Although a general appearance-related interpretation bias was not present, a valence specific interpretation bias consistent with previous research (Altabe et al., 2004) was found. Compared to participants with lower levels of appearance concern, those with higher levels interpreted more words as being both appearance-related and of negative valence. This finding was only present when accounting for positive and negative affects. Although causality cannot be assumed, the evidence suggests that individuals with greater levels of appearance concern also perceive more elements of their environment as appearance-related and negative.

Congruent with evidence of biased attention in eating disorders (Shafran et al., 2007), an appearance-orientated attentional bias was demonstrated. Participants' responses to the VDP were associated with their level of appearance concern. Individuals with higher levels of concern demonstrated increased attention directed towards stimuli interpreted as appearance-related. Furthermore, the presence of appearance-related bias within this opportunity sample suggests such maladaptive processing may be common. The effect size was, however, small suggesting appearance-biased attention may involve a more complex interaction of mediators than just level of concern. It may also, in part, explain the lack of significant relationships in the ANCOVA exploring the VDP data in more detail.

The priming contingent bias reported by Labarge et al. (1998) suggested appearance-related attention bias may occur at a post-attentive level of processing. The bias observed within the present research was independent of pre-task priming. The discrepancy between these findings may be due to different attention tasks utilised. The Stroop task requires differentiation between attributes of the same stimulus whereas the VDP requires spatial attention (Mogg et al., 2000). Although the present study employed a modified VDP, entailing differentiation between two separate stimuli in the response condition, this task still presents different requirements to the within-stimulus differentiation of the Stroop task. The findings of Labarge et al. (1998) may reflect biases during more complex perceptual procedures.

Although the study results suggest that basic appearance-orientated processing biases may occur automatically without pre-task priming, the results do not provide conclusive clarification of level of processing required to activate this processing bias. The VDP modification afforded preliminary exploration of the impact of prolonged presentation of stimuli. However, analyses fail to demonstrate any significant interactions and all effect sizes were small. The lack of clarification may be the result of the methodology employed and may be resolved by employment of masked and unmasked versions of the traditional VPD in future research.

Limitations

The study had a number of limitations. Predominantly, young women comprised the sample. Sample homogeneity inhibits generalisation and prevents direct comparison with previous use of the DAS24 measure of appearance concern on more diverse samples. Furthermore, although evaluation of gender differences was made, a larger, equally split sample is required to substantiate the present findings.

Finally, causality of the relationships found cannot be inferred from the present research. Experimental manipulation of attention

towards negative weight/shape stimuli by Smith and Rieger (2006) suggests that this relationship may potentially be interactive. Further evidence is required to establish whether this is the case within general appearance concerns as well as eating disorders.

Conclusions

The research suggests that appearance concern incorporates a propensity to interpret ambiguous stimuli as both negative and appearance-related, accompanied by a tendency to preferentially attend to information categorised as such. These features are reminiscent of hypervigilance (Mathews, 1990). Individuals with high levels of concern may perceive the world in a way that continually reinforces and exacerbates their concern. Recent research has provided evidence that experimental manipulation of anxiety-biased processing can reduce anxiety (Beard & Amir, 2008); similar therapeutic methods may apply to treatment of appearance concern. Therapy targeting maladaptive perceptual biases may prove useful. Both CBT (see Mobini & Grant, 2007) and acceptance and commitment therapy (Hayes, Strosahl, & Wilson, 1999) offer potentially beneficial approaches. Exploration of related processing biases may aid the tailoring of more effective treatment.

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