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The causal role of selective attention for thin-ideal images on negative affect and rumination

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ABSTRACT

Background and Objectives: Attentional bias towards thin-ideal body images has been implicated as a vulnerability factor for eating disorder symptomatology. However, the nature and causal basis of its relationship with other cognitive vulnerability factors, namely, eating disorder-specific rumination and negative mood, remains unclear. Accordingly, the current study investigated the causal influence of attentional bias towards thin-ideal images on emotional and ruminative vulnerability, in response to a body image-related stressor.

Methods: An established attentional bias modification (ABM) procedure, the modified dot probe task, was used for the assessment and manipulation of attentional bias. Female undergraduate students (N = 110) aged between 17 and 24 years were randomly assigned to either 'attend' towards or 'avoid' thin-ideal images. Pre- and post-attentional training, participants completed the dot probe task, as well as state measures of rumination and negative mood. Additionally, following post-ABM assessment of attentional bias, participants were given a body image-related stressor.

Results: Results showed that participants trained to attend to thin bodies reported heightened negative mood, in response to the stressor, compared with participants trained to avoid thin bodies. On the other hand, groups did not demonstrate a differential increase in eating disorder-specific rumination in response to the stressor.

Limitations: The current findings will require replication with clinical samples. Additionally, state rumination and negative mood were assessed via single items.

Conclusions: These results provide the first causal evidence for the role of attentional bias towards thin-ideal images in negative emotional vulnerability. Importantly, these results suggest attentional bias may serve as a risk factor for mood reactivity and a potential target for strategies designed to enhance emotional resilience.

1. Introduction

Empirical evidence suggests selective attentional processing of thin-ideal bodies is a key vulnerability factor for eating disorder symptomatology in females. For example, studies using eye-tracking technology have shown attentional biases towards images of thin-ideal female bodies in a non-clinical sample of women with high levels of body dissatisfaction (Cho & Lee, 2013) as well as in those diagnosed with bulimia nervosa (Blechert, Nickert, Caffier, & Tuschen-Caffier, 2009) or anorexia nervosa (Pinhas et al., 2014). Moreover, recent research has found an association between selective attention for thin female bodies/body parts and body dissatisfaction in non-clinical samples of women using a behavioural assessment of selection attention (i.e., the widely-used dot probe task) (Dondzilo, Rieger, Palermo, Byrne, & Bell, 2017; Joseph et al., 2016; Moussally, Brosch, & Van der Linden, 2016). In the dot probe task used by Dondzilo et al. (2017), a pair of stimuli (i.e., a thin body image and a neutral stimulus) were briefly presented on a computer screen, which was followed by a probe (i.e., a letter 'p' or 'q' to which the participant responded by indicating the corresponding letter on a computer keyboard) replacing one of the stimuli. Faster responding to probes that replaced thin body stimuli, relative to neutral stimuli, indicated an attentional bias to thin bodies. Collectively, these studies implicate the maladaptive role of attentional bias towards thin-ideal bodies on body image and eating pathology.

Despite significant progress in the understanding of the pathological consequences of attentional bias towards thin-ideal bodies, there is less clarity regarding its relationship with other eating disorder-related cognitive vulnerabilities. One such vulnerability is eating disorder-specific rumination, which has been conceptualized as preoccupation with eating, shape, and weight concerns (Park, Dunn, & Barnard, 2011).

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Some researchers have argued, on theoretical grounds, that attentional bias and depressive rumination work together to influence vulnerability to depression (De Raedt & Koster, 2010; Koster, De Lissnyder, Derakshan, & De Raedt, 2011). In support of this notion, there is substantial research showing an association between depressive rumination and an attentional bias for negative information (Donaldson, Lam, & Mathews, 2007; Grafton, Southworth, Watkins, & MacLeod, 2016; Joormann, Dkane, & Gotlib, 2006; Owens & Gibb, 2016; Southworth, Grafton, MacLeod, & Watkins, 2016) and preliminary evidence to suggest that attentional bias plays a causal role in depressive symptoms, via the mediating role of depressive rumination (Yang, Ding, Dai, Peng, & Zhang, 2015).

Extending on this work, Dondzilo et al. (2017) showed that eating disorder-specific rumination mediated the relationship between attentional bias towards images of thin female bodies and both body dissatisfaction and dietary restraint in young women. These findings suggest that an attentional bias towards thin-ideal images may lead to further elaborative processing, by ruminating about eating, body shape, and/or weight concerns. In turn, this may serve to develop and/or exacerbate dietary restraint and body dissatisfaction. However, the correlational nature of the data does not permit firm conclusions to be drawn about the causal relationship between attentional bias to thin bodies and eating disorder-specific rumination.

In addition to eating disorder-specific rumination, negative affect comprises a risk factor for eating disorder symptomatology (Leehr et al., 2015; Stice, 2001, 2002; Stice, Gau, Rohde, & Shaw, 2017; Stice, Marti, & Durant, 2011). It is possible that selective attention for thin-ideal bodies serves to trigger negative affect, in addition to eating disorder-specific rumination. This is based on a compelling body of evidence indicating that attentional bias causally influences emotional vulnerability or reactivity to subsequent induced or real life stress (Beevers & Carver, 2003; Dandeneau & Baldwin, 2004; Dandeneau, Baldwin, Baccus, Sakellaropoulo, & Pruessner, 2007; Fox, Cahill, & Zougkou, 2010; MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002; See, MacLeod, & Bridle, 2009). For example, an induced attentional bias towards threat words led to greater increases in negative mood, in response to a stress-inducing task, compared with a induced attentional bias towards neutral words (MacLeod et al., 2002). In another study, undergraduate students trained to avoid rejection-related information reported less exam-related stress and anxiety after having experienced their exam (Dandeneau et al., 2007). Thus, in considering the aforementioned evidence it is plausible that selectively attending to thin bodies may increase susceptibility to both heightened negative mood and rumination on eating, shape, and weight concerns.

Accordingly, the aim of the current study was to determine whether attentional bias towards thin female images causally contributes to emotional and ruminative vulnerability in young women. It was hypothesised that individuals trained to attend to thin bodies would demonstrate increased negative mood and eating disorder-specific rumination, in response to a body image-related stressor, compared with individuals trained to avoid thin bodies.

2. Method

2.1. Participants

Female undergraduate students (N = 110) participated in the study in exchange for course credit. Sample size was determined beforehand based on previous studies reporting effects using the current methodology (Kemps, Tiggemann, & Hollitt, 2016; Kemps, Tiggemann, Orr, & Grear, 2014; MacLeod et al., 2002; Smith & Rieger, 2006). A sample of female undergraduate students, rather than clinical participants, was utilised to avoid the ethical issue of inducing potentially maladaptive attentional biases in highly vulnerable individuals. Participants were between the ages of 17 and 24 (M = 19.08, SD = 1.43) with a mean BMI of 22.06 (SD = 3.64, range = 16.41 to 39.13). Ethics approval for this study was granted in accordance with the requirements of the *National Statement on Ethical Conduct in Human Research* and the policies and procedures of the University of Western Australia.

2.2. Measures

2.2.1. Depression Anxiety Stress Scales-21 (DASS-21; Lovibond & Lovibond, 1995)

The DASS-21 is a 21-item self-report questionnaire that assesses three components of negative affect: depression, anxiety, and stress. These subscale scores are summed to yield a total score of negative affect, with higher scores indicative of greater disturbance. Items refer to the past week; and scores range from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*). Support for the psychometric properties of the DASS-21 includes high internal consistency and adequate construct validity (Henry & Crawford, 2005). The Cronbach's alpha for the total score in the present study was $\alpha = 0.94$.

2.2.2. Ruminative Response Scale for Eating Disorders (RRS-ED; Cowdrey & Park, 2011)

The nine-item RRS-ED assesses ruminative thinking about eating, body shape, and/or weight. Participants rate their tendency to experience ruminative symptoms on a four-point Likert scale ranging from 1 (*almost never*) to 4 (*almost always*). Thus, higher scores indicate higher levels of eating disorder-specific rumination. The RRS-ED has demonstrated both strong internal consistency and validity (Cowdrey & Park, 2011, 2012). Researchers have also distinguished two RRS-ED subscales: brooding and reflection (Cowdrey & Park, 2011; Dondzilo, Rieger, Palermo, Byrne, & Bell, 2016). For the purposes of the present investigation, only the composite score of the RRS-ED was relevant. Cronbach's alpha for the composite score in the current sample was $\alpha = 0.91$.

2.2.3. Subjective state ratings

Subjective state ratings of negative mood and eating disorder-specific rumination *at the moment* were assessed using the following 100-point visual analogue scales (VAS) ranging from “not at all” to “very much”, respectively: At the moment 1) I am feeling sad, 2) I am thinking about my feelings concerning my eating and body shape and/or weight. These items were informed by previous research investigating the effect of induced rumination on eating disorder symptoms (Naumann, Tuschen-Caffier, Voderholzer, Caffier, & Svaldi, 2015). Support for the construct validity of these state rumination and negative mood items was evident in terms of their associations with validated measures of trait eating disorder-specific rumination and negative affect. Specifically, the state rumination item correlated with the RRS-ED at $r = 0.62$, $p < .001$ and the state negative mood item correlated with the DASS at $r = 0.49$, $p < .001$.

2.3. Materials

In line with previous research assessing attentional bias towards images of female bodies (Dondzilo et al., 2017), thin body shape images of a positive emotional valence were paired with abstract art images of a neutral emotional valence for the purpose of modification and assessment of attentional bias. Thin body images comprised of 20 previously rated thin images (Dondzilo et al., 2017) and 20 additional images which were sourced from the internet and cropped as per the original 20, to focus on specific weight-relevant body regions (e.g., abdomen and thighs). The 20 new thin body images were selected from an initial pool of 70 thin body images, which were rated by 19 independent judges using the 10-point Self-Assessment Manikin affective rating system (Lang, 1980), from 0 (*unpleasant*) to 9 (*pleasant*). On the basis of these ratings, 20 thin body images rated to be strongest in positive valence (M = 5.87, SD = 0.35) were chosen. These images were found to be statistically equivalent to the valence of the 20