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I can't stop looking at them: Interactive effects of body mass index and weight dissatisfaction on attention towards body shape photographs

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ABSTRACT

Although attentional biases toward body-related information contribute to the etiology and maintenance of body dissatisfaction (BD) and eating disorders (EDs), attentional disengagement in women with BD and EDs is not clear. The present study investigated the association between weight dissatisfaction and attentional disengagement from body-related pictures and the possible moderating effect of body mass index (BMI) on this relation. Two hundred and four undergraduate women engaged in an experiment using a pictorial spatial cueing paradigm including fat/thin bodies and neutral household photos. Partial correlations and simple slopes regression analyses were conducted with attentional disengagement index scores of each category of cues. Findings suggested that independent of BMI, weight dissatisfaction was directly associated with attentional disengagement from both fat and thin pictures. In addition, among women with low and medium BMIs, the more they were dissatisfied with their bodyweight, the more difficulty they had disengaging their attention from fat body pictures.

There is an abundant literature on information processing preferences related to body size, body shape and food cues, some of which suggest that attentional biases toward such cues contribute to the etiology and maintenance of body dissatisfaction and eating disorders (EDs; Cash & Strachan, 2002; Lee & Shafran, 2004). According to Vitousek and Hollon's (1990) cognitive theory of EDs, attentional biases toward weight-related information arise as a result of underlying maladaptive schemata associated with shape, weight and self. Individuals with maladaptive schemata differ from those without in several ways, including enhanced attention to and enhanced memory for schema-consistent information (e.g., fat stimuli) and resistance to schema-inconsistent information (e.g., thin stimuli). Two approaches have emerged within this literature. The first examines how body dissatisfied or ED samples process information about their own body (e.g., Blechert, Ansorge, & Tuschen-Caffier, 2010; Janelle, Hausenblas, Ellis, Coombes, & Duley, 2008; Jansen, Nederkoorn, & Mulkens, 2005; Roefs, Jansen, Moresi, Willems, van Grootel, & van der Borgh, 2008; Smeets, Jansen, & Roefs, 2011; Smeets, Tiggemann, et al., 2011), and the second focuses on how these samples process body-, weight- and shape-related information in their general environment (e.g., Chen & Jackson, 2005; Chen & Jackson, 2006; Gao, Deng, et al., 2011; Glauert, Rhodes, Fink, & Grammer, 2010; Rieger, Schotte, Touyz, Bemont, Griffiths, & Russell, 1998; Shafran, Lee, Cooper, Palmer, & Fairburn, 2007). In the first approach, consistent evidence indicates that body dissatisfied and ED samples are highly self-critical when looking at their own bodies (Jansen et al., 2005; Roefs et al., 2008; Smeets, Jansen, et al., 2011; Smeets, Tiggemann, et al., 2011). Conversely, research on the second approach has been less consistent. Therefore, the nature of attentional biases toward external body, weight, and shape stimuli are not well understood.

Early studies often used modified Stroop color naming tasks to study attentional bias in ED samples, and most of the results indicated that ED samples were often slower to name the color of disorder-relevant stimuli than neutral cues (Davidson & Wright, 2002; Lee & Shafran, 2004; Perpina, Leonard, Treasure, Bond, & Banos, 1998; Sackville, Schotte, Touyz, Griffiths, & Beaumont, 1998). However, there are conceptual ambiguities and methodological issues when using modified Stroop color naming task; namely, it cannot distinguish different attentional components (Dobson & Dozois, 2004; Lee & Shafran, 2004). Attentional biases corresponding to disturbance-relevant stimuli (e.g., anxiety related stimuli, depression related stimuli, or ED related stimuli) can include facilitated attention, disengagement difficulty, or attentional avoidance (see Cisler & Koster, 2010). Facilitated attention refers to the relative ease or speed with which attention is drawn to a disturbance-relevant stimulus (i.e., attentional

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orienting). Disengagement difficulty refers to the degree to which a disturbance-relevant stimulus captures attention and impairs switching attention away from it to another stimulus. Attentional avoidance refers to the phenomenon in which attention is preferentially allocated towards locations opposite the location of the disturbance-relevant cue, thus indicating avoidance of this cue (e.g., Cisler & Koster, 2010; Gao, Wang, Jackson, Zhao, Liang, & Chen, 2011; Glauert et al., 2010; Koster, Verschuere, Crombez, & Van Damme, 2005). Recently, researchers have turned to two main tasks (the dot probe task and odd-one-out visual search task) to distinguish different attentional components to clarify the nature of attentional biases in body dissatisfied and ED samples.

The dot probe task was originally developed by MacLeod, Mathews, and Tata (1986). In this task, a pair of stimuli (e.g., a body-related stimulus and a neutral stimulus) are briefly presented on a screen, one above the other or one beside the other, and are immediately followed by a dot (the probe) in the location of one of the stimuli. Participants are required to respond to the probe as quickly as possible. The reaction time to probe would be reduced if participants were attending to the region of the screen. This task is possible to distinguish engagement and disengagement subcomponents of attention, either by manipulating the presentation duration (Mogg, Bradley, Miles, & Dixon, 2004) or by including neutral trials (Koster, Crombez, Verschuere, & De Houwer, 2004). The odd-one-out visual search task was introduced by Hansen and Hansen (1988) and later modified by other researchers. In this task, a group of words/pictures stimuli are simultaneously presented on the screen, and they are often presented in the shape of a 2×2, 3×3 or 5×4 matrices. Participants are asked to indicate whether one of the stimuli is different from others on a predefined dimension by pressing the corresponding key. For example, the matrix might contain a single body-related target word (e.g., fat) among eight distractor or neutral words (e.g., box, bed, cot) in a 3×3 matrix. In this case, the participants would have to react to the body-related word. The odd-one-out task can be used to assess attentional engagement by evaluating response latencies in detecting disturbance-relevant targets (e.g., body-related stimuli) versus neutral targets (e.g., car-related stimuli) among other kind of neutral distractors (e.g., furniture-related stimuli). Disengagement can be evaluated by comparing response latencies in detecting a neutral target (e.g., car-related stimuli) among disturbance-relevant distractors (e.g., body-related stimuli) versus latencies for detecting a neutral target (e.g., car-related stimuli) from another neutral stimulus category (e.g., furniture-related stimuli; Rinck, Reinecke, Ellwart, Heuer, & Becker, 2005; Smeets, Jansen, et al., 2011; Smeets, Roefs, van Furth, & Jansen, 2008; Smeets, Tiggemann, et al., 2011).

Using an odd-one-out task, Smeets et al. (2008) found that patients with EDs were faster detecting body words in arrays of neutral words than individuals without EDs. These findings suggest attentional engagement towards body information was speeded in patients with EDs. However, because valences of body words were not specified, it was not clear whether the effect reflected a bias towards negative, positive, or general body information. Dot probe studies suggest ED and body dissatisfied samples displayed facilitated attention towards negative body cues (e.g., "fat," "obese," or "tubby"). Rieger et al. (1998) reported that patients with EDs were faster at responding to probes in the location of previously-presented words denoting a large physique and slower responding to probes in the location of previously-presented words denoting thinness. Shafran et al. (2007) found that relative to thin body shape pictures, ED samples were faster at responding to probes in the same location as overweight or neutral body shape pictures. Recently, using the dot probe paradigm combined with eye-tracking technology, Gao, Wang, et al. (2011) reported that women with body dissatisfaction showed initial orienting, speeded detection, and initial maintenance biases towards fat body words (e.g., "fat" or "plump") in addition to a speeded detection-avoidance pattern of biases in relation to thin body words (e.g., "slim" or "slender"). Together, these findings suggest that individuals with EDs or body dissatisfaction preferentially process negative body information and/or resist or avoid thin body information as proposed by Vitousek and Hollon (1990).

To our knowledge, few published studies have focused on attentional disengagement among women with body dissatisfaction and EDs. The importance of inhibited disengagement from threat in individuals with anxiety has been highlighted in anxiety disorder studies, with models of anxiety-based attentional biases suggesting that inhibited disengagement has a significant role in the etiology and maintenance of anxiety disorders (e.g., Amir, Elias, Klumpp, & Przeworski, 2003; Fox, Russo, Bowles, & Dutton, 2001; Ouimet, Gawronski, & Dozois, 2009). Given that patterns of attentional bias toward food or body-related information among individuals with body dissatisfaction or EDs are similar to those linked to anxiety disorders (Lee & Shafran, 2004; Rieger et al., 1998), attentional disengagement difficulties warrant serious consideration as a cognitive vulnerability to exacerbations in body dissatisfaction and ED risk.

Recently, two odd-one-out studies assessed attentional bias in ED or body dissatisfied samples (Smeets et al., 2008; Smeets, Jansen, et al., 2011; Smeets, Tiggemann, et al., 2011). Neither of them showed any indication of attentional distraction by body-related stimuli. However, this paradigm may not be the best option for investigating attentional disengagement. In the studies from Smeets et al. (2008), Smeets, Jansen, et al. (2011), and Smeets, Tiggemann, et al. (2011), the 5×4 stimuli matrix was presented on the screen until a response was made or for a maximum of 20 s. The mean behavioral response latencies were around 4 s, during which engagement, disengagement, and re-engagement of visual attention could occur several times.

To illustrate, Gao, Wang, et al. (2011) assessed eye movements of women with and without body dissatisfaction within a dot probe task and found that women with body dissatisfaction had comparatively longer initial fixations on fat words and shorter initial fixations on thin words. The authors suggested that following attentional capture by fat stimuli in very early stage of information processing (i.e., less than one second), women with body dissatisfaction had more difficulty, at least initially, disengaging from them. In contrast, shorter initial fixations on thin words among this group may have reflected rapid disengagement of overt attention from these stimuli (Garner, Mogg, & Bradley, 2006). Although tracking of eye movements may illuminate subtle biases in visual attention that arise soon after stimulus presentations, opinions differ when choosing appropriate eye movement indices for evaluating disengagement. For example, in a free-viewing task, Giel, Friederich, Teufel, Hautzinger, Enck, and Zipfel (2011) used total gaze duration to evaluate attentional engagement and disengagement and found that patients with anorexia nervosa demonstrated more attentional disengagement to food pictures than did controls, whereas Gao, Wang, et al. (2011) used first fixation duration, finding attentional disengagement difficulty from fat words and disengagement facility from thin words. Moreover, the dot probe paradigm may not be ideal for evaluating disengagement, because the pairs of stimuli are simultaneously presented on the screen and attention could be easily implicitly captured by the unattended one, which could involve covert eye movements such as saccades (for a review, see Simons, 2000). Therefore, it remains an issue as to how the attentional disengagement obtained from the dot probe paradigm can be understood or explained.

To investigate disengagement, researchers have used a modified spatial cueing paradigm (Posner, 1980). The task is widely used because the direction and disengagement of attention can be observed clearly (e.g., Dai & Feng, 2009; Fox et al., 2001; Fox,