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Attentional avoidance of emotional information in emotional eating

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ABSTRACT

We investigated an attention bias (AB) for emotional faces in emotional eating (EM). A group obtaining a low score ($n = 18$) on the Emotional eating scale of the Dutch Eating Behavior Questionnaire and a high scoring group ($n = 23$) completed the Exogenous Cueing Task (ECT). The ECT experiment measured their reaction times to the location of a target dot preceded by a happy, sad, angry or neutral face cue. The Coping Inventory for Stressful Situations was administrated to collect information on participants' coping strategies. Compared to the group with a low degree of EM, the high EM group showed significant attentional avoidance of emotional faces, particularly negative faces, in the ECT. The coping questionnaire indicated that the high EM group displayed higher levels of avoidance coping compared to the low EM group. General levels of EM and avoidance coping were also positively correlated, and avoidance coping significantly predicted the level of EM. The findings of the present study indicate that attentional avoidance of emotional content, which has previously been observed in clinical studies of eating disorders (Cardi et al., 2015a; Davies et al., 2011), is also present in subclinical samples of EM.

1. Introduction

Emotional eating (EM) refers to overeating in response to emotional distress (Spoor et al., 2007). EM poses a significant risk factor for the development of eating disorders (ED), in particular binge eating disorder (Haedt-Matt et al., 2014). EM is known to evoke negative effects on mood, eating behavior and weight (Aspen et al., 2013; Ouwens et al., 2009; van Strien et al., 2016; Werthamm et al., 2014). This calls for the need to detect key vulnerability factors that contribute to the etiology and/or maintenance of EM.

EM is generally explained by a maladaptive affect regulation strategy. According to affect regulation models, the motivation to overeat is rooted in an attempt to avoid emotional distress or to escape from aversive self-awareness (Heatherton and Baumeister, 1991; Spoor's et al., 2007; Stice's et al., 2005; Vandewalle et al., 2016). Overeating in response to stress preserves or even aggravates over time through the process of negative reinforcement (Heatherton et al., 1991; Spoor et al., 2007). Increased food intake under distressing circumstances is not systematically observed in self-described emotional eaters, however, (Adriaanse et al., 2016; Bongers and Jansen 2016) and positive mood has also been found to elicit increased food intake (Cardi et al., 2015b). This indicates that a multitude of complex factors underlies the disordered eating pattern observed in EM.

A transdiagnostic factor known to contribute to emotional vulnerability and maladaptive affect regulation is selective information-processing of emotional content, which translates in cognitive biases in attention, memory, and interpretation (Eaton et al., 2015; Mathews and MacLeod, 2005). A wide array of cognitive-experimental tasks, such as the emotional Stroop-task, emotional no-go tasks, dot-probe tasks, and autobiographical memories tasks have been applied to study biased cognition associated with emotional vulnerability (Aspen et al., 2013; Mathews and MacLeod, 2005; but see e.g., Pothos et al., 2009; Rodebaugh et al., 2016 for a critical evaluation of measures of cognitive bias).

In the current study, we determined selective attention processing or an attention bias (AB) towards emotional cues in EM using the Exogenous Cueing Task (ECT, Beckwé and Deroost, 2016; Koster et al., 2005, 2010). AB in the ECT may emerge as a facilitated attentional engagement towards a salient stimulus or an impaired attentional disengagement away from the stimulus. Conversely, when attention is allocated away from the salient stimulus, this is interpreted as attentional avoidance.

To the best of our knowledge, there are no studies on EM that have investigated cognitive bias using emotional cues. Studies on AB for emotional cues in ED show a bias towards angry (Harrison et al., 2010) and sad faces (Cardi et al., 2015a,) in people with bulimia nervosa (BN)

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and anorexia nervosa (AN), whereas attentional avoidance of both positive and negative faces has also been demonstrated in clinical (Cardi et al., 2015a,; Davies et al., 2011) and subclinical samples of ED (Sharpe et al., 2016), in addition to a lack of attentional processing of happy faces in AN (Cserjési et al., 2011). Despite the heterogeneity of ED samples, these data suggest that after initial attentional engagement to emotional cues, people with ED deliberately engage in attentional avoidance of emotional stimuli. AB for other types of cues, such as food or body/weight/shape stimuli have also been consistently observed in ED (see e.g., Aspen et al., 2013; Stojek et al., 2018 for a review). In EM, an AB towards food cues in self-identified emotional eaters has been observed during sad mood (Hepworth et al., 2010; but see Werthamm et al., 2014 for opposing results), with supports the idea that EM serves as a maladaptive coping mechanism to deal with stress. Taken together, the data on AB are in line with the notion that people with a disordered eating pattern process emotional information differently due to abnormalities in social and emotional functioning (Cardi et al., 2015a,; Harrison et al., 2010).

Given that EM is an important antecedent of ED, we expect an AB for emotional faces in EM to emerge in the ECT in the present study. More specifically, we expect individuals with a high degree of EM to show an AB for emotional faces as compared to individuals with a low degree. Since EM is theorized to serve as an avoidance strategy for emotional distress, we tested this by administrating the Coping Inventory for Stressful Situations (CISS, de Ridder et al., 2004). The CISS established three types of coping: task-oriented coping (deliberately trying to solve the problem or trying to change the situation), emotion-oriented coping (reactions include emotional responses) and avoidance-oriented coping (avoiding the stressful situation through distraction or social diversion). We expect people with a high degree of EM to score particularly high on the avoidance scale. We also assessed the relationship between EM, coping style and AB for emotional faces to determine a possible contribution of coping style to AB in EM.

2. Method

2.1. Participants

60 healthy adults (23 men, 37 women) between 18 and 45 years old were recruited through social media and student platforms of the Vrije Universiteit Brussel to participate in a study on EM. Participants with a (history of a) psychiatric condition, including an eating disorder, were excluded from participation. Participants with self-reported elevated levels of affective complaints ($n = 11$) were also discarded from the analyses (see questionnaires below). Based on their self-reported EM (see questionnaires below) 41 participants were included in the final sample and divided into a low EM group ($n = 18$) and a high EM group ($n = 23$). Table 1 displays the group characteristics.

2.2. Measures and procedure

2.2.1. Procedure

The experiment took place in the psychology laboratory of the Vrije Universiteit Brussel. Participants first completed the informed consent and questionnaires, and then carried out the Exogenous Cueing Task in individual testing cubicles. The experiment ended with a debriefing of the experiment's purpose. Testing results could be requested through email upon completion of the data analyses. The procedure was carried out in accordance with the ethical standards of the ethical board of the Vrije Universiteit Brussel and the Helsinki Declaration.

2.2.2. Questionnaires

The *Dutch Eating Behavior Questionnaire* (DEBQ, van Strien et al., 1986) was administrated, measuring the three subscales emotional eating (13 items), external eating (10 items) and restrained eating (10 items). Items are rated on a 5-point Likert scale ranging from 1 = never to 5 = very often. The factorial and discriminant validity and test-retest reliability of the DEBQ and subscales are good (van Strien et al., 2007; van Strien et al., 2012). In the present study, DEBQ subscales showed good to excellent internal consistency, with Cronbach's α 0.97 for emotional eating, 0.88 for external eating and 0.92 for restrained eating. DEBQ norm scores are 1 (very low), 2 (low), 3 (below average), 4 (average), 5 (above average), 6 (high) and 7 (very high). Participants obtaining a norm score below 5 (average) on the Emotional Eating subscale were assigned to the low EM group ($n = 18$), while participants scoring above average were assigned to the high EM group ($n = 23$). Participants obtaining an average norm score ($n = 8$) were discarded from the analyses.

The Dutch version of the *Coping Inventory for Stressful Situations* (CISS, de Ridder & Van Heck, 2004) was used to assess participants' coping strategies. The questionnaire encompasses task-oriented coping (16 items), emotion-oriented coping (16 items) and avoidance-oriented coping (16 items). Items are rated on a 5-point Likert scale ranging from 1 = not at all to 5 = very much. The internal consistency and the test-retest reliability of the Dutch CISS are good (de Ridder and van Heck, 2004). Internal consistency (Cronbach's α) in the present sample was excellent for task-oriented coping (0.93) and emotion-oriented coping (0.92), and good for avoidance-oriented coping (0.82).

Important to note is that we controlled for affective complaints, which are known to evoke an AB (Beckwé and Deroost, 2016; Koster et al., 2005; Koster et al., 2010). Depressive complaints were assessed using the Dutch version of the *Beck Depression Inventory* (BDI-II-NL, Van der Does, 2002), consisting of 21 statements which participants have to rate from 0 to 3. The Dutch version of the BDI-II has a satisfactory validity and reliability (Van der Does, 2002). Norm scores are: 0–13 (minimal depression), 14–19 (mild depression), 20–28 (moderate depression) and 29–63 (severe depression). Participants obtaining a norm score of ≥14 were discarded from the analyses. Anxiety was assessed by means of the Dutch version of the *State-Trait Anxiety Inventory* (STAI-DY, Van der Ploeg, 2000), containing 40 statements with an answering scale of 1–4, and divided into the subscales state anxiety (20 items) and trait anxiety (20 items). The STAI-DY has a good validity and test-retest reliability (Van der Ploeg, 2000). Participants obtaining a norm score of eight or more on either the state or trait anxiety scale, indicating elevated levels of anxiety, were excluded from the analyses. Elevated levels of depression and anxiety overlapped in a number of participants, in total $n = 11$ were discarded from the analyses based on their BDI-II-NL and STAI-DY scores. In the present sample, the BDI-II-NL (0.84), the STAI state (0.87) and the STAI trait (0.85) demonstrated good internal consistency (Cronbach's α).

2.2.3. Exogenous cueing task (ECT)

The ECT was used to assess AB. Reaction times (RTs) were collected with E-Prime 2.0 Professional software that was ran on a Windows 7 computer (laptop) 60-Hz, 15-inch, 32 bits color monitor. The facial stimuli were adopted from the MacBrain Face Stimuli Set (Research Network on early experience and brain development).

An ECT trial started with a 500 ms fixation cross, flanked by two side frames in which a happy, angry, sad or neutral face cue appeared for 200 ms or 1000 ms. The cue duration was manipulated to determine the time-frame of the AB indices (see below). The face cue was then masked for 50 ms, after which the frames disappeared, and the target dot was presented left or right. Participants had to press the `z' key for a left target and the `n' key for a right target, using their index fingers. An equal amount of valid (cue and target appear on the same location) and invalid (cue and target appear on the opposite location) trials was randomly presented. Participants completed 20 practice trials before completing 384 trials test trials. Test trials were presented in two blocks of 192 trials, with a counterbalanced cue presentation of 200 or 1000 ms, separated by 30 seconds.