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Emotional responses to images of food in adults with an eating disorder: A comparative study with healthy and clinical controls

Phillipa Hay [a,b,*], Mary Katsikitis [c]

[a] School of Medicine, University of Western Sydney, Locked Bag 1797, Penrith, NSW 2751, Australia
[b] School of Medicine, James Cook University, 1 James Cook Dr, Douglas, Townsville, QLD 4811, Australia
[c] University of the Sunshine Coast, Faculty of Arts and Business, Maroochydore DC, Queensland, 4558, Australia

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ABSTRACT

Emotive responses to foods in people with eating disorders are incompletely understood in relation to whether the extent of emotional response is due to the eating disorder or non-specific emotional states.
The aims of the present study were to investigate negative and positive emotive responses to food images in adults with an eating disorder, and to compare responses to a (i) healthy and a (ii) clinic (psychiatry) control group. Participants viewed 20 images (16 of foods previously found to evoke fear, disgust and happiness and 4 neutral images) at half-minute intervals and rated emotive responses on 3 visual analogue scales for each image. Participants with an eating disorder (n = 26) were found to have significantly increased negative emotive (disgust and fear) responses and reduced positive (happiness) responses to the images compared to the 20 clinic and 61 healthy participants. Differences between groups remained significant when controlling for baseline levels of fear, disgust and happiness. Thus, the emotive responses to foods did not appear due to non-specific increases in anxiety or depression but rather was due to the presence of an eating disorder.

1. Introduction

Eating disorders (EDs) are common mental health problems (APA, 2013). In addition to maladaptive cognitions and behaviours (e.g., Giel et al., 2011) people with EDs experience strong negative emotions towards food and eating (McNamara, Chur-Hansen, & Hay, 2008; McNamara, Hay, Katsikitis, & Chur-Hansen, 2008). Macht (2008) has proposed that the desire to eat may also be suppressed by emotions such as fear, which are high in arousal or intensity. Overeating and/or binge eating can occur as well in an effort to diminish or escape from negative or even positive emotions (Hamilton-Wasson, 2003; Jeppson, Richards, Hardman, & MacGranley, 2003).

Giel et al. (2011) conducted a systematic review investigating the processing of food stimuli in patients diagnosed with an ED. The review reported that individuals with an ED experienced food stimuli as less pleasurable and imaging studies suggested that patients were more emotionally involved with such stimuli (Giel et al., 2011). In addition, several studies have implicated the emotions of fear and disgust as mediating factors in how individuals with EDs or with elevated levels of ED symptoms respond to food. Davey, Buckland, Tantow, and Dallos (1998) reported that individuals with an ED had significantly higher levels of disgust to food than a sample of normal individuals. This study and others (Davey et al., 1998; Schienle et al., 2004) found that ED patients were not significantly higher in disgust sensitivity in general, but rather in relation to specific aspects of the human body, bodily products and food.

While Davey and colleagues did not utilise images of food in their study, Harvey, Troop, Treasure, and Murphy (2002) found elevated levels of disgust and fear to high calorie food images in a sample of non-ED participants with increased ED symptoms. More recently, McNamara, Hay, Katsikitis, and Chur-Hansen (2008) examined emotional responses to food images in a non-ED sample of young adult women. Consistent with predictions, as eating concern increased, fear responses to food increased.

Based on these previous studies the current study was planned to further research how people with EDs emotionally respond to food compared to a group of psychiatry controls and a group of controls without a disorder. The decision was made to include a group of psychiatr controls due to the high co-morbidity of ED with anxiety, depression and other disorders (Giel et al., 2011; Steinglass et al., 2012; Swinbourne & Touyz, 2007). It has even been suggested that emotional responses to food stimuli may in part be due to components of disorders such as anxiety and depression, and not the ED per se (Giel et al., 2011).

* Corresponding author. Tel.:+61 2 412330428.
E-mail address: P.Hay@uws.edu.au (P. Hay).

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Furthermore, there is a substantial overlap between certain characteristics of anxiety disorders such as OCD and EDs such as anorexia nervosa (AN) (Steinglass et al., 2012).

The main aim of this study was to investigate whether non-ED disorder specific emotions account for responses to foods in people with an ED. Based on the results of our previous study (McNamara, Hay, Katsikitis, & Chur-Hansen, 2008) we hypothesised that those with an ED would have a greater emotive response to food than the normative control groups. Comparisons between those with an ED and another psychiatric disorder were exploratory.

2. Method

2.1. Participants

Three groups of 107 females aged ≥18 years participated in this study. Group 1 participants, the "ED group" (n = 26) were recruited from university clinics in Townsville (n = 14) and NSW (n = 12). Group 2 (the 'psychiatry controls') consisted of individuals diagnosed with an Axis I (APA, 1994) psychiatric disorder and who had not received a diagnosis of an ED (DSM-IV criteria were applied as were current at the time of data collection). The psychiatry control group participants (n = 20) were recruited from two university clinics in Queensland (n = 14) and from a clinical out-patient programme of a large Sydney teaching hospital (n = 6). Group 3, the 'healthy' control group of participants without a current psychiatric disorder (n = 61), consisted of volunteers from an undergraduate university psychology (n = 54) and nursing programme (n = 7).

2.2. Procedure

A set of PowerPoint slides of a range of food and non-food images was presented to each participant at half-minute intervals. Images were the 20 images used in previous studies in our laboratory (McNamara, Hay, Katsikitis, & Chur-Hansen, 2008). Participants rated their level of fear, happiness and disgust, separately for each image, on three 10 cm visual analogue scales (VAS) from "no emotion" to "most ever fear, happiness, or disgust". A summary mean score for disgust, fear and happiness was computed for all 16 food item responses, and all analyses were conducted on these summary scores.

The foods were photographed from a local supermarket and widely used trading market. They included foods that aroused disgust (e.g., green spotted herbal sausages), a happy or "excited" response (e.g., McDonald's "Happy meal") and fear due to unfamiliarity (e.g., Chinese skinned ducks) or, in those with eating disorders, possible fear of binging (e.g., a chocolate block). Four non-food images, (e.g., a chair, building) were included to check for aberrant responses, such as rating all images as high on fear. There were no such aberrant responses. Immediately prior to the PowerPoint presentation participants rated their level of happiness, fear and disgust on a 10 cm visual analogue scale from "no (emotion)" to "most ever".

2.3. Questionnaires

The Eating Disorder Examination Questionnaire (EDE-Q) was used to assess eating disorder symptomatology during the past four weeks (Beglin & Fairburn, 1992). The EDE-Q is comprised of 41 items and yields a global score in addition to scores on four subscales (i.e., Restraint, Shape Concern, Weight Concern, and Eating Concern) with each subscale demonstrating excellent reliability and validity (Beglin & Fairburn 1992; Luce & Crowther, 1999; Mond, Hay, Rodgers, Owen, & Beumont, 2004). Australian community norms and validation studies have been published (Mond, Hay, Rodgers, & Owen, 2006). BMI was calculated from self-reported height and weight.

Diagnoses were confirmed by experienced clinicians (clinical psychologists and psychiatrists) according to the DSM-IV criteria and the Mini International Neuropsychiatric Diagnostic Interview for the DSM (Sheehan & Lecrubier, 2005). This is a widely used and well validated instrument.

2.4. Ethics

The study was approved by the Human Research Ethics Committees of the respective Universities (H6644, A/09/209) and lead teaching hospital (08/CHW/259).

2.5. Statistics

Quantitative statistical analyses used the Statistical Package for the Social Sciences (SPSS) Version 20.0 software program. Data were inspected for normality and because the group data displayed a non-normal distribution, the Kruskal Wallis test was used to ascertain between group differences, with the Mann Whitney U Test for post-hoc tests. The Spearman correlation statistic rho (r_s) was used to test for correlations between baseline levels of emotion (i.e., before the viewing of the images) and levels of emotive response to food. Data were

Table 1
Participants' demographic data and eating disorder symptom severity scores.

	Eating disorder	Psychiatry controls	Normal controls	K–W χ^2, p, df = 2
	Mean (SD)			
	Median IQ range			
N	26	20	61	
Age	26.1 (8.3)	30.9 (10.9)	26.1 (7.7)	
	23.5 (18–34)	25 (22.5–42.8)	18 (24–33)	4.0, 0.13
Body mass index	22.4 (6.5)	23.8 (5.3)	23.9 (5.8)	
(kg/m^2)	20.7 (18.6–25.1)	22.4 (20.8–24.6)	22.5 (20.6–24.3)	3.5, 0.17
EDE-Q[a] scores				
Global score	4.6 (1.1)	1.9 (1.4)	1.7 (1.3)	
	4.9 (3.4–5.3) $_b$	1.4 (0.7–3.2)$_a$	1.4 (0.6–2.7)$_a$	44.6, <0.001
Restraint	4.5 (1.3)	1.9 (1.3)	1.5 (1.4)	
	4.9 (3.5–5.8)$_b$	1.6 (0.9–2.9)$_a$	1.2 (0.2–2.4)$_a$	43.5, <0.001
Shape concern	5.0 (1.2)	2.4 (1.8)	2.4 (1.8)	
	5.6 (3.6–5.9)$_b$	1.7 (1.0–3.9)$_a$	1.9 (0.9–4.2)$_a$	34.8, <0.001
Weight concern	4.7 (1.2)	1.9 (1.3)	1.5 (1.4)	
	5.0 (4.0–5.6)$_b$	1.7 (0.7–3.0)$_a$	1.7 (0.4–3.2)$_a$	33.3, <0.001
Eating concern	4.1 (1.3)	1.3 (1.3)	0.9 (1.2)	
	4.2 (3.0–5.1)$_b$	0.9 (0.2–1.9)$_a$	0.4 (0–1.4)$_a$	47.7, <0.001

[a] EDE-Q = Eating Disorder Examination — Questionnaire, differing subscripts indicate post hoc Mann Whitney U tests of between group significance $p < 0.05$.