



## Emotional face processing in women with high and low levels of eating disorder related symptoms

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### ABSTRACT

**Objectives:** Emotional processing has rarely been investigated in those “at risk” of developing an eating disorder. This study investigated the processing of six basic emotions depicted on faces in an “at risk” group, compared to a control group.

**Design:** Participants were women with high ( $N=29$ ) and low ( $N=23$ ) levels of eating disorder symptoms who were not taking psychotropic medication. A well characterised computerised task (Facial Expression Emotion Task) was administered to all participants.

**Results:** Women with high levels of eating disorder symptoms, compared to those with low levels, were less accurate at recognising happy and neutral faces, but showed no differences in their accuracy at recognising other emotions. They also showed a trend to be less good at discriminating anger, but better at discriminating surprise from other emotions. Depressive and anxious symptoms did not provide a complete explanation for the findings.

**Conclusions:** The findings support the inclusion of emotional processing in models of eating disorders, and suggest that it may have a role in their development. Emotional processing warrants further investigation particularly in those “at risk” but also in those with eating disorders.

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### 1. Introduction

Clinical descriptions have long suggested that people with eating disorders have deficits in emotional processing, including in the context of interpersonal relationships (e.g. Bruch, 1973, p50). It has been suggested that these may help account for the fact that patients with eating disorders often have significant problems with social functioning (Kucharska-Pietura, Nikolaou, Masiak, & Treasure, 2004). In the context of interpersonal relationships, for example, misinterpretation of another person’s emotional state might result in an unhelpful behaviour or response which may then have a negative consequence. Social functioning difficulties may persist even after behavioural symptoms have remitted (Yager, Landsverk, & Edelman, 1987), and become chronic (Ratnasuriya, Eisler, Szmuckler, & Russell, 1991). Problems with social functioning may also help maintain the eating disorder symptoms (Fairburn & Harrison, 2003). Research suggests that social and interpersonal situations, for example, are frequent triggers for eating disorder related behaviour (Abraham & Beumont, 1982).

Research has investigated ability to understand and process patients own internal emotions, and this ability has a role in cognitive models of eating disorders. However, little research attention has been given to the ability of those with eating disorders to understand/interpret the emotional states of other people.

Recent developments in cognitive models of eating disorders (e.g. Cooper, Wells, & Todd, 2004; Fairburn, Cooper, & Shafran, 2003) conceptualise binge-eating, to a greater or less extent, as a means of coping with intense (internal) cognitive and affective distress, while lack of awareness of own emotional states has been identified as a significant risk factor in cognitive models of

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anorexia nervosa (AN) (e.g. [Connan, Campbell, Katzman, Lightman, & Treasure, 2003](#); [Guidano and Liotti, 1983](#)). Cognitive models, however, pay much less attention to patient's ability to comprehend other people's emotional states, and do not generally provide an explanation of whether and how this might play a role in the development or maintenance of eating disorders.

Theoretically, in developmental models, understanding of one's own and of other's emotional states is often regarded as interdependent. Attachment theory outlines how deficits in one will affect the development of the other, and vice versa (e.g. [Fonagy, Gergely, Jurist, & Target, 2002](#)). Emotional processing difficulties also arise in the context of the early mother child relationship, with the mother and infant forming an affective relationship from the beginning of life (e.g. [Bowlby, 1969](#)). Historically, developmental factors have not been emphasised in cognitive models of EDs although there is recent work providing a preliminary integration of the two models ([Cooper, 2005](#)). There is also a cognitive–interpersonal model ([Schmidt and Treasure, 2006](#)) which includes difficulties in recognising others emotions as part of one process (avoidance) maintaining AN. Importantly, a deficit in understanding others emotions is likely to make cognitive therapy tasks difficult to complete successfully.

A number of studies have used the self report Toronto Alexithymia Scale (TAS: [Taylor, Ryan, & Bagby, 1985](#)) to assess emotional processing. These have indicated that patients with eating disorders, including those with AN ([Beales and Dolton, 2000](#)) and bulimia nervosa (BN) ([Bydlowski et al., 2005](#)) have deficits in emotional processing. Two recent studies in non-clinical groups, for example, have also found high levels of eating disorder related symptoms are related to deficits on the TAS ([Kiyotaki and Yokoyama, 2006](#); [Quinton and Wagner, 2005](#)), suggesting that emotional processing deficits may also be characteristic of those “at risk” or who have sub-clinical presentations. Although these findings are of interest, the TAS has been criticised for amalgamating several aspects of emotional processing ([Cooper, 2003](#)), including both awareness of own and other's emotional states. It has also been suggested that more specific and objective measures are needed ([Gilboa-Schechtman, Avnon, Zubery, & Jeczmierny, 2006](#)).

A small number of studies have used more objective means to assess emotional processing in clinical samples. These typically involve ability to identify emotion in others. To date, most studies have used emotional faces as stimuli, but have produced mixed findings. [Zonneville-Bender, van Goozen, Cohen-Kettenis, van Elburg, and van Engeland \(2002\)](#) found that adolescents with eating disorders were worse than controls at identifying emotion, using pictures presented on videotape. [Kucharska-Pietura, Nikolaou, Masiak, and Treasure \(2004\)](#), report similar findings in women with AN, using nine emotions presented on slides. However, [Mendlewicz, Linkowski, Bazelmans, and Philippot \(2005\)](#) used a computer based task, composed of facial stimuli taken from Ekman's series ([Matsumoto and Ekman, 1998](#)), but found no difference between those with AN and controls in accuracy or reaction time to five different emotions. Similarly, [Kessler, Schwarze, Filipic, Traue, and von Wietersheim \(2006\)](#), also using computerised presentation, found no difference between those with AN and controls in ability to recognise the six basic facial emotions, with the exception of a trend for the patients to recognise surprise less rapidly than controls. There appear to be no comparable studies in those with BN, and little information on which to base differential predictions in BN compared to AN.

A wide range of tasks have been used in these studies, most of which have unknown ability to discriminate between different groups. In several studies the medication status of the patients tested is unclear, and some are reported to be taking selective serotonin reuptake inhibitors (SSRIs). This is likely to be significant given that several studies have found similar tasks to be highly sensitive to SSRI administration (e.g. [Harmer et al., 2003](#)). Despite the high prevalence of depression in those with eating disorders, and increasing recognition of the importance of anxiety disorders (e.g. [Hinrichsen, Wright, Waller, & Meyer, 2003](#)), only one study controlled for depressive symptoms ([Kucharska-Pietura et al. \(2004\)](#)), and none for anxiety, thus some of the significant effects observed may be due to general distress, rather than any eating disorder specific features. This is particularly relevant given that both anxiety and depression are known to be associated with both emotional processing deficits and characteristic biases in the processing of, for example, negative information.

Clinically, there is increased recognition of the prevalence and seriousness of sub-clinical eating disorders. While their extent and nature remains understudied, it has been suggested that this group (which includes those identified in the Diagnostic and Statistical Manual-IV ([American Psychiatric Association, 1994](#)) manual as Eating Disorder Not Otherwise Specified: ED-NOS) is by far the largest of those with an eating disorder ([Fairburn & Harrison, 2003](#)). Moreover, many will subsequently develop either AN or BN. To date, however, no investigation of emotional processing using facial stimuli appear to have been conducted in a group “at risk” of developing an eating disorder, or who have sub-clinical symptoms. This is an important area for research given that relatively little is known about this group. Investigation of their emotional processing may also provide some insight into why and how those “at risk” may develop AN or BN, and how similar those “at risk” are to those with the full syndrome disorders.

The aim of the current study was to investigate the processing of emotional facial stimuli in a group of women with high scores on a measure of eating disorder related symptoms (i.e. an “at risk” or sub-clinical group) and a group of women with low scores. A well characterised, computerised task of emotional facial stimuli, measuring the full range of basic emotions, was used. Potential participants were excluded if they were taking any centrally acting medication (e.g. SSRIs or other medication known to affect the central nervous system) at the time of study and depression and anxiety were taken into account statistically in conducting the data analysis. Given previously conflicting findings, the study was designed to be exploratory and no specific hypotheses were investigated.

## 2. Method

### 2.1. Participants

A sample of two hundred and eighty-one women students enrolled in various undergraduate and post-graduate degrees at two universities completed the Eating Attitudes Test-26 (EAT; [Garner, Olmsted, Bohr, & Garfinkel, 1982](#)) and provided their contact

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