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Emotional reactivity to social stimuli in patients with eating disorders

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ABSTRACT

Patients with eating disorders often display a wide range of difficulties in psychosocial functioning. Most of the studies on this subject have focused on theory of mind; however, little is known about the subjective emotional reactivity of patients to social situations. The aim of this study was to evaluate the patients' perceptions of their own emotions when viewing pictures with social content. Emotional reactivity was assessed in 85 women (29 with anorexia nervosa, 28 with bulimia nervosa, and 28 healthy controls) by using 30 images from the International Affective Picture System. Images were divided into categories based on its social content and its emotional valence. The emotional response was evaluated through the Self-Assessment Manikin. Patients with bulimia nervosa presented higher arousal and lower control when viewing images with social content of pleasant, unpleasant, and neutral valence. Patients with anorexia nervosa reported higher arousal and lower control only for social images with neutral valence. There were no differences between groups for the control images. The finding of specific differences in emotional reactivity to pictures with social content contributes to a more accurate understanding of the difficulties of patients in social situations.

1. Introduction

Patients with anorexia nervosa (AN) and bulimia nervosa (BN) show difficulties in socio-emotional processing (Schmidt and Treasure, 2006; Russell et al., 2009; Oldershaw et al., 2011; Treasure and Schmidt, 2013), that are associated with the development and maintenance of the illness and usually imply a poorer prognosis (Zucker et al., 2007). Impaired social functioning has been mentioned among the original descriptions of the symptomatology of eating disorders (ED) (Pearce, 2004). Social phobia, relationship difficulties within the family, poor socialization skills, fear and avoidance of intense emotions and unrealistic social expectations are some of the features that have been widely observed in ED patients (Kaye et al., 2004; Schmidt et al., 1997; Godart et al., 2004; Tiller et al., 1997; Daley et al., 2008; Button et al., 1996).

Recently, there has been increased interest in the socio-emotional difficulties present in patients with ED. Most of the studies on this subject have focused mainly on one aspect of the social cognition, namely, theory of mind. Theory of mind (ToM) refers to the ability to attribute mental states to oneself and other people (Premack and Woodruff, 1978). In the majority of these studies, deficits in ToM have been observed in patients with AN and BN (Russell et al., 2009; Medina-Pradas et al., 2012; Tapajóz P. de Sampaio et al., 2013a). EDs have also been associated with the concept of alexithymia, a disturbance that affects emotional processing, which results in the inability to adequately express emotions and feelings (Bydlowski et al., 2005; Courty et al., 2015). Another aspect of the emotional difficulties presented across the whole spectrum of ED, that play an important role in the development and maintenanceof these disorders, is the emotional dysregulation (Harrison et al., 2010a; Lavender et al., 2014; Brockmeyer et al., 2014).

Despite the growing body of research that has been conducted on the socio-emotional aspects of EDs (Oldershaw et al., 2011), few studies have focused on the characterization of the emotional reactivity of patients to social situations. We use the term emotional reactivity to refer to a brief emotional response to environmental stimuli (Henry et al., 2012). To date, the subjective emotional response of patients with EDs to their social environment remains

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an open question.

According to Lang et al. (1999), affective processing can be better understood following a dimensional model. They proposed the existence of three basic dimensions of bipolar type around which the emotional response can be organized: (a) *affective valence* ranging from "pleasant" to "unpleasant," (b) *arousal or activation* with poles from "activated" to "calm" and (c) *control*, ranging from "in control" to "controlled by emotions." In order to test their hypothesis they developed an instrument capable of assessing these dimensions, the Self-Assessment Manikin (SAM) (Bradley and Lang, 1994).

A particularly important aspect of the emotional response to be considered, is the level of arousal that individuals experience when faced with social stimuli. In the autism literature, it has been proposed that the atypical behavioral responses to social situations, especially alterations in eye contact seen in patients suffering from Autism Spectrum Disorders (ASD), could be caused by an abnormal level of arousal being experienced in reaction to the social environment (Senju and Johnson, 2009; Mathersul et al., 2013; Louwerse et al., 2014).

In some neuropsychiatric disorders other than autism, differences have been observed in the level of arousal to emotional stimuli. Patients with schizophrenia judged aversive pictures with social content as less arousing than did healthy controls (HC) (Aminoff et al., 2011). In patients with bipolar disorder, a higher intensity of arousal compared with that in HCs, has been observed regardless of the valence of the stimuli (M'Bailara et al., 2012). Nevertheless, in a previous study, it has been found more arousal than HCs when confronted with neutral images (M'Bailara et al., 2009). On the other hand, patients with major depressive disorder presented reduced emotional reactivity to both positively and negatively valenced stimuli (Bylsma et al., 2008).

To our knowledge, few studies in the field of eating disorders have specifically assessed the subjective level of arousal in reaction to social stimuli. Zonnevylle-Bender et al. (2005) examined self-reported emotional arousal and neurophysiologic variables, like heart rate and Hypothalamic–Pituitary–Adrenal (HPA) axis responses to psychosocial stress, in a group of 10 AN patients compared with 22 HCs, through a public speaking test designed to induce an anxious stress. They found that AN patients presented higher levels of anxiety due to stress but this was not reflected in their neurophysiologic response. The HC group reported higher levels of self-reported anxiety, which were consistent with increases in their neurophysiologic responses. These results show a discrepancy between the recognized emotion and the corresponding physiologic arousal in AN patients.

Some studies have examined other aspects of the socio-emotional processing by using different paradigms of visual stimuli (Oldershaw et al., 2011). Joos et al. (2009) assessed the existence of deficits in socio-emotional processing with the use of stimuli from the International Affective Picture System (IAPS). The images were selected to show emotions such as fear, anger, sadness and happiness. Compared with healthy controls, patients with restrictive AN showed an increased fear reaction when confronted with stimuli containing anger, whereas BN patients presented a tendency toward decreased fear. No other differences in emotional perception were observed.

Harrison et al. (2010a) assessed attentional biases toward social stimuli (pictures with faces) versus nonsocial stimuli (e.g., chairs) through an emotional Stroop task among patients with AN, patients with BN, and HCs. They found that ED patients had greater attentional bias in color naming for social stimuli. They also had greater bias toward angry faces than toward neutrals. In a subsequent study with the same paradigm, Harrison et al. (2010b) also observed a significantly higher attentional bias for social and anger-threat stimuli in patients recovered from AN compared with HCs, which suggests that this bias may be a trait of AN.

In an experimental study on facial expression and subjective experience of emotion induced through film clips (positive, negative and neutral), Davies et al. (2011) found that AN patients were less facially expressive than HCs in response to positive and negative stimuli, and report feeling less positive emotion but the same level of negative emotion relative to HCs. The authors also found that AN patients looked away significantly more during the negative film clip, as an attempt to avoid a negative feeling. In a posterior study using the same paradigm in adolescents with AN, Rhind et al. (2014) also found that patients presented less facial affect than HCs, although no differences in subjective emotion experience was reported. In AN recovered patients, it was observed that attenuated facial affect was less marked (Davies et al., 2013).

In summary, the subjective emotional experience of eating disorders patients when faced with social stimuli, is yet to be explored, despite the existence of studies that have evaluated various aspects of social processing, such as recognition (Jänsch et al., 2009; Pollatos et al., 2008) and expression of emotions (Davies et al 2011, 2013; Rhind et al., 2014), attentional biases (Harrison et al., 2010a, 2010b), theory of mind (Tchanturia et al., 2004; Russell et al., 2009; Oldershaw et al., 2010; Medina-Pradas et al., 2012; Tapajóz P. de Sampaio et al., 2013a, 2013b), emotional regulation (Harrison et al., 2010a; Lavender et al., 2014; Brockmeyer et al., 2014) and social anhedonia (Tchanturia et al., 2012; Harrison et al., 2014).

The study of the emotional subjective reactivity to social pictures may help to better understand the mechanisms associated with social difficulties and is a significant issue considering that the subjectivity have been somewhat neglected over the last decades (Barrett et al., 2007; Treasure, 2012). From our perspective, to assess the subjectivity of an individual regarding his emotional experiences provides a richer, accurate and customized picture of what's going on in their inner world. Moreover, according Tchanturia et al. (2015), more studies about emotional processing in ED are necessary, especially on the effect of affective valence in emotional processing. On the other hand, as mentioned by M'Bailara et al. (2012), the ability of patients to respond to external stimuli is a critical issue because it directly involves their ability to adapt to the environment.

In previous studies, we have observed that patients with AN show difficulties when performing theory of mind tasks (Tapajóz P. de Sampaio et al., 2013a) and that this difficulties are related to weak central coherence (Tapajóz P. de Sampaio et al., 2013b). Our main motivation for this work was to extend our research to other aspects of social cognition. Rather than to analyze the ability of patients to understand the mental states of others, our goal was to study how these patients feel when observing images with social content. In fact, the aim of the present work was to empirically evaluate the emotional reactivity (valence, arousal, and control) of patients with eating disorders when viewing pictures with social content. A secondary objective was to explore a possible association between emotional response and psychopathologic profile.

In view of the lack of previous studies that specifically assess the level of subjective reactivity of patients with EDs when viewing social images, but based on consistent reports about difficulties in other domains of social cognition (Oldershaw et al., 2011), and on solid evidence of higher levels of alexithymia, inhibition and emotional avoidance in patients with anorexia nervosa (Courty et al., 2015; Lawson et al., 2008; Wildes et al., 2010), our hypothesis was that, when confronted with social images, AN patients might present an emotional reactivity profile consisting in underarousal and overcontrol in comparison with HCs. On the other hand, patients with BN usually show higher rates of impulsivity and emotional dysregulation (Anestis et al., 2009;