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# Subjective emotional responses to IAPS pictures in patients with borderline personality disorder, cluster-C personality disorders, and non-patients

M. Peter<sup>a,\*</sup>, A. Arntz<sup>b</sup>, T.A. Klimstra<sup>c</sup>, M. Faulborn<sup>d</sup>, A.J.J.M. Vingerhoets<sup>e</sup>

<sup>a</sup> Department of Personality Disorders, GGz Breburg, Lage Witsiebaan 4, Tilburg, the Netherlands

<sup>b</sup> Department of Clinical Psychology, Faculty of Social and Behavioral Sciences, University of Amsterdam, Nieuwe Achtergracht 129, Amsterdam, the Netherlands

<sup>c</sup> Developmental Psychology, Tilburg University, Warandalaan 2, Tilburg, the Netherlands

<sup>d</sup> Department of Forensic Psychiatry, GGz Breburg, Lage Witsiebaan 4, Tilburg, the Netherlands

<sup>e</sup> Department of Medical and Clinical Psychology, Tilburg University, Warandalaan 2, Tilburg, the Netherlands

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## ABSTRACT

According to Linehan (1993), emotion dysregulation is a central feature of borderline personality disorder (BPD). We hypothesized that patients with BPD are emotionally hyperresponsive. For BPD treatment, it is important to evaluate this hypothesis, because, if it is supported, therapeutic interventions could be designed to help patients to better manage hyperemotional reactions. We investigated the subjective reactions (in terms of valence and arousal) of patients with BPD to visual emotional stimuli of the International Affective Picture System (IAPS). We hypothesized that, compared to patients with Cluster-C personality disorders and non-patients, BPD patients would show higher scores on the arousal dimension and higher negative scores on the valence dimension when rating IAPS pictures with varying degrees of arousal and valence. Ratings of valence and arousal for 40 IAPS pictures were collected from 39 borderline personality disorder (BPD), 36 patients diagnosed with Cluster-C personality disorders (PD), and a group of 226 non-patients. Contrary to expectations, BPD patients did not differ from the non-patients. This indicates that their self-report scores do not reflect hypersensitivity. We found that patients with BPD showed lower scores on arousal than Cluster-C PD patients. The scores on valence suggested that Cluster-C PD patients also experienced more positive emotions than BPD patients.

## 1. Introduction

According to Linehan (1993), borderline personality disorder (BPD) results from emotion dysregulation. This emotional dysregulation is conceptualized as a combination of emotional vulnerability and an inability to modulate emotional responses. The key components of this vulnerability in BPD are hypothesized to be a greater emotional sensitivity (low threshold for recognition of emotional stimuli), greater emotional reactivity (high amplitude of emotional responses), and a slower return to baseline arousal (longer duration of emotional responses) (Glenn and Klonsky, 2009). The current study focuses on the second component and contrasts the general emotion hyperreactivity theory with theories that hypothesize that BPD is characterized by stronger emotional responsivity to specific stimuli, such as emotional, sexual, and physical abuse (Lobbestael and Arntz, 2015; Rosenthal

et al., 2008). The results of previous studies on emotional reactivity vary across stimulus type (e.g., film clips, personalized scripts), emotional valence of the stimulus (i.e., neutral, positive, negative), comparisons groups (i.e., non-patients, other Axis I or II groups), and emotional outcomes (self-reported total negative affect vs. specific emotions).

Consistent with Linehan's (1993) theory of BPD, Lynch et al. (2006) found that BPD patients are more sensitive to identifying emotional expression in faces than non-patients are. Further, research using biological measures of emotion processing in BPD has also provided support for emotion hyperreactivity in BPD. Specifically, compared to controls, BPD patients have a heightened startle response to unpleasant stimuli (Ebner-Priemer et al., 2005; Glenn and Klonsky, 2009). Hazlett et al. (2007) reported that compared with healthy controls, BPD patients exhibited exaggerated affective startle modulation during un-

\* Corresponding author at: Department of Personality Disorders De Woenselse Poort, GGz Eindhoven, Dr. Poletlaan 40, 5626 Eindhoven, the Netherlands.  
E-mail address: [m.peter@ggze.nl](mailto:m.peter@ggze.nl) (M. Peter).

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pleasant, but not neutral words. Interestingly, compared with healthy control subjects, BPD patients rated the unpleasant words as significantly less unpleasant, whereas group ratings for the neutral words were similar. In our study, we also compared different groups, as we compared borderline patients to Cluster C personality patients and non-patients.

However, emotional hyperreactivity in BPD is not consistently reported in experimental studies. Several studies have failed to demonstrate that BPD patients exhibit increased psychophysiological responses to negative pictures (Domes et al., 2009; Herpertz et al., 1999, 2000), although there was also evidence of an enhanced amygdala activation to aversive stimulation (Herpertz et al., 2001). In a meta-analysis of 19 functional neuroimaging studies, BPD patients showed, compared to non-patients, relatively increased activation of the left amygdala and posterior cingulate cortex along with blunted responses of the bilateral dorsolateral prefrontal cortex during the processing of negative emotional stimuli (Schulze et al., 2016). These results appear to be consistent with results from most self-rating-based studies which did not find significant group effects in BPD (e.g., Niedtfeld et al., 2010; Schulze et al., 2011) or even blunted responses compared to non-patients (e.g., Hazlett et al., 2012). Several other studies (Ellices et al., 2012; Jacob et al., 2010; Kuo et al., 2009, 2016;) illustrate that BPD patients do not exhibit greater self-reported emotional reactivity than non-patients.

In BPD patients, hyperarousal and emotional reactivity do tend to occur when the attachment-safety system is threatened (Fonagy, 2000; Levy, 2005). Thus, images of interpersonal threat and interpersonal relations (e.g., the attachment projective, the eye in the mind test, and so on) tend to activate the amygdala-hippocampal systems (Hall et al., 2010; Schmahl et al., 2003). These tend to be shown clearly in imaging, but less so at the behavioral level.

In the present study, we aimed to further investigate the emotional reactivity of BPD by using the International Affective Picture set (IAPS; Lang et al., 1998). The IAPS is a well-known and widely used stimulus set of pictorial affective material. In neuroimaging research in BPD, the IAPS are among the most commonly used material to elicit emotional reactivity (Krause-Utz et al., 2014; Mauchnik and Schmahl, 2010; Van Zutphen et al., 2015). Findings from these studies show that limbic hyperreactivity and diminished recruitment of frontal brain regions may yield a link between disturbed emotion processing and other core features of BPD such as impulsivity and interpersonal disturbances. Koenigsberg et al. (2002, 2009) observed no differences in valence and arousal levels between a BPD group and non-patients, but did find different patterns of regional brain activation in BPD patients. This raises the possibility that, although borderline patients demonstrate a higher reactivity of mood and a higher sensitivity to emotional stimuli than non-patients, their subjective experience of emotional intensity does not differ from that of the non-patients. To clarify whether findings are specific to BPD, comparisons with other clinical groups are needed. In the present study, we expand upon this work by comparing the IAPS self-report evaluations by BPD patients, non-patients, and patients with Cluster-C PDs. We included Cluster-C PD patients as a comparison group because these patients tend to have high levels of Neuroticism (Saulsman and Page, 2004) and therefore should have emotionality-related problems as well.

To be able to draw meaningful conclusions on hyperreactivity specific to BPD patients, one must compare the findings with both patients with other personality disorders and non-patients. By doing this, we expected to find a unique pattern of hyperreactivity in BPD patients. Based on the theory of Linehan (1993), we expected BPD patients to have higher scores on the arousal dimension and more negative valence scores than Cluster-C PD patients and non-patients. Finally, we explored the association between the severity of BPD and hyperreactivity. We expected severe BPD to be associated with more hyperreactivity, thus to higher arousal and negative valence scores.

## 2. Methods

### 2.1. Participants

The patient group consisted of 39 patients (5 men and 34 women) diagnosed with BPD and 35 patients (12 men and 23 women) with Cluster-C PD (primary diagnoses: 17 avoidant personality disorder, 5 dependent personality disorder, and 13 obsessive personality disorder). Within the BPD group, 7 patients showed comorbidity with Cluster-C PD as they also met the criteria of a Cluster-C PD. The primary diagnosis was determined on the basis of the request for help and on what the primary focus of treatment should be to meet the demand for help. The patients were all waiting for outpatient treatment at the Mental Health Institute of Tilburg (GGZ Breburg). Acute and chronic psychotic disorders, as well as bipolar disorder, organic disorders, dissociative identity disorder, and mental retardation were exclusion criteria for both patients with BPD and Cluster-C PDs. Age for both patient groups ranged from 25 to 58 years ( $M_{\text{age}} = 36.3$ ;  $SD = 8.8$ ). The patient group in this study is a subsample of the sample that was investigated in an earlier study by Peter et al. (2013). That study focused on emotional intelligence and not on the IAPS.

For the non-patient group, data were used from another sample ( $N = 240$ ). The non-patient group are healthy controls. All non-patients voluntarily participated in this study, after being approached by a data-collection agency (Center Data Tilburg). Although we did not have a formal assessment for the presence of psychopathology in the non-patient sample, an inclusion criterion was that participants had to report good mental health and no prior experience with mental health care. This inclusion was based on subjective reports. Specifically, we selected participants aged between 19 and 58 years in order to match the age range of the patient samples. The resulting non-patient group consisted of 226 individuals ( $M_{\text{age}} = 2.3$  years;  $SD = 9.7$ ).

### 2.2. Procedure

This study was approved by the institute's Medical Ethics Review Committee (METIGG Kamer Zuid). Written-informed consent was obtained from all participants. DSM-IV classifications of the patient group were based on the Structured Clinical Interview for DSM-IV (SCID-II; First et al., 1997; Dutch version by Weertman et al., 2000), which is part of the standard intake procedure at GGZ Breburg. After the intake, patients were invited to participate in this study. Patients were assessed at GGZ Breburg where the IAPS pictures were presented on a 15-inch laptop. The non-patients completed the IAPS at home on their own computer. The IAPS pictures were presented in the same sequence to every participant, with each image displayed for 6 s.

### 2.3. Materials

As stimuli, 40 pictures were selected from the International Affective Picture System (IAPS; Lang et al., 1998). The IAPS is a collection of photographic images that have been shown to induce positive, negative, or neutral affective states. Picture ratings on the dimensions of valence and arousal were scored on a 9-point scale. The dimension of *valence* differentiates positive (pleasant) from negative (unpleasant) emotional states. The dimension of *arousal* distinguishes highly exciting, arousing states from calm, relaxed states. Four independent researchers rated the IAPS pictures in valence and arousal in the Dutch population. For every quadrant, we selected 10 photos with the highest loadings to evoke extreme emotional reactions in this study. For example, we selected pictures with domestic violence, group lynch/murder of a person, and a starving child. In this sense, we intended to trigger the attachment safety mechanism of participants. We made a selection of 10 pictures from each of the four quadrants, quadrant 1 (positive valence, high arousal), quadrant 2 (negative valence, high

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