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Emotional sensitivity in youth with borderline personality pathology

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ABSTRACT

If Borderline Personality Disorder (BPD) is characterized by an underlying emotional sensitivity, individuals with this disorder would be expected to demonstrate accurate identification of emotional expressions at earlier stages of expression (i.e., lower thresholds of facial expressivity across all emotional valences). Twenty-one outpatient youth (aged 15–24 years) meeting 3 or more DSM-IV BPD criteria and 20 community-derived participants (aged 15–24 years) with no history of psychiatric problems were tested on a measure of emotional sensitivity, the Face Morph Task. In this test faces morph from neutral to each of the six basic emotional expressions. The BPD group showed no evidence of heightened sensitivity to emotional facial expressions compared to the community control group (all $P>0.05$ and effect sizes ranging from 0 to 0.6). They require comparable levels of emotional expressivity in order to correctly identify emotions. Therefore, emotional sensitivity might not be apparent early in the course of BPD. Rather, it might develop later in the course of the disorder or be present only in severe BPD.

1. Introduction

Facial expressions of emotions are fundamental social emotional signals with a strong evolutionary bias and immediate implications for behaviour. Emotional expressions provide information about the intentions of others, personal relations, evoke emotional responses in others and serve as incentives for action (Keltner and Kring, 1998). For instance, sad expressions have been linked with promoting nurturance and inhibiting aggression and hostility in others, while angry expressions have been shown to reduce errant behaviour (e.g., breaking social rules and expectations) in observers. Dysfunction in either their own emotional displays or perception of emotions in others can disrupt or harm social relationships and self-management by eliciting adverse responses from others and failing to elicit supportive responses when needed. As such, aberrant processing and responding to facial emotional expressions might result in detrimental effects on social functioning.

Emotion dysregulation lies at the core of Linehan's biosocial theory of BPD (Linehan, 1993), which is one of the most thoroughly delineated etiological models of borderline pathology (for other models, see: (Fonagy et al., 2000; Judd and McGlashan, 2003; Kernberg, 1967, 1975, 1976). The dysfunction proposed by Linehan is one of broad dysregulation across all aspects of emotional responding. Individuals with BPD display greater emotional sensitivity (low threshold for recognition of emotional stimuli), greater emotional reactivity (high amplitude of emotional responses), and longer duration of emotional responses (slower return to baseline arousal). BPD emerges from transactions between individuals with biological vulnerabilities and specific environmental influences (e.g., family environment). More specifically, impulsivity is seen as a predisposing vulnerability for both current and future difficulties with emotion regulation, resulting in dysregulation across cognitive processes, neurochemistry and physiology, facial and muscle reactions and emotion-linked actions (Crowell et al., 2009). There is some empirical support for this hypothesis. Individuals with BPD process information in a negatively biased way (Veen and Arntz, 2000; Meyer et al., 2004), remember more negatively salient words (and perhaps more negative memories) (Korfine and Hooley, 2000), are more sensitive to emotional stimuli (Frank and Hoffman, 1986; Ladisch and Feil, 1988), tend to rate faces as less friendly and more rejecting (Meyer et al., 2004) and have reduced facial emotional expressiveness to positive as well as negative stimuli (Renneberg et al., 2005). This is despite having autonomic arousal and startle responses comparable to the non-BPD control group (Herpertz et al., 1999; Herpertz et al., 2000; Herpertz et al., 2001) and better mental state discrimination based on the eye region of the face compared to community controls (Fertuck et al., 2009).

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Recently, Domes et al. (2009) systematically reviewed six studies focusing on BPD patients' recognition and responding to facial stimuli. Four of these studies used static emotional expressions with somewhat varying results. In a predominantly female sample (66%), Levine et al. (1997) reported lower accuracy in recognising facial expression of anger, fear and disgust in the BPD group (n = 30), compared to the non-psychiatric comparison (n = 40) group matched on age and education level. Similarly, Bland et al. (2004) found impaired recognition accuracy for fearful angry and sad faces in women with BPD. Minzenberg et al. (2006) compared outpatients with BPD (n = 43, 88% female) to healthy controls (n = 26, 89% female) on emotion recognition tasks across visual and auditory modalities (facial, prosodic, and integrated facial/prosodic). Patients with BPD showed normal ability to recognize isolated facial or prosodic emotions. They did, however, have impaired recognition of emotions in integrated facial/prosodic stimuli. Impaired discrimination of non-emotional facial features was also evident and might be related to some of the more serious symptoms of the disorder (e.g., interpersonal antagonism). The above studies used a multiple-choice answer format, where participants had to choose an answer from a list of alternatives. In contrast, Wagner and Linehan (1999) asked participants to describe the emotional state of the presented person. They examined recognition of emotional facial expressions among women diagnosed with BPD (n = 21), compared to a group of women diagnosed with histories of childhood sexual abuse (n = 21) and a group of women with no history of sexual abuse or BPD (n = 20). Unlike the other studies, they found that the BPD group were accurate in recognising emotions, but had significantly heightened sensitivity towards recognition of fear. Nevertheless, the above studies using static emotional facial expressions have not clarified whether BPD patients show differences in accuracy of labelling specific emotions or have a different detection threshold for more ecologically valid ambiguous stimuli (i.e., facial stimuli not at 100% expression or facial stimuli with ambiguous blends of emotion).

In order to simultaneously examine detection threshold and recognition accuracy for emotional faces, dynamic facial expressions need to be utilised. Moreover, recognition of emotions relies upon anatomically separable brain regions, depending on whether the stimuli were static or dynamic displays of facial affect and there is evidence that different types of knowledge about emotions may draw upon different neural systems (Adolphs, 2002; Adolphs et al., 2003). Temporal and limbic-related cortices may be important in retrieving information about emotions signalled by static stimuli, while parietal and frontal lobe areas may be more involved in retrieving knowledge about emotions signalled through dynamic movement (Adolphs et al., 2003). In addition, the role of brain areas mediating attention (e.g., inferior medial prefrontal cortex) are implicated for longer presentation times since multiple cognitive processes compete when a stimulus is presented for more than three seconds, such that the observer divides attention between emotions evoked by the stimulus and their secondary cognitive associations (Geday et al., 2007). Thus the difference between static and dynamic tasks may not only be in terms of stimulus presentation but also in the brain regions activated during the experimental task.

Two studies of emotion processing in BPD to date have used dynamic facial expressions in their design. Lynch et al. (2006) demonstrated that participants with BPD (n = 20, 85% female) were significantly more likely to correctly identify facial affect (regardless of valence) at an earlier stage than healthy controls (n = 20, 85% female), implicating heightened sensitivity to facial emotion in BPD. Conversely, Domes et al. (2008) found that female BPD patients had detection thresholds comparable to a female non-clinical control group. BPD patients (N = 25) showed a significant reduction in detection threshold over the course of the experiment, compared to a control group (N = 25; matched on age, IQ and education), suggesting that enhanced sensitivity might be particular to emotional expression of familiar faces. Moreover, they found that BPD patients significantly over-reported anger when evaluating ambiguous blends of anger/sadness and anger/happiness. Some of the differences in findings between the two studies might be explained by differences in experimental design. In Lynch et al.'s study, participants were allowed to change their mind as often as they liked during the course of the experiment, whereas in Domes et al.'s study the trial was stopped following the first response and participants were allowed to label the facial stimuli without the time restraints. Factors other than emotional sensitivity, such as the opportunity to guess, are thus likely to vary between the two studies.

In summary, the majority of research to date does not support the assumption of general hypersensitivity to facial emotions in BPD. Rather, this collective evidence suggests more subtle impairments in labelling accuracy, as well as a tendency to interpret ambiguous faces in a more negative way (i.e., a bias toward negative emotional perceptions). It is also of note that females, whether girls or women, perform affect recognition tasks better than males (McClure, 2000; Thayer and Johnsen, 2000). The majority of studies reviewed in this paper have either used samples consisting entirely or mostly of females and thus reflect the predominance of the BPD diagnosis in females. Where mixed samples were used, the ratio of males to females was closely matched between clinical and control groups, suggesting that the observed pattern of results was not due to different gender ratios between clinical and control groups. Some of the differences in the findings could be accounted for by the choice of comparison group, as well as the choice of response format (free response vs. forced choice). More importantly, group differences in accuracy observed in the majority of previous studies do not necessarily reflect differences in sensitivity, as the majority have used facial stimuli at 100% expression without examining stimuli at lower levels of intensity. The use of dynamic emotional stimuli might be more appropriate, as they are more effective than static stimuli in activating brain areas that process emotion (LaBar et al., 2003; Sato et al., 2004).

The abovementioned studies have recruited adult samples (mean age approximately 30 years or more). As BPD commonly has its onset in adolescence or early adulthood (Chanen et al., 2008a), the participants in the above studies are likely to have had long durations of illness. Therefore, previous research has been confounded by the effects of chronic BPD, as well as factors associated with the duration of illness, such as recurrent co-occuring Axis I disorders including substance use (Zanarini et al., 2004a), deliberate self-harm, cumulative traumatic events (Zanarini et al., 2005) and treatment (including polypharmacy) (Zanarini et al., 2004b). Examining the processing of social threat early in the course of BPD is likely to reduce the influence of such factors on brain morphology (Chanen et al., 2008b). However, comparing a younger BPD sample to adults with BPD (>30 yrs of age) may not be appropriate. This is because in younger participants brain development may not be complete in the key areas (e.g., frontal lobe) that are at least partially involved in recognising facial emotions (Adolphs et al., 2003; Toga et al., 2006). The present study therefore utilised a community control group in the same age range as the clinical participants.

The aim of the present study was to explore the emotional sensitivity hypothesis in a sample of youth with features of BPD. If BPD is characterized by an underlying emotional sensitivity it would be expected that compared to healthy controls of the same age range, individuals with BPD features would show accurate identification of emotional expressions at earlier stages of expression across all presented emotional expressions. Moreover, it was hypothesised that in comparison to the community group of the same age range, the BPD group would have higher ratings of threat and arousal, as well as lower ratings of valence and dominance/control of the 'recognised' facial expressions.

2. Method

2.1. Participants

Twenty-one outpatients meeting three or more DSM-IV BPD criteria and aged between 15 and 24 years (mean age = 18.90, SD = 3.10 years; 3 male, 18 female) were recruited from the HYPE Clinic a specialized early intervention program for BPD (Chanen et al., 2009) at