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Facial trust appraisal negatively biased in borderline personality disorder

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ABSTRACT

Borderline personality disorder (BPD) is characterized by unstable interpersonal relationships and intense concerns regarding abandonment and rejection. Previous studies suggest that these and other symptoms of BPD may have their origin in a greater appraisal of untrustworthiness in others. However, it is not known whether this is a result of a heightened sensitivity to trust related stimuli, an improved ability to discriminate between such stimuli, or a response bias. Furthermore, impairment in facial fear appraisal may influence trust appraisal. Healthy controls and individuals diagnosed with BPD appraised human faces that were parametrically varied along either a trust or fear dimension. The BPD group exhibited a response bias to rate the untrustworthiness of facial stimuli higher compared to controls, but there were no significant differences in the discriminability or sensitivity of trustworthiness between groups. Furthermore, ambiguous trust decisions were associated with longer response times (RTs) in individuals with BPD relative to controls. Individuals with BPD have a facial appraisal bias specific to untrustworthiness that does not co-occur with impairments in the appraisal of fear.

1. Introduction

Borderline personality disorder (BPD) is a serious psychiatric disorder associated with high levels of mortality in the form of suicide (Oldham, 2006) and a pronounced health care burden (Bender et al., 2001). A hallmark symptom of BPD is a profound sensitivity to perceived threats to interpersonal relationships (Blais et al., 1999; Stanley and Siever, 2010). The social cognitive mechanisms by which the appraisal of social cues influence psychopathology in BPD has been the focus of a small but growing literature. Some studies have found that BPD is associated with an overall impairment in emotion recognition (Bland et al., 2004; Levine et al., 1997) particularly when multi-modal, complex processing is required (Minzenberg et al., 2006). Others have reported that overall emotion recognition does not differ between patients and controls; however, individuals with BPD have a bias to interpret negative emotions and traits in neutral or ambiguous social stimuli (Arntz and Veen, 2001; Domes et al., 2008; Meyer et al., 2004; Murphy, 2006). Yet further evidence from both clinical observations(Carter and Rinsley, 1977; Krohn, 1974), and experimental research (Arntz et al., 2009; Fertuck et al., 2009; Lynch et al., 2006) has suggested that BPD may be associated with enhanced accuracy in appraising the mental states and emotions of others. In sum, these studies have suggested that individuals with BPD are worse than, equal to, or better than controls at evaluating social cues. A possible explanation for the disparate findings may be that, in BPD, emotion and personality trait appraisals are subserved by different social and cognitive processes, and, therefore need to be dissociated when investigating social appraisals.

Appraisal of personality traits engages distinct cognitive-affective processes as compared to the appraisal of transient emotional expressions. For example, trait appraisal requires a prediction of future interpersonal behaviors (Freedman et al., 1951; Gilbert and Malone, 1995), whereas emotion appraisal generally requires an assessment of another's transient affective state and the short-term consequences of that state on the appraiser (Bliss-Moreau et al., 2008). Though they are sophisticated social judgments, trust and other trait appraisals (such as of attractiveness, dominance, and likability) can be made in as little as 100 ms (Todorov et al., 2009). Neuroimaging studies have demonstrated that the neural networks that process emotional appraisals are likely to be highly specialized and located in sensory cortex (Haxby et al., 2002). In contrast, predictive judgments regarding traits are likely to require more flexible circuits in frontal cortex (Bechara et al., 2000). Moreover, though these systems are distinct, they must interact during both types of judgments—emotion appraisals are influenced by trait appraisals and vice versa (Gilbert and Malone, 1995; Oosterhof and Todorov, 2009; Todorov, 2008; Winston et al., 2002).

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Individuals with BPD are highly sensitive to social rejection (Ayduk et al., 2008; Butler et al., 2002; Miano et al., 2012; Staebler et al., 2011). Rejection sensitivity is theorized to be an adaptation that minimizes their experience of emotional pain and dysphoria by helping individuals with BPD avoid the experience of rejection (Ayduk et al., 2008), the reaction to which is more intense and prolonged relative to healthy controls (Stanley and Wilson, 2006; Stiglmayr et al., 2005). Trait appraisals regarding the trustworthiness of others—that is, whether others will reject, be dishonest with, negatively judge, or otherwise emotionally hurt—suggests that individuals with BPD have a generalized mistrust of others (Arntz and Veen, 2001; Ayduk et al., 2008; Barnow et al., 2009; Franzen et al., 2011; King-Casas et al., 2008; Meyer et al., 2004; Miano et al., 2012; Nigg et al., 1991; Unoka et al., 2009; Zittel Conklin and Westen, 2005; Zlotnick et al., 2002). Though such appraisal differences are consistently found in BPD, the source of these differences—abnormalities in emotion appraisal, trait appraisal, or both—remains unclear. Furthermore, whether such differences are due to a deficit in the ability to distinguish trustworthy from untrustworthy individuals, an improved sensitivity in the ability to detect "untrustworthy" personality traits, or a response bias in the way individuals with BPD make trust-related decisions is also unknown. In a preliminary study (Miano et al., 2012) we found that BPD features in a non-clinical sample were associated with the appraisal of greater untrustworthiness in neutral faces, and that greater rejection sensitivity mediated the relationship between untrustworthy facial appraisals and increased BPD features. Other personality trait appraisals, such as the degree to which the faces were perceived as extroverted, dull, or attractive, were not associated with BPD symptoms.

We compare trust and fear appraisal in BPD for three reasons. First, since a general deficit in fear appraisal could impact trust appraisal (Oosterhof and Todorov, 2009), we assess whether any trust appraisal impairment could be explained as deficit in fear appraisal. Secondly, facial fear appraisal may be also be impaired in BPD (Dyck et al., 2009; Wagner and Linehan, 1999), so any BPD finding with trust appraisal needs to be differentiated from fear appraisal differences between BPD and controls. Finally, facial fear processing has been extensively studied in basic and clinical research (Whalen et al., 1998), allowing a comparison of our sample with established findings.

To test the hypotheses, participants were assessed on their appraisal of trustworthiness or fearfulness of facial stimuli. Using signal detection theory, we compared three parameters of psychophysical performance—discriminability, sensitivity, and response bias—to show that the perceptual mechanisms used to assess whether emotion, in general, and trust in particular, are impaired in BPD. Signal detection theory (Green and Swets, 1966) is a framework that may aid in resolving the nature of psychophysical differences between groups. By parametrically manipulating the trustworthiness of a stimulus, it is possible to determine whether differences between groups are due to perceptual (sensitivity or discriminability) or response (strategy/bias) properties of the decision (Fig. 1). The aim of the present study is to determine whether the increase in negative trust appraisals associated with BPD is due to (1) improved categorical perception of trust-related facial features, (2) a hypersensitivity to the presence of trust-related facial features, or (3) a behavioral response strategy. In evaluating our hypotheses, we also addressed several potentially confounding variables that have not been adequately addressed in most prior studies, including demographic factors (age, education, and ethnicity/race), severity of depression, state levels of emotional arousal, medication status, aggressivity, and abuse history status (cf. Fertuck et al., 2006; Harkness et al., 2005; Lee et al., 2005).

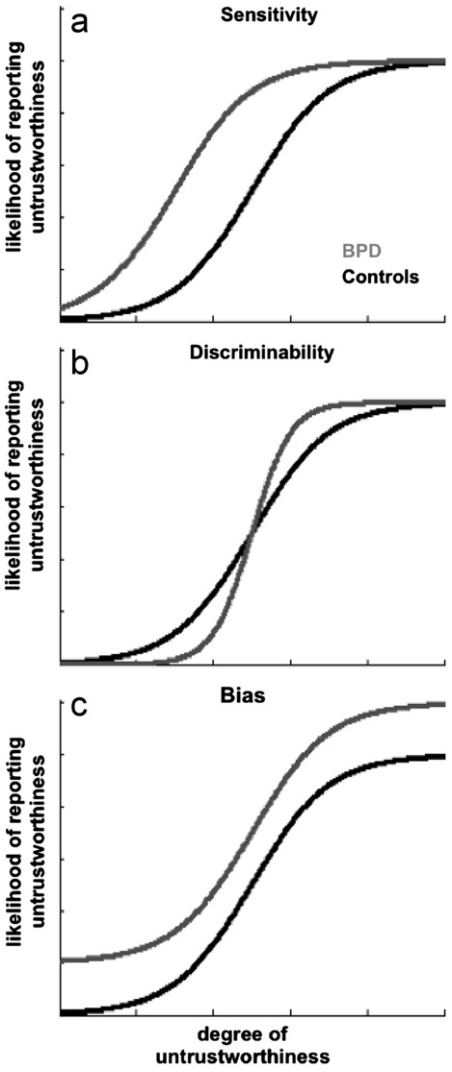

Fig. 1. Signal detection theory. There are three possible ways that appraisals of stimulus valence (e.g. trustworthiness or fearfulness) can differ between groups. (A) Increased sensitivity to untrustworthy features would amplify the likelihood of detection. (B) Greater discriminability would allow finer distinction between trustworthy and untrustworthy appraisals. (C) A response bias increases the likelihood of an untrustworthy appraisal independent of stimulus features. Linear combinations of these three psychophysical differences can also exist.

2. Method

2.1. Participants

BPD participants ($n=17$) were recruited through advertisement, hospital and clinic referrals, and from within active research protocols within a public psychiatric research institution. Exclusion criteria for the BPD group were the diagnoses of schizophrenia and other psychotic disorders, mental retardation, history of severe head trauma, or other cognitive impairment that might interfere with the accuracy assessments or competency to give informed consent. Control participants ($n=19$) were recruited through two sources. First, participants were recruited by advertisement and were assessed with the Structured Clinical Interview for DSM-IV (SCID)-I semi-structured interview and the SCID-II screener questionnaire. They were excluded if there was presence of any lifetime psychiatric or substance use disorder. Second, undergraduate students from a public, racially and ethnically diverse urban college were screened for elevated BPD symptoms with the SCID-II screener. Demographic and clinical characteristics of the samples are summarized in Tables 1 and 2. Institutional Review Boards approved the study, all participants were informed about the risks and benefits of participation, and all provided written consent.

2.2. Measures

2.2.1. Clinical assessment

For individuals with BPD, diagnoses were determined by the Structured Clinical Interview for DSM-IV, Patient Edition (SCID-I; Spitzer et al, 1992) and