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Misreading the facial signs: Specific impairments and error patterns in recognition of facial emotions with negative valence in borderline personality disorder

Zsolt Unoka *, Dóra Fogd, Melinda Füzy, Gábor Csukly

Department of Psychiatry and Psychotherapy, Faculty of General Medicine, Semmelweis University, 1083 Budapest, Hungary

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ABSTRACT

Patients with borderline personality disorder (BPD) exhibit impairment in labeling of facial emotional expressions. However, it is not clear whether these deficits affect the whole domain of basic emotions, are valence-specific, or specific to individual emotions. Whether BPD patients' errors in a facial emotion recognition task create a specific pattern also remains to be elucidated. Our study tested two hypotheses: first, we hypothesized, that the emotion perception impairment in borderline personality disorder is specific to the negative emotion domain. Second, we hypothesized, that BPD patients would show error patterns in a facial emotion recognition task more commonly and more systematically than healthy comparison subjects. Participants comprised 33 inpatients with BPD and 32 matched healthy control subjects who performed a computerized version of the Ekman 60 Faces test. The indices of emotion recognition and the direction of errors were processed in separate analyses. Clinical symptoms and personality functioning were assessed using the Symptom Checklist-90-Revised and the Young Schema Questionnaire Long Form. Results showed that patients with BPD were less accurate than control participants in emotion recognition, in particular, in the discrimination of negative emotions, while they were not impaired in the recognition of happy facial expressions. In addition, patients over-attributed disgust and surprise and under-attributed fear to the facial expressions relative to controls. These findings suggest the importance of carefully considering error patterns, besides measuring recognition accuracy, especially among emotions with negative affective valence, when assessing facial affect recognition in BPD.

1. Introduction

Facial emotion recognition, the ability to accurately infer the emotional state of others from facial emotional expressions, is essential for intact social functioning. In turn, misinterpretations due to impaired facial emotion recognition are likely to result in impairment of social relations. Borderline personality disorder (BPD) is a serious psychiatric disorder that is characterized by impaired social functioning, unstable interpersonal relationships (e.g. expectations of abandonment and extreme positive and negative views of significant others), inappropriate, intense anger and stress-related paranoid ideation (DSM-IV American Psychiatric Association, 2000). Given that individuals with BPD exhibit deficiencies in the establishment and maintenance of interpersonal relationships, it can be hypothesized that in cases of BPD there exists a fundamental impairment in mental state discrimination (Kernberg, 1975; Young et al., 2003; Fonagy and Bateman, 2008) and, as a part of this, impairment in the ability to decode emotions from facial expressions. This, in itself or combined with disturbances in mental state reasoning, may serve as the basis of the observed deficits in social functioning. Despite the plausibility of this hypothesis, to date, only a few studies have been published using facial emotion recognition paradigms to investigate the bases of interpersonal impairments in BPD. These studies yielded mixed results. What is more important, to our knowledge, no study has investigated the error pattern of facial emotion recognition using the full range of basic emotions so far.

Although studies seem to agree that the ability of facial emotion recognition is altered in patients with BPD compared to healthy controls, results concerning the pattern of alteration are somewhat contradictory. Some studies found that BPD patients show enhanced sensitivity to facial emotional expression of fear (Wagner and Linehan, 1999) and increased accuracy in the detection of sadness, happiness, surprise, anger, fear and disgust (Lynch et al., 2006) relative to healthy controls. A recent study, however, was not able to demonstrate this elevated sensitivity in terms of reduced detection threshold (Domes et al., 2008). A group of studies found that BPD patients were, in fact, less accurate in terms of emotion recognition compared to healthy controls, especially for expressions of anger, fear

* Corresponding author at: Department of Psychiatry and Psychotherapy, Faculty of General Medicine Semmelweis University, Balassa u. 6., 1083 Budapest, Hungary. Tel.: +36 1 239 49 93; fax: +36 1 210 0336.
E-mail address: unoka@psych.sote.hu (Z. Unoka).

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and disgust (Levine et al., 1997), and anger, fear and sadness (Bland et al., 2004), though a more recent study was not able to replicate these results (Minzenberg et al., 2006). In addition, some studies documented a tendency to over-report fear when BPD subjects were presented with a neutral facial expression (Wagner and Linehan, 1999). Others reported negative bias in fast emotion discrimination of neutral, fearful and angry facial expressions in comparison to healthy subjects, although when processing time was unlimited, no difference was found between the performance of BPD patients and healthy controls (Dyck et al., 2009). Apart from being controversial, both with regard to the nature of alteration in the ability to recognize basic emotions and to the extent and direction of distortions, the reported findings do not make it clear whether the impairment is selective for specific emotions, is selected for valence, or affects the whole domain of basic emotions.

Inconsistencies among previous studies regarding the accuracy of emotion recognition may have resulted from several factors including the implementation of different stimulus material (e.g. Ekman versus another set of stimuli, inclusion versus omission of neutral faces), differences in the intensity of the emotional expression, time limits and task instructions. As Fertuck et al. (2009) point out, previous studies were not consistent in their attention given to potentially confounding factors such as education level, source of patient recruitment (treatment seeking versus community based; inpatient versus outpatient), co-occurring psychiatric disorders, medication status, and state levels of psychopathology, all of which may influence emotion and mental state appraisal.

Despite its relevance, no previous study using the full range of basic emotions investigated the error pattern of face recognition among BPD patients. Several clinical theories of BPD claim that BPD patients are inclined to misread others' minds, resulting in distorted mentalizing, which suggests a biased processing of social information (Kernberg, 1975; Linehan, 1995; Young et al., 2003; Fonagy and Bateman, 2008; Sharp and Fonagy, 2008). According to these theories, as a result of the combination of abusive and rejecting family environments (Rogosch and Cicchetti, 2005; Zanarini et al., 1989), invalidation of emotions (Linehan, 1995), and temperamental vulnerability (Skodol et al., 2002), abusive-abused object relations dyads (Kernberg, 1975), insecure attachment style, dysfunctional working models (Agrawal et al., 2004), and early maladaptive schemas (Young et al., 2003) develop in BPD patients. This distorted mentalizing style can produce not merely an inaccuracy of facial emotion recognition, but also a pattern of errors in reading facial emotional expressions. Thus, it is reasonable to hypothesize that close examination of the errors BPD patients commit in a facial emotion recognition task would identify a distinctive pattern of response, explicable on the basis of the clinical theories mentioned above.

In order to address the ability of emotion recognition and direction of distortions in relational context, we chose a facial emotion recognition task that uses faces with gaze directed toward the research subject. Emotional expressions with gaze directed toward the subject often signal the social evaluation by, or the behavioral intentions of, the person displaying the emotion (Wicker et al., 2003). Such expressions carry the potential of evoking the experience in research subjects that they themselves are the target of another's emotion. It is important to mention that the task we used required verbal categorization of the emotional stimuli by demanding the selection of the appropriate label, which requires controlled, effortful processing (Ochsner and Gross, 2005; Grandjean and Scherer, 2008), a domain also known to be impaired in BPD (Fertuck et al., 2005; Ayduk et al., 2008).

The six basic emotions we used were: happiness, surprise, fear, sadness, anger, and disgust. To investigate the nature of impairment in depth, we classified the facial expressions from two points of view. With respect to valence we categorized facial expression of happiness as positive, and fear, sadness, anger, and disgust as negative. The dimension of valence in case of facial emotion expression has a twofold importance. First, the positive–negative valence evaluation is the earliest automatic process, and the subsequent differentiation among negative affects needs a more extensive, effortful and controlled processing, according to the idea of serial-processing mechanisms of facial emotions (Adolphs, 2002; Ochsner and Gross, 2005; Grandjean and Scherer, 2008). Second, from an interpersonal perspective, faces with positive valence (expressing happiness) have a rewarding effect, inducing affiliative behavior and trust, whereas faces with negative valence (anger, disgust, fear and sadness) prompt avoidance, and are evaluated as less trustworthy (Oosterhof and Todorov, 2008).

We divided the facial expressions of negative emotions further along the interpersonal dimension of dominance-submission. A face expressing anger represents a dominant-attacking other, a face expressing disgust represents a dominant-rejecting other, whereas empathy-provoking fearful and sad faces represent a submissive other for the subject who is the target of the other's emotion (Oosterhof and Todorov, 2008).

Surprise was not included in either of the valence groups, for a surprised expression may be construed either as having a positive or as having a negative valence, an ambiguity which is not possible to dissolve in the absence of contextual information (Kim et al., 2003). We had, however, good reason to include the facial expressions of surprise in the stimulus set. Surprised expressions provide an important comparison expression for fear, since both expressions share physical features, and previous studies found that fear is often confused with surprise (Ogawa and Suzuki, 1999; Rapcsak et al., 2000). As patients with BPD experience difficulties recognizing ambiguous expressions (Bland et al., 2004; Domes et al., 2008; Dyck et al., 2009), and they have a heightened sensitivity to the recognition of fear (Wagner and Linehan, 1999), the inclusion of surprised faces provided a possibility to further explore this problem.

The aim of our study was twofold. First, we investigated whether there was an emotion recognition deficit, and whether facial emotion recognition impairment in BPD was valence-specific, as suggested by a number of the studies quoted above (Levine et al., 1997; Bland et al., 2004), or it was restricted to particular emotions. To determine this, we compared BPD patients and healthy individuals in their ability to accurately identify facial expressions of the six basic emotions.

Second, we analyzed the error pattern for each emotion, and compared it between BPD patients and healthy subjects. In order to limit some of the potential confounds mentioned in the third paragraph, we used a facial emotion identification paradigm shown in previous studies to be sensitive to the impairments of this patient group (Ekman 60 Faces paradigm, Ekman and Friesen, 1976). In addition, we chose an inpatient sample with severe psychopathology and high comorbidity, and a case-control study design with an age-matched, socio demographically comparable sample of healthy volunteers as comparison group.

Based on the above-mentioned theoretical assumptions and previous results, first, we hypothesized that BPD patients would be able to differentiate between faces with positive and negative emotional valence as well as healthy control subjects. However, would differ significantly in their ability to differentiate among negative emotions such as fear, sadness, disgust and anger. Second, we hypothesized that BPD patients would show a specific pattern of errors while healthy comparison subjects would show random errors. We predicted that BPD patients would confuse surprise with fear more often than controls. In evaluating these hypotheses, we also addressed general psychopathology, early maladaptive schemas and several potentially confounding variables that have not been adequately addressed in most prior studies, including demographic factors (age and education), medication status, and Axis I comorbidity.