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Recognition of emotion from body language among patients with unipolar depression

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ABSTRACT

Major depression may be associated with abnormal perception of emotions and impairment in social adaptation. Emotion recognition from body language and its possible implications to social adjustment have not been examined in patients with depression. Three groups of participants (51 with depression; 68 with history of depression in remission; and 69 never depressed healthy volunteers) were compared on static and dynamic tasks of emotion recognition from body language. Psychosocial adjustment was assessed using the Social Adjustment Scale Self-Report (SAS-SR). Participants with current depression showed reduced recognition accuracy for happy stimuli across tasks relative to remission and comparison participants. Participants with depression tended to show poorer psychosocial adaptation relative to remission and comparison groups. Correlations between perception accuracy of happiness and scores on the SAS-SR were largely not significant. These results indicate that depression is associated with reduced ability to appraise positive stimuli of emotional body language but emotion recognition performance is not tied to social adjustment. These alterations do not appear to be present in participants in remission suggesting state-like qualities.

1. Introduction

Major depressive disorder represents a significant and common cause of disability and social impairment (Kessler et al., 2003; Richards, 2011). Its frequency and burden are expected to increase in years to come (Monroe and Harkness, 2011). Individuals affected by unipolar depression continue to exhibit diminished psychosocial adjustment in multiple domains of functioning during the remission phase of the illness (Wells et al., 1989; Coryell et al., 1993; Hays et al., 1995; Shapira et al., 1999). Psychosocial adaptation reflects an individual's functioning and satisfaction in multiple social roles (e.g., family, work environment, friends) and is the result of a complex interplay of personal needs/wants and social demands (for further insights see Figueira and Brissos (2011)). The reasons behind psychosocial impairment in depression are not well understood (Hammen et al., 2009). One hypothesis suggests that a significant underpinning is abnormal emotion recognition from socially relevant stimuli (Ridout et al., 2007; Bourke et al., 2010; Bistricky et al., 2011).

As a whole, results of emotion recognition in depression have not been entirely consistent. Some investigators have shown that persons with depression exhibit impaired recognition of happy stimuli (Walker, 1981; Mandal and Bhattacharya, 1985; Surguladze et al., 2004; Csulkly et al., 2009) while others have not (Cooley and Nowicki 1989; Gur et al., 1992; Rubinow and Post, 1992; Persad and Polivy, 1993; Leppanen and Hietanen, 2004; Kan et al., 2004; Csulkly et al., 2009). Adding further complexity to the issue, in some studies, depression was associated with impaired recognition of *negative* emotions (e.g., angry, fearful and sad stimuli) (Feinberg et al., 1986; Rubinow and Post, 1992; Persad and Polivy, 1993; Asthana et al., 1998). Whereas impairment in recognition of happiness is mood congruent, reduced recognition of negative emotions is arguably a less mood congruent feature.

The studies discussed above were based on emotions portrayed by facial expressions, and in fact, emotion perception research in depression has primarily used human face stimuli neglecting the universe of emotional body language (Coulson, 2004). Findings attained using facial expressions are often extrapolated as indicators of the category of socially relevant stimuli as a whole. Novel and complementary insights may emerge when expanding the study of emotion perception to emotional body language (EBL, de Gelder, 2006; Hinzman and Kelly, 2012). In addition, the study of

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perception of EBL in depression fills a critical niche because the brain circuits processing EBL stimuli are only partially overlapping with the brain circuits processing facial expressions (de Gelder, 2006) and may be differentially affected by the depressive illness.

Body language may be defined as the collection of signs (e.g., posture, speed of movement, meaningful coordination of actions) expressed by the human body (Watzlawick et al., 1967; de Gelder, 2006; Schindler et al., 2008). Body language conveys a significant amount of emotionally and socially relevant information (Adolphs and Tranel, 2003; Heberlein et al., 2004; Bigelow et al., 2006; Atkinson et al., 2007). Perception of body language has been estimated to constitute up to 60–70% of human social communication (Burgoon, 1985). People who are able to correctly perceive body language signals tend to experience more meaningful relationships, greater social approval (Hodgins and Zuckerman, 1990) and competence (Seay and Altekruse, 1979; Noller, 1980; Trower, 1980). This is not surprising considering that facial expressions and body postures signal relevant information about emotional behaviors and intentions (Ekman, 1993; de Gelder, 2006) and that they are continuously appraised during social interactions (Bouhuys et al., 1999). Whereas EBL has been the subject of several studies in healthy participants (Coulson, 2004), schizophrenia (Bigelow et al., 2006), alcohol use disorder (Maurage et al., 2009), and focal brain damage (Heberlein and Saxe, 2005; Atkinson et al., 2007), to date, EBL has never been studied in depression (Coulson, 2004; Meeren et al., 2005; Calvo-Merino et al., 2008; Van den Stock et al., 2009).

Emotion perception in general and perception of EBL in particular may relate to social adaptation, a critical outcome measure in depression studies (Paradiso et al., 2011). A relationship between change in perception of socially relevant stimuli and poorer social adaptation in depression has been often posited but not empirically tested (Hodgins and Zuckerman, 1990; Ridout et al., 2003; Yoon et al., 2009; Gollan et al., 2010). One partial exception is a study that examined the association between emotion perception and psychological aggression towards sentimental partners as a function of depressive tendencies (Marshall et al., 2011). This study did not include individuals diagnosed with major depression (Marshall et al., 2011).

The present study examined perception of emotions across different body language stimuli in patients with unipolar major depression. Stimuli were included to examine perceptual responses to distinct facets of EBL including single body stimuli, stimuli depicting social interaction and socially relevant stimuli in motion. This approach was planned with the intent to capture the complexity of emotion perception and allowed assessment of consistency and differences of responses for differing types of stimuli. Dynamic stimuli were chosen based on the evidence that static and dynamic stimuli are processed by partially differing brain structures (Downing et al., 2001; Adolphs et al., 2003). Dynamic stimuli were added also because emotions in real-life are often conveyed by stimuli in motion (Kan et al., 2004; Hoffmann et al., 2006). Analyses were planned to study the effects of static and dynamic tasks as a function of diagnosis. Considering the dearth of studies on EBL in depression and the inconsistencies in the literature on depression and emotion perception from face stimuli, specific predictions on valence and direction of potential abnormalities were not made.

Examination of perception of EBL during remission was also a focus of the present report. This aspect of the present research was planned based on studies suggesting that alterations in the processing of social stimuli may continue into remission (Leppanen and Hietanen, 2004; LeMoult et al., 2009) but also on views that some alterations of brain activity in depression may revert to normalcy following remission (Drevets, 1998; Mayberg et al., 1999; Sheline et al., 2001; Drevets et al., 2002). Finally, analyses were planned to examine the association between variables showing a significant group effect on perception of EBL and psychosocial adaptation. It was expected that depression would be characterized by alterations in emotion perception and these would correlate with poorer social adaptation.

2. Methods

2.1. Participants

The study sample consisted of 51 patients examined during an active episode of depression, 68 examined while in remission (estimated *mean* time in remission in months=50.7; *S.D.*=54.9) and 69 healthy comparison participants (i.e., reporting no life-time episodes of depression) recruited from the University of Iowa Departments of Internal Medicine and Psychiatry inpatient and outpatient services and from the Iowa City Veterans Administration Medical Center Primary Care service and through advertisements as part of a study on late-life depression and social perception (Paradiso et al., 2011). Exclusion criteria were: (a) major psychiatric co-syndromal disorder including history or presence of obsessive compulsive disorder, psychosis other than that accompanying depression, bipolar affective disorder, primary anxiety disorder, eating or somatoform disorder and related disorders or substance use disorders; (b) history of brain injury or other neurological or medical or surgical disease potentially impairing cognition; (c) clinical evidence of preexisting dementia as defined by DSM-IV criteria (American Psychiatric Association, 2005), (d) vision or hearing deficits. Informed consent was obtained according to the Institutional Review Board (IRB) of the University of Iowa. All participants were compensated for their participation.

Descriptive information on demographic, clinical, and cognitive variables for the groups is shown in Table 1. There were no significant group differences in age, sex and education as well as in (visual and verbal) memory and visual/spatial abilities. A group effect of Full Scale IQ (FSIQ), $F(2; 187)=5.5$, $P=0.005$ was found to be significant. However, all participants with depression showed FSIQ compatible with accurately understanding directions for the experimental tasks (FSIQ *ranges*: depression=65–132; remission=84–134; healthy volunteers=78–141). Participants with active illness suffered from moderate to severe depression (Table 1). Participants with current depression and in remission did not differ on classes of psychoactive medications used for treatment, χ^2 (5)=8.75, $P>0.05$ (Table 2).

2.2. Psychiatric assessment

The Structured Clinical Interview for DSM-IV-TR Axis 1 Disorder (SCID, First et al., 2002) was administered by a trained research assistant to confirm diagnosis of depression and exclude other Axis 1 disorders. When possible, medical records were reviewed in order to confirm information gathered during patient interviews (Paradiso et al., 2011). Severity of depression was assessed using the 24-item version of the Hamilton Depression Rating Scale (HAM-D, Hamilton, 1960). Remission was defined as no longer meeting major depression diagnosis during the previous two months (American Psychiatric Association, 2005) and having a score of 7 or less on the HAM-D (Hamilton, 1960). Anxiety was measured using the Hamilton Anxiety Rating Scale (HAMA, Hamilton, 1959). Some of the patients were receiving pharmacological treatment (Table 2).

Social adjustment over the previous two weeks was assessed using the Social Adjustment Scale Self-Report (SAS-SR), a widely-used self-report scale consisting of 42 items rated on a 5-point scale and measuring six social domains: work (time lost, impaired performance, distress, disinterest, feelings of inadequacy), social and leisure time (diminished contact with friends and social interactions, loneliness, boredom), extended family (reticence, withdrawal, family attachment, resentment, worry), marital relationship (sexual problems, dependency, lack of affection), parental (lack of involvement and affection, impaired communication) and family unit (economic, inadequacy of family unit, guilt) based on patient's performance on a day-to-day basis, quality of interpersonal relationships, friction with others, inner feelings and satisfaction (Weissman, 1999). Scores for each domain were computed by averaging the scores for all answered items within that domain with higher scores indicating greater impairment. The total SAS-SR score was calculated by averaging all items (Shapira et al., 1999; Weissman et al., 2001).

2.3. Experimental stimuli

Experimental tasks included emotion recognition from point-light walkers (PLWs), body postures, movie stills with masked and unmasked faces. These tasks were developed and modified in the Departments of Neurology and Psychiatry at the University of Iowa. The use of these tasks has been validated in several studies and with different populations of participants (see below). Total administration time was 40–45 min. Participants had the opportunity to take breaks between each task if they so desired.