



## Emotional face processing deficit in schizophrenia: A replication study in a South African Xhosa population

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### Abstract

Schizophrenia is associated with a deficit in the recognition of negative emotions from facial expressions. The present study examined the universality of this finding by studying facial expression recognition in African Xhosa population. Forty-four Xhosa patients with schizophrenia and forty healthy controls were tested with a computerized task requiring rapid perceptual discrimination of matched positive (i.e. happy), negative (i.e. angry), and neutral faces. Patients were equally accurate as controls in recognizing happy faces but showed a marked impairment in recognition of angry faces. The impairment was particularly pronounced for high-intensity (open-mouth) angry faces. Patients also exhibited more false happy and angry responses to neutral faces than controls. No correlation between level of education or illness duration and emotion recognition was found but the deficit in the recognition of negative emotions was more pronounced in familial compared to non-familial cases of schizophrenia. These findings suggest that the deficit in the recognition of negative facial expressions may constitute a universal neurocognitive marker of schizophrenia.

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### 1. Introduction

Schizophrenia has been linked to deficits in recognition of emotional facial expressions (Edwards

et al., 2002). These deficits may partly arise from a broader impairment in perception as patients with schizophrenia perform worse than controls in a variety of perceptual tasks (Feinberg et al., 1986; Gessler et al., 1989; Kerr and Neale, 1993; Salem et al., 1996). However, there are also findings that point to a disproportionate deficit in emotion recognition tasks (Streit et al., 2001; Walker et al., 1984) and it is increasingly acknowledged that,

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rather than a general deficit that encompasses all emotions, schizophrenia may be associated with a more specific deficit in the processing of a subset of negative emotions. Individuals with schizophrenia show, for example, normal performance on recognition of happy faces but they are significantly impaired in recognition of anger, sadness, and fear (Bediou et al., 2005; Bell et al., 1997; Silver et al., 2002). This deficit is especially manifested in the perception of intense negative emotional expressions, as patients with schizophrenia fail to show the normal pattern of better recognition of increasingly intense negative facial expressions (Kohler et al., 2003). It is possible that the deficit in the recognition of negative facial expressions originates, in part, from structural and functional abnormalities in the amygdala and related brain structures (Exner et al., 2004; Gur et al., 2002; Hempel et al., 2003; Kosaka et al., 2002; Phillips et al., 1999; 2003; Williams et al., 2004).

A deficit in the processing of negative emotions may therefore constitute one of the core neurocognitive markers of schizophrenia. However, because the majority of studies have focused on Caucasian samples, the universality of this feature of schizophrenia remains largely unexplored. The recognition of a limited set of facial expressions appears to be similar across cultures (Ekman, 1994) but there are indications that even the fundamental aspects of face processing are shaped by culture-specific learning experiences (Golby et al., 2001; Elfenbein and Ambady, 2002). Cross-ethnic differences in emotion recognition amongst schizophrenia patients have also been reported (Brekke et al., 2005), although other studies have shown that the emotion recognition deficits are similar across groups of American, German, and Indian schizophrenia participants (Habel et al., 2000).

In the present study, we examined the universality of the association between schizophrenia and emotion processing deficits by studying whether this finding is replicated in an indigenous African population, the Xhosas. They are one of the southernmost indigenous African populations and belong to the Nguni language group. Findings suggestive of ethno-specific genetic loci for schizophrenia in African-American (Kaufmann et al., 1998) and South African-African (Riley et al.,

2000) samples and an apparent ethno-specific differential response to antipsychotic treatment (Emsley et al., 2002) point towards possible unique etiological findings in African samples of patients (Niehaus et al., 2005). However, although varying degrees of inter-ethnic variation in the symptoms of schizophrenia have been reported, the core symptoms appear to be similar across cultures (Ensink et al., 1998; Malik et al., 1990; Ndeti and Singh, 1983; Sartorius et al., 1986; Emsley et al., 2001). Emsley et al. (2001) and Niehaus et al. (2005) found compelling evidence from studies in the Xhosa population that the symptom dimensions and in particular the negative symptoms of schizophrenia are relatively resistant to cultural influences. We are, however, not aware of any studies examining emotional information processing in Xhosa schizophrenia patients. This study therefore aimed to examine whether the selective deficit in the processing of negative emotions is also found in Xhosa schizophrenia patients.

Emotion recognition was assessed by using a controlled, computerized task that measures rapid perceptual discrimination of matched positive (happy), negative (angry), and neutral facial expressions, and that also permits assessment of biases in emotional information processing (attribution of emotion to neutral faces; Leppänen et al., 2003, 2004). A task with short stimulus-presentation duration (200 ms) was used in order to better approximate the brief duration of facial expressions in everyday life and the automatic nature of emotion perception (cf. Surguladze et al., 2004; Edwards et al., 2001). Both low- and high-intensity expressions were used to test the hypothesis that individuals with schizophrenia may have a specific difficulty in recognizing high-intensity negative expressions (Kohler et al., 2003). Finally, given the previous findings that familial and non-familial cases of schizophrenia are associated with different patterns of neurocognitive impairments (Malaspina et al., 1998) and that familial vulnerability to schizophrenia is associated with face processing abnormalities (Loughland et al., 2004), we examined whether familial and non-familial cases of schizophrenia differed on emotion recognition performance.

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