



## Emotional processing in a non-clinical psychosis-prone sample

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Received 4 April 2003; accepted 24 September 2003

### Abstract

Symptoms of psychosis have been proposed to form part of a continuous distribution of experiences in the general population rather than being an all-or-nothing phenomenon. Indeed, schizotypal signs have been reported in subjects from non-clinical samples. Emotional processing has been documented to be deficient in schizophrenia. In the present study, we tested the hypothesis whether putatively psychosis-prone subjects would show abnormalities in emotion processing. Based on the extremes of Launay–Slade Hallucination Scale (LSHS) ratings of 200 undergraduate students, two groups of subjects (total  $N=40$ ) were selected. All 40 participants filled in the Schizotypal Personality Questionnaire (SPQ). We compared both groups on an alexithymia questionnaire and on four behavioral emotional information processing tasks. Hallucination-proneness was associated with an increased subjective emotional arousal and fantasy-proneness. Although no differences between the high and low group were observed on three behavioral emotion processing tasks, on the affective word-priming task presentation of emotional stimuli was associated with longer reactions times to neutral words in high schizotypal subjects. Also, SPQ scores correlated with several emotion processing tasks. We conclude that these findings lend partial support to the hypothesis of continuity between symptoms characteristic of schizophrenia and psychosis-related phenomena in the normal population.

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*Keywords:* Psychosis-prone; Hallucination; Schizophrenia

### 1. Introduction

A growing number of studies consider psychosis as a continuum with normal functioning at one end and abnormal functioning (psychosis) at the other end (Verdoux and van Os, 2002; Johns and van Os, 2001;

Claridge, 1997). In accordance with this view, Johns and van Os (2001) have reviewed evidence indicating that psychotic signs, often called schizotypal signs or schizotypal traits, are present in healthy people to a certain extent. Schizotypy refers to the personality trait of experiencing 'psychotic' symptoms (Claridge, 1997) and schizotypy may be conceptualized as a predisposition to schizophrenia at the level of the organization of the personality (Meehl, 1989; Vollema and van den Bosch, 1995). Such schizotypal traits, e.g., referential thinking and odd or eccentric behavior have

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been hypothesized to be normally distributed in the non-clinical population (Chapman et al., 1976).

One of the cardinal dysfunctions associated with schizophrenia concerns processing of emotional information (McKenna, 1994), including disturbances in the expression, experience and perception of emotions. Indeed, Krapelin (1907) regarded emotional disturbances, such as flattened and inappropriate affect, to be characteristic of schizophrenia. Although schizophrenic patients inadequately *express* emotions (Berenbaum and Oltmanns, 1992; Knight and Valner, 1993; Kring et al., 1994; Kring and Neale, 1996), Kohler et al. (2000) and Myin-Germeys et al. (2000) suggested that the subjective *experience* of emotion is much less disturbed in schizophrenia.

Sifneos (1973) introduced the term 'alexithymia' to describe abnormalities in affect regulation. More specifically, alexithymia refers to difficulties in recognizing, identifying and describing one's own emotions. Thus, alexithymic individuals have impaired affect regulation (Bagby and Taylor, 1997) and may also show specific inability to communicate emotions while the experience of emotion might be intact (Kihlstrom et al., 2000). Cedro et al. (2001) demonstrated that schizophrenic patients have higher scores on an alexithymia questionnaire than healthy controls, i.e., they have more problems in identifying and verbalizing their emotions.

With regard to behavioral measures of emotional processing in schizophrenia, deficits in emotion recognition have been found (Edwards et al., 2002). In addition, schizophrenic patients appear to inadequately process facial affect (Addington and Addington, 1998; Streit et al., 2001) and demonstrate a reduced left-perceptual bias in the processing of emotional chimeric faces (Gooding et al., 2001). There might also be a bias towards material with a negative emotional valence, as observed in a study in which hallucinating patients were more sensitive to negative words compared to controls (Johns et al., 2002). Moreover, a recent study (Hoschel and Irle, 2001) reported that negative emotional expressions yield stronger priming effects in schizophrenia patients compared to control subjects (hyperpriming).

The present study is important for several reasons. First, research on psychosis-prone or schizotypal individuals may help to develop preventive interventions for schizophrenia. Cannon et al. (2002) and

McGorry et al. (2002) already showed that early interventions in prodromal schizophrenic patients reduces the risk of early transition to psychosis in young people and possibly reduces the incidence of schizophrenia. Second, the study of non-clinical subjects with schizotypal traits enables researchers to study schizotypal phenomena without the confounding contribution of factors such as medication, duration of illness and severe psychopathology or institutionalization. Third, previous research has concentrated on cognitive dysfunctions that may be associated with psychotic traits in non-clinical samples (Aleman et al. 2000; Suhr, 1997). To our knowledge, the present study is the first to examine emotional processing in such a sample.

The aim of this study was to investigate whether healthy individuals with high positive schizotypy differ from individuals with low positive schizotypy (as screened by the Launey–Slade Hallucination Scale (LSHS)) on measures of subjective and objective emotional information processing tasks. Following the schizophrenia literature positive schizotypal signs could, like positive symptoms in schizophrenia, be associated with an attentional bias for negative-valenced material, including threat, anger and sadness (Phillips et al., 1999; Mandal et al., 1999). In contrast, negative symptoms of schizophrenia reflect a more generalized and severe emotion-recognition deficit (Mandal et al., 1999; Schneider et al., 1995).

On subjective emotion processing (as measured with an alexithymia questionnaire), we predicted that individuals with positive schizotypal signs would report lower levels of identifying and verbalizing their own emotions compared to individuals without positive schizotypal signs. On the other hand, higher levels of emotionalizing might be expected, as an increase in arousal and anxiety has been associated with occurrence of positive symptoms in schizophrenia (Delespaul et al., 2002). With regard to behavioral emotional information processing, we concentrated on verbal and facial affect recognition. On verbal affect recognition tasks, we hypothesized that persons with positive schizotypal signs would show an increased sensitivity to emotional material, specifically an attentional bias for material with a negative valence. Thus, greater priming especially for negative-valenced words and a reduced Stroop effect in an emotional counting Stroop paradigm for the positive

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