

Perception of happy and sad facial expressions in chronic schizophrenia: Evidence for two evaluative systems

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Abstract

Background: Persons suffering from schizophrenia have impaired perception of emotional expressions, but it is not clear whether this is part of a generalized deficit in cognitive function.

Aim: To test for existence of emotion-specific deficits by studying the effects of valence on recognition of facial emotional expressions.

Methods: 24 male subjects suffering from chronic schizophrenia were examined with two tests of perception of emotion: the Penn Emotion Acuity Test (PEAT 40) and the Emotion Differentiation Task (EMODIFF). Clinical state was assessed with the Scale for the Assessment of Negative Symptoms (SANS) and Scale for the Assessment of Positive Symptoms (SAPS), visual memory with the Benton Visual Retention Test (BVRT) and motor function with the finger tapping test.

Results: Identification of happy facial expressions showed significant negative correlation with age, cumulated time in hospital and length of current hospitalization; positive correlations were found with visual retention and finger tapping scores. Identification of sad facial expressions showed significant correlation only with cumulated time in hospital while identification of neutral facial expressions showed no significant correlations. Discrimination between degrees of happy but not sad facial expression showed a positive correlation with negative symptoms.

Conclusion: Perception of happy and sad emotion relates differently to significant illness parameters. This differentiability supports the existence of an emotion-specific deficit in perception of emotions in schizophrenia and of separate channels for processing positive and negative emotions. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: Emotion; Negative symptoms; Cognitive tests; Schizophrenia; Facial recognition; Valence

1. Introduction

The ability to correctly perceive emotional expression in others is an important social skill that may be defective in patients with schizophrenia (Walker et al.,

1984; Feinberg et al., 1986; Turner, 1964; Morrison et al., 1988; Borod et al., 1993; Kerr and Neale, 1993; Bellack et al., 1996; Heimberg et al., 1992) and could contribute to impaired social functioning (Walker et al., 1984; Feinberg et al., 1986).

Since cognitive impairment is also common in people with schizophrenia (Goldberg and Gold, 1995), impaired perception of emotion may reflect either specific deficits or be part of a general reduction in cognitive abilities. Several studies found correlations

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between impairment in facial emotion perception and other neuropsychological measures including span of attention (Kee et al., 1998) and non emotional facial perception tasks (Kerr and Neale, 1993; Salem et al., 1996; Addington and Addington, 1998). While these results seem to support the existence of a generalized deficit this finding was not universal (Penn et al., 1997; Heimberg et al., 1992). The question whether emotion processing is differentially impaired compared to cognitive processing, and clarification of the relationship between emotion processing deficit and other aspects of the illness such as clinical symptoms and course, require further investigation. Clearer understanding of the mechanism of emotion processing may be significant for therapeutic intervention.

The role of emotion specific factors such as valence on perception of emotion is even less clear. Studies have shown that valence can influence perception of emotion in schizophrenia (Bell et al., 1997) and in brain damaged patients (Mandal et al., 1999a,b). Researchers are divided on the question of whether there is a single channel for perception of affect or whether separate channels exist for evaluating positive and negative affect (Cacioppo and Gardner, 1999). Examination of the differential relationships between valence-specific emotion processing and cognitive functions may be a first step in testing this question.

We recently reported a relationship between the ability to identify facial emotion expressions and other areas of cognition, in particular visual retention and finger tapping (Silver and Shlomo, 2001) using a standardized test of facial emotion identification developed by Kerr and Neale (1993). Comparing responses to individual emotions using this test was complicated by large emotion-related variations in response which ranged from nearly 100% accuracy for happiness to below 50% for some other emotions, suggesting task difficulty effects (Silver and Shlomo, 1999, unpublished data).

In this study we used two tests developed to control for task difficulty. The Penn Emotion Acuity Test (PEAT) contains black-and-white displays of happy, neutral and sad expressions selected for yielding reliable detection in healthy people (Erwin et al., 1992). The task has shown differential deficit in schizophrenia (Heimberg et al., 1992) and specificity of deficits to false positive identification of neutral

stimuli in depression (Gur et al., 1993). The emotion-differentiation task (EMODIFF, Kohler et al., 2000) uses the same stimuli but with finer gradations of intensity within valence. The subject is asked to determine if one of two expressions is happier or sadder than the other.

We hypothesized that perception of happy and sad facial expressions would relate differentially to significant features of the illness including clinical symptoms, chronicity and neuropsychological function. As the patients were tested in several functional domains including emotional, cognitive, motor and visuo-motor coordination areas (which will be reported separately), a limited range of cognitive tests was used. To minimize potential confounds of medication induced extrapyramidal side effects we chose patients treated with atypical antipsychotics and included assessments of extrapyramidal side effects and motor activity.

2. Methods

24 male subjects were recruited from the Flugelman (Mazra) Psychiatric hospital. All fulfilled DSM IV criteria for chronic schizophrenia and were diagnosed by consensus between treating and research psychiatrists. They were inpatients in extended treatment wards and were treated with atypical antipsychotics (clozapine $N = 1$ dose 500 mg/d, olanzapine $N = 11$ mean dose 15.0 mg/d SD 3.9 range 10–20 mg/d, risperidone $N = 12$, mean dose 4.3 mg/d SD 1.5 range 2–7mg/d). All met criteria for treatment resistance and were put on atypical neuroleptics after ineffective long-term treatment with typical antipsychotics of several chemical types. The minimum period on atypical drugs was 6 weeks. Seven patients were diagnosed as Paranoid type, 17 as Disorganized type. All but one patient were right hand dominant. Subjects were assessed clinically and cognitively tested by the same rater in 2 or 3 sessions that were within 3 days of each other.

The rater (NS), a senior trainee psychiatrist, was trained in assessment procedures and reached good inter-rater agreement on the scales used ($r > .8$) with a benchmark reference group. At the time of clinical assessment the rater was not aware of the results of emotional or cognitive testing which were

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