

# Accuracy and intensity of posed emotional expressions in unmedicated schizophrenia patients: Vocal and facial channels

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## Abstract

This study investigated the ability of schizophrenia patients to volitionally display various emotional expressions. Accuracy and intensity of facial and vocal emotional expression were rated in 26 unmedicated male schizophrenia patients and 20 non-patient male controls while posing emotional facial and vocal expressions. Results indicate that schizophrenia patients, compared to non-patient controls, had deficits in their ability to portray some, but not all, emotions. Accuracy and intensity of posed facial and vocal expressions were inversely correlated with negative symptoms in the patient group. We conclude that observable flattened affect in schizophrenia during posed expression is not evident across all emotions. Furthermore, substantial disruption in the ability to portray posed emotions may be largely driven by the presence of negative symptoms.

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## 1. Introduction

Research and clinical reports indicate that schizophrenia is a disorder associated with affective deficits, e.g., anhedonia, avolition, flat affect. In particular, diminished facial expression, (i.e. flat affect), is a fundamental symptom of the disease; indicative of poor prognosis (Fenton and McGlashan, 1991); temporally stable (Putnam and Harvey, 2000); and associated with chronicity (Carpenter and Strauss, 1991). Facial flat affect has been identified in schizophrenia using the EMFACS coding system (Krause et al., 1989), the

FACES coding system (Kring et al., 1993; Kring and Neale, 1996; Kring and Earnst, 1999), more subjective rating systems (Pansa-Henderson et al., 1982; Martin et al., 1990), as well as with electromyographic recording (Kring et al., 1999; Kring and Earnst, 2003). In addition, diminished affective expression has been found in the speech of schizophrenia patients as measured by acoustical analyses of speech prosody (Alpert and Anderson, 1977; Andreasen et al., 1981; Levin et al., 1985; Alpert et al., 1989) as well as by judges' ratings of emotion (Abrams and Taylor, 1978; Andreasen, 1979).

Accumulated evidence indicates that facial expressivity and emotional experience are often dissociated in schizophrenia; therefore, flat affect in schizophrenia does not necessarily represent a reduction in emotional experience. Several studies have found that schizophrenia

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patients displayed less facial expressivity than non-patient controls while watching affect-eliciting films, yet reported normal levels of emotion (Berenbaum and Oltmanns, 1992; Kring et al., 1993; Kring and Neale, 1996; Kring and Earnst, 1999). This finding of normal emotional experience is further supported by studies using emotion-modulated startle where the startle response amplitude of schizophrenia patients did not differ from healthy controls when presented with affect-eliciting stimuli (Schlenker et al., 1995; Curtis et al., 1999). Dissociations have also been found in the vocal realm where a group of schizophrenia patients, in contrast to patients with depression, demonstrated lower levels of vocal positive affect, as indexed by vocal cues. Additionally, the schizophrenic group displayed higher levels of negative affect, indexed by corrugator muscle movement. However, this study found no group differences in self-reported affect (Sison et al., 1996).

In addition to diminished spontaneous facial affective display, schizophrenia patients have demonstrated diminished facial and vocal activity when posing emotional expressions. Using only verbal commands and only measuring accuracy, Gottheil and colleagues (1976) found that medicated schizophrenia patients were less accurate than non-patient controls in posing some emotions (i.e. anger and sadness), but not others (i.e. surprise, fear, or joy). Several studies have provided verbal and pictorial instructions separately (Braun et al., 1991; Gaebel and Wölwer, 1992; Yecker et al., 1999; Trémeau et al., 2005) and have reported diminished intensity (Yecker et al., 1999; Trémeau et al., 2005) and accuracy in posed displays (Gaebel and Wölwer, 1992; Trémeau et al., 2005). Another study reported schizophrenia patients' posed expressions to be less accurate but only when cued by verbal command (Braun et al., 1991). Using only verbal cues but measuring both intensity and accuracy simultaneously, Borod and colleagues (1989) found that medicated patients were less accurate and intense in their posed facial expressions. Vocally, schizophrenia patients have also been found to be both less intense and less accurate (Levin et al., 1985; Borod et al., 1989; Murphy and Cutting, 1990).

There are several inconsistencies in the studies of posed emotional expression in schizophrenia that make the data difficult to interpret. One issue is that often the participants have been on neuroleptic medication that may have affected performance on these tasks. Neuroleptic medication likely influences symptom presentation as well as facial and vocal emotional display. Furthermore, studies have used different induction methods (verbal commands and pictorial presentation) and have rarely (only Borod et al., 1989, with 6

schizophrenia patients) measured accuracy and intensity in both channels (vocal and facial). The ability to pose facial and vocal expressions has been found to be positively related in non-patient populations (Zaidel and Mehrabian, 1969; Cunningham, 1977), but it is not known if these two channels are related in schizophrenia populations. Additionally, the degree of negative symptoms may affect the ability to pose emotional expression, and this has not been adequately investigated in previous studies.

If, in addition to the diminished activity found in spontaneous expression, schizophrenia patients' posed expressions are found to be less expressive, this indicates that the symptom of flat affect is driven by an impairment of the ability to volitionally portray emotions—that is, a skill or neuromotor deficit (Dworkin et al., 1996), rather than a deficiency in the neural and behavioral systems that underlie emotional experience. This would be consistent with emotion research in schizophrenia where a dissociation between emotional display and experience has been found. That is, reduced emotional display has not been found to be reflective of reduced emotional experience.

As negative symptoms are largely affective deficit symptoms, it is expected that there will be relationships between negative symptoms and the intensity and accuracy of posed emotional expression. Furthermore, it is expected that flat affect will specifically be related to posed expression as both share the common substrate of emotional expression.

Research on the relationship between the ability to encode facial and vocal cues has shown that the two skills are positively related in non-patient populations (Zaidel and Mehrabian, 1969; Zuckerman et al., 1975, 1978; Cunningham, 1977). This suggests that there is a nonspecific encoding factor which accounts for the communication of affect in more than one channel. Therefore, failure to find associations between accuracy and intensity and between the vocal and facial channels may indicate a disruption in the constellation of affective communication skills.

The present study sought to investigate posed facial and vocal emotional expressions in unmedicated schizophrenia patients and non-patient controls. Accuracy and intensity of emotional expression were measured simultaneously in the face and in the voice. Negative symptoms were measured in the patient group and related to the accuracy and intensity of the posed expressions. To our knowledge, this is the first study to measure accuracy and intensity in both expressive channels in an unmedicated group of schizophrenic individuals.

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