

Affect Recognition in Schizophrenia: A Synthesis of Findings Across Three Studies

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THE results of three studies of affect recognition in schizophrenia, all using the same measures (the Face Emotion Identification Test, the Face Emotion Discrimination Test, and the Test of Facial Recognition), are reviewed. The studies differed on two important subject characteristics: patient chronicity and medication status. One study examined chronically ill, unmedicated patients (Kerr and Neale 1993); a second study included chronically ill, medicated patients (Mueser et al. 1996); and a third study examined acutely ill, medicated patients (Bellack, Blanchard and Mueser 1996). Results across the three studies suggest that chronicity of the illness, but not medication status, was related to poor performance on the affect recognition tests. Furthermore, chronically ill patients tended to perform poorly on the control task (the Test of Facial Recognition) as well as the affect perception tasks, suggesting a generalized impairment in facial perception. The implications of the findings for research on social perception are considered, as well as for interventions designed to improve social competence in schizophrenia.

A common clinical and experimental observation is that patients with schizophrenia have marked impairments in their ability to perceive relevant situational and interpersonal stimuli (Cramer, Bowen, and O'Neill 1992; Cutting 1981; Sampson, Ray, Pugh, and Clark 1962; Stilson, Walsmith, and Penn 1971; White-man 1954). For example, patients with schizophrenia frequently misinterpret others' facial expressions (Archer, Hay, and Young 1992), display inconsistent interpersonal judgments (Livesay 1981), show an inadequate fund of social knowledge (Munoz, Munoz, Blas, and Ruiz

1992), and fail to detect social cues (Corri-gan and Green 1993) compared with non-patients. Impairments in social perception undoubtedly contribute to problems in social functioning, as suggested by theories of social competence (Liberman, De-Risi, and Mueser 1989; Morrison and Bellack 1981; Trower, Bryant, and Argyle 1978). From a theoretical perspective, these observations have raised debate as to whether social perception in schizophrenia is uniquely affected or if it is secondary to generalized cognitive deficits (Chapman and Chapman 1978; Kerr and Neale 1993). Thus, poor social perception

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in schizophrenia is of both clinical and theoretical significance.

Of particular interest to experimental psychopathologists has been the issue of the extent to which patients with schizophrenia have deficits in their perception of facial expressions. Despite clinical folklore, the actual data on facial expression recognition in patients with schizophrenia are quite mixed. Some studies have found the expected impairment in facial affect recognition (Archer et al. 1992; Garfield, Rogoff, and Steinberg 1987; Gessler, Cutting, Frith, and Weinman 1989; Heimberg, Gur, Erwin, Shtasel, and Gur 1992; Kerr and Neale 1993; Walker, McGuire and Bettes 1984), but others have not (Joseph, Sturgeon, and Leff 1992; Novic, Luchins, and Perline 1984; recently reviewed by Penn, Corrigan, Bentall, Racenstein, and Newman 1997). Fundamental questions still remain, including whether patients actually have a deficit in facial affect recognition, and, if so, what are the determinants of the deficits and how can they be characterized?

A major obstacle to the synthesis of findings in this area has been the tendency for each study to employ a different measure of affect recognition. An additional limitation of many measures has been the absence of attention to either the instrument's psychometric properties or its cross-validation. The net result has been a mishmash of findings from different studies, with little clue as to the source of the discrepancies.

Recognizing the need for a standardized, psychometrically sound instrument for assessing emotion recognition in schizophrenia, Kerr and Neale (1993) recently developed a set of measures: the Face Emotion Identification Test, the Face Emotion Discrimination Test, the Voice Emotion Identification Test, and the Voice Emotion Discrimination Test. These tests were first standardized on nonpsychiatric patients and then cross-validated on additional samples of nonpatients. Differences on these tests between patients with schizophrenia and nonpatients were then evaluated, as well as dif-

ferences in two control tests (the Test of Facial Recognition: Benton, VanAllen, Hamsher, and Levin 1978; the Speech Sounds Perception Test: Golden and Anderson 1977). Since publication of Kerr and Neale's (1993) article, we have conducted two further studies using the same two face emotion recognition tasks and the control test, the Test of Facial Recognition (Bellack et al. 1996; Mueser et al. 1996). The present report provides a brief summary and synthesis of the findings across the Kerr and Neale (1993), Bellack et al. (1996), and Mueser et al. (1996) studies.

METHOD

Subjects

The subjects in all three studies included patients with schizophrenia or schizoaffective disorder and nonpatient controls. Bellack et al. (1996) also included a group of patients with bipolar disorder, but these subjects are not discussed here. Diagnoses were established according to *DSM-III-R* criteria (American Psychiatric Association 1987) using structured clinical interviews, the Schedule for Affective Disorders and Schizophrenia (Endicott and Spitzer 1978) for most patients in Kerr and Neale's (1993) study, and the Structured Clinical Interview for *DSM-III-R* (Spitzer, Williams, Gibbon, and First 1990) for the Bellack et al. (1996) and Mueser et al. (1996) studies. Kerr and Neale's (1993) sample included only patients with schizophrenia, whereas Bellack et al. (1996) and Mueser et al. (1996) included both patients with schizophrenia and schizoaffective disorder. However, analyses comparing these two patient groups in the Bellack et al. (1996) and Mueser et al. (1996) studies failed to detect any differences in the face perception measures.

Nonpatient controls, matched to the patients on most demographic characteristics, were recruited from either hospital staff (Kerr and Neale 1993; Mueser et al.

1996) or the surrounding community (Bellack et al. 1996). The demographic characteristics of subjects across the three studies were fairly similar. The average age ranged between the mid-30s to the mid-40s; education was approximately high school graduate level; race was predominantly white; and most patients had never married whereas most controls had married. There was a slight difference in the gender composition between the studies, although gender was matched between patients and controls within each study. Similar numbers of male and female subjects were included in the Bellack et al. (1996) and Mueser et al. (1996) studies, whereas the preponderance of subjects in Kerr and Neale (1993) were male (85%). All subjects in the Bellack et al. (1996) study were paid for their participation; in Kerr and Neale (1993) the controls were paid but the patients were not; and neither the patients nor the controls were paid in Mueser et al. (1996).

The patient samples differed in terms of their chronicity and medication status. The Kerr and Neale (1993) and Mueser et al. (1996) studies included chronic, long-stay hospital patients. Bellack et al. (1996) studied acutely ill patients who had been admitted to a psychiatric hospital for brief treatment of a symptom exacerbation (2 to 4 weeks). These patients were assessed in the hospital after their symptoms had stabilized. Patients in Kerr and Neale's (1993) study had received no medications for at least 2 weeks prior to testing. In contrast, all patients in Bellack et al. (1996) and Mueser et al. (1996) were stabilized on antipsychotic (and often other) medications.

Measures

All three studies included the same two measures of facial emotion recognition and the same control measure of face recognition. In addition, each study also included other assessments unique to that study (e.g., other assessments of affect recognition, symptoms, social function-

ing). We consider here only those three measures employed in all three studies.

The two tests of emotion recognition were the Face Emotion Identification Test (Kerr and Neale 1993) and the Face Emotion Discrimination Test (Kerr and Neale 1993). Both of these tests utilize black-and-white photographs of facial emotions developed by Ekman (1976) and Izard (1971), which are presented on videotape. The Face Emotion Identification Test consists of 19 photographs, each depicting one of six different emotions (happy, sad, angry, surprise, disgust, shame), which are shown individually to subjects for 15 seconds each, with 10 seconds of blank tape between each stimulus presentation. After each photo the subject makes a forced choice by selecting which emotion was depicted. The test is scored by summing the total number of correct emotion identifications.

The Face Emotion Discrimination Test consists of 30 pairs of photos, each pair including two different people displaying one or two of the six emotions depicted in the Face Emotion Identification Test. The pairs are presented simultaneously for about 15 seconds, with about 15 seconds of blank tape between each presentation. The subject's task is to judge whether the two people in each pair are depicting the same or different emotions. The test is scored by summing the total number of correct discriminations.

A "control" test of facial perception was included to evaluate whether impairments were specific to affect recognition or could be attributed to generalized impairments in face perception, the Test of Facial Recognition (Benton et al. 1978). For this test the subject is shown a target photo of a person and then below that target is an array of six photos. In the first part, the subject's task is to identify which one of the six photos is the same person as in the target photo. In the second part, the subject identifies which three of the six photos are the same person as in the target photo. The test is scored by counting the total number of correct identifications. The Kerr and

Neale (1993) and Mueser et al. (1996) studies used the short form of this test, whereas Bellack et al. (1996) used the long form.

RESULTS

The results of the three studies are summarized in Table 1. All three studies found that the patients with schizophrenia performed worse than the controls on the Test of Facial Recognition. However, the acutely ill patients in Bellack et al. (1996) did not differ from the controls in their performance on either of the facial emotion recognition tests, whereas the chronic patients in the Kerr and Neale (1993) and Mueser et al. (1996) studies showed impaired performance on both tests compared with controls, irrespective of whether they were receiving antipsychotic medications. The results suggest that chronicity, not medication status, is related to poor performance of patients with schizophrenia on the emotion recognition tests developed by Kerr and Neale (1993). In line with this interpretation, Mueser et al. (1996) reported a significant (negative) correlation between time spent in the hospital and performance on the facial perception tests.

DISCUSSION

The studies reviewed here are unique in that they all employed a common set of measures of facial emotion recognition and perception. Prior to these studies it had been difficult to compare the results of research in this area because of the variety of methods used to assess affect perception. Furthermore, few researchers have attempted to replicate their findings on independent samples of patients and controls. For these reasons, it has been impossible to determine whether inconsistent findings across the studies were due to differences in the specific nature of the assessment instruments (e.g., still photographs versus videotaped stimuli), the

sample characteristics (e.g., acute versus chronic patients), or simply idiosyncratic (i.e., nonreplicable) results.

The three studies involving Kerr and Neale's (1993) two measures (the Face Emotion Recognition Test and the Face Emotion Identification Test) and the control test (the Test of Facial Recognition (Benton et al. 1978) revealed a clear pattern of results. Poor performance on the emotion perception tasks was found in patients with chronic schizophrenia but not in those with acute schizophrenia. Medication status of the chronic patients did not influence the performance of these patients. Furthermore, patients performed more poorly on the control test relative to nonclinical control subjects in all three studies.

These findings suggest that patients with chronic schizophrenia display a pattern of generalized deficits in their facial perception abilities, rather than focal impairments in recognizing facial expressions. Such a pattern is consistent with Chapman and Chapman's (1978) notion of the "generalized cognitive deficit" in schizophrenia but is limited by the failure to include other measures of cognitive functioning unrelated to facial perception. In other words, an argument for the presence of a generalized deficit would have been strengthened by including measures that assessed a range of cognitive skills, including those which evaluated general perceptual skills (e.g., perception of geometric figures). Since all of the visual perception tasks in the three studies utilized faces as stimuli, the most reasonable conclusion is one of a generalized deficit in face perception rather than a general deficit in cognitive performance.

The performance pattern observed for the patients with acute schizophrenia (i.e., deficits on only the Test of Facial Recognition) is potentially important and warrants further investigation. Because these individuals were tested when their symptomatology had stabilized, it is possible that "normalization" of affect perception precedes that of general face perception rather than vice versa, an assertion that

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Table 1
SUMMARY OF THREE STUDIES ON FACE PERCEPTION IN PATIENTS WITH SCHIZOPHRENIA

Study	Number of Controls	Number of Patients	Chronicity	On/Off Medication	Face Emotion Identification Test				Face Emotion Discrimination Test				Test of Facial Recognition			
					Patients	Controls	Patients	Controls	Patients	Controls	Patients	Controls	Patients	Controls	Patients	Controls
Kerr and Neale (1993)	20-30	19-28	Chronic	Off	8.79*	3.81	13.73	3.17	20.21*	4.73	26.08	3.09	19.13*	4.49	23.39	1.99
Bellack et al. (1996)	19	32-35	Acute	On	11.69	3.98	12.68	2.40	23.46	3.35	24.79	3.12	43.62*	5.18	47.44	2.91
Mueser et al. (1996)	15	25-28	Chronic	On	10.93*	4.04	14.13	2.34	20.84*	4.60	24.63	2.92	17.32*	3.65	21.29	3.10

Note. Kerr and Neale (1993) and Mueser et al. (1996) used the short version of the Test of Facial Recognition, whereas Bellack et al. (1996) used the long version.
*Patients performed significantly worse ($p < .05$) than controls.

is consistent with some models of social cognition (Cosmides and Tooby 1994; discussed by Ostrom 1984; Penn et al. 1997). Longitudinal studies which examine changes in both emotion and face perception over time and across symptom states may shed light on this hypothesis.

These findings confirm the common clinical observation that patients with schizophrenia often have difficulty recognizing facial expressions. They also qualify the observation by suggesting that these impairments are not limited to facial expressions, and they are most likely to be present in chronically ill patients. The functional significance of these deficits is unclear. However, considering the severity of social impairment of patients with chronic schizophrenia, the results are consistent with theories of social competence, which posit an association between social perception skills and social skill (Morrison and Bellack 1981; Trower et al. 1978). In line with this was Mueser et al.'s (1996) finding that performance on the facial perception tests was weakly correlated with social skill and more strongly correlated with social functioning on the ward, a finding recently replicated in a different sample of inpatients with chronic schizophrenia (Penn, Spaulding, Reed, and Sullivan 1996). From a treatment point of view, these results suggest that efforts to improve the social perception skills of patients with schizophrenia may facilitate their ability to manage social encounters and achieve interpersonal needs. However, they also suggest that the impairments in social functioning characteristic of patients with acute schizophrenia may not be due to deficits in affect perception, as patients in Bellack et al. (1996) performed at a comparable level as the controls on these tests.

Although these studies shed light on the issue of deficits in affect perception in patients with schizophrenia, they leave open many questions, including the generalizability of the findings. In most day-to-day interactions, facial expressions are but one source of data about another per-

son's affective state, with other cues providing equally or more important information. Patients with schizophrenia may have impairments in their social schemata (Corrigan, Wallace, and Green 1992) and social knowledge (Cutting and Murphy 1990) that limit their ability to perceive relevant contextual cues about emotion, independent of their emotion recognition skills. Research is needed that examines the ability of patients with schizophrenia to decode affective stimuli in interpersonal situations that more closely resemble their "real-life" interactions. Thus, facial affect perception skill may only be a component of broader social perception skills.

Future research should also examine the nature of affect perception deficits in stabilized outpatients with schizophrenia. Subjects in Bellack et al. (1996) differed from Kerr and Neale (1993) and Mueser et al. (1996) not only in chronicity but in terms of residential setting. Bellack et al.'s subjects were outpatients who had recently been admitted for an acute exacerbation of symptoms, whereas subjects in the other two studies were generally long-term stay patients. This raises the hypothesis that hospitalization status may contribute to affect perception performance. Therefore, the "generalized deficit pattern" observed among inpatients may result from the lack of variability in the environments. Redundancy in the social environment may contribute to "generalized" perceptual skills. Conversely, among outpatients, varied contexts and encountering individuals in different social roles could lead to differentiation of perceptual skills (e.g., those necessary to discern friendship, threat, etc.). Thus, outpatients may not demonstrate the observed generalized deficit in affect perception found in chronically ill inpatients.

On a final note, the findings do not address the issue of *which* emotions individuals with schizophrenia have particular difficulty in perceiving. The affect perception tasks, the Face Emotion Identification Test, and Face Emotion Dis-

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crimination Test, index performance as a summary score across all emotions. Therefore, in order for a comprehensive model of affect perception in schizophre-

nia to be developed, future research should examine the perception of specific emotions in standardized tasks adapted for this clinical population.

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