SHORT REPORTS

Emotion Recognition and Social Competence in Chronic Schizophrenia

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This study evaluated (a) whether chronic, medicated schizophrenia patients show deficits in emotion recognition compared to nonpatients, and (b) whether deficits in emotion recognition are related to poorer social competence. Two emotion recognition tests developed by S. L. Kerr and J. M. Neale (1993) and Benton's Test of Facial Recognition (A. Benton, M. VanAllen, K. Hamsher, & H. Levin, 1978) were given to patients with chronic schizophrenia and nonpatient controls. Patients' social skills, social adjustment, and symptomatology were assessed. Like Kerr and Neale's unmedicated patients, these patients performed worse than controls on both emotion recognition tests and the control test. For patients, facial perception was related to the chronicity of illness and social competence. Chronicity of illness may contribute to face perception deficits in schizophrenia, which may affect social competence.

Recent research has evaluated whether schizophrenia patients have impairments in emotion recognition. The findings have been inconsistent: some studies reported differences (Kerr & Neale, 1993), but others did not (Novic, Luchins, & Perline, 1984). Discrepant findings may be partly due to the variety of methods used to study emotion recognition, which has made it impossible to compare the results across different studies. Also, many measures have been developed for a single study, with little attention given to their psychometric properties and cross-validation.

An exception to this problem is a set of instruments recently developed by Kerr and Neale (1993) for the assessment of emotion recognition in schizophrenia patients: The Face Emotion Identification Test, the Face Emotion Discrimination Test, the Voice Emotion Identification Test, and the Voice Emotion Discrimina-

tion Test. These tests were standardized and cross-validated on nonpatients. Kerr and Neale then compared unmedicated, chronic schizophrenia patients to nonpatient controls on these tests and on two control tests that were matched in difficulty to the emotion recognition tests. They found that the schizophrenia patients performed more poorly than the nonpatients on both emotion recognition tests and the control tests. Kerr and Neale interpreted their results as supporting the generalized deficit hypothesis of performance in schizophrenia, rather than pointing to distinct impairments in emotion recognition.

Antipsychotic medications can improve cognitive and perceptual functioning in schizophrenia patients (Spohn & Strauss, 1989). Because Kerr and Neale (1993) studied patients who had been withdrawn from antipsychotic medication, the question remains whether medicated patients with chronic schizophrenia also have deficits in facial perception. One goal of the present study was to address this question by examining emotion recognition ability in chronic schizophrenia patients who were maintained on antipsychotic medication.

A second goal was to evaluate the relationship between deficits in emotion recognition and social competence. Theories of social competence postulate that social perception skill (i.e., the ability to recognize relevant social parameters, such as facial expression) is an important factor in mediating social skill and social adjustment (Wallace, 1984). Despite the hypothesized impact of social perception on social competence, little research has addressed this issue. Thus, we conducted assessments of patients' social skill and adjustment in order to evaluate their relationship to deficits in emotion recognition.

Method

Participants

The participants were 28 long-term inpatients (20 with schizophrenia, 8 with schizoaffective disorder) residing in the Medical College of

Pennsylvania Research Unit at Norristown State Hospital (NSH) and 15 nonpatient controls. Participants were between the ages of 29 and 62. The mean age of patients was 44.79 (SD = 9.62) years; for controls, it was 44.20 (SD = 7.81). Patients averaged 11.02 (SD = 1.90) years of education, and controls averaged 12.13 (SD = 1.73). Fifteen (53%) patients were women, 26 (93%) were White, and 20 (71%) were never married. Ten (67%) controls were women, 9 (53%) were White, and 2 (20%) were never married. The two groups differed in race and marital status, $\chi^2(1, N = 43)$ = 9.22, p < .01, and $\chi^2(1, N = 43)$ = 10.38, p < .001, but not the other demographic variables. The mean patient age at first hospitalization was 21.04 (SD = 5.69) years; patients had spent a mean of 9.47 (SD = 10.49) years in the hospital.

Diagnoses were established with the Structured Clinical Interview for DSM-III-R (SCID; Spitzer, Williams, Gibbon, & First, 1990) conducted by one of three trained interviewers. Prior to assessing study patients, SCID interviewers had participated in a training course and demonstrated satisfactory levels of interrater reliability (κs > .80). In addition, four study patients were rated by two interviewers, with 100% agreement on diagnosis.

All patients were stabilized on antipsychotic medication, with a mean chlorpromazine equivalent dosage of 650.45 mg (SD = 529.46). Ten patients (36%) were also receiving lithium, 9 (32%) benzodiazepines, 7 (25%) anticonvulsants, 4 (14%) anticholinergics, 4 antidepressants (14%), and 1 (4%) a beta-blocker. The nonpatient controls were recruited from among nonprofessional staff employees at NSH.

Measures

Assessments of face perception were conducted for all participants. Assessments of symptoms, social skill, and social adjustment were conducted only for the schizophrenia group.

Emotion and face recognition. Two emotion recognition tests were given: the Facial Emotion Identification Test (FEIT) and the Facial Emotion Discrimination Test (FEDT; Kerr & Neale, 1993). Both tests use black and white photographs of facial emotions developed by Ekman (1976) and Izard (1971) and are presented on a videotape. The FEIT consists of 19 facial photographs, each depicting one of six different emotions (happy, sad, angry, surprise, disgust, shame), which are shown one at a time to participants for 15 s, with 10 s of blank tape between each stimulus presentation. After each photo, the participant makes a forced choice by selecting which of the six emotions is depicted. The test is scored by summing the total number of correct emotion identifications (range = 0–19).

The FEDT consists of 30 pairs of photos, each pair including two different people displaying one or two of the six emotions depicted in the FEIT. The pairs are presented simultaneously for 15 s, with 15 s of blank tape between each presentation. The participant's task is to judge whether the two people in each pair have the same or different emotions. The test is scored by summing the total number of correct discriminations (range = 0–30).

To evaluate whether impairments were specific to emotion recognition rather than facial feature processing, general cognitive efficiency, and other aspects of task performance, we included as a control task the short form of the Test of Facial Recognition (TFR; Benton, VanAllen, Hamsher, & Levin, 1978). For the TFR the participant is shown a target photo of a person, and below that target is an array of six photos. In the first part, the participant'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 participant identifies which three of the six photos are the same person as the target. The test is scored by counting the total number of correct identifications (range = 0–27).

Symptoms. Patients' symptoms were assessed with the Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962). The following BPRS subscales were examined: Anergia, Thought Disorder, Anxiety-Depression, Activation, and Hostility. Interrater reliabilities on 25% of

the patient sample, based on intraclass correlation coefficients (ICC), were satisfactory for all subscales (range = .61–.97).

Social skill. Brief, highly structured role play tests of social skill discriminate schizophrenia individuals from other diagnostic groups and nonpatients and are predictive of role functioning in the community (Bellack, Morrison, Wixted, & Mueser, 1990). Although studies support the validity of role plays for assessing social skill, prior research has focused on acute patients, and their validity with chronic patients is unknown. Because of the absence of data on the validity of brief role play tests for chronic patients, we used a more extended and less structured role play assessment of social skill, a Conversation Probe (CP; Penn, Mueser, Spaulding, Hope, & Reed, 1995).

Patients participated in two CPs, each lasting 3 min, one with a male and one with a female confederate, with order counterbalanced across patients. The confederates were unfamiliar with the patients and were blind to all study assessments. Prior to the CP the patient was informed that the confederates would play the role of a new volunteer on the ward who they would have 3 min to get to know, and they were to respond as though the confederate were actually a volunteer. Confederates were trained to use standardized prompts during the conversation if a period of 10 s elapsed after the confederate had spoken and the patient had not responded. CPs were videotaped and later rated for social skill. CPs were not conducted with the controls because the role play scenario had low relevance for these participants.

Social skill ratings were made of the CP by research assistants who did not know the patients and were blind to all study assessments. The two CPs for each patient were rated in random order, with both raters rating all patients. First, all ratings of global social skill were conducted. Then, the tapes were rated a second time for specific components of social skill. Component skills were selected for rating on the basis of our previous research (Penn et al., 1995) and discussions with the raters after the global ratings had been completed. Social skill ratings were made after observing each entire 3-min CP.

Ratings were made with anchored 5-point Likert scales ranging from 1 (*poor*) to 5 (*good*). Ratings were made of overall social skill (overall effectiveness as a communicator); meshing (smoothness of turn taking); fluency (smooth verbal speech and lack of verbal disruptions); clarity (clear enunciation of words); affect (appropriate expression of feeling through voice tone, facial expression, etc.); gaze (eye contact); involvement (extent to which patient appears engaged in conversation); on topic (ability to respond to the major topic of conversation); and delusional speech (absence of talking about what appears to be delusions). For analyses, component ratings were combined into two categories by computing z scores for each variable and summing the scores: nonverbal–paralinguistic skills (meshing, fluency, clarity, affect, gaze, involvement) and verbal content (on topic, delusional speech).

Training of raters was done on 10 CPs, randomly drawn from all the CPs. When satisfactory reliability had been achieved, the remaining CPs were rated and the training CPs were re-rated. ICCs between the two raters calculated on the nontraining CPs demonstrated good interrater reliability (range = .78–.91). Analyses were conducted on the mean of the two ratings provided by each judge.

Social adjustment. Social adjustment ratings of patients over the past month were made using the Social Behavior Schedule (SBS; Wykes & Sturt, 1986) by hospital staff familiar with the patients, but not with study assessments. The SBS consists of 30 items, each rated on anchored 5-point Likert scales ranging from 1 (*good*) to 5 (*poor*). Items assessing work were dropped because no patients worked. Nonbehaviorally anchored items were also dropped. Ratings corresponded to the following areas of social adjustment: social mixing (ability to make appropriate social contacts), inappropriate behavior (e.g., destructive behavior), altered activity level (under- or overactivity), personal appearance and hygiene, and leisure activities.

Each patient was rated by two staff members. ICCs computed across all raters and all patients on each area of social adjustment indicated good agreement between raters (range = .68–.73), except for leisure

Table 1
Descriptive Statistics of Emotion Perception Tests and Facial Recognition Test

	Schizophrenia			Control		
Gender	N	M	SD	N	M	SD
	Face Emotion Identification Test					
Men	13	9.38	3.15	5	14.40	2.41
Women	15	12.27	4.33	10	14.00	2.49
Total	28	10.93	4.04	15	14.13	2.34
	Face Emotion Discrimination Test					
Men	13	20.46	4.18	5	25.00	3.81
Women	13	21.23	5.15	10	24.30	2.58
Total	26	20.84	4.60	15	24.53	2.92
	Test of Facial Recognition					
Men	13	16.15	3.67	5	19.80	3.42
Women	12	18.58	3.31	10	22.00	2.83
Total	25	17.32	3.65	15	21.27	3.10

activities, which was dropped. The mean of the two staff members' ratings was used in the statistical analyses.

Results

Face and Emotion Recognition

The internal reliabilities of the face and emotion recognition tests were examined by computing coefficient alphas for each test separately for the patients and controls. For the patients, the alphas for all tests were acceptable: FEIT, $\alpha = .64$; FEDT, $\alpha = .74$; and TFR, $\alpha = .63$. For the controls, alpha was low for FEIT (.20), but acceptable for the FEDT (.65) and the TFR (.60).

To evaluate whether performance on the three tests (FEIT, FEDT, TFR) was related to group or gender, we performed a 2 × 2 multivariate analysis of variance (MANOVA), with the scores on the tests as the dependent variables. The multivariate F for the group effect was significant, $F(3, 32) = 7.23, p < .001$,

but not the effects for gender or the Gender × Group interaction, $F(3, 32) = 1.81, ns$ and $F(3, 32) = 1.06, ns$. Univariate F tests indicated significant effects for FEIT, $F(1, 34) = 21.53, p < .001$; FEDT, $F(1, 34) = 10.15, p < .003$; and TFR, $F(1, 34) = 9.06, p < .005$. Patients scored worse on all three tests. Descriptive statistics for the three face perception tests are contained in Table 1.

We examined the relationship between performance on the recognition tests in the schizophrenia group and demographic and clinical variables. None of the demographic variables were related to performance; neither was schizophrenia–schizoaffective diagnosis (t tests, Pearson correlations).

To determine whether performance on the FEIT, FEDT, and TFR was related to the clinical variables (age at first hospitalization, total duration in the hospital, BPRS subscales), we performed an omnibus test of the significance of the correlation matrix (Cohen & Cohen, 1983), which was significant, $\chi^2(20, N = 25) = 31.50, p < .05$. One-tailed significance tests indicated that FEIT was significantly correlated with age at first hospitalization (.36, $p < .05$), duration in the hospital ($-.43, p < .01$), and BPRS Anergia ($-.55, p < .01$), but FEDT was not related to any clinical variables. TFR was significantly correlated with duration in the hospital ($-.35, p < .05$) and Anergia ($-.43, p < .01$). Thus, earlier age at first hospitalization, longer time spent in the hospital, and higher Anergia were related to poorer performance on some of the recognition tests.

Social Competence

Pearson correlations were computed to explore the relationship between perception and social competence among the patients (Table 2). We used one-tailed significance tests because we expected poor social competence to be related to greater impairment in perception.

An omnibus test on the correlation matrix of the summary scores for CP, SBS, and the face perception measures was significant, $\chi^2(21, N = 25) = 57.76, p < .001$, suggesting an overall relationship between social competence and face perception. Because nonverbal–paralinguistic skill was correlated with FEIT, we computed correlations between the individual social skills that

Table 2
Correlations Between Face Perception Tests and Social Competence Measures Among Chronic Schizophrenia Patients

Social competence measure	Face Emotion Identification Test[a]	Face Emotion Discrimination Test[a]	Test of Facial Recognition[a]
Conversation Probe[a]			
Nonverbal Paralinguistic skill	.37*	.20	.28
Verbal content	−.04	.06	−.17
Overall social skill	.30	.14	.01
Social Behavior Schedule[b]			
Social mixing	−.45**	−.35*	−.61***
Inappropriate behavior	−.02	−.16	−.11
Altered activity level	−.11	−.34*	−.40*
Personal appearance/hygiene	−.61***	−.38*	−.65***

[a] High scores denote better performance. [b] High scores denote worse social adjustment.
*$p < .05$. **$p < .01$ ***$p < .001$ (one-tailed tests).

comprise that category and that test. Significant correlations were found between the FEIT and meshing, $r(24) = .32$, $p < .05$; fluency, $r(24) = .45$, $p < .01$; gaze, $r(24) = .42$, $p < .02$; and involvement, $r(24) = .33$, $p < .05$, but not affect, $r(24) = .00$, ns, or clarity, $r(24) = .23$, ns. Thus, most of the nonverbal–paralinguistic skills were related to the FEIT in the expected direction. Several of the categories on the SBS were strongly related to the face perception measures, especially social mixing and personal appearance and hygiene, indicating that good performance on these tasks was associated with better social interactions and more appropriate hygiene and appearance.

Discussion

The chronic medicated schizophrenia patients performed significantly worse on the three face perception tasks than the controls. The tendency for patients to perform poorly on both the emotion recognition tasks (FEIT, FEDT) and the control test (TFR) suggests a generalized deficit in face perception, rather than a specific impairment in emotion recognition, an interpretation consistent with Kerr and Neale (1993). Kerr and Neale previously reported similar deficits on these tasks for chronic unmedicated patients (means for FEIT, FEDT, and TFR were 8.79, 20.21, and 19.13, respectively). The poor performance of the medicated chronic patients in this study, coupled with the equally poor performance of the unmedicated chronic patients in Kerr and Neale's study, indirectly suggests that impairments in face perception in these patients are not ameliorated by medication. The possibility that chronicity underlies the perceptual deficits is supported by the finding that age of first hospitalization, duration of illness, and severity of Anergia on the BPRS were all correlated with performance on some of the face perception measures.

In a recent study using the FEIT and FEDT (Bellack, Blanchard, & Mueser, in press), we found that acutely ill, medicated schizophrenia patients did not differ from controls, although their performance on the TFR was worse.[1] The better performance of the acute patients on these tasks could be due to the less chronic course of their illness. Alternatively, antipsychotic medication may reduce perceptual deficits in acutely ill but not chronic patients.

There was an overall association between the face perception measures in the schizophrenia patients and social competence, including social adjustment on the ward (the SBS) and social skill (CP). These results are in line with theories of social competence, which posit that social perception is an important determinant of social skill and social adjustment (Wallace, 1984). The stronger association between the SBS and face perception, compared to social skill, could be due to the fact that the former assessment incorporated a range of different social situations, whereas the latter involved only one (Epstein, 1983).

Two final points deserve brief discussion. First, Anergia was related to deficits in face perception. Despite inconsistent findings, negative symptoms in schizophrenia tend to be associated with poorer premorbid functioning (Mueser, Bellack, Morrison, & Wixted, 1990), cognitive and neuropsychological impairments (Owens & Johnstone, 1980), and worse social skill (Bellack et al., 1990). Furthermore, in this study Anergia was related to both nonverbal–paralinguistic skill ($r = -.58$, $p < .01$) and overall social skill ($r = -.48$, $p < .01$), but not verbal

content ($r = .25$, ns). These results are consistent with trends in the literature and suggest that deficits in face perception are also related to the severity of negative symptoms.

Second, the internal reliabilities of the face perception tests indicated high coefficient alphas for the patients on all tests (range = .63–.74), similar to those reported by Kerr and Neale (1993; range = .74–.76). For the controls, alphas were also high on both the FEDT (.65) and the TFR (.60), but not the FEIT (.20).[2] In contrast, Kerr and Neale reported for their controls adequate alphas on the FEIT and FEDT (range = .56–.77), but low alphas on the TFR (range = .35–.47). The low alphas for the controls on the FEIT in this study and Bellack et al. (in press) raise questions about the psychometric adequacy of this test. The low alpha does not appear to be due to low variance on this item, because its standard deviation is only slightly less than the FEDT. It is possible that there are marked differences in the difficulty of items on the test, resulting in a lower average correlation between items. Kerr and Neale noted the difficulty in identifying adequate stimulus materials for the development of the FEIT and its low internal reliability.

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[1] The acute patients in Bellack et al. (in press) had spent less cumulative time in the hospital than the chronic patients in this study, with no overlap in the distributions between the samples. Direct comparisons of performance on the three tests indicated better performance for the acute than chronic patients: FEIT, $t(64) = 3.00$, $p < .004$; FEDT, $t(64) = 2.72$, $p < .008$; and TFR, $t(63) = 4.87$, $p < .001$.

[2] In Bellack et al. (in press), the schizophrenia–schizoaffective disorder patients had coefficient alphas of .79 for the FEIT and .64 for the FEDT, whereas for the nonpatient controls the respective alphas were .39 and .69.

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