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# Social perception and social skill in schizophrenia

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**Abstract**

The relationship of social perception to social skill in schizophrenia was investigated. Twenty-six outpatients completed three social perception tasks (i.e. facial affect recognition, social cue recognition, and self-ratings of social skill) and participated in two role-plays. Correlational analyses revealed that the self-ratings of social skill had the most consistent relationship with social skill among the social perception measures, even after controlling for symptomatology and subject demographics. Other measures of social perception (i.e. social cue recognition) had weaker relationships with social skills. Implications for future research and psychosocial interventions are discussed.


*Keywords:* Schizophrenia; Affect perception; Social functioning

## 1. Introduction

Impairments in social functioning are among the hallmarks of schizophrenia (DSM-IV; American Psychiatric Association, 1994). These impairments not only represent a domain relatively independent of symptomatology (e.g. Lenzenweger and Dworkin, 1996), but they precede illness onset (Hans et al., 1992; Walker, 1994; Baum and Walker, 1995) and predict outcome (Sullivan et al., 1990; Perlick et al., 1992; Tien and Eaton, 1992). These findings indicate that social dysfunction has implications for the development and course of schizophrenia.

Given the importance of social functioning in schizophrenia, it is critical to understand factors which underlie deficits in this area. Models of social functioning posit that both cognitive processes and social perception skills contribute to social performance failures among persons with

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schizophrenia (Trower et al., 1978; Morrison and Bellack, 1981; McFall, 1982; Liberman et al., 1986). Recently, empirical findings have confirmed a correlational and predictive association between cognitive factors, such as verbal memory and vigilance, and psychosocial functioning among persons with schizophrenia (reviewed by Green, 1996; Penn et al., 1998b).

Less attention has been placed, however, on the role of social perception skills in the social adjustment of persons with schizophrenia. This may be an important omission, as there is evidence that social perception is associated with adjustment in non-clinical subjects. For example, higher non-verbal social perception is associated with marital adjustment and satisfaction (Sabatelli et al., 1986), and better social skills [Costanzo and Archer (1989); and see Toomey et al. (1997) for somewhat contradictory findings], especially in female subjects (Firth et al., 1986). Superior ability to decode facial expressions is associated with social competence in children (Phillipot and Feldman, 1990). Finally, the ability to discriminate between socially skilled and unskilled behavior is associated with heterosocial skills in males (e.g. Conger et al., 1991). In general, the emphasis of research on social perception in schizophrenia has focused on issues of general psychopathology (i.e. the 'generalized' versus 'specific' deficit) rather than functional significance [reviewed in Morrison et al. (1988) and Penn et al. (1997)]. Thus, the contribution of social perception to social impairments in schizophrenia is relatively less well understood than for cognitive factors.

There is some evidence that deficits in social perception are associated with interpersonal behavior among inpatients with schizophrenia. Specifically, non-verbal social perception skills were associated with social skills during a problem solving task (Toomey et al., 1997). Furthermore, performance on facial affect recognition tasks was significantly related to ward behavior in two samples of inpatients with chronic schizophrenia (Mueser et al., 1996; Penn et al., 1996). These findings are notable in that different measures of facial affect recognition and ward behavior were used in the two studies. Furthermore, the results of the two studies converge with that of Appelo et al. (1992), who found that ward behavior among inpatients was associated with a different measure of social perception, namely social sequencing skills. Taken together, these studies indicate a significant correlational role for social perception in the naturally occurring behavior of inpatients with schizophrenia.

A number of extensions can be made on the research summarized above. First, the functional role of social perception has been assessed primarily in inpatients with schizophrenia. Assessment of the relationship between social perception and social skill among outpatients with schizophrenia is important for a number of reasons. First, because both social perception and social functioning are sensitive to phasic changes of the disorder (discussed in Penn et al., 1995a, 1997), one cannot assume that findings with chronically ill inpatients will generalize to an outpatient sample. Second, there is some evidence, albeit mixed, that social perception deficits persist during remission (e.g. Hellewell et al., 1994; Woelwer et al., 1996; Corrigan and Nelson, 1998; see Cutting, 1981; Gessler et al., 1989, for evidence of state-related deficits). Such deficits during remission may contribute to social performance failures which, in turn, could increase the likelihood of relapse. Thus, identifying the relationship between social perception and social skill among remitted outpatients may have important treatment implications.

A second extension is that previous research in this area has used only one measure of social perception, typically a task of facial affect recognition (e.g. Mueser et al., 1996; Penn et al., 1996). Social perception, however, is not limited to facial affect recognition, but encompasses diverse skills such as cue recognition, self-perception, and forming inferences about others (Morrison and Bellack, 1981; Penn et al., 1997; Corrigan, 1997; Kenny, 1988). Therefore the functional significance of social perception in schizophrenia cannot be adequately evaluated unless multiple measures, ideally assessing different domains, are included in the investigation.

The purpose of the present study was to inves-

tigate the functional significance of social perception in schizophrenia. In addition to facial affect recognition, two other social perception tasks were included in the study design. These tasks were the Social Cue Recognition Test (SCRT; Corrigan and Green, 1993) and subject ratings of their own social skill following a role-play ('self-perception'). Both tasks have been previously investigated in schizophrenia and other psychiatric disorders. Specifically, performance on the SCRT has been shown to be associated with both cognitive factors (i.e. verbal memory and vigilance) and social skill [reviewed by Corrigan (1997)]. Self-perception is commonly used to measure perceived social skills among persons with depression (e.g. Gotlib and Meltzer, 1987) and social anxiety (e.g. Hope et al., 1995), and is associated with others' ratings of an individual's personality characteristics in non-clinical subjects (Berry, 1991). Among persons with schizophrenia and other severe mental disorders, there is evidence that the self-perceived social skills are related to confederate ratings of social skill (Appelo et al., 1992) and are fairly accurate (Fingeret et al., 1985; Monti and Fingeret, 1987), although a tendency toward over-rating them has been reported (Carini and Nevid, 1992). It should also be underscored that self-perception is inherently social in nature; one's view of oneself and one's impact on others, which occurs within a social context, has important implications for current and future impression management tactics (Levesque, 1997; Silverstein, 1997). In order to simulate the type of self-observations that may occur in natural interactions, subjects were asked to rate their social skills immediately following a role-play rather than having them observe videotapes of their conversation (Hope et al., 1995).

In general, it was hypothesized that better social perception would be associated with higher ratings of social skill. Because performance on the social cue recognition and facial affect recognition tasks has been shown to have some relationship to social behavior in schizophrenia, it was further hypothesized that performance on these tasks would have a stronger relationship to social skill than to the self-perception task. To test this hypothesis, differences in the strength of bivariate correlations between each of the measures of social perception and social skill will be statistically evaluated. Finally, analyses will be conducted to determine the role of 'third variables', such as symptoms and demographics, in mediating the relationship between social perception and social skill.

## 2. Method

### 2.1. Participants

Twenty-six outpatients at the University of Chicago, Center for Psychiatric Rehabilitation (UCCPR) participated in the study. All subjects met criteria for schizophrenia based on the Structured Clinical Interview for DSM-IV, Patient version (SCID-P; Spitzer et al., 1995) and a chart review. The SCID-P was administered by research assistants who had been trained to a kappa of at least 0.70 with consensus criteria from the UCCPR. Subjects were excluded from participation if they had a chart history of neurological disorder or developmental disability, corrected vision of less than 20/30 on the Snellen Eye Chart, less than a third grade reading level as measured by the Wide Range Achievement Test — Revised (WRAT), and evidence of substance abuse in the past 6 months (determined from the SCID-P).

The participants in the study had a mean age of 33.4 years (S.D. = 9.7), had been previously hospitalized an average of 4.8 times (S.D. = 3.8), had a mean educational level of 12.1 years (S.D. = 1.8), and had an average score of 49.5 on the WRAT (S.D. = 12.8) ($N = 23$; WRAT scores were unavailable for three subjects). Males and females accounted for 57.6% and 42.4% of the sample, respectively. Sixty-five percent of the sample was African–American and 35% was Caucasian. Finally, all subjects received anti-psychotic medication with an average daily dosage [chlorpromazine (CPZ) equivalent] of 698 mg (S.D. = 513.65).[1]

[1]The neuroleptic dosage level was unavailable for one subject. Thus, this subject was excluded from the computation of the average neuroleptic level for study participants.

### 2.2. Materials

#### 2.2.1. Brief Psychiatric Rating Scale

Subjects were administered the expanded version of the Brief Psychiatric Rating Scale (BPRS; Ventura et al., 1993) by research assistants (RAs) trained to a minimum intraclass correlation coefficient (ICC; Shrout and Fleiss, 1979) of 0.80 according to criterion ratings from the UCCPR. Based on a recent factor analysis of over 400 individuals with schizophrenia (and replicated in an independent sample of over 300 individuals with schizophrenia) (Mueser et al., 1997), four symptom clusters were used: Affect (somatic concern, anxiety, guilt, depressive mood, and hostility); Anergia (emotional withdrawal, motor coordination, uncooperativeness, blunted affect); Thought Disorder (grandiosity, suspiciousness, hallucinatory behavior, unusual thought content); and Disorganization (conceptual disorganization, tension, mannerism/posturing).

#### 2.2.2. Social skills assessment

Social skills were assessed with the Conversation Probe (CP) role play test, a procedure which has been used in previous research with individuals with schizophrenia (Penn et al., 1995a,b; Mueser et al., 1996). The CP requires the subject to initiate and maintain a conversation with a stranger for 3 min. The CP used in the current study was part of a broader investigation of social cognition, social skill, and impression management in schizophrenia (Penn et al., 1998a). Thus, subjects either were instructed to make a good impression on the confederate or told that the confederate was to make a good impression on them. These instructions were counterbalanced across the two role-plays. Subjects participated in two 3-min CPs, each with a different confederate. The CP was conducted in a building on the grounds of the subjects' day program. Subjects were informed that they would have 3 min to get to know the confederate. The confederates were trained to employ standardized prompts during the conversation (e.g. 'Tell me about your family?') if a period of 5 s elapsed after the confederate had spoken and the patient had not responded. Subjects were instructed that the role-plays would be videotaped (for later ratings), and were notified when videotaping and the role-play had begun.

Two research assistants, unfamiliar with study participants and experimental conditions, rated the subject's videotaped social skills. The following skills were rated on anchored 5-point Likert scales ranging from 1 (poor) to 5 (good): Overall social skill; Clarity (clear enunciation of speech); Fluency (smoothness of verbal speech; absence of verbal interruptions, such as 'uhs', 'stutters'); Affect (appropriate communication of feeling through facial expression, use of gestures, voice tone); Gaze (eye contact); and Involvement (extent to which the individual appears involved in the conversation with the confederate). The final social skill, Asks Questions, was rated on a 5-point Likert scale anchored by 'none' and 'many'. Thus, these social skills were rated for both role plays.

Raters were trained on 20 CPs drawn from our library of role-plays from previous research with individuals with schizophrenia (e.g. Penn et al., 1995b). When satisfactory reliability had been achieved (i.e. ICCs $> 0.70$), the CPs for the study were rated. ICCs between the two raters calculated on 73% of the set of CPs[2] (i.e. across both high- and low-impression management role-plays) ranged from 0.46 (Fluency) to 0.94 (Involvement), with a mean ICC of 0.78.

To determine if subject social skill differed across the two role-plays, a repeated measures MANOVA was conducted on the seven social skill variables. The multivariate effect was not significant, $F_{7,19} = 2.23$, n.s. Thus, the ratings of social skill were collapsed across both role-plays.

Because multiple confederates were used in this study (i.e. four individuals), a one-way multivariate analysis of variance (MANOVA) was conducted on the seven social skill variables with confederate as the grouping variable. This analy-

[2] The second research assistant had to leave suddenly prior to completing all of the social skill ratings. However, given the high level of average inter-rater reliability (i.e. ICC = 0.78), the ratings from the second rater were used in the absence of the other research assistant.

sis was not significant, $F_{21,51} = 0.96$, n.s. Thus, the data for the four confederates were combined in all subsequent analyses.

*2.2.3. Facial affect recognition tasks*

Facial affect recognition was assessed with the Face Emotion Identification Task and the Face Emotion Discrimination Task (FEIT; FEDT; Kerr and Neale, 1993). The FEIT is composed of 19 black–white photographs of faces expressing six basic emotions (happy, sad, angry, afraid, surprised, ashamed). The items are presented on videotape for 15 s. After viewing the item, the subject identifies which of the six emotions best represents the affect expressed by the face. The FEDT comprises 30 photographs of same-sex pairs presented for 15 s each. The FEDT requires the subject to determine whether two faces presented next to one another are expressing the same or a different emotion. Performance on both tasks is indexed as the total number correct. Internal consistency for the FEIT and FEDT was 0.59 and 0.70, respectively, which is comparable to that reported in previous research with this measure (Kerr and Neale, 1993; Mueser et al., 1996).

*2.2.4. Social Cue Recognition Test (SCRT)*

Sensitivity to interpersonal cues was assessed with the SCRT (Corrigan and Green, 1993). The SCRT comprises eight videotaped vignettes of two or three people interacting. Following each vignette, the subject answered 36 true–false questions about the interpersonal cues in the interaction. These cues have been categorized as either 'concrete' (e.g. 'what was the person wearing?') or 'abstract' (e.g. 'what were the goals or intentions of the person in the vignette?'). The SCRT has been shown to have good psychometric properties [reviewed by Corrigan (1997)]. Performance on the SCRT for recognition of concrete and abstract cues is evaluated with a non-parametric index of cue sensitivity (A′).

*2.2.5. Self-perception*

Self-perception was assessed via administration of a two-item scale administered immediately following each role-play. Each of the two items (listed below) were rated on eight-point Likert-scales: Impression made on the research assistant (a very unfavorable impression/a very favorable impression); Overall social skill (very socially unskilled/very socially skilled). As subject social skill was collapsed across both role-plays (see above section on social skills assessment), internal consistency for the self-perception scale was determined for the four items (i.e. for both scales combined). Computation of Cronbach's alpha revealed the self-perception to have high internal consistency (i.e. 0.81).

## 3. Results

### 3.1. Preliminary analyses

Prior to the primary analyses, distributions of all variables were examined for deviations from assumptions of normality. The means and standard deviations for the symptom, social skill, and social perception variables are summarized in Table 1. Three variables (anergia, social cue sensitivity for abstract and concrete cues, and eye contact) met criteria for significant skewness and kurtosis (Tabachnick and Fidell, 1989). To improve normalization of these variables, inverse data transformations were conducted on anergia and social cue sensitivity, while a square root transformation was performed on the eye contact variable.[3]

Because it was hypothesized that better social perception would be associated with higher ratings of social skill, all correlations reported below are based on one-tailed significance tests. As there were no hypotheses regarding the association between study variables and clinical/demographic factors, two-tailed significance tests were

[3] Because social cue sensitivity and eye contact variables were negatively skewed, these variables were 'reflected' (i.e. all scores were subtracted from a constant value, which was equal to the highest value in the distribution plus one), prior to data transformation.

used. Finally, the 'layering' approach, which tends to be less conservative than the Bonferroni method, was utilized to correct alpha levels associated with conducting multiple correlational analyses (Darlington, 1990).[4]

### 3.2. Correlational analyses

To facilitate interpretation of the social perception variables, correlational analyses were conducted on the three social perception tasks to determine the degree of overlap among them. As summarized in Table 2, there is significant shared variance among the facial affect recognition and social cue recognition tasks. Because of the high correlation between the two social cue recognition tasks, these tasks were combined into one variable. However, the self-perception task is not significantly associated with performance on the other social perception tasks. Thus, self-perception appears to represent a domain independent of facial affect recognition and social cue recognition.

The correlations between social perception and social skill are summarized in Table 3. Due to the large number of correlations, correction of the alpha level was employed for each index of social perception performance (i.e. for each set of seven bivariate correlations). A higher number of correct responses on the emotion identification task (i.e. FEIT) was associated with higher overall social skills, greater speech clarity, and more involvement in the conversation. The association between emotion identification and speech clarity remained significant after using the corrected alpha level. Conversely, fewer significant associations were observed between the emotion discrimination task (i.e. FEDT) and the social cue recognition tasks with social skill, and none of these correlation coefficients met the corrected alpha level. Subjects' ratings of their own social skill were positively associated with better overall social skills, more affective expression, better eye contact and involvement in the conversation, and the asking of more questions. All of these correlations remained significant after employing the corrected alpha level. Finally, a test of dependent correlations revealed that the bivariate correlations between self-perception and affective expression and questions asked were significantly

Table 1
Means and standard deviations for BPRS subscales, social perception tasks, and social skill tasks

| Task | Mean | S.D. |
|---|---|---|
| BPRS subscale[a] | | |
| Affect | 13.1 | 5.4 |
| Anergia | 6.6 | 4.6 |
| Thought Disorder | 13.5 | 5.6 |
| Disorganization | 5.0 | 2.1 |
| Social perception | | |
| SELF-P | 15.4 | 5.6[b] |
| FEIT | 11.2 | 2.9[c] |
| FEDT | 24.1 | 3.6[d] |
| SCRT-CON | 0.84 | 0.13[e] |
| SCRT-AB | 0.84 | 0.13[e] |
| Social skill[f] | | |
| Oss | 6.7 | 1.8 |
| Fluency | 6.8 | 1.3 |
| Clarity | 7.4 | 2.0 |
| Affect | 6.7 | 2.1 |
| Involvement | 6.9 | 2.4 |
| Gaze | 7.6 | 2.6 |
| Asks Questions | 4.8 | 2.7 |

*Abbreviations.* FEIT, Face Emotion Identification Task; FEDT, Face Emotion Discrimination Task; SCRT-CON, Social Cue Recognition — Concrete Cues; SCRT-AB, Social Cue Recognition — Abstract Cues; SELF-P, Self-Perception; OSS, Overall Social Skill; ASKS QUESTIONS, Number of Questions asked

[a] Based on $n = 25$; BPRS data for one subject were unavailable.
[b] Range = 0–28.
[c] Range = 0–19.
[d] Range = 0–30.
[e] Range = 0–1.
[f] Range = 2–10.

[4] Layering is an alternative to employing Bonferroni correction. In this approach, the probability level of the most significant correlation is multiplied by the number of correlations ($N$). If the product is below $P < 0.05$, the probability level of the second-highest correlation is multiplied by $N - 1$. If that product is below $P < 0.05$, the probability level of the third-highest correlation is multiplied by $N - 2$. This process continues until the product of probability level and number of remaining correlations is greater than 0.05.

Table 2
Inter-correlations among the social perception tasks

| Task | FEIT | FEDT | SCRT-CON[a] | SCRT-AB[a] | Self-perception |
|---|---|---|---|---|---|
| FEIT | – | 0.35* | *0.51*** | *0.56*** | 0.14 |
| FEDT | | – | *0.60*** | *0.52*** | −0.04 |
| SCRT-CON | | | – | *0.95*** | −0.18 |
| SCRT-AB | | | | – | −0.20 |
| Self-perception | | | | | – |

*Note.* Correlation values in italic type remained significant after correcting for multiple correlational analyses.
[a] One subject was missing SCRT data. Thus, correlations with SCRT-CON and SCRT-AB were based on 25 subjects.
* $P < 0.05$.
** $P < 0.01$.

higher than those between the SCRT and these variables.

### 3.3. Multiple regression analyses

To determine the most parsimonious combination of social perception variables predicting social competence, backward multiple regression analyses were conducted. Only those social perception variables having a significant association with social skill (i.e. $P < 0.05$) were entered into the regression analyses. Social skill variables which were predicted by only one social perception variable (i.e. number of questions asked and affective expression were only associated with self-perception) were not included in the regression analyses.

As summarized in Table 4, higher overall social skill was predicted by a combination of better performance on the emotion identification task and self-ratings of social skill. Greater speech clarity was predicted by better performance on the emotion identification task, while better eye contact was predicted by a combination of ratings on the self-perception task and performance on the emotion discrimination task. Finally, greater involvement in the role-plays was associated with higher self-ratings of social skill.

### 3.4. Clinical / demographic variables

Subsequent analyses were conducted to evaluate whether any third variables (i.e. age, gender,

Table 3
Correlations between social perception and social skill variables

| Social perception | Social skill | | | | | | |
|---|---|---|---|---|---|---|---|
| | OSS | Fluency | Clarity | Affect | Gaze[a] | Involvement | Ask |
| FEIT | 0.44* | 0.08 | *0.50*** | 0.32*** | −0.29 | 0.34* | 0.09 |
| FEDT | 0.17 | 0.12 | 0.29 | 0.07 | −0.39* | 0.18 | 0.08 |
| SCRT | 0.14 | 0.27 | 0.38* | 0.09 | −0.17 | 0.23 | −0.04 |
| SELF-P | *0.53*** | 0.20 | 0.26 | *0.48*** | *−0.45** | *0.60*** | *0.56*** |

*Abbreviations.* OSS, Overall Social Skill; ASK, Number of Questions Asked; FEIT, Face Emotion Identification Task; FEDT, Face Emotion Discrimination Task; SCRT, Total Social Cue Recognition; SELF-P, Self-Perception.
*Note.* Italicized correlations remained significant after correcting for multiple correlational analyses.* $P < 0.05$; ** $P < 0.01$; *** $P < 0.06$.
[a] Due to the data transformation, negative correlations are in the expected direction (i.e. better social perception with better eye contact).

Table 4
Final backward multiple regression models predicting social skill from social perception tasks

| CV | PV | Beta | $R^2$ | $F^a$ |
|---|---|---|---|---|
| OSS | SELF-P | 0.47 | 0.41 | 8.08** |
| | FEIT | 0.37 | | |
| Clarity | FEIT | 0.50 | 0.25 | 7.77** |
| Gaze | SELF-P | −0.47 | 0.37 | 6.79** |
| | FEDT | −0.41 | | |
| Involvement | SELF-P | 0.60 | 0.36 | 13.4** |

*Abbreviations.* CV, Criterion Variable; PV, Predictor Variable.
** $P < 0.01$.
[a] $F$ to enter.

years of education, prior hospitalizations, neuroleptic dosage level, symptomatology) mediated the observed relationship between social perception and social skill. Multivariate analyses of variance (MANOVAs) were first conducted to determine the presence of gender or ethnic differences in social perception and social skill. The multivariate effect of gender was not significant for either social perception, $F_{4,20} = 0.69$, n.s., or social skill, $F_{7,18} = 0.63$, n.s. These results parallel the non-significant multivariate effects of ethnicity on social perception, $F_{4,20} = 0.08$, n.s., and social skill, $F_{7,18} = 2.2$, n.s. Thus, performance on the study variables did not differ as a function of gender or ethnicity.

To evaluate the role of the remaining third variables, the following steps were taken. First, Pearson correlations were computed between the third variables and the study variables. Second, significant correlates were then regressed onto the social perception and social skill variables (e.g. regressing anergia onto overall social skill) with the residual reflecting variance independent from clinical/demographic variable influence. Multiple regressions were then conducted using the residualized social perception and social skill variables.

The following third variables showed significant bivariate associations with the study variables: Age was significantly associated with performance on the SCRT ($r = -0.47$), and raw scores on the WRAT were significantly associated with eye contact during the role-play ($r = -0.43$). With respect to symptomatology, thought disorder was associated with performance on the SCRT ($r = -0.51$), while anergia was significantly associated with the following variables:[5] FEIT (0.43); SCRT (0.38); overall social skill (0.66); fluency (0.51); speech clarity (0.56); affective expression (0.71); involvement in the conversation (0.68); number of questions asked (0.40); and eye contact (−0.39).

Backward regression analyses were repeated with the residualized study variables. These analyses resulted in the following final regression models: overall social skill predicted by self-perception ($R^2 = 0.19$, $P < 0.05$); speech clarity predicted by the emotion identification task ($R^2 = 0.11$, $P < 0.10$); eye contact predicted by self-perception ($R^2 = 0.21$, $P < 0.05$); and involvement in the conversation predicted by self-perception ($R^2 = 0.29$, $P < 0.01$). It should also be noted that the bivariate associations between self-perception and affective expression ($r = 0.38$) and number of questions asked ($r = 0.48$) both remained significant with the residualized social skill variables. The pattern of results suggests that the relationships between self-perception and social skill are not mediated by demographic variables or symptomatology.

## 4. Discussion

The present study examined the functional significance of social perception in an outpatient sample with schizophrenia. Two important findings emerged from the analyses. First, a measure of self-perception had the most consistent relationship with social skill among the social perception variables. This association generally remained significant even after controlling for the influence of demographic and symptom variables. Second, contrary to expectations, the associations

[5] Because of the data transformation, positive correlations reflect greater anergia being correlated with more impaired performance on the study variables. The association between anergia and eye contact is in the appropriate direction.

between facial affect recognition and social cue recognition with social skill were fairly weak. These two findings will be discussed below.

Subject ratings of their own social skill during two role-plays were highly associated with independent ratings of their social performance. This finding is noteworthy in that previous work on self-perception has focused on 'impaired perspective' (e.g. Carini and Nevid, 1992) rather than on the behavioral consequences of self-perception. These discrepant findings may be a function of the following factors: First, the role-play was unstructured and allowed subjects to converse naturally rather than only in response to a confederate's specific prompts (Carini and Nevid, 1992). Second, self-perception was assessed immediately following the role-play without having subjects view their videotaped performance, a methodology consistent with evaluation of self-perception in other disorders and among non-clinical subjects (e.g. Gotlib and Meltzer, 1987; discussed in Kenny, 1993). Finally, and perhaps relevant to the study findings, there is evidence from the social phobia literature that the correspondence between self-perception and independent ratings of social performance increases as symptomatology remits (Hope et al., 1995). Thus, the observed association between self- and other-ratings of social skill among outpatients with schizophrenia may reflect a normalization of the self-perception skills measured in the current study. In this regard, the findings suggest that perception of one's social skills may have a role, currently limited to a correlational one, in accounting for social dysfunction.

Interestingly, self-perception was not associated with either facial affect recognition or social cue recognition. Why was this null relationship observed? First, the issue of 'shared-method variance' may be raised; the facial affect and social cue recognition tasks both require the subject to first view and rate videotapes, while the self-perception task involves rating social skills from memory. In fact, this hypothesis could be expanded by arguing that the self-perception task is primarily a memory rather than a perception task. Although this is clearly an empirical issue, the argument is somewhat weakened by evidence showing that memory is associated with performance on both facial affect recognition (Schneider et al., 1995) and social cue recognition [reviewed by Corrigan (1997)].

Furthermore, like the self-perception task, the social cue recognition task requires subjects to make their ratings from memory (i.e. after each individual vignette is terminated). Thus, if memory were a primary component of the self-perception task, a stronger association with the other social perception tasks might have been expected. Alternatively, the pattern of findings may merely reflect differences in the tasks' object of perception. Both the facial affect and social cue recognition tasks require the subject to make ratings of other, hypothetical individuals (i.e. persons either playing a role or without a clear identity). Conversely, the self-perception task requires the subject to rate her/himself; thus, personal relevance may be higher than that for laboratory-based tasks presented on videotape. The fact that the 'object' was the same for both the self-perception task and the independent social skill ratings may be the most parsimonious explanation for the strong associations among these variables. Therefore self-perception may be measuring a construct independent of the other social perception tasks.

Future research needs to examine the processes underlying self-perception in schizophrenia. For example, the role of memory could be examined by assessing the relationship between self-perception and neurocognitive memory tasks (e.g. the Wechsler Memory Scale-III). To investigate whether self-ratings are influenced by mode of presentation (i.e. from memory or videotape), it would be useful to compare the self-ratings of persons with schizophrenia, made both after a role-play and after observing their own performance. Given the strong association between self-perception and social skill reported in this study, identification of the processes underlying self-perception may provide important targets for improving self-perception skills.

Contrary to our hypothesis, facial affect recognition and social cue recognition were only weakly associated with social skills. Although the sample size was relatively small, most of the non-signifi-

cant correlations were not borderline, suggesting that a larger sample would not have markedly changed the results. It is possible that the study findings reflect a functional independence between these social perception tasks and social performance. An alternative hypothesis is that the 'criterion' of social functioning used in the present study, social skill during two role-plays, did not adequately tap into abilities that require social perception skills. In other words, the ability to read facial and social cues may not be very important during a brief (i.e. 3-min) interaction. Consequently, the ability to make subtle discriminations between different affective expressions and social intentions may exert greater influence during complex interactions or across a greater range of behavior. This would be consistent with findings showing a significant association between facial affect recognition and general social functioning, rather than with specific social skills (i.e. Mueser et al., 1996).

In closing, the present study suggests that the ability of individuals with schizophrenia to perceive their own social behaviors may have important functional consequences. Future research should examine the functional role of social perception across a range of social domains, not just those limited to specific social skills. Replication of these findings may underscore the need to incorporate social perception training into psychosocial interventions. Finally, the role of self-perception in particular, and social perception in general, in the social behavior of persons with schizophrenia should be evaluated with respect to other important processes, e.g. social problem solving and cognitive functioning. Such an assessment will help determine if social perception, compared to other domains of functioning, contributes independent variance to social behavior, and will be a critical step in developing a comprehensive, empirically based model of social dysfunction in schizophrenia.

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