Relations between social skills and ward behavior in chronic schizophrenia

David L. Penn [a], Kim T. Mueser [b], Robert Doonan [c], Pallavi Nishith [d]

[a] Illinois Institute of Technology, Department of Psychology, 3101 South Dearborn, Chicago, IL, 60616-3793, USA
[b] Dartmouth Medical School, Concord, NH, USA [c] Medical College of Pennsylvania/EPPI, Philadelphia, PA, USA
[d] Center for Cognitive Therapy, Philadelphia, PA, USA

Abstract

The relationship between social skills and ward behavior among chronic schizophrenia patients was investigated. Twenty-eight inpatients participated in an unstructured role play test and were rated by staff members on a number of indices of ward behavior (e.g., social interactions, inappropriate behavior). Overall, there was a relationship between social skill on the role play and social behavior on the ward. Speech clarity was the social skill most strongly related to ward behavior, even when controlling for symptomatology. However, several other social skill variables (e.g., gaze, affect) were not related to social adjustment. The results are discussed in terms of the validity of social skill assessments in patients with chronic schizophrenia, and their implications for psychosocial treatment of this population.

Keywords: Social skill; Ward behavior; (Schizophrenia)

1. Introduction

Social skill has been hypothesized to be an important contributing factor to social functioning among schizophrenia patients (Liberman et al., 1989). Social skill is a multidimensional construct which can include speech form and content, paralinguistic features (e.g., voice fluency), nonverbal communication (e.g., gestures), and interactive balance (e.g., timing of responses) (Mueser and Sayers, 1992). The primary method for assessing social skills in schizophrenia is the role play test. Role play assessments discriminate schizophrenia patients from other diagnostic groups and non-

patients (Bellack et al., 1990b; Mueser et al., 1991; Bellack et al., 1992) and are related to global behavior on the ward (Appelo et al., 1992), role functioning in the community (Bellack et al., 1990a; Bellack et al., 1990b; Halford et al., 1990), premorbid adjustment (Mueser et al., 1990b), and negative symptoms (Jackson et al., 1989; Bellack et al., 1990b). Thus, the schizophrenia patient's ability to demonstrate good social skills during interactions with others relates to both social functioning and, to a lesser extent, psychopathology.

Research on the ecological validity of role play tests in schizophrenia has focused predominantly on acute (e.g., Bellack et al., 1990a) and outpatient samples (e.g., Halford et al., 1990), with less attention to more chronic, impaired patients. Only one study, to our knowledge, examined social skills

---

* Corresponding author.

in chronically ill inpatients (Appelo et al., 1992). This study utilized a role play procedure (i.e., the Simulated Social Interaction Test; SSIT; Curran, 1982) in which only the first response from the subject to the confederate was rated. The role plays employed in this format may be a poor reflection of real-life interactions which typically last longer than a single exchange (Bellack, 1983; Torgrud and Holborn, 1992). Another limitation of the Appelo et al. study (1992) is that ratings were made of global social skill, but not of the nonverbal and paralinguistic behaviors (e.g., eye contact), which contribute to social performance (Liberman, 1982). Thus, little research has examined how a range of social skills relate to ward behavior among chronic schizophrenia inpatients.

The purpose of this study was to investigate the ecological validity of role play assessments of social skill for a chronically ill sample of inpatients. Ecological validity was evaluated by assessing the relationship between social skill during an unstructured role play, the Conversation Probe (CP; Wallace and Liberman, 1985), and ward behavior based on ratings from the Social Behavior Schedule (SBS; Wykes and Sturt, 1986). Ward behavior was examined because this is the primary environment in which social skills are needed for schizophrenia inpatients. Because social skill has been found to be related to negative symptoms (Jackson et al. 1989) and gender (Mueser et al., 1990a; Mueser et al., in press), we also evaluated the extent to which the relationship between social skill and ward behavior was mediated by such variables. Consistent with previous findings from acute inpatients (i.e., Bellack et al., 1990b), it was hypothesized that better social skills among chronic schizophrenia inpatients would be related to ratings of more appropriate ward behavior.

2. Materials and methods

2.1. Subjects

Twenty-eight chronic schizophrenia inpatients from the Medical College of Pennsylvania (MCP) Research Unit at Norristown State Hospital participated in the study. The MCP research unit is a long-stay unit where the mean duration of the most recent hospitalization was 113.71 months (SD = 125.89). Subjects were between the ages of 18 and 62, were not dependent on psychoactive substances, and were free of any organic disorders that would interfere with establishing a clear diagnosis. All subjects met DSM-III-R (American Psychiatric Association, 1987) criteria for schizophrenia (20) or schizoaffective disorder (8) based on the Structured Clinical Interview for DSM-III-R (SCID; Spitzer et al., 1990). SCIDs were conducted by interviewers who had participated in a SCID training course and had achieved satisfactory levels of inter-rater reliability prior to the current study.

The sample had the following demographic characteristics: age: 44.79 (SD = 9.62); gender: male = 13, female = 15; education (years) = 11.02 (SD = 1.90); age of illness onset = 21.04 (SD = 5.69). Patients were maintained on an average chlorpromazine equivalent (Davis et al., 1983) of 650.45 mg (529.46). In addition, 14% of the subjects (4) were receiving anticholinergic medication.

2.2. Measures

Psychopathology

Symptoms were assessed with the Brief Psychiatric Rating Scale (BPRS; Overall and Gorham, 1962; 1988; Woerner et al., 1988). The following subscales from the BPRS were analyzed as proposed by Overall and Gorham (1962): Activation, Anxiety-depression, Anergia, Hostility, and Thought Disorder. The training of the interviewers involved observation of videotaped interviews prior to the study. Inter-rater reliabilities, using formula 2 of the intraclass correlation coefficient (ICC; Shrout and Fleiss, 1979) were calculated on 25% of the patient sample and ranged from 0.61 (Thought Disorder) to 0.97 (Anxiety–Depression), indicating satisfactory reliability.

Social skill

Social skills were assessed with the Conversation Probe (CP) role play test. The CP requires the subject to initiate and maintain a conversation with a stranger for 3 minutes. The CP has been

used extensively to assess social skill in non-schizophrenia patients, such as those with social phobia (e.g., Heimberg et al., 1990; Herbert et al., 1992) and may be a more ecologically valid measure of social skill than structured formats (Torgrud and Holburn, 1992). Among schizophrenia patients, performance on the CP relates to social functioning in the community (Halford et al., 1990), symptomatology (Penn et al., 1994), and information processing (Penn et al., in press). These studies lend support for the validity of the CP with schizophrenia patients.

Subjects participated in two 3-minute CPs, one each with a male and female confederate, with order counterbalanced across subjects. The instructions given to subjects and the training of the confederates followed the same procedure as Penn et al. (in press). Subjects were informed that the confederate would play the role of a new volunteer on the ward. Subjects were then instructed that they would have 3 minutes to get to know the confederate and that they should respond as if the confederate was actually a volunteer at the hospital. The confederates were trained to employ standardized prompts during the conversation (e.g., 'What are your hobbies?') if a period of 5 seconds elapsed after the confederate had spoken and the patient had not responded. Upon completion of the first CP, the second CP was conducted. All role plays were videotaped and later rated for social skill.

Two research assistants, unfamiliar with the patients and blind to all study assessments, made overall and component ratings of social skills. The two CPs for each patient were rated in a random order with both raters rating all subjects. Specific skills were selected for rating based on our previous research (e.g., Mueser et al., 1990a; Penn et al., in press) and were conducted after ratings of Overall social skill had been completed (for all subjects). Skill ratings were made after observing each entire 3-minute CP.

Ratings were made on anchored 5-point Likert scales ranging from 1 (poor) to 5 (good). The following skills were rated: Overall Social Skill (the overall effectiveness of the subject as a communicator, including verbal, nonverbal, and paralinguistic components, as well as the 'Gestalt' of

the speaker's ability to make his or her point); Meshing (the smoothness of turn-taking and conversational pauses); Fluency (the smoothness of verbal speech; the absence of verbal disruptions, such as 'uhs,' stutters, word repetitions or changes, or incoherent sounds); Clarity (the clear enunciation of words); Affect (the appropriate communication of feeling through voice tone, facial expression, use of gestures, and body movement); Gaze (eye contact with the confederate); Involvement (the extent to which the patient appears involved in the conversation with the confederate); On Topic (the subject's ability to respond to the major topic of the conversation, to stay on topic, or to introduce related issues); Delusional Speech (the extent to which the subject talks about what appear to be delusions).

The range of correlations between Overall Social Skill and the component behaviors was 0.27 (Affect–Overall Social Skill) to 0.74 (Fluency–Overall Social Skill), with a mean correlation of 0.53. The range of correlations among the component behaviors was −0.03 (Delusional Speech–Meshing) to 0.82 (Affect–Involvement), with a mean correlation of 0.39. Only 9/28 correlations among the component behaviors were over 0.50, suggesting weak associations between these variables.

Raters were trained on 10 CPs, randomly selected from the total set of CPs for each confederate. When satisfactory reliability had been achieved (>0.75), the remaining CPs were rated. ICCs between the two raters calculated on the entire set of CPs, excluding the 10 CPs used for training, ranged from 0.78 (Overall Social Skill) to 0.91 (Delusional Speech, Affect, Gaze, Involvement).

Ward behavior

Ward behavior ratings were made using the Social Behavior Schedule (SBS; Wykes and Sturt, 1986) completed by hospital staff members who were familiar with the patients. The SBS consists of 30 items, each rated on anchored 5-point Likert scales range from 1 (good) to 5 (poor). Ratings are based on ward behavior observed over the past month. For the present study, items that assessed work were dropped because no patients worked. Further, items that were not behaviorally anchored

were also dropped (e.g., Unrealistic Aims; Suicidal and Self-Harming Thoughts and Behaviors).

To reduce the number of ward behaviors for subsequent analyses, the two first authors (DLP and KTH) independently grouped items into categories based on area of content. A factor analysis was not conducted due to the small sample size. Categories were generated by each author independently, followed by discussion and consensus. Items were organized to correspond to the following areas: conversational skills, appropriateness of behavior, activity level, and hygiene and grooming.

Ratings were thus made on the following areas of social adjustment (SBS items comprising each area are in parentheses): *Social Mixing* (Communication: Taking the initiative; Conversation: Incoherence; Conversation: Oddity/inappropriateness, Ability to make social contacts in an appropriate way, Socially unacceptable habits or manners, Proportion of social contacts which are hostile in nature); *Inappropriate Behavior* (Destructive behavior, Inappropriate sexual behavior, Laughing and talking to self, Acting out bizarre ideas, Posturing and mannerisms), *Reduced Activity Level* (Underactivity: Lack of spontaneous activity, Slowness, Depressive appearance or statements; Overactivity (reverse scored)); *Personal Appearance and Hygiene (Neatness)*. The last category included only one item.

Staff members were trained on the use of the SBS and practiced ratings on non-study patients (i.e., patients not meeting criteria for the study). Each study patient was rated by two different staff members with a total of eight staff members providing ratings. Inter-rater reliabilities calculated on each item revealed non-significant ICCs for two items: Proportion of Social Contacts which are Hostile in Nature and Leisure Activities. These items were dropped from subsequent analyses. ICCs computed across all raters and all patients on each area of social adjustment indicated good agreement between raters, with ICCs ranging from 0.68 (Inappropriate Behavior) to 0.73 (Social Mixing). Computation of coefficient alphas for each scale supported the categorization procedure: Social Mixing, $\alpha = 0.78$; Reduced Activity Level, $\alpha = 0.69$; Inappropriate Behavior, $\alpha = 0.57$.

3. Results

3.1. Preliminary analyses and descriptive statistics

T-tests were computed to determine whether patients' ratings of Overall and component (e.g., meshing) social skills were related to gender of the role play partner. No significant differences emerged for any of the social skill variables. Thus, social skill ratings were collapsed across confederate gender for all subsequent analyses. Descriptive statistics for social skill and ward behavior variables are presented in Table 1. In general, subjects tended to be rated as average to slightly-above average (compared to other state hospital patients) in most social skill and ward behavior areas.

3.2. Correlational analyses

Pearson correlations were computed to explore the relationship between social skills and ward behavior. One-tailed significance tests were used because we hypothesized that good social skills would be related to higher ratings of ward behavior. These correlations are presented in Table 2. Since the rating scales for social skill and ward behavior are reversed (i.e, in terms of poor-good),

Table 1
Descriptive statistics for social skill and ward behavior measures

Social functioning variable	Mean	SD
Social skill[a]		
Overall	2.71	0.75
On topic	4.46	0.61
Delusion	4.12	1.01
Meshing	3.71	0.83
Fluency	3.30	0.73
Clarity	3.90	0.93
Affect	4.05	0.89
Gaze	3.43	0.91
Involvement	3.65	0.86
Ward Behavior[b]		
Social mixing	2.48	0.62
Inappropriateness	2.30	0.92
Underactivity	1.64	0.57
Neatness	2.57	1.34

[a] High means denote better social skill (scale = 1–5).
[b] High means denote more maladaptive behavior on the ward (scale = 1–5).

Table 2
Inter-correlations between social skill and ward behavior

Social skill	Ward Behavior (SBS)			
	Social mixing	Inapprop.	Underactivity	Neatness
Overall	−0.14	−0.37*	−0.06	−0.15
On Topic	−0.31	−0.37*	−0.10	−0.32
Delusion	−0.14	−0.32	0.09	0.09
Meshing	−0.26	−0.29	−0.28	−0.28
Fluency	−0.34*	−0.39*	−0.02	−0.39*
Clarity	−0.35*	−0.42*	−0.43*	−0.20
Affect	0.00	0.23	−0.26	0.12
Gaze	−0.13	0.18	−0.07	−0.28
Involvement	−0.11	0.14	−0.18	−0.20

*$P < 0.05$; Inapprop. = Inappropriate behavior.

negative correlations are in the expected direction. Cohen and Cohen (1983) suggest an omnibus test of the correlation matrix to determine if the set of correlations significantly differs from zero[1]. The results of this analysis were significant ($\chi^2(36) = 56.7$, $p < 0.05$)). This suggests that there was a significant relationship between the set of social skill variables and the ward behavior variables.

Examination of the pattern of specific correlations indicated that subjects with greater Fluency and Clarity had better conversational skills on the ward. Greater Clarity was also associated with more activity on the ward, while greater Fluency was associated with more Neatness. Overall social skill, Clarity, Fluency, and On Topic were associated with less Inappropriate ward behavior. No other correlations were significant at the $p < 0.05$ level.

3.3. Multiple regression analyses

To determine which combination of social skill variables best predict ward behavior, backward multiple regression analyses were conducted. Only social skill variables significantly correlated with ward behavior were entered into these analyses

[1] The formula for the omnibus correlation matrix test is $\chi^2 = (N-3)\Sigma(z')^2$; where N = sample size, z' = converted r. This procedure is analogous to a MANOVA for determining whether significant results are present in a multivariate design.

(e.g., Speech Fluency and Clarity being the only social skill variables entered into multiple regression analyses predicting Social Mixing). Two of the four ward behavior variables were significantly predicted by social skill: Inappropriateness and Underactivity were both predicted by Clarity in the role play ($R^2 = 0.17$, $p < 0.05$; $R^2 = 0.18$, $p < 0.05$). The model predicting Neatness from Fluency approached significance ($R^2 = 16$, $p = 0.055$). Thus, patients who were better able to enunciate their speech were rated as less inappropriate and more active on the ward.

3.4. Clinical/demographic variable analyses

Analyses were conducted to determine whether any clinical/demographic variables (i.e., gender, age, length of hospitalization, BPRS scores, CPZ) mediate the observed relationships between social skill and ward behavior. The focus of the analyses was on social skill variables which *significantly* predicted ward behavior (i.e., Clarity–Inappropriateness; Clarity–Underinvolvement). For gender, two Multivariate Analysis of Variance (MANOVA) analyses were conducted on social skill and ward behavior variables. The multivariate effect for gender was significant for the social adjustment MANOVA ($F(4,21) = 3.60$, $p < 0.05$), but not for the social skill MANOVA ($F(9,15) = 1.08$, ns). Univariate analyses indicated that females had superior scores on Social Mixing ($F(1,26) = 5.01$, $p < 0.05$), and Neatness ($F(1,26) = 10.5$, $p < 0.05$), but did not differ in Inappropriateness ($F(1,25) = 0.10$, ns) or Underinvolvement ($F(1,26) = 0.08$, ns). Thus, gender was related to ward behavior, but not social skill, suggesting that it did not mediate the significant relationships between social skills and ward behavior.

Pearson correlations were computed between variables in the regression models and all other clinical/demographic variables. Significant correlates were then regressed onto social skill and ward behavior variables (e.g., regressing Age, the independent variable, onto Speech Clarity, the dependent variable) with the residual reflecting variance independent from clinical/demographic variable influence. Multiple regressions were then conducted using the residualized social skill and ward

behavior variables. Only two significant correlations emerged: Clarity–Age ($r = -0.42$, $p < 0.05$) and Clarity–Anergia ($r = -0.39$, $p < 0.05$). The residualized Clarity variable significantly predicted Inappropriateness and Underinvolvement, accounting for slightly more variance than in the previous regression analyses ($R^2 = 0.22$; $R^2 = 0.21$). Thus, the clinical/demographic variables measured in this study did not appear to mediate the significant relationships between social skill and ward behavior.

4. Discussion

The results of this study indicate that the social skills of chronic schizophrenia inpatients, assessed by a role play test, were related to staff ratings of ward behavior over the previous month. Although the overall relationship between skill and ward behavior was not strong, an omnibus test of the correlations between the two sets of measures was significant, suggesting an association between these domains of social functioning. These findings are in line with Appelo et al. (1992) who found an association between global skill and adjustment in chronic schizophrenia patients, and they extend upon previous work conducted with acutely ill (Bellack et al., 1990a) and outpatient samples (Halford et al., 1990).

Despite the overall association between social skill and ward behavior on the ward, many correlations between these two sets of variables were not significant at the $p < 0.05$ level. The number of nonsignificant correlations between skill and ward behavior appears to be at odds with the robust relationships reported between social skill and role functioning in the community among less severely ill schizophrenia patients (i.e., Bellack et al., 1990a; Halford et al., 1990). A number of factors may account for the apparently discrepant findings. First, the current study included only chronic patients, while Bellack et al. (1990a) and Halford et al. (1990) utilized acute and outpatient subjects respectively. Ward behavior among chronic schizophrenia inpatients therefore may be more influenced by non-skill factors (e.g., neurological deficits) than in other schizophrenia samples.

Second, these studies used community functioning as their criterion measure, while the current study and those cited above (i.e., Appelo et al., 1992; Penn et al., in press), used ward behavior as the criterion measure. Thus, ward behavior may be constrained by the demands of the institution (Goffman, 1961), producing a limited range of behavior. Therefore, the greater range of behavior afforded by living in the community may increase the likelihood of significant correlations being manifest. Alternatively, appropriate ward behavior may be less determined by good social skill than role functioning in the community.

The significant prediction of ward behavior by speech clarity (and significant correlations with fluency) suggests that paralinguistic skills play an important role in ward behavior. A similar finding was reported in an earlier study (i.e., Penn et al., in press). Due to the correlational nature of the design, however, the direction of the relationship cannot be inferred. Thus, lucid speech may allow patients to interact more frequently with others. Conversely, patients who engage in inappropriate behavior and/or withdraw from others may manifest less intelligible speech because of limited and/or aversive interpersonal experiences. Therefore, when in a role play, factors such as anxiety and/or poor learning history may disrupt the patient's speech pattern.

The results of the current study have implications for social skills training. Specifically, among chronic schizophrenia patients, targeting paralinguistic skills during training may be an important first step towards improving ward functioning. Remediation of paralinguistic skills may be addressed through either social skills training or in a token economy approach (e.g., reinforcing patients for speaking more clearly to staff).

A number of caveats should be noted about the current findings. First, the design was correlational and cross-sectional. Therefore, the issue of causality and stability of the social skill-ward behavior relationships cannot be evaluated. Second, the associations between social skill and ward behavior were weak and in many cases not significant at the $p < 0.05$ level. However, the pattern of correlations suggest important relationships (i.e., 6/8 significant correlations involved paralinguistic skill

and ward behavior) and an omnibus test of the correlation matrix indicated that the set of correlations significantly departed from zero. Further, multiple regression models predicting ward behavior from social skill remained unchanged after controlling for demographic/clinical variables. Thus, the results appear to be robust.

Future research should explore the implications of these findings. A greater range of role play procedures should be utilized, including those of structured and unstructured format. This will allow a more thorough evaluation of the social skill-ward behavior association. In addition, ratings of chronic schizophrenia patients' social adjustment outside the hospital (e.g., during home visit trips to the community) may shed light on whether their ward behavior is a reflection of their social functioning in the community or the constraints of the institutional setting.

The present study represents an attempt to delineate the relationship between levels of social functioning among individuals with chronic schizophrenia. The findings suggest that a relationship exists, with the relationship being strongest for paralinguistic social skills. Such work will hopefully form the basis of more effective treatments aimed at improving social functioning in patients with chronic schizophrenia.

Acknowledgements

References

Appelo. M.T., Woonings, F.M.J., van Nieuwenhuizen, C.J., Emmelkamp, P.M.G., Sloof, C.J. and Louwerens, J.W. (1992) Specific skills and social competence in schizophrenia. Act. Psychiatrica Scand. 85, 419-422.

Bellack, A.S. (1983) Recurrent problems in the behavioral assessment of social skill. Behav. Res. Ther. 21, 29-41.

Bellack, A.S., Morrison, R.L., Mueser. K.T., Wade, J.H. and Sayers, S.L. (1990a) Role play for assessing the social competence of psychiatric patients. Psychol. Assess: JCCP 2, 248-255.

Bellack, A.S., Morrison, R.L., Wixted, J.T. and Mueser. K.T. (1990b) An analysis of social competence in schizophrenia. Br. J. Psychiatry 156, 809-818.

Bellack, A.S., Mueser, K.T., Wade, J., Sayers, S. and Morrison, R.L. (1992) The ability of schizophrenics to perceive and cope with negative affect. Br. J. Psychiatry 160, 473-480.

Cohen, J. and Cohen, P. (1983) Applied multiple regression/correlation analysis for the behavioral sciences. 2nd edition. Hillsdale: Lawrence Erlbaum Associates.

Curran, J.P. (1982) A procedure for the assessment of social skills: The simulated social interaction test. In: Curran, J.P. and Monti, P.M. (Ed.) Social skills training, New York: Guilford.

Davis, J., Janicak, P., Linden, R., Moloney, J. and Pavkovic, I. (1983) Neuroleptics and psychotic disorders. In J.T. Coyle and S. J. Enna (Eds.), Neuroleptics: Neurochemical, behavioral, and clinical perspectives (pp. 15-64) New York: Raven Press.

Goffman, E. (1961) Asylums: Essays on the social situations of mental patients and other inmates. New York: Doubleday.

Halford, W.K., Hayes, R.L. and Varghese, F.N. (1990) Do social skills matter? The relationship between social skills, social functioning, and quality of life in schizophrenic patients. Poster presented at the 24th annual convention of the Association for the Advancement of Behavior Therapy, San Francisco, CA.

Harder, D.W., Strauss, J.S., Greenwald, D.F., Kokes, R.F., Ritzler, B.A. and Gift, T.E. (1990) Predictors of outcome among adult psychiatric first-admissions. J. Clin. Psychol. 46, 119-128.

Herbert, J.D., Hope, D.A. and Bellack, A.S. (1992) Validity of the distinction between generalized social phobia and avoidant personality disorder. J. Abnor. Psychol. 101, 332-339.

Heimberg, R.G., Hope, D.A., Dodge, C.S. and Becker, R.E. (1990) DSM-III-R subtypes of social phobia. J. Nerv. Ment. Dis. 178, 172-179.

Jackson, H.J. and Edwards, J. (1992) Social networks and social support in schizophrenia: Correlates and assessment. In: D.J. Kavanagh (Ed.), Schizophrenia: An overview and practical handbook. New York: Chapman and Hall.

Jackson, H.J., Minas, I.H., Burgess, P.M., Joshua, S.D., Charisiou, J. and Campbell, I.M. (1989) Is social skills performance a correlate of schizophrenia subtypes. Schizophr. Res. 2, 301-309.

Liberman, R.P. (1982) Assessment of social skills. Schizophr. Bull. 8, 62-81.

Liberman, R.P., DeRisi, W.R. and Mueser, K.T. (1989) Social

skills training for psychiatric patients. Allyn and Bacon: Needham Heights, MA.

Mueser, K.T., Bellack, A.S., Douglas, M.S. and Morrison, R. L. (1991) Prevalence and stability of social skill deficits in schizophrenia. Schizophr. Res. 5, 167–176.

Mueser, K.T., Bellack, A.S., Morrison, R.L. and Wade, J.H. (1990a) Gender, social competence, and symptomatology in schizophrenia: A longitudinal analysis. J. Abnor. Psychol. 99, 138–147.

Mueser, K.T., Bellack, A.S., Morrison, R.L. and Wixted, J.T. (1990b) Social competence in schizophrenia: Premorbid adjustment, social skill, and domains of functioning. J. Psychiatry Res. 24, 51–63.

Mueser, K.T., Blanchard, J.B. and Bellack, A.S. (in press) Social skill and memory: The role of gender. Psychiatry Res.

Mueser, K.T. and Sayers, M.D. (1992) Social skills assessment. In: D.J. Kavanagh, (Ed.), Schizophrenia: An Overview and Practical Handbook. New York: Chapman and Hall.

Overall, J.E. and Gorham, D.R. (1962) The Brief Psychiatric Rating Scale. Psychol. Rep. 18, 799–812.

Overall, J.E. and Gorham, D.R. (1988) Brief Psychiatric Rating Scale. Psychopharm. Bull. 24, 99.

Penn, D.L., Hope, D.A., Spaulding, W. and Kucera, J. (1994) Social anxiety in schizophrenia. Schizophr. Res. 11, 277–284.

Penn, D.L., Mueser, K.T., Spaulding, W., Hope, D.A. and Reed, D. (in press) Information processing and social competence in chronic schizophrenia. Schizophr. Bull.

Shrout, P.E. and Fleiss, J.L. (1979) Intraclass correlations: Uses in assessing rater reliability. Psychol. Bull. 86, 420–428.

Strauss, J.S. and Carpenter, W.T. (1977) Prediction of outcome in schizophrenia: Five-year outcome and its predictors. Arch. Gen. Psychiatry 34, 159–163.

Torgrud, L.J. and Holborn, S.W. (1992) Developing externally valid role-play for assessment of social skills: A behavior analytic perspective. Behav. Ass. 14 245–277.

Wallace, C.J. and Liberman, R.P. (1985) Social skills training for patients with schizophrenia: A controlled clinical trial. Psychiatry Res. 15 239–247.

Woerner, M., Manuzza, S. and Kane, J.M. (1988) Anchoring the BPRS: An aid to improved reliability. Psychopharm. Bull. 24, 112–117.

Wykes, T. and Sturt, E. (1986) The measurement of social behavior in psychiatric patients: An assessment of reliability and validity of the SBS schedule. Br. J. Psychiatry 148, 1–11.