The Allen Cognitive Level Test and Social Competence in Adult Psychiatric Patients

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Key Words: cognitive disability • mental health • social skills

Objectives. The purpose of this study was to investigate the relationship between cognitive disability and social skills in an acute care adult inpatient psychiatric population (n = 55).

Method. Independent ratings of patient’s social skills were made during a semistructured interview using the Social Interaction Test (SIT), followed by measurement of cognitive disability using the revised Allen Cognitive Level Test (ACL-90). Reliability of the assessments was established.

Results. Significant correlations were found between the ACL-90 and SIT scores: patients with greater cognitive disability had poorer social skills. ACL-90 scores were not related to gender or diagnosis. A gender difference was found for SIT scores with women having better social skills than men.

Conclusion. These findings suggest there is a relationship between cognitive disability and social skills in adult psychiatric inpatients. Implications for occupational therapy treatment include better integration of the grading of the cognitive and social requirements of tasks to achieve optimal functioning.

Impairments in cognitive and social functioning are common characteristics of patients with psychiatric disorders (Kaplan & Sadock, 1991). Impairments in cognitive and social functioning result in pervasive disability at both the individual and interpersonal levels. To assess cognitive functioning, clinicians have developed measurement tools that rely heavily on either language skills or verbal responses, such as the Mini-Mental Status Exam (Folstein, Folstein, & McHugh, 1975) and the Wechsler Adult Intelligence Scale (Wechsler, 1981). In keeping with occupational therapy’s focus on purposeful activity, Allen (1985) developed a tool to assess cognitive functioning that uses the observation of sensorimotor actions. Allen (1985) reasoned that disease-related impairment in the ability to perform routine tasks is a reflection of cognitive disability and identified six hierarchical levels of functions. The Allen Cognitive Level (ACL) Leath er Lacing Test (Allen, 1985) was developed to differentiate between the levels. The lowest levels, level one (automatic actions) and level two (postural actions), reflect very low levels of functioning and are rarely encountered in acute care inpatient psychiatric settings. Patients at level six (planned actions) are treated in outpatient settings and are rarely hospitalized. Most patients in acute care hospitals for psychiatric disorders are at the third (manual actions), fourth (goal-directed actions), and fifth (exploratory actions) levels. Recent developments in the ACL test have deemphasized the steps between the levels in favor of a 25-point scale from 3.0 to 5.8. The revised ACL test is referred to as the ACL-90 and was used in this investigation (Allen, 1990).

When discussing the characteristic impairments and consequences of psychiatric disorders, Allen and Allen (1987) associated cognitive disabilities with social disabilities. Much of the discussion of social disabilities focuses on social role and personal functioning in the community. A relationship between cognitive functioning and functioning in the community would also suggest that cognitive disability is related to social skill impairment, because social skills in psychiatric patients have been found to be related to community functioning (Bellack, Morrison, Wixted, & Mueser, 1990). As the cognitive disabilities frame of reference has been developed and refined, there has been a recognition among occupational therapists that routine tasks are not limited to concrete activities and that routine tasks include many areas of everyday functioning. This recognition is reflected in the Routine Task Inventory, which has four scales: self-awareness, situational awareness, occupational role, and social role (Allen, Earhart, & Blue, 1992). Within these scales are specific social skill items such as speaking, communicating meaning, and cooperating with others, as well as global social skills such as planning activities, caring for family, and engaging in good citizenship. Similarly, theorists in the field of social skills have postulated that effective social skills are the product of perceptual skills, cog-
nitive skills and motor (behavioral) skills (McFall, 1982; Wallace & Boone, 1984). Despite the hypothetical relationship between cognitive disability measured on the ACL and social skills, research has not directly addressed this issue. This question has important clinical implications because it suggests that patients functioning at different cognitive levels have corresponding social deficits that would require occupational therapy intervention. This investigation was conducted to evaluate whether cognitive disability as measured by the ACL-90 would be related to a behavioral measure of social skills in adults with psychiatric illness in an acute care inpatient setting.

Method

Subjects

The subjects were 59 adults admitted to the inpatient units of the Medical College of Pennsylvania at Eastern Pennsylvania Psychiatric Institute (MCPIEPPI). All patients who were admitted from July 1992 through December 1992 were considered candidates for the study. Patients were excluded from the study for the following reasons: obvious visual impairments or upper extremity dysfunction, existence of a language barrier (e.g., not fluent in English), mental retardation as a primary diagnosis, admission to the hospital within the prior year, and previous participation in the Activities Assessment process. Patients were tested between 4 and 10 days after their admission. Table 1 and Table 2 summarize the demographic characteristics of the subjects.

Measures

The Social Interaction Scale (SIT) (Trower, Bryant, & Argyle, 1978) was used to rate social competence. Observers use the SIT to rate social behavior during a semistructured interview conducted by another person. The SIT was chosen over role play measures of social skills, such as the Simulated Social Interaction Test (Curran, 1982), because it offered several advantages. Interviews are a common experience of psychiatric patients and therefore allow for a more realistic patient response. The SIT also avoids problems identified with role-playing tests such as the subject's understanding of the instructions, the situational content of the role play, and the confederate's behavior influencing the role play (Belack, 1983).

The interview format used was the Activities Interview, which is routinely conducted with all patients admitted to MCPIEPPI. The interview includes a variety of open-ended questions designed to help identify the patient's interests, strengths, goals, and problems as these relate to the reason for hospital admission and the services offered by the multidisciplinary Therapeutic Activities Department.

Trower et al. (1978) grouped the 29 items on the SIT into three subscales: Voice Quality, Nonverbal, and Conversation. Each item is rated on a 5-point Likert scale ranging from 0 (Good) to 4 (Very Poor). The Voice Quality subscale rates the use of sound as a basic medium for communication, to communicate feelings, and to give meaning to speech. Voice Quality items are Volume, Tone, Pitch, Clarity, Pace, and Speech Disturbances. The Nonverbal scale rates the use of observable behavior in communication. Nonverbal scale items include Proximity, Communication, to communicate feelings, and to give meaning to speech. Voice Quality items are Volume, Tone, Pitch, Clarity, Pace, and Speech Disturbances. The Nonverbal scale rates the use of observable behavior in communication. Nonverbal scale items include Proximity, Communication, to communicate feelings, and to give meaning to speech. Voice Quality items are Volume, Tone, Pitch, Clarity, Pace, and Speech Disturbances. 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Nonverbal scale items include Proximity, Communication,
Table 2
Demographic Characteristics of the Patients:
Continuous Variables (N = 59)

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>38.29</td>
<td>13.65</td>
<td>19</td>
<td>74</td>
</tr>
<tr>
<td>Age of first hospitalization</td>
<td>34.25</td>
<td>13.79</td>
<td>14</td>
<td>72</td>
</tr>
<tr>
<td>Education (years)</td>
<td>11.66</td>
<td>1.95</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>Duration of current hospitalization (days)</td>
<td>25.14</td>
<td>16.49</td>
<td>4</td>
<td>74</td>
</tr>
</tbody>
</table>

Four raters were trained by the principal investigator (the first author) in the use of the SIT by observing videos of psychiatric interviews. Behavior was rated within the context of the interview situation and in relation to normal social behavior, not psychiatric symptoms (i.e., a depressed person who made poor eye contact was rated Poor for gaze). Approximately 20% of the subject interviews were observed by two raters to establish interrater reliability. Interclass Correlation Coefficient (ICC) calculated for the SIT total score and each of the subscales indicated satisfactory levels of interrater reliability (SIT Total Score ICC = .88, Voice Quality ICC = .73, Nonverbal ICC = .84, Conversation ICC = .70).

Pearson product-moment correlations were calculated between the SIT total scores, with each of the subscale scores, and for each of the subscales with each other. Correlations ranged from a high of $r(53) = .92$ (SIT, Conversation) to a low of $r(53) = .51$ (Voice, Conversation), with a median correlation of $r(53) = .68$. All levels of significance exceeded $p < .001$, indicating a strong association between the measures of social skills.

The ACL-90 (Allen, 1990) is the latest refinement of a task assessment used by therapists in the field of psychiatric occupational therapy since the early 1970s. The ACL-90 is a visual motor task that provides an estimate of the subject's ability to follow directions, to solve problems, to complete more complex stitches without assistance, described the assessment process, and obtained the subject's consent. The assessment was initiated in the unit day room with the subject, ACL-90 tester, and SIT rater sitting at a table. The ACL-90 tester engaged the subject in the Activities Interview; the SIT rater was a passive observer. When the interview was concluded, the SIT rater left the room while the activities program was explained to the subject and the ACL-90 was administered. Both ACL-90 and SIT ratings were completed independently (blind) and given to the principal investigator for collation with clinical and demographic data.

### Medication

Subjects were tested within 10 days of their hospital admission while their symptoms were being stabilized through medication. Subjects were receiving medication consistent with their diagnosis and standard psychopharmacological therapy. Medications included neuroleptics, antidepressants, mood stabilizers, and medications to control side effects of medications and to control agitation. Subjects were not tested if they were experiencing serious side effects from their medications such as akathisia. No subject was receiving electroconvulsive therapy.

### Procedure

The order of testing of subjects was established at the beginning of each week with a random order list. Two staff members, a social skills rater and an ACL-90 rater, were involved in the testing of each subject. The ACL-90 tester approached the subject, introduced himself or herself, described the assessment process, and obtained the subject's consent. The assessment was initiated in the unit day room with the subject, ACL-90 tester, and SIT rater sitting at a table. The ACL-90 tester engaged the subject in the Activities Interview; the SIT rater was a passive observer. When the interview was concluded, the SIT rater left the room while the activities program was explained to the subject and the ACL-90 was administered. Both ACL-90 and SIT ratings were completed independently (blind) and given to the principal investigator for collation with clinical and demographic data.

### Results

The data were analyzed by conducting Pearson product-moment correlations to test the hypothesis that cognitive disability as measured by the ACL-90 was related to impaired social skill as measured on the SIT (one-tailed tests). Complete social skill ratings and ACL-90 tests were obtained with 55 of the 59 subjects because SIT raters were unavailable to observe the interviews of 4 subjects. ACL-90 tests were conducted with these 4 subjects with a second ACL-90 observer as part of the ACL-90 interrater reliability process.

The ACL-90 was found to be significantly correlated with the total SIT score ($r(53) = -.32, p < .01$) and two of the three subscales, Nonverbal ($r(53) = -.27, p < .05$) and Conversation ($r(53) = -.32, p < .01$), but not Voice Quality ($r(53) = -.16, p = not significant [ns]$). High ACL-90 scores reflect higher cognitive ability; high SIT scores denote lower social skills. Therefore, higher functioning measured on the ACL-90 was associated with better social skills, as predicted (see Figure 1).

To evaluate whether ACL-90 scores were related to either gender or diagnosis, the diagnosis groups of schizophrenia and schizoaffective disorder were com-
Figure 1. Mean social interaction test scores for subjects grouped by Allen Cognitive Level Test-90 (ACL-90) scores: 3.0 to 3.9 (n = 5), 4.0 to 4.9 (n = 31), and 5.0 to 5.8 (n = 19). SIT = Social Interaction Test.
Table 3
Social Interaction Scores by Diagnosis and Gender (n=33)

<table>
<thead>
<tr>
<th>Disorders</th>
<th>SIT Total Score</th>
<th>Voice Quality</th>
<th>Nonverbal</th>
<th>Conversation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Affective disorders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>11</td>
<td>11.09</td>
<td>3.73</td>
<td>1.82</td>
</tr>
<tr>
<td>Men</td>
<td>6</td>
<td>14.67</td>
<td>6.06</td>
<td>2.83</td>
</tr>
<tr>
<td>Schizophrenia and related disorders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>6</td>
<td>9.67</td>
<td>7.56</td>
<td>1.83</td>
</tr>
<tr>
<td>Men</td>
<td>10</td>
<td>18.40</td>
<td>7.03</td>
<td>3.50</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>13.70</td>
<td>6.73</td>
<td>2.52</td>
</tr>
</tbody>
</table>

*Note. SIT = Social Interaction Test.*

$t(34) = -2.79, p < .01$. No other tests were significant ($p > .05$), indicating that subjects with schizophrenia were similar in other respects to subjects with affective disorders.

To evaluate whether the ACL-90 and SIT total score were related to the demographic and clinical variables listed in Tables 1 and 2, correlations (continuous variables) and t tests (categorical variables) were computed. For the clinical variables, one-tailed tests of significance were used to test the hypothesis that greater dysfunction would be related to lower ACL-90 scores and higher SIT scores. For demographic variables, two-tailed tests were used to examine differences. The analysis of ACL-90 with demographic and clinical variables included all 55 subjects, whereas the analysis of the SIT scores with clinical and demographic data included 55 subjects.

The ACL-90 scores were related significantly to only two variables: employment ($t(57) = -2.45, p < .02$), and substance abuse ($t(57) = -2.88, p < .01$). Subjects who were employed within 3 months of the hospital admission scored higher on the ACL-90 ($M = 5.13$) than subjects who were unemployed ($M = 4.58$). Subjects who reported use of drugs or alcohol within 3 months of admission scored higher on the ACL-90 ($M = 4.84$) than subjects who reported no substance abuse ($M = 4.40$). The ACL-90 was not related to any of the other clinical or demographic variables ($p > .10$).

The SIT scores were significantly related to only one variable, length of stay in the hospital ($t(53) = .29, p < .02$). Subjects who showed more deficits in their overall social skills when rated within 10 days of their admission were later found to have longer hospital stays. Married subjects tended to have better overall social skills than never-married subjects; however, the t test was not significant ($t(53) = 1.84, p = .07$). No other clinical or demographic variables were significantly related to overall social skills ($p > .10$).

Discussion

The central hypothesis explored in this study was whether cognitive disability is related to impairment of social skills. The results provide strong support for the hypothesis. Impaired cognitive ability as measured by the ACL-90 was strongly correlated to impaired social skills as measured on the SIT. This was found for the total social skills score and two of the three subscales, Nonverbal skills and Conversational skills, but not the Voice Quality skills. The finding of an association between the ACL-90 and SIT is consistent with theories of social competence that propose an important role for cognitive factors in social skill (Liberman et al., 1986; Trower, Bryant & Argyle, 1978).

The results are also consistent with several studies that found cognitive impairments are related to poor social skills or social functioning for subjects with schizophrenia (Mueser, Bellack, Douglas, & Wade, 1991; Penn, Mueser, Spaulding, Hope, & Reed, in press; Wykes & Dunn, 1992).

In both the Wykes and Dunn (1992) and the Mueser et al. (1991) studies, a relationship was found between the measures of cognition and social skills for subjects with schizophrenia and schizoaffective disorder but not for affective disorder subjects. The Penn et al. (in press) study was an investigation of subjects with chronic schizophrenia, thus the issue of diagnosis was not addressed. A diagnosis effect for the relationship between cognition and social skills was not found in this study. A possible explanation is to be found in the measures of cognition used in the different studies. The Wykes and Dunn (1992) study used response processing time as a measure of cognition, Mueser et al. (1991) used memory, and the present study used a complex sensorimotor task. We hypothesize that the ACL-90 is a more global measure of cognition than the response processing time and memory. The ACL-90 encompasses many elements of cognition, such as attention, memory, processing, organization, and problem-solving. The ACL-90 may be a useful index of overall cognitive functions across a variety of disorders but may be less sensitive to focal deficits associated with specific disorders (e.g., speed of information processing in schizophrenia).

The present study found no difference in social skills between subjects with the diagnosis of schizophrenia and schizoaffective disorder and subjects with affective disorders. This finding is in contrast to other studies that have
shown a difference in social skills between subjects with these conditions (Bellack, Morrison, Mueser, Wade, & Savers, 1990; Bellack, Mueser, Wade, & Morrison, 1992; Mueser et al., 1991). There are several possible explanations for the absence of a diagnosis effect for social skills. First, this study used the diagnosis entered on the subject's chart at the time of discharge, whereas the other studies used structural clinical interviews by a trained but independent interviewer to determine diagnosis. Second, social skills were rated during an interview on the unit for this study, whereas the other studies used observation of behavior in a role-play situation. The on-unit interview may be a more realistic and less inhibiting situation, particularly for subjects with schizophrenia. Finally, in the present study, subjects were assessed on the unit 4 to 10 days after admission when acute symptoms were still present. It is uncertain when the subjects were tested relative to acute symptomatology in the other studies but it may be that research and role plays were conducted off the unit toward the middle or end of the subject's hospital stay when symptoms have been stabilized.

The finding in the present study of a gender difference in social skills for subjects with schizophrenic and affective disorders, women having greater social skills than men, is consistent with other studies of gender differences in the social functioning of patients with schizophrenia (Dworkin, 1990; Mueser, Bellack, Morrison, & Wade, 1990; Salokangas, 1983). A gender difference for social skills with females having better social skills has also been found in populations without dysfunction (Firth, Conger, Kuhlenschmidt, & Dorsey, 1986; Sarason, Sarason, Hacker, & Basham, 1985). In the present study, when the total subject group was examined, only in the area of nonverbal behavior were women found to be more socially skilled than men.

No gender or diagnosis differences were found in the ACL-90 measures of cognitive disability. The absence of a gender difference for cognitive ability is consistent with the previously cited studies (Mueser et al. 1990; Penn et al., in press; Wykes & Dunn, 1992). The absence of a difference in ACL-90 scores between diagnosis is in contrast to earlier findings reported by Allen (1982). More recently, Allen and Allen (1987) has reported a range for cognitive disability levels associated with diagnosis, depression levels four to six, mania levels three to six, and schizophrenic disorders around level four. A possible explanation for lack of diagnosis effect with ACL-90 scores in this study is that during the early stages of a hospital admission, the degree of cognitive disability resulting from the acute symptoms or the impact of adjusting to new medications masks underlying diagnostic differences.

The present study has several implications for the clinical practice of occupational therapy in psychiatry. First, the high interrater reliability of the ACL-90 found in the study supports the use of the ACL-90 as a clinical tool that, with training of therapists, can be expected to provide consistent measures of patient performance. This finding is important as occupational therapists in mental health strive to develop reliable assessment tools. Second, the finding that the ACL-90 scores relate to measures of social skills supports Allen and Allen’s (1987) suggestion that cognitive disabilities can be used to predict social functioning. Third, the findings suggest an integration of cognitive disability approaches to patient treatment with the social rehabilitation approach to patient treatment. The cognitive disability approach to treatment focuses on teaching people how to adapt to limitations in their functioning resulting from the cognitive impairments associated with illness. The social rehabilitation approach to patient treatment (also known as community living skills, or psychoeducational approaches) uses social learning theories and education strategies to improve social functioning (Broekema, Danz, & Schloemer, 1975; Crist, 1986; Heras, Dion, & Walsh, 1993; Johnston, 1987; Kramer, 1984; Lillie & Armstrong, 1982; Maslen, 1982). By applying the principles of task analysis described by cognitive levels, occupational therapists have become experts at analyzing the components of motor actions required to engage in routine tasks during patient treatment. In the inpatient hospital setting, occupational therapy is provided through interpersonal interaction either in a one-on-one situation or more frequently, in groups. In addition to grading the task requirements of an activity, the social requirements of the activity should be graded to match the patient’s social abilities, so that optimal functioning is achieved. This grading is required if patients are to learn to adapt to deficits in their cognitive and social functioning and to make the occupational therapy intervention more effective.

The area of money management is illustrative of the association between cognitive skills, social skills, and the grading of tasks required in both of these areas for effective functioning. On the individual level, there are task aspects of money management, such as recognition and manipulation, daily storage and retrieval, making change, using simple mathematics skills, simple budgeting, and using money to satisfy needs (e.g., purchasing food). At the same time, all cash transactions are mediated through social interactions. The patient must interact with others to obtain and use the money. Patients frequently obtain money through government agencies that require both task and social skills for successful outcomes. Many lower-functioning patients have an assignee who controls their funds, with whom they must negotiate to obtain money. Patients frequently initiate requests for money and in turn are the recipients of requests from others for money; this suggests the need for assertive skills. As patients enter more independent living situations with the potential for employment, the challenges of money management increase and require more complex tasks and social skills. Money management then requires budgeting, use of bank accounts, obtaining and paying for services, necessi-
tating more complex social skills such as negotiation and compromise. The example of money management demonstrates the interconnection between cognitive abilities and social skills to facilitate optimal patient independence. The elements of social skills that need to be graded include nonverbal items (gaze, posture, position, proximity, gesture, and orientation) and conversation items (turn-taking, meshing, supportive routines, questions, disclosure, assertiveness, listening feedback, length, variety, formality, and initiative behavior). One goal of future research would be to identify and explore the specific components of social skills that are related to cognitive disabilities.

The finding that higher ACL-90 scores were related to prior substance abuse, substance abusers having better functional ability than nonabusers, is similar to the findings of others. Mueser, Yarnold, Levinson, Singh, Bellack, Kee, Morrison, and Yadalam (1990) found a history of cannabis use was related to fewer symptoms and fewer hospitalizations for schizophrenia patients. Mueser, Yarnold, and Bellack (1992) reported that patients with a history of cocaine abuse had fewer prior hospitalizations. Arndt, Tyrrell, Flaus, and Andreasen (1992) and Dixon, Haas, Weiden, Sweeney, and Frances (1991) found that persons with schizophrenia who abuse alcohol and cannabis had better premorbid adjustment. These findings support the suggestion that initial access to drugs requires better social and adaptive functioning. The subsequent onset of psychiatric symptoms may then lead to increased drug use as the person attempts to cope with the stress of mental illness (Arndt et al., 1992).

The relationship between higher ACL-90 scores and being employed before hospital admission is in the expected direction. Patients who were able to maintain employment until a short time before hospital admission would be expected to perform better on a measure of functional ability than patients who were unable to obtain or maintain employment. It would be worth exploring the predictive value of the ACL-90 and the ability to return to work in future research.

The SIT scores were related to only one clinical variable, length of hospital stay. Impaired social skills were related to longer hospital admissions. A possible relationship between social skills and length of hospital stay has received little research attention. Similar findings to those of this study have been reported by Mueser, Levine, Bellack, Douglas, and Brady (1990), Dobson and Neufeld (1987), and Miller and Willer (1979). The relationship of impaired social skills to longer hospital stays suggests that social skills either influence length of stay or are related to other factors that influence length of stay (e.g., severity and persistence of symptoms).

Conclusion

The present study suggests that cognitive disability assessed by the ACL-90 is related to impairment of social skills measured on the SIT. Because of the correlational nature of the data analyzed, the direction of the underlying relationship is undetermined. Further research is needed to identify the specific relationships of cognitive disabilities, social skills, and their various components. Further research is also needed to identify whether deficits in social skills are a result of deficits in cognitive skills or if both result from a third common factor of mental illness; for example, mental illness may lead to fewer opportunities to learn and to practice the skills required for both cognitive and social functioning. ▲

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