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Multivariate Predictors of Social Skills Performance in Middle-Aged and Older Outpatients with Schizophrenia Spectrum Disorders

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Abstract

Background—Cognitive impairment and negative symptoms are two of the primary features of schizophrenia associated with poor social functioning. We examined the relationships between clinical characteristics, specific cognitive abilities, and social skills performance in middle-aged and older outpatients with schizophrenia and normal comparison subjects.

Method—One hundred ninety-four middle-aged and older schizophrenia outpatients and 60 normal comparison subjects were administered a standardized, performance-based measure of social skills using role-plays of various social situations (Social Skills Performance Assessment; SSPA), and measures of current level of social contact (Lehman Quality of Life Interview), psychiatric symptom severity (Positive and Negative Syndrome Scale, Hamilton Depression Rating Scale), insight (The (Birchwood *et al.*) Insight Scale), and cognitive functioning (Mattis Dementia Rating Scale).

Results—Patients demonstrated worse social skills than did normal subjects. Better performance on the SSPA was associated with having less severe positive and negative symptoms, fewer social contacts, and better attention, initiation/freedom from perseveration, visuospatial ability, abstraction ability, and memory. After controlling for demographic, clinical, and insight-related factors, abstraction ability was the strongest predictor of social skills performance, followed by frequency of social contact.

Conclusions—Social functioning (as measured through direct observation of social skills performance) was related to cognitive ability in outpatients with schizophrenia. Addressing such cognitive impairment may help improve social functioning and result in greater overall quality of life.

Keywords

Cognition; Neuropsychology; Psychosis; Aging; Performance-Based Assessment

INTRODUCTION

Cognitive impairment is a primary feature of schizophrenia (Bleuler, 1943; Heaton et al., 1994; Heinrichs, 2005) related to multiple functional disabilities, including social skills impairment (Reeder et al., 2004). Although greater severity of psychiatric symptoms, particularly negative symptoms (Harvey et al., 1997), has also been associated with poor social functioning, cognitive impairment appears to account for more variability in social functioning than does symptom severity (Patterson et al., 1998; Patterson et al., 2001; Patterson et al., 2002). In a comprehensive review of the literature, Green and colleagues (2000) found that vigilance, working memory, verbal memory, and executive functioning were the neuropsychological domains most frequently associated with social functioning. The increasing awareness of the associations between cognition, social functioning, and community integration in psychosis (Bellack et al., 1994; Twamley et al., 2002) has resulted in growing interest in treatments to improve cognition (Marder & Fenton, 2004). At the same time, schizophrenia researchers have increasingly prioritized the measurement of functional outcomes, including social functioning. For example, the Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) consensus battery (Marder & Fenton, 2004) includes measures of social competence, social functioning, and social adjustment.

As the population in general ages, the number of older people with schizophrenia will increase as well. These older individuals may experience additional barriers to social functioning that are less prominent among younger adults with schizophrenia, such as age-related cognitive decline, reduced mobility, and friends passing away. However, most research on social functioning among people with schizophrenia has been completed with younger adults (Bellack et al., 1994; Addington et al., 1998; Pinkham and Penn, 2006) and suggests that people with schizophrenia have worse social skills than the general population (Mueser et al., 1991).

There are several strategies for measuring social functioning. Many studies of social functioning in schizophrenia, including most of those reviewed by Green et al. (2000), have used self-reports or informant ratings of social performance (e.g., (Harvey et al., 1997; van Beilen et al., 2003; Miura et al., 2004). These approaches have economic advantages over other strategies and describe typical styles of interaction regardless of how socially skilled someone is capable of acting. However, such measures may be hampered by the biases inherent in the reporting method, such as social desirability, poor insight due to disease processes, retrospective memory effects, or minimal informant exposure to the behaviors under investigation. These biases can be reduced through the use of performance-based measures that allow trained raters to directly observe social skills in laboratory settings. Performance-based measures such as the Maryland Assessment of Social Competence (Bellack et al., 1994) and the Conversation Probe Role-Play Test (Penn et al., 1994) use role-play scenarios to elicit specific social behaviors while maintaining control over extraneous factors. They also have advantages over naturalistic observation strategies, such as standardized administration, control over environmental and situational confounds, time limitedness, and greater focus and efficiency. These performance-based measures are not measures of typical interaction styles, but are measures of the capacity to engage in social activity. Therefore, there may be a discrepancy between a person's capacity for social interaction in the laboratory and level of social skill demonstrated during everyday social interactions.

Associations between cognitive impairment and performance-based measures of social skills have been observed among younger adults with schizophrenia. Specific areas of cognitive functioning that have been associated with social skills performance include attention, verbal memory, and cognitive flexibility/executive functioning (Bellack et al., 1994; Addington et al., 1998; Addington and Addington, 2000; Pinkham and Penn, 2006). Although Addington

and Addington (2000) found associations between cognitive abilities and social skills performance, they were unable to find relationships with self- and informant-reports of social functioning, possibly due to the aforementioned limitations of this reporting strategy. It is also unclear whether the relationships between cognition and social skills performance exist among older adults with schizophrenia.

Our group previously reported on the development and validation of a performance-based measure of social skills, the Social Skills Performance Assessment (Patterson et al., 2001). The SSPA was designed for use with individuals with schizophrenia and adapted from the Role Play Task of the Social Problem Solving Battery (Bellack et al., 1990). A study of 83 schizophrenia outpatients and 52 normal comparison subjects suggested that the SSPA had high test-retest reliability ($r=0.92$), and was highly correlated with other performance-based measures of general functional status, such as the Direct Assessment of Functional Status (DAFS; (Loewenstein et al., 1989); $r=0.70$, $p<.001$) (Patterson et al., 2001). Poor performance on the SSPA was found to be associated with greater overall cognitive impairment and worse negative symptoms (Patterson et al., 2001).

The goals of the current study were to replicate and expand Patterson and colleagues' (2001) findings and identify specific domains of cognitive functioning associated with social skills performance using a larger sample of middle-aged and older individuals with schizophrenia. We hypothesized that 1) patients would demonstrate impaired social skills performance compared to healthy subjects, 2) such impairment would be related to impairments in attention, memory and executive functioning, 3) cognitive abilities and negative symptoms would predict social skills performance after controlling for demographic and clinical factors, and 4) better social skills performance would be related to better social functioning as measured by self-reported frequency of social interactions. Additionally, we sought to examine, in an exploratory manner, the relationships between specific cognitive abilities and individual domains of social skills.

METHODS

Participants

The patient sample consisted of 194 outpatients with DSM-IV-based (American Psychiatric Association, 1994) chart diagnoses of schizophrenia ($n=167$) or schizoaffective disorder ($n=27$), between the ages of 40 and 75 years old (97% were under age 65), who completed baseline assessments for a trial of an intervention to improve everyday functioning (see Table 1). A patient's chart diagnosis was the diagnosis of record provided by the treating psychiatrist. A subset ($n=96$) of the outpatients were compared to 60 age- and education-matched healthy comparison subjects (age range=40–76 years, mean=58; education range=6–18, mean=13) in order to evaluate differences in social skills performance (see Table 2). The majority of the healthy comparison subjects were community members who had participated in previous research on the SSPA (Patterson et al., 2001) at our center, but the present sample of patients was not included in any previous reports on the SSPA. All of the participants were psychiatrically, physically, and psychopharmacologically stable. Participants were excluded if they had a history of seizure disorder or head injury with >30 minutes loss of consciousness, a current diagnosis of dementia, or a current diagnosis of substance abuse or dependence.

Procedure

The University of California, San Diego Institutional Review Board approved this study and all subjects provided written informed consent to participate. Outpatients were recruited from board-and-care facilities and day treatment centers in San Diego County by trained recruiters who have established relationships with facility managers and residents. Recruitment focused

on larger board-and-care facilities, each housing at least 20 middle-aged and older residents (≥ 40 years of age) with long standing psychotic disorders. Therefore, the majority of the patients (92%) resided in group living situations. Comparison subjects were recruited from the general San Diego community via local advertising. All measures were administered by psychometricians trained to a high level of interrater reliability (e.g., SSPA intraclass correlation coefficient = 0.91). All measures were administered by the same examiner during a single evaluation period.

Measures

The SSPA uses two three-minute role-play tasks to evaluate subjects' ability to participate in everyday social interactions (Patterson et al., 2001). Scenario 1 involves a neutral social situation (introducing oneself to a new neighbor), whereas Scenario 2 involves a potentially conflictual social situation (convincing a landlord to fix a leak that has not been repaired after a previous complaint). Each role-play is enacted between the participant and the examiner, and is audio-taped for subsequent scoring. Items requiring visual observation (e.g., body posture, facial expression, grooming) are rated directly following the interaction, rather than via audio tape. A total overall score is calculated by summing ratings (on a scale of 1 [low] to 5 [high]) across scenario-specific domains. For a fuller description of the SSPA, refer to Patterson et al. (2001).

The Lehman Social Contact Scale, a subscale from the Quality of Life Interview (Lehman, 1996), measures frequency of interactions with friends outside the household, and was included as a secondary measure of social functioning. Subjects report, on a five-point scale (1=not at all, 5=daily), the frequency with which they engage in specific social behaviors, such as spending time with a friend. Previous versions of the Social Contact Scale have demonstrated adequate internal consistency (median $\alpha=.68$) and one-week test-retest reliability (median $\alpha=.65$; (Lehman, 1996)).

Measures of psychiatric symptom severity included the Positive and Negative Syndrome Scale (PANSS; (Kay et al., 1987)) and the 17-item Hamilton Depression Rating Scale (HAM-D; (Hamilton, 1960)). Higher scores on both measures reflect greater severity of illness.

The Birchwood Insight Scale (IS; (Birchwood et al., 1994)) is a Likert-type scale measuring awareness of illness, need for treatment, and symptom attributions. Higher scores reflect greater insight. The IS has adequate internal consistency ($\alpha=0.75$) and good one-week test-retest reliability ($r=0.90$).

Cognitive performance was evaluated with the Mattis Dementia Rating Scale (DRS; (Mattis, 1973)), a 20-minute screening tool with five subscales including Attention, Initiation/Perseveration (e.g., verbal fluency), Construction (visuospatial ability; e.g., figure copying), Conceptualization (verbal and visual abstraction ability), and Memory. Total scores range from 0–144, with higher scores reflecting better cognitive performance. Although the DRS does not measure executive functioning broadly, as conceptualized by Green and colleagues (2000), the Conceptualization subscale is the best proxy for executive functioning available from the DRS.

2.4. Analyses—All data were examined for normality of distribution. A reflected logarithmic transformation was used to normalize the negatively skewed, leptokurtic distribution of the DRS Attention subscale scores. Categorical variables with more than two levels (ethnic background and relationship status) were recoded into dichotomous variables for correlational and regression analyses (Caucasian vs. non-Caucasian, and single/never married vs. history of marriage or cohabitation, respectively). Two separate analyses of variance (ANOVA) were used to compare schizophrenia to schizoaffective patients and patients to normal comparison subjects on demographic, clinical, and social skills performance variables, with the exceptions

of gender, ethnic background, and relationship status, which were compared using chi-square tests. Pearson correlation coefficients were calculated to identify relationships between social skills performance and demographic, clinical, social contact, and cognitive measures. A hierarchical multiple regression analysis was used to identify the strongest demographic, clinical, and cognitive predictors of total social skills performance. Only predictors that were significantly correlated with social skills were included in the regression analysis. Because no demographic variables were correlated with social skills, predictors were entered into the model in two steps: 1) clinical characteristics: positive symptoms, negative symptoms, insight, and social contact; and 2) cognitive performance: DRS Attention, Initiation/Perseveration, Construction, Conceptualization, and Memory subscale scores.

RESULTS

Patients with schizophrenia and schizoaffective disorder were similar on measures of all demographic, clinical, and cognitive characteristics, with the exceptions of depressive symptoms being more severe for schizoaffective patients (means were 9.01 and 15.85, respectively; $F(1,90)=10.82, p=.001$), and attention being higher in schizophrenia patients (means were 34.65 and 33.31, respectively; $F(1,89)=4.53, p=.036$). We therefore combined the patients from these two groups for all further analyses.

Clinical, cognitive, and social skills characteristics of the patients are presented in Table 1. Patients with schizophrenia reported relatively low levels of positive, negative, and depressive symptoms, and their overall cognitive ability fell within the mildly to moderately impaired range, with greater impairment in the domains of Initiation/Perseveration, Conceptualization, and Memory than in Attention and Construction. Compared with the patient group, the healthy comparison subjects were significantly older and more educated, and were disproportionately female and married. We therefore used a subset of 96 patients, matched on age and education with the comparison subjects, for comparisons between these two groups (see Table 2).

Comparisons between healthy comparison subjects and a subset of age- and education-matched schizophrenia patients are presented in Table 2. Consistent with our first hypothesis, the patients demonstrated significantly worse social skills than did the normal comparison group ($F(1,154)=201.67; p<.001$).

Correlations for schizophrenia patients between performance on the SSPA and demographic, clinical, and cognitive variables are presented in Table 3. Although our second hypothesis was that social skills performance would be associated with the cognitive domains of attention, memory, and executive functioning, we found that all of the DRS subscales were significantly correlated with SSPA total scores, with measures of executive functioning (conceptualization ability and initiation and lack of perseveration) and memory being most highly correlated.

Results from the regression analysis (Table 3) showed that the overall model explained approximately 25% of the variance in SSPA scores. Clinical predictors explained 12% of the variance and cognitive abilities explained another 13% of the variance in SSPA performance. Consistent with our third hypothesis, cognitive ability was one of the two predictors of social skills. Specifically, patients' ability to abstract verbal and visual information (Conceptualization) independently predicted 6.5% of the variability in social skills. Contrary to our hypothesis, negative symptom severity did not predict social skills performance. Instead, frequency of social contact was the only other independent predictor of social skills performance. However, the direction of this relationship was counterintuitive and ran contrary to hypothesis four; better social skills performance was associated with having fewer social contacts.

To further explore the relationships between cognitive abilities and specific components of social skills performance among schizophrenia patients, we computed correlations between the DRS subscale scores and all SSPA domain scores (see Table 4). All SSPA domains were significantly correlated with overall cognitive ability. Ability to focus on the conversation was most related to overall cognitive ability, whereas grooming was least related. Most specific domains of cognitive functioning were significantly related to most domains of social ability. Abstraction ability (Conceptualization), which was most highly correlated with overall SSPA score, was most related to ability to focus on the conversation.

DISCUSSION

The current study identified relationships between social skills performance and demographic and clinical characteristics as well as cognitive abilities in middle-aged and older outpatients with schizophrenia. As expected, patients demonstrated worse social skills performance than did normal comparison subjects. For patients, better overall social skill performance was correlated with higher scores on all measured domains of cognitive functioning, including attention, initiation/freedom from perseveration, visuospatial ability, abstraction ability, and memory. Lower positive and negative symptom severity, greater insight, and less frequent social contact were also associated with better SSPA performance. The negative association between social skills performance and self-reported frequency of social contact was unexpected and may be representative of the discordance between assessing ability to demonstrate social skills, and typical styles of social interaction. Additionally, those with better social skills may be more aware of their lack of social contact and therefore more likely to report lower levels of contact; whereas people with poor social skills may be less attuned to their social interactions and therefore worse self-reporters. It may also be that people who are more impaired and cannot live independently are living in group settings (e.g., board-and-care, skilled nursing facility) where they may have more opportunities for social interaction. Our relatively small cohort of patients who were not living in group settings made it difficult to test this hypothesis.

When clinical and cognitive variables were included in a multivariate model, abstraction ability was the only significant cognitive predictor of social skills performance. The DRS Conceptualization subscale measures abstraction ability, concept formation, and pattern recognition. The ability to identify a concept or topic and provide responses related to that topic may be important in maintaining social interactions. It is important to note the high degree of intercorrelation between the cognitive domains, which could have limited our ability to identify individual contributions of each cognitive domain.

Contrary to our hypotheses, and previous research, negative symptom severity was not predictive of SSPA performance after controlling for other factors. It may be that although there is a bivariate relationship between negative symptom severity and social skills performance, the relationship is attenuated in the presence of other predictors.

The relationships between cognitive abilities and specific domains of social skills performance were also examined. Overall cognitive ability was related to all measured domains of social skills. The ability to conceptualize information and think abstractly was related to more domains of social skills functioning than was any other cognitive ability. These results suggest that poor cognitive ability can have a broad effect on social performance, and that executive functioning may play a key role in appropriate social interactions.

Previous research has also identified relationships between social skills and attention (vigilance) and memory (Green et al., 2000). Although measures of attention and memory were correlated with SSPA scores in the present study, these measures were not uniquely predictive of performance on the SSPA in the presence of additional predictor variables. This may be due

to lower sensitivity of the DRS attention and memory subscales compared with other neuropsychological measures, or, alternatively, to the conceptualization subscale accounting for a greater share of the variance, consistent with other reports of frontal executive measures being associated with social skills (Hatashita-Wong et al., 2002; Yamashita et al., 2005; Zanello et al., 2006). Additionally, we used a performance-based measure of social skills rather than self- or informant-reports (cf Chino et al., 2006), and an outpatient sample (cf Cohen et al., 2006), which may account for some of the differences in findings.

The current study has several limitations. The SSPA is a proxy for social ability, and does not measure social skills in real-world settings. Although the DRS evaluates cognitive abilities in multiple domains of functioning, it is a screening tool that does not measure all of the neuropsychological domains of interest (e.g., sustained attention, planning, and strategizing). However, the degree of impairment in this population was severe enough to be detected by the DRS, as was variability of impairment in multiple domains of functioning. Although we included a measure of frequency of social contact, we did not include a self- or informant-report of social skills. Therefore, we were unable to evaluate the relationship between self- or informant-reported social skills and SSPA performance. Additionally, our schizophrenia sample consisted entirely of psychiatrically stable, middle-aged and older outpatients, limiting the generalizability of our findings.

The cross-sectional nature of the current study precludes definitive causal inferences regarding the relationship between cognitive abilities, symptom presentation, and social skills performance. Longitudinal studies have demonstrated that cognitive deficits often precede the development of psychotic symptoms (Erlenmeyer-Kimling et al., 2000; Cannon et al., 2002). Both retrospective and prospective studies of early predictors of schizophrenia suggest that poor social functioning also precedes the onset of psychotic symptoms (Bearden et al., 2000; Niemi et al., 2003). However, little is known about the temporal relationship between cognitive deficits and social impairment in prodromal schizophrenia.

Our findings for a middle-aged and older adult population were consistent with previous research suggesting that cognitive abilities play an important role in social functioning among younger adults with schizophrenia. Psychosocial interventions that target cognitive deficits, such as cognitive training, have demonstrated some efficacy for the improvement of cognitive and daily functioning among primarily younger adults with schizophrenia (Twamley et al., 2003). These same strategies may be useful for middle-aged and older adults as well, given the consistency of association between cognitive and social functioning across age groups.

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DECLARATION OF INTEREST

None.

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Table 1

Demographic, clinical, and cognitive characteristics of schizophrenia outpatients

Characteristic	n	Possible Range	Mean (SD)
Demographic Characteristics			
Age (years)	194	40–75	50.2 (6.8)
Education (years)	194	3–18	11.7 (2.7)
Male	124 (63.9%)		
Ethnic Background			
Caucasian	106 (54.6%)		
Hispanic	48 (24.7%)		
African American	26 (13.4%)		
Asian	8 (4.1%)		
Native American	6 (3.1%)		
Other	0		
Relationship Status			
Married	11 (5.7%)		
Cohabiting	5 (2.6%)		
Separated	16 (8.2%)		
Divorced	52 (26.8%)		
Widowed	6 (3.1%)		
Single, Never Married	102 (52.6%)		
Living Situation			
Group setting	179 (92%)		
Individual setting	15 (8%)		
Clinical Characteristics			
Diagnosis			
Schizophrenia	167 (86.1%)		
Schizoaffective Disorder	27 (13.9%)		
Duration of illness (years)	169		25.1 (11.2)
Lehman Frequency of social contact	190	1–5	3.6 (1.1)
Birchwood Insight Score	186	0–16	6.5 (1.9)
Psychiatric symptoms			
PANSS (positive symptoms)	194	7–49	14.5 (5.4)
PANSS (negative symptoms)	194	7–49	14.4 (4.4)
Hamilton Depression Rating Scale	191	1–17	10.0 (7.1)
Psychotropic Medication Status			
No medications	11 (5.7%)		
Typical antipsychotic only	20 (10.3%)		
Atypical antipsychotic only	117 (60.3%)		
Combined typical and atypical	37 (19.1%)		
Unknown	9 (4.6%)		
Mattis Dementia Rating Scale			
Attention	194	0–39	34.3 (2.5)
Initiation/perseveration	194	0–37	31.8 (5.5)
Construction	194	0–6	5.2 (1.2)
Conceptualization	194	0–39	33.4 (4.6)
Memory	194	0–25	20.6 (3.5)
Total Score	194	0–144	125.3 (12.9)
Social Skills Performance Assessment			
Interest/Disinterest	194	1–5	3.1 (1.1)
Fluency	194	1–5	2.9 (1.1)
Clarity	194	1–5	3.3 (1.1)
Focus	194	1–5	3.3 (1.2)
Affect	194	1–5	3.1 (1.0)
Social Appropriateness	194	1–5	3.1 (0.8)
Grooming	194	1–5	3.3 (1.3)
Overall Conversation Ability	194	1–5	2.9 (1.1)
Negotiation Ability	194	1–5	2.1 (1.2)
Submission/Persistence	194	1–5	2.4 (1.3)
Overall Argument	194	1–5	2.1 (1.2)
Total	194	9–43	26.1 (6.8)

Table 2
Demographic, clinical, and cognitive characteristics of the healthy comparison (HC) subjects and an age- and education-matched subset of schizophrenia outpatients

	HC Mean (SD) or percent (n=60)	Patient Mean (SD) or percent (n=96)	F or χ^2	df	p
Demographic Characteristics					
Age (years)	57.65 (9.85)	55.21 (6.36)	3.54	1,154	.062
Education (years)	13.03 (2.15)	12.44 (2.39)	2.48	1,154	.117
% Male	33.3%	59.4%	10.02	1	.002
% Caucasian	46.7%	67.7%	6.79	1	.009
% Single, Never Married	1.7%	45.8%	34.55	1	<.001
% Living in a Group Setting	0%	79.2%	92.63	1	<.001
Mattis Dementia Rating Scale					
Attention	35.67 (1.24)	34.46 (2.30)	11.19	1,146	.001
Initiation/perseveration	36.44 (1.21)	31.00 (5.90)	47.12	1,146	<.001
Construction	5.84 (0.37)	5.18 (1.23)	15.91	1,146	<.001
Conceptualization	37.35 (2.33)	33.70 (4.83)	28.39	1,146	<.001
Memory	23.81 (1.29)	20.46 (3.73)	42.50	1,146	<.001
Total Score	139.11 (3.83)	124.80 (14.01)	56.62	1,146	<.001
Social Skills Performance Assessment					
Interest/Disinterest	4.64 (0.55)	3.04 (1.05)	118.96	1,154	<.001
Fluency	4.48 (0.66)	2.78 (1.08)	120.11	1,154	<.001
Clarity	4.93 (0.17)	3.27 (1.09)	137.03	1,154	<.001
Focus	4.87 (0.29)	3.35 (1.16)	97.52	1,154	<.001
Affect	4.43 (0.74)	3.07 (1.13)	81.38	1,154	<.001
Social Appropriateness	4.41 (0.59)	2.97 (0.84)	135.99	1,154	<.001
Grooming	4.83 (0.49)	3.28 (1.29)	79.76	1,154	<.001
Overall Conversation Ability	4.48 (0.73)	2.85 (1.06)	110.21	1,154	<.001
Negotiation Ability	4.00 (1.01)	1.93 (1.13)	135.37	1,154	<.001
Submission/Persistence	4.15 (0.90)	2.28 (1.26)	99.76	1,154	<.001
Overall Argument	3.98 (0.95)	1.96 (1.13)	133.38	1,154	<.001
Total	38.77 (3.13)	25.27 (6.67)	201.67	1,154	<.001

Table 3

Pearson correlations and regression coefficients of demographic, clinical, and cognitive ability scores on the Social Skills Performance Assessment (SSPA) in patients with schizophrenia (n =194)

Variable	r with SSPA	Step 1 ^a		Step 2 ^b	
		β	p	β	p
Demographic characteristics					
Age (years)	-.131				
Gender	.005				
Education, (years)	.141				
Ethnic minority status	-.016				
Marital status	.018				
Living situation	-.044				
Clinical characteristics					
Duration of illness	-.033				
HAM-D	-.002				
PANSS-positive symptoms	-.171 *	-.140	.056	-.114	.110
PANSS-negative symptoms	-.145 *	-.107	.143	-.069	.341
Insight (Birchwood)	.237 ***	.223	.002	.136	.051
Social Contact (Lehman)	-.176 *	-.177	.013	-.142	.035
Mattis Dementia Rating Scale	.186 **			.023	.753
Attention (transformed)	.235 ***			-.059	.475
Initiation/perseveration	.180 *			.047	.513
Construction	.418 ***			.340	<.001
Conceptualization	.312 ***			.048	.584
Memory					

^a R²=0.123, R² change=0.123, F change=6.262, df=4, 178, p<.001

^b R²=0.249, R² change=0.126, F change=5.790, df=5, 173, p<.001

* p≤.05

** p≤.01

*** p≤.001

Table 4
Pearson's Correlations between domains of cognitive and social functioning in patients with schizophrenia (n = 194)

	Attention	Initiation/Perseveration	DRS Scales		Memory	Total
			Construction	Conceptualization		
SSPA Subscales						
Interest/ Disinterest	.150 *	.214 **	.097	.373 ***	.240 ***	.328 ***
Fluency	.174 **	.150 *	.244 ***	.299 ***	.229 ***	.290 ***
Clarity	.212 **	.131	.113	.390 ***	.249 ***	.321 ***
Focus	.184 **	.169 ***	.150 *	.496 ***	.307 ***	.375 ***
Affect	.153 *	.219 ***	.177 *	.228 ***	.245 ***	.295 ***
Social Appropriateness	.117	.203 **	.181 *	.261 ***	.255 ***	.283 ***
Grooming	.051	.145 ***	.150 *	.170 ***	.059	.169 ***
Overall Conversation	.207 **	.257 ***	.096	.372 ***	.263 ***	.369 ***
Negotiation Ability	.028	.134	.043	.222 ***	.161 *	.188 **
Submissiveness/Persistence	.065	.041	.051	.258 ***	.205 **	.181 *
Overall Argument	.101	.165 ***	.088	.242 ***	.201 **	.237 ***
Scenario 1 Total	.212 **	.262 ***	.203 **	.416 ***	.298 ***	.404 ***
Scenario 2 Total	.149 *	.186 **	.147 *	.381 ***	.293 ***	.337 ***
Overall SSPA Total	.186 **	.235 ***	.180 *	.418 ***	.312 ***	.388 ***

*
p ≤ .05

**
p ≤ .01

p ≤ .001