Symptoms of schizophrenia and social cognition

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ABSTRACT

This study investigated the relationship between deficits in social cognition and the dimensional descriptors for schizophrenia. Social cognitive functioning was measured using patient narratives describing card arrangements using the picture arrangement subtest of the Weschler Adult Intelligence Scale—Revised. Stories were rated for number of normative themes, number of words, coherence, plausibility of attributions of emotions, and plausibility of attributions of intentions. Symptoms of Psychoticism were positively related to all ratings except of the plausibility of attributions of intentions. Ratings of story coherence, number of normative ideas, plausibility of attributions of intentions, and plausibility of attributions of emotions were negatively related to symptoms of disorganization. There was a negative relationship between negative symptoms and all rating categories except story coherence. Results indicate that it could be productive to attempt to tailor psychosocial interventions to the dominant symptom picture of patients with schizophrenia in order to improve aspects of social cognitive functioning.

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1. Introduction

Social cognition is a multidimensional construct that incorporates a wide range of abilities related to how people think about themselves and others, and interpret social information (Penn et al., 2008). Social cognitive abilities can impact broadly on a person's life, including processes that influence the number and quality of interpersonal relationships, the likelihood of success in work and personal achievement, and the ability to manage finances and basic self-care activities (Corrigan and Penn, 2001; Green et al., 2005). The processes involved in social cognition include emotion perception, social knowledge, deficiencies in defining and resolving social conflicts, mental state decoding or theory of mind (ToM), and the ability to integrate contextual and historical information to facilitate social understanding (Bellack et al., 1994; Brüne, 2003). Patients with schizophrenia evidence impairments in both neurocognition and social cognition (Goldberg and Schmidt, 2001) however measures of social cognition significantly contribute unique variance to interpersonal functioning (Corrigan and Penn, 2001). Meta-analyses indicate that patients with schizophrenia show significant and stable mentalizing impairments related to social cognition that are not moderated by IQ, gender, or age (Sprong et al., 2007).

Among the deficits in social cognition reported among patients with schizophrenia several are well documented, including a compromised ability to infer and interpret others' feelings, and a tendency to excessively ascribe negative emotions to others (Penn et al., 2008), and distortions in mental state decoding and mental state reasoning (Sarfati and Hardy-Baylé, 1999). The degree of social cognitive deficits reported in patients with schizophrenia are not observed in non-psychotic psychiatric patient samples (Penn et al., 2008), or patients diagnosed with manic psychoses (Cutting and Murphy, 1990).

Multivariate studies of positive and negative symptom ratings support a three factor model (Andreasen et al., 1995; Cuesta and Peralta, 1995; Liddle, 1987; Appendix B of the DSM-IV-TR). Studies of the relationship between these symptom patterns and social functioning indicate that negative and disorganized symptoms are related to social dysfunction and lower levels of social competence (Penn et al., 2008). Positive (psychoticism) symptoms in contrast are not significantly related to deficits in social functioning (Liddle, 1987; Brekke et al., 1994). Patients characterized by a predominance of negative symptoms or incoherence perform most poorly on theory of mind (ToM) tasks, apparently because of difficulties representing the mental states of others as well as themselves (Frith and Corcoran, 1996). Negative symptoms are also associated with lower levels of complexity of social representations, poor social adjustment (Morrison et al., 1990), impaired capacity for emotional investment (Sarfati and Hardy-Baylé, 1999), and greater disability in vocational role functioning (Van der Does et al., 1993). Symptoms of disorganization have been associated with failure to take into account the intentions of others, as well as impairments in causal attributions, accuracy of character ascriptions, and integration of social episodes (Mazza et al., 2006; Sarfati et al., 1997, 1999). The literature is not consistent regarding the degree or manner in which positive symptoms (e.g. auditory hallucinations and delusions) are related to social cognition however, mild to moderate impairments in social perception are

Table 1
SANS/SAPS global symptom ratings.

Symptom ratings	Mean	S.D.	Median	Skewness
Negative symptoms	1.61	1.22	2.00	0.21
Psychoticism symptoms	2.81	2.35	3.00	0.32
Disorganization	2.77	2.49	2.00	0.61
	Mean	S.D.	Range	
BPRS total	32.98	8.91	13–64	
N = 54				

reportedly associated with paranoid symptoms, and more severe impairments with disorganization or severity of thought disorder (Nelson et al., 2007).

There are a number of approaches that have been used to measure social cognition. We used a task in which participants were asked to provide narrative descriptions of the events depicted in their arrangements of the Picture Arrangement (PA) cards of the Wechsler Adult Intelligence Scale—Revised (WAIS-R, Wechsler, 1981). This task was developed and validated in studies of social cognition in clinical samples of patients diagnosed with borderline personality disorder (Westen and Segal, 1993; Lipsitz et al., 1993; Segal et al., 1993). Participants' PA stories were rated by trained raters blind to the diagnosis of participants and correlated with SANS/SAPS global symptom groupings based on the three factors consistently identified in multivariate studies (Andreasen et al., 1995; Cuesta and Peralta, 1995; Liddle, 1987). It was hypothesized that: (1) Disorganization symptoms will be negatively correlated with ratings of story coherence, and plausibility of attributions of intentions; (2). Negative symptoms will be correlated with fewer words in stories, inclusion of fewer normative ideas and emotion words, and lack of accuracy of emotions attributed to characters and, (3) Psychoticism (delusions and hallucinations) symptoms will be correlated with story length.

2. Method

2.1. Participants

Fifty-four patients residing in a public mental hospital participated in the study. Participants included 25 males and 29 females; 26 were Caucasians and 28 were African-Americans; ages ranged between 21 and 60 years, with a mean age of 35.6 years (S.D. 4.32), education averaged 11.2 years (S.D. 2.18). The average number of previous hospital admissions was 4.65 (S.D. 5.62, range 0–26), average length of current hospitalization was 5.4 months, range 8 weeks to 10.5 years. Average interval since initial diagnosis and hospitalization was 14.6 years (S.D. = 8.15), most recent Mini Mental Status Exam Mean = 25.64 (S.D. 3.82). Thirty-seven participants were currently taking atypical antipsychotic medications, and 23 were on combined typical and atypical antipsychotics. The average chlorpromazine-equivalent dose was 563. 4 mg/day (S.D. = 386.72). All participants were stabilized on medications for at least 2 weeks prior to participation in the study. Participants had primary chart diagnoses of schizophrenia or schizoaffective disorder. Chart diagnoses had been established and reviewed in clinical team diagnostic staff meetings within the previous 60 days. Diagnoses were independently confirmed by unit psychologists using the Structured Clinical Interview for DSM-IV. Exclusion criteria included legal incompetence, co-diagnoses of substance dependence, mental retardation, tardive dyskinesia, dementia or other organic impairment. The research protocol was approved by the agency IRB, and informed consent was obtained from each participant. Researchers were not affiliated with unit treatment teams.

Table 2
PA story ratings.

PA story rating	Mean	S.D.	Range	Skewness
Story coherence	3.08	0.90	1.00–4.78	−0.15
Total words/story	32.62	13.43	7.11–85.88	1.38
Intention plausibility	3.43	1.04	0.00–4.88	−1.03
Narrative core ideas	3.41	1.25	0.33–5.78	−0.38
Emotion words/story	0.22	0.23	0.00–1.03	1.73
Plausibility of emotions	0.74	0.68	0.00–3.13	1.80
N = 54				

2.2. Materials

An interview was conducted with each patient by the second author (an advanced graduate student in psychology trained and experienced in diagnostic interviewing) to gather information for completion of the Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1983), and the Scale for the Assessment of Positive Symptoms (SAPS; Andreasen, 1984). The interviewer was previously trained by the first author in use of the SANS/SAPS instruments to a criterion of 0.80 inter-rater reliability. The three symptom dimensions used to develop subsyndromal symptom scores for, 1) Psychoticism, 2) Disorganization, and 3) Negative symptoms (Andreasen et al., 1995), were based on multivariate studies of SANS/SAPS ratings (Andreasen et al., 1995; and Cuesta and Peralta, 1995). Symptom ratings were completed immediately after the SANS/SAPS interview. Unit psychologists' ratings of all participants on the 18-item Brief Psychiatric Rating Scale (BPRS; Overall and Gorham, 1962) and Mini Mental Status Exam (MMSE), completed within no more than the prior 30 days, were obtained from patients' charts after completion of the experimental procedure.

Following completion of the SANS/SAPS ratings the same interviewer administered the reading subtest of the Wide Range Achievement Test-III (WRAT-III; Snelbaker et al., 2001). The sub-test consists of a list of 42 words that progressively increase in difficulty. Participants were asked to pronounce as many words as they could. The WRAT-III reading subtest provides an estimate of current and premorbid intelligence (Johnstone et al., 1996; Flanagan et al., 1997). Next, the interviewer administered the Picture Arrangement (PA) subtest of the Wechsler Adult Intelligence Scale (WAIS-R; Wechsler, 1981) following the procedure described by Segal et al. (1993). Confirmatory factor analysis indicates that performance on the PA subtest is indicative of social cognitive ability that is separable from general intelligence (Allen et al., 2007). The PA subtest consists of 10 sets of cards containing illustrations of characters engaged in various social scenarios with each card set having a correct logical arrangement that conveys a coherent story. The scoring of participants' verbal stories allows for the analysis of social, relational, and situational meaning attributed to the card scenarios (Westen and Segal, 1993). Used in this way, the PA test provides an approach to studying social adjustment via the assessment of participants' ability to organize and sequence social cues, to distinguish essential from non-essential details, and to integrate social cues and cognitive percepts (Segal et al., 1993).

2.3. Procedure

The PA cards were arranged and presented in accordance with standard WAIS-R instructions. Once participants completed arranging each set of cards they were asked to describe the story depicted in the card arrangement. Each story was transcribed verbatim by the interviewer as it was presented. The entire procedure from SANS/SAPS interview and ratings to completion of the PA story task was completed by participants in less than 1 h.

PA protocols were obtained from twenty-five undergraduate student volunteers to establish normative/core themes for each arrangement of cards using WAIS-R scoring criteria. All undergraduate participants were screened on the Schizotypal Personality Questionnaire (SPQ-B, Raine and Benishay, 1995) and first-degree relatives diagnosed with schizophrenia spectrum disorder to rule out participants that scored more than one standard deviation above the normative mean total score. Core ideas or narrative themes for each correct card arrangement were identified by five undergraduate raters working independently. Inter-rater reliability of normative narrative themes/core ideas was excellent (0.82).

Participants' stories were rated for number of core ideas included in each narrative, total number of words included in each story, and number of words describing character emotions. In addition, stories were rated for overall coherence, plausibility of intentions, and plausibility of emotions attributed to characters using a five-point scale (e.g., 0 implausible or incoherent to 4 very plausible or coherent). Story coherence was defined as the degree to which the story narrative presented a clear and understandable description rather than confused or rambling. Core ideas were defined as themes or ideas that were observed in 90% of normative student stories for that particular card arrangement (e.g., "a man sees two boys fighting over a comic book…"; "a young man goes to serenade his girlfriend…"). Most card sequences typically were rated for several core ideas. Plausibility of intentions was rated on the basis of whether or not the attributed intention or motivation of a character was judged to be reasonable or

Table 3
Multiple regression standardized beta coefficients and story ratings.

Story rating	Disorganized beta	Psychotic beta	Negative beta	WRAT3 beta
Length of story	0.05	0.24	−0.45**	0.35*
Emotion words	−0.21	0.01	−0.51**	−0.16
Emotion attributions	0.01	0.15	−0.32	−0.15
Story coherence	−0.30*	0.06	−0.28	0.47
Normative/core ideas	−0.20	0.17	−0.45	0.46
Attributions of intentions	−0.21	0.05	−0.31	0.36

* $P < 0.05$.
** $P < 0.01$.