



## Social cognition, social competence, negative symptoms and social outcomes: Inter-relationships in people with schizophrenia



Marc Kalin<sup>a</sup>, Sara Kaplan<sup>a</sup>, Felicia Gould<sup>a</sup>, Amy E. Pinkham<sup>b,c</sup>, David L. Penn<sup>d,e</sup>, Philip D. Harvey<sup>a,f,\*</sup>

<sup>a</sup> University of Miami Miller School of Medicine, USA

<sup>b</sup> The University of Texas at Dallas, USA

<sup>c</sup> The University of Texas Southwestern Medical School, USA

<sup>d</sup> University of North Carolina, USA

<sup>e</sup> Australian Catholic University, Australia

<sup>f</sup> Research Service, Bruce W. Carter VA Medical Center, Miami, FL, USA

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### ABSTRACT

Social deficits are common in people with schizophrenia and the treatment of deficits in social competence has been a long-time treatment strategy. However, negative symptoms and social cognitive deficits also contribute to social dysfunction. In this study, we examined the correlations between everyday social outcomes, a performance based measure of social competence, and performance on 8 different social cognition tests in 179 patients with schizophrenia. Social cognition, social competence, and motivation-related negative symptoms accounted for 32% of the variance in real-world social outcomes. In addition, two different social cognition tests, along with expression-related negative symptoms accounted for 32% of the variance in performance-based assessments of social competence. These data suggest that negative symptoms exert an important influence on social outcomes and social competence, but not social cognition, and that social cognition and social competence exert separable influences on real-world social outcomes. Improving social outcomes seems to require a multi-faceted approach which considers social cognition, social competence, and negative symptoms.

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Impairment in real-world social functioning is a central feature of schizophrenia (Bellack et al., 1990; Hooley, 2010). Social functioning deficits are seen in people before they develop schizophrenia, as well as in relatives of those with the disease (Couture et al., 2006). While current pharmacological treatments for schizophrenia reduce rehospitalizations, they have not significantly helped with poor functional outcomes, including social deficits (Harvey and Bowie, 2012; Priebe, 2007). Social skills training has been the mainstay psychosocial treatment for many years with the rationale that learning social competencies would be helpful in improving social functioning (Smith et al., 1996). While social skills training can improve deficits in social competence, negative symptoms, which include deficits in both motivation and

emotional expression, correlate with poor everyday social outcomes and do not respond to current pharmacological interventions (Fervaha et al., 2013; Kirkpatrick et al., 2006).

Recently, we (Robertson et al., 2014) examined a large sample of patients with schizophrenia ( $n = 561$ ) and found that clinical assessments of two particular negative symptoms, passive social withdrawal and active social avoidance, accounted for more variance in real world social outcomes than performance on an interactive assessment of social competence. Furthermore, those analyses showed that these two negative symptoms exerted their influence on social outcomes independently of the correlations between social competence and real world social outcomes. Thus, failures to engage in social activities were not correlated with performance-based measures of social competence and patients with both high and low levels of social competence were found to have essentially equivalent levels of social functioning.

Research also has shown a consistent relationship between social cognition and everyday social outcomes (Mancuso et al., 2011; Penn et al., 2008). Social cognition has been defined as the “mental

\* Corresponding author. Department of Psychiatry and Behavioral Sciences, University of Miami Miller School of Medicine, 1120 NW 14th Street Miami, FL 33136, USA.

E-mail address: [philipdharvey1@cs.com](mailto:philipdharvey1@cs.com) (P.D. Harvey).

operations that underlie social interactions, including perceiving, interpreting, and generating responses to the intentions, dispositions, and behaviors of others” (Green et al., 2008). Social cognition is typically broken down into four domains: emotion processing, social perception, attributional bias, and theory of mind (Green and Horan, 2010; Pinkham et al., 2014). Emotion processing is defined as the ability to understand the emotions that another is experiencing by observing facial expressions, vocal features, or both. Social perception is the ability to interpret social cues from behavior in a social context. Theory of mind is the ability to infer others’ intentions, beliefs, and dispositions. Attributional style is the ability to develop ideas regarding the cause of both positive and negative life events. There is mounting evidence to suggest that deficits in social cognition are a distinct contributing factor to poor social outcomes in schizophrenia and that deficits in social cognition may also correlate with deficits in social competence (Horan et al., 2008; Mancuso et al., 2011).

The past findings indicate that social skills, negative symptoms, and social cognition all have been found to predict real-world social outcomes, but not necessarily in the same study. For instance, a recent study looked at both social cognitive impairments and negative symptoms as predictors of functional outcomes (Bell et al., 2011). The researchers examined whether the correlation between negative symptoms and social cognition and functional outcomes were related or separate constructs. As expected, the data showed that high levels of social cognition and low levels of negative symptoms were correlated with more positive functional outcomes. The findings also indicated that these two domains—negative symptoms and social cognition—were separate, distinct factors contributing to poor outcomes, suggesting that efforts to improve treatments should focus on treatments for these two domains of impairment. However, this study did not include a performance-based assessment of social competence or social skills. Another study examined the effects of performance on a social cognition task (i.e., a Theory of Mind task), negative symptoms, and a performance-based assessment of social competence on real-world social outcomes (Couture et al., 2011). They found that theory of mind deficits acted as a mediator between social competence and social outcomes, and also that negative symptoms and social competence were directly correlated with functional outcomes. While informative, it is noteworthy that this study examined only one domain of social cognition. Given the multidimensional nature of social cognition noted above, an important next step is to understand the interrelationship among all known domains of social cognition, social competence, and negative symptoms and how they predict social outcomes. Developing a broader understanding of these factors has the potential to guide the development of treatment strategies to most efficiently improve social functioning in patients with schizophrenia.

The present study aimed to examine and quantify the cross-sectional contribution of several known predictors of real-world social outcomes, including negative symptoms, social competence (measured with a performance-based social skills task), and social cognition (measured with 8 different measures) in 179 patients with schizophrenia. This sample is entirely independent from the previous sample reported on by Robertson et al. (2014). The current study used items from the Positive and Negative Syndrome Scale (PANSS) to index negative symptoms while also using the PANSS positive symptom factor for comparison purposes. Social competence was measured with the Social Skills Performance Assessment (SSPA; Patterson et al., 2001). Real-world social outcomes were obtained from ratings generated with a structured rating system that generated rated on the basis of input from patients and from a variety of different informants. This study examined not only the relationships between social skills, negative symptoms, and social

cognition with social outcomes, but also the predictive relationships between interactive measures of social competence, performance-based measures of social cognition, and clinical ratings of negative symptoms. Our primary hypothesis was that including social cognition in the predictive equation would increase the level of variance in real world social outcomes accounted for, compared to the previous study which used only social competence and negative symptoms as predictors. We also expected that if there were an overlap between predictors, a comprehensive assessment of social cognition would reduce the predictive relationship between negative symptoms and real world social outcomes by accounting for variance that previously was attributed to negative symptoms. Our negative symptoms assessment included both motivation deficits and expression deficits to the extent that these concepts are captured by the PANSS.

## 1. Methods

### 1.1. Subjects

The data was collected in two different geographical locations. The study participants were patients ( $n = 179$ ) with schizophrenia or schizoaffective disorder, receiving treatment at outpatient locations in Miami and Dallas. Miami patients were recruited from the outpatient services at the University of Miami Miller School of Medicine. Patients in Dallas were recruited using Metrocare Services, a large non-profit provider of mental health services in Dallas County, as well as other outpatient services associated with the University of Texas Southwestern Medical (UTSW) Center. All research participants signed informed consent forms in accordance with the policies of their respective Institutional Review Boards. Patients were participants in the Social Cognition Psychometric Evaluation (SCOPE) study (Pinkham et al., 2014) from whom data were collected between October 2012 and May 2014.

All participants completed a structured diagnostic interview—the Mini International Neuropsychiatric Interview, 6th Edition (MINI) (Sheehan et al., 1998)—administered by a trained interviewer, followed by a consensus process at each site. Additionally during screening, all participants were administered the Wide Range Achievement Test, 3rd Edition (WRAT-III) Recognition Reading subtest (Wilkinson, 1993). Grounds for exclusion from the study included a history of traumatic brain injury, brain disease such as seizure disorder or neurodegenerative condition, a reading score below the 6th grade reading level, or the presence of another DSM-IV diagnosis that would exclude the diagnosis of schizophrenia. In order for the data to reflect findings from an inclusive range of participants and their real-world conditions, comorbid substance use disorders were only an exclusion criterion if the patient had a diagnosis of substance abuse in the last month or substance dependence in the past 6 months. Any patients who arrived for their study visits appearing intoxicated were rescheduled. Patients who were currently receiving inpatient treatment were not recruited, but those living in many different kinds of residential facilities—supervised, unsupervised, supported, or unsupported—were all recruited.

1.2. *Assessment strategy. Upon completion of a successful screening, the collection of test assessments was completed in a counter-balanced order*

#### 1.2.1. Real-world functional outcomes

Informants were identified by the participants and were high contact clinicians, family members, or close friends. We used the Specific Levels of Functioning (SLOF; Schneider and Struening, 1983) as our functional outcomes rating scale. Ratings for each

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