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Self-assessment of social cognitive ability in individuals with schizophrenia: Appraising task difficulty and allocation of effort

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ABSTRACT

Patients with severe mental illnesses manifest substantial deficits in self-assessment of the abilities that impact everyday functioning. This study compares patients with schizophrenia to healthy individuals on their social cognitive performance, their assessment of that performance, and the convergence between performance and indicators of effort in solving tasks. Patients with schizophrenia ($n = 57$) and healthy controls (HC; $n = 47$) completed the Bell-Lysaker Emotion Recognition Test (BLERT), a psychometrically sound assessment of emotion recognition. Participants rated their confidence in the accuracy of their responses after each item. Participants were instructed to respond as rapidly as possible without sacrificing accuracy; the time to complete each item was recorded. Patients with schizophrenia performed less accurately on the BLERT than HC. Both patients and HC were more confident on items that they correctly answered than for items with errors, with patients being less confident overall; there was no significant interaction for confidence between group and accuracy. HC demonstrated a more substantial adjustment of response time to task difficulty by taking considerably longer to solve items that they got wrong, whereas patients showed only a minimal adjustment. These results expand knowledge about both self-assessment of social cognitive performance and the ability to appraise difficulty and adjust effort to social cognitive task demands in patients with schizophrenia.

1. Introduction

People with schizophrenia often show limited awareness of illness and difficulties in the self-assessment of their abilities and illness status (Amador et al., 1994; Durand et al., 2015; Gould et al., 2015; Keefe et al., 2015). Mis-estimation of ability is not specific to severe mental illness; most healthy individuals often overestimate their abilities across many different functional situations (Kruger & Dunning, 1999). However, healthy individuals are typically able to use feedback to adjust their self-assessment and thus adjust their effort or opinions of their competence. People with schizophrenia have been reported to fail to adequately adjust their effort in response to situational demands and reinforcement structures (Reddy et al., 2015), which may be due to difficulties in evaluation of their own abilities or challenges in assessing the difficulty of environmental challenges.

Previous research has shown that self-reports of ability, across the domains of cognition and everyday functioning, do not correlate with either objective performance on cognitive and functional tasks (Durand et al., 2015) or informed clinicians' reports of functioning (Sabbag et al., 2011) in individuals with schizophrenia. This impaired self-assessment ability is one of several features of the lack of insight, demonstrated in a growing body of literature (e.g. Amador et al., 1994; Medalia & Thysen, 2010; Siu et al., 2015). Impairment in self-assessment has the potential for bi-directional impact in that those with poor performance may not recognize it, and those with adequate skills may underestimate their abilities (Harvey & Pinkham, 2015). Perhaps most importantly, deficits in self-assessment have been shown to have a stronger association with impairments in everyday functioning than actual impairments in cognition and functional skills (Gould et al., 2015). These findings suggest that self-assessment may be an important treatment target and that examination of self-assessment in other domains may be fruitful. Given its strong relationship to social outcomes (Fett et al., 2011; Pinkham & Penn, 2006), social cognition is one such domain.

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Relatively few studies have examined self-assessment of social cognitive abilities in schizophrenia; however, these studies conducted have revealed difficulties. Specifically, when identifying the emotions and mental states of others, individuals with schizophrenia are more likely both to be incorrect *and* to report higher confidence in their incorrect responses (Köther et al., 2012; Langdon et al., 2014; Moritz et al., 2012). Thus, individuals with schizophrenia seem to have difficulty determining when they are likely to have misjudged a social situation; this may negatively impact social interactions and may be due to challenges in estimating the level of difficulty of the social demands.

Poor self-assessment may also contribute to difficulties with judging the difficulty of environmental demands. A potential reason for reduced performance in functional tasks, both cognitive and social cognitive, could be problems in effort adjustment when faced with tasks of differential difficulty (Docx et al., 2015; Fervaha et al., 2013; Horan et al., 2015). If individuals are unable to understand their own strengths and weaknesses (i.e. impaired self-assessment), it may be more challenging to understand the true difficulty of a task. Thus, challenges in judging one's one ability may lead to problems in determining whether increasing effort would be likely to achieve a greater chance of success.

This paper reports on self-assessment of social cognitive abilities in a sample of adult patients with schizophrenia and demographically similar healthy controls. Social cognition and corresponding confidence and adjustment of effort were measured using a modified version of the Bell-Lysaker Emotion Recognition test (BLERT; Bell et al., 1997; Bryson et al., 1997). In this modification we asked participants to solve problems as rapidly as possible without sacrificing accuracy. We also asked them to provide a confidence assessment regarding the accuracy of their solutions after each item. We hypothesized that patients with schizophrenia, compared to healthy controls, would: 1): manifest poorer overall accuracy; 2); show impaired self-assessment by manifesting lower convergence between performance and confidence; and 3): manifest a reduced ability to adjust effort to challenging stimuli, as indexed by similar response times for both correct and incorrect items.

Additionally, as a growing body of literature has identified depression as a moderator of self-evaluation, we examined the influence of depression by including it as a covariate in our analyses. Mild depression has been shown to correlate with more accurate self-assessment of cognitive abilities in people with schizophrenia (Bowie et al., 2007; Gould et al., 2015; Sabbag et al., 2012), consistent with previous research in healthy populations demonstrating that mild depression contributes to more accurate judgment (Dunning & Story, 1991) and that deflating feedback leads to increases in the accuracy of self-assessment. Finally, because of previous work that implicated negative symptoms in impairments in allocation of effort and self-assessment (e.g., Horan et al., 2015; Sabbag et al., 2012), we examined the associations between negative symptoms and social cognitive performance, confidence in performance, and the response times for correct and incorrect responses for the patients with schizophrenia.

2. Method

2.1. Participants

Participants were 57 patients with schizophrenia or schizoaffective disorder and 47 healthy controls (HC) recruited from three study sites: The University of Texas at Dallas (UTD), the University of Miami Miller School of Medicine (UM), and the University of North Carolina at Chapel Hill (UNC). UTD participants were recruited from Metrocare Services, a nonprofit mental health services provider for Dallas County, TX, and other area clinics. UM recruitment took place at the Miami VA Medical Center and the Jackson Memorial Hospital-University of Miami Medical Center. UNC individuals were recruited from the Outreach and Support Intervention Services (OASIS) program and Caramore, a structured support program for individuals with severe mental illness. The present study is a part of the fourth phase of the SCOPE psychometric study, an evaluation of modifications of social cognitive tests (Pinkham et al., 2015); throughout this phase of the study, promising candidate measures were modified and pilot tested using smaller samples.

To be eligible, patients required a DSM-IV diagnosis of schizophrenia or schizoaffective disorder. Patients could not have any hospitalizations within the last two months and had to be on a stable medication regimen for a minimum of six weeks with no dose changes for a minimum of two weeks. HC were screened for history of psychopathology to ensure they did not meet criteria for any major DSM-IV Axis I or II disorders. Exclusion criteria for both groups included: 1) presence or history of pervasive developmental disorder or mental retardation (defined as IQ < 70) by DSM-IV criteria, 2) presence or history of medical or neurological disorders that may affect brain function (e.g. seizures, CNS tumors, or loss of consciousness for 15 min or more), 3) presence of sensory limitation including visual (e.g. blindness, glaucoma, vision uncorrectable to 20/40) or hearing impairments that interfere with assessment, 4) no proficiency in English, 5) presence of substance abuse in the past month, and 6) presence of substance dependence not in remission for the past six months.

2.2. Measures

2.2.1. Diagnoses

Diagnoses were confirmed using the *Mini International Neuropsychiatric Interview* (MINI; Sheehan et al., 1998), a brief structured diagnostic interview, supplemented by the Psychosis Module of the *Structured Clinical Interview for DSM Disorders* (SCID; First et al., 2002).

2.2.2. Social cognition

All participants completed a modified version of the Bell Lysaker Emotion Recognition Test (BLERT; Bell et al., 1997; Bryson et al., 1997). This task consists of 21 video clips of a male actor, providing dynamic facial, vocal-tonal, and upper-body movement cues and measures the ability to correctly identify seven emotional states: happiness, sadness, fear, disgust, surprise, anger, or no emotion. The original version of the BLERT has demonstrated good reliability and validity (Bell, Bryson & Lysaker, 1997; Pinkham et al., 2015). The task in the present study was modified in two ways from the standard administration. First, participants were instructed to respond as rapidly as possible without sacrificing accuracy, which could include responding prior to the offset of the video clip. Second, after identifying the expressed emotion, participants rated how confident they were that their response was correct on a scale from 0 (not at all confident) to 100 (extremely confident). Response time to answer each item was recorded from the start of the video clip to when the participant provided their answer. Participants could respond during or after the presentation of the video clip (most participants responded after the video clip finished). Due to varying run times for each item, the video clip run time was subtracted from the total response time (from the start of the video clip to the participant's response) to yield an accurate participant response time. This method can yield negative values when the participant responded before the clip finished, thus a separate method of capturing accurate response time was examined in all analyses as a "back up" method: a proportion of total response time (inclusive of video clip run time) to video run time. Results did not change utilizing this "back up" method, thus results based on the first method will be reported. Response time was used as a proxy for effort allocation, with a longer response time indicative of *more* effort being exerted. For both response times and confidence ratings, means were calculated separately for correct and incorrect items.

2.2.3. Depressive symptoms

Depressive symptomology was assessed using the Beck Depression Inventory (BDI-II; Beck et al., 1996), a 21-item self-report measure of severity of depression. Items are measured on a scale from 0 to 3. A total