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Empathy, depressive symptoms, and social functioning among individuals with schizophrenia



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ABSTRACT

Empathy deficits have been associated with schizophrenia and depression. We compared whether individuals with schizophrenia with and without co-occurring depressive symptoms differed on self-reported and performance-based measures of empathy and social functioning. We also examined the relationships among depressive symptoms, empathy, clinical symptoms, and social functioning. Twenty-eight individuals with schizophrenia and depressive symptoms, 32 individuals with schizophrenia without depressive symptoms, and 44 control subjects were compared on assessments of depressive symptoms, empathy, global neurocognition, clinical symptoms, and social functioning. Both groups of individuals with schizophrenia scored higher than controls on the Interpersonal Reactivity Index personal distress subscale. Individuals with schizophrenia and co-occurring depressive symptoms scored significantly higher than individuals with schizophrenia without depressive symptoms on the personal distress subscale. Personal distress and depressive symptoms were significantly correlated among individuals with schizophrenia and co-occurring depressive symptoms, while both measures negatively correlated with social functioning. Emotional empathy was related to clinical symptoms in both groups of individuals with schizophrenia. Personal distress partially mediated the relationship between co-occurring depressive symptoms and social functioning. Personal distress may be an important implication for social functioning among individuals with schizophrenia and co-occurring depressive symptoms, and should be examined further as a potential treatment target.

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1. Introduction

Empathy involves the ability to process emotional cues (verbal and nonverbal) displayed by others and consists of both ‘emotional’ and ‘cognitive’ components (Shamay-Tsoory, 2011; Zaki and Ochsner, 2011). The emotional component involves sharing and detecting the emotions displayed by others, and regulating the emotional response to others, while the cognitive component involves understanding the emotional perspective of others and distinguishing between the feelings experienced by others from one's own (Decety, 2011). Cognitive empathy is similar to theory-of-mind (ToM), which can be defined as inferring the cognitive mental states (i.e., beliefs and intentions) of others and using this information to predict future behavior (Brune and Brune-Cohrs, 2006). Although these constructs share some underlying neural mechanisms, they can be differentiated by the emotional understanding

and the self–other distinction that underlie cognitive empathy (Shamay-Tsoory, 2011).

Individuals with schizophrenia are characterized by deficits in empathy across a range of methods, including self-report (Achim et al., 2011; Haker et al., 2012) and performance-based measures (Langdon et al., 2006; Shamay-Tsoory et al., 2007; Derntl et al., 2009; Smith et al., in press). Although the literature appears to be mixed regarding the presence of emotional empathy deficits in this group (Sparks et al., 2010; Achim et al., 2011; Smith et al., 2012), studies have consistently observed deficits in cognitive empathy (Derntl et al., 2009; Sparks et al., 2010; Achim et al., 2011; Smith et al., 2012). Moreover, recent studies demonstrated that cognitive empathy, but not emotional empathy, explained unique variance in social functioning after accounting for neuro-cognitive deficits and clinical symptoms (Smith et al., 2012; Smith et al., in press).

Given that empathy explains unique variation in social functioning among individuals with schizophrenia (Smith et al., 2012; Smith et al., in press), it is important to investigate clinical factors that might exacerbate these empathy deficits. One such factor could be the presence of depressive symptoms, which occur more frequently among individuals with schizophrenia compared to the general

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population (Lançon et al., 2001; Kessler et al., 2003; Buckley et al., 2009) and are associated with reduced functioning (Fervaha et al., 2013; Kasckow et al., 2010; Simonsen et al., 2010). Moreover, individuals with a non-psychotic major depressive disorder have impairments in both emotional and cognitive empathy (Cusi et al., 2011; Schreiter et al., 2013). Based on findings of heightened depression among individuals with schizophrenia, depressive symptoms in this population could be related to exacerbated impairments in empathy (Baez et al., 2013).

In the current study, we hypothesized that (1) individuals with schizophrenia and depressive symptoms (SCZ+DEP) would have exacerbated impairments in the emotional and cognitive components of empathy as compared to individuals with schizophrenia and no depressive symptoms (SCZ); (2) SCZ+DEP would have poorer social functioning than SCZ; (3) among SCZ+DEP, (a) greater depressive symptoms would be related to impaired empathy and lower social functioning; (b) impaired empathy would be related to poorer social functioning; (c) impaired empathy would mediate the relationship between depressive symptoms and social functioning. We tested these hypotheses using a multimodal approach with self-report and performance-based measures of both empathy and social functioning. Lastly, we explored the relationship between depressive symptoms and the clinical symptoms of schizophrenia, duration of illness (years since onset of psychotic symptoms), and antipsychotic medication treatment.

2. Methods

2.1. Participants

Participants included 28 SCZ+DEP, 32 SCZ, and 44 healthy controls (CON) between 18 and 55 years of age. The Northwestern University Schizophrenia Research Group recruited all participants through outpatient mental health services, advertisements in surrounding neighborhoods, the National Alliance for Mental Illness, and online. The Structured Clinical Interview for the DSM-IV (SCID) (First et al., 2002) was administered by MS and PhD-level research staff and used to determine a diagnosis of schizophrenia, other Axis-I disorders, and pharmacological treatment. The diagnoses were validated by a semi-structured interview performed by a research psychiatrist and by a review of available medical records.

Depressive symptoms were rated using the Montgomery Asberg Depression Rating Scale (MADRS) (Montgomery and Asberg, 1979; Bondolfi et al., 2010) and based on observations during the SCID. Ten items were rated on a seven-point Likert scale with a possible range of 0–60. Using MADRS cutoff scores, 0–6 reflected a normal range of minor or absent depressive feelings, while scores of 7–19 reflected mild depressive symptoms, 20–34 reflected moderate depressive symptoms, and 35+ reflected severe depressive symptoms. A total MADRS score and individual ratings for apparent sadness, total sadness, inner tension, reduced sleep, reduced appetite, concentration difficulties, lassitude, inability to feel, pessimistic thoughts, and suicidal thoughts were evaluated. The alpha reliability among SCZ+DEP was acceptable ($\alpha=0.63$). Reliabilities for CON and SCZ were unacceptable (both $\alpha < 0.30$), but this finding is expected given that few subjects in these two scored above '0' on this measure. All individuals with schizophrenia were clinically stable prior to study participation and treated with antipsychotic medications.

Exclusion criteria for CON included having (1) a lifetime history of any Axis I psychiatric disorder according to SCID criteria or (2) a first-degree relative with a psychotic disorder (including bipolar disorder). Additional exclusion criteria for both groups were: DSM-IV criteria for substance abuse or dependence within the past 6 months or a documented neurological injury or disorder. Northwestern University Feinberg School of Medicine's Institutional Review Board approved the study protocol and all participants provided informed consent. The completion of all study measures required approximately 5–6 h over the course of 2–3 visits.

2.2. Measures

2.2.1. Self-report empathy

The 28-item Interpersonal Reactivity Index (IRI) (Davis, 1983) was used to measure four areas theorized to reflect empathy. Cognitive empathy was measured with fantasy (i.e., shifting one's feelings to fictional characters) and perspective-taking (i.e., understanding the perspective of others), while emotional empathy was measured with empathic concern (i.e., generating affective concern for others) and personal distress (i.e., becoming upset when others are in difficult situations).

The internal consistency of the IRI was generally acceptable but not strong for the control subjects and individuals with schizophrenia (across both groups): fantasy ($\alpha=0.76$, $\alpha=0.70$, respectively), perspective-taking ($\alpha=0.73$, $\alpha=0.49$, respectively), empathic concern ($\alpha=0.79$, $\alpha=0.70$, respectively), and personal distress ($\alpha=0.67$, $\alpha=0.63$, respectively).

2.2.2. Performance-based empathy

Two computerized tasks from an adapted version of the Derntl paradigm (Derntl et al., 2009) assessed cognitive empathy with emotional perspective-taking and emotional empathy with affective responsiveness (Smith et al., in press). The developers translated the directions and tasks from German into English and worked with the principal investigator (MJS) to edit the text for readability. Each task used a two alternative, forced-choice response format with standardized face stimuli (Gur et al., 2002) and took approximately 20 min to complete. Accuracy (i.e., percent correct) and response times (RT) were recorded for each task. Sample stimuli from the two tasks can be found here (Smith et al., in press).

2.2.2.1. Affective responsiveness. Participants judged how they would feel in various emotional scenarios presented as 150 brief sentences describing emotional (i.e., fear, anger, sadness, disgust, happiness, neutrality) and neutral situations (25 stimuli per emotion). The sentences were presented for 6 s and a response slide displaying two emotional faces was presented for a maximum of 4 s. Participants selected the emotional expression that reflected how they would feel in the scenario; one face correctly depicted how most people would feel in the scenario and the other face was a randomized option.

2.2.2.2. Emotional perspective-taking. Participants were shown 60 scenes displaying two actors engaged in social interactions depicting happiness, sadness, anger, fear, disgust and neutrality (10 scenes each). The face of one actor was masked and participants were prompted to select which of the two facial expressions would best reflect how the masked character would feel in each interaction. Each social interaction scene was displayed for 4 s and followed by a response slide that presented two faces for a maximum of 4 s. The emotional empathy task was completed prior to the cognitive empathy task.

2.2.3. Social functioning measures

Social competence was assessed using the Social Skills Performance Assessment, a video-recorded test comprised of two role-play scenes that involved meeting a new neighbor and making a request from a landlord. Based on the work of Patterson et al. (2001), each scene was rated on a five-point scale across eight criteria for the first scene and nine criteria for the second scene. A final score was calculated by averaging the two role-play scores (ICC=0.97 for two blinded raters on 25% of the videos). Social attainment was assessed using the total score from a participant interview version of the Specific Levels of Functioning (SLOF) scales, which asks participants to consider their typical level of functioning in the areas of interpersonal relationships, social acceptability, activities of daily living, and work skills (Schneider and Struening, 1983). The SSPA and SLOF have been previously validated as measures of functioning in individuals with schizophrenia (Patterson et al., 2001; Harvey et al., 2007).

2.2.4. Global neurocognition

We used a neuropsychological test battery to approximate the six non-social cognitive domains in the Measurement and Treatment Initiative to Improve Cognition in Schizophrenia battery (Marder and Fenton, 2004). Speed of processing included Trail Making Test Part A (Reitan and Wolfson, 1985), category fluency (animals) (Benton et al., 1976), and the Digit-Symbol Coding subtest from the Wechsler Adult Intelligence Scale-Third Edition (WAIS-III) (Wechsler, 1997a). Attention included the mean across the two, three, and four-item d' scores from a continuous performance task (Barch et al., 2004). Verbal Working Memory (WM) included performance on Letter-Number Sequencing and Digit Span subtests from the Wechsler Memory Scale-Third Edition (WMS-III) (Wechsler, 1997b). Non-verbal WM included the Spatial Span subtest from the WMS-III (Wechsler, 1997b). Verbal learning included the total score of trials 1–5 on the California Verbal Learning Test-Second Edition (Delis et al., 1983). Reasoning and problem solving included scores from the Matrix Reasoning subtest of the WAIS-III (Wechsler, 1997a) and the Trail Making Test Part B (Reitan and Wolfson, 1985). Each domain was computed by standardizing raw or scaled scores from individual subtests using z-score transformations with the current sample, and then averaging these scores within the domains. Global neurocognition was computed as an average across the six domains scores.

2.2.5. Clinical measures

We used the global ratings from the Scale for the Assessment of Positive Symptoms (Andreasen, 1983b) and the Scale for the Assessment of Negative Symptoms (Andreasen, 1983a) to provide us with positive, negative, and disorganized symptoms.

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