Theory of mind correlates with clinical insight but not cognitive insight in patients with schizophrenia

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ABSTRACT

Research on the relationship between insight and social cognition, in particular Theory of Mind (ToM), in schizophrenia has yielded mixed findings to date. Very few studies, however, have assessed both clinical insight and cognitive insight when examining their relationships with ToM in schizophrenia. The current study thus investigated the relationship between clinical insight, cognitive insight, and ToM in a sample of 56 patients with schizophrenia and 30 healthy controls. Twenty-seven patients were classified as low in clinical insight according to their scores on the 'insight' item (G12) of the Positive and Negative Syndrome Scale (PANSS). Moreover, cognitive insight and ToM were assessed with the Beck Cognitive Insight Scale (BCIS) and the Yoni task, respectively. The results indicated that patients with poor clinical insight performed worse on tasks of second-order cognitive and affective ToM, while the ToM performance of patients with high clinical insight was equivalent to that of healthy controls. Furthermore, while clinical insight was correlated with ToM and clinical symptoms, cognitive insight did not correlate with clinical insight, ToM, or clinical symptoms. Clinical insight thus appears to be an important factor related to ToM in schizophrenia.

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1. Introduction

Theory of mind (ToM) refers to the cognitive ability to understand one's own and others' thought processes, and to explain and predict the behaviour of other people through the process of making inferences regarding their mental states, knowledge, beliefs, and intentions (Premack and Woodruff, 1978; Brüne and Brüne-Cohrs, 2006; Sprong et al., 2007). ToM is commonly assessed by examining one's performance on first- and second-order false belief tasks (Wimmer and Perner, 1983; Perner et al., 1987). First-order ToM refers to inferring the thoughts of another person, while second-order ToM involves reasoning about what one person (A) thinks about another person's (B) thoughts (Baron-Cohen et al., 1997). Second-order ToM thus represents a more complex level of inference. ToM is an important component of social cognition, especially given its impact on an individual's

neurocognition and functional outcomes, including one's level of social functioning and ability to perform real world tasks (Fett et al., 2011).

The extant literature indicates that patients with first-episode or chronic schizophrenia, as well as non-psychotic first-degree relatives of patients with schizophrenia, all exhibit ToM impairments (Sprong et al., 2007; Bora et al., 2009; Bora and Pantelis, 2013). Specifically, schizophrenia patients tend to show greater impairment on second-order ToM compared to first-order ToM (Sprong et al., 2007; Bora et al., 2009). However, most of the aforementioned studies did not use a range of tasks to examine ToM in a comprehensive way. Furthermore, in recent years an increasing number of studies have suggested that the construct of ToM can be broken down into affective and cognitive components (Baron-Cohen et al., 1997; Shamay-Tsoory et al., 2002). While cognitive ToM refers to one's knowledge of another person's thoughts or beliefs, affective ToM refers to one's knowledge of another person's emotions (Shamay-Tsoory and Aharon-Peretz, 2007). These components of ToM have become the focus of much social cognition research in schizophrenia, with studies indicating that second-order affective ToM, specifically, appears to be

impaired in patients with schizophrenia (Shamay-Tsoory et al., 2007a, 2007b).

Dissociations between the affective and cognitive components of ToM have been supported by neuroimaging studies (Shamay-Tsoory and Aharon-Peretz, 2007; Bodden et al., 2013). Bodden et al.'s (2013) study, for example, contrasted affective and cognitive ToM and revealed additional activation in the right temporo-parietal junction and cingulate cortex, as well as the left supplementary motor area specific to the affective component. Conversely, the right dorsolateral prefrontal cortex has been demonstrated as selectively important for cognitive ToM (Kalbe et al., 2010).

Insight is an important variable that should be taken into consideration when studying ToM in patients with schizophrenia. Insight, in general, refers to one's understanding or awareness of him/herself. For patients with psychiatric disorders, such as schizophrenia, clinical insight specifically refers to a person's awareness of their illness and need for treatment (David, 1990; Amador et al., 1993). However, beyond the clinical domain, one's cognitive insight, that is one's self-evaluation of his/her experiences and cognition, is also important (Beck, 2004). As such, the Beck Cognitive Insight Scale (BCIS; Beck, 2004) was developed to evaluate one's self-reflectiveness and self-certainty in their interpretations of their experiences.

The cognitive and clinical aspects of insight have been shown to positively correlate with each other (Riggs et al., 2012), although they are conceptualized as being distinct aspects of meta-cognition (David et al., 2012). Schizophrenia is associated with impairments in both clinical and cognitive insight (Riggs et al., 2012). For instance, 50–80% of patients with schizophrenia have been shown to be partially or totally lacking clinical insight (Lincoln et al., 2007). Cognitive insight, however, has not been as extensively investigated in these patients. In a study reported by Bora et al. (2007a), patients in the acute phase of schizophrenia demonstrated poor cognitive insight, however, only self-reflectiveness and not self-certainty appeared to improve following treatment. Diminished clinical and cognitive insight has been associated with poor neurocognition, social functioning, and treatment adherence (Favrod et al., 2008; Quee et al., 2011; Nair et al., 2014). Furthermore, while most studies show that clinical insight and clinical symptoms are closely correlated (Zhou et al., 2015), studies examining the relationship between cognitive insight and clinical symptoms have given inconsistent results (see review by Riggs et al. (2012)).

Research on the relationship between insight and social cognition, in particular ToM, in schizophrenia has largely yielded inconclusive findings. Pousa et al. (2008b) explored the relationship between clinical insight and ToM by conducting multivariate linear regression analyses. While clinical insight did not significantly correlate with ToM, it contributed significantly to a model including other variables (together accounting for 48% of the variance in ToM), suggesting an indirect interaction between insight and ToM, mediated by psychosocial, clinical, and neurocognitive variables (Pousa et al., 2008b). A more recent study with out-patients revealed a significant correlation between clinical insight and ToM, as measured by the Hinting Task, a false-belief task, and the Faux Pas Recognition Test (Konstantakopoulos et al., 2014). In another study conducted by Quee et al. (2011), patients with both recent-onset and chronic psychotic disorders were recruited. Results indicated that both ToM and clinical symptoms were significant predictors of clinical insight in chronic patients, but not in recent-onset patients. Finally, in another study which instead focused on cognitive insight and ToM, results revealed that the two constructs were not correlated, although performances on different ToM tasks correlated with each other (Lysaker et al., 2011).

Several factors might account for the above mixed findings.

These include factors such as illness duration, severity of symptoms, and the tasks used to assess ToM (Harrington et al., 2005). Severity of symptoms may even be the greatest confounding factor in the relationship between insight and ToM, because the relationship between specific symptoms, insight, and ToM is extremely complicated (Lincoln et al., 2007; Pousa et al., 2008a; Riggs et al., 2012). Nevertheless, further research is required in this area and very few studies to date have assessed clinical insight and cognitive insight together when examining their relationships with ToM in schizophrenia patients.

To address the limitations and the inconclusive nature of past research findings, we investigated the relationships between clinical insight, cognitive insight, and ToM in a sample of patients with schizophrenia and healthy controls. It was hypothesised that clinical insight would correlate with performance on the ToM tasks, in that patients with high clinical insight would outperform those with low clinical insight. It was anticipated that this would especially be the case for the second-order ToM task, while ToM performance in general would be poorer in patients than in healthy controls. Furthermore, correlations between ToM, clinical insight and cognitive insight, and correlations between insight measures and symptoms would be calculated to provide further clarification on the relationship between ToM and clinical insight. Exploratory multiple regression analyses of the contribution of ToM to clinical insight would also be conducted.

2. Method

2.1. Participants

Fifty-six inpatients who met the diagnostic criteria for schizophrenia according to the ICD-10 (World Health Organisation, 1993) were recruited from two mental health sites. Patients' clinical symptoms were assessed with the Positive and Negative Syndrome Scale (PANSS; Kay et al., 1987) by qualified psychiatrists. Thirty healthy controls were also recruited from the community and the universities. Healthy controls were included in the study based on the absence of personal and family history of mental disorders. Exclusion criteria for all participants included: History of neurological illness, alcohol/drug dependence, or history of head injury. The study was reviewed and approved by the ethical committees of the Mental Health Centre of Shantou University, the Institute of Mental Health of Peking University, and the Institute of Psychology, Chinese Academy of Sciences. Informed written consent was obtained from all participants prior to the enrolment.

2.2. Measures

2.2.1. Intellectual assessment

The short form of the Chinese version of the Wechsler Adult Intelligence Scale – Revised (WAIS-R; Gong, 1992) with four subscales (Information, Arithmetic, Similarities, and Digit Span) was used to estimate participants' intellectual functioning.

2.2.2. Clinical symptoms and insight assessment

The PANSS (Kay et al., 1987) was used by psychiatrists to assess the clinical symptoms of the patients. Each item of the PANSS was rated from 1 (Absent) to 7 (Extreme) according to standardized instructions. In addition to the total score, three separate subscale scores for positive symptoms, negative symptoms, and general psychopathology were obtained. Moreover, item G12 (impaired insight and judgement) of the PANSS was used to estimate the severity of lack of clinical insight, with a higher score representing a more serious deficit in awareness of illness. Specifically, the rating of item G12 considers multiple dimensions, including the