



The relationship between insight and theory of mind in schizophrenia



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ABSTRACT

Introduction: It has been proposed that theory of mind (ToM) deficits underlying difficulties in taking the perspective of others may substantially contribute to insight impairment in schizophrenia. The present study aimed to explore the effect of ToM deficits on insight impairment independently of co-existent neurocognitive deficits and symptom severity in chronic schizophrenia.

Methods: Fifty-eight chronic patients with schizophrenia and 56 matched healthy participants were assessed with the Schedule for the Assessment of Insight (SAI-E) along with a series of ToM tasks and a comprehensive battery of neuropsychological measures. Symptoms were measured with the Positive and Negative Syndrome Scale and the Calgary Depression Scale for Schizophrenia.

Results: ToM impairment explained a substantial proportion of variance in overall insight and its three major components: awareness of illness, relabelling of symptoms and treatment compliance. Moreover, the effect of ToM deficits on insight remained significant even after controlling for all neurocognitive factors and symptom ratings. Regression analysis showed that symptoms and cognitive deficits also contribute to impaired insight in schizophrenia. General intellectual ability was negatively associated with both overall insight and relabelling of symptoms. Executive functions were negatively associated with relabelling.

Conclusion: Our findings confirm that ToM deficits negatively affect insight independently of neurocognitive deficits and symptom severity in chronic schizophrenia. The effect of ToM deficits on insight should be further examined in the broader context of the failures in metacognition and their relationships with insight impairment in schizophrenia.

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1. Introduction

Lack of insight is a core feature of schizophrenia that impacts negatively on medication adherence (Kemp and David, 1997; Dassa et al., 2010), treatment outcome (David et al., 1995; David, 2004), and social functioning (Lincoln et al., 2007; Erickson et al., 2011). According to current understanding, insight in psychosis is a continuous and multidimensional phenomenon involving the ability to recognize that one has a mental illness, the capacity to relabel unusual mental events as pathological, and compliance with treatment (David, 1990). While mechanisms underlying insight impairment are still unknown, it has been found to be associated with severity of symptoms (Mintz et al., 2003) and cognitive deficits, especially lower IQ and executive dysfunction (Morgan and David, 2004; Aleman et al., 2006). On the other hand, the positive associations of insight with depression (Mintz et al., 2003), suicidality (Crumlish et al., 2005) and internalized stigma (Lysaker

et al., 2007) suggest that denial of illness as a defensive style or coping strategy might contribute to poor insight (Moore et al., 1999; Donohoe et al., 2004; Cooke et al., 2007).

Insight entails the correct attitude toward morbid change in oneself and relies on the capacity to reflect upon self from the perspective of the other (i.e., "to see ourselves as others see us") (David, 1999). This capacity, in turn, is clearly linked to the ability to understand mental states (e.g., beliefs, knowledge, and intentions) of others, that is, Theory of Mind (ToM) or mentalizing (Premack and Woodruff, 1978). Thus, it has been recently proposed that ToM deficits underlying difficulties in taking the perspective of others may substantially contribute to insight impairment in schizophrenia (Carruthers, 2009; Langdon and Ward, 2009; Wiffen and David, 2009).

A growing body of evidence suggests that patients with schizophrenia show ToM impairment (Harrington et al., 2005; Sprong et al., 2007; Bora et al., 2009) which is relatively independent from overall cognitive dysfunction (Abdel-Hamid et al., 2009; Bozidak et al., 2011). Until now, research on the relationship between ToM and insight in schizophrenia has revealed mixed results, with some studies finding a positive association (Langdon et al., 2006; Bora et al., 2007; Langdon and Ward, 2009; Lysaker et al., 2011; Wiffen et al., 2013), and others finding no

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association (Drake and Lewis, 2003; Stewart et al., 2010) or no straightforward relationship (Pousa et al., 2008a; Pijnenborg et al., 2013). Many factors could account for these contradictory results, such as the sample size, the use of control group, the tasks used for the assessment of ToM (Harrington et al., 2005), and uncontrolled differences in cognitive factors that can affect both ToM performance (Shur et al., 2008; Couture et al., 2011) and insight. Symptomatology might be another confounding factor of the relationship between ToM and insight, since specific symptoms might be related to poorer ToM performance (Pousa et al., 2008b; Kern et al., 2009) and poorer or better insight (Mintz et al., 2003). Finally, the differences between the samples of previous studies in diagnosis and phase of illness might be a major reason for the contradictory findings, since multiple clinical and cognitive factors might affect differentially insight into psychosis across phases of the illness (Tranulis et al., 2008; Quee et al., 2011).

Against the above background, we sought to explore the relationship between ToM and insight – overall and its major components – in schizophrenia focusing on chronic patients and including several clinical and cognitive factors in our investigation. We conceptualized ToM as a broad set of modular reasoning skills, one of which might support self-awareness or insight. We therefore hypothesized that there would be a significant effect of ToM deficits on insight impairment independently of co-existent neurocognitive deficits and symptom severity.

2. Methods

2.1. Participants

Fifty-eight patients (34 male and 24 female) were recruited from the outpatient services of the Byron–Kessariani Community Mental Health Centre based on the following criteria: (a) diagnosis of schizophrenia according to the DSM-IV-TR criteria (American Psychiatric Association, 2000) by an experienced clinical psychiatrist, (b) duration of illness of at least 3 years, and (c) clinical stability during the past 6 months. Fifty-six healthy participants (30 male and 26 female) were recruited from the local community. The two groups were matched for gender, age and educational level. Inclusion criteria for the control subjects were no personal history of psychiatric disorder or family history of psychosis. Exclusion criteria for all participants included: mental retardation, personal or family history of any neurological disorder, history of head injury, alcohol or substance abuse in the preceding 6 months. All the patients were taking an antipsychotic medication at the time of assessment: 48 (82.8%) were on atypical and 18 (31.0%) on typical antipsychotics. In addition, 15 (25.9%) were on an anticholinergic agent, 16 (27.9%) on an antidepressant (twelve on SSRI and four on SNRI) and 12 (20.7%) on a benzodiazepine.

2.2. Assessments

2.2.1. Clinical assessments

Diagnosis of schizophrenia in patients and the absence of mental disorders in the control group were confirmed using the Structural Clinical Interview for DSM-IV Axis I Disorders (First et al., 1997). Additional information for patients was obtained from their medical records and treating physicians. Antipsychotic medication dosage was converted into chlorpromazine equivalents (Woods, 2003; Bazire, 2005). Symptoms of schizophrenia were rated using the positive and negative subscales of the Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987). Depressive symptoms were separately assessed with the Calgary Depression Scale for Schizophrenia (CDSS) (Addington et al., 1992). Handedness was assessed by the Annett Handedness Questionnaire (Annett, 1970).

The Schedule for the Assessment of Insight – Expanded version (SAI-E) (Kemp and David, 1997) was used to assess patient's insight into illness. This is an 11-item semi-structured interview providing a general measure of insight along with three subscales for the major

dimensions of insight: (a) awareness of illness, (b) relabelling of symptoms, and (c) treatment adherence. The Greek version of the scale has proven validity and reliability in patients with schizophrenia (Konstantakopoulos et al., 2013).

2.2.2. Cognitive evaluation

A comprehensive neuropsychological battery was administered to all participants. The Vocabulary subscale of the Wechsler Adult Intelligence Scale (WAIS) (Wechsler, 1955) was used to estimate general intelligence (Groth-Marant, 1999). The cognitive domains that were assessed included:

- *attention and processing speed*, which were assessed with the first part of the Stroop word and color naming test (Stroop-word) (Stroop, 1935) and the Trail Making Test part A (Trails A) (Reitan and Wolfson, 1985),
- *working memory*, which was examined with the Digit Span backward test from WAIS,
- *visuospatial abilities*, which were assessed with the Block Design subscale from WAIS and the copy trial of the Rey–Osterrieth Complex Figure Test (RCFT) (Rey, 1941; Osterrieth, 1944),
- *verbal memory*, which was examined with the Babcock story recall test (Babcock, 1930),
- *visual memory*, which was assessed with the immediate and the delayed recall trials of the RCFT, and
- *executive functions*, which were assessed with the interference score of the Stroop test (Stroop-interference), the Phonemic and Semantic fluency from the Verbal Fluency Test (VFT) (Benton and Hamsher, 1978), the number of categories completed and number of perseverative errors in the Wisconsin Card Sorting Test 64-version (WCST) (Kongs et al., 2000), and the Trail Making Test part B (Trails B).

2.2.3. ToM assessment

ToM was assessed with a series of verbal tasks that estimate different aspects of the mentalizing capacity (Harrington et al., 2005) and have been found to discriminate between schizophrenia and non-schizophrenia samples in previous studies [e.g. (Corcoran et al., 1995; Frith and Corcoran, 1996; Shur et al., 2008; de Achaval et al., 2010)].

- The *False belief task* (Frith and Corcoran, 1996) consists of two stories that require appreciation of a character's false belief regarding the situation to predict his/her action. The number of correct predictions was estimated.
- The *Hinting task* (Corcoran et al., 1995) consists of short passages in which one of the characters is dropping an obvious hint to another. The subject was then asked what the character really meant when he/she said this. For each correct response two points were given. If the subjects failed to give the correct response, an even more obvious hint was added to the story and one point was given for each correct response. Four of the original 10 passages were used in the present study, as in the study by Janssen et al. (2003).
- The *Faux Pas Recognition Test* (Faux Pas) (Stone et al., 1998) consists of 20 stories, half of which contain a social Faux Pas (one of the characters says something that it would be better not to say). The number of correct detections of Faux Pas plus the number of correct rejections (i.e., detection of non-Faux Pas stories) was estimated.

2.2.4. Procedures

All participants had been informed about the research procedures and given written informed consent as approved by the local Ethics Committee. All clinical assessments were performed by the same physician rater (D.P.) with the exception of SAI-E which was independently administered by another clinician (G.K.). The neuropsychological battery was administered to each participant within one week after the clinical assessment.

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