



## Social cognition and quality of life in schizophrenia

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### ABSTRACT

Schizophrenia is associated with poor quality of life (QOL). Whereas the effects of neurocognitive deficits and psychopathology on QOL of schizophrenia patients have recently been elucidated, little is known about social cognitive deficits in this regard. This study investigated the influence of social cognition on QOL in schizophrenia. A sample of 1032 patients, 1011 of their siblings, and 552 healthy controls was recruited from the Dutch Genetic Risk and Outcome in Psychosis (GROUP) study. Participants completed a battery of cognitive tests, including social cognitive tests on theory of mind and emotion perception. To assess QOL the World Health Organization QOL Assessment-BREF (WHOQOL-BREF) was used. Schizophrenia symptoms were assessed with the Positive and Negative Syndrome Scale (PANSS). Social cognitive performance was significantly worse in patients compared to siblings and healthy controls. Patients had the poorest QOL, while QOL in healthy controls was better than in siblings. Theory of mind but not emotion perception or neurocognition was associated with QOL in patients, whereas neurocognition was the only significant predictor of QOL in siblings and healthy controls. There was a significant interaction between theory of mind and symptom severity with respect to QOL. Our study indicates that social cognition is associated with QOL in schizophrenia. Theory of mind rather than emotion perception is associated with QOL, and this association is moderated by schizophrenia symptoms. In particular, patients with relatively unimpaired theory of mind and more severe schizophrenia symptoms have poor QOL and could therefore benefit from therapeutic intervention.

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### 1. Introduction

Quality of life (QOL) in schizophrenia patients is impaired compared with that in the general population (Ruggeri et al., 2005). Clinical factors, including schizophrenia symptoms and neurocognitive functioning, and socio-demographic variables have been suggested to contribute to the poor life satisfaction of patients with this disorder (Pinikahana et al., 2002; Eack and Newhill, 2007; Fiszdon et al., 2007).

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However, the associations between neurocognition and QOL are fairly modest and some studies indicate that the association is non-significant when illness severity is taken into account. (Heslegrave et al., 1997; Hofer et al., 2005; Wegener et al., 2005; Matsui et al., 2008). Furthermore, the predictive role of socio-demographic variables appears to be minor (Ruggeri et al., 2005).

QOL and functional outcome in patients with schizophrenia are related (Brekke et al., 2001). The latter scores community functioning, whereas QOL measures subjective life satisfaction (Brekke et al., 2001). Evidence suggests that functional outcome in schizophrenia is more strongly related to social cognition than to neurocognition (McGurk et al., 2007; Pijnenborg et al., 2009; Fett et al., 2011). This raises the possibility that social cognition may be a factor influencing QOL in schizophrenia. To the best of our knowledge, this issue has not been studied so far. Therefore, the aim of the current study was to examine the relation of QOL and social cognition using a large group of schizophrenia patients.

Social cognition is a multidimensional construct (Couture et al., 2006). Theory of mind and emotion perception are important domains of social cognition based on the recent Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) recommendations (Green et al., 2005). Theory of mind is

the ability to infer the intentions and beliefs of others, sometimes also referred to as social intelligence (Baron-Cohen et al., 2001). Emotion perception is the ability to infer emotional information from facial expressions (Couture et al., 2006). In this study, we focused on these two core domains of social cognition because they are impaired in schizophrenia and have previously been suggested to play a role in predicting outcome (Couture et al., 2006; Fett et al., 2011). Theory of mind is probably the most important domain in this regard, as it is more strongly associated with community functioning ( $r=0.48$ ), compared to other social cognitive domains including emotion perception ( $r=0.22$ ) (Fett et al., 2011).

Although neurocognition and social cognition are separable domains (van Hooren et al., 2008), it has been argued that social cognitive impairment in schizophrenia is non-specific and that any association with outcome may be due to confounding by neurocognitive impairment (Kerr and Neale, 1993; Dickinson et al., 2008; Fiszdon and Johannesen, 2010). Estimates of variance in social cognition accounted for by neurocognition range from 34 to 83% (Vauth et al., 2004; Sergi et al., 2007). Importantly, most studies on the association of neurocognition and outcome do not report standardized measures of schizophrenia symptoms, thus neglecting the possibility that schizophrenia symptoms could moderate the relationship between cognition and outcome (Bora et al., 2009; Ventura et al., 2009; Rassovsky et al., 2011). Therefore, we included neurocognition and psychopathology in our analyses. In addition, we investigated the influence of social cognition and neurocognition on QOL of siblings of schizophrenia patients and of healthy controls to compare the effects of these factors on QOL between patients, their relatives and healthy individuals.

We hypothesized that social cognition of schizophrenia patients would predict their QOL. We expected that 1) the nature of the association would be positive, i.e., patients with a relatively unimpaired social cognition have a better QOL, and 2) theory of mind would more strongly predict QOL than emotion perception. To investigate an illness-related association, we explored a possible interaction between schizophrenia symptoms and social cognition in relation to QOL in patients.

## 2. Method

### 2.1. Procedure and sample

The data derives from baseline measures of the ongoing longitudinal multicenter study 'Genetic Risk and Outcome in Psychosis' (GROUP). The procedure of recruitment, informed consent, approval by the accredited Medical Ethics Review Committee (METC) and population characteristics have been described in a previous report on the GROUP study (N. Korver, P.J. Quee, H.B.M. Boos, C.J.P. Simons, GROUP, unpublished data, 2010). The full GROUP sample consisted of 1120 patients with a non-affective psychotic disorder, 1057 of their siblings, 919 of their parents and 590 unrelated healthy controls from the general population. In the present study, we only included siblings of schizophrenia patients, because unlike the parents, they were raised under the same environmental conditions. Also, only the participants for whom an IQ score was available were included, because our aim was to include neurocognition in the analyses.

Our inclusion criteria for patients, siblings and healthy controls were: (1) age between 16 and 60; (2) good command of the Dutch language and (3) ability and willingness to give informed consent. Patients had to meet the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (APA, 2000) criteria for a non-affective psychotic disorder, as assessed by the Comprehensive Assessment of Symptoms and History Interview (Andreasen et al., 1992). An additional inclusion criterion for the sibling group was the absence of a lifetime psychotic disorder. For the control group additional inclusion

criteria were not having (1) a lifetime psychotic disorder and/or (2) a first degree family member with a lifetime psychotic disorder.

### 2.2. Measures

All the measures used in the GROUP project, were selected on the basis of established reliability and validity, as well as on their feasibility for use in large multisite studies.

#### 2.2.1. Measure of Quality of life

**2.2.1.1. World Health Organization Quality Of Life Assessment-BREF (WHOQOL-BREF).** This instrument is a 26-item self-report questionnaire assessing QOL (WHOQOL Group, 1998). It includes four domain scores (physical, psychological, social and environmental) and two individually scored items measuring a subject's overall perception of his QOL and satisfaction with his health. All items are rated on a five-point Likert scale. For all measures, higher scores reflect better QOL.

#### 2.2.2. Measure of emotion perception

**2.2.2.1. Degraded facial affect recognition task.** The facial affect recognition task (van 't Wout et al., 2004) uses photographs of four different actors (two males, two females) depicting four emotions: angry, happy, fearful and neutral. The task comprises 64 trials consisting of 16 face presentations in each emotion category. The emotions were shown with 75% intensity in order to increase the difficulty of the task. Subjects were asked to indicate the emotional expression of each face with a button press and to respond as accurately as possible. Outcomes were the proportion of faces correctly recognized as neutral, happy, fearful and angry emotions.

#### 2.2.3. Measure of theory of mind

**2.2.3.1. Hinting task.** Theory of mind was assessed with the hinting task (Corcoran et al., 1995; Janssen et al., 2003; Versmissen et al., 2008). The task tests the ability of subjects to infer the real intentions behind indirect speech utterances. It comprises ten short passages presenting an interaction between two characters that end with one of the characters dropping a hint. The subject is then asked what the character really meant. Correctly identified hints are scored with two points. In case of an incorrect response a more obvious hint is added. A subsequent correct response is scored with one point; an incorrect response is scored as zero. The outcome range is 0–20.

#### 2.2.4. Measures of neurocognition

**2.2.4.1. Benton facial recognition test.** The short form of the Benton facial recognition test (Benton et al., 1983), a measure of the ability to match unfamiliar faces, was used to assess whether deficits in facial affect recognition are not mediated by differences in general facial recognition ability.

**2.2.4.2. Wechsler Adult Intelligence Scale (WAIS III).** The Arithmetic (working memory), Digit Symbol-Coding (processing speed), Block Design (reasoning and problem solving) and Information subtests (verbal comprehension) of the WAIS III were administered as an indicator of IQ (Wechsler, 1997; Blyler et al., 2000). We are aware that neurocognition in schizophrenia is often represented in terms of separable dimensions of cognitive deficits. Hence, the grouping of neurocognition as a single construct (IQ) is somewhat artificial. We did so in the current study to reduce the complexity of the models, minimize the number of parameters, and maximize the robustness of the findings.

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