Schizophrenia Research 172 (2016) 131–136

Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

Emotional Intelligence deficits in schizophrenia: The impact of non-social cognition

Beatrice Frajo-Apor *, Silvia Pardeller, Georg Kemmler, Anna-Sophia Welte, Alex Hofer

Medical University Innsbruck, Department of Psychiatry, Psychotherapy and Psychosomatics, Anichstraße 35, 6020 Innsbruck, Austria

ARTICLE INFO

Article history:
Received 22 September 2015
Received in revised form 1 February 2016
Accepted 15 February 2016

Keywords:
Emotional Intelligence
Schizophrenia
MSCEIT
Non-social cognition
Mediation analysis

ABSTRACT

Background: Previous studies using the Mayer–Salovey–Caruso Emotional Intelligence Test (MSCEIT) revealed significant performance deficits across all areas of Emotional Intelligence (EI) in schizophrenia patients compared to healthy controls. However, none of these studies has investigated a potential influence of non-social cognition on these findings.
Methods: 56 schizophrenia outpatients and 84 control subjects were investigated using the MSCEIT and the Brief Assessment of Cognition in Schizophrenia (BACS). Analyses of covariance were performed with adjustment for the BACS composite score and education. To investigate this issue in more detail, a mediation analysis was conducted.
Results: Patients showed significantly lower EI and non-social cognition levels compared to healthy controls. After adjustment for BACS composite score and education, only the group difference in the "managing emotions" branch and thus in the "strategic" EI part of the MSCEIT remained statistically significant, whereas for all other MSCEIT branches (perceiving, using, understanding emotions) statistical significance was lost. The mediation analysis revealed that the difference between schizophrenia patients and controls regarding the MSCEIT total score was almost fully attributable to the mediating effect of non-social cognition.
Conclusions: Our findings suggest that in schizophrenia patients EI is largely influenced by non-social cognitive functioning. Only the "managing emotions" branch was found to be independent of non-social cognition. Consequently, non-social cognitive performance was mainly responsible for the observed differences in EI between schizophrenia patients and controls. This has to be taken into account when interpreting MSCEIT data in this population.

1. Introduction

Social and non-social cognitive deficits are core features of schizophrenia and exert a major influence on a patient's psychosocial functioning and well-being (Addington et al., 2006; Schaefer et al., 2013). Non-social cognition includes mental abilities like attention or memory, whereas the term 'social cognition' comprises cognitive processes underlying the processing of social stimuli and includes the following areas: theory of mind, attributional bias, social perception, and emotion processing, i.e. perceiving and using emotions (Barrett and Salovey, 2002; Green et al., 2008).

While the bulk of research has focused on emotion perception, the present study concentrates on the concept of "Emotional Intelligence" (EI) as introduced by Salovey and Mayer, who define EI as "the subset of social intelligence that involves the ability to monitor ones' own and others feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and actions" (Salovey and Mayer, 1990). From the perspective of this "ability model", EI is understood as a combination of emotion-specific abilities: perceiving, using, understanding, and managing emotions.

The Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) is an established instrument to measure EI-performance (Mayer et al., 2003) and has been used in schizophrenia studies before (Dawson et al., 2012; Eack et al., 2010; Fanning et al., 2012; Green et al., 2011a; Horan et al., 2011; Kee et al., 2009). Overall, previous studies have revealed significant performance deficits in all MSCEIT branches in schizophrenia patients compared to healthy controls. Importantly, these deficits have been shown to persist across phases of illness (Green et al., 2011b) and to be stable over time (Horan et al., 2011).

While it has been demonstrated that social and non-social cognition are related but distinct constructs (Ventura et al., 2013), the associations between ability-based EI and non-social cognition in schizophrenia have not yet been sufficiently investigated. Fanning et al. reported on a small to moderate association between the neurocognitive composite score of the MATRICS Consensus Cognitive Battery (MCCB) (Green and Nuechterlein, 2004) and different social cognitive measures including the "managing emotions" branch of the MSCEIT (Fanning et al., 2012).

* Corresponding author.
E-mail addresses: beatrice.frajo-apor@i-med.ac.at (B. Frajo-Apor), silvia.pardeller@tirol-kliniken.at (S. Pardeller), georg.kemmler@tiroler-kliniken.at (G. Kemmler), anna.welte@i-med.ac.at (A.-S. Welte), a.hofer@i-med.ac.at (A. Hofer).

http://dx.doi.org/10.1016/j.schres.2016.02.027
0920-9964/

In contrast, Dawson et al. found a positive correlation between the understanding emotions branch of the MSCEIT and the Brief Assessment of Cognition in Schizophrenia (BACS) (Keefe et al., 2004) composite score (Dawson et al., 2012), whereas in Eack et al.'s study all MSCEIT branches correlated with non-social cognition in moderate effect sizes (Eack et al., 2010). Interestingly, none of these studies investigated whether the observed difference in EI between schizophrenia patients and healthy controls may be fully or partly attributable to group differences in non-social cognition (in other words, whether non-social cognition may act as a mediator between diagnostic group and EI). Accordingly, the present study was conducted to bridge this gap.

2. Methods

All procedures contributing to this work complied with the standards of the local Ethics Committee and were conducted according to GCP standards on human experimentation and the Helsinki Declaration of 1975, as revised in 2008. All participants signed informed consent forms. Study procedures were performed by a trained research team.

2.1. Participants

The study sample consisted of patients suffering from paranoid schizophrenia from a specialized outpatient unit of the Department for Psychiatry, Psychotherapy and Psychosomatics of the Medical University Innsbruck and of healthy control subjects from the community. A brief medical screening interview was used to exclude subjects with any physical or neurological illness or any condition affecting neural or cerebrovascular function. In patients, diagnosis was confirmed by means of the *Mini Mental Neuropsychiatric Interview* (*M.I.N.I.*) (Sheehan et al., 1998). They had to be clinically stable without hospitalization for at least 6 months and had to be on stable medication for at least three months. Psychopathology was assessed by means of the Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987). Exclusion criteria included any other axis I disorder as well as axis II disorders as assessed by the *Structured Clinical Interview for Axis-II-Disorders* according to DSM-IV (*SCID II*) (Wittchen et al., 1996).

Comparison subjects had to be unremarkable in the M.I.N.I. and the SCID II. They were excluded, if they had a family history of schizophrenia, other psychotic disorders, or bipolar disorder among first-degree relatives.

2.2. Emotional Intelligence

To assess EI, the German pencil-and-paper version (Steinmayr et al., 2011) of the Mayer-Salovey-Caruso-Emotional-Intelligence Test (MSCEIT) (Mayer et al., 2002a, 2002b) was used. This instrument consists of 141 items and provides eight task scores that measure the four branches of EI: perceiving, using, understanding, and managing emotions. Whereas the "perceiving emotions" part measures the ability to recognize emotions accurately in faces and pictures, the "using emotions" part is about using emotions to enhance cognitive processes. The "understanding emotions" part tests the knowledge how emotions interact with each other and change over time and the "managing emotions" part measures the ability to deal with and regulate emotions. The test contains different kinds of tasks: for example, subjects have to indicate to which degree specific emotions are expressed in a photograph of a human face, or they are asked to evaluate the usefulness of certain emotions in specific situations. The MSCEIT also contains vignettes with descriptions of different emotional states in combination with "solutions" to cope with these emotions. In succession, subjects have to indicate how effective each solution is (effectiveness ranges from "1" very ineffective, to "5" very effective). These branches cover all aspects of EI and can be assigned to the areas of emotional experiencing (="experiential EI"; perceiving + using emotions) and emotional reasoning (= "strategic EI"; understanding + managing emotions). Similar to other intelligence tests, the average score is 100 with a standard deviation of 15.

The test is both content and structurally valid (overall reliability r = 0.93) besides showing discriminate validity from measures of analytic intelligence and many personality constructs (Brackett and Salovey, 2006).

2.3. Non-social cognition

Non-social cognition was measured with the Brief Assessment of Cognition in Schizophrenia (BACS) (Keefe et al., 2004). This battery covers a broad range of neurocognitive functions (verbal memory, working memory, motor speed, attention, executive functioning, and verbal fluency) and requires less than 35 min to complete. The composite score can be calculated by standardizing the average of those 6 measures by dividing that average by the standard deviation of the average in the normative sample.

2.4. Statistical methods

Statistical analysis was performed by means of the statistical package SPSS, version 22.

The Shapiro–Wilk test was employed to investigate metric variables, in particular subscales of the MSCEIT and the BACS, for deviations from normality. Group comparisons (schizophrenia versus control) with respect to socio-demographic and clinical variables were performed by means of the t-test, Mann–Whitney U-test and Fisher's exact test, depending on the variable type (normally distributed, non-normally distributed metric, and dichotomous variables, respectively). The Mann–Whitney U-test was also employed for group comparisons with regard to EI and non-social cognition, as the majority of the subscales of the MSCEIT and the BACS showed significant deviation from a normal distribution. In order to assess if differences in EI between schizophrenia patients and controls are fully or partly accounted for by differences in

Table 1
Socio-demographic and clinical variables.

Variable		Schizophrenia patients (N = 56)	Healthy controls (N = 84)	Statistics	p-Value
Age, mean ± SD	Years	45.3 ± 10.2	44.8 ± 9.3	**Z = 0.29**	0.770[a]
Sex (%)	Male	60.3	48.2	**p = 0.175**	0.175[b]
	Female	39.7	51.8		
Education, mean ± SD	Years	12.7 ± 3.1	14.7 ± 3.3	**Z = 3.69**	<0.001[a]
Duration of illness, mean ± SD	Years	15.5 ± 10.6	–		
PSP, mean ± SD		**60.9 ± 13.6**			
PANSS, mean ± SD	Positive symptoms	12.4 ± 5.1	–		
	Negative symptoms	14.8 ± 5.0	–		
	General symptoms	26.8 ± 6.6	–		
	Total score	53.9 ± 13.0	–		

Abbreviations: PANSS = Positive and Negative Syndrome Scale; PSP = Personal and Social Performance Scale; Z = Z-value; p = p-value.
[a] Mann–Whitney U-test.
[b] Fisher's exact test.