Neuro-cognition and social cognition elements of social functioning and social quality of life

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A B S T R A C T

Previous studies have shown that deficits in social cognition mediate the association between neuro-cognition and functional outcome. Based on these findings, the current study presents an examination of the mediating role of social cognition and includes two different outcomes: social functioning assessed by objective observer and social quality of life assessed by subjective self-report. Instruments measuring different aspects of social cognition, cognitive ability, social functioning and social quality of life were administered to 131 participants who had a diagnosis of a serious mental illness. Results showed that emotion recognition and attributional bias were significant mediators such that cognitive assessment was positively related to both, which in turn, were negatively related to SQoL. While one interpretation of the data suggests that deficits in emotion recognition may serve as a possible defense mechanism, future studies should re-assess this idea.

1. Introduction

Research has shown that persons with serious mental illness (SMI) experience a decreased social quality of life (SQoL) and social functioning compared to people without SMI (e.g. Ulas et al., 2008). This lower SQoL and functioning are attributed to deficits in social cognition that includes attribution errors, theory of mind (TOM), and emotion recognition abilities (Brüne et al., 2011; Penn et al., 2008). These deficits impede their ability to accurately identify the emotions of others, leading them to make faulty attributions regarding other people's behaviors as well as faulty inferences about others' thinking and intentions (Augoustinos et al., 2006; Penn et al., 2008). In addition, deficits in their neuro-cognitive abilities to plan and perform goal-based activities (e.g. verbal and visual memory as well as executive functions) are also thought to account for the low SQoL and social functioning (e.g. Schmidt et al., 2011; Sergi et al., 2007; Green et al., 2000).

Empirical studies as well as research in neuro-imaging suggests that neuro-cognition and social cognition are related yet distinct in their contribution to outcome (Allen et al., 2007; Brunet-Gouet and Decety, 2006; Pinkham et al., 2008). In addition, social cognition has been found to mediate the association between neuro-cognition and functional outcomes (Bell et al., 2009; and reviews of Couture et al. (2006) and Schmidt et al. (2011)). According to this mediation, cognitive

ability increases social cognition which in turn increases functional outcomes (Schmidt et al., 2011).

Notably, the abovementioned studies measured general functional outcomes such as GAF (e.g. Schmidt et al., 2011) or more specific ones such as vocational performance (e.g. Bell et al., 2009), which reflects relatively objective measures of functioning. To gain a more complete understanding of the complex patterns between neuro-cognition, social cognition and outcome, however, it is necessary to study also subjective outcomes which are considered distinct yet related and complementary to the often assessed objective ones (Silverstein and Bellack, 2008; Roe et al., 2011). Thus, while social functioning refers to the social skills one has in order to perform a variety of social roles (Priebe, 2007), SQoL refers to the level of satisfaction one has with regard to his or her social network and activity and is considered an important domain of the overall quality of life construct (Connell et al., 2014). Thus, SQoL presents a subjective appraisal of ones' social activity and status based on positive aspects such as feeling belongings, fitting in with society and negative aspects such as being in a relationship where constantly criticized and stigmatization (Connell et al., 2014). Studies on SQoL among persons with SMI revealed lower SQoL than people without SMI and that this lower SQoL is related to aspects of metacognition and social cognition (Hasson-Ohayon et al., 2014; Ofir-Eyal et al., 2014). In addition to the significant illness burden (Nordstroem et al., 2017), it

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was suggested that deficits in understanding oneself and the other in an interpersonal context results in lower satisfaction with one's social life (Hasson-Ohayon et al., 2011; Ofir-Eyal et al., 2014). Of note, previous studies have rarely compared subjective and objective measures of social life domains, despite possibly serving complementary aspects.

While past research supports the associations between specific aspects of social cognition (mostly emotion recognition and theory of mind; e.g. Bell et al., 2009) and neuro-cognition, the purpose of the current study was to test whether social cognition – i.e., emotion recognition, theory of mind, and attributional bias – mediate the association between neuro-cognition and social functioning, and between neuro-cognition and SQoL. We hypothesized that social cognition abilities would mediate the associations between neuro-cognition and two outcomes: social functioning and SQoL.

2. Method

2.1. Study design and procedure

The current study was part of a larger intervention study that assessed the effectiveness of Social Cognition and Interaction Training (SCIT) versus therapeutic alliance-focused therapy in psychiatric community settings in Israel (Clinicaltrail.gov ID NCT02380885). The data presented in this paper were collected before the intervention took place, between 2014 and 2016. Approval for the study was obtained from the ethics committee of the Department of Psychology at Bar-Ilan University, as well as from two psychiatric hospital committees. After receiving a detailed explanation of the study, all research participants provided their written informed consent. Data were collected by an experienced mental health practitioner who was trained to administer the study measures.

2.2. Participants

The current study included 131 participants whose ages ranged from 20 to 69 years ($M = 39.3$, $SD = 10.7$). These individuals had a case-record diagnosis of SMI and a psychiatric disability of at least 40% (determined by a medical committee, made up in part by a psychiatrist), and met the criteria for National Insurance Institute of Israel (NII) disability benefits (a roughly comparable process to attaining the designation of SMI in the U.S.). However, previous research showed that 86% of 16,000 people in Israel who had a psychiatric disability of at least 40% had a diagnosis of a psychotic-related disorder (Struch et al., 2011); it is therefore likely that most of the participants in our study sample had a psychotic disorder. In addition, the majority were men (60%), 65% had never been married, and most of them had completed at least a high school level of education (80%). Their mean duration of illness was 14.2 years (SD = 9.1), and their mean number of previous hospitalizations was 2.1 ($SD = 2.8$). Inclusion criteria were participants' fluency in Hebrew and their provision of informed consent. The inclusion of a sample of persons with a serious mental illness but different diagnoses is in accord with SAMHSA definition of SMI as presenting a category of disorders with low GAF score, and based on the idea that diverse diagnosis share similar social deficits (Iyer et al., 2005; Kessler et al., 2003) and therefore interventions aim at improving these deficits are provided across different diagnoses groups (Chan et al., 2010; Hasson-Ohayon et al., 2014; Lahera et al., 2013; Penn et al., 2005). Of note, SMI is regarded as including schizophrenia, bipolar disorder, severe forms of depression, and obsessive– compulsive disorder with predomination of schizophrenia spectrum disorders (Iyer et al., 2005).

2.3. Measurements

2.3.1. The Facial Emotion Identification Task

The facial emotion identification task (FEIT: Kerr and Neale, 1993)

is a widely used measure of emotion perception and is indexed by the number of correctly identified emotions out of a total of nineteen pictured faces. Emotions include happiness, anger, sadness, fear, surprise, and shame. The FEIT has demonstrated good reliability in studies on schizophrenia (Kerr and Neale, 1993; Mueser et al., 1996; Penn et al., 2000). In the current study we examined reliability by Test-Retest reliability among a sub-sample of twenty-five of the respondents participated in the reliability test. The correlation between the two measurements was 0.76.

2.3.2. The Faux Pas Recognition Test

The Hebrew-language version (Shamay-Tsoory et al., 2005) of the *Faux Pas Recognition Test* (Stone et al., 1998) was used in this study to assess theory of mind (TOM). This measure consists of 10 stories in which a faux pas has occurred and 10 stories in which no faux pas has occurred (control stories). A faux pas is considered to have occurred when the speaker says something without taking into account that the listener might not want to hear this story or might be hurt by it. After each story, the participants are asked seven questions regarding their recognition of the occurrence of a faux pas (e.g., their understanding of the mental state of the speaker and listener, or their understanding of the emotional state of the listener). This task assesses emotional and cognitive attributions, and the score for each story ranges between 0 and 7 (task range: 0–70). Cronbach's alpha in our previous study was high (0.91 in Hasson-Ohayon et al., 2014), and in the current study it was found to be satisfactory at 0.71.

2.3.3. The Ambiguous Intentions Hostility Questionnaire

The Hebrew-language version (Hasson-Ohayon et al., 2014), of the *Ambiguous Intentions Hostility Questionnaire* (AIHQ; Combs et al., 2007), was administered to participants. The AIHQ is a measure of attributional style for situations with negative outcomes and ambiguous causality. Participants are asked to read each of five vignettes, to imagine that the scenario is happening to her or him (e.g., "You walk past a group of teenagers at a mall and you hear them start to laugh"), and to write down the reason why the other person (or persons) acted the way he/she/they did toward the participant. Two independent raters subsequently code this written response on a 5-point Likert scale for the purpose of computing a "hostility bias." The participant then rates the degree to which he or she thinks the other person (or persons) performed the action on purpose, how angry this action would make the participant feel, and how much the participant would blame the other person (or persons). Finally, the participant is asked to write down how she or he would respond to the situation, a response which is later coded by two independent raters in order to compute an "aggression index." *For this study, we chose one variable to present attributional biases (to avoid too many analyses) and therefore we focused on the primary outcome of the hostility bias for ambiguous situations (ranged 5–25, with a higher number indicating a greater hostility bias)* as it reflects a bias in perception of the other (and not a possible behavioral response). The AIHQ has been shown to have very good levels of reliability and inter-rater agreement (ICC = 0.80+) and to be correlated with other measures of paranoia and hostility (Combs et al., 2007, 2009). Our previous study showed high inter-rater reliability (ICC = 0.85) of the Hebrew version used with SMI (Hasson-Ohayon et al., 2014). Cronbach's alpha in the current study was 0.71.

2.3.4. The Montreal Cognitive Assessment

The Hebrew-language version (Lifshitz et al., 2012) of the Montreal Cognitive Assessment (MoCA, Nasreddine et al., 2005) was used as a screening test for global cognitive function. This tool assesses memory, visuospatial ability, executive function, attention, concentration, working memory, and orientation. Administering this measure takes approximately 15 min and has a maximum score of 31, with lower scores representing poorer performance. It has been previously used with persons who have schizophrenia and has been shown to be