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Letter to the Editor

Metacognition in youth at-risk for psychosis

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Dear Editors,

Metacognition is commonly described as thinking about thinking and is the ability to evaluate and control our cognitive processes. Deficits in metacognitions have been widely reported in schizophrenia, and have been associated with the persistence of symptoms, poorer cognition, low insight, and poorer functioning both in schizophrenia and first-episode psychosis (FEP) patients (Arnon-Ribenfeld et al., 2017; Lysaker et al., 2019; Massé and Lecomte, 2014). Fewer studies have investigated metacognition in individuals at clinical high-risk (CHR) for psychosis. CHR individuals have significantly poorer metacognition compared to healthy controls (Cotter et al., 2017) and for CHR individuals poor metacognitive functioning is associated with poor neurocognition (Shakeel et al., 2019), greater symptom severity (Morrison et al., 2006), poor social functioning (Bright et al., 2018), elevated levels of perceived stress (Morrison et al., 2006), and increased risk of transition to psychosis (Barbato et al., 2014).

A range of methods have been used to assess metacognitions, however, a more ecologically valid approach was introduced by Lysaker et al. (2005) which involves analyzing an individual's spontaneous speech samples to determine metacognitive content. The Metacognitive Assessment Scale-Abbreviated (MAS-A) assesses metacognition through personal narratives of self and illness in which the participants reflect on their own lives. From this narrative, four aspects of metacognition are derived, comprehension of one's own mental states, comprehension of others' mental states, the extent to which an individual can form a complex sense of their relationship to others, and the ability to utilize knowledge of mental states to cope with psychological challenges and distress.

Our aim was to determine the correlates of metacognition in a CHR sample using, for the first time, the MAS-A. We hypothesized that metacognition would be negatively associated with symptom severity, and positively with cognition and functioning. We also explored the possible association of gender, trauma, and stress with metacognition.

The sample consisted of 40 CHR participants who met CHR criteria based on the Structured Interview for Psychosis-Risk Syndromes (SIPS) (McGlashan et al., 2010). All participants signed consent and parental consent was obtained from parents/guardians of participants under 18. The University of Calgary Conjoint Health Research Ethics Board approved the study.

Metacognitions were assessed with the Metacognitive Assessment Scale (MAS-A) which contains four scales: self-reflectivity (comprehension of one's own mental states), understanding others (comprehension of other individuals' mental states), decentration (ability to see the world as existing with others having independent motives), and mastery (ability to utilize knowledge of mental states to intentionally manage conflicts and subjective distress). Measures included social and role functioning, cognition (speed of processing, verbal learning, working memory) and social cognition (theory of mind, facial affect recognition and social perception). Assessment of personal and environment stressors included an assessment of trauma before age 16, bullying, perceived discrimination, life events and daily stress. Details of measures are presented in Supplementary Material 1.

The sample consisted of 21 females and 19 males, with a mean age of 17 and mean years of education of 11 years. Eighty-percent were Caucasian and 78% lived at home. Females had significantly higher ratings on the MAS-A (Supplementary Tables 1 and 2). High ratings on the MAS-A were associated with more severe attenuated psychotic symptoms ($r = 0.34$, $p = 0.03$), high scores on the RAD and verbal fluency, a high number of life events, increased stress due to these life events, increased levels of daily stress and increased perceived discrimination (Table 1). Negative symptoms and social and role functioning were unrelated to metacognitions. Individuals who had experienced psychological bullying had higher ratings on the MAS-A. MAS-A scores were unrelated to past trauma, see Supplementary Table 3.

Our results showed that metacognition was associated with increased severity of attenuated psychotic symptoms in CHR, suggesting that some aspects of heightened metacognition (e.g., increased self-focused attention, threat monitoring) may contribute to attenuated psychotic symptom formation (Morrison et al., 2006). The limited associations with cognition and social cognition may be due to the fact that cognitive deficits such as those seen in schizophrenia are rarely observed in those at CHR (Addington et al., 2019) and that the RAD focuses on the ability to understand the complexities of interpersonal relationships which is part of the MAS-A (Lysaker et al., 2019, 2014).

The most consistent associations in this study were between metacognition and multiple measures of stress, perceived discrimination, and psychological bullying. Participants with low levels of metacognition may be less capable of perceiving stress, bullying and discrimination. This is analogous to the unskilled and unaware effect observed elsewhere (Kruger and Dunning, 1999) and suggests that individuals with decreased metacognitive ability may have a lower ability to report on phenomena that depends on adequate metacognition. That is, this relationship may be driven by the underreporting of stress, discrimination, and bullying by CHR individuals with lower levels of metacognition.

Although schizophrenia studies show that metacognition positively influences social and work functioning, only one CHR study examined functioning and reported that negative beliefs about uncontrollability and danger, was negatively associated with time spent in structured

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Table 1
Correlates of Metacognitive Assessment Scale.

Variable	MAS total	Self-reflectivity	Understanding others	Decentration	Mastery
Social cognition					
RAD	0.29*	0.41**	0.35*	0.17	0.22
TASIT	0.22	0.27	0.31	0.13	−0.04
Facial affect recognition	−0.28	−0.22	−0.14	−0.40*	−0.23
Facial affect discrimination	0.28	0.20	0.30	0.21	0.19
Cognition					
Trails A	−0.22	−0.16	−0.04	−0.13	−0.35*
BACS	0.26	0.26	0.26	0.16	0.15
HVLT	0.18	0.15	0.24	0.17	0.24
Verbal Fluency	0.32*	0.19	0.38*	0.22	0.24
LNS	0.09	0.18	0.09	−0.03	−0.03
Stress					
Total life events	0.54**	0.53**	0.53**	0.26	0.31
Stress due to life events	0.56**	0.53**	0.47**	0.32	0.40*
Number of daily life events	0.30	0.32	0.32	0.40*	0.41*
Daily stress total	0.55**	0.45**	0.41*	0.42*	0.48*
Perceived discrimination	0.44*	0.31	0.28	0.30	0.50**

RAD = Relationships Across Domains, TASIT = The Awareness of Social Inferences Test, BACS=Brief Assessment of Cognition in Schizophrenia, HVLT = Hopkins Verbal Learning Test, LNS = letter number span.
* $p < 0.05$.
** $p < 0.01$.

activity (Bright et al., 2018). Here, the assessment of activity may be tapping a different function than our functional measures. However, further CHR studies are required before definite conclusions can be drawn (Cotter et al., 2017).

Limitations include: first, the data is cross-sectional, and it is unknown whether metacognition as assessed by the MAS-A relates to longer term outcome such as transition to psychosis. Secondly, we did not have a healthy control group. To partially compensate for this, in Supplementary Table 4 we present a comparison of our results with studies using comparable healthy participants (Hasson-Ohayon et al., 2015; Trauelsen et al., 2016) and FEP patients (Massé and Lecomte, 2014). Our CHR participants generally performed better than FEP but not as well as healthy controls.

In summary, this study demonstrates that using the MAS-A, metacognition is significantly associated with, stress, perceived discrimination, and psychological bullying and with some aspects of cognition and social cognition. Metacognitive treatments may help with reducing distress among CHR owing to its effects on these diverse processes (Lysaker et al., 2019).

Contributors

J Addington and J Stowkowy were responsible for the design of the study and for supervision of all aspects of data collection. J Addington was responsible for the statistical analysis and writing the final version of the paper. All authors contributed to initial drafts of the paper and approved the final manuscript.

Declaration of Competing Interest

There are no conflicts of interest for any of the authors with respect to this study.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.schres.2019.07.005.

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