



## Metacognitive profiles in schizophrenia and bipolar disorder: Comparisons with healthy controls and correlations with negative symptoms



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### ARTICLE INFO

#### Keywords:

Schizophrenia  
Bipolar disorder  
Metacognition  
Social cognition  
Negative symptoms

### ABSTRACT

While deficits in metacognition, or the ability to notice and reflect upon mental states has been observed in schizophrenia and linked with poorer concurrent and future function, it is unknown whether these deficits are unique to schizophrenia. Accordingly, this study assessed metacognition using the Metacognitive Assessment Scale–Abbreviated (MAS-A) and the Metacognitions Questionnaire–30 (MCQ-30) among 26 adults with schizophrenia, 23 with bipolar disorder and 23 healthy controls. Symptom levels of the psychiatric groups were assessed with the Brief Psychiatric Rating Scale. ANCOVA controlling for age and education revealed that the schizophrenia group had lower scores on the MAS-A total and its subscales compared to the bipolar group and healthy controls. The bipolar disorder group also had lower MAS-A scores than the healthy control group. No group differences were found for the MCQ-30. Examination of symptom correlates revealed MAS-A scores were most commonly related to negative symptoms in both clinical groups. The total score and need for control subscale of MCQ-30 was related to total symptomatology and positive symptoms in patients with bipolar disorder. Correlations between the two measures of metacognition revealed that higher MAS-A scores were significantly related to lower scores on the Need to Control Thoughts MCQ-30 subscale.

### 1. Introduction

The ability to think about mental states has been referred to as metacognition for over 40 years (Flavell, 1979). As research on metacognition has expanded, the construct has come to encompass a spectrum of activities which range from noticing discrete thoughts, wishes and feelings, being aware of attentional biases and ultimately integrating these phenomena into a more complex sense of oneself and others which is needed to negotiate psychosocial challenges (Semerari et al., 2003; Lysaker et al., 2013). Recently, metacognitive deficits have been seen as playing an important role in outcome in schizophrenia. Metacognitive deficits have been observed in schizophrenia in all phases of the disorder (Lysaker et al., 2014; Vohs et al., 2014; Hasson-Ohayon et al., 2015; Masse and Lecomte, 2015; MacBeth et al., 2016;) and are linked to poorer outcomes. For example, deficits in the ability to form and use complex representations of self and others has been found to predict poorer levels of daily functioning (Snethen et al., 2014;

Bo et al., 2015), anhedonia in the absence of depression (Buck et al., 2014), lesser levels of subjective recovery (Kukla et al., 2014), prospective assessments of psychosocial functioning (Lysaker et al., 2010), intrinsic motivation (Luther et al., 2016), and negative symptoms (McLeod et al., 2014; Lysaker et al., 2015a). From another perspective (Wells, 2000), dysfunctional metacognitive beliefs have also been reported in schizophrenia. These include negative appraisals about the benefit of becoming involved in cognitive activities and heightened anticipation of the uncontrollability, and danger of thoughts (Sellers et al., 2016) and have been associated with positive symptoms (Baker and Morrison, 1998; Morrison et al., 2011), especially hallucinations (Varese et al., 2011; Hill et al., 2012; Austin et al., 2015).

While these studies regarding metacognition have offered promising insights into understanding the unique challenges of schizophrenia, less is known about how unique these deficits are to schizophrenia as opposed to being a general feature of serious mental illness. For example, it is unclear whether persons with schizophrenia have similar versus

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dissimilar problems with metacognition compared to other common kinds of disabling psychotic conditions such as bipolar disorder. Several studies have found that patients with bipolar disorder have deficits in the ability to think about the mental states of others (Wolf et al., 2010; Martino et al., 2011; Benito et al., 2013; Temmerman et al., 2015; Santos et al., 2017). Two recent meta-analyses have indeed found that compared to non-psychiatric controls, patients with bipolar disorder have deficits in the abilities to recognize both motive and affective states in others (Samamé et al., 2015) and that these deficits are not merely a function of mood state (Bora et al., 2016). Of note, one recent longitudinal study has suggested that patients with bipolar disorder recover their capacity for thinking about others as they move towards a euthymic mood state (Ioannidi et al., 2015).

While there may be metacognitive deficits in bipolar disorder, there is reason to hypothesize that these are less severe than in schizophrenia. Tas et al. (2014) have compared the metacognitive functions of patients with schizophrenia and bipolar disorder and found that patients with schizophrenia have more severe deficits in some forms of metacognition (i.e., self-reflectivity), but not others, and that the metacognitive deficits of both groups had a different pattern or correlation with neurocognitive function. The generalizability of this study was limited by the sample being composed of participants in a state of remission and the lack of a healthy control group needed to gauge the magnitude of deficits. A meta-analysis of studies looking at the related construct of social cognition found that overall patients with schizophrenia had more social cognitive deficits compared to patients with bipolar disorder, however there was significant overlap in terms of those deficits (Bora and Pantelis, 2016). Concerning metacognitive beliefs, studies have shown elevated levels of maladaptive metacognitive beliefs among patients with bipolar and unipolar depression which were associated with ruminations, and worry (Batmaz et al., 2014) as well as anxiety and depression (Sariso et al., 2014).

Understanding whether metacognitive deficits are present in bipolar disorder and differ in schizophrenia has several important implications. For one, if the metacognitive profiles of these disorders differ, then different treatment strategies may be called for; further, the confirmation of metacognitive deficits in bipolar disorder might point to the possibility of adapting clinical interventions which have shown promise for enhancing metacognitive capacity for patients with other conditions such as schizophrenia (Lysaker et al., 2015b) and personality disorders (Dimaggio et al., 2015; Vohs and Leonhardt, 2016; Buck et al., in press).

To explore this issue, the primary aim of this study was to test whether there were differences in the metacognitive capacity of three groups: patients with schizophrenia, patients with bipolar disorder and healthy controls. We included two measures, which tap different domains of metacognition: the Metacognition Assessment Scale-Abbreviated (MAS-A; Lysaker et al., 2005) which assesses the capacity to notice mental states, form integrated senses of self and others, to see the world as viewable from multiple perspectives and then to use that information in the face of psychosocial challenges, and the Metacognition Questionnaire (MCQ; Wells and Cartwright-Hatton, 2004) which assesses metacognitive beliefs, or beliefs related to worry, cognitive confidence and self-consciousness, and need for control. We included both these measures because each, as noted above, has been separately linked to outcome in schizophrenia. Further, each may differently affect outcome in either condition. Whereas more synthetic forms of metacognition may limit persons' abilities to understand what they want and why they react as they do in dealing with psychosocial challenges, metacognitive beliefs or difficulties attending to attentional biases may result in heightened confusion, hyperarousal and worry, degrading function according to a different route. We predicted that patients with schizophrenia would exhibit the poorest levels of metacognition on both measures compared to patients with bipolar disorder and healthy controls and that the metacognitive function of patients with bipolar disorder would be more impaired relative to that of healthy controls. We reasoned this would be the case, given parallel findings that both

psychosocial and social cognition deficits are greater in schizophrenia than in bipolar disorder and that social cognitive and psychosocial function of both groups is less than in persons with no psychiatric illness (Bora and Pantelis, 2016).

The secondary aims of our study were to examine the symptom correlates of both measures of metacognition. Recent theoretical and empirical work suggests that a lack of complex and integrated ideas about self and others may reduce the meaningfulness of daily experience resulting in reduced motivation and avolition (Buck et al., 2014). We predicted that lower levels of synthetic metacognitive function in the clinical groups would be related to negative symptoms. While negative symptoms in patients with bipolar disorder have not been nearly as widely studied as in schizophrenia, there is evidence that they represent a barrier to recovery for this group (Strauss et al., 2016). By contrast, we predicted that dysfunctional metacognitive beliefs in the clinical sample would be related to higher levels of positive symptoms, anxiety and depression (Wells and Cartwright-Hatton, 2004). We reasoned that rumination with themes of worry and threat might activate a vicious cycle in which negative cognitions and affects would reinforce one another, potentially sustaining delusional ideas and hallucinations.

Finally, we had the exploratory aim of examining whether the two measures of metacognition were associated with one another. Theoretically, while each taps a different part of the spectrum of metacognition, they might be expected to influence one another. For example, lower levels of synthetic metacognitive capacity might leave persons less able to notice and correct a maladaptive focus on worry, threat, or control. Alternatively, preoccupation with worry, threat or control may limit awareness of changes in mental states making it difficult to understand oneself and others in a complex nuanced manner.

## 2. Methods

### 2.1. Participants

Participants were 72 adults diagnosed with bipolar disorder ( $n = 23$ ), a schizophrenia spectrum disorder ( $n = 26$ ), and a group of healthy control participants ( $n = 23$ ). Both clinical samples were comprised of adults in a non-acute phase of illness and were recruited from two different outpatient psychiatric units and received medication and supportive counseling. The diagnosis was made according to the criteria of DSM-IV-TR (APA, 2000) by treating psychiatrists who had decades of experience in the treatment of psychotic patients. Further demographic information is included in Table 1. Exclusion criteria for the clinical samples were the presence of a disability or cognitive impairment, neurological disorders, drug addiction in the last month, hospitalizations or medication changes in the last month. The non-clinical sample were recruited through advertisements in local newspapers and underwent a short clinical consultation with a psychiatrist in order to exclude any major mental disorders, drug or alcohol addiction or neurological condition.

### 2.2. Instruments

#### 2.2.1. Indiana Psychiatric Illness Interview (IPII; Lysaker et al., 2002)

The IPII is a semi-structured interview that asks participants to describe their understanding of their mental illness and psychological challenges. The protocol for participants with vs. without mental illness differed somewhat from each other. First, all participants are asked to tell the story of their lives. Participants diagnosed with a mental illness were then asked whether they believed they have a mental illness, and about problems related to this, as well as how they felt about having a mental illness. The next set of questions concern how things may have changed since having a mental illness, such as cognitions, emotions, personality characteristics and psychosocial function. Next, participants with mental illness were asked about how they controlled their mental

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