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## Relationship between cognitive insight and attenuated delusional symptoms in individuals with at-risk mental state



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### ABSTRACT

Cognitive insight, defined as the ability to evaluate and correct one's own distorted beliefs and misinterpretations, is hypothesized to contribute to the development of psychotic symptoms. We investigated cognitive insight in individuals with at-risk mental state (ARMS), which is associated with a clinically high risk of psychosis. Sixty individuals with ARMS were compared with 200 healthy controls in terms of cognitive insight measured using the Beck Cognitive Insight Scale. We also investigated the relationship between cognitive insight and attenuated delusional symptoms. In addition, we examined differences in the cognitive insight of individuals with ARMS with or without near-threshold delusional symptoms and differences in the cognitive insight of individuals with ARMS with or without later transition to psychosis. The results showed that individuals with ARMS exhibited higher self-certainty than healthy controls, indicating impairments in cognitive insight in the former. More importantly, our results revealed that self-certainty was correlated with attenuated delusional symptoms and that individuals with ARMS who had near threshold delusional symptoms had higher self-certainty. These findings indicate that overconfidence in one's own beliefs or judgments might be related to the formation and maintenance of attenuated delusions in individuals with ARMS.

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### 1. Introduction

According to the cognitive model of psychosis (Garety et al., 2001), individuals with psychosis are impaired in considering alternative explanations for anomalous experiences. Such a deficit is thought to be associated with the development and maintenance of the positive symptoms of psychosis. Similarly, Beck et al. (2004) hypothesized that psychotic phenomena, especially delusions, are related to the impaired capacity of psychotic subjects to evaluate their own anomalous experiences. To explore this capacity, Beck et al. proposed the concept of cognitive insight, defined as a patient's capacity to evaluate his or her own anomalous experiences and atypical interpretations of events. In contrast to clinical insight (David, 1990; Amador et al., 1991), which typically refers to a person's awareness of illness, symptoms, treatment need, consequences of illness, and so forth, cognitive insight refers to metacognitive processes of reevaluation and the correction of

distorted beliefs and misinterpretations (Beck et al., 2004; Riggs et al., 2012). Cognitive insight can be measured with the Beck Cognitive Insight Scale (BCIS; Beck et al., 2004). The BCIS comprises a self-reflectiveness subscale, which includes items related to reflectiveness, objectivity regarding beliefs and interpretations, and openness to the possibility of having misinterpreted experiences, and a self-certainty subscale, which evaluates overconfidence in decision-making and resistance to correction. Overall cognitive insight is estimated by calculating the difference between the self-certainty and self-reflectiveness scores.

In accordance with the hypothesis of Beck et al. (2004), previous studies have demonstrated impaired cognitive insight in patients with schizophrenia, and some authors have shown an association between reduced cognitive insight and delusions in schizophrenia. For example, individuals with delusions tend to show higher self-certainty (Engh et al., 2007; Warman et al., 2007) and lower self-reflectiveness (Buchy et al., 2009; Engh et al., 2010) than those without delusions, and higher self-certainty appears to be positively correlated with delusional symptoms (Kimhy et al., 2013). These findings suggest that impaired cognitive insight could be associated with the formation of delusional symptoms and that

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this impairment would likely exist in the prodromal stage of schizophrenia.

In order to investigate this possibility, we thought it ideal to examine the putative prodromal state of psychosis known as an at-risk mental state (ARMS; Yung et al., 1998). ARMS can predict the subsequent transition to psychosis (e.g., Fusar-Poli et al., 2012), and many individuals with ARMS experience attenuated psychotic symptoms such as ideas of reference, suspiciousness, odd beliefs, and perceptual distortions. In addition, a previous study examining the clinical insight of those with ARMS reported that such individuals exhibited an impaired ability to appraise anomalous experiences as symptoms of illness (Lappin et al., 2007).

To date, only one study has examined cognitive insight in individuals with ARMS. Kimhy et al. (2013) reported that individuals with ARMS showed self-certainty and self-reflectiveness comparable to those of healthy controls and lower than those of patients with schizophrenia. They also examined the relationship between attenuated delusional symptoms and cognitive insight, but, contrary to expectations, they found that self-certainty and self-reflectiveness were not related to attenuated delusional symptoms in people with ARMS. However, they also reported that the self-certainty scores of people with ARMS were between those of patients with schizophrenia and healthy controls; that is, people with ARMS had higher, but not significantly higher, self-certainty scores compared with healthy controls. In addition, individuals with ARMS who had near-threshold persecutory ideation exhibited higher self-certainty scores compared with those with milder or no persecutory ideation, indicating that at least some symptomatic individuals with ARMS exhibit higher self-certainty. Therefore, the Kimhy et al. (2013) study was not sufficient to conclude that individuals with ARMS have impaired cognitive insight, and more research is required to clarify this issue.

In the present study, we investigated the following: (i) the degree of cognitive insight of individuals with ARMS compared with healthy controls, (ii) the relationship between attenuated delusional symptoms and cognitive insight, (iii) differences in cognitive insight between individuals with ARMS with and without near-threshold delusional symptoms, and (iv) differences in cognitive insight between individuals with ARMS with and without later transition to psychosis. We hypothesized that the self-certainty of individuals with ARMS would be higher than that of healthy controls and that attenuated delusional symptoms would be associated with self-certainty in individuals with ARMS. In

addition, we predicted that self-certainty scores would be higher in individuals with ARMS who had near-threshold delusional symptoms and those who had later transition to psychosis.

## 2. Methods

### 2.1. Participants

Participants were recruited from the Sendai At-Risk Mental State and First Episode (SAFE) specialized clinic (Mizuno et al., 2009). Subjects had to meet the following inclusion criteria: (i) were aged between 14 and 35 years, (ii) were seeking psychiatric help, and (iii) fulfilled the ultra-high-risk criteria as defined by the Japanese version of the Comprehensive Assessment of At-Risk Mental States (CAARMS-J; Miyakoshi et al., 2009). Individuals were assessed with the CAARMS-J by trained and experienced psychiatrists, and diagnoses were confirmed at consensus meetings with the clinical team. All included subjects met one or more of the following criteria for ARMS: (i) attenuated psychotic symptoms (APS), (ii) brief limited intermittent psychotic symptoms (BLIPS, a brief psychotic episode that resolves spontaneously within 1 week), or (iii) state and trait risk factors (a recent decline in functioning plus a first-degree relative with either psychosis or a schizotypal personality disorder).

The exclusion criteria were as follows: (i) a history of psychotic or manic episodes as specified in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (American Psychiatric Association, 2000); (ii) serious risk of suicide or violence due to a personality disorder; (iii) current substance dependence; (iv) known intellectual disability (IQ < 70); or (v) neurological disorder, head injury, or any other significant medical condition associated with psychiatric symptoms.

Sixty individuals (22 men and 38 women; mean [S.D.] age = 19.48 [4.17] years) met the required criteria and were included in the ARMS group for this study. The demographic characteristics of this group are shown in Table 1. Among the 60 individuals with ARMS, 35 were medication-free (58.3%), 12 (20.0%) were taking antipsychotic medications (risperidone, 4; olanzapine, 3; sulpiride, 2; and aripiprazole, 3), 12 (20.0%) were taking antidepressants, and 4 (6.7%) were taking mood stabilizers.

Two hundred university students (81 men and 119 women; mean [S.D.] age = 20.3 [1.9] years) were recruited at Tohoku University as healthy controls. All participants were asked as a part of the study questionnaire if they had ever been diagnosed with a psychiatric disorder; those who answered affirmatively were excluded from the control group.

All study participants provided written informed consent, and the research design was approved by the Ethics Committee of Tohoku University Graduate School of Medicine and Tohoku University Hospital. This study complied with the principles laid down in the Declaration of Helsinki for experiments involving humans.

### 2.2. Assessment of cognitive insight

The BCIS (Beck et al., 2004) is a self-report instrument consisting of 15 items, each rated on a 4-point scale from 0 (do not agree at all) to 3 (agree completely), resulting in two component scores, self-reflectiveness and self-certainty. A composite index representing cognitive insight is calculated by subtracting self-certainty from self-reflectiveness. The psychometric properties of the Japanese version of the BCIS (BCIS-J) were previously examined by Uchida et al. (2009). The reliability of the BCIS-J was confirmed using Cronbach's alpha coefficients and the test-retest method; convergent validity was confirmed through correlation analysis, which found significant correlations between this scale and 2 other measures of clinical insight, the Schedule for the Assessment of Insight and the Lack of Insight item from the Positive and Negative Syndrome Scale. The BCIS-J was administered within 1 week of assessment with the CAARMS-J.

### 2.3. Assessment of attenuated delusional symptoms

We used the CAARMS to assess attenuated delusional symptoms. The Japanese version of the CAARMS (CAARMS-J) was translated from the original CAARMS by Yung et al. (2005), and reliability and validity were confirmed by Miyakoshi et al. (2009). The CAARMS is a semi-structured interview designed to measure a wide variety of symptoms. It contains seven categories consisting of 28 items that measure attenuated positive symptoms (unusual thought content, non-bizarre ideas, perceptual abnormalities, and disorganized speech), negative symptoms, general psychopathologies, behavioral changes, and Huber's basic symptoms in individuals with ARMS. Each item is rated in terms of intensity (0–6) and frequency or duration (0–6) of the symptom or problem. To assess attenuated delusional symptoms as one entity, we combined the "unusual thought content" and "non-bizarre ideas" items of the CAARMS-J into one item, equivalent to the "disorder of thought content" item in the first edition of the CAARMS (Yung et al., 2005). Near-

**Table 1**

Demographic variables and scores on the Comprehensive Assessment of At-Risk Mental States (Japanese version, CAARMS-J) in participants with an at-risk mental state (ARMS;  $n=60$ ) and healthy controls ( $n=200$ ).

Characteristics	Mean (S.D.)		Statistics	P
	ARMS	Healthy controls		
Gender (number of males/females)	22/38	81/119	$\chi^2=0.28$	NS
Age (years)	19.48 (4.17)	20.34 (1.87)	$t=1.55$	NS
Education (years)	11.58 (2.25)			
GAF	47.63 (6.72)			
CAARMS-J				
Thought content	3.37 (1.25)			
Perceptual abnormalities	2.85 (1.44)			
Disorganized speech	1.67 (6.72)			

ARMS, At-risk mental state; GAF, the Global Assessment of Functioning; CAARMS-J, The Japanese version of the Comprehensive Assessment of At-Risk Mental States; S.D., standard deviation.

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