

# Metacognitive Abilities, Beliefs and Delusionality: A Three-group Comparison Along the Psychosis Spectrum

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## INTRODUCTION

### Delusion:

- Fixed beliefs that are not amenable to change in spite of presenting clear and reasonable conflicting evidence of the external reality
- Monothematic to polythematic themes: persecutory (64.5%), referential (39.7%), grandiose, control, etc.
- Core symptom in the schizophrenia spectrum and other psychotic disorders SSD : eg. 90% in schizophrenia, 100% in delusional disorders

### Delusional ideation in nonclinical populations

- Prevalent : 10%-15%, and 1%-3% of them resemble delusions
- Link to broader social and emotional difficulties that predispose individuals to psychotic disorders

### Metacognition : ‘thinking about thinking’

- Interconnected cognitive operations that allow individuals to create complex and integrated representations of the self and others
- Two distinctive models → 1) metacognitive beliefs 2) abilities

## METHOD AND ANALYSES

### Participants

SSD patients with delusions (n = 21)

Nonclinical: high delusional ideation = 738, Low delusional ideation = 886

### Measures

- The Community Assessment of Psychic Experiences (CAPE): Nonclinical groups were divided using the 25th percentile cutoff on CAPE’s sub-dimensions
- The Metacognitions Questionnaire-Short Form (MCQ-30)
- The Metacognitive Self-Assessment Scale (MSAS)

### Analyses

- A. When the assumptions of one-way ANOVA were violated, nonparametric Kruskal-Wallis test was used to compare each subscale of MCQ-30 and MSAS across three groups, followed by Dunn’s test for multiple comparisons.
- B. When significant baseline differences were identified, these variables were included as covariates using Quade’s test to determine whether the group differences remained significant after adjustment.

### Metacognitive beliefs

#### (Self-Regulatory Executive Function Model)

- Maladaptive beliefs induce maladaptive thinking patterns, which heightens the vulnerability to anxiety and psychosis
- 1) positive beliefs about worry (PB), 2) negative beliefs about the uncontrollability and danger of thoughts (UD), 3) cognitive confidence (CC), 4) need to control thoughts (NC), 5) cognitive self-consciousness (CS)

### Metacognitive abilities

#### (Metacognitive Multi-Function Model)

- Four independent sets of functional abilities for performing various thought operations.
- 1) Self-reflectiveness (SELF), 2) decentering-differentiation (DEC), 3) understanding others’ minds (UOM), 4) and mastery (MAST)

## RESEARCH GAP

- Inconsistent subscale findings on the association of metacognitive beliefs between SSD patients (with or without delusions) and non-patients
- A three-group comparison (SSD, ARMS group, and non-patients) found nuanced subscale differences between groups
- Possible associations of metacognition and delusionality

- Limited analysis on individual metacognitive subscales: only overall differences in metacognitive abilities between a) patients and non-patients and b) individuals with high and low PLEs are found
- The heterogeneous nature of PLEs highlights the need to narrow down to single psychotic symptomology
- Metacognitive abilities negatively correlated with delusional ideation, suggesting its protective role in preventing the development of delusions.

## HYPOTHESIS

H1. Graded group differences across all five metacognitive beliefs

SSD patients > high delusional ideation group > low delusional ideation group  
(HIGH) (LOW)

H2. Graded group differences on all five metacognitive abilities

SSD patients < high delusional ideation group < low delusional ideation group  
(HIGH) (LOW)

## RESULTS

H1: Significant overall group differences in all five subscales of MCQ-30

- In all five beliefs, HIGH scored significantly higher than LOW, while the scores between SSD patients and HIGH were not significantly different (SSD = HIGH > LOW)

H2: Significant overall group differences in SELF, DEC, and MAST.

- LOW scored significantly higher than HIGH only in SELF and MAST, while the scores between SSD patients and the HIGH were not significantly different (SSD = HIGH < LOW)

|           | SSD patients<br>(n = 21)<br>Median (IQR) | High delusional<br>ideation<br>(n = 738)<br>Median (IQR) | Low delusional<br>ideation<br>(n = 886)<br>Median (IQR) | Group comparisons                                                         |
|-----------|------------------------------------------|----------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------|
| MCQ-PB    | 12 (7.00)                                | 12.0 (5.00)                                              | 10.0 (5.00)                                             | $\chi^2(2) = 133$ p < .001 $\epsilon^2 = 0.0807$<br>[SSD = HIGH > LOW]    |
| MCQ-UD    | 12 (5.00)                                | 13.0 (6.00)                                              | 9.0 (5.00)                                              | $\chi^2(2) = 308$ p < .001 $\epsilon^2 = 0.187$<br>[SSD = HIGH > LOW]     |
| MCQ-CS    | 15 (4.00)                                | 14.0 (5.00)                                              | 12.0 (5.00)                                             | $\chi^2(2) = 122$ p < .001 $\epsilon^2 = 0.0742$<br>[SSD = HIGH > LOW]    |
| MCQ-NC    | 13 (6.00)                                | 12.0 (5.00)                                              | 9.0 (3.00)                                              | $\chi^2(2) = 221$ p < .001 $\epsilon^2 = 0.135$<br>[SSD = HIGH > LOW]     |
| MCQ-CC    | 14 (7.00)                                | 12.0 (6.00)                                              | 10.0 (5.00)                                             | $\chi^2(2) = 143$ p < .001 $\epsilon^2 = 0.0871$<br>[SSD = HIGH > LOW]    |
| MSAS-SELF | 17.0 (7.00)                              | 17.0 (5.00)                                              | 19.0 (6.00)                                             | $\chi^2(2) = 22.6$ p < .001 $\epsilon^2 = 0.0138$<br>[SSD = HIGH < LOW]   |
| MSAS-DEC  | 17.0 (5.00)                              | 19.0 (5.00)                                              | 19.0 (5.00)                                             | $\chi^2(2) = 7.36$ p = 0.025 $\epsilon^2 = 0.00448$<br>[SSD = HIGH = LOW] |
| MSAS-UOM  | 9.00 (2.00)                              | 10.0 (3.00)                                              | 10.0 (3.00)                                             | $\chi^2(2) = 2.18$ p = 0.336 $\epsilon^2 = 0.00133$                       |
| MSAS-MAST | 16.0 (5.00)                              | 17.0 (4.00)                                              | 18.0 (5.00)                                             | $\chi^2(2) = 16.7$ p < .001 $\epsilon^2 = 0.0102$<br>[SSD = HIGH < LOW]   |

## DISCUSSION

### Study strength

- First 3-group comparison dividing nonclinical individuals into two groups based on their delusional ideation level by CAPE
- First to adopt the four-factor structure to examine the association between each metacognitive ability and delusionality
- Results consistent after controlling covariates and sensitivity analyses

### Implications

- Confirms the significance of assessing both metacognitive beliefs and metacognitive abilities independently by each subscale
- Delusions could be the prominent psychotic symptom contributing to higher metacognitive beliefs along the psychosis spectrum
- Extended previous findings and provides new evidence on the association between specific metacognitive abilities and delusionality
- SELF and MAST possibly play a protective role preventing individuals from developing high delusional ideations among non-clinical individuals
- Future research on more nuanced comparisons with other psychotic symptoms on the strength of association of metacognitive beliefs
- Potential value of early metacognitive interventions, such as MCT and MERIT, for non-clinical individuals with high delusional ideation

### Limitations

- Imbalanced group size
- Arbitrary group extraction of the two nonclinical groups using cutoff and total scores on subdimensional items
- Self-report measure may overestimate prevalence of psychotic symptoms