

The double-strand bond between metacognition and schizophrenia: actual impact and future directions

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Abstract

Controlling, monitoring, and modulating cognitive processes is what is known as metacognition: it guides behavior through several types of mental activities that range in complexity from discrete activities, such as recognizing others' judgment, to more integrated ones, such as recognizing oneself and others' cognitive processes. There is an increasing body of research examining the impact of schizophrenia on metacognition, underlining their double-strand link, especially on a wide range of mental processes, including reasoning, autobiographical memory, cognitive beliefs, and clinical insight. Metacognition is intimately linked to the severity of symptoms as well as specific sympto-

matic sub-domains, such as positive symptoms, negative symptoms, or disorganization. Recently, cognitive-derived psychotherapies have been developed to treat metacognitive deficits in schizophrenia. While all these treatments share a metacognitive component, each one targets different aspects. In metacognitive therapy, false or unhelpful beliefs are treated; in metacognitive training, cognitive biases are the main focus; in cognitive-behavioral therapy for psychoses, the core is represented by schematic dysfunctional beliefs; in metacognitive reflection insight therapy, metacognitive knowledge and self-identity are addressed; and in metacognitive interpersonal therapy for psychosis, interpersonal ideas or events may trigger delusional thinking. Future directions should address the need for more refined knowledge of metacognition processes and the need for growing mental health professionals' expertise in the field. Moreover, the evaluation of metacognition-based intervention effectiveness in real-world populations and in high-risk psychosis and their enforceability in mental health facilities should become a critical issue.

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Introduction

Classically and simply defined as the ability to think about one's thinking, in its most comprehensive sense, metacognition can be described as a continuum of mental activities, ranging from discrete ones like awareness of others' judgment accuracy (introspective accuracy) to more integrated ones like understanding cognitive processes, biases, and modulating them.¹ Different theoretical metacognitive models and derived approaches for treating psychosis have been developed in the last few decades. The self-regulatory executive function model proposed by Wells and Matthews states that it is not the occurrence of mental events such as negative thoughts and emotions that trigger prolonged distress, but rather the perseverative thinking style known as cognitive attentional syndrome (CAS).²

It consists of strategies for managing stressful thoughts and emotions, such as worrying, ruminating, threat monitoring, thought control strategies, and maladaptive coping behaviors.³ Based on the model, the CAS plays a central role when negative thoughts and feelings cause psychological distress and worsen and extend negative affect. CAS activity, according to this model, is promoted by implicit metacognitive beliefs, both positive and negative in orientation. For example, worrying can help us be prepared, but there are also negative beliefs about how uncontrollable and dangerous thoughts and feelings can be; for example, "I cannot control my worrying once it begins". On the other hand, the integrative model of metacognition developed by Lysaker *et al.* can be viewed as an "umbrella concept" character-

ized by different elements: from discrete cognitive functions to complex and comprehensive cognitive functions, also encompassing neurocognitive functions and social cognition.⁴ In this way, metacognitive processes enable individuals to access a sense of self and others at any given time.⁴ However, metacognition exhibits at least 4 features that are not reducible to the integrated model.⁵ First of all, metacognition is not necessarily intentional but may include automatic processes. The second point is that metacognition is not an individual's mind process but an intersubjective one. Another feature of metacognitive processes is that they can be extended to other people or a larger community. As a final point, metacognition cannot be simply categorized as intact or compromised but can vary largely by physiological status as well as deficit levels.

Metacognition in schizophrenia

As a result of incremental attention to metacognition in the last few decades, many psychometric instruments have been developed to assess the ability of people with psychiatric diseases such as psychosis to combine different information into representations of themselves and others. This has also contributed to the recognition that metacognitive deficits are a key element of these disorders. The results of 2 recent meta-analyses indicated a clear and strong relationship between metacognition, neurocognition, and functional outcome,⁶ as well as a loss of global metacognition abilities in schizophrenia patients when compared to healthy controls.⁷ When compared to both healthy individuals and people suffering from severe medical conditions such as HIV,⁸ patients suffering from psychosis exhibit much weaker metacognitive abilities. Although a certain grade of metacognition impairment can be relieved by numerous psychiatric and psychological alterations, there is a greater prevalence and impact of metacognitive deficits in people with psychosis than in people with bipolar disorder, depression, anxiety disorders, post-traumatic stress disorder, substance abuse, and borderline personality disorder.⁹

As a result of these deficits, these patients are often unable to form a solid sense of their own emotions and beliefs, their own point of view, or to adequately respond to psychosocial stimuli. Metacognitive impairment seems to be a core feature of schizophrenia from the beginning of the disease in first-episode psychosis (FEP),¹⁰ but alterations were also found in individuals with a high risk of developing psychosis. Metacognition abilities, prefrontal cortex density, and striatum gray matter density were found to be significantly correlated in early-stage psychosis. Among individuals with a definite high psychosis risk, metacognitive skills show a significant correlation with cortical thickness, particularly in the inferior and middle frontal gyri, superior temporal cortex, and insula. In addition, more recent studies suggest that hippocampal integrity plays a much more important role in metacognition than frontal areas in FEP individuals. Metacognition deficits can also impact several symptom domains and psychosocial functioning and performance in people with schizophrenia, as underlined by a recent meta-analysis.¹¹ In a large number of studies conducted in different nations and clinical settings, it has been shown that impaired metacognitive capability is associated with more severe negative symptoms.⁹ Several studies found that worsening metacognition also predicted a subsequent worsening of negative symptoms,⁹ conferring on metacognition evaluation a potential role as an outcome predictive factor. In contrast, having and maintaining functional metacognition abilities strongly correlate with better work per-

formance, an increase in physical exercise and activity, and an improved response to working-based rehabilitation programs, as well as better adaptive social behaviors regardless of the individual's overall psychopathology or neuropsychological functioning, thus making metacognition a potential target for specific psychotherapeutic interventions.⁹

Measuring metacognition in schizophrenia

In light of what has already been discussed, it is crucial to accurately and reliably measure metacognition. Measuring metacognition in people with schizophrenia and other psychoses is crucial to expanding illness comprehension and developing research and specific treatment programs. However, schizophrenia's complexity, cognitive impairments, and lack of insight typically associated with psychotic diseases make this difficult. Schizophrenia can impact the ability to answer questions accurately and consistently because of its alterations in reality, perception, and thinking organization. Moreover, patients may have difficulty understanding the questions and/or recalling information accurately. As a consequence, responses may be inaccurate, and data validity may be affected. Currently, there are numerous assessment instruments for metacognition abilities that can be used in schizophrenia and related psychosis, recently reviewed by Martiadis *et al.*⁹ These instruments range from semi-structured interviews used to obtain life narratives (Indiana Psychiatric Illness Interview), which can be then analyzed with other instruments (Metacognition Assessment Scale, Metacognition Assessment Scale-Abbreviated), to semi-structured interviews measuring specific domains directly (Metacognition Assessment Interview, Metacognition Self-Assessment Scale), to self-administered scales that get more focused over time [Beck Cognitive Insight Scale, Metacognition Questionnaire (MCQ), MCQ-30, MCQ for Adolescents, MCQ for Children, MCQ-Child Version, MCQ-Child Revised]. Present psychometric instruments for metacognition in schizophrenia vary in theoretical base and examined domains, address different target populations and examination aims (basal assessment, follow-up, case study, intervention monitoring); in addition, they have different time expenditures and training requirements (semi-structured interviews *versus* self-administered scales), reliability, language availability, and recognized spread and utilization.

Metacognition-based psychotherapies for schizophrenia

It is common for therapists to take a metacognitive approach to psychotherapy, where they discuss with patients their emotional and cognitive states (*e.g.*, memories of previous negative experiences or coping strategies) and attempt to change unhelpful beliefs and thoughts. In the last decade, with the emergence of the so-called third wave of cognitive-behavioral therapy (CBT), several psychotherapeutic interventions, including metacognitive-based ones, have been developed, such as CBT for psychosis (CBT-P),¹² metacognitive therapy,¹³ metacognitive training (MCT),¹⁴ metacognitive reflection insight therapy (MERIT),¹⁵ and metacognitive interpersonal therapy for psychosis (MIT-P).¹⁶

CBT-P is the most established approach with the longest history. It amalgamates behavioral therapy elements with the so-called second or "cognitive wave" and increasingly incorporates elements originating from the "third wave" of CBT. By identify-

ing automatic abnormal thoughts (“I might be followed by someone watching me”) and re-evaluating them, the first CBT-P manuals aimed to change psychotic symptoms directly. Additionally, behavioral interventions aimed to develop new adaptive coping strategies and positive activities to cope with distressing symptoms. CBT interventions based on the third wave emphasize acceptance of symptoms, as in acceptance and commitment therapy, and use strategies like mindfulness, exposure to negative emotions, and imagination techniques such as compassionate mind training to address negative thoughts and emotions. The third-wave interventions are also designed to assist in the recovery process and achieving life goals. As compared to treatment as usual, most meta-analyses find that CBT-P is effective and found a small to medium-sized effect in favor of CBT-P for positive symptoms, general psychopathology, and social functioning.¹⁷ Additionally, CBT-P has been shown to be effective for patients who prefer not to take antipsychotics. However, its effects on patients at risk or at the prodromal stage have become more difficult to determine.

Metacognitive therapy was developed by Wells *et al.* and initially applied to anxiety and mood disorders.¹³ According to this approach, mental diseases are caused by the activation of the CAS “toxic” thinking style, which locks people into temporary emotional states (anxiety, sadness, anger, worry, *etc.*). Worry and rumination, threat monitoring, and dysfunctional coping behaviors are the main features of this cognitive style. As part of the model, dysfunctional metacognitive beliefs are assumed to maintain the CAS, such as “rumination helps me find solutions to my problems”. The model is transdiagnostic in nature; the CAS in psychosis is similar to that in other mental disorders. Metacognitive therapy increases cognitive flexibility, modifies metacognitive beliefs, and reduces CAS (*e.g.*, dysfunctional coping strategies). Experiential strategies (for example, practicing detached mindfulness, *i.e.*, letting go rather than trying to change or control an experience) and knowledge-based strategies (for example, challenging metacognitive beliefs) are the main approaches used in this therapy model.

Essentially, MCT is a group-based training program (even though an individual version has been developed).¹⁴ A combination of cognitive remediation, cognitive behavioral therapy for psychosis, and psychoeducation is employed to address cognitive biases that underlie delusions. These biases are assumed to be escalations of normal thinking styles, and individuals with psychosis, with less insight into these biases, tend to perpetuate them as well. Jumping to conclusions, attributional biases, and overconfidence in errors are among the primary thinking errors targeted. Several meta-analyses found that MCT is effective in reducing positive symptoms and delusions, is well tolerated by participants, and has positive effects sustained over time.¹⁸ Most studies demonstrated small to medium effect sizes in positive symptom reduction at the conclusion of the training and long-term effects. Effects on delusions have been confirmed by 2 meta-analyses. Moreover, MCT showed encouraging results *versus* psychoeducation in recent-onset psychosis individuals.¹⁸

At its core, MERIT contends that individuals with schizophrenia spectrum disorders lack the ability to construct a complex and integrated sense of themselves and others. Despite the severity of the illness, these deficits are predictive of concurrent and prospective functional capacities that can improve with psychotherapy. In contrast to symptom- or problem-focused approaches, MERIT therapy was conceptualized as recovery-oriented, with the following hypothesized therapeutic action taking place consecutively: i) promotion of greater metacognitive abilities; ii) access to a more integrated sense of self and others; iii)

better ability to develop a personally meaningful idea about what recovery means; iv) capacity to direct their own recovery. Since MERIT responds to each patient’s fluctuating metacognitive capacity, it can be used by all patients, regardless of severity or disorder stage. A recent randomized controlled trial found that MERIT can improve the ability to use reflective knowledge to cope with psychological challenges, improving or at least maintaining symptom levels.¹⁹ MERIT can also be delivered through telehealth platforms.

Two randomized-controlled trials have also reported positive outcomes and good patient acceptance rates without evidence of adverse effects.⁹

MIT-P is an adaptation of metacognitive interpersonal therapy (MIT), a distinct approach to personality treatment based on the assumption that maladaptive schemas and metacognitive deficits in personality disorders are a barrier to the challenges of social life.^{16,20} In accordance with the MIT manual, therapists are guided in engaging patients and encouraging metacognition growth. The MIT process begins with the formulation of a collaborative case, followed by the elicitation of detailed autobiographical episodes, the identification of affect and how it relates to thoughts and actions, as well as the formulation of hypotheses about the schemas and the planning of strategies to change them. After developing a shared formulation, MIT strives to help patients break free of maladaptive interpersonal schemas. Furthermore, MIT-P assumes that positive symptoms may hinder healthy metacognitive function and that inadequate metacognitive capacity may contribute to symptoms. Therefore, MIT-P has detailed techniques for treating symptoms as well. These include empathic responses to suffering caused by these symptoms, normalizing patients’ inner experiences, and promoting cognitive and behavioral mastery of suffering. The next step is to elicit narrative episodes in which the symptom occurs. Patients are also encouraged to understand the relationship between emotional distress and symptoms and how maladaptive interpersonal schemas may trigger them. Finally, patients are guided to use their expanded understanding of themselves and others to respond to symptoms. As an example, they may realize that assessing themselves as strong eliminates the persecutory views of others.²¹ MIT-P supporting evidence includes a series of case studies.²¹ These preliminary findings encourage future research into the feasibility, tolerability, and efficacy of this approach among people suffering from schizophrenia.

Conclusions

Schizophrenia is a severe psychiatric condition that massively influences the quality of life of those receiving this diagnosis, as well as that of their families and caregivers. People suffering from schizophrenia have lower work performance, lower motivation, and significant cognitive deficits, besides the core symptomatology of the disease. They also have poorer awareness of themselves and others, which is the main aspect of metacognition. Metacognition itself affects work performance, autobiographical memory, motivation, symptoms severity, and social cognition in schizophrenia. Metacognition is thus a double strand linked to mental health and interconnected with schizophrenia symptoms. Several metacognition-based psychotherapy approaches have been developed to address specific metacognitive deficits typically involved in some schizophrenia dimensions that influence outcome and recovery. Future studies with more participants are needed to form a more complex image of the metacognitive deficits in schizophrenia and the way they interact

with certain aspects of life. Future directions in research may include the development of more precise and refined psychometric tools to easily and reliably measure metacognition in schizophrenia patients, the development of effective, acceptable, and feasible psychotherapy programs specifically addressing metacognition issues, and new rigorous and controlled trials aiming to assess the efficacy of existing and future approaches.

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