

Metacognition, social cognition, and social functioning in schizophrenia: current evidence

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SUMMARY

Objective

The purpose of this narrative, non-systematic review was to examine the interconnections between metacognition, social cognition, and social functioning based on current evidence.

Methods

A literature search on PubMed was carried out (from 1997 through 2024) to find all narrative or systematic reviews and meta-analyses published in English.

Results

Eight out of 379 records met the inclusion criteria: three reports analyzed the relationship between metacognition and social functioning, three the relationship between social cognition and social functioning, two the interplay between metacognition, social cognition and social functioning in schizophrenia.

Discussion

Understanding the interplay between metacognition and social cognition is crucial for improving social functioning of patients affected by schizophrenia. Although a considerable amount of the literature focused on the relationship between social functioning and social cognition, there is a lack of secondary literature that explores the dynamics between social functioning, social cognition, and metacognition. Future research directions should continue to explore the complex interplay among these variables, with a focus on moving theoretical knowledge into practical, therapeutic applications that enhance the lives of individuals living with schizophrenia.

Key words: schizophrenia, metacognition, social cognition, social functioning, cognitive intervention(s)

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Introduction

Schizophrenia is one of the leading causes of disability worldwide, which accounts for 1.1% of the total DALYs (disability-adjusted life years) and 2.8% of YLDs (years lived with disability). Individuals with schizophrenia struggle to independently carry out everyday activities, to keep a job, and fulfill their social responsibilities^{1,2}. The disability resulting from schizophrenia is complex, going beyond the symptomatic presentations commonly associated with the disorder and includes a range of cognitive, emotional, and behavioral impairments that reduce patient's social functioning².

Social functioning is the individual's capacity to execute and fulfill roles and tasks in social settings, encompassing aspects such as engaging in relationships, participating in employment, pursuing education, and engaging in community activities. It involves a broad spectrum of skills and behaviors essential for effective interaction within the society, including communication, grasping social norms, establishing social connections, and maintaining personal relationships. Social functioning in schizophrenia is often profoundly compromised. Bleuler's original concept of

“autism”, which described the withdrawal from reality into fantasy, underscores the social disconnection inherent in the disorder³. Social functioning consists of 4 domains: community functioning, social behavior in the milieu, social problem solving, and social skills⁴⁻⁶. Impairments in social functioning in individuals with schizophrenia are not merely a consequence of symptoms’ severity but also result from a complex interplay of neurocognition, metacognition and social cognition⁷. In schizophrenia, neurocognitive impairments are often present before full blown psychosis, representing early signs of the illness⁸. There’s a clear correlation between the severity of neurocognitive deficits and the ability to perform occupational and social functions⁴. Research has also shown that neurocognitive impairments are strong predictors of poor vocational outcomes and lower levels of independent living⁹.

Metacognition refers to the cognitive processes that make individuals able to reflect upon, understand, and control their own cognitive activities. It involves self-awareness about one’s cognitive capabilities, monitoring the effectiveness of one’s cognitive strategies, and the ability to adjust those strategies when necessary. It’s the aspect of cognition that involves “thinking about thinking”, where one assesses the effectiveness of their own mental processes to guide learning or problem-solving actions¹⁰. In schizophrenia, the impairment of metacognitive functions results in a range of problems that have a negative impact on the person’s life. People with schizophrenia may struggle with self-reflection, resulting in a lack of insight into their own mental states and condition. Understanding the thoughts, intentions, and emotions of others becomes challenging, leading to social isolation. It’s difficult for individuals to recognize their actions as self-commenced. Identifying the causes of events can be challenging, which may result in paranoid thoughts or misunderstandings about others’ intentions. Decision-making processes are also affected, as metacognition is crucial for evaluating different problem-solving solutions. Lastly, maintaining a coherent personal narrative becomes challenging, impacting the development of a stable identity and often leading to a fragmented self-perception¹¹. In the context of psychosis, as recently described to Meyers¹² three primary metacognitive frameworks have emerged: introspective accuracy, metacognitive beliefs, and metacognitive capacity, ranging from discrete to integrative processes. At the lower end of this spectrum, discrete metacognitive capacity includes the ability to make accurate inferences about another’s perspective, involving lower-level neurocognitive skills like recognizing the information presented to an individual or interpreting the facial expressions of others. At the higher end of the metacognitive spectrum, integrate metacognitive capacity

enables people to create an integrated understanding of how individuals, including the self, make sense of the social world and act on this understanding with confidence and authority. This ability is dependent on higher-level cognitive processing, such as constructing a coherent narrative and deriving meaning from experiential learning¹³.

Introspective accuracy includes understanding one’s skills and biases. This domain is a discrete form of metacognition that measures one’s awareness about the accuracy of a specific judgment at a specific moment. Metacognitive beliefs include beliefs about one’s own thought processes, the value of worry, the need for thought control, and cognitive reliability. In the case of conflict, such beliefs might include whether worry and thought control are helpful in resolving the conflict. Metacognitive capacity involves integrating life’s cognitive and emotional experiences into a comprehensive view of self and others. This includes self-awareness and synthesizing diverse information into complex concepts. It also means applying this knowledge in psychosocial situations. In the argument scenario, it involves merging feelings and thoughts and applying knowledge about the friend to manage the conflict¹².

Social cognition is the mental operation involved in understanding, processing, and responding to social stimuli, including the recognition and interpretation of others’ emotions, intentions, beliefs, and behaviors. According to the 2006 National Institute of Mental Health workshop⁹ social cognition comprises five main domains: Theory of Mind (ToM) (the ability to attribute mental states to oneself and others), Emotional Processing (the ability to identify emotions in others), Social Knowledge (the capacity to solve interpersonal problems through verbal and non-verbal communication), Social Perception (the ability to identify, understand and employ social cues, roles and rules to make inferences about context), and Attribution Bias (the way through which everyone explains the causes of an event). Deficits in ToM are associated with impaired social functioning, as individuals may misinterpret social cues and intentions, leading to social withdrawal and isolation¹⁴. Impairments in emotional processing contribute to difficulties in forming and maintaining relationships, as the accurate interpretation of emotions is crucial for empathetic and effective communication¹⁵. Impairment in social knowledge can result in social clumsiness, isolation, and even stigmatization, as individuals may inadvertently violate social norms or exhibit behaviors considered inappropriate in their cultural context¹⁶. Deficits in social perception can lead to misjudgments in social situations so that individuals with schizophrenia may misunderstand a neutral

expression as hostile, leading to social mistrust and interpersonal difficulties¹⁷. Attributional biases¹⁸ (with individuals often attributing negative events to internal, stable, and global factors, while attributing positive events to external, unstable, and specific factors) can contribute to low self-esteem, hopelessness and difficulties in social interactions and may also impact on the individual's ability to learn from social experiences and adapt to changing social contexts.

Both metacognition and social cognition adopt similar skills and processes in interpreting, understanding, and responding to the social world. Moreover, both of them have an impact on an individual's social functioning. The reduced ability to think about your own mental states may affect the ability to understand the mental states of other people. Metacognitive deficits can worsen impairments in social cognition. Likewise, social cognitive difficulties can limit opportunities for social learning and feedback, which can affect metacognition. Interventions that address both metacognitive and social cognitive deficits may offer the most promise for improving social functioning in schizophrenia, given the bidirectional relationship between them⁹.

The purpose of this narrative review is to examine the interconnections between metacognition, social cognition, and social functioning based on current evidence. We explored the extensive literature focusing on metacognition, social cognition and their impact on social functioning in people with schizophrenia. The methodological approach was designed to capture and synthesize key findings from the available body of research in this area.

Methods

On December 22th, 2023, an electronic search on PubMed was carried out (from 1997 through 2024), using the following search terms:

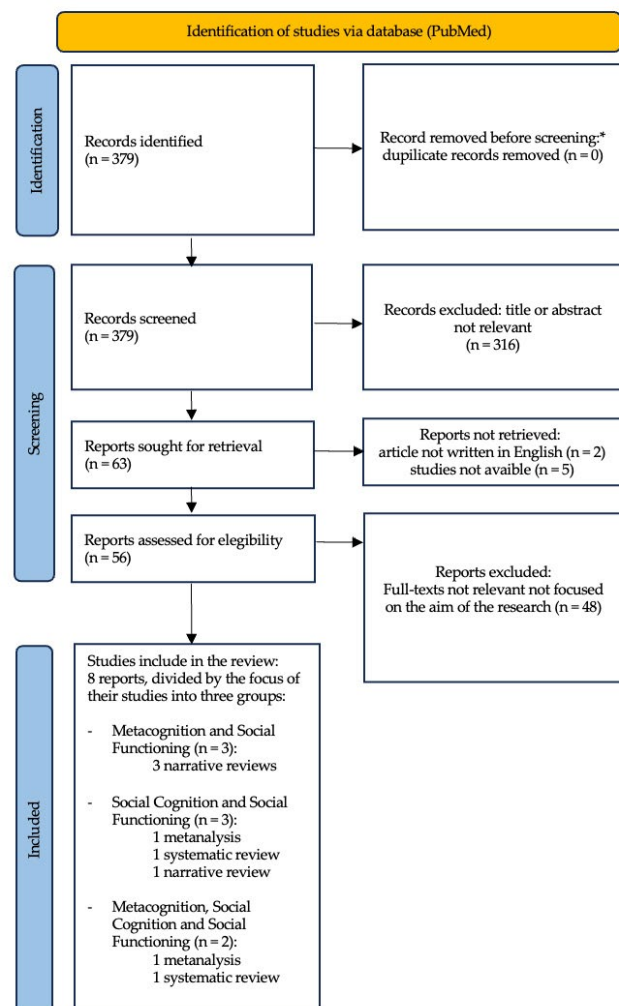
(metacognition AND schizophrenia) OR (metacognition AND "social functioning" AND schizophrenia) OR ("social cognition" AND schizophrenia) OR ("social cognition" AND "social functioning" AND schizophrenia) OR (metacognition AND "social cognition" AND "social functioning" AND schizophrenia)

Recognizing the vast volume of literature available, the search was refined by filtering the presence of the terms only in the titles or abstracts of publications. This approach was chosen to ensure a focused and relevant selection of articles for review. Furthermore, the search was limited to secondary literature, such as reviews (narrative or systematic reviews) and meta-analyses, to use the information and insights gathered from multiple primary studies. Only peer-reviewed articles were considered for this review and only results published in English were selected. This criterion was applied to

ensure that the review was based on widely accessible literature for the international academic and medical community.

The narrative, non-systematic, nature of this review was chosen due to the extensive scope of the topic and the intention to provide a broad, comprehensive overview rather than a focused meta-analysis or systematic review. This approach allowed for a more exploratory and interpretative examination of the literature, enabling the identification of trends, themes, and gaps in the current understanding of the intersection between metacognition, social cognition, and social functioning in schizophrenia.

The screening and selection process is summarized in Figure 1.



*No automation tools were used.

FIGURE 1. Flow-chart of the selection process of the reports included

Results

Three hundred sixty-nine records were obtained from the search on PubMed. Following the algorithm described above and reported in Figure 1, 8 records were finally selected. In detail, two metanalysis, two systematic reviews and four narrative reviews were included. Results are presented in three subsections, the first one describes the relationship between metacognition and social functioning, the second one the relationship between social cognition and social functioning, the third one the interplay between metacognition, social cognition and social functioning.

Metacognition and social functioning in schizophrenia

In this subsection we considered three narrative reviews.

A narrative review written by Lungu et al.¹⁹ examined 18 studies: all of them considered different subcomponents of metacognition and their specific interactions. However, the most studied was the interaction between metacognition and work performance. Comparative studies aim to make comparison between schizophrenia spectrum disorders and different psychiatric disorders, predominantly bipolar disorder.

Among the included studies, only one (Lysaker et al.²⁰) focused on the association between altered metacognition and social functioning in patients affected by schizophrenia ($n = 26$), as compared with individuals with bipolar disorder ($n = 23$) and people without psychiatric illnesses ($n = 23$). Clinical samples were comprised of middle-aged adults (mean = 46.54, SD = 8.96) in a non-acute phase of illness, receiving medication and supportive counselling and were recruited from two different outpatient psychiatric units. Metacognition was assessed by the Metacognitive Assessment Scale-Abbreviated (MAS-A) and the Metacognitions Questionnaire-30 (MCQ-30). Participants were also assessed using the Brief Psychiatric Rating Scale (BPRS) and Indiana Psychiatric Illness Interview (IPI), to get information about their personality and psychosocial function. Schizophrenia patients were found to have more severe deficits in two domains of metacognition. i.e., awareness of others and mastery, when compared to the other groups. Additionally, people with schizophrenia have notable difficulties with the memory related to self-awareness. Authors found significant association between two metacognitive domains (awareness of others and self-reflectivity) and withdrawal/retardation ($p < 0.01$), which is indirectly linked with aspects of thinking and lower social functioning.

Lysaker et al.²¹ focused on metacognition in schizophrenia and overlaps with related constructs, on treatment outcome and functioning and their potential mediators. As for the aim of our review, two studies must be consid-

ered. The first one²² tested, through structural equation modeling, if the influence of deficits in neurocognition upon social function is at least partially mediated by one aspect of metacognition, namely mastery. The sample comprised 102 middle age (mean = 46.5 years) adults diagnosed with schizophrenia (68) or schizoaffective disorder (34), in a stable phase of their illness, recruited from Veterans Affairs Medical Centers (69%) or Community Mental Health Centers (31%), mainly male (85%) patients. Specifically, the authors found significant associations between Mastery and Interpersonal Relation Factor of the Quality of Life Scale (QLS), a domain directly related to social function. Moreover, mastery was linked to both neurocognition (assessed using Wechsler adult intelligence scale, WAIS, Wechsler memory scale, WMS, Hopkins verbal learning test, HVL, Wisconsin card sorting test, WCST) and social function, but no significant path was found between neurocognition and Interpersonal Relation Factor. The second study²³ considered the same population of the previous one for a 5-months-follow-up. The authors found that metacognitive mastery influences concurrent social functioning and that levels of metacognitive mastery at baseline influences the metacognitive mastery 5 months later, which similarly affects social functioning 5 months later. Lysaker et al.²⁴ published a narrative review with two studies. The cross-sectional study of Gagen et al.²⁵ analyzed 334 adults diagnosed with schizophrenia (230) and schizoaffective disorder (104) recruited from Veterans' Affairs Medical Center in Indiana and community mental health centers in Indiana and New Jersey. The mean age was 43.54 years. The authors found that lower level of metacognitive functioning, assessed by Metacognition Assessment Scale-A (MAS-A), in particular lower levels of self-reflectivity and mastery subscales, are associated with lower scores of QLS interpersonal total score. Moreover, patients with more negative symptoms had lower levels of overall metacognition and greater impairment in domains of self-reflectivity and mastery than the group with good social functioning. Surprisingly, metacognitive capacity in patients with predominantly positive and hostility symptoms and poor social function, was not different when compared with metacognitive capacity in patients with good social function, suggesting that positive symptoms may represent an alternative path to social dysfunction, in which metacognitive deficits do not play a major contributory role. Arnon-Ribenfield et al.²⁶ published a metanalysis of 32 studies that examines the relationship between metacognitive abilities and various outcome measures in individuals with schizophrenia, schizoaffective disorder and first episode psychosis. Metacognition was assessed through MAS-A, social functioning by means of Capacity for emotional investment (TAT) and Global

assessment functioning (GAF). Findings revealed a negative small effect size for the association between metacognitive abilities and outcome measures in patients. Authors found significant association between metacognitive deficits and both symptomatic and psychosocial functioning measures (effect size = 0.94, 95% CI: 0.58 to 1.2).

Social cognition and social functioning in schizophrenia

In this subsection we considered one metanalysis, one systematic review and one narrative review.

Fett et al.²⁷ published a metanalysis of 52 studies on 2692 patients with a diagnosis of non-affective psychosis, aged 18-66 years, which found correlations between 9 neurocognitive domains (problem solving, processing speed, attention and vigilance, working memory, verbal learning, visual learning, verbal comprehension, verbal fluency, overall neurocognition), 3 social cognitive domains (theory of mind, emotion perception and processing, social perception and knowledge) and 4 domains of functional outcome (community functioning, social behavior in the milieu, social problem solving, social skills). In the included studies, a huge variety of tests were employed: globally, 53 different tests were used to assess neurocognitive ability, 27 different tests for social cognition and 32 different scales to assess social functioning (see table n°1 and n°3 of the metanalysis for a detailed list). Of our interest, a significant positive correlation emerged between ToM and community functioning (effect size = 0.48), emotional processing and community functioning (effect size = 0.31), emotional processing and social behavior in the milieu (effect size = 0.22), social perception and community functioning (effect size = 0.41), social perception and social skills (effect size = 0.24). No analysis could be performed on social problem solving and any SC domain due to a lack of data.

Couture et al.⁶ reviewed 5 studies²⁸⁻³² focused on the correlation between social cognition and social functioning. Sergi et al.²⁸, in 72 schizophrenia outpatients in a stable phase of illness. Patients were assessed with Profile of Nonverbal Sensitivity (PONS) and Role Functioning Scale (RFS). The authors didn't find a direct correlation between social perception and social functioning. Brekke et al.²⁹ recruited 100 individuals affected by schizophrenia or schizoaffective disorders in a stable phase of illness, referred from four community-based psychosocial rehabilitation programs in urban Los Angeles. They completed a 12-month follow-up with face-to-face interviews at baseline and at the end of follow-up, assessing neurocognitive functioning (through neuropsychological measures), social cognition, i.e., the emotional processing (Facial Emotion Identification Test (FEIT), the Voice Emotion Identification Test (VEIT), and the Videotape Affect Perception Test (VAPT), social

competence, social support, and functional outcome, i.e., items covering the domains of social, independent living, and work functioning assessed with the Role Functioning Scale (RFS). The authors found significant associations between direct effects of perception of emotion and RFS -Social subscale ($p < 0.05$) and indirect effects of perception of emotion and RFS - Social subscale ($p < 0.05$). Total effect of perception of emotion are also significantly associated with RFS - social. Hooker and Park³⁰ analyzed the association between emotional processing (assessed with Biehl Facial Affect Recognition, Nowicki and Duke Vocal Affect Recognition) and social behavior in milieu (assessed with Social Disfunction Index) in 20 schizophrenia inpatients from a local residential mental health care facility. Facial Emotional Processing significantly correlated with communication/social dysfunction ($p < 0.05$) but not independent living, family or other relationships, or community/recreational functioning. Kee et al.³¹ employed FEIT and VEIT to assess emotional processing and Social Contacts and Useful Employment (SCOS) and RFS to assess social functioning at baseline and after 12 months in 81 people affected by schizophrenia or schizoaffective disorder in a stable phase of illness. They didn't find direct association between social functioning and emotional processing. Schenkel et al.³² performed a comparison between ToM (assessed with Hinting Task) and social functioning (evaluated information gathered from interviews and reports from nursing, psychiatry, psychology, and social work staff) in 42 individuals with schizophrenia or schizoaffective disorder recruited from an inpatient psychiatric rehabilitation research unit at a state psychiatric hospital in Lincoln, Nebraska. They found that good level of ToM was significantly associated with good premorbid social functioning ($p < .0001$). Giuliani et al.³³ reported the main findings of the three studies conducted by the Italian Network for Research on Psychoses (NIRP) of people with schizophrenia³⁴⁻³⁶. In the first cross-sectional study³⁴, 921 patients, aged between 18 and 66 years, in stable phase of illness, 379 unaffected first-degree relatives of these patients and 780 healthy controls were recruited. Several instruments were used to assess illness related variables (including social cognition deficits), Personal Resources (Resilience, Service Engagement), and Context related variables (Social network, Job or housing opportunities, residential support, Disability compensation, Internalized stigma) (to consult the complete list see table n°3 of the article)³⁴. Network analysis confirmed neurocognition, social cognition, resilience, and real-life functioning as distinct constructs. TASIT-1, that assesses basic emotion recognition, emerged as the social cognition domain with the strongest association with functional capacity, suggesting that good ability to recognize emotions leads to

improved interpersonal skills necessary for functional capacity tasks (e.g., communication). Moreover, the SLOF domain “everyday life skills” occupied a central position, linking other real-life functioning domains with psychopathology, internalized stigma, functional capacity, and, consequently, neurocognition and social cognition. In the four-years longitudinal study^{35,36}, 618 subjects, out of the 921 subjects with schizophrenia enrolled at baseline, were recruited: SEM³⁵ analysis showed that social cognition predicted work skills and relationships; severe positive symptoms predicted lower work skills; severe experiential symptoms predicted worse relationships; more social incentives predicted better everyday life skills. Less severe experiential symptoms and better social cognition predicted improved relationships. Lastly, the longitudinal network analysis³⁶ matched cross-sectional results: neurocognition, social cognition, resilience, and real-life functioning remained central and connected, while everyday life skills and functional capacity were pivotal. Psychopathological domains were peripheral. Non-recovered patients had more and stronger network connections than recovered ones, with everyday life skills and disorganization having a higher strength among non-recovered.

The interplay between metacognition, social cognition and social functioning in schizophrenia

In this subsection we considered one systematic review and one metaanalysis.

The review of Burns and Patrick³⁷ analyzed 14 randomized, controlled studies on the effect of antipsychotics on many key aspects of social functioning in treatment-resistant schizophrenia. The social functioning scales used were the GAF scale, the Global Assessment Scale (GAS) and the Social Functioning Scale (SFS), Social and Occupational Functioning Assessment Scale (SOFAS), Short-Form 36 Health Survey (SF-36) and the Personal and Social Performance Scale (PSP). Briefly, amisulpride, as well as aripiprazole and risperidone, has been found effective in treating negative symptoms in schizophrenia, which are closely linked to metacognitive and social cognitive capacities as well as risperidone and aripiprazole; the efficacy of clozapine in positive and negative symptoms in treatment-refractory schizophrenic patients highlights how pharmacological therapies influence various aspects of social and metacognitive functioning.

The metaanalysis of Lemmers-Jansen et al.³⁸ included 18 studies on the associations between social cognition's domains theory of mind and emotion perception and processing, and social functioning and social skills. Several scales were used to assess social functioning (GAF, GAS, SFS, SF-36, PSP, SLOF) and social cognition (MSCEIT, TASIT, FEIT). Metacognitive, which wasn't assessed through semi-structured scales, was directly linked to social cognition and indirectly implied in pre-

dicting social outcomes. ToM and emotion perception resulted significantly associated with overall social functioning and social skills.

Discussion

In our review, we found that a wide amount of the research in this area is focused on global rather than social functioning (studies that were excluded). Moreover, many of the studies put the emphasis on its cognitive aspects, rather than exploring the interplay with metacognition and social cognition. There is a lack of secondary literature that explores the dynamics between social functioning, social cognition, and metacognition, although there is significant research on the relationship between social functioning and social cognition. This underscores the need for further investigation to study the complex interconnections between these three domains.

It is also important to note that studies discussing the relationship between these three domains, namely metacognition, social cognition, and social functioning, often primarily focus on treatment and improvement of the first two domains in relation to the positive outcome of the latter. This perspective highlights the importance of understanding how to interconnect these three domains to develop targeted therapeutic approaches that can have a significant impact on the lives of individuals affected by schizophrenia.

Moreover, there is considerable variability in the scales used to measure social functioning, as well as in the tests for metacognition and social cognition, leading to difficulties in comparing studies. The lack of universally accepted and validated measurement tools hinders the ability to draw consistent conclusions across research. Literature often highlights the involvement of certain subdomains of metacognition (like self-awareness and mastery) and social cognition (such as theory of mind and emotional processing) in relation to social functioning. This could either be a result of selection bias or a consistent finding across studies, necessitating further investigation to understand the broader implications.

Finally, Studies often do not adequately consider other confounding variables such as insight into illness, which could significantly influence the interplay between metacognition, social cognition, and social functioning. Recognizing and accounting for these variables is crucial for a more accurate understanding of their relationships.

Moving forward, future studies should focus on integrating a more diverse set of metacognitive and social cognitive aspects, and consider the inclusion of additional variables that may influence social functioning.

Nishida et al.³⁹ examined the role of social cognition and metacognition in explaining the variance between self-reported and objectively-rated social functioning

scores in patients with schizophrenia. The findings indicate that discrepancies in self- and clinician-evaluated social functioning (SLOF scores) can be attributed to differences in cognitive insight and social cognition, as measured by the Beck Cognitive Insight-Scale (BCIS) and the Social Cognition Screening Questionnaire (SCSQ), respectively. This suggests that patients' deficits in understanding their own functional status and in comprehending others' thoughts (theory of mind) contribute to the observed variances in SLOF scores.

Lysaker et al.⁴⁰ highlighted the significance of integrating metacognitive therapy with social skills training. This approach, which addresses both internal cognitive processes and external social interaction dynamics, can significantly enhance social functioning. By improving self-awareness, thought regulation, and social interaction skills, such therapies help individuals better manage their thoughts and emotions, leading to improved communication and social interactions.

De Jong et al.⁴¹ emphasized the value of personalized therapy programs in treating schizophrenia. Tailoring treatment plans to address specific metacognitive and social cognitive deficits ensures a more focused and effective approach. This personalization is vital due to the diverse symptom presentations and cognitive deficits encountered in schizophrenia, highlighting the need for treatments that are adaptable to individual needs.

Research by Hasson-Ohayon et al.⁴² and Kaneko et al.⁴³, underlines the benefits of combining metacognitive and social cognitive training. This integrated approach not only offers immediate benefits but also contributes to long-term improvements in social engagement and quality of life. Enhancing metacognitive abilities and social cognitive skills has been shown to reduce negative symptoms like social withdrawal and anhedonia, thereby promoting better social functioning and engagement. The use of technology in these therapies, including virtual reality and computer-assisted programs, provides innovative and effective means to practice social skills in a safe environment. Group therapy settings further add value by offering peer support and feedback, fostering a sense of community.

Finally, Burn and Patrick³⁷ highlighted the importance of integrating family members and community resources into therapy sessions. Involving family in the therapeutic process creates a supportive environment essential for practicing and reinforcing new social skills. Additionally, community resources offer further support and opportunities for social interaction, emphasizing the role of a supportive network in the effective treatment of schizophrenia.

Conclusion

The research on social functioning in schizophrenia, particularly in the context of metacognition and social cogni-

tion, represents a critical area of investigation. The integration of evidences from neuroscience, clinical psychology, and social research has put the light to the complex interplay between these cognitive domains and their impact on the daily lives of individuals with schizophrenia. The advancements in neuroimaging and neurobiology offer pathways for developing targeted therapeutic interventions. These insights contribute to a deeper knowledge of the biological mechanisms of schizophrenia for a potential development of personalized treatment approaches. Clinical psychology's contribution through psychotherapeutic interventions and the exploration of subjective experiences has been instrumental in addressing the cognitive deficits in schizophrenia. Techniques such as CBT and metacognitive training have shown promise in enhancing metacognitive and social cognitive abilities, leading to improved social functioning and quality of life. Moreover, social research sheds light on the impact of these cognitive impairments on social interactions and functioning in real-world settings. Understanding the role of social and environmental factors in the course and treatment of schizophrenia is crucial for developing comprehensive care models that address both clinical and social needs. The interdisciplinary approach in studying social functioning in schizophrenia underscores the necessity of a complex perspective. Collaboration among these disciplines is not only improving our knowledge about the disorder but also driving the development of more effective, holistic interventions. Future research directions should continue to explore these complex connections, with a focus on moving theoretical knowledge into practical, therapeutic applications that enhance the lives of individuals living with schizophrenia.

Ultimately, this body of research underlines the importance of social functioning as a central aspect of schizophrenia treatment and recovery. By focusing on the interplay of metacognition, social cognition, and social functioning, we can move towards more effective, personalized care that supports individuals in leading fulfilling, socially integrated lives.

Conflict of interest statement

The authors declare no conflict of interest.

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Authors' contributions

Conceptualization, P.R. and C.M.; methodology, P.R.; software, C.B. and R.S.; data curation R.S.; writing—original draft preparation, P.R., C.B. and R.S.; writing—review and editing, P.R., C.B., S.B., P.B., C.M.; supervision, P.R. All authors have read and agreed to the published version of the manuscript.

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