The effectiveness of metacognitive training for patients with schizophrenia: a narrative systematic review of studies published between 2009 and 2015

Daniel Pankowski¹, Joachim Kowalski², Łukasz Gawęda³

¹Department of Rehabilitation Psychology, Faculty of Psychology, University of Warsaw
²Department of Psychology of Individual Differences, Faculty of Psychology, University of Warsaw
³Faculty of Psychology, University of Social Sciences and Humanities, Warsaw

Summary

Aim. The aim of this paper is to review results of studies on the effectiveness of metacognitive training (MCT) for patients with schizophrenia in reduction of psychotic symptoms and cognitive biases. Furthermore, other variables, like social functioning, insight and neurocognitive functions, are analyzed.

Method. Systematic search in databases PubMed, EBSCO, Google Scholar, EMBASE, Cochrane Central Register of Controlled Trials and PsycINFO regarding studies on the effectiveness of the MCT was made. The review included 14 studies published in years 2009–2015, in which design of the study made comparison between MCT group and control group possible.

Results. Combined number of patients in MCT group was 354 and 355 in control group. The largest effect size was obtained for severity of delusions (d < 0.23; 1 >), especially reduction of conviction and distress of delusional beliefs. An effect size regarding negative symptoms reduction was small. Large effect size was observed for insight improvement (d < 0.45; 1.32 >). Positive impact of MCT on cognitive biases severity (d < 0.21; 0.83 >, especially jumping to conclusions) and improvement in some aspects of neurocognitive functions was observed (d < 0.2; 0.63 >). There was no improvement in social functioning of patients in MCT group. Follow-up studies show sustainability in symptoms improvement lasting at least 6 months.

Conclusions. MCT is an effective form of therapy in reduction of delusions, cognitive biases related to schizophrenia and improvement of insight. Relatively easy accessibility and sustainability of therapeutic effects indicates that MCT can be effectively used in therapy.

The study was not sponsored.
The authors D. P. and Ł. G. equally contributed to the article
of schizophrenia. To enhance training efficacy, especially in patients’ general functioning, combining it with others forms of therapy is to be considered.

**Key words:** schizophrenia, group metacognitive training; cognitive biases

**Introduction**

In most cases schizophrenia is characterized by chronic course [1] with alternating stages of relapses and acute episodes in which positive symptoms, like hallucinations and delusions, can occur. In most cases schizophrenia is related to decrease in social functioning [2], frequent unemployment [3], more frequent solitary habitation [4], more frequent suicide attempts [5]. Half of the patients with schizophrenia diagnosis in Poland receive some form of social benefit, mostly illness allowances, and overall cost of these benefits (nearly billion PLN\(^1\)) is roughly equal to National Health Fund expenditures on medical services and medication for this group of patients [6].

Modern approach to the matter of schizophrenia etiology takes into consideration biological [7], psychological [8] and environmental [9] factors. However, antipsychotic medication is still the most frequent form of therapy [10]. Recent meta-analyses of pharmacological treatment efficacy suggest unsatisfactory response to treatment in this group of patients [11, 12]. About 25% of patients experience psychotic symptoms despite regular medicine intake [13]. Furthermore, therapy based solely on pharmacological treatment does not enable satisfactory improvement in patients’ social functioning [14]. These observations encourage clinicians to seek forms of therapy other than pharmacological, to increase overall efficacy of treatment.

Nowadays, cognitive-behavioral therapies (CBTs) [15], trainings of cognitive functions [16], social cognition [17] or metacognitive training [18, 19] are more often used in the treatment of schizophrenia. It is worth noticing that although CBT is recommended in treatment of schizophrenia patients [20], there are no reliable data concerning greater effectiveness of this treatment method in comparison to other psychosocial interventions in this clinical group [21]. However, CBT is one of the most verified psychotherapeutic methods of schizophrenia therapy.

In cognitive model of psychotic symptoms the role of cognitive biases as triggers of delusions and hallucinations is emphasized [22]. In the model of hallucinations created by Bentall [23] and developed by other authors (review [24]), attributional biases process is accentuated. These biases can cause patients to perceive thoughts as alien in origin. External attribution is central for hallucinatory experiences. Some studies also suggest that patients with hallucinatory experiences have a tendency to misidentify fantasy and reality [25, 26]. Cognitive bias based on prematurely, rashly drawn conclusions (so-called jumping to conclusions) seems especially important for delusions [27, 28]. It was also shown that attributional biases play a role in the etiology of delusions [29].

\(^1\) Approximately – about 250 million euro or 280 million American dollars.
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Models constructed in such a way gave basis for therapeutic work in cognitive-behavioral approach (CBT) [30]. There are two CBT approaches to be distinguished. The first one concentrates on content of psychotic experiences and the second one concentrates on cognitive biases.

The first approach includes classic forms of CBTp (cognitive-behavioral therapy for psychosis), in which main tenet is to work directly with symptoms experienced by a patient [31]. In CBTp the subject of therapeutic work are specific convictions about reality – both delusional as well as non-delusional – which may contribute to symptoms sustaining. CBTp enhances pharmacological treatment effects. A recent study also suggests that CBTp is effective in treatment of psychotic patients who are not taking antipsychotic medication [32]. Meta-analyses show that CBTp allows for significant, in comparison to control conditions, improvement in symptoms severity and associated distress [33]. However, CBTp therapy is still out of reach for many patients. It causes researchers to seek for more accessible, structured forms of therapy and trainings.

These searches resulted in creating metacognitive approach. The basic assumption of this approach is not to work with psychotic experiences but to concentrate on cognitive biases that underlie these symptoms. One of the methods based on this approach, also accessible in Poland [18, 19], is metacognitive training (MCT) [33]. Description of method and clinical experiences of MCT in Poland can be found in work of Gawęda et al. [19].

MCT is a group (3–10 patients) form of therapy which focuses on cognitive biases related to psychotic symptoms. Basic aim of MCT is to increase awareness of cognitive biases and distortions; enriching and changing repertoire of problem-solving strategies and encouraging patients to critical reflection (e.g., on consequences of cognitive biases) [34]. MCT enables discussion with patients on particular cognitive biases, their impact on the development of psychosis and impact on social functioning. Training consists of 8 modules depicting biases linked most commonly to psychotic symptoms (jumping to conclusions, dysfunctional attributional styles, biases against disconfirmatory evidence, social cognition deficits, depressive schemes and overconfidence of false memories).

Aim

The aim of this paper is to conduct systematic review of studies of group MCT efficacy in different aspect of patients’ functioning. This review focuses on a broad spectrum of variables which can be influenced by MCT. Analyses focused on MCT influence on psychotic symptoms, cognitive biases, social functioning, insight and neurocognition.

Method

Studies of the effectiveness of MCT published in years 2009–2015 were selected by screening following databases: PubMed, EBSCO, Google Scholar, EMBASE,
Cochrane Central Register of Controlled Trials and PsycINFO. Following keywords were used for searching target articles: “MCT schizophrenia”, “metacognitive training schizophrenia” and “metacognition schizophrenia”. Reference lists were also scanned with a purpose of identification of potential suitable studies.

After obtaining all studies concerning MCT efficacy, clinical studies in which comparison between experimental and control group was possible were selected. Studies concerning proceedings on MCT adaptation, training procedure and theoretical background descriptions as well as modifications with individual training sessions were excluded from the analysis.

First, as an indicator of the effectiveness of MCT, statistical significance at the level of \( p < 0.05 \) was considered. Additionally, due to low statistical power (e.g., small samples) of some studies, effect size was calculated and analyzed (an assessment of impact of MCT on outcome variables). Results are interpreted as follows: \( d < 0.2 \) – no effect; \( 0.2 < d < 0.5 \) – small effect size; \( 0.5 \leq d < 0.8 \) – medium effect size; \( d > 0.8 \) – large effect size. This review used Cohen’s \( \text{dcorr} \) [35], which takes into consideration sample size and group differences in the first measurement (pre-test), or values of Cohen’s \( d \) statistic given by the authors of studies.

### Results

As a result of database search 27 studies were identified. However, some of the studies did not meet the inclusion criteria. Six articles concerned descriptions of MCT method [18, 19, 36–39], two concerned feasibility and adherence of MCT assessed by patients [40, 41] and one was a case study [42]. Moreover studies were excluded because of: individual sessions with patients [43], lack of control group [44, 45] and lack of English version of the paper [46].

<table>
<thead>
<tr>
<th>No.</th>
<th>Study</th>
<th>Study group</th>
<th>Intervention in control group</th>
<th>Randomization</th>
<th>Single-blind study</th>
<th>Follow-up</th>
<th>Number of sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Aghotor et al., 2010 [47]</td>
<td>Inpatients of psychiatric ward</td>
<td>Discussion group</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>2.</td>
<td>Kumar et al., 2010 [48]</td>
<td>Inpatients of psychiatric ward</td>
<td>TAU</td>
<td>+</td>
<td>n.a.</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>3.</td>
<td>Moritz et al., 2011 [49]</td>
<td>Inpatients of psychiatric ward, also with secondary substance-related diagnosis</td>
<td>TAU</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>4.</td>
<td>Briki et al., 2014 [50]</td>
<td>Inpatients of psychiatric hospitals</td>
<td>Supportive therapy</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>16</td>
</tr>
</tbody>
</table>

*Table 1. Methodological characteristic of the analyzed studies*

*table continued on the next page*
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<table>
<thead>
<tr>
<th></th>
<th>Study Details</th>
<th>Clients of</th>
<th>Methodology</th>
<th>TAU</th>
<th>Partially</th>
<th>Assessment</th>
<th>Months</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>Gawęda et al., 2015 [51]</td>
<td>Community Social Support Group Program</td>
<td>TAU</td>
<td>+</td>
<td>Partially</td>
<td>-</td>
<td></td>
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<tr>
<td>6</td>
<td>Lam et al., 2015 [52]</td>
<td>Inpatients of psychiatric centers</td>
<td>TAU</td>
<td>+</td>
<td>Self-report assessment measures</td>
<td>-</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Favrod et al., 2014 [53]</td>
<td>Outpatients of psychiatric centers</td>
<td>TAU</td>
<td>+</td>
<td>+</td>
<td>After 6 months</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Kuokkannen et al., 2014 [54]</td>
<td>Inpatients of forensic psychiatry ward</td>
<td>TAU</td>
<td>+</td>
<td>+</td>
<td>After 3 and 6 months</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>van Oosterhout et al., 2014 [55]</td>
<td>Inpatients of psychiatric hospitals</td>
<td>TAU</td>
<td>+</td>
<td>+</td>
<td>After 6 months</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Moritz et al., 2013 [56]</td>
<td>Inpatients of two psychiatric centers</td>
<td>Cognitive remediation</td>
<td>+</td>
<td>+</td>
<td>After 6 months</td>
<td>8 and another 8 between post-treatment and follow-up assessment</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Moritz et al., 2014 [57]</td>
<td>Inpatients and outpatients of psychiatric wards</td>
<td>Cognitive remediation</td>
<td>+</td>
<td>+</td>
<td>After 6 months and 3 years</td>
<td>8 and another 8 between post-treatment and follow-up assessment</td>
<td></td>
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Non-randomized controlled studies (NRS)

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<tr>
<th></th>
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<th>Methodology</th>
<th>TAU</th>
<th>Partially</th>
<th>Assessment</th>
<th>Months</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Naughton et al., 2012 [58]</td>
<td>Inpatients of forensic psychiatry ward</td>
<td>TAU</td>
<td>-</td>
<td>Partially</td>
<td>-</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Rocha et al., 2013 [59]</td>
<td>Clients of socio-occupational centers</td>
<td>TAU</td>
<td>-</td>
<td>n.a.</td>
<td>-</td>
<td>18</td>
<td></td>
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<tr>
<td>14</td>
<td>Erawati et al., 2014 [60]</td>
<td>Inpatients of psychiatric wards</td>
<td>TAU</td>
<td>-</td>
<td>n.a.</td>
<td>-</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

TAU – treatment as usual; + – use of certain methodological procedure; – – certain methodological procedure was not used; n.a. – data not available

Finally, 14 studies of clinical effectiveness of MCT were analyzed. Table 1 presents characteristics of studies included in the review. Eleven of the described studies are randomized controlled trials (RCT) [47–57]; in most cases assessors were blind to allocation of participants in groups [47, 49–58]. Worth noticing is that only in
Table 2. An overview of the analyzed studies of metacognitive training efficacy

<table>
<thead>
<tr>
<th>No.</th>
<th>Study</th>
<th>N</th>
<th>Psychopathology</th>
<th>Cognitive biases</th>
</tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Aghotor et al., 2010 [47]</td>
<td>30: MCT – 16; TAU – 14</td>
<td>PANSS</td>
<td>No significant results (PANSS P: d = 0.43, PANSS: d = 0.23)</td>
</tr>
<tr>
<td>2</td>
<td>Kumar et al., 2010 [48]</td>
<td>16: MCT – 8; TAU – 8</td>
<td>PANSS, BABS</td>
<td>Improvement in positive symptoms (d = 1.10) in PANSS; improvement in insight and delusions certainty (d = 1.00) in BABS</td>
</tr>
<tr>
<td>3</td>
<td>Moritz et al., 2011 [49]</td>
<td>36: MCT – 18; TAU – 18</td>
<td>PANSS, PSYRATS</td>
<td>Improvement in distress caused by delusions (PSYRATS: Intensity of distress d = 0.68)</td>
</tr>
<tr>
<td>4</td>
<td>Briki et al., 2014 [50]</td>
<td>50: MCT – 25; TAU – 25</td>
<td>PANSS, PSYRATS</td>
<td>Improvement in positive symptoms (d = 0.61) in PANSS</td>
</tr>
<tr>
<td>5</td>
<td>Gawęda et al., 2015 [51]</td>
<td>44: MCT – 23; TAU – 21</td>
<td>PSYRATS, Paranoia Checklist</td>
<td>Improvement in positive symptoms (d = 0.54) (PSYRATS); frequency (d = 0.75) and conviction (d = 0.57) of delusions (Paranoia Checklist)</td>
</tr>
<tr>
<td>6</td>
<td>Lam et al., 2015 [52]</td>
<td>77: MCT – 38; TAU – 39</td>
<td>data not available</td>
<td>data not available</td>
</tr>
<tr>
<td>7</td>
<td>Favrod et al., 2015 [53]</td>
<td>52: MCT – 26; TAU – 26</td>
<td>PANSS, PSYRATS</td>
<td>Improvement in positive symptoms (PANSS P: d = 0.7; 6-month follow-up d = 0.63); delusions (PSYRATS: d = 0.58; 6-months follow-up: d = 0.57; conviction d = 0.70; 6-month follow-up d = 0.86); improvement in delusion distress after 6 months: PSYRATS distress: d = 0.42</td>
</tr>
<tr>
<td>8</td>
<td>Kuokkanen et al., 2014 [54]</td>
<td>20: MCT – 10; TAU – 10</td>
<td>3 items from PANSS (P1, P6, G12), PSYRATS</td>
<td>Improvement in Suspiciousness/persecution – P6 in PANSS after 3 – and 6-month follow-up. No significant results (PANSS: d = 0.42)</td>
</tr>
<tr>
<td>9</td>
<td>van Oosterhout et al., 2014 [55]</td>
<td>128: MCT – 58; TAU – 70</td>
<td>PSYRATS, GPTS</td>
<td>Improvement in persecutory delusions in GPTS after 24-week follow-up (d = 0.4)</td>
</tr>
<tr>
<td></td>
<td>Authors, Year</td>
<td>N</td>
<td>Intervention</td>
<td>Outcome</td>
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<tr>
<td>10</td>
<td>Moritz et al., 2013 [56]</td>
<td>150</td>
<td>MCT – 76; TAU – 74</td>
<td>PANSS, PSYRATS</td>
</tr>
<tr>
<td>11</td>
<td>Moritz et al., 2014 [57]</td>
<td>150</td>
<td>MCT – 76; TAU – 74</td>
<td>PANSS, PSYRATS</td>
</tr>
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</table>

Non-randomized controlled studies (NRS)

<table>
<thead>
<tr>
<th></th>
<th>Authors, Year</th>
<th>N</th>
<th>Intervention</th>
<th>Outcome</th>
<th>Metacognitive Measure</th>
<th>Fisher</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Naughton et al., 2012 [58]</td>
<td>19</td>
<td>MCT – 11; TAU – 8</td>
<td>PANSS</td>
<td>No significant results (PANSS P: d = 0.37, PANSS N: d = 0.72, PANSS: d = 0.44)</td>
<td></td>
<td>data not available</td>
</tr>
<tr>
<td>13</td>
<td>Rocha et al., 2013 [59]</td>
<td>35</td>
<td>MCST – 19; TAU – 16</td>
<td>PANSS</td>
<td>Improvement in overall psychopathology (PANSS G: d = 0.30)</td>
<td>Facial emotion recognition (FEIT), Emotion regulation (MSCEIT-ME), Theory of mind (hinting task), Attributional styles (AIHQ-A), Social perception (SPS), Jumping to conclusions: Fish Task</td>
<td>Improvement in theory of mind (d = 0.42), social perception (d = 0.6), emotion recognition (d = 0.76) and more draws to decision (d = 0.53)</td>
</tr>
<tr>
<td>14</td>
<td>Erawati et al., 2014 [60]</td>
<td>52</td>
<td>MCT – 26; TAU – 26</td>
<td>PSYRATS</td>
<td>Improvement in delusions severity. Lack of data necessary to calculate effect size*</td>
<td>Metacognitive Ability Questionnaire</td>
<td>Improvement in metacognitive abilities. Lack of data necessary to calculate effect size*</td>
</tr>
</tbody>
</table>

MCT – Metacognitive Training; TAU – Treatment as Usual; PANSS – Positive and Negative Syndrome Scale; BADE – Bias Against Disconfirmatory Evidence; BABS – Brown Assessment of Beliefs Scale; PSYRATS – Psychotic Symptoms Rating Scales; CBQ-P – Cognitive Biases Questionnaire for Psychosis; GPTS – Green Paranoid Thought Scale; DACOBS – Davos Assessment of Cognitive Biases Scale; MCQ-30 – Metacognitive Questionnaire; MCST – Metacognitive and Social Cognition Training; FEIT – Facial Emotion Identification Test; MSCEIT-ME – Mayer-Salovey-Caruso Emotional Intelligence Test; AIHQ-A – Ambiguous Intentions Hostility Questionnaire; SPS – Social Perception Scale; d – Cohen’s d effect size; * – lack of post test data, only difference between pre and post test measurements, without standard deviation value.
four studies [47, 50, 56, 57] active intervention, which could minimize the effect of additional time spent with the therapist, was included in control group. Groups with treatment as usual (TAU) were the most common groups of reference in studies on the effectiveness of MCT. In these studies TAU consists of various psychotherapeutic activities – from elements of psychoeducation [48] to elaborate psychotherapeutic programs [51]. Lam et al. in their study [52] have investigated only insight (lack of symptoms severity and cognitive biases assessment; Table 2). This study was included into the review because it fulfills the criteria of clinical insight assessment. In one of the studies [59] the analyses concerned a fusion of metacognitive training and a social cognition programs. It consisted of 18 sessions: meetings twice a week with one MCT session and one interactive social cognition remediation session.

A total of 709 patients were included in the reviewed studies – 354 people in experimental group with metacognitive training and 355 in the control group with active placebo and treatment as usual. Studies were conducted in independent clinical centers in Germany, Portugal, Poland, France, Switzerland, Ireland, Finland, the Netherlands, Indonesia, India and Hong Kong in years 2009–2015. Two studies [54, 58] included patients of facilities for convicted persons with diagnosis of mental illness.

Impact of MCT on psychopathology symptoms

Assessment of schizophrenia symptoms severity was performed in ten randomized controlled trials [47–51, 53–57] and three non-randomized controlled studies [58–60]. Two studies [54, 60] lack data necessary to compute effect size – there were no post-test results, only difference between pre – and post-test but without the standard deviation values.

Positive symptoms were assessed in ten randomized controlled trials [47–51, 53–57] and three non-randomized controlled studies [58–60]. A significant improvement (p < 0.05) was observed in nine of them [47, 48, 50, 51, 53, 54, 56, 57, 60] and effect sizes ranged from small [56], through medium [49–51, 53, 57], to large [48]. In analyses of Aghotor [47] and van Oosterhout [55] there were no statistically significant differences between the studied groups, but small effect size was observed for positive symptoms measured on PANSS [47] (d = 0.43), overall score (d = 0.23) and persecutory delusions (d = 0.26), as well as in Green Paranoid Thoughts Scale (GPTS) [55]. In the study by Gawęda et al. [51] there was a reduction in total severity of symptoms (PSYRATS) at the statistical trend level (p = 0.08) and the effect size was d = 0.54. There were no statistically significant differences in severity of hallucinations and delusions. The observed effect sizes were as follows: hallucinations frequency (d = 0.27), amount of negative content in auditory hallucinations (d = 0.21), degree of negative contents in auditory hallucination (d = 0.23), distress connected to hallucinations (d = 0.23), frequency of delusional preoccupation (d = 0.25) and distress connected to delusions (d = 0.29) measured using the same scale. In the study by Briki et al. [50] improvement in delusions severity in PANSS at statistical tendency level with effect size d = 0.38
The effectiveness of metacognitive training for patients with schizophrenia: a narrative was observed. In studies by Rocha et al. [59] and Naughton et al. [58] there were no significant differences between groups and the effect size was small (d < 0.2).

Impact of MCT on negative symptoms was analyzed in two randomized controlled trials [48, 49] and two non-randomized controlled studies [58, 59]. None of them achieved statistically significant results. In the study by Naughton et al. [58], despite insignificant results (p > 0.05), medium effect size was observed (d = 0.72).

Impact of MCT on overall psychopathology symptoms severity (General Psychopathology score in PANSS) was included in three randomized controlled trials [48–50] and one non-randomized controlled study [58]. In none of them statistically significant results were obtained. In one of the studies [58] medium effect size for general symptoms severity was observed (d = 0.67) and in the study by Kumar et al. [48] small effect size was shown (d = 0.41).

In the study by Briki et al. [50] small effect size of “preoccupation with own thoughts” (d = 0.27) and “active social avoidance” (d = 0.27) in PANSS was observed. In the study by Moritz et al. [49] from 2011 small effect size was obtained (d < 0.2) for conceptual disorganization, excitement and distress.

Impact of MCT on cognitive biases

In six randomized controlled trials [47, 49, 51, 54, 56, 57] and one non-randomized controlled study [59] impact of MCT on jumping to conclusions (JTC) severity was analyzed. One of the studies [54] lacks data necessary to compute effect size – there were no post-test results, only difference between pre – and post-test but without the standard deviation values. In other study [59] statistically significant improvement was observed in jumping to conclusions severity, which means more draws needed to make a decision (d = 0.53). In the study by Moritz et al. [49], despite no significant results, medium effect size was observed (d = 0.52) and small effect size in studies by Aghotor et al. (d = 0.31) [47] and Moritz et al. (d = 0.21) [56]. In two studies [51, 57] there were no significant differences between groups and effect size was small (d < 0.2).

In two newer randomized controlled trials cognitive biases were assessed with self-report questionnaires [51, 55]. In one of these studies [51], there was statistically significant improvement in catastrophizing (d = 0.79), jumping to conclusions (d = 0.73) and overall score (d = 0.83) of CBQp, which is used to assess cognitive biases. In one of the studies [55], despite no statistically insignificant results, there was a medium effect size observed in subjective measure of social cognition deficits (d = 0.28).

Impact of MCT on neurocognitive functions

Assessment of cognitive functioning was performed in four randomized controlled trials [49, 51, 56, 57] and one non-randomized controlled study [59]. Statistically significant difference (p < 0.05) was shown in two studies for: attentional functions [57]
(d = 0.21) and recollection of verbal material after delay (d = 0.63) [49]. In these studies, despite no significant differences between groups, medium effect size was observed for immediate recollection of verbal material improvement (d = 0.63) [49] and small effect size for attentional processes and visuospatial aspects of working memory (d = 0.20) [57].

Impact of MCT on general functioning

MCT impact on general level of psychological, social and professional functioning was assessed in two randomized controlled trials [50, 51] and one non-randomized controlled study [58]. In studies by Naughton et al. (GAF; d = 1.49) [58] and Briki et al. (QLS “Social circle”; d = –0.35) [50] there was a statistically significant change in comparison to control group. In this study, despite no statistically significant difference, small effect size in social initiatives was observed (d = 0.49) [50]. In the study by Gawęda et al. [51], conducted among chronic patients attending Community Social Support Group Program, there were no statistically significant differences between the two compared groups and effect size was small (d < 0.2).

Impact of MCT on insight

Insight was assessed in six randomized controlled trials [48, 50–53, 55]. Results of four studies show significant improvement with effect size ranging from small (delusions awareness: d = 0.45) [53], through medium (d = 0.56) [51] to large (d = 1.01; d = 1.10; d = 1.32) [48, 52]. In one study, despite lack of statistically significant results, small effect size was observed: (d = 0.34) [50]. Furthermore in the study by Favrod et al. [53] small effect size in delusion attribution in SUMD (d = 0.24) was observed, despite lack of statistically significant results. In one study [55] there were no significant results and effect size was infinitesimal (d < 0.2).

Sustainability of therapeutic effects: longitudinal studies

In four randomized controlled trials [53–56] follow-up assessments were conducted after six months and in one study, after three years [57]. The study by Kuokkanen et al. [54] lacks data necessary to compute effect size.

The study by Favrod et al. [53] indicates sustained positive impact of MCT on positive symptoms severity (PANSS P: d = 0.63), especially delusions (PSYRATS Delusions: d = 0.57; “Delusional conviction” scale: d = 0.86; “Distress connected to delusions” scale: d = 0.52) after six months. Studies by Moritz et al. [56] (d = 0.34) and van Oosterhout et al. [55] (d = 0.40) also indicate improvement in delusions severity after six months. The study by Kuokkanen et al. [54] indicates improvement in suspiciousness after 3 and 6 months. Furthermore, in the study by Favrod et al. [53] there was a statistically significant difference between groups in the level of insight (d = 0.47) after six months.
In the study by Moritz et al. [57] there was an impact of MCT on positive symptoms severity (PANSS P: \( d = 0.52 \)), including delusions (PANSS Delusions: \( d = 0.45 \); PSYRATS Delusions: \( d = 0.59 \)) after three years.

In another study [56], despite no statistically significant differences in assessments, small effect size was observed for improvement in cognitive biases: in need of more draws to make a decision (\( d = 0.21 \)). In the study by van Osterhout et al. [55] in second assessment after six months, improvement in subjective cognitive problems (\( d = 0.25 \)) and conviction of lack of control (\( d = 0.22 \)) in DACOBS and MCQ-30 was observed.

**Discussion**

The aim of this review was to analyze effectiveness of metacognitive training for patients with schizophrenia in the context of: 1) psychotic symptoms; 2) cognitive biases; 3) neurocognitive function; 4) general functioning; 5) insight. Sustainability of improvement in randomized controlled trials with assessment after 6 months and 3 years was also analyzed.

Empirical evidence indicate satisfactory efficacy of MCT in improvement of positive symptoms [48–51, 53, 54, 56, 57, 60] lasting at least half a year after participation in the training [53, 56]. The most recent study also shows sustained improvement after three-year follow-up period [57]. The largest improvement was shown for delusions [53], especially distress caused by delusions [49], level of conviction towards delusions [53] and their frequency [51]. Some studies also show improvement in hallucinations severity [50]. Our review suggests that MCT can have smaller effect on hallucinations in comparison to delusions. This result is not surprising regarding that MCT interventions target mainly cognitive biases related to delusions (jumping to conclusions – JTC). Not all obtained results were significant, despite of at least small [47, 58] effect size. One of the reasons may be small sample size that cause lower statistical power. Lack of satisfactory improvement may also be related to low intensity of MCT [61], which can be increased by the addition of Individualized Metacognitive Therapy for Psychosis (MCT+) [61]; it can also be complemented by other psychotherapeutic activities. It may be especially relevant in case of patients with chronic experience of psychotic symptoms [51].

According to cognitive model of psychosis [22], in MCT symptoms improvement is obtained through improvement in cognitive biases severity. Findings from the review suggest positive impact of MCT on cognitive biases underlying psychotic symptoms (especially delusions). The largest effect size was observed in JTC [51, 59], emotion-based reasoning and catastrophizing [51]. It has to be noted that in the study by Rocha et al. [59] a broad selection of assessment tools for cognitive biases was used, however, there is no possibility of comparing these results, concerning for example theory of mind, with results from other studies. Similarly, positive effect of MCT on cognitive biases measured by questionnaires was observed in the study by Gawęda et al. [51], however, with no effect of MCT on JTC and theory of mind.
deficits as assessed with experimental methods. This result may suggest that among chronic schizophrenia patients the cognitive aspect of cognitive biases can be easier to change than the behavioral component. This issue requires further studies comparing patients’ response to MCT in different aspects of cognitive biases (e.g., cognitive aspect – self-awareness of cognitive biases vs. behavioral aspect – behavior that is revealed in experimental paradigm and shows cognitive biases).

Despite that improvement in neurocognitive functions is not an aim of MCT, some studies show positive effect of MCT on these functions. Positive impact on attentional functions and recollection of verbal material after delay was observed [49, 57]. However, it was not confirmed by all of the studies [51, 56, 59]. Some improvements in neurocognitive functioning may reflect connections between cognitive biases and neurocognition [62]. It is possible that therapeutic work with cognitive biases in MCT may affect neurocognitive functions [62]. It is worth to notice that one of the modules (memory) is devoted to strategies of better remembering and may have an impact on cognitive functions.

A significant result, from clinical point of view, is an improvement in insight gained through participation in MCT [52]. Randomized controlled trials with follow-up assessment show sustained effects of MCT on clinical insight [53]. Also the study conducted among chronically ill patients attending Community Social Support Group Program indicates that MCT positively impacts patients’ insight (large effect size) [51]. Improvement of clinical insight is significant in the context of patient-physician compliance and motivation to stay in treatment. Indeed, as shown in other study, insight is positively correlated with help-seeking behavior in patients [63]. MCT helps to gain clinical insight which may positively impact patients’ attitude towards treatment.

Final conclusions form the review of studies of the effectiveness of MCT should be considered in the light of studies’ limitations. In five studies [47, 49, 54, 58, 59] researchers named small sample sizes as a problem, in two studies contact between patients of experimental and control group was an issue [49, 57]. Rocha et al. [59], Erawati et al. [60] and Naughton et al. [58] pointed out lack of randomization as a disadvantage. In studies by Naughton et al. [58], Rocha et al. [59] and Favrod et al. [53] there was no active placebo for patients from waiting lists. Moritz et al. [56], in the discussion of their results, put information about too short period between main assessment and follow-up assessment (6 months) and small numbers of controlled variables, similarly to van Oosterhout et al. [55]. Favrod et al. [53] noticed significant delusions severity in patients in the period of 3 months before the research. Van Oosterhout et al. [55] pointed out using older version of MCT (2007), drop-out of patients between assessments and using large amount of self-description questionnaires.

Studies concerning efficacy of MCT differ in methods of symptoms severity assessment. Furthermore, the range of considered variables is heterogeneous (heterogeneous assessment of cognitive biases; insight and social functioning were assessed only in few studies). Considering heterogeneity of studies, the authors did not employ meta-analysis in this review [64]
Further research directions may be assessing efficacy of MCT in group at risk of developing psychotic disorders (At Risk Mental State). Similar studies [65] applying CBTp have shown efficacy of this therapeutic method. The aspect of social functioning (e.g., Global Assessment of Functioning – GAF, Social Functioning Scale – SFS) of patients who took part in metacognitive training (prospective study) is also worth analyzing.

**Conclusions**

1. The highest effectiveness of MCT was observed for reduction of delusions severity.
2. Metacognitive training allows for effective therapeutic work with cognitive biases related to delusions.
3. Metacognitive training allows for clinical (self-awareness of symptoms) and cognitive (self-awareness of cognitive deficits and biases) insight build-up in patients with schizophrenia.
4. Randomized controlled trials with follow-up assessment suggest that improvement in symptoms and insight lasts at least 6 months.

**References**


The effectiveness of metacognitive training for patients with schizophrenia: a narrative


Address: Łukasz Gawęda
II Department of Psychiatry
Medical University of Warsaw
02-242 Warszawa, Kondratowicza Street 8