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# A practice-oriented review on effectiveness of metacognitive training (MCT) for psychosis

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● **ABSTRACT.** Questa review riporta una panoramica pratica del *metacognitive training for psychosis* (MCT). Vengono presentate questioni pratiche relative all'uso e alla gestione del training. Il MCT si compone di due cicli di 8 moduli (più due moduli aggiuntivi). Review e meta-analisi hanno dimostrato la sua fattibilità e l'elevata accettazione da parte dei pazienti. Si riportano effect size medi per quanto riguarda la riduzione dei sintomi psicotici. Gli effetti sul saltare alle conclusioni sono misti. Gli effetti maggiori sono riportati quando i pazienti hanno sintomi psicotici più generali e da lievi a moderati e quando i due cicli interi vengono completati. Vengono discussi punti di forza e limiti e sono discusse delle raccomandazioni per l'applicazione e le ricerche future. MCT offre un progresso significativo nel trattamento della psicosi.

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● **SUMMARY.** This review contains a practical overview of the *metacognitive training for psychosis* (MCT); practical issues concerning the use and administration of the training are presented. MCT consists of two cycles of 8 modules (plus two additional modules). Reviews and meta-analyses have demonstrated the feasibility and high acceptance by patients. Medium effect sizes are reported with regard to reduction of psychotic symptoms. Effects on jumping to conclusions are mixed. Largest effects are reported when patients have more general, and mild to moderate psychotic symptoms, and when the two full cycles are completed. Strengths and limitations are discussed, and recommendations for use and future research are presented. MCT is a meaningful addition to the treatment of psychosis.

**Keywords:** *Metacognitive training, Reasoning biases, Delusions, Improved wellbeing, Practical issues*

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## INTRODUCTION

Delusions are one of the core diagnostic criteria for psychotic disorders (American Psychiatric Association, 2013). They are defined as fixed false beliefs that are held with high conviction, and are not amenable to change in light of conflicting evidence. These irrational beliefs are based on wrong conclusions of the outer reality, defying normal reasoning, and remain firm even when overwhelming proof is presented to dispute them. There is strong evidence that cognitive processes, in particular cognitive biases are involved in the formation and maintenance of delusions (Bentall, 1994; Broyd, Balzan, Woodward & Allen, 2017; Moritz & Woodward, 2007a). Cognitive biases, such as jumping to conclusions (JTC) (Dudley, Taylor, Wickham & Hutton, 2016), bias against discriminatory evidence (BADE) (Woodward, Moritz, Cuttler & Whitman, 2006), and overconfidence in errors (Moritz & Woodward, 2006) are common amongst patients with psychosis, and affect their daily social interactions and functional outcomes (Brüne, Dimaggio & Lysaker, 2011). In the early years of this millennium, there was a need for a cognitive approach in treatment of psychosis, given that treatment effects of antipsychotics are moderate (Huhn et al., 2020), and up to 30% of patients is treatment resistant (Caspi, Davidson & Tamminga, 2004). With cognitive behavioural therapy (CBT) symptoms improve, but insight remains poor (Pijnenborg, van Donkersgoed, David & Aleman, 2013). Therefore, in 2002/2003 Moritz and Woodward (Moritz & Woodward, 2007b) developed the metacognitive training (MCT).

Metacognitive training aims to raise patients' awareness for their reasoning styles (e.g. cognitive biases), and targets positive psychotic symptoms through general metacognitive thinking. The goal of the MCT is the application of this awareness and knowledge in daily life. The focus is process- and not symptom-oriented: individual delusional themes are not directly addressed. Through this indirect, so-called "backdoor approach", MCT seeks to both increase awareness about and normalisation of cognitive processes underlying positive psychotic symptoms. MCT is based on a large body of empirical evidence and incorporates elements of psychoeducation, cognitive remediation (CR), and CBT. Transfer to daily life is a strong focus point. In this practice-oriented review, we will first describe the training, its content and practical issues concerning the use and

administration of the training. Then the dynamic character is described, the individual therapy (MCT+) and recent additions are highlighted. In the effectiveness section, we will discuss empirical findings, reviews and meta-analyses. We conclude by considering the strengths and limitations of the MCT and providing recommendations about characteristics of patients who might benefit the most from MCT, and with recommendations for administering the MCT.

MCT is a group intervention that consists of two parallel cycles of eight separate modules (for a description of the content of the modules, see Table 1). The training is highly structured, but with enough room for participants to exchange their views and experiences. The MCT consists of stand-alone modules, allowing for patients to join treatment groups at any time. The two parallel versions of the MCT ensure that modules with the same content can be repeated without repeating the exact exercises. The modules typically start with familiarising the participants with the target domain. The cognitive processes described are normalised and examples in daily life are given. Additionally, the consequences of excessive use of the respective cognitive process in psychosis are demonstrated, emphasising the (interpersonal) problems and occasional symptom worsening this may cause. The major part of the module consists of interactive exercises, the majority of which is delusion-neutral. The large amount of exercises allows the trainer to choose a selection relevant for the group (Moritz, Vitzthum, Randjbar, Veckenstedt & Woodward, 2010). First, the exercises are explained, thereafter participants do them independently, without answer options or extra prompts. Difficulty of the exercises may vary. At the end of the module, the relevance is emphasised by pointing again to the link between the cognitive process and psychosis (in a slide titled 'Transfer to psychosis') and with a case example. Homework may be presented, providing a short summary of the content of the module, and exercises with own experiences related to this module during the following week. In the first training session, participant receive two cards, with the purpose of carrying these with them. The yellow card contains three questions, that may help the patient rethink and reappraise a situation that feels threatening or insulting: "What is the evidence?", "Are there alternative views?", and "Even if it's like that... am I overreacting?". The red card is more personal, and names and telephone numbers of people/institutions the patient can turn to in case of a crisis should be filled in.

**Table 1** – Content of the metacognitive training per module (Moritz & Woodward, 2007b)

Module title	Target domain	Typical exercises
1. Attribution – Blaming and taking credit	Self-serving bias (self-serving bias vs depressive attributional style)	Different causes (blaming self, others or circumstances) of positive and negative events must be contemplated. Explanations including various causes are preferred to mono-causal explanations. The negative social consequences of self-serving attribution are highlighted.
2. Jumping to conclusions I	Data gathering bias (jumping to conclusions/ liberal acceptance/ bias against disconfirmatory evidence)	Hasty decisions may lead to incorrect answers, or give impressions that often reveal only half the truth. Fragmented pictures are shown that eventually display objects, and ambiguous pictures are displayed.
3. Changing beliefs	Incorrigibility (bias against disconfirmatory evidence)	Cartoon sequences are shown in backward order, which increasing ambiguity. Patients learn to withhold strong judgments until sufficient evidence has been collected and are encouraged to consider alternative views.
4. To empathise I	Theory of mind (first order)	Pictures of human faces are presented. Patients are asked how the people depicted might feel. Cartoon strips must be completed. Patients learn that relying on facial expression alone can be misleading, and multiple cues should be considered.
5. Memory	Overconfidence in errors (false memories)	Factors that may promote or impair memory acquisition are discussed. Complex scenes are displayed with two typical elements missing. Patients are taught to differentiate between false and correct memories by the vividness of the memory.
6. To empathise II	Theory of mind (second order/need for closure)	Different aspects guiding theory of mind (e.g. language) and their social consequences are discussed. Cartoon sequences are presented, and the perspective of one of the characters is considered.
7. Jumping to conclusions II	Data gathering bias (jumping to conclusions/ liberal acceptance)	As in module 2, the disadvantages of quick decision making are outlined. Paintings are displayed, and the correct title must be deduced from four response options.
8. Mood and self-esteem	Depressive thinking style (mood and self-esteem)	Depressive symptoms, causes, and treatment options are discussed. Typical depressive cognitive patterns are discussed. Strategies to help patients to improve mood and self-esteem are presented. This module does not contain typical exercises.
9. Additional module I: Self-esteem	Increasing self-esteem (sources/strengths/ strategies)	Self-esteem is a subjective dimension. The difference between low vs healthy self-esteem, and possible sources to self-esteem are shown. Participants are encouraged to focus on aspects in their life that are going well to increase self-esteem. Suggestions for daily routines are given.
10. Additional module II: Dealing with prejudices (Stigma)	Stigma (increasing awareness of self-stigma)	Mental illness is common in the general population (and also occurs in famous people). It does not define one's worth. Self-stigma is minimised by awareness and learning how to deal with the illness. Common clichés and misconceptions about psychosis are debunked. Ways of communicating about the illness to others are presented.

MCT group size ideally varies between 3-10 patients. The therapist may be a psychologist, occupational therapist, or other staff. The modules are highly standardised, and most slides are self-explanatory. MCT administration requires minimal staff training and preparation before sessions. The therapist ideally has received a training from the MCT staff, or has taken the certified online e-learning course (German and English: [www.uke.de/e-mct](http://www.uke.de/e-mct)). A thorough study of the extensive manual may also suffice, which provides extensive suggestions for administration (Moritz & Woodward, 2007a). The training modules are available at cost-free download ([www.uke.de/mct](http://www.uke.de/mct)) in many languages, and the manual may be requested at no costs through registration. An MCT session only requires a quiet room (with tables and chairs), a computer and a projector. The training also provides a set of behavioural rules for the training sessions, ensuring participants' wellbeing, privacy and respect towards other participants and the therapist. In most research settings MCT is administered twice a week, however, one weekly session is more general common practice.

In open group settings it may happen that patients repeat the exact same module. This is not a problem, because the exact answers to the exercises are forgotten, however, the content of the module is remembered, and patients may have encountered situations where they could put the learned content into practice. These different levels of experience increase the dynamics of the group, where the more experienced participants may function as a role model to the new participants. Modules may be repeated, and repetition within a module also plays an important role for maximum retention: in the introduction, the target domain of the module is explicitly presented; the slide 'Why are we doing this' emphasises the link with psychosis; and finally in the learning goals the target domain is revisited, followed by an example with psychosis. Additionally, the large amount of exercises facilitates consolidation through repetition, to increase learning through implicit confrontation with the dysfunctional thinking style. The interactive exercises and real life daily examples allow for participants to discuss own experiences, and give the MCT an "entertaining" character.

## Ongoing development

"[...] In order to reach more meaningful change that will allow patients to lead fulfilling lives, existing treatment

options, including MCT, must be improved".

While these words were published years later (Moritz, Woodward & Balzan, 2016), they clearly represent the attitude of the team behind the MCT. From the very start, adaptations were made, exercises modified, added or removed. Starting initially with MCT in four languages, now the modules are available in 37 different languages. Following the digital developments, video material was generated and collected, to increase the naturalistic character of the examples. Recently, the program, initially designed to reduce positive symptoms only, has been expanded with two (optional) additional modules, targeting (I) self-esteem and (II) stigma (dealing with prejudice) (Moritz & Schneider, 2016). For many patients emotional well-being represents a high treatment priority (Moritz & Schneider, 2016). An application was developed, the MCT & More app, targeting emotional problems and metacognition beyond psychosis (Lüdtke, Pult, Schröder, Moritz & Bücken, 2018). And finally, an e-learning course for therapists was created. Local initiatives to increase the usability of the treatment were supported. The Dutch version presents the text on the slides in smaller portions, increasing readability of the theoretical slides. Additionally, 'patients with psychosis' was replaced by 'individuals with a vulnerability for psychosis' to increase acceptance and identification with the examples. In Italy, a version specifically targeting youth with early psychosis was created (Ussorio et al., 2016), adapting language and the examples to the frame of reference of the young, by incorporating slides more animated and colourful, enriched by comics and cartoons; changing examples to familiar settings (school exams, fighting with siblings or friends) and including current idols (i.e., from sports, music, and cinema); the word 'psychosis' was replaced with 'distress,' 'problem,' or similar softer terms (Ussorio et al., 2016).

The group MCT formed the basis of the individual metacognitive therapy (MCT+), now available in 14 languages (Moritz et al., 2011). It consists of 11 sessions, with 10 modules provided by the therapy, and a first general session (no sheets available), to establish contact and perform an anamnesis. This first session is followed by an introduction to MCT+, and a case formulation, where the specific delusions and other symptoms of the patient are discussed. These elements are common practice in CBT, but differ greatly from the group training, where information processing is the central focus, and not the individual's specific problems. However, in the MCT+, personal delusional content should be openly

discussed. MCT+ uses exercises similar to the group MCT, applies them to the patient's individual problems and symptoms in a discussion between patient and therapist (Moritz et al., 2011). The MCT group modules Attribution (1), Changing beliefs (3), To empathise (4 & 6), and Memory (5) were adapted for this individual therapy. The module Decision making was designed, based on the MCT module Jumping to conclusions (2). The modules Depressive thinking styles and Self-esteem were adapted from MCT module 8 and the additional module I, Self-esteem. The therapy ends with a module containing information on living with psychosis, addressing stigma (see additional module II) and dealing with stress, in order to prevent relapse.

Cognitive biases are common also in other psychopathologies, and the basis of the MCT for psychosis was used to create MCT trainings for depression (D-MCT) (Jelinek, Faissner, Moritz & Kriston, 2019), depression later in life (MCT-Silver) (Schneider, Bücker, Riker, Karamatskos & Jelinek, 2018), borderline personality disorder (B-MCT) (Schilling, Moritz, Kriston, Krieger & Nagel, 2018), and obsessive compulsive disorder (MyMCT) (Miegel et al., 2020).

## EFFECTIVENESS

### From early to recent findings

Pilot studies (for reference, see Moritz & Woodward, 2007b) have demonstrated feasibility and safety of the MCT (Moritz & Woodward, 2007a). The *Positive and Negative Syndrome Scale* (PANSS) and the *Psychotic Symptom Rating Scales* (PSYRATS) were used as outcome measures for symptom severity. Subsequent assessor blind randomised controlled trials (RCT) showed medium effect sizes for the improvement of JTC, however, outcomes were not significant (Aghotor, Pfueller, Moritz, Weisbrod & Roesch-Ely, 2010; Moritz et al., 2011). Additionally, medium effect sizes were found on subjective training success, PANSS positive symptoms (Aghotor et al., 2010), and PANSS five-factor model subscales (Moritz et al., 2011). These findings did not reach significance either. After eight weeks (one module per week), delusional distress significantly decreased, and memory and social quality of life significantly improved. Most improvement was found on subjective wellbeing and general reasoning (Moritz et al., 2011).

The first longitudinal study, a two-site RCT, including 150 patients, with additional measurement at 6 months follow-up did not assess cognitive biases at post-treatment. Symptom severity was the main outcome, showing a significant reduction in delusion score after MCT compared to the control condition, and a trend towards significance for the PANSS positive subscale (Moritz et al., 2013). This outcome was associated with the number of attended sessions. Additionally, more patients showed a reduction of at least 20% on the PSYRATS delusion subscale, both post intervention and at follow-up. This study confirms the earlier findings that especially the appraisal of delusions improves and remains at this improved level even after 6 months. Overconfidence in errors also decreased (Köther et al., 2017). Participants were re-assessed at 3-year follow-up (Moritz et al., 2014). PANSS positive score and the PSYRATS delusion scale remained significantly lower for the MCT group compared to the control group. With the intention to treat analyses, PANSS delusion and total score also showed significant results after 3 years. Additionally, self-esteem and quality of life were significantly increased in the MCT compared to control group, showing a “sleeper” effect (Moritz et al., 2014).

After the above described German studies, RCTs were conducted across Europe and Asia. Most studies confirmed positive effects of MCT on the subjective perception of delusions or hallucinations (Favrod et al., 2014; Kumar et al., 2010). Other subjective measures such as usefulness, change of knowledge, helpfulness to recovery reported by the patient (Howe & Brown, 2015) and self-reflection (Lam et al., 2015) improved significantly, but self-certainty remained unchanged (Lam et al., 2015). However, one study could not detect any improvement in symptoms or cognitive biases due to MCT (van Oosterhout et al., 2014). Despite being well-powered, this study had included patients with at least moderate delusional symptoms, whereas other studies included more mildly ill patients, which might account for the absence of findings. Finally, recently the additional modules 9 & 10 were included in a study in Japan, showing a significant decrease of PANSS positive scores and of global functioning in the MCT group (Ishikawa et al., 2020).

After these studies in chronic (schizophrenia) patients, the patient population and methods were extended. MCT was administered to psychosis patients in a forensic setting (Kuokkanen, Lappalainen, Repo-Tiihonen & Tiihonen, 2014; Naughton et al., 2012). Global functioning and

consent to treatment improved after 16 sessions (Naughton et al., 2012). After a shorter treatment period, positive symptoms improved, but this result was not sustained (Kuokkanen et al., 2014). Furthermore, two Spanish groups investigated MCT in recent-onset psychosis, showing no effect on symptom severity (Ahuir et al., 2018; Ochoa et al., 2017). However, the larger study found an effect of MCT on cognitive insight, self-reflection, tolerance to frustration, and improvement of general functioning (Ochoa et al., 2017). An Italian study showed that duration of untreated psychosis in young patients did not seem to affect MCT outcomes (Ussorio et al., 2016). All patients improved on general psychopathology and positive symptoms, social functioning, as well as on verbal memory, executive function and on metacognitive and mentalising measures. MCT treatment was combined with the experience sampling method (ESM) in a Dutch study including early onset patients (Pos et al., 2018). No improvement in paranoid ideation nor in JTC was found. It was tentatively suggested that MCT reduced the association between negative affect and paranoid ideation (Pos et al., 2018). MCT has also been combined with neuroimaging, investigating the neural mechanisms underlying JTC (Andreou et al., 2018). After four weeks of MCT training, changes in neural activation were observed, possibly suggesting more effective neural processing during evidence gathering.

## Reviews and meta-analyses

The first MCT review concluded that the MCT was feasible, safe, and highly accepted by patients. Furthermore, in most studies, JTC and positive symptoms improved, more in the MCT than in the active control condition, reporting moderate effect sizes (Moritz, Vitzthum, Randjbar, Veckenstedt & Woodward, 2010). Subsequent review papers added improvements in interpersonal and psychosocial functioning, and an indication of maintenance of the effects of decreased symptom severity and burden after MCT (Kumar, Menon, Moritz & Woodward, 2015), even at 3 years post treatment (Moritz et al., 2014). A systematic review including 14 studies published between 2009 and 2015 confirmed previous findings, however, did not find improvement in social functioning of patients in the MCT group (Pankowski, Kowalski & Gawęda, 2016). MCT is considered to be fun by at least 75% of the patients, and they would recommend

it to other patients (Moritz et al., 2014). These aspects are important elements for treatment motivation and adherence. Other reviews found that MCT might be better suited (compared to CBT) for patients with lower illness insight, since delusions are not directly targeted, and that MCT might be most efficacious in first-episode psychosis patients (Menon et al., 2017). With regard to cognitive biases, most studies focused on JTC, with mixed results. Effect sizes are generally small to medium, and results do not always reach significance (Moritz et al., 2014).

An early meta-analysis incorporating a restricted selection of studies found small, non-significant effects of MCT compared to the control condition, on positive symptoms, delusions and JTC (van Oosterhout et al., 2016a). Reanalysis with three additional studies revealed significant effects for positive symptoms and delusions, but not for JTC (van Oosterhout et al., 2016b). Subsequent meta-analyses found significant improvement on the PANSS positive scale (Eichner & Berna, 2016; Jiang, Zhang, Zhu, Li & Li, 2015), and a significant decrease in delusions (Eichner & Berna, 2016), with a moderate effect directly at post-test, and sustaining after 6 months (Liu, Tang, Hung, Tsai & Lin, 2018). A large significant effect was found on subjective acceptance of the intervention (Eichner & Berna, 2016). Furthermore, two more recent meta-analyses compared MCT with other metacognitive interventions. Results show that all investigated metacognitive treatments reported less drop-out rated compared to other forms of treatment, and either more or similar symptom reduction (Philipp et al., 2019). With regard to insight, MCT shows a medium effect for self-reflectiveness, a small effect for self-certainty, and improved cognitive insight (Lopez-Morinigo et al., 2020). MCT is significantly superior to cognitive remediation, and bordering significance when compared to treatment as usual, with respect to symptom reduction. However, a study on cognitive biases reported no differences in outcomes between studies with passive and active control conditions (Sauvé, Lavigne, Pochiet, Brodeur & Lepage, 2020).

Most meta-analyses report significant heterogeneity between the investigated studies, complicating strong conclusions. Furthermore, studies vary in the control conditions used for comparison. Greater effects are reported when comparing to cognitive training, and smaller when comparing to treatment as usual. However, psychotic symptoms generally improve and results on JTC are mixed. MCT is well appreciated, and most effects are found in improved quality

of life, self-esteem, and (meta-)cognitive measures such as memory and self-reflection (Eichner & Berna, 2016). At the same time, distress related to symptoms is reduced.

## Single modules and moderators

Adapted versions of the MCT modules on JTC have been used for short interventions to improve reasoning, targeting data gathering and belief inflexibility (Ross, Freeman, Dunn & Garety, 2011), and treatment decision making capacity (Turner et al., 2019). Both studies used an attention task as active control condition. After JTC training, participants showed a significant decrease in JTC, and a trend towards more flexibility and less conviction in their delusions (Ross et al., 2011). Patients showed a large improvement on treatment decision making, compared to the control condition, and this effect was mediated by the reduction on JTC (Turner et al., 2019). However, for participants with an extreme tendency to hasty decision making, the JTC treatment was not beneficial. Work has only just begun addressing which MCT modules or procedures carry the treatment effect (Moritz et al., 2016). Future research may unravel the effective elements of the separate modules and the training as a whole.

Personal factors increasing the effectiveness of MCT treatment are: low self-esteem, increased social anxiety at treatment start, a positive appraisal of the MCT (Moritz, Menon, Andersen, Woodward & Gallinat, 2018), and lower treatment insight (Naughton et al., 2012). Similar characteristics have been reported for the effectiveness of MCT+, where more JTC, lower decision making threshold and low self-esteem in patients increased outcomes (Leanza, Studerus, Bozikas, Moritz & Andreou, 2020). For patients with severe delusions, group MCT might not be the best treatment (Eichner & Berna, 2016; van Oosterhout et al., 2014). The developers of MCT now recommend that patients with severe delusional and disorganised symptoms should rather participate in individualised CBT or MCT+. The reverse is advised for patients who are not ready yet for a direct confrontation with their symptoms (Moritz & Woodward, 2007b). Within the first 2 years after psychosis onset, duration of untreated psychosis does not seem to influence treatment outcomes with respect to symptom severity (Ussorio et al., 2016). And finally, the number of sessions attended also influenced treatment outcomes, irrespective of treatment condition (Moritz et al., 2018). In sum, MCT has most effect

in patients with higher general symptoms (low self-esteem, increased social anxiety) and mild to moderate psychotic symptoms, who are motivated to adhere to the training.

## Strengths and limitations of MCT

One of the major strengths of the MCT is the backdoor approach. Instead of directly challenging the belief system, MCT aims to give the patient insight that there may be various explanations for an event and that it is better to evaluate it from various perspectives, before forming a firm belief (Kumar et al., 2010; Ross et al., 2011). This makes the acquired skills transferable to other contexts and MCT may be associated with improvements in social and occupational functioning in general (Briki et al., 2014; Moritz et al., 2010; Naughton et al., 2012). The group training as such can also be viewed as a form of social competence training. A second strength is the acceptance and positive experience of the patients. Psychosis patients are difficult to motivate for therapy, and a positive therapeutic experience can only be beneficial for their wellbeing. Additionally, MCT has been shown to be effective not only in high income Western countries, after adaptation of the exercises to the specific culture and language, suggesting the underlying mechanisms to be culture free.

However, a limitation is that not all patients display all cognitive biases addressed in MCT. Therefore, not all modules may be equally relevant for all group members (Moritz et al., 2014). Furthermore, patients with severe symptoms do not benefit from the MCT, but when patients show too little symptoms, a floor effect may appear (Moritz et al., 2011). A third limitation is that treatment stays are often very brief, and for many patients even 8 modules of one cycle would last longer than their treatment duration (Moritz et al., 2016).

## Recommendations

To overcome these limitations, some recommendations are presented. When patients are too ill, with severe psychotic symptoms, MCT may not be effective (Turner et al., 2019; van Oosterhout et al., 2014) and MCT+ is recommended. This improvement is also dependent on the number of sessions followed, that is, on motivation and treatment adherence. It is recommended to administer at least 8-10 sessions (including

additional modules), preferably more than 16-20. As an outcome measure, PSYRATS is found to be a more sensitive measure than PANSS. A combination of MCT and MCT+ shows largest reduction of delusional symptoms (Moritz et al., 2011), and ideally MCT is presented in a combination with (some form of) CBT (Moritz & Woodward, 2007b). MCT might precede CBT, ameliorating the cognitive infrastructure maintaining delusional beliefs, which are then more directly challenged by CBT (Moritz et al., 2011). However, symptom improvement is not necessarily the best guide to functional improvement, and it is recommended to include a clinically significant change measure, the Reliable Change Index (Aghotor et al., 2010), and a functional mental capacity measure (Naughton et al., 2012).

## CONCLUSION

This practice based review provided a historical overview of the MCT from the first pilot study to recent meta-

analyses. From the very beginning, MCT was evaluated by patients as nice to do, fun and useful for daily routines. Almost without any exception, studies reported positive effects on psychotic symptoms. Findings on JTC are mixed. JTC is a strong bias in people with delusions, that is difficult to change with only a brief training intervention (Ross et al., 2011). Overconfidence in errors is reduced (Köther et al., 2017), but other cognitive biases have not been used as outcome measures, hence no conclusions on effectiveness can be drawn. Stable effects are seen in increases of quality of life, delusion distress and conviction, self-esteem, social functioning, usefulness, and memory and self-reflection. In sum, especially general (meta-) cognitive and real life outcome measures improve. Significance of the results depended on the kind of control condition, the number of sessions and patient characteristics. Vulnerability for psychosis has a lifelong impact on social lives and functioning of patients. In view of the existing literature, it seems beneficial and meaningful to administer the MCT at a certain point in treatment.

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