

# Effectiveness of metacognitive interventions for mental disorders in adults—A systematic review and meta-analysis (METACOG)

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## Abstract

We evaluated the effectiveness and acceptability of metacognitive interventions for mental disorders. We searched electronic databases and included randomized and nonrandomized controlled trials comparing metacognitive interventions with other treatments in adults with mental disorders. Primary effectiveness and acceptability outcomes were symptom severity and dropout, respectively. We performed random-effects meta-analyses. We identified Metacognitive Training (MCTrain), Metacognitive Therapy (MCTherap), and Metacognition Reflection and Insight Therapy (MERIT). We included 49 trials with 2,609 patients. In patients with schizophrenia, MCTrain was more effective than a psychological treatment (cognitive remediation, SMD = -0.39). It bordered significance when compared with standard or other psychological treatments. In a post hoc analysis, across all studies, the pooled effect was significant (SMD = -0.31). MCTrain was more effective than standard treatment in patients with obsessive-compulsive disorder (SMD = -0.40). MCTherap was more effective than a waitlist in patients with depression (SMD = -2.80), post-traumatic stress disorder (SMD = -2.36), and psychological treatments (cognitive-behavioural) in patients with anxiety (SMD = -0.46). In patients with depression, MCTherap was not superior to psychological treatment (cognitive-behavioural). For MERIT, the database was too small to allow solid conclusions. Acceptability of metacognitive interventions among patients was high on average. Methodological quality was mostly unclear or moderate. Metacognitive interventions are likely to be effective in alleviating symptom severity in mental disorders. Although their add-on value against existing psychological interventions awaits to be established, potential advantages are their low threshold and economy.

## KEYWORDS

mental disorders, meta-analysis, metacognition, psychotherapy, systematic review

## 1 | INTRODUCTION

In the last 20 years, the concept of metacognition, a term first introduced by John H. Flavell in the 1970s (Flavell, 1979), was used to develop new psychological interventions in order to address some of

the shortcomings of more traditional psychotherapies (Hamm, Hasson-Ohayon, Kukla, & Lysaker, 2013; Keller & Boland, 1998; Ludvik & Boschen, 2015; Richter, 1999; Wells & Purdon, 1999). Some authors understand metacognitive interventions as an extension of cognitive-behavioural therapy (CBT; Hofmann & Asmundson, 2008;

Moritz et al., 2014), whereas others classify them as third wave therapies (Gordon-King, Schweitzer, & Dimaggio, 2018; Hunot et al., 2013) or use metacognition in the context of integrative psychotherapies (Dimaggio et al., 2017; Inchausti et al., 2017; Lysaker et al., 2011). In general, metacognitive interventions include specific therapeutic elements that target patients' "knowledge and cognition about cognitive phenomena" (Flavell, 1979). Still, there is a variety of publications in which interventions are called "metacognitive" but which differ in their definition of the term. While working on this systematic review, we developed a working definition of metacognitive interventions. We define them as "treatments that explicitly target metacognitive content—characterized by the awareness and understanding of one's thoughts and feelings as well as the thoughts and feelings of others—as the key element." Also, they are goal-oriented and aim to alleviate disorder-specific and individual symptoms by specifically enhancing metacognitive capacities in order to gain more flexibility in the attention, monitoring, control, and regulation of cognitive processes. According to this definition, we included three metacognitive interventions in our systematic review: *Metacognitive Training* (MCTrain), first developed by Steffen Moritz and Todd Woodward for patients with schizophrenia (Moritz & Woodward, 2007); *Metacognitive Therapy* (MCTherap), first developed by Adrian Wells and Gerald Matthews for patients with generalized anxiety disorder (GAD; Wells & Matthews, 1994); and metacognitively oriented integrative psychotherapies that are based on a narrative approach and were developed for patients with personality disorders and schizophrenia (Dimaggio & Semerari, 2001; Lysaker & Lysaker, 2001; Semerari et al., 2003). In this review, the latter group of interventions is represented by *Metacognition Reflection and Insight Therapy* (MERIT) as introduced by Lysaker and Klion (2017), because to date, there are no results of randomized controlled trials (RCTs) or non-RCTs (NRCTs) available for other conceptualizations like *Metacognitive Interpersonal Therapy* (Dimaggio et al., 2017). Despite a number of differences, all three metacognitive interventions share the assumption of a metalevel of cognition that affects emotions and behaviour through giving attention to and reflecting on thoughts and beliefs (for a review, see Moritz & Lysaker, 2018).

Metacognitive interventions were disseminated for a variety of mental disorders. Their evidence base is constantly growing, and evaluation studies report improved psychological symptoms. As described in our review protocol (Kühne et al., 2017), previous narrative and systematic reviews conclude positive effects for MCTherap (Normann, van Emmerik, & Morina, 2014; Wells, 2013) and MCTrain (Eichner & Berna, 2016; Liu, Tang, Hung, Tsai, & Lin, 2018; Moritz et al., 2014), but their results are limited by methodological shortcomings, especially in regard to the search and selection of the primary studies, the investigated mental disorders, and the systematic evaluation of quality of evidence and risk of bias. Also, meta-analyses report inconsistent findings (Jiang, Zhang, Zhu, Li, & Li, 2015; van Oosterhout et al., 2015). Thus, a comprehensive and methodologically sound systematic review that covers the existing evidence including RCTs and NRCTs of metacognitive interventions in different mental disorders is needed.

In this systematic review, we aim to assess the effects of metacognitive interventions for adult patients with mental disorders. Therefore, the purpose of this study is threefold. First, we investigate

### Key Practitioner Message

- Our meta-analyses suggest that Metacognitive Training and Metacognitive Therapy are likely to be effective in alleviating symptom severity in mental disorders.
- Metacognitive Training and Metacognitive Therapy are accessible interventions that can easily be adapted to various clinical settings.
- Large and independent multicentre trials investigating short- and long-term effects that are relevant to patients are needed to strengthen the evidence base.

whether metacognitive interventions are effective. Second, we investigate whether effectiveness within these interventions varies across mental disorders. Third, we explore the acceptability of different metacognitive interventions.

## 2 | METHODS

This review was registered with the PROSPERO international prospective register of systematic reviews (CRD42016051006). A detailed review protocol has been published in an open access journal (Kühne et al., 2017). For deviations from the protocol and further specifications, see (Section S1 of the supplement). We conducted this systematic review and the meta-analyses in accordance with current guidelines (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009; Shea et al., 2007; The Cochrane Collaboration, 2009).

### 2.1 | Eligibility criteria

We included RCTs and NRCTs that were conducted in adults ( $\geq 18$  years) with any mental disorder. Diagnoses needed to be based on a formal classification (e.g., ICD, World Health Organization, 1992; DSM, American Psychiatric Association, 2000) or on reliable and validated disorder-specific questionnaires. We included studies regardless of patients' co-morbidity (including any physical disorder) and treatment setting.

We only included studies that investigated metacognitive interventions meeting our working definition. Comparators were other specific active treatments (psychological, pharmacological, or combined psychological and pharmacological treatment) and nonactive treatments (e.g., standard treatment, placebo, and waitlist). We defined psychological treatment as any form of treatment that uses psychological methods to alleviate symptoms. Thus, they include comprehensive psychotherapeutic treatments that are based on scientific theories and consider patients' personal needs as well as single psychological techniques like psychoeducation or relaxation techniques, supportive treatments, and treatments that foster cognitive functioning. We defined standard treatment as inpatient or outpatient treatments including pharmacotherapy, contacts to case workers, other psychosocial support, or occupational therapy.

The primary effectiveness outcome was symptom severity at the end of intervention measured with a disorder-specific questionnaire or symptom rating scale. Secondary effectiveness outcomes were treatment response, improvement in overall symptomatology, changes in metacognitive processes, satisfaction with treatment, and quality of life. In a patient involvement workshop, applicability of metacognitive interventions, autonomy, self-perception, empowerment, and emotion regulation were identified as further secondary effectiveness outcomes mainly relevant to patients (Brütt et al., 2017). The primary acceptability outcome was the number of patients who dropped out of the treatment due to any reason. Secondary acceptability outcomes were the number of patients with treatment-related adverse events.

## 2.2 | Search

We conducted an electronic database search in MEDLINE, ISI Web of Science, BIOSIS, CINAHL, PsycINFO, and the Cochrane Central Register of Controlled Trials (CENTRAL) on April 28, 2017, and an updated MEDLINE search on March 7, 2018. We searched clinical trial registries through the World Health Organization's trials portal (ICRTP) and ClinicalTrials.gov and then contacted the principle investigators of unpublished and ongoing trials. We checked reference lists of the included studies as well as other systematic reviews and were in contact with key authors of metacognitive interventions (Adrian Wells and Steffen Moritz) for more information regarding published and unpublished studies. To identify grey literature, we searched ProQuest Dissertations, Open Grey, and Google Scholar. For the complete search strategies, see Section S2.

## 2.3 | Study selection

One reviewer (R. P.) screened titles and abstracts of all identified studies to identify potentially eligible studies. Two out of three reviewers (R. P., F. K., and R. M.) independently screened the full texts of these studies for inclusion. If we found studies to be ineligible, we documented the reasons for exclusion. In case we disagreed on the eligibility of a study, we discussed criteria until we reached a consensus or consulted a third reviewer. If there was more than one report for a study, we subsumed them because the units of interest were the studies rather than the reports (Table S5.1).

## 2.4 | Data collection process and data items

Two out of five reviewers (R. P., F. K., R. M., and two scientific employees) independently extracted study characteristics including intervention characteristics, sample characteristics, metacognitive intervention and comparators, and outcome data using a structured Microsoft Excel sheet (Section S3). In case the extracted data differed, we reached consensus through discussion or a third reviewer. If outcome data or study characteristics were unclear or not reported, we contacted the corresponding author, documented correspondence, and marked the added data.

## 2.5 | Assessment of methodological quality

We used Cochrane's tool (The Cochrane Collaboration, 2009) for assessing the risk of bias of the included RCTs and the ROBINS-I tool (Sterne et al., 2016) for assessing the risk of bias in the included NRCTs. Two out of five reviewers (R. P., F. K., R. M., and two more scientific employees) independently judged risk of bias. If we disagreed on the methodological quality, we discussed criteria until we reached a consensus or consulted a third reviewer. In case a report missed data for adequate judgement of risk of bias, we searched the associated study protocol or trial registration or contacted the corresponding author.

## 2.6 | Data synthesis

For the primary effectiveness outcome symptom severity, we ranked the administered scales for each disorder according to psychometric criteria and frequency of application. We preferred observer-rated outcomes over patient-reported outcomes as they are more likely to be blinded (for details, see Section S4). When studies reported data for more than one time of measurement, we extracted all available data but only synthesized data for the time of primary measurement, which was the end of intervention in all of the studies.

The secondary effectiveness outcome response rate was defined depending on the mental disorder investigated in the study. We used a minimum decrease of 30% compared with the score at baseline for positive symptoms of schizophrenia (Howes et al., 2017); of 35% for obsessive-compulsive disorder (OCD; Farris, McLean, van Meter, Simpson, & Foa, 2013; Lewin et al., 2011); and of 50% for depression (Keller et al., 2000), anxiety (Loerinc et al., 2015), and posttraumatic stress disorder (PTSD; Bryant et al., 2008). If response rates were not reported, we estimated the number of responders according to Suissa's formula (Meister, von Wolff, & Kriston, 2015; Suissa, 1991).

For continuous outcomes, we summarized the outcomes by calculating standardized mean differences (SMD) for studies that utilized different questionnaires or scales. For dichotomous outcomes (response and dropout rates), we calculated odds ratios with corresponding 95% confidence intervals. We calculated odds ratios on the basis of the intention-to-treat sample as defined by the authors. However, for the calculation of SMD, we needed to use the sample size reported by the authors. We calculated and reported SMD, when the sample size was  $\geq 5$  in each group. We combined studies for meta-analyses, when at least two studies reported data for the same comparison and outcome.

We conducted separate meta-analyses for the different types of metacognitive interventions and mental disorders. Also, we only compared metacognitive interventions that were similar with regard to therapist guidance (e.g., full psychotherapy, major or minor therapist support, and unguided) or delivery mode (e.g., face to face and online). We calculated meta-analyses using a random-effects model, because we assumed that included studies will show considerable heterogeneity (Kriston, 2013). We tested statistical heterogeneity between study results using Cochran's Q test and the  $I^2$  statistic (Higgins, Thompson,

Deeks, & Altman, 2003). To test for possible reporting bias and small-study effects, we used Egger's test (Egger, Smith, Schneider, & Minder, 1997) and examined funnel plots visually. We did not perform subgroup analyses in case of categorical predictors or meta-regression analyses in case of metric predictors (Section S1). We performed sensitivity analyses excluding studies without randomization (NRCTs). Results were contrasted to those acquired with data from all studies in order to control for possible effects of study design on pooled effects.

### 3 | RESULTS

#### 3.1 | Study selection

Altogether, we screened 4,404 records. Figure 1 shows the flow diagram, including reasons for exclusion of full-text articles. Additional information on excluded studies and identified ongoing studies are listed in the Table S5.2. We included 49 primary studies reported in 58 publications in our review. A total of 39 studies with 2,179 patients provided data for quantitative analyses.

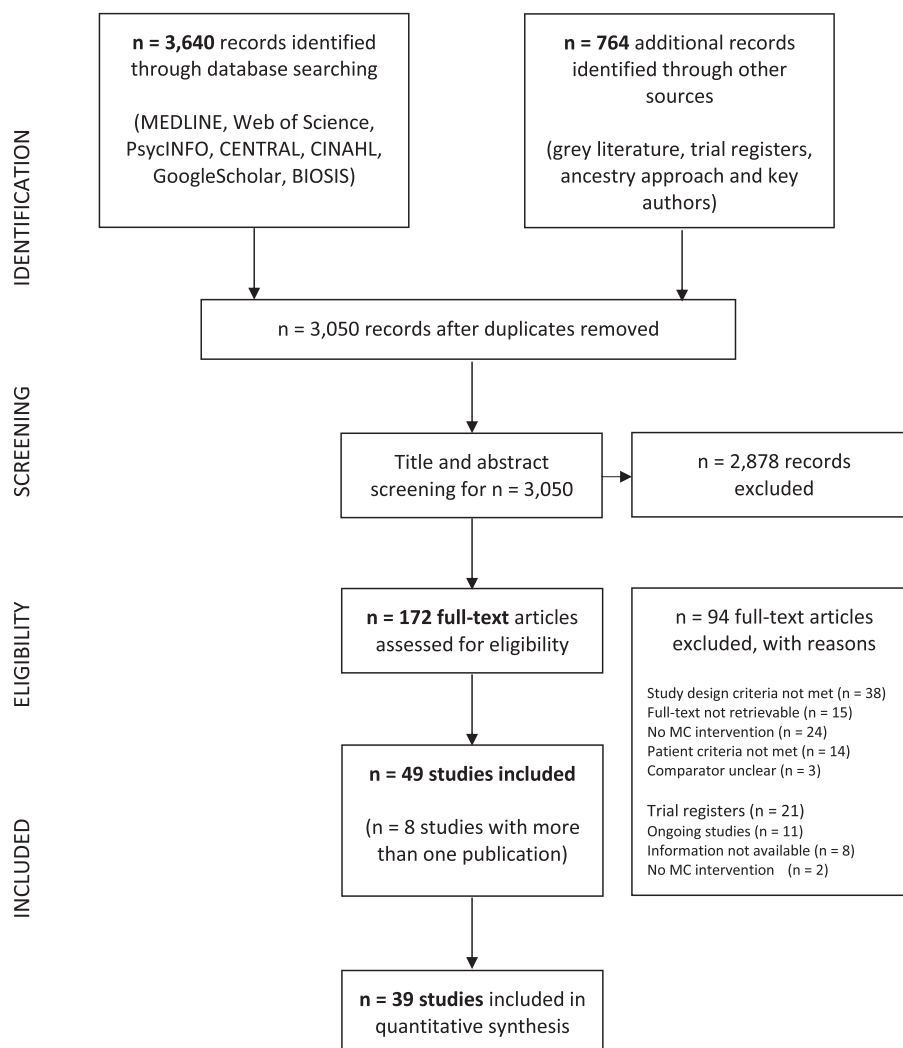
#### 3.2 | Description of included studies

##### 3.2.1 | Study characteristics

We included 44 RCTs and five NRCTs that were published between 2007 and 2018 (Table S5.1). More than half of the studies were conducted in European countries ( $n = 31$ ), followed by Iran ( $n = 8$ ), Australia and New Zealand ( $n = 3$ ), China ( $n = 2$ ), India ( $n = 2$ ), the United States ( $n = 2$ ), and Indonesia ( $n = 1$ ). Six RCTs were conducted as three-arm studies.

##### 3.2.2 | Sample and intervention characteristics

The overall number of included patients was 2,609 and ranged from four to 154, with an average age ranging from 24 to 46 years. Although gender distribution varied between 0% and 96% of females, Table S5.1 shows that only 21 of the 49 studies had more than 50% of female participants. Evidence for each of the metacognitive interventions was primarily reported for the mental disorders which the interventions were originally developed for. Twenty-eight studies tested the effectiveness of MCTrain, most of them in patients with schizophrenia (21/28). MCTherap was tested in 19 of the 49 studies, mostly



**FIGURE 1** Flow diagram of identified and included records

in patients with depression (7/19). MERIT was tested in two studies in patients with schizophrenia. Treatment was conducted in individual (27/49), group (20/49), or mixed sessions (2/49) and lasted between 2 and 52 weeks in inpatient and outpatient settings. Comparators were other psychological treatments ( $n = 24$ ), standard treatment ( $n = 12$ ), waitlist ( $n = 11$ ), pharmacotherapy alone ( $n = 3$ ), or combined treatment ( $n = 2$ ).

### 3.2.3 | Outcome data

Most studies reported symptom severity based on rating scales at the end of treatment (45/49). Response rates, however, were only reported in nine studies and needed to be estimated in the majority of studies (34 studies). Because synthesized results on response rates may be of reduced reliability, we only report them in Sections S6 and S7. In regard to secondary outcomes, overall symptomatology was reported in 13/49 studies, changes in metacognitive processes in 14/49 studies, and quality of life in 10/49 studies (Table S5.1). Moreover, the outcomes identified as clinically relevant in the patient involvement workshop (Brütt et al., 2017) were not reported in any of the studies. As for acceptability, five studies did not report any data on the number of patients that dropped out of the treatment. Most of the studies (45/49) did not report treatment-related adverse events. The remaining four studies reported no adverse events or effects.

### 3.2.4 | Methodological quality

In 26 out of 44 RCTs, the sequence for random allocation was generated adequately. The allocation of patients to the study arms was adequately concealed in half of the studies (21/44). Because we investigated psychotherapy studies, it was not possible to blind patients or therapists adequately in any of them. Blinding was adequate for assessment of the primary outcome in more than half of the studies (23/44), and almost half (22/44) reported outcome data completely. Twelve out of 44 studies were registered prior to start and reported the outcome data as planned. In half of the studies, it was ensured that the intervention was implemented as conceptualized (22/44) and that patients in all study arms were attended to equally (26/44). For 12 studies, we rated that the authors had no conflict of interest. Table S5.3 shows the results of the methodological quality assessment of the RCTs in more detail. The results of the methodological quality assessment for the five included NRCTs are presented in the Table S5.4.

## 3.3 | Quantitative analyses

Table 1 shows the results of the quantitative analyses. Figures 2–4 show the forest plots for the primary outcome of symptom severity. Additional forest plots and funnel plots are presented in Sections S6 and S7.

### 3.3.1 | MCTrain

We conducted meta-analyses for 23 of the 28 studies that investigated MCTrain in addition to standard treatment or psychological treatment. Standard treatment always included pharmacotherapy.

For patients with schizophrenia, we calculated meta-analyses for 15 RCTs and four NRCTs that compared MCTrain with standard treatment or with psychological treatments (Supportive Therapy and Psychoeducation, Newspaper Discussion, and Cognitive Remediation Tasks) in a total sample of 1,127 patients. MCTrain was statistically more effective when compared with Cognitive Remediation Tasks but only bordered significance when compared with standard treatment or other psychological treatments (Table 1). In a post hoc analysis, we pooled data across all studies to make our meta-analysis comparable with earlier meta-analyses (Eichner & Berna, 2016). For this analysis, patients in the MCTrain groups reported significantly less symptoms on average than those in the control groups (Figure 2). These results corresponded with responder and sensitivity analyses (Figures S6.1 and S6.2, respectively). The included studies were clinically heterogeneous with regard to the control groups, patient characteristics, and the type of MCTrain that was tested (see Table S5.1 for detailed characteristics). Accordingly, statistical heterogeneity was substantial across studies. Fewer patients dropped out of the MCTrain groups than out of the groups that performed cognitive remediation tasks. Dropout rates between the MCTrain groups and the other control groups did not differ (Figure S6.3). When we examined the funnel plots visually, we found no indication for publication bias (Figure S6.4). Accordingly, Egger's test for publication bias was not significant ( $p = 0.14$ ).

For patients with OCD, MCTrain was developed as an unguided online self-help intervention (myMCT). Three studies with a total sample of 245 patients (Moritz et al., 2016; Moritz et al., 2018; Moritz, Jelinek, Hauschildt, & Naber, 2010) tested the effectiveness of myMCT against standard treatment alone. Patients in the myMCT groups showed significantly less severe obsessive-compulsive symptoms than those in the control groups (Table 1). Groups did not differ in the number of patients who responded to the treatment (Figure S6.5). There was no substantial statistical heterogeneity (Figure 2). Although treatment dropout was not determined for these online interventions, two studies specified that 14% to 21% of the patients did not read the self-help manual (Moritz et al., 2010; Moritz et al., 2018). Compared with the control groups, fewer patients in the myMCT group completed postassessment (Figure S6.6). One study with a sample of 128 patients (Hauschildt, Schröder, & Moritz, 2016) compared myMCT with a psychological treatment (psychoeducation). Groups did not differ in symptom severity (Table 1). Of the 90% of the patients who completed postassessment in both groups, half of the patients stated that they did not read the myMCT manual thoroughly. A post hoc analysis, across all four studies, showed that patients receiving myMCT reported significantly less symptoms on average than those in the control groups (Table 1). The number of studies was too small to make a conclusive statement on publication bias (Figure S6.7).

MCTrain for patients with depression was tested in one study with a sample of 84 patients (Jelinek et al., 2016). Patients in the

**TABLE 1** Results of quantitative analyses

Comparison	No. of studies	Data available for % of ITT sample		SMD	95% CI	Heterogeneity (I <sup>2</sup> , p for Q statistic)	Significance of treatment effect
		MCT	Control				
MCTrain for positive symptoms in schizophrenia							
Standard treatment	11	88%	93%	−0.27	−0.59 to 0.05	60.7%, p = 0.00	z = −1.68, p = 0.09
Psychological treatment: <i>Supportive Therapy and Psychoeducation</i>	2	73%	73%	−0.28	−0.81 to 0.25	57.3%, p = 0.13	z = −1.03, p = 0.31
Psychological treatment: <i>Newspaper Discussion</i>	2	85%	89%	−0.41	−1.00 to 0.18	35.9%, p = 0.21	z = −1.36, p = 0.17
Psychological treatment: <i>Cognitive Remediation Tasks</i>	4	95%	88%	−0.39	−0.67 to −0.10	35.2%, p = 0.23	z = −2.63, p = 0.01
Post hoc: Any other treatment	19	87%	88%	−0.31	−0.50 to −0.12	51.0%, p = 0.01	z = −3.23, p = 0.001
MCTrain for severity of obsessive–compulsive symptoms							
Standard treatment	3	63%	81%	−0.40	−0.70 to −0.09	0.0%, p = 0.80	z = −2.58, p = 0.01
Psychological treatment: <i>Psychoeducation</i>	1	100%	100%	−0.10	−0.45 to 0.25	NA	z = −0.57, p = 0.57
Post hoc: Any other treatment	4	75%	88%	−0.27	−0.50 to −0.04	0.0%, p = 0.56	z = −2.32, p = 0.02
MCTrain for other mental disorders							
Depression Psychological treatment: <i>Health Training</i>	1	100%	100%	−0.63	−1.07 to −0.19	NA	z = −2.81, p = 0.01
BPD Psychological treatment: <i>Progressive Muscle Relaxation</i>	1	74%	72%	−0.12	−0.65 to 0.41	NA	z = −0.43, p = 0.66
MCTherap for severity of depressive symptoms							
Nonactive treatment: <i>Waitlist</i>	3	100%	100%	−2.80	−5.30 to −0.30	95.0%, p = 0.00	z = −2.19, p = 0.03
Psychological treatment: <i>Cognitive–behavioural treatments</i>	3	100%	100%	0.02	−0.40 to 0.43	0.0%, p = 0.46	z = 0.07, p = 0.94
Pharmacological Treatment	1	100%	100%	−3.21	−4.68 to −1.74	NA	z = −4.28, p ≤ 0.001
MCTherap for severity of anxiety symptoms							
Other psychological treatment: <i>Cognitive–behavioural treatments</i>	4	86%	89%	−0.46	0.76 to −0.16	0.0%, p = 0.81	z = −3.00, p = 0.003
Psychological treatment: <i>Applied Relaxation</i>	1	100%	100%	−1.25	−2.21 to −0.29	NA	z = −2.56, p = 0.01
Nonactive treatment: <i>Waitlist</i>	1	92%	92%	−1.85	−2.70 to −1.00	NA	z = −4.26, p ≤ 0.001
MCTherap for other mental disorders							
PTSD Nonactive treatment: <i>Waitlist</i>	2	100%	100%	−2.36	−4.40 to −0.31	82.9%, p = 0.02	z = −2.26, p = 0.02
BDD Nonactive treatment: <i>Waitlist</i>	1	100%	100%	−1.36	−2.34 to −0.39	NA	z = 2.75, p = 0.01
MERIT for schizophrenia symptoms in early psychosis							
Psychological intervention: <i>Supportive Therapy</i>	1	80%	100%	−0.42	−1.36 to 0.52	NA	z = −0.88, p = 0.38

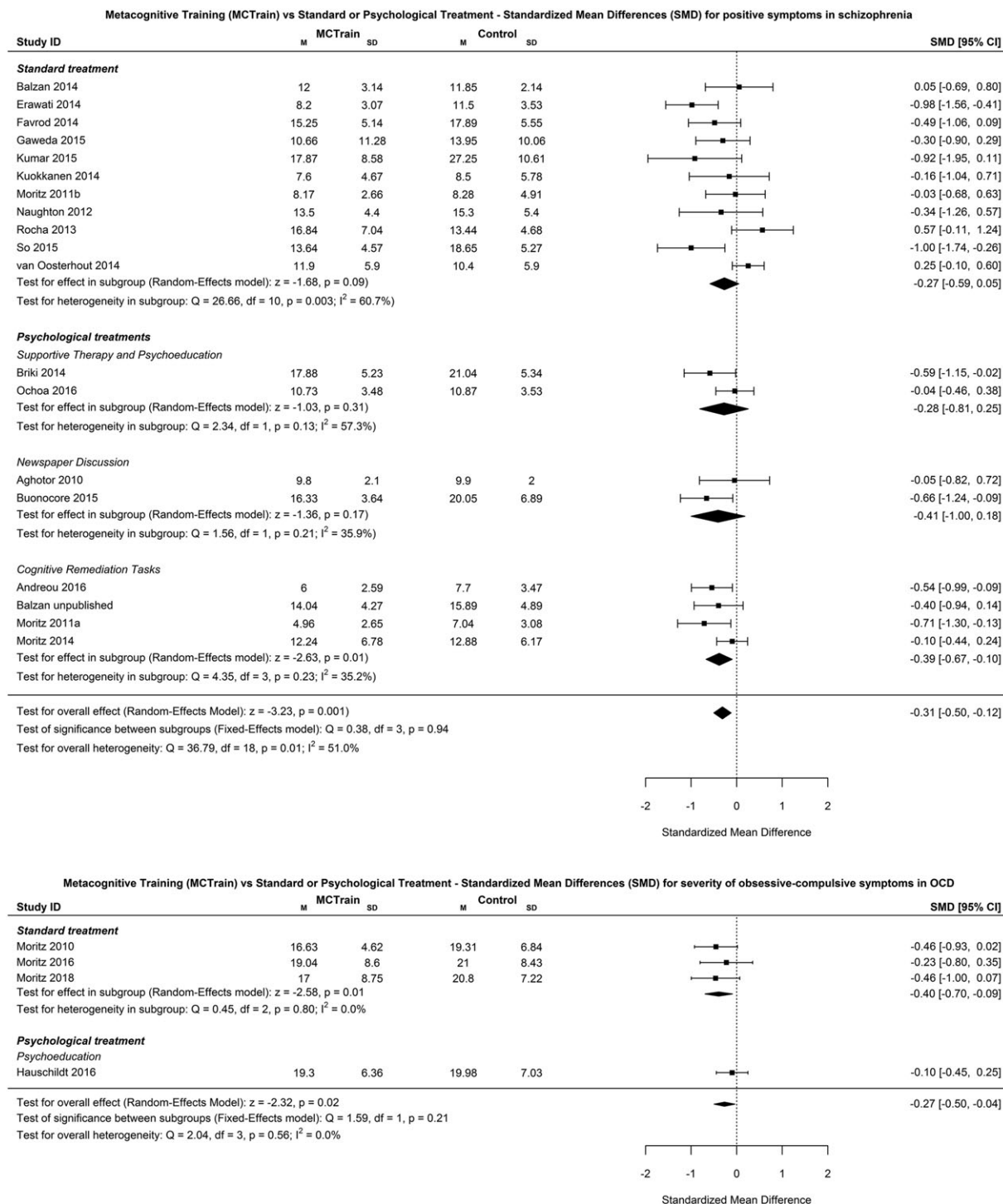
Note. BDD: body dysmorphic disorder; BPD: borderline personality disorder; PTSD: posttraumatic stress disorder.

MCTrain group reported significantly less severe depressive symptoms than those receiving a psychological treatment (health training; Table 1). Less patients dropped out of the MCTrain group (3/41) than out of the control group (2/43).

MCTrain for BPD was tested in two studies that compared MCTrain with a psychological treatment (progressive muscle relaxation

training, PMR). In one study with a sample of 74 patients (Schilling, Moritz, Kriston, Krieger, & Nagel, 2017), groups did not differ in the average severity of BPD symptoms (Table 1). More patients dropped out of the PMR group (7/36) than out of the MCTrain group (1/38). Another study (Schilling, Moritz, Köther, & Nagel, 2015) did not report data for any of the predefined outcome measures.





**FIGURE 2** Standardized mean differences for Metacognitive Training versus standard or psychological treatment in patients with schizophrenia (upper figure) and with obsessive-compulsive disorder (lower figure)

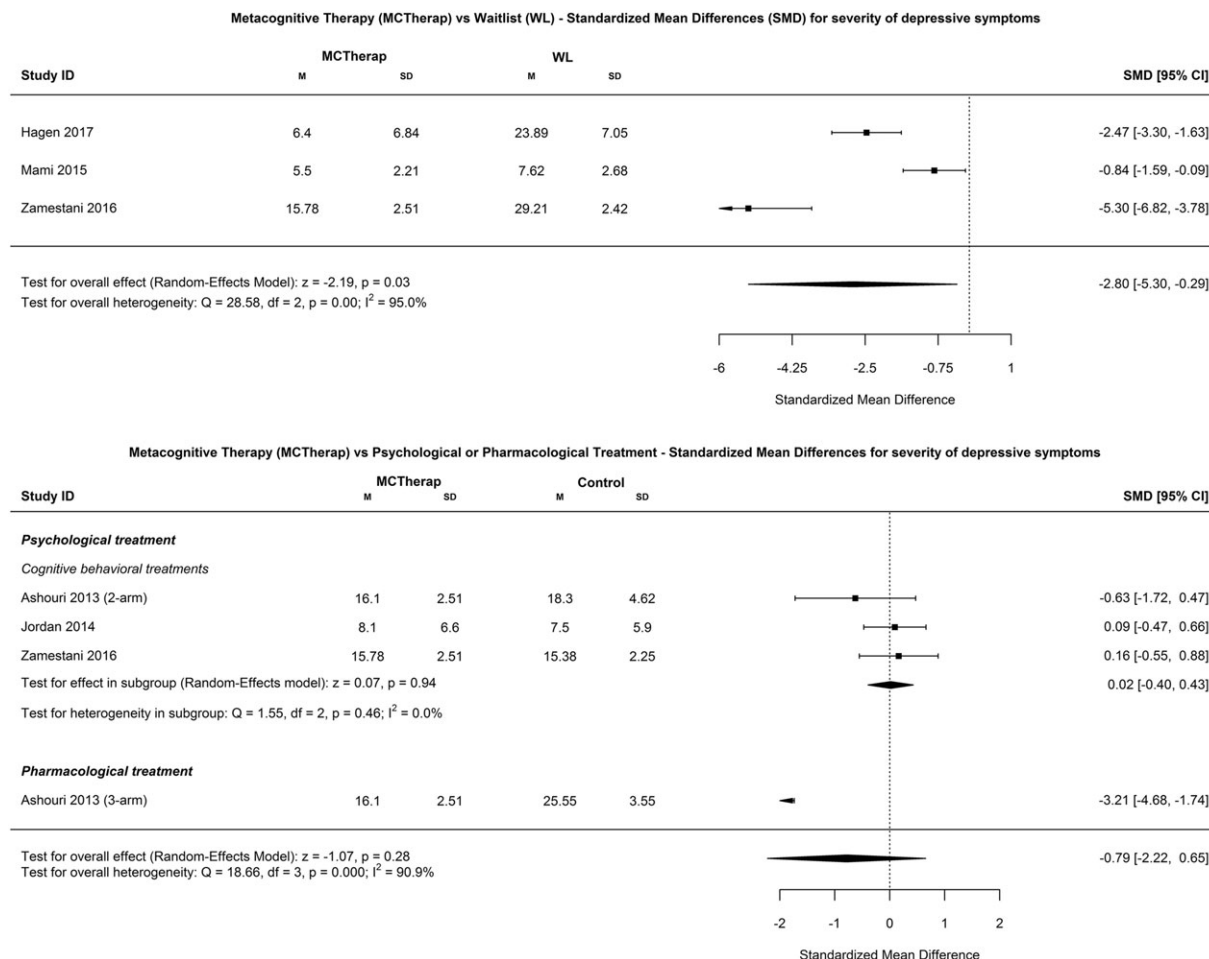
### 3.3.2 | MCTherap

We conducted meta-analyses for 11 of the 19 studies that investigated MCTherap; in four studies, patients continued pharmacological treatment (see Table S5.1 for detailed characteristics).

Three studies compared a total sample of 99 patients with depression (Hagen et al., 2017; Mami, Sharifi, & Mahdavi, 2015; Zemestani, Davoodi, Honarmand, Zargar, & Ottaviani, 2016) receiving MCTherap with patients on a waitlist to receive MCTherap. Overall,

MCTherap was superior in alleviating depressive symptoms. Statistical heterogeneity was considerable (Figure 3). Results corresponded with responder analysis (Figure S7.1). Dropout rates did not differ between the groups (Figure S7.2).

Three studies compared a total sample of 98 patients with depression (Ashouri, Atef-Vahid, Gharaee, & Rasouljan, 2013; Jordan et al., 2014; Zemestani et al., 2016) receiving MCTherap against patients receiving psychological treatments (CBT or Behavioural Activation). Overall, treatment groups did not differ in the average severity



**FIGURE 3** Standardized mean differences for Metacognitive Therapy versus nonactive waitlist (upper figure) and psychological or pharmacological treatment (lower figure) in patients with depression

of depressive symptoms at the end of intervention (Table 1). Neither did the groups differ in the number of patients who responded to or dropped out of the treatment (Figures S7.4 and S7.5, respectively). There was no statistical heterogeneity for any of the outcomes (Section S7).

In a study (Ashouri et al., 2013) that tested MCTherap against a pharmacotherapy only condition in patients with depression, the MCTherap group reported significantly less severe depressive symptoms than patients receiving pharmacotherapy (Table 1).

Four studies compared MCTherap with other psychological treatments (mindfulness-based stress reduction or CBT) in a total sample of 182 patients with mixed or co-morbid anxiety disorders (Capobianco, Reeves, Morrison, & Wells, 2018; Johnson, Hoffart, Nordahl, & Wampold, 2017; Kvistedal, 2011; Nordahl, 2009). Overall, MCTherap was superior to another psychological treatment in alleviating symptoms of anxiety (Table 1). Accordingly, more patients in the MCTherap groups responded to the treatment than in the control groups (Figure S7.7). Dropout rates did not differ between the groups (Figure S7.8). Two single studies (Kvistedal, 2011; Wells et al., 2010) included in the overall analysis (Figure 4) reported results in favour of MCTherap compared with waitlist and psychological treatment (applied relaxation; Table 1). There was no statistical heterogeneity for any of the outcomes (Section S7).

Two studies compared MCTherap with a nonactive waitlist group in a total sample of 41 patients (Wells & Colbear, 2012; Wells, Walton, Lovell, & Proctor, 2015). Results suggest that MCTherap may be superior to a waitlist group in alleviating PTSD symptoms (Figure 4).

Statistical heterogeneity was considerable (Table 1). Compared with the patients in the waitlist group, more patients in the MCTherap group responded to the treatment (Figure S7.10). Dropout rates did not differ between the groups (Figure S7.11).

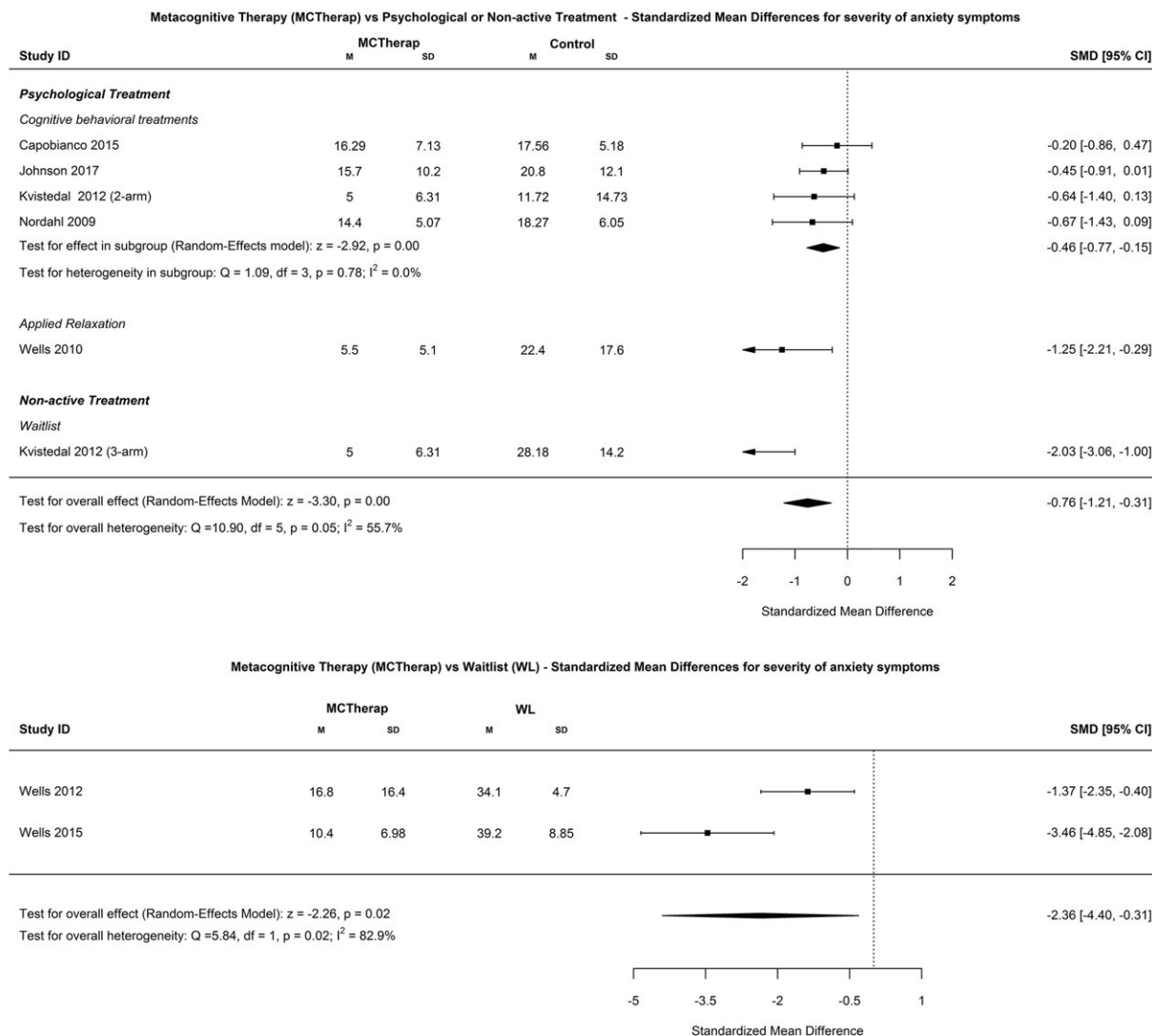
Because of the small number of studies and small sample sizes within the studies, visual examination of funnel plots was inconclusive (Section S7).

One study tested MCTherap against a nonactive waitlist group in patients with body dysmorphic disorder (Rabiei, Mulkens, Kalantari, Molavi, & Bahrami, 2012). Patients in the MCTherap group reported less symptoms than those in the waitlist group (Table 1).

### 3.3.3 | MERIT

One study (Vohs et al., 2017) compared MERIT for the treatment of patients with early phase psychosis (MERIT-EP) with standard treatment. Results showed that MERIT-EP did not improve symptoms to a greater extent than standard treatment at the end of intervention





**FIGURE 4** Standardized mean differences for Metacognitive Therapy versus psychological or nonactive treatment in patients with mixed anxiety disorders (upper figure) and versus nonactive waitlist in patients with posttraumatic stress disorder (lower figure)

(Table 1). Another study (Lysaker et al., 2015) compared patients with schizophrenia who received either MERIT or Supportive Therapy. However, the qualitative study did not report data for any of the predefined outcome measures.

## 4 | DISCUSSION

Our systematic review assessed the effectiveness of metacognitive interventions for adult patients with mental disorders. We showed that MCTrain and MCTherap were at least as effective as another psychological intervention and mostly outperformed nonactive treatments in treating patients with schizophrenia, OCD, anxiety disorders, PTSD, and depression. Patients with schizophrenia did not seem to benefit from MERIT regarding symptom severity. Acceptability of metacognitive interventions was high among the investigated patient groups. Because interventions were tested for the mental disorders they were originally developed for, there is only evidence for a limited number of mental disorders so far. Hence, we did not investigate

whether the effectiveness of each intervention varied across mental disorders.

We analysed the evidence of 34 RCTs and four NRCTs with a total sample of 2,148 patients quantitatively. More than half of the included trials studied the effectiveness of MCTrain, whereas MCTherap and MERIT were investigated less often. For all three interventions, we found that a large proportion of the studies was conducted and (co-)authored by the researchers who had developed the interventions.

### 4.1 | MCTrain

We found that MCTrain was statistically superior to cognitive remediation tasks in patients with schizophrenia but not to any of the other control groups. One possible explanation may be that the other control groups provided treatments in which patients' ability to reflect and to think about themselves was fostered to a greater extent than during cognitive remediation tasks. Moreover, MCTrain in addition to standard treatment improved positive symptoms but only bordered

statistical significance. In a post hoc analysis across all studies, MCTrain was more effective in alleviating symptom severity than any of the control groups. The magnitude of the effect was comparable with a recent meta-analysis on CBT for psychosis (Mehl, Werner, & Lincoln, 2015). These results may be due to the small number of studies that were included in the planned analyses, which may have led to a lower statistical power of the meta-analyses compared with the meta-analysis that included all studies. Another explanation may be that standard treatment for patients with schizophrenia included pharmacotherapy (mostly antipsychotics), which usually reduces patients' positive symptoms substantially. Therefore, it might be difficult to show the additional benefits of MCTrain on positive symptoms beyond standard treatment with antipsychotics. Our results are in line with recently published meta-analyses, which synthesized results on positive symptoms and pooled data across all included studies but differed in their selection of studies (Eichner & Berna, 2016; Liu et al., 2018; van Oosterhout et al., 2015). Our meta-analysis represents a more comprehensive selection of studies. The overall positive effect for MCTrain needs to be interpreted carefully because of the differences in patient characteristics, control groups, and study design of the primary studies (Jiang et al., 2015).

The effect for MCTrain compared with a waitlist control group in patients with OCD was larger than reported in a recent meta-analysis on unguided self-help interventions (Pearcy, Anderson, Egan, & Rees, 2016). Our result is compromised by the small number of studies included in the comparison and by the low retention rate. However, current research states that low retention and acceptance rates are common in these types of interventions. Subjective appraisal of myMCT was mainly favourable. Although guided interventions seem to be more beneficial, the effectiveness of online interventions is similar to other psychotherapeutic approaches (Baumeister, Reichler, Munzinger, & Lin, 2014; Karyotaki et al., 2015; Richards & Richardson, 2012).

## 4.2 | MCTherap

The meta-analysis suggests that MCTherap outperforms another active psychological intervention in patients with anxiety. Whereas MCTherap was superior to waitlist control groups in patients with depression, there was no evidence of a beneficial effect of MCTherap when compared with cognitive-behavioural psychological treatments for depression in our meta-analysis. One theoretical explanation for these results might be that MCTherap was conceptualized for GAD and later adapted for other mental disorders. Therefore, MCTherap may target underlying mechanisms of GAD more precisely than CBT, a benefit that might not apply for depression. Another possible explanation for these results may be that in one of the studies testing MCTherap against CBT for depression (Jordan et al., 2014), the patients receiving MCTherap were more often diagnosed with severe co-morbidities than the ones receiving CBT. Our findings are in line with other meta-analyses that reported the effectiveness of MCTherap for anxiety and PTSD (Normann et al., 2014; Sadeghi, Mokhber, Mahmoudi, Asgharipour, & Seyfi, 2015). The authors of one review (Normann et al., 2014) concluded that MCTherap was

superior to CBT not only in patients with anxiety but also in patients with depression. Their conclusion is limited by the fact that only one of the primary studies (Nordahl, 2009) investigated a mixed sample including patients with depression next to GAD and eating or personality disorders. The other four primary studies were conducted in patients with GAD (Kvistedal, 2011; van der Heiden, Muris, & van der Molen, 2012; Wells et al., 2010) or PTSD (Proctor, 2008).

One strength of the included primary studies on MCTherap is that they reported data for the number of randomized patients. Nevertheless, findings are limited by the small number of studies that we were able to combine for comparisons. Methodological limitations were similar to those found for MCTrain.

## 4.3 | MERIT

The included studies indicate that this type of metacognitive intervention addressed other outcomes than symptom severity. As a long-term intervention, MERIT seemed to foster patients' insight and reflectiveness but did not alleviate symptom severity. More evidence needs to be gathered for reliable conclusions.

## 4.4 | Other results

Next to symptom severity, which was the main outcome in most of the primary studies, a focus group with former psychiatric patients named metacognitive changes and quality of life as relevant outcomes (Brütt et al., 2017). Both were only analysed in about a quarter of the studies. Other outcomes that patients found highly relevant to their everyday lives were analysed in none of the studies. Especially patients with chronic mental disorders like schizophrenia who have adapted to their symptoms may find interventions more helpful that address other outcomes than symptom severity.

Further, only few of the included studies reported the predefined secondary outcomes. Whereas response rates are well defined for affective disorders (Bryant et al., 2008; Keller et al., 2000; Loerinc et al., 2015), criteria for schizophrenia are less consensual. Also, adverse events should be reported systematically for psychotherapy studies (Meister et al., 2016). Results may provide helpful information on how to implement metacognitive interventions in terms of relevance and applicability.

## 4.5 | Methodological evaluation of the systematic review

Our systematic review and meta-analyses address most of the shortcomings that of prior reviews on metacognitive interventions. First, this contribution does not only cover evidence on different types of metacognitive interventions, it also provides an overview of results for various mental disorders. Second, by means of a sensitive search strategy including grey literature and contacting authors of metacognitive interventions, it is likely that we were able to identify most existing studies. In this context, we offer a working definition that may enable other researchers to identify studies on metacognitive interventions more easily and encourage them to also

choose a comprehensive approach when reviewing future evidence in this field. Third, when preparing and conducting this systematic review and the meta-analyses, we followed methodological standards and reported results in accordance with current guidelines (Guyatt et al., 2011; Moher et al., 2009; Shea et al., 2007; The Cochrane Collaboration, 2009). Two reviewers independently assessed eligibility, methodological quality, and extracted data.

Although few primary studies reported results at follow-up, this review focused on the effectiveness of metacognitive interventions at the end of intervention. Therefore, the results are compromised and no conclusions about the long-term effects can be drawn from this systematic review. As metacognitive interventions do not only incorporate metacognitive elements, it remains unclear whether symptoms were alleviated by metacognitive elements or other therapeutic factors. In the primary studies, metacognitive changes were assessed with a number of different instruments based on different underlying constructs, which is why we were not able to report the results in more detail than in the primary studies or make conclusive statements. The contribution of metacognitive elements to treatment effects still needs to be tested, given that metacognitive changes are systematically assessed and analysed in future studies. Steffen Moritz developed MCTrain and authored a number of studies that investigated the effectiveness of MCTrain. As a co-author of this review, he was involved in drafting of the manuscript and contributed to the interpretation of results, which constitutes a conflict of interest.

#### 4.6 | Quality of evidence

Even though it may be possible that the primary studies were conducted with higher methodological quality, we rated a lot of domains as unclear, because necessary information was not reported. Thus, we were unable to make conclusive statements about the overall methodological quality and assessed it as moderate or unclear. For the primary studies of all three metacognitive interventions, risk of bias seemed unlikely with regard to the randomization procedures; however, results of these primary studies may still be biased due to possible conflicts of interest, which often were not stated, and inadequate blinding of patients, personnel, and outcome assessments. Publication bias can be rated as unlikely because of our sensitive search strategy (Guyatt et al., 2011). Statistical heterogeneity varied across comparisons and was different for MCTrain and MCTherap. The estimates for MCTrain in patients with schizophrenia varied in their direction, leading to substantial heterogeneity. This can be explained by different clinical characteristics and study designs. The estimates for the MCTherap studies did not vary in their direction, but in their extent. Pooled estimates for MCTrain in patients with schizophrenia and OCD showed narrow confidence intervals. Accordingly, results for the primary outcomes are likely to be precise (Guyatt et al., 2011). Pooled estimates for the comparisons between MCTherap and waitlists had broad confidence intervals, likely due to the small number of studies with small sample sizes that were combined for meta-analyses. Therefore, results of these comparisons have to be interpreted as imprecise. All included studies directly addressed the

aim of this systematic review, which is why limitations due to indirectness of comparisons are unlikely (Guyatt et al., 2011).

#### 4.7 | Future research

Although the number of studies testing the effectiveness of metacognitive interventions is constantly growing, the existing evidence base does not seem to have become more conclusive within the last years. Particularly, trials performed by researchers other than the scientists who had developed the interventions would be desirable to rule out allegiance bias. After addressing methodological shortcomings, including small sample sizes, future research could investigate not only whether the effectiveness of the different interventions varies across disorders but also to which clinical context they can be applied to best. For example, it can be concluded from our systematic review and from the three separate meta-analyses that MCTrain and MCTherap are short, accessible interventions that can easily be adapted to various clinical settings. Due to the available evidence, MCTrain may be most effective when it is delivered as an add-on treatment in an inpatient setting, and MCTherap and MERIT may be most beneficial when implemented in outpatient care. Recent promising results for metacognitively oriented psychotherapies (Gordon-King et al., 2018; Inchausti et al., 2017) suggest that their integrative treatment approach complements research in this field, alongside the cognitive-behavioural interventions (Lysaker & Klion, 2017).

Looking at the summarized evidence, metacognitive interventions are a theoretically founded extension to existing traditional psychotherapeutic interventions. The concept of metacognition adds another perspective to understand underlying mechanisms of mental disorders that are otherwise hard to capture and, thus, may help patients to broaden their self-perception. Accordingly, we encourage that each intervention is further studied within its field in order to be beneficial for a wide range of patients. Large and independent multicentre trials investigating short- and long-term outcomes that are relevant to patients, including adverse and long-term effects, are needed to strengthen the evidence base.

### 5 | CONCLUSION

Unclear to moderate quality evidence suggests that metacognitive interventions are likely to be effective in the treatment of a number of mental disorders, particularly when compared with nonactive treatments. The effectiveness of these interventions, especially MCTrain and MERIT, when compared with established psychotherapies like CBT still needs to be studied. Further independent research should address the methodological shortcomings of existing trials and focus on finding the ideal place of metacognitive interventions in the mental health care system.

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## CONFLICT OF INTEREST

Metacognitive Training was developed and studied by S. M. L. K. participated in trials of the Metacognitive Training as independent statistician. All other authors declare no conflict of interest.

## AUTHOR CONTRIBUTIONS

F. K., M. H., and L. K. designed the study, and F. K., R. M., M. H., S. M., and L. K. wrote the review protocol. F. K., J. L., and R. P. conducted literature searches. F. K., J. L., R. M., and R. P. extracted data. R. P. and R. M. conducted the statistical analyses. R. P. and R. M. wrote the first draft of the manuscript, and all authors revised it critically for important intellectual content. We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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