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Further evidence for the effectiveness of a metacognitive group training in schizophrenia

S. Moritz [a,*], A. Kerstan [a], R. Veckenstedt [a], S. Randjbar [a], F. Vitzthum [a], C. Schmidt [a], M. Heise [a], T.S. Woodward [b,c]

[a] University Medical Center Hamburg-Eppendorf, Department of Psychiatry and Psychotherapy, Martinistraße 52, D-20246 Hamburg, Germany
[b] Department of Psychiatry, University of British Columbia, Vancouver, British Columbia, Canada
[c] BC Mental Health and Addictions Research Institute, Vancouver, British Columbia, Canada

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ABSTRACT

Metacognitive training (MCT) for patients with schizophrenia is a novel psychological group treatment targeting cognitive biases putatively involved in the pathogenesis of schizophrenia (e.g. jumping to conclusions, overconfidence in errors). Its eight modules are available cost-free online in many languages. In the present study, 36 subacute or remitted patients were randomly allocated to either an MCT or a wait-list group who received treatment-as-usual (TAU). Baseline and post assessments were 8 weeks apart and were performed blind to group status. MCT showed significantly greater improvement on the following parameters relative to the TAU group: delusion distress (PSYRATS), memory and social quality of life. In the MCT group, the rate of jumping to conclusions bias was reduced after training. No differences occurred on the PANSS. The present study confirms prior reports that MCT exerts beneficial effects on some cognitive and symptomatic parameters.

Introduction

Schizophrenia is a severe and disabling psychiatric disorder. Core symptoms are hallucinations and delusions which are frequently accompanied by negative (e.g. flat affect) and disorganized (e.g. formal thought disorder) symptoms. Symptomatic and functional outcome (e.g. work status) are poor (Green, Kern, & Heaton, 2004; Lambert & Naber, 2009). Since the 1950s, dopamine receptor blockers have evolved as the treatment of choice and replaced cruel and mostly ineffective measures such as psychosurgery and insulin shocks. However, even newer antipsychotic medications exert only a medium effect size relative to placebo, approximately one quarter of all patients relapse (Leucht, Arbter, Engel, Kissling, & Davis, 2009; Leucht et al., 2003). Compliance remains low under the newer compounds (Byerly, Nakonezny, & Lescouflair, 2007; Voruganti, Baker, & Awad, 2008) which may reflect a number of factors, most notably side-effects, lack of insight, poor therapeutic alliance and memory problems (Moritz et al., 2009).

Psychotherapy is increasingly adopted as a complementary approach to psychopharmacology. Its most prominent and best evaluated protagonist is cognitive-behavioural therapy (CBT; Fowler, Garety, & Kuipers, 1995) which seeks to identify and change maladaptive beliefs, attitudes and behaviours subserving schizophrenia symptoms in particular. CBT exerts a weak to medium effect size beyond the effectiveness of antipsychotic medication (Lincoln, Suttner, & Nestoriuc, 2008; Wykes, Steel, Everitt, & Tarrier, 2008; Zimmermann, Favrod, Trieu, & Pomini, 2005) and is now recommended in some countries as standard treatment for schizophrenia, including Great Britain and Germany.

A solid body of literature (for reviews see Bell, Halligan, & Ellis, 2006; Freeman, 2007; Garety & Freeman, 1999; van der Gaag, 2006) has linked cognitive biases, that is, distortions in the collection, appraisal and processing of certain information (e.g. jumping to conclusions, overconfidence in errors), to positive schizophrenia symptoms. Based on this research, we have developed a new group treatment program entitled metacognitive training for schizophrenia (MCT; Moritz, Woodward, & Burlon, 2005; Moritz, Woodward, & Metacognition Study Group, 2010). Its primary aim is to raise the patients' awareness for both the presence and dysfunctionality of cognitive distortions by means of exercises which frequently evoke cognitive biases often resulting in erroneous decisions (for reviews see Moritz, Vitzthum, Randjbar, Veckenstedt, & Woodward, 2010; Moritz & Woodward, 2007b). Thus, patients are provided corrective experiences. The relationship between cognitive biases and psychosis is continuously stressed throughout

* Corresponding author. Tel.: +49 40 7410 56565; fax: +49 40 7410 57566.
E-mail address: moritz@uke.uni-hamburg.de (S. Moritz).

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the sessions and patients are taught alternative coping and information processing strategies. MCT may be regarded a hybrid of CBT and cognitive remediation (CRT). Like CRT it involves many cognitive tasks. Like CBT, the training ultimately targets psychotic symptoms, but adopts a "backdoor approach" by first dealing with the cognitive infrastructure involved in the formation and maintenance of the disorders. Its format (powerpoint presentation) facilitates dissemination which remains a problem with psychological interventions (Shafran et al., 2009). Raising metacognitive awareness is believed to intercept the progression from false appraisals of certain ("as if") experiences to fixed false (delusional) beliefs (Moritz, Vitzthum et al., 2010; Moritz & Woodward, 2007b).

MCT is currently available in 18 languages and can be obtained cost-free online via http://www.uke.de/mkt. Its 8 modules (two cycles are available) deal with monocausal and unbalanced attributions (module 1), jumping to conclusions (modules 2 and 7), belief inflexibility (module 3), deficits in theory of mind and social cognition (modules 4 and 6), overconfidence in (memory) errors (module 5) as well as emotional problems and low self-esteem (module 8).

Several treatment trials assert the feasibility and short-term effectiveness of the MCT approach. Treatment adherence and acceptance were excellent in the initial trial (Moritz & Woodward, 2007a) and exceeded a cognitive remediation program on several parameters including subjective efficacy. Positive feedback has been obtained with other language versions as well (Favrod et al., 2009; Gaweda, Moritz, & Kokoszka, 2009). A second German trial (Aghotor, Pfueller, Moritz, Weisbrod, & Roesch-Ely, 2010) reported a medium effect size ($d = .43$) for the improvement of positive symptoms over and above an active control. Importantly, assessments were performed blind to randomization, as knowledge about group allocation has been found to inflate estimates of efficacy (Wykes et al., 2008). Another randomized controlled trial on reasoning training using exercises from the two JTC modules (MCT modules 2 and 7) versus an active control group found favourable effects for MCT: Patients undergoing MCT were more cautious in their decision-making at re-assessment compared to the control group. Furthermore, their belief flexibility increased, although the latter finding did not achieve a conventional level of significance (Ross, Freeman, Dunn, & Garety, in press). In a small randomized controlled trial with an Indian sample, the MCT group improved more than the treatment-as-usual (TAU) group on several aspects of delusions and conceptual disorganization in the range of a medium to large effect size (Kumar et al., 2010). Two other studies (Briki et al., 2008; Linder et al., 2008) found positive effects on delusion severity and quality of life, but conclusions are mitigated by the fact that no comparison group was employed. A combination of group and individualized MCT (summary in Moritz, Vitzthum et al., 2010) was significantly better than cognitive remediation for JTC, delusion conviction (PSYRATS) and delusion severity (PANSS). Again, ratings were made blind at baseline and four weeks later. A Dutch trial showed that MCT has positive effects on both cognitive biases and symptoms (Moritz et al., in press).

While prior studies mainly looked at acute or subacute inpatient populations, the present investigation was concerned with the effect of MCT in a stabilized but chronic patient sample recruited from two community rehabilitation facilities. Many of the patients had a dual-diagnosis involving substance dependency. A recent review conservatively estimated the comorbidity of schizophrenia and substance abuse disorders at almost 50% (Buckley, Miller, Lehrer, & Castle, 2009).

Despite the high prevalence of substance abuse in schizophrenia, patients with comorbid diagnoses are often excluded from research studies. In the current study our goal was to determine whether or not they would also benefit from the training. In addition to symptom ratings we investigated several cognitive parameters as well as quality of life. The latter variable is especially important since some studies have found that increasing illness insight, a target of the MCT, may promote depression (Lincoln, Lüllmann, & Rief, 2007) and low quality of life (Karow et al., 2008).

Methods

Participants

Study participants were drawn from two facilities in Hamburg: the Community Center Hamburg-Eimsbüttel, Germany (GPZE), a unit for chronic patients with in- and outpatient programs, and a specialized therapy centre for inpatients with a comorbid diagnosis of psychosis and addiction in Hamburg-Bahrenfeld, Germany (TPS). Inclusion criteria were a schizophrenia spectrum diagnosis. Liberal inclusion criteria were deliberately chosen to allow generalization to a typical patient population. Only the following criteria led to exclusion: (a) age lower than 18 or higher than 65 years, (b) IQ < 70 and (c) an inadequate command of the German language. Substance abuse or dependence was not an exclusion criterion and was observed in 53% of the sample (diagnoses were determined using DSM-criteria, see below). Patients were randomly assigned to the MCT (see below) or a wait-list group (treatment-as-usual, TAU) following baseline assessment and receipt of informed consent. The randomization plan (no stratification) was developed by a statistician and kept confidential to the trainers or assessors. Eight weeks after the baseline, that is, after one complete MCT cycle, a re-assessment was conducted. Assessments were made blind to group allocation: Assessors and trainers were accordingly different persons who were strictly advised not to exchange information regarding patients and treatments. Likewise, patients were reminded at the post-assessment not to reveal any information that may disclose their group allocation.

The completion rate was 100% in both groups. The test battery took approximately 2 h per session. Patients were reimbursed for the assessments with 10€. However, no compensation for the treatment sessions was provided. Approval was obtained from the local ethics committee. The sociodemographic characteristics of the sample are displayed in Table 1.

Metacognitive training (MCT)

Each MCT participant group comprised between 6 and 9 patients and was delivered by psychologists or psychology trainees with several years of experience in the treatment of patients. The training was administered once weekly and missed sessions were not individually repeated. All MCT group members received a maximum of eight sessions. Each session lasted 45–60 min and adhered to the study protocol and the instructions provided in the manual (see www.uke.de/mkt).

Patients in the TAU group received MCT subsequent to the re-assessment. Patients in the MCT group were told not to disclose training elements to the wait-list group but since patients were treated in the same environment communication about the training could not be entirely prevented.

Instruments

Before participation, patients were diagnosed using a short neuropsychiatric interview complemented by extensive medical chart information relying on DSM-criteria. Patients who did not meet criteria for a schizophrenia spectrum disorder were excluded from the present study.

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Table 1
Sociodemographic and psychopathological variables at baseline.

Variables	MCT ($n = 18$)	TAU ($n = 18$)	Statistics (t(df) = 34)
Background			
Sex (male/female)	15/3	13/5	$\chi^2 = .63$, $p > .6$
Age in years	33.6 (8.8)	31.9 (7.0)	$t = .65$, $p > .5$
Years in school	10.83 (1.54)	10.44 (1.50)	$t = .76$, $p > .4$
Premorbid intelligence (100 = average; SD = 15)	102.33 (14.29)	99.24 (11.59)	$t = .70$, $p > .4$
Percentage maximum neuroleptic dosage in mg	65.42 (46.32)	66.76 (42.86)	$t = .09$, $p > .9$
Quality of Life (WHO-Qol-BREF)	77.53 (11.01)	84.82 (10.27)	$t = 2.00$, $p = .04$[a]
Psychopathology			
PANSS positive	11.39 (3.77)	11.33 (6.14)	$t = .03$, $p > .9$
PANSS negative	13.56 (5.85)	13.39 (4.60)	$t = .09$, $p > .9$
PANSS disorganization	15.06 (5.23)	15.06 (5.37)	$t = .00$, $p > .9$
PANSS excitement	11.44 (2.45)	11.22 (2.76)	$t = .26$, $p > .8$
PANSS distress	14.50 (4.96)	14.17 (5.23)	$t = .20$, $p > .8$
PANSS total[b]	48.83 (11.48)	48.56 (12.66)	$t = .07$, $p > .9$
Remitted (Andreasen criteria)	50%	56%	$\chi^2 = .11$, $p > .7$
PSYRATS hallucinations	3.22 (7.48)	5.29 (9.85)	$t = .70$, $p > .4$
PSYRATS delusions	5.50 (7.20)	3.50 (5.39)	$t = .94$, $p > .3$
Cognition			
Fish task – draws to decision [% jumping to conclusions]	1.94 (2.00) [56%]	2.33 (1.41) [50%]	$t = .13$, $p > .8$
TMT A	31.42 (7.84)	34.25 (14.70)	$t = .72$, $p > .4$
TMT B	87.58 (39.82)	101.22 (79.54)	$t = .65$, $p > .5$
d2	137.06 (38.65)	131.61 (51.32)	$t = .35$, $p > .7$
RBMT immediate	6.50 (3.23)	8.83 (3.28)	$t = 2.15$, $p = .04$
RBMT delayed	4.92 (3.23)	7.42 (3.40)	$t = 2.26$, $p = .03$

[a] df = 32 due to 2 baseline missing values.
[b] The PANSS total score is not the sum of the subscale scores of this algorithm.

Psychopathological assessment

Schizophrenia and general psychopathology was assessed with the Positive and Negative Syndrome Scale (PANSS; Kay, Opler, & Lindenmayer, 1989) which represents the most widely used instrument for the assessment of schizophrenia symptoms in clinical trials. Its psychometric properties are adequate (Kay et al., 1989; Peralta & Cuesta, 1994; Santor, Ascher-Svanum, Lindenmayer, & Obenchain, 2007). Ratings followed semi-structured interviews and clear standard operating procedures. Syndromes were computed according to an algorithm proposed by van der Gaag et al. (2006).

We further assessed more qualitative aspects of hallucinations and delusions with the Psychotic Symptom Rating Scales (PSYRATS; Haddock, McCarron, Tarrier, & Faragher, 1999). The PSYRATS is a semi-structured interview. Ratings are aided by anchor points. Unlike the PANSS, raters have fewer liberties since the patients' responses are directly translated into scores according to frequency and percentages. The psychometric properties are satisfactory (Drake, Haddock, Tarrier, Bentall, & Lewis, 2007; Haddock et al., 1999). The items for the auditory hallucinations subscale are: frequency (PH1), duration (PH2), location (PH3), loudness (PH4), beliefs about origin (PH5), negative content (PH6), intensity of negative content (PH7), amount of distress (PH8), intensity of distress (PH9), disruption of life (PH10) and control (PH11). The items of the delusions subscale are: amount of preoccupation (PD1), duration of preoccupation (PD2), conviction (PD3), amount of distress (PD4), intensity of distress (PD5) and disruption of life (PD6). For the German version of the PSYRATS, the original version of the PSYRATS was translated by a German speaker and then back-translated to the original by a native speaker. The back-translation was approved by the authors of the original version.

Cognitive biases: fish task

The jumping to conclusions bias (JTC) was determined with a computerized variant of the beads task which provides similar results as the original task (Moritz et al., 2010; Speechley, Whitman, & Woodward, 2010; Woodward, Munz, Leclerc, & Lecomte, 2009).

At the beginning, participants were instructed that a fisherman, who was presented between two lakes, would catch fish *from one lake only* throughout the entire experiment (each fish was then thrown back into the lake). The two lakes contained orange and grey fish in opposing ratios (80% orange: 20% grey fish and vice versa). For the post-assessment, a second version with different colors (red and green fish) but the same ratios was used (here, the other lake was favored by the chain of events). A graded estimates procedure with simulated decisions and probability estimates was adopted: After each catch, the participant was required to make two judgements: (1) a probability rating from 0 to 100% about the likelihood that the fish (including previous ones) were being drawn from either lake A or B and (2) whether or not the subject would decide for one of the lakes based on the available evidence. Decisions could be removed/changed after each piece of information (i.e. caught fish). The participant was told beforehand that the task would continue regardless whether or not a (simulated) decision was made.

Each new fish was shown along with previous fish, connected by a string to reduce memory load (Moritz & Woodward, 2005). The most recently caught fish (always far right) was marked with a small arrow. For all subjects, 10 fish were displayed (pre-treatment version: O = orange; G = grey: O-O-O-G-O-O-O-O-G-O; post-treatment version: G = green; R = red: R-R-R-G-R-R-R-R-G-R). Two parameters were computed: the number of draws to decisions and the jumping to conclusions bias which was defined as a decision after only one fish (Freeman et al., 2004).

Conversation between participant and experimenter was kept at a minimum in order to keep results unbiased. Instructions were read by the experimenter from the computer monitor.

Neuropsychological functioning

Memory was assessed with the subtest logical memory from the Rivermead Behavioural Memory Task (B. A. Wilson, Cockburn, & Baddeley, 1985), whereby the subject is read a short story consisting of 21 pieces of information. Results were scored according to a manualized score sheet providing indexes for immediate and delayed recall. To avoid learning effects, parallel versions were used for the two assessments. The psychometric properties of the test battery are adequate (B. Wilson, Cockburn, Baddeley, & Hiorns,

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1989) and the test has proven feasible in a schizophrenia population before (Moritz, Ferahli, & Naber, 2004).

The Trail-Making Test (TMT) A and B were administered to assess speed of information processing and set-shifting (Reitan, 1992). The A-form requires the subject to combine numbers in pseudo-random location as fast as possible in ascending order. In the B-part, the subject has to combine numbers and letters as fast as possible in both alternating and ascending fashion (1-A-2-B-3-C…).

A letter cancellation test (d2; Brickenkamp, 1978) was administered to assess selective attention. The subject has to cancel as many *d*s tagged with two hyphens as possible and should ignore all other symbols (i.e. *d*s tagged with more or less than two hyphens or any *p*s). The psychometric properties of the test are adequate (Brickenkamp, 1978).

Quality of life

Quality of life is a multi-facetted construct which we investigated with the Brief Quality of Life Questionnaire of the WHO (WHOQOLBREF; World Health Organization, 2004). This scale covers the following domains: physical health (e.g. "How satisfied are you with your capacity for work?"), psychological health (e.g. "Do you have enough energy for every-day life?"), social relationships (e.g. "How satisfied are you with your personal relationships?"), and environment (e.g. "Have you enough money to meet your needs?"). The scale has proven reliable and feasible and has been used in schizophrenia research before (Chino, Nemoto, Fujii, & Mizuno, 2009; Herrman, Hawthorne, & Thomas, 2002). We did not expect changes on physical well-being or environment as these were neither primary treatment targets nor unlikely to change within short time. Primary variables of interest were psychological well-being and social relationships.

Post-assessment questionnaire

At the end of the final MCT session, patients in the MCT group were handed an evaluation questionnaire which took approximately 5 min to complete and had been used in a study on the MCT before (Moritz & Woodward, 2007a). It covers several areas which are deemed important for psychological intervention (e.g. recommendations to others, usefulness to daily life, fun). Its 10 questions should be rated on a five-point Likert scale (1 = fully disagree, 2 = disagree, 3 = not sure, 4 = agree, 5 = fully agree). Participants were reminded to provide an open and critical feedback. Anonymity was assured.

Results

Baseline characteristic

At baseline, the two groups did not significantly differ on any of the sociodemographic, psychopathological and cognitive variables except for quality of life and memory (see Table 1). Approximately half of the sample fulfilled remission criteria (Andreasen et al., 2005) and 75% of the sample scored 4 or higher on not more than 1 of the critical PANSS remission items.

Analyses of covariance with the pre–post difference as the dependent variable, and the baseline score as a covariate, were subsequently conducted for variables with discrepant baseline scores. This method controls for both baseline differences and regression to the mean (Borm, Fransen, & Lemmens, 2007; Vickers & Altman, 2001), which cannot be achieved with conventional two-way mixed models with Time as the within-subject and Group as the between-subject factors.

Psychopathology

No differences emerged on any of the PANSS subscale change scores, $t(34) < 1.11$, $p > .2$, $d < .38$. For the PSYRATS we found significant change scores on the intensity of distress exerted by delusions (PD5), $t(34) = 2.02$, $p = .05$, $d = .68$. Although the result was not significant, group differences on PD4 (amount of distress) achieved a medium effect size in favour of the MCT, $t(34) = 1.49$, $p = .14$, $d = .5$ (all other items: $t(34) < .16$, $p > .1$; see Fig. 1).

Fish task (jumping to conclusions)

For data gathering, as measured by the fish task, the difference for draws to decision approached trend level, $t(34) = 1.54$, $p = .13$,

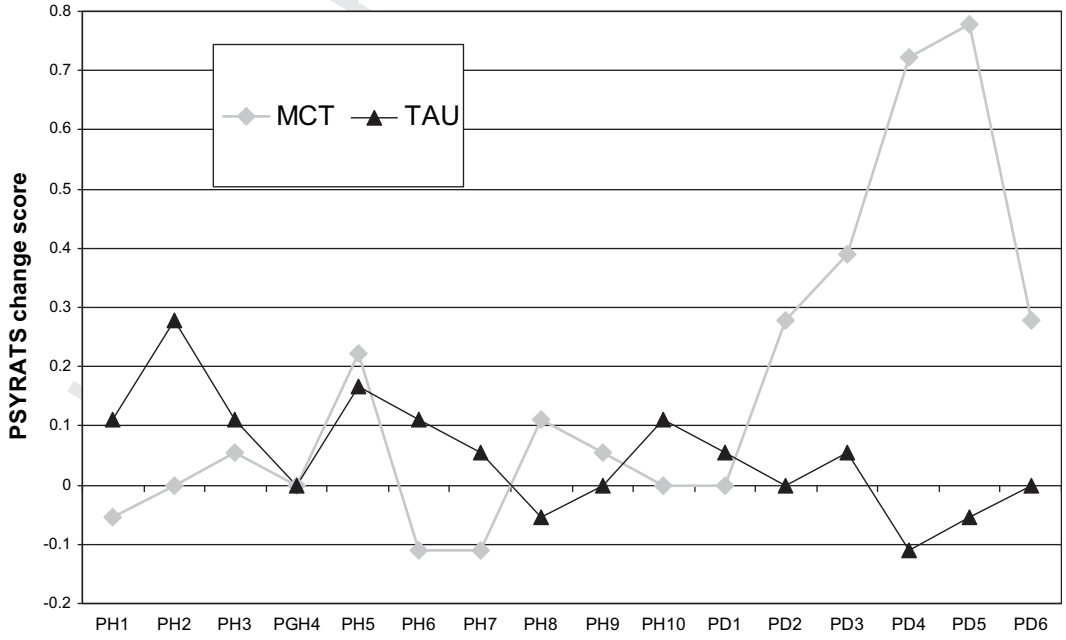

Fig. 1. For PSYRATS delusion (PD) item 4 (amount/time of distress) and PD 5 (intensity/severity of distress) at least medium effect sizes were secured. For the hallucination items, group differences were insignificant and small.

$d = .52$: while the MCT group were more cautious in their decision-making behaviour across time (change: $M = 1.11$), the control group responded virtually unchanged (change: $M = .33$; see Fig. 2). When jumping to conclusions was entered as a dichotomous variable (decision versus no decision), the results were essentially the same ($d = .45$): The rate of JTC was halved in the MCT group (56–28%), whereas it showed only a small decline in the TAU group (50–44%).

Cognition

Group differences were not present for the TMT and d2 parameters with respect to change scores (all $t < 1.3$, $p > .2$, $d < .23$). As can be derived from Fig. 3, MCT patients improved over time in both RBMT parameters relative to the wait-list group. While for immediate memory, group differences were present at trend level, $t(34) = 1.90$, $p = .07$, $d = .63$, for delayed memory a significant difference emerged, $t(34) = 2.89$, $p = .007$, $d = .96$. As groups performed differently on the RBMT at baseline, we entered the baseline score as covariate in subsequent analyses which resulted in a significant finding for immediate, $F(1,33) = 2.28$, $p = .03$, $\eta^2_{partial} = .06$, and delayed recall, $F(1,33) = 4.89$, $p = .03$, $\eta^2_{partial} = .13$.

Quality of life

Subanalyses showed that baseline quality of life differences were solely due to psychological well-being. Here, baseline scores were entered as covariate. The MCT group improved significantly on social relationships over time relative to the wait-list group, $t(32) = 2.23$, $p = .03$, $d = .77$ (all others, $t < .81$, $p > .4$, $d < .28$).

Subjective appraisal of the training

The results of the post-assessment training appraisal are listed in Table 2. As can be seen the vast majority of the subjects was satisfied with the training. Approximately 2 out of 3 patients applied the training lessons in every-day life, regarded the training as an important part of the entire treatment program and more than 4 out of 5 patients found the training useful, fun, would recommend it to others and all patients endorsed that the rationale and the goals of the training were clear to them.

Discussion

The present sample consisted of 36 chronic schizophrenia patients with low schizophrenia symptom severity. In fact, approximately 50% fulfilled remission criteria (Andreasen et al., 2005). Floor effects (i.e. lack of room for improvement) may thus explain why none of the PANSS symptoms resulted in significant differences between the groups over time. For the PSYRATS, which is deemed more sensitive than the PANSS to capture the effects of psychological intervention (Greenwood et al., 2010), patients in the MCT group improved significantly greater on the item capturing intensity of distress due to the delusions (PD5), which represents a core treatment target for psychological interventions in psychosis (Birchwood & Trower, 2006; Greenwood et al., 2010). Additionally, MCT was superior at a trend level for the item amount of distress due to delusions (PD4). While both items tap similar aspects they are not redundant: item 4 asks for the amount of time delusions cause distress while item 5 assesses the severity of the distress.

Despite rather low symptom profiles every second patient showed a JTC bias which is widely regarded as a risk factor for schizophrenia positive symptoms (Fine, Gardner, Craigie, & Gold, 2007; Freeman, 2007) and is predictive of treatment outcome (Menon, Mizrahi, & Kapur, 2008). In line with other studies on MCT (Aghotor et al., 2010), the training exerted a beneficial effect on JTC: MCT halved the rate of JTC while it stayed virtually the same in the TAU group. In contrast, CBT does not necessarily ameliorate JTC according to prior studies (Brakoulias et al., 2008; Garety et al., 2008). Unprecedented and somewhat unexpected given that the training does not aim to improve "cold" cognitive functioning (i.e. impairments of higher cortical functioning), the MCT group improved

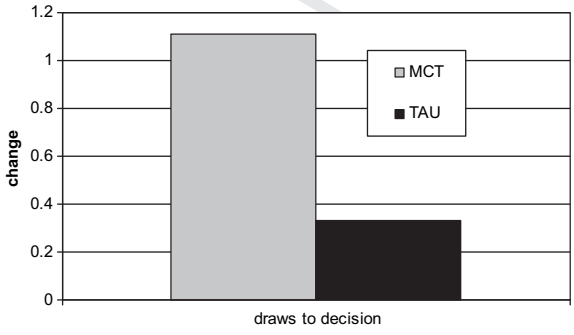

Fig. 2. Patients in the MCT group slowed decision-making relative to the control group over time. The rate of JTC was halved from 56% to 28%, while the TAU group showed a small decline from 50% to 44%.

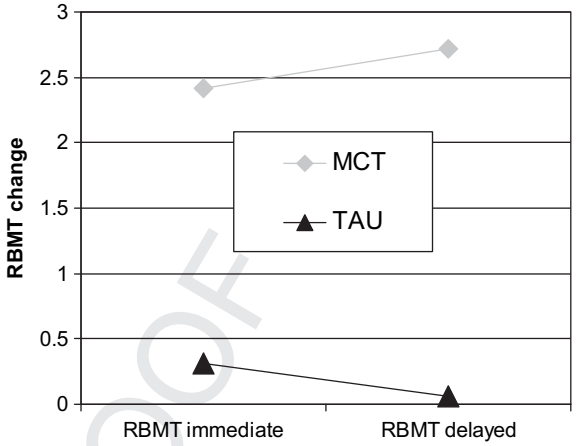

Fig. 3. Change scores (pre–post) for the RBMT. While the patients in the TAU group did not improve, the MCT patients substantially gained performance at re-assessment for immediate (trend) and especially delayed (significant) memory. Group differences were strengthened after a correction for baseline differences.

Table 2
Appraisal of MCT training.

Items	$\bar{x}$	% Yes (% no)[a]	*s*; range
The training was useful and sensible	4.57	92.9% (0%)	.65; 3–5
I had to force myself to go to the training regularly	1.71	0% (86%)	.73; 1–3
In every-day life, I do *not* apply the lessons learned	2.21	7.1% (71.4%)	.80; 1–4
The training was an important part of my treatment program	3.86	64.3% (14.3%)	1.10; 2–5
I would have liked to spend the time doing something else	1.64	0% (78.6%)	.84; 1–3
The training was fun	4.64	85.7% (7.1%)	.50; 4–5
A lot of what I learned during training is useful to my daily routine	3.29	50.0% (21.4%)	1.27; 1–5
The goals and rationale of the training were clear to me	4.64	100.0% (0%)	.50; 4–5
I would recommend the training to others	4.29	85.7% (0%)	.73; 3–5
I found it beneficial that the training was administered in a group	4.36	78.6% (0%)	.84; 3–5

[a] Yes responses = either 4 (agree) or 5 (fully agree) were endorsed.

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memory at the endpoint as assessed with the logical memory test of the Rivermead Behavioural Memory Test, especially on delayed memory. Although speculative at this point, the attenuation of distress may have released cognitive resources that were previously occupied by for example ruminative and paranoid thoughts. Although one of the MCT modules briefly conveyed strategies for improved learning (e.g. mnemonic aids, involving multiple sensory channels for recollection) we do not assume any primary effect of MCT on memory unlike for example in cognitive remediation therapy which tries to stimulate memory directly.

In addition and in line with prior findings (Briki et al., 2008), the training improved quality of life, particularly its social aspects. Thus, it seems that some of the primary goals of the MCT were met (Moritz, Vitzthum et al., 2010; Moritz & Woodward, 2007b): Patients are encouraged to reduce withdrawal, approach others and seek advice as well as help from their social environment. Social engagement is fostered by multiple features of the training. For example, patients are handed a yellow and a red card after the first session. On the red card the patient should enter names of people he or she may turn to in times of crisis. The yellow card poses three questions patients should contemplate if they feel persecuted or spied on, one of these asking how others may interpret the situation. Moreover, the group training can be viewed as a form of social competence training as patients have to work together in order to arrive at solutions, and should contribute to discussions as well as listen to and contemplate ideas from others. Almost 80% of the patients appreciated that the sessions were conducted in a group.

Before we turn to possible implications, a number of shortcomings must be noted. While the study provides evidence for the efficacy of the training, the results cannot speak to whether these improvements are maintained in the long run and decrease the probability of relapse. Thus, follow-up studies are required which should incorporate relapse rates as secondary outcome variables. Secondly, the sample was rather small. Some of the effect sizes were least in the medium range but reached only a trend level of significance. Larger samples are thus needed to determine whether these effect sizes are reliable or not. Moreover, larger samples will also be required to determine for which subgroup the MCT is most beneficial. Another potential problem of the study – inherent to many studies investigating the effects of psychological interventions – was that patients in the TAU group might have received information about the contents of the MCT and thus might have indirectly benefited from the group training by hearsay, homework material and role model making the treatment conditions less orthogonal than desired. Since we had a chronic sample with residual symptoms, floor effects may have narrowed space for improvement on the PANSS, on which symptom decline had been found before (for a review see Moritz, Vitzthum et al., 2010). As additional limitations we – like most clinical studies – have not corrected for multiple testing. Moreover, some of the changes in the treatment group may relate to factors unrelated to MCT (e.g. therapeutic contact, group discussion). Therefore, active control designs are superior to wait-list designs. While the results tentatively suggest that the MCT can be administered in patients with substance abuse, we had no formal measure to estimate change on this variable.

The study asserts the feasibility and effectiveness of MCT in a chronic patient sample. In view of emerging evidence in favour of the MCT obtained from our and other groups (for reviews see Moritz, Vitzthum et al., 2010; Moritz & Woodward, 2007b) we think that MCT may represent a potential complement to psychopharmacology, and may precede CBT in patients who are not yet willing to work on or even disclose their delusional ideas. There is evidence, that the action mechanisms of psychopharmacology, MCT and CBT are different: Antipsychotic medication mainly decreases the behavioural impact of delusional symptoms and provides detachment (Mizrahi et al., 2006), whereas MCT aims to ameliorate the cognitive infrastructure maintaining delusional beliefs (Moritz, Vitzthum et al., 2010) the latter being more directly challenged by CBT. Any combination will likely yield surplus effects.

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