

International Encyclopedia of Rehabilitation

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Metacognitive training in schizophrenia: from basic research to intervention

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Abstract

Until the 1980s psychological attempts to treat schizophrenia were frequently considered inefficient or even harmful. This long-standing reservation against psychotherapy has many roots, perhaps most importantly the view that delusions in particular and schizophrenia in general are not amenable to understanding. However, many recent findings confirm that psychological and cognitive factors play a prominent role in the pathogenesis of the disorder. Metacognitive training (MCT), which can be considered a variant of cognitive-behavioral therapy (CBT), targets cognitive biases that are involved in the pathogenesis of schizophrenia. Cognitive biases represent thinking distortions and processing preferences rather than performance deficits and limitations in mental capacity. For example, many patients diagnosed with schizophrenia show a tendency to jump to conclusions, to firmly hold onto incorrect positions in face of disconfirming evidence and a tendency to personalize blame. Importantly, these biases are not only found in acutely delusional patients but are also detected in remission and delusion-neutral situations, precluding tautological inferences. The MCT aims to make patients aware of these biases and to change them through exercises and

education which in turn should decrease the severity and the conviction into delusional beliefs. Thus, MCT which is conducted in a group setting encompasses knowledge translation/psychoeducation and cognitive training. A new variant of the training entitled MCT+ has been developed to treat patients in one-to-one therapeutic sessions.

This review first introduces new evidence on cognitive biases underlying positive symptoms in schizophrenia (i.e. delusions and hallucinations). After each section it is briefly described how MCT aims to alter these cognitive distortions. Finally, results that speak for the feasibility, safety and efficacy of this approach are presented.

Introduction

The psychological treatment of schizophrenia has been neglected until recently. In brief, for decades the attitude has prevailed that delusions, a primary symptom of schizophrenia, can be understood but not readily be treated (Sigmund Freud, see Freud 1911), or be treated but not psychologically understood (Karl Jaspers, see Walker 1991). In recent years, the situation has changed and psychological treatment faces less scepticism: Cognitive-behavioral techniques have been successfully applied in the treatment of psychosis (Wykes et al. 2008), although - as in other psychological disorders - dissemination is less than optimal. The reasons for this gradual paradigm shift are complex. First, as we will turn to in section 3, there is ample evidence that cognitive factors are involved in the disorder which can not only be understood but also altered (Bell et al. 2006, van der Gaag 2006). Second, while the introduction of atypical neuroleptics has somewhat improved the outcome of psychopharmacological treatment, it is estimated that at least every second patient withdraws from medication (Byerly et al. 2007, Lieberman et al. 2005), often due to side-effects (e.g. sleepiness, weight gain). Depending on the criteria adopted, 20-60% of the patients are non-responders (Elkis 2007, Lindenmayer 2000), that is, they show no or incomplete remission. Like typical neuroleptics, some of the atypical neuroleptics induce neurological side-effects at higher doses. Despite their “perceived” high efficacy, the effect size of neuroleptics against placebo are only in the medium effect size range according to a recent meta-analysis (Leucht et al. 2009). For this reason, complementary psychological approaches are urgently needed. Psychopharmacology and psychotherapy are not in competition. Psychotherapy aims to improve the person’s understanding of their symptoms and reducing distress. This may also improve medication compliance. Psychopharmacology in turn is often helpful for psychotherapy since agitation, poor concentration, formal thought disorder and hostility may undermine or even preclude a therapeutic relationship.

Metacognitive training for schizophrenia patients

Against the background of solid evidence for the existence of cognitive biases in schizophrenia, for which patients often lack adequate awareness (see next section), Moritz and Woodward began to compile material for a novel cognitive treatment program in 2004 (for an overview see Moritz and Woodward 2007b) entitled metacognitive training (from metacognition = “thinking about one’s thinking”).

The training is delivered by a health care specialist in a group of 3-10 schizophrenia spectrum patients (see section 4). It comprises eight modules consisting of pdf-converted PowerPoint slides (for several languages, two parallel cycles are available). Each module has an introduction as well as multiple exercises, and concludes with learning aims. Case examples and slides underlining the relevance of particular biases for psychosis emphasize the relationship between the group exercises, cognitive biases and mental health problems. MCT targets typical cognitive errors and problem solving biases in schizophrenia. There is evidence

that these disturbances may separately or in combination culminate in the formation of beliefs that may become delusions. The main objective of the training is to raise the patient's awareness of these cognitive distortions and to prompt them to critically reflect on, complement and alter their current repertoire of problem solving skills. As longitudinal studies assert (Klosterkötter 1992), psychosis is not a sudden incident but is often preceded by a gradual change in the appraisal of one's cognitions and social environment over the course of several weeks. In other words, the development towards a psychotic breakdown is potentially a reversible process and not necessarily a one-way street. Empowering metacognitive competency may thus act prophylactically on psychotic breakdown.

In the next sections we will familiarize the reader with problematic thinking styles recognized as potential contributors to the development of delusions that are targeted in the different modules of the MCT: attributional style (module 1), a jumping to conclusions bias (modules 2 and 7), a bias against disconfirmatory evidence (module 3), problems in social cognition (modules 4 and 6), over-confidence in memory errors (module 5) and depressive cognitive patterns (module 8). At first, the basic research findings will be summarized. Then we will turn to the specific MCT module(s) and describe how active change is achieved via the MCT exercises. In section 4, several recommendations for administration are provided followed by a chapter on current evidence for the effectiveness of the approach.

The present program is available in many languages and can be downloaded free of charge via the following link: <http://www.uke.de/mkt>.

Cognitive biases in schizophrenia

As mentioned before, a psychological or cognitive understanding of delusion formation has long been obstructed by claims that delusions are not amenable to understanding. Since the 1980s, however, cognitive research has questioned strong formulations of this account. Several meaningful cognitive mechanisms, which will be described in the following, have been implicated in the pathogenesis of fixed false beliefs (i.e. delusions).

Jumping to conclusions and need for closure

Basic research on jumping to conclusions in schizophrenia

Starting with the research of Garety and coworkers (e.g. Garety et al. 1991, Huq et al. 1988), who stimulated cognitive basic research into schizophrenia and refined CBT intervention in this population, an extensive literature has investigated decision-making in schizophrenia (for a review see Fine et al. 2007). Using the so-called beads tasks, individuals are asked to decide from which jar beads of two different colors are being taken. For instance the beads in one jar are distributed in the proportion of 80:20 black and red, whereas in the other jar they are in the proportion of 80:20 red and black. Participants are asked to indicate when they are sure that a sequence of beads is coming from one particular jar (see a variant of this task in figure 1). In this reasoning task, it has been observed that 40-70% of schizophrenia patients gather very little information before arriving at a definite conclusion. This response pattern, termed jumping to conclusions (JTC), may not come as a surprise, as patients often take far-fetched cues or coincidences as "evidence" (e.g. one patient thought that the first author was in fact her ex-boyfriend who had waited for her for years to take revenge – the single "evidence" for her belief was that both shared the same initials). Correcting this reasoning style is hypothesized to improve symptoms (see section 5 for preliminary evidence for this assumption).

JTC is thought to play an important role in the formation and maintenance of the disorder and is not a mere epiphenomenon of delusions. This is supported by the fact that it occurs in non-clinical participants with psychosis-prone symptoms (Freeman et al. 2008, Van Dael et al. 2006), such as sensory irritations (attenuated form of hallucinations) or suspiciousness (attenuated form of paranoia).

The longitudinal course of JTC is not yet clearly understood. It seems that JTC is most pronounced in active paranoia (Moritz et al. in press-a), but even remitted patients show this response pattern (Moritz and Woodward 2005). Moreover, in recent studies we found that patients do not only collect less information but also weigh information inadequately (Glöckner and Moritz in press). Other research findings suggest that patients adopt liberal criteria for a decision (Moritz and Woodward 2004, Moritz et al. 2006b, Moritz et al. 2007b). To illustrate, in statistics, a decision is considered justified when the probability reaches 95%. There still is a 5% chance that one is wrong, but this is considered an acceptable level of risk. Cognitive research confirms that humans are not very good with probabilities. In our everyday life, we rarely ask ourselves if our judgments have reached the 80% or 95% probability level. Under laboratory conditions, however, healthy people were found to be more conservative in their judgments than schizophrenia patients: A probability level of 54% was sufficient for the average schizophrenia patient to endorse a response option, while healthy subjects needed at least 70% probability to be convinced (Moritz et al. 2006b). Interestingly, recent evidence suggests that patients are largely unaware of their hastiness and often view themselves as rather hesitant and indecisive (Freeman et al. 2006, Kuepper et al. submitted).

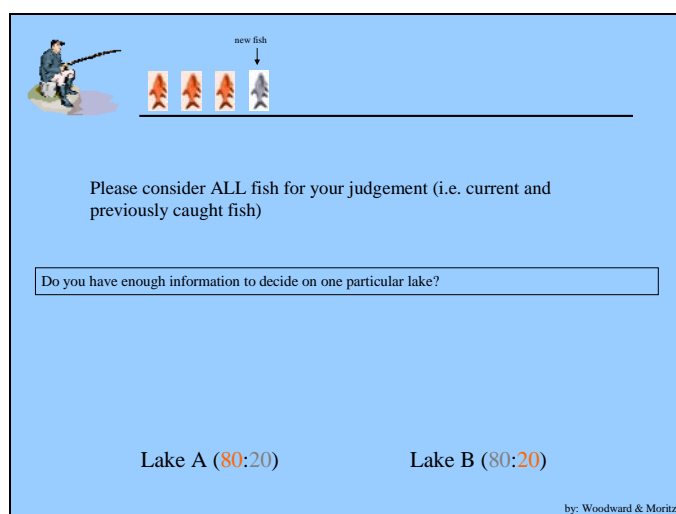


Figure 1. Examples of the “fish task”, a variant of the beads task. Subjects have to deduce from which of two lakes a fisherman is catching his fish. A decision after only one fish is considered “jumping to conclusions”. Approximately 40-70% of schizophrenia patients make a decision after only one fish (or bead), while most controls wait for 4-6 fish or beads until they make up their mind.

Treatment of jumping to conclusions with the MCT (modules 2 and 7)

Modules 2 and 7 deal with jumping to conclusions (JTC). In both modules, the group first discusses both advantages (e.g. saving time) and disadvantages of JTC (less reliable judgment, high probability of errors). Examples are provided for how JTC may cause problems. Then, “urban legends” are discussed (e.g. “Paul is dead” legend in cycle A of the MCT dealing with the rumor that Paul McCartney, one member of the band The Beatles, was

replaced by an imposter after a fatal car accident). Arguments for and against this belief should be collected, exchanged and evaluated for their plausibility. It is made clear to patients that these kinds of legends have partly arisen due to jumping to conclusions and are based on dubious evidence. Thus, they are a good model for delusional ideas.

The exercises from the first task set of module 2 show common objects (e.g. a frog; see figure 2), which are displayed in decreasing degrees of fragmentation: New features are added in eight successive stages, until the entire object is eventually displayed. Participants are asked to rate the plausibility of either self-generated or pre-specified response alternatives. Patients should withhold their decision until sufficient evidence has been presented. For example, the first stage of the “frog” exercise strongly resembles a lemon, as only the contour of the frog is displayed. A hasty decision consequently results in an error.

An edited example of the second task set is shown in figure 3. Here, complex pictures are shown, which, depending on the observer’s perspective, contain two different objects or scenes. Participants are asked to give their first impression of the picture, and then to change their perspective in order to find the alternative figure. To summarize, participants are trained to avoid succumbing to first impressions, which may eventually prove incorrect (1. task set) or reveal only half truths (2. task set). It is emphasized that situations can change over time, and further evidence often casts a different light on things. Therefore, alternative views and attitudes should not be dismissed prematurely.

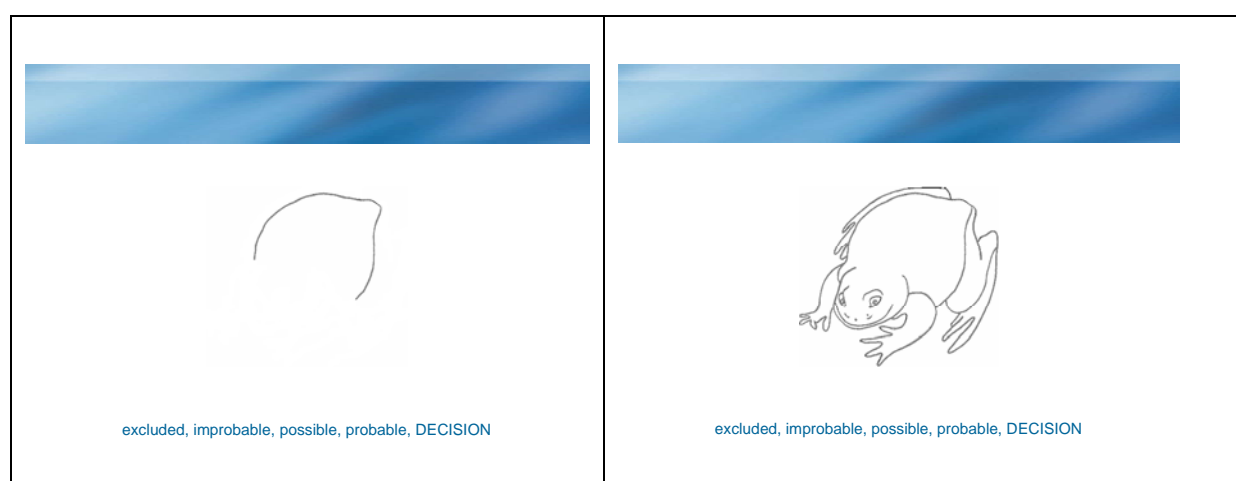


Figure 2. In task set 1 of module 2 (jumping to conclusions I) patients are shown a fragmented object (e.g. frog) that is displayed with increasing details (for display purposes, only the first and last pictures are shown). Hasty decisions can lead to wrong responses, thus demonstrating the dysfunctionality of jumping to conclusions.

What do you see?



Eskimo or Pharaos?

("Pharao" von Nathalie Weiß)

Figure 3. In task set 2 of module 2 (jumping to conclusions II) picture puzzles with two different objects or scenes are presented (e.g. edited example of the group training: Eskimo vs. Pharaoh). This task set demonstrates that hasty decisions do not necessarily lead to incorrect decisions, but that one might overlook important details and interpretations.

In module 7 (jumping to conclusions II), a number of paintings are shown to the patients (see figure 4). The task is to choose the correct title from four response options. For some paintings the solution is rather obvious, but for others it only becomes clear upon a thorough visual search. Again, the learning purpose is to realize that gathering superficial data prompts errors.



- a. Confession of adultery
- b. Courtship (Karl Zewy)
- c. Announcement of a relative's death
- d. The flower seller

Figure 4. In module 7 (jumping to conclusions I) patients are shown paintings and are asked to discuss the pros and cons of different response options (i.e. potential titles). Then, the correct title (here: b) is displayed. Premature decisions often prompt false conclusions. Close inspection of the painting reveals several hints that speak for B (man has brought flowers, coquettish look of the lady) and at the same time speak against alternative titles (e.g. the painting is visibly old and in former times “adultery” was an unlikely topic for art work; a flower seller would not have brought only a single plant).

Attributional style and self-esteem

Basic research on attribution and self-esteem in schizophrenia

Patients with schizophrenia usually do not blame the weather, their illness or bad luck when negative events occur but often cast blame onto other people (e.g. neighbours) and/or institutions (e.g. police). This attributional style is a form of *scapegoating* which, in a milder form, is also found in healthy people in everyday life. As with JTC, this style is not confined to delusional scenarios but can also occur in delusion-remote situations. Whether patients display a self-serving bias (attribution of success to oneself, attribution of failure to others or circumstances) or only externalize blame to others is subject of a yet undecided debate: While early research by Bentall suggested the former (Bentall 1994), more recent findings (Kinderman and Bentall 1997) bring forward evidence for the latter. Overall, attributional biases are more pronounced in chronic than in first episode patients (Krstev et al. 1999) and are related to acute symptoms (Moritz et al. 2007a).

According to Bentall, this attributional style helps to raise a deep-rooted low self-esteem (Bentall et al. 2001). Studies using the Implicit Association Test (IAT) indeed support the claim that deviances in attributional style are related to decreased covert (implicit) self-esteem (McKay et al. 2006, Moritz et al. 2006a), a notion previously put forward by Adler (Adler 1914/1929). Other studies show low explicit self esteem (Freeman et al 1998). A recent study (Moritz et al. 2006a) demonstrated that delusional patients had greater explicit self-esteem

than those with remitted symptoms, possibly reflecting an ambivalence of patients toward their symptoms. Although psychotic symptoms are, in many cases, accompanied by a feeling of endangerment and panic, they occasionally provide their holder with a sense of importance, meaning and company (e.g. hearing positive voices). In line with this, good insight has been linked to depressive symptoms (Buchy et al. 2009, Lincoln et al. 2007). However, evidence speaking for and against a linkage between paranoid ideation and self-esteem is mixed. Discrepancies across studies may reflect differences in delusional content such as grandiosity, and may heavily depend on the perceived power of the persecutor, his or her prestige and deservedness of the persecution (bad-me versus poor-me paranoia).

Many patients with schizophrenia show affective disturbances. In contrast to early claims by Kraepelin (1899) who separated dementia praecox (later termed schizophrenia) from depression and manic-depressive illness, a linkage between schizophrenia and mood disorders is now well established. It has been estimated (Buckley et al. in press) that at least 50% of the schizophrenia population additionally suffers from depression. Studies on self-esteem show that 2 (Moritz et al. in press-b) to 3 (Freeman et al. 1998) out of 4 patients have abnormally low self-esteem, which may be one reason (among others) for the high suicide rate in schizophrenia, which is estimated in the range of 5-15% (for overviews see Preston and Hansen 2005, Siris 2001).

Treatment of attributional biases and poor self-esteem with the MCT (module 1 and 8)

In module 1, patients are first familiarized with the concept of attribution. The social consequences of different attributional styles are highlighted (e.g. blaming others for failure may lead to interpersonal tensions). Following this, patients have to find reasons for briefly described incidents (see figure 5). Situational as well as personal factors should be taken into account. There are always a number of different possible explanations which should be considered even if only one explanation seems valid at first (e.g. “A friend is talking behind your back”; possible explanation: “The person is planning a conspiracy against you”; alternative interpretations: “That person asked other people whether you were ill as you look quite stressed out. He did not want to ask you directly as you could be upset or insulted.”; “This is normal, we all gossip from time to time.”). People should consider that mono-causal inferences are unlikely, and that it can be helpful to generate alternative explanations (Freeman et al. 2004).

A friend did not show up to a meeting with you.

What caused your friend not to turn up?

What is the main reason for this event?

Yourself?
 Another person or other people?
 Circumstances or chance?




Figure 5. In module 1 (attributional style) group members should discuss reasons for complex scenarios. Monocausal inferences are called into question and subjects are encouraged to contemplate several causes.

Module 8 (Mood & self-esteem) deals with depression and self-esteem. The exercises target depressive cognitive biases such as overgeneralization and selective abstraction (see figure 6). The trainer explains how distorted cognitive patterns can be replaced by more realistic and helpful ones. In addition, the module targets dysfunctional coping strategies often adopted by people with psychological problems.

People with schizophrenia have a tendency to interpret everyday experiences as extremely negative (e.g. intense negative thoughts and images) and to react with a heightened level of fear (Morrison 2001). These worries are subsequently strengthened by enhanced vigilance and efforts to suppress them. Thought suppression can counter-intuitively enhance the impact of negative thoughts. In this module it is instead recommended to observe one's own thoughts from a detached perspective without interfering. Finally, some techniques are provided which, when used regularly, help to alter low self-esteem and to raise depressed mood.

1. Exaggerated Generalization	
What would be a more realistic and helpful evaluation?	
Event	False Generalization Positive/constructive evaluation
"I weigh too much", "My nose is crooked"	"I am ugly" "I am not ugly just because of one single imperfection; there are some things I like a lot about myself, for example my eyes"
A job interview did not go as expected.	"I will never ever find work again" "How can I improve for my next interview?"
<p>➤Allow errors!: Nobody's perfect! If you stutter from time to time, this does not mean that you cannot express yourself. If occasionally you make a mistake, this does not mean you are sloppy.</p>	

Figure 6. In module 8 (mood & self-esteem) participants are taught how to avoid negative self-appraisal. The module uses techniques introduced by Beck and Ellis. It also aims to

replace dysfunctional coping strategies (e.g. thought suppression) with more helpful ones (e.g. detached mindfulness for worries).

Metamemory

Basic research on metamemory problems in schizophrenia

An extensive literature suggests that patients with schizophrenia display a decrease in memory functioning (Aleman et al. 1999, Heinrichs and Zakzanis 1998) which relate to problems with encoding and learning information rather than rapid forgetting (Moritz et al. 2001). These dysfunctions negatively impact on functional outcome such as independent living, the patient's work situation and social skills (Green et al. 2004). In addition to the investigation of objective memory functioning, a new line of literature has turned to metamemory, which is the subjective appraisal of one's memory performance, particularly response confidence (Moritz and Woodward 2006b) and memory vividness (e.g. Danion et al. 2005). For example, the recollections in schizophrenia patients are often vague and do not include many perceptual details. More recently, our research repeatedly demonstrated that patients with schizophrenia are over-confident in memory errors while at the same time being under-confident in correct responses (for a review see Moritz and Woodward 2006b). This twofold response pattern may stem from liberal acceptance of response alternatives and JTC, respectively (Moritz et al. 2008). Premature termination of cognitive search processes and liberal decision criteria may lead to a neglect of essential cues that signal the fallibility of an incorrect response option, thereby promoting over-confidence in errors in patients. In contrast, controls may adopt more scrutinous strategies expressed as a reluctance to fully endorse a response option when evidence is incomplete. Along the same lines, healthy control participants exhibit greater confidence in correct responses relative to patients with schizophrenia, since the detection of multiple supportive cues increases response confidence. A recent study identified a general pattern of over-confidence in schizophrenia patients, which, however, was more pronounced for errors (Kircher et al. 2007). As it is the case for the aforementioned biases, over-confidence in errors is not restricted to delusional memories (e.g. alien abduction, recollections of a former life) and is regarded as a risk factor and antecedent rather than a consequence of paranoid symptoms.

Treatment of metamemory problems with the MCT (module 5)

In module 5, the group first discusses ways to enhance memory recall through mnemonic strategies. The ubiquity of memory problems is highlighted: No one can recall past incidents perfectly, and humans are not only prone to forgetting, but also to false memories. Then, visual stimuli from the so-called *Deese-Roediger-McDermott*, or false memory paradigm, are presented (Roediger and McDermott 1995). Many of the stimuli have been utilized in prior basic research studies. This material is known to elicit a large number of false memories, even in 50-80% of healthy subjects. Group members are instructed to look at the pictures (see figure 7) carefully and to memorize each item as vividly as possible in order to avoid the false memory effect. Each picture (display time: 15 to 30 seconds) is followed by a recognition task in which participants have to decide whether an item had been displayed or not. Although in most investigations patients with schizophrenia did not differ from controls in *accuracy* in the Deese-Roediger-McDermott paradigm (e.g. Huron and Danion 2002), their conviction for error responses was disproportionately increased (Moritz et al. 2006c). The fallibility of human memory is emphasized: Memory is constructive and does not function like a video recorder. One of the objectives of this module is to teach patients to doubt their memories, if a vivid recollection is not available. In this case, additional proof should be collected, particularly for important situations (e.g. interpersonal conflicts).

Kiosk

- kiosk sign
- sausage
- garbage can
- bench
- flags
- price tags
- bottles
- vendor



= not presented

Figure 7. Patients have to study complex and rather prototypical pictures. These pictures typically elicit false memories. Strongly suggested items are typically added by logical inference and *spreading of activation* in semantic memory. Exercises teach patients to rely on perceptual recollections rather than gist or logical inference.

Bias against disconfirmatory evidence

Basic research on a bias against disconfirmatory evidence in schizophrenia

In addition to undue conviction and the falsity of a belief, incorrigibility is another defining feature of delusions (e.g. people providing evidence that challenges a delusional belief may be avoided or discredited as enemies). Since 2005, a bias against disconfirmatory evidence (BADE) has been repeatedly demonstrated, again using delusion neutral material (Woodward et al. 2007a, b, Woodward et al. 2006a, Woodward et al. 2006b, Woodward et al. 2008). In a typical task, the subject is confronted with increasing pieces of information. For BADE trials, the subject is lured into false assumptions that are disconfirmed by subsequent information. While healthy subjects usually correct their ratings when the evidence changes (Fugelsang et al. 2004), patients are “led up the garden path” in those tasks. Schizophrenia patients are less able to disengage from initially plausible interpretations, which, over the course of three trials, become more and more implausible. This effect was demonstrated in both first-episode (Woodward et al. 2006a) and predominantly chronic patients (Moritz and Woodward 2006a) as well as in healthy participants scoring high on delusional ideation (Buchy et al. 2007). In some studies, this bias was more pronounced in currently deluded patients (Woodward et al. 2006a, Woodward et al. 2006b).

Treatment of the bias against disconfirmatory evidence in schizophrenia (module 3)

Stubbornness is a common human feature. Its disadvantages are highlighted at the beginning of module 3. Historical and case examples are given on how incorrigibility promotes problems to the point of disastrous events. Patients are then familiarized with the so-called confirmation bias. Three objects are presented (cycle A: three (different) types of flowers; B: three sorts of fruits). Hereupon, patients are asked to think of a higher level category that subsumes the presented objects by suggesting new objects within this category (superordinate

categories: living beings, food). With yes/no answers the trainer provides feedback as to whether or not the proposed elements fit into the predetermined superordinate category or not. As the presented objects mislead many persons to believe the superordinate categories are *flowers* or *fruits*, most people generate objects that only fit into these categories instead of contemplating alternative hypotheses. This illustrates a powerful psychological bias (i.e. the confirmation bias), which occurs when people ignore alternative sources of information (e.g. certain newspapers, TV programs, books) that do not match their attitudes. The subsequent exercises consist of a series of three pictures shown in reversed order. Some of these were developed in the basic research studies mentioned above. The sequences of pictures gradually reveal an ambiguous plot (see figure 8). For each picture, participants are asked to rate the plausibility of four different interpretations. The correct interpretation is highlighted at the end of each trial. One of the four interpretations appears improbable upon the presentation of the first picture, but eventually proves to be true in most cases. Two of the other interpretations seem plausible upon the presentation of the first picture, but are eventually wrong (lure (BADE) trials). Patients should learn to search for more information before judging, and to correct themselves, if disconfirmatory evidence is encountered.

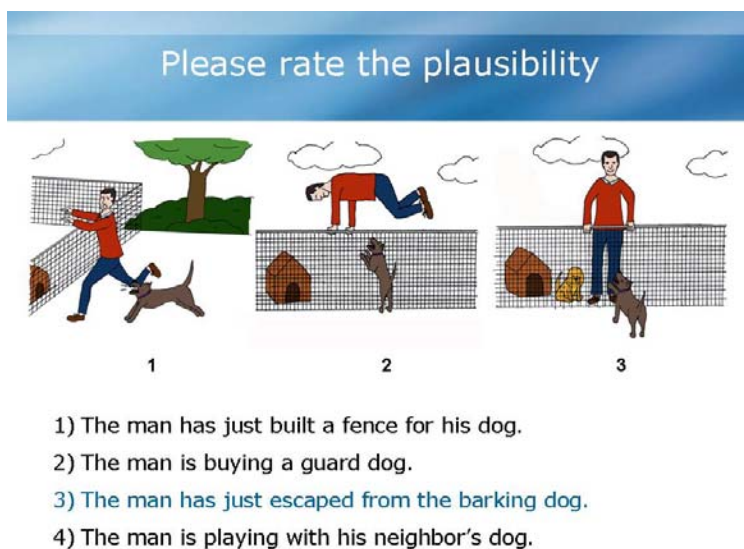


Figure 8. Successively, three pictures are shown together with four response alternatives (at first; picture 3 only; then pictures 3 and 2 together; finally all pictures, at the end the correct solution is highlighted). In this example, information on the first presented picture (3) misleads to false responses. With the following pictures it becomes increasingly evident that the man has escaped from a barking dog, even though at first it may have seemed as if options 1 or 4 were more likely.

Theory of Mind

Basic research on deficits in theory of mind in schizophrenia

Deficits in social cognition or theory of mind (ToM) are frequently observed in psychosis (Brüne 2005) as well as other psychiatric patients, for example affective disorders (e.g. Kerr et al. 2003, Uekermann et al. 2008). Patients are mostly not adequately aware that their behavior is inappropriate and impolite at times. ToM is an umbrella term and encompasses a wide range of aspects, including social knowledge and competence, emotion detection (e.g. faces, prosody and irony) and social reasoning. Deficits in this area have repeatedly been found in schizophrenia, but the results are equivocal with regard to their specificity for this disorder and their association with paranoid symptoms (Brüne 2005). Some evidence suggests that ToM problems are especially severe in disorganized patients (Sprong et al. 2007).

However, this does not preclude an important role for ToM as an aggravating factor in the formation of false beliefs. Cognitive biases such as JTC and BADE may become most problematic in combination with problems in social reasoning (Moritz et al., in press), especially in view of a tendency to interpret neutral facial expressions and actions of others as hostile.

Treatment of deficits in theory of mind in schizophrenia (module 4 and 6)

The group first discusses different cues for social cognition (e.g. appearance, language) and their validity. It is stressed that each cue is fallible and that social cognition is best when a range of different cues is used. Participants are then asked to identify basic human emotions and assign them to facial expressions (see figure 9). This task is easily solved by most participants as context information is provided. For the next set of items, which do not contain contextual information, misinterpretations are very common. Other tasks of module 4 have been adopted from Sarfati and Hardy-Bayle (1999). This module conveys the message that although facial expressions are very important for the understanding of inner feelings of a person, they can deceive to false assumptions.

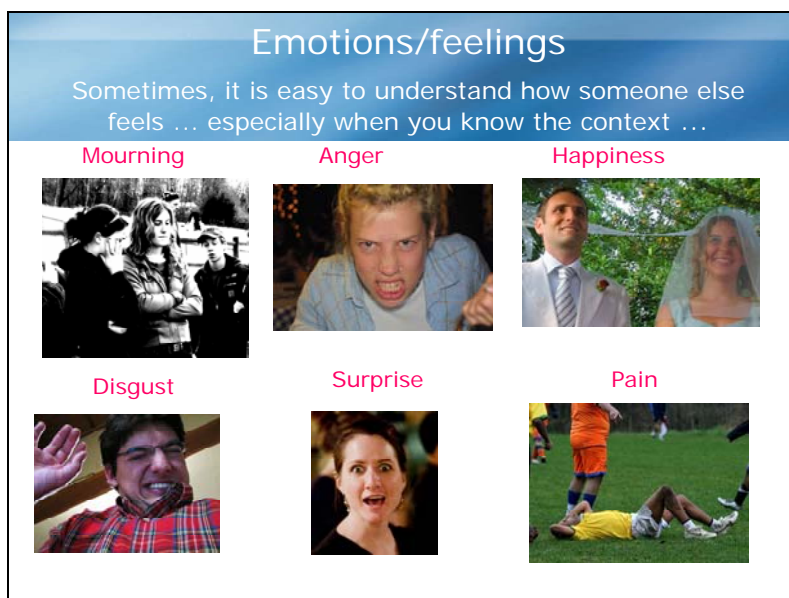
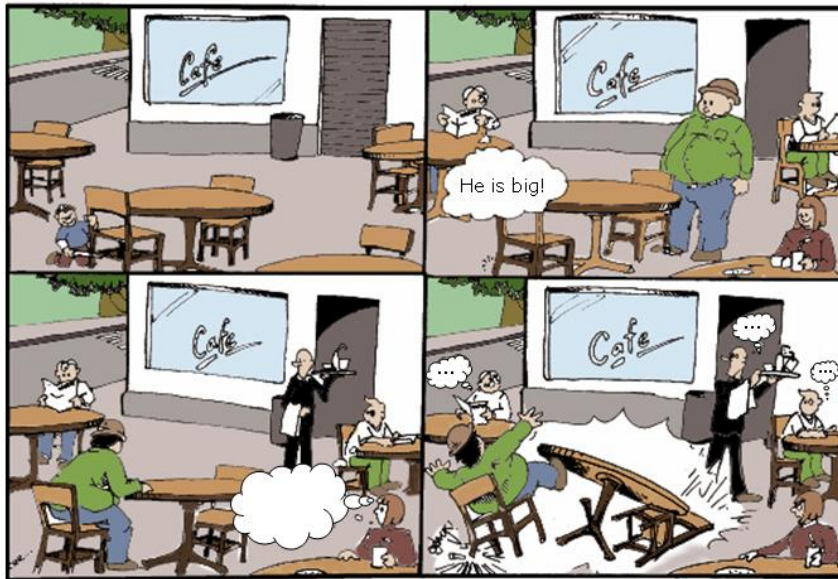


Figure 9. Example from module 4 (To empathize...I). Participants are asked to identify the facial expressions and the underlying emotional states. At the end, the correct solutions are presented. While the initial set of pictures provides context information facilitating the identification of the correct solution, subsequent pictures only show faces which often mislead to wrong inferences. The learning aim is that patients should attenuate their level of conviction in case information is incomplete.

In module 6, comic sequences are presented, for which participants are required to take the perspective of one of the protagonists, and to deduce what the character may think about another person or a certain event (see figure 10). In the style of the BADE exercises in module 3, most slides are presented in reverse sequential order, with the final picture within the comic being displayed first. In other words, the last picture(s) is (are) presented first, while the first pictures of the comic sequence remain covered. With each novel picture, more context information is revealed about the storyline. For the majority of items in the standard as well as in the "BADE-ized" administration, several interpretations remain possible until the end. In this case, participants should propose what additional information is required for a reliable judgment. Even if a sequence remains ambiguous, it should be discussed which interpretation is best supported by the available evidence.

Example: An overweight man falls off a chair



What might people think...are they correct?

Figure 10. Example from module 6 (To empathize...II). The pictures are viewed one by one. In this example patients sometimes do not understand that the viewer has more information than the people in the cafe who are not aware that the chair was tampered with, and may think that the chair broke only because of the man's weight, when in fact the same would have happened with a lighter person.

Administration of the program

Time-frame and setting

Metacognitive Training (MCT) consists of two parallel cycles (A and B) each comprising eight modules (see www.uke.de/mkt). An administration mode of two sessions per week is advantageous (one module per session). Thus, inpatients who are in treatment for four weeks or longer could undergo a full cycle. Outpatients receiving prolonged treatment may be able to attend both cycles (A and B). The parallel versions (i.e. cycles) are identical in terms of their rationale but contain different exercises.

The group size ranges from 3 to 10 patients, whereby an optimal group size comprises around 5 patients. Trainers are preferably psychologists or psychiatrists who have long-term experience with schizophrenia spectrum disorder patients. Psychiatric nurses, social workers and occupational therapists may also be eligible.

Each session should last between 45 and 60 minutes. The modules are pdf-converted PowerPoint files which should be projected onto a white wall or screen in the Adobe Acrobat® *full screen* mode. Each module contains more exercises than can be accomplished in this time-frame. Hence, the trainer should pick the most relevant exercises for the group and may skip ahead to the learning aims of the module when the end of the session is

approaching. The final slides describe the relevance of the tasks for daily life as well as for psychosis. Finally leaflets with homework are handed out.

After the first session, every participant should receive a yellow and a red card. The yellow card raises three fundamental questions which the patients should contemplate when they are feeling offended, persecuted or insulted:

1. What is the evidence?
2. Are there alternative views?
3. Even if it's like that...am I over-reacting?

These questions are intended to prompt patients to re-consider the available evidence particularly in critical situations, before drawing hasty and perhaps consequential decisions. On the red card the patient is encouraged to write down names and telephone numbers of persons and institutions which can be contacted in case of crisis or breakdown.

Problematic situations

If a group member displays psychotic symptoms during sessions, these should neither be supported nor challenged in front of the group. Individual delusional ideas should be addressed in face-to-face sessions such as CBT. An alternative is Individualized Metacognitive Therapy (MCT+) which builds on the MCT, currently only available in German language. If patients are already distanced from their delusional ideas, it is beneficial to talk about corresponding experiences on those exercises addressing delusional themes (e.g. module 1, scenario “A friend is talking behind your back”; module 6, scenario in which two men appear to talk about a third man). Finally, the slides titled “Why are we doing this?” (at the beginning of each module) and “What does this have to do with psychosis?” (at the end of each module) provide an opportunity for further individual reflections on experiences of psychosis.

Introducing the program to patients

MCT is an open program which should preferably be administered twice a week. Patients can enter at any module within a cycle. Any new participant should be informed about the goal of the program—preferably by participants who have already attended some sessions. Most patients will not know what *metacognition* means which can be explained as follows: “*Meta* is Greek for above and *cognition* refers to higher mental processes such as attention and problem-solving. In other words, metacognition is thinking about our thinking. The aim of the program is to learn more about human cognition, and how we can observe and change it to optimize problem-solving. At the heart of the program are thinking styles that may contribute to the formation of odd ideas and psychotic symptoms”.

Inclusion criteria

The training is primarily developed for patients with schizophrenia spectrum disorders. The program may also be suitable for patients with other diagnoses, who currently or in the past have displayed individual symptoms of psychosis (e.g. paranoid delusions, ideas of reference, hallucinations). Patients with a short attention span, hostility, aggressiveness, and inappropriate behavior or those with severe formal thought disorder, should delay the start of the training until some symptom remission occurs. As a rule of thumb, all schizophrenia patients can participate, if they are able to attend other group programs (e.g. occupational therapy).

Atmosphere

Although the training is highly structured and has a clear focus on the exercises, lively discussions should be encouraged and patients should be given sufficient time to exchange their views. Social interaction is a core factor for gaining self-awareness and changing behavior. A friendly and humorous atmosphere should be created. The exercises should be delivered in an entertaining, interactive and playful fashion.

Metacognitive training: Data on feasibility, subjective and objective effectiveness

Several studies have been conducted since the introduction of the MCT addressing the feasibility, safety and effectiveness of the approach (Moritz and Woodward 2007b). In a first pilot study (Moritz and Woodward 2007a), 40 schizophrenia patients were randomly assigned to either MCT or CogPack training (cognitive remediation program aimed at memory, attention and other basic cognitive functions). After 4 weeks with two weekly sessions, group members were requested to appraise the training. Patients rated the MCT superior on all outcome criteria. Four out of 10 criteria achieved statistical significance (e.g. fun, recommendation to others, being less bored and usefulness to daily life). Group adherence was excellent.

In a second study (Aghotor 2007, in press), 30 patients were randomly assigned to either MCT or an active control intervention (newspaper group: Patients read and discussed newspaper articles). Blind to group assignment, psychopathology and several (meta) cognitive parameters were assessed before and after intervention which again were 4 weeks apart and involved a complete MCT cycle (i.e. 8 sessions). An accelerated decline in positive symptomatology was observed in the MCT group relative to the active control condition, assessed using the positive syndrome score of the Positive and Negative Syndrome Scale (PANSS) ($d=.43$). JTC was also reduced for the MCT group ($d=.31$). In line with the prior study, MCT received a more favourable subjective appraisal than the active control ($d=.51$).

In an independent study in the UK (Ross et al. in press) 36 patients were randomly assigned to an active control or a single MCT session using several exercises from MCT modules 2 and 7. A significant decline in JTC behavior occurred in the MCT relative to the control group, and there was tentative evidence for a decrease in delusion conviction in some of the MCT patients.

A small trial in India by Kumar and colleagues (in press) allocated schizophrenia patients to either the MCT group or a treatment as usual group. The PANSS (see above) and the Psychosis Rating Scales (PSYRATS) served as primary outcome instruments. Patients in the MCT improved significantly on several parameters tapping delusions and hallucinations relative to the control group. Two single-armed studies have been presented as posters on scientific conferences (Briki et al. 2008, Linder et al. 2008). They confirm the feasibility of the training and the acceptance among patients. Patients improved on delusion severity, illness insight and quality of life.

Another recent trial (Kerstan 2009) compared 18 patients undergoing MCT to 19 patients on a waitlist control group. Pre- and post assessments were two months apart, and the MCT sessions were administered once weekly. Patients in the MCT group were mainly remitted so that the possibility of symptom decline was reduced due to floor effects. Nevertheless, compared to the patients in the waitlist group, patients attending the MCT group benefited significantly from the training on delusional distress, memory and social relationships, as

measured by a quality of life instrument. Further, a medium effect size was found for an improvement of JTC relative to the wait-list condition.

A recent trial (2009) completed in the Netherlands (for a summary see Ferwerda et al., submitted) included 29 patients. In this pilot study, the effect of the MCT was measured after participants had undergone one MCT cycle. The delusion subscale of the PSYRATS (see above), the Beck Depression Inventory II (BDI-II) and the Green et al. Paranoid Thought Scales (GPTS; assesses ideas of social reference and persecution) were administered. Patients improved on both GPTS subscales: social reference ($p = .03$) and ideas of persecution ($p = .01$) after the intervention. Of the 29 clinical paranoid patients, 13 (45%) fell below the cut-off score of 68 on GPTS. The score on the delusional rating scale of the PSYRATS was also significantly reduced after the MCT ($p = .01$), indicating a decrease in conviction in the delusional belief as well as in the experienced distress of the delusional belief. Results on the BDI were not significant ($p = .11$). Among the limitations of the trial was the lack of a clinical control group.

In a trial on individualized metacognitive therapy (MCT+; Moritz et al., in press), 40 patients were randomized either to CogPack training (see above) or a combination of group and individual metacognitive Therapy (MCT+). The MCT+ is more focused on individual symptoms and combines elements of CBT (dispute of fixed beliefs by means of Socratic dialogue, response prevention, elaboration of an illness model) with core features of MCT. As in (MCT) group training, a “back-door approach” is adopted: Instead of immediately challenging symptoms and delusional appraisals, which may severely undermine the therapeutic alliance, cognitive biases are addressed first before the therapy goes on to challenge individual biases and delusions. The MCT/MCT+ group improved significantly more on the PANSS delusions and positive subscales and delusion conviction as measured with the PSYRATS relative to the active control. CogPack was not superior to treat cognitive parameters such as executive functioning and attention. The MCT group also showed also a significant decline on jumping to conclusions over time relative to CogPack.

Conclusion

Over the last two decades there has been increasing support for psychological models of schizophrenia indicating that cognitive biases may play an important role in the formation and maintenance of the disorder. The goal of the MCT is to sharpen patients’ (metacognitive) awareness of these biases and to carry over the learning aims to their daily life. There is also increasing support for the efficacy of the MCT as a stand-alone program, but we encourage individual therapy for many patients, now available with MCT+. Given mounting evidence for beneficial effects of cognitive intervention in schizophrenia, together with high rates of relapse, noncompliance with neuroleptic medication and its medium effect size, cognitive interventions should be considered part of routine intervention.

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