Metacognitive Skill Training
for Patients with Schizophrenia (MCT)

Version 3.2

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Introduction

Why another cognitive training program?

There were several driving forces behind our decision to develop the present metacognitive training program[1]. For many years we have been concerned with the question of how to transfer the wealth of knowledge on metacognitive impairments in schizophrenia into a cognitive therapeutic intervention program, since we were unsatisfied with the apparent gap between our advanced understanding of the metacognitive processes in schizophrenia and its poor utilization in clinical practice. Further, as researchers we wanted to be more personally involved in the treatment of schizophrenia patients.

The eight modules of the present program target cognitive errors and problem solving biases common in schizophrenia, which alone or in concert culminate in the establishment of false beliefs and may progress to delusions. The sessions pursue the goal of bringing such problems to the awareness of patients, and to prompt patients to critically reflect, complement or change their current repertoire of problem solving skills. The problematic thinking styles recognized as potential contributors to the development of delusions include an increased self-serving bias (module 1), jumping-to-conclusions behavior (module 2 and 7), a bias against disconfirmatory evidence (module 3), deficits in theory of mind (module 4 and 6), over-confidence in memory errors (module 5), and depressive cognitive patterns (module 8). Despite good empirical evidence for these theories, it needs to be acknowledged that some of these accounts are subject to ongoing scientific debate, and are not yet unequivocally supported.

The treatment modules are designed to be administered as a group program. Individual delusional themes are to remain unchallenged (to sustain a stable patient-practitioner relationship) and shall be addressed in one-to-one therapeutic sessions outside the MCT. In other words, the purpose is to alter the "cognitive infrastructure" of delusions rather than targeting individual delusional systems.

Additionally, we endeavored to develop a program that is engaging for patients as well as both entertaining and interactive. This, in our view, enhances the likelihood that the program will have a lasting influence. For this reason, we have refrained from incorporating any "drill & practice" tasks were not incorporated. Basic cognitive dysfunctions, such as attentional problems, are not explicitly targeted in the program. In our view, it is unclear whether such cognitive dysfunctions really represent vulnerability factors, as they are also present in other psychiatric groups.

Throughout this program we illustrate the relevance of the individual modules to everyday events. Ideally, patients will reconsider their problem-solving routines and apply the newly acquired information to daily life. Leaflets with homework should assist this process.

The present program is cost-free and can be downloaded via the following web-link: (http://www.uke.uni-hamburg.de/kliniken/psychiatrie/ index_17380.php).

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[1] Metacognition can be described as "thinking about one's thinking", and involves the ability to monitor decision-making, information gathering, and to cope with basic cognitive limitations.

We cannot provide extensive information about the theoretical background of the modules and would like to refer the practitioner to the relevant literature cited for each module in each corresponding section.

The manual is kept as brief as possible since we are aware that many clinicians are reluctant to read thick manuals but prefer to get straight to work. Furthermore, most aspects of the program are self-explanatory, and we do not want to overly restrict the practitioner's individual style and creativity.

Before getting started…
Before turning to the program, some basic prerequisites must be addressed.

How many modules exist, and what is the time-frame?
The program consists of eight modules. For inpatients who are not treated for longer than four weeks on the ward, it is recommended to provide two sessions per week, each presenting a new module. This ensures that inpatients complete at least one cycle of the program during their stay. However, for outpatients who are in therapy for longer periods of time, it has proven advantageous to perform a given module over two successive sessions.

How many patients can attend the program?
The group size should range between 3-10 patients.

How long is each session?
Each module should take approximately 45-60 minutes to complete.

How is each session started?
It is a good idea to start each new session with a brief discussion about the previous module. After letting one patient describe the tasks from the prior module, the practitioner may relate the content to daily problems or events.

How is each session ended?
If the tasks are not completed by the end of the session (which will most often be the case), the practitioner should skip forward to the final slide(s) describing the relevance of the tasks to daily life.

How should the training room be set up?
A quiet room with sufficient chairs is required, which offers the opportunity to project the slides onto a white wall or screen.

What equipment is needed?
A projector (beamer) and a computer/laptop equipped with Adobe Acrobat reader® (free download) are needed. Optional: multiple computer screens if no projector is available

Who is eligible to be a practitioner?
Practitioners should be psychologists or psychiatrists who are experienced with schizophrenia spectrum disorder patients, ideally in group settings.

How should the practitioner deal with psychotic symptoms expressed during sessions?
Individual psychotic symptoms should be neither challenged nor supported in the course of the training. For treatment of *individual* delusions, other intervention methods may be administered (e.g., cognitive-behavioral therapy). However, for tasks that depict common delusional themes (e.g., Module 1, scenario "A friend is talking behind your back"; Module 5: false memories; Module 6, scenario in which two men only appear to talk about a third man), it is useful for patients who are distanced from their delusions to talk about related delusional experiences.

How should the program be introduced to patients?
The metacognitive skills training program is an open program. Patients may enter and leave during the course of the program, and it is therefore helpful to tell each new patient what this program is about – ideally with the help of other members, who have already attended some modules. The term *metacognition* should be explained to patients: *meta* is Greek for beyond/above and *cognition* refers to higher cognitive processes such as attention, memory and problem-solving. The aim of the program is to learn more about cognition, and how we can shape it to optimize problem solving. At the heart of the program are thinking styles that may contribute to the emergence of delusions. Consequently, each module has an accompanying slide where the relevance of the tasks for schizophrenia/psychosis is highlighted (slide: "Why do we do this?").

Which patients are eligible for training?
1. Ideally, patients with schizophrenia, schizophrenia spectrum disorders, or patients with other diagnoses who currently or have previously experienced psychotic symptoms (particularly delusions, ideas of reference, hallucinations) are eligible for this program.
2. Patients should be able to attend a 1-hour session. For highly distractible patients the training session may be too stressful, but participation should be attempted.
3. Present delusions and hallucinations are not exclusion criteria for group participation, unless patients have very strong self-referential ideation. Patients with manic episodes showing inappropriate (antisocial, sexual, hostile) behavior should not attend until some symptom remission occurs, as it may endanger the group dynamics.
4. If a patient fails to attend a session, this does not present a major problem, as the program is not designed in sequential stages: every module deals with a specific aspect of metacognition, and does not build on or refer to other modules.

Atmosphere
1. The training session should not be rushed. Completing all the slides in one session is not required. As mentioned earlier, some material may be administered in future sessions. Although the material is fixed, there should be room for individual discussion and for patients to express their views. Nevertheless, the therapist should keep the group's focus on the tasks.
2. Some patients are fearful of speaking in public. These patients may be encouraged to participate with simple yes/no questions ("Do you also think that…?"), or by general instructions to raise one's hand to display support for an item of discussion (e.g., "Is there anybody who has already made a decision…?"). Participants should not be forced to engage in conversation and the practitioner should behave in a non-patronizing/supportive manner.

3. From time to time the practitioner should emphasize the basic rules of interpersonal engagement (e.g., listen to other people, let others speak out), particularly when problematic communication patterns are observed. If certain group members overly dominate discussions, it is reasonable to establish a pattern of taking turns so that each member has an opportunity to contribute, or the practitioner may appoint a particular member to respond.
4. Create a friendly and – when appropriate – humorous atmosphere. The tasks should be entertaining. Critical comments towards individuals should be discouraged – from either the practitioner or any of the group members.

When the slide "Why do we do this?" appears, the practitioner should clarify that the lessons relate to common cognitive biases that paranoid/psychotic patients experience according to current scientific knowledge. At the same time it must be emphasized that not all of the patients attending the program will necessarily possess these biases. The relationship between the tasks and everyday life must be stressed frequently since the primary goal of the program is to apply the skills developed in each module (e.g., gathering information, not blaming others for failure) to daily life. A discussion of subjective experiences and observations is very helpful in this regard.

In the following, we provide an outline for each module that includes the target domains, the basic task, theoretical rationale, the aims of the module, as well as necessary preparations and recommendations for administration.

Module 1: Attributional Style

Target domain: self-serving bias (external-personal attribution for blame, internal attribution for positive events)

Basic task: In the first part of the program, patients will be familiarized with different attributional styles and their social consequences (e.g., blaming others for failure may cause interpersonal difficulties). Then, as a task, patients are encouraged to use this information to provide neutral (more objective) responses for various events (e.g., sharing success with others instead of solely attributing this to oneself). In the second part, patients will be asked to discuss reasons for a specific outcome (mostly bad or good). For example, reasons why a friend has not called (negative), or why someone said that he/she likes you (positive). Patients will be encouraged to consider how they themselves, others, and situational factors can influence an event. There are no definitive answers for this task; instead the exercise is intended to facilitate thinking about causality. Even under circumstances where only one explanation seems valid (e.g., possible explanation for "A friend is talking behind your back": "The person does not like me."), patients should be encouraged to consider alternatives (e.g., "That person has asked other people if I am ill because he does not want to ask me directly since I could be upset or worried."; "This is normal, we all gossip from time to time, this does not mean that he or she is a bad person.").

Material: Set-up is analogous to the Internal, Personal, Situational Attribution Questionnaire (IPSAQ, Kinderman & Bentall, 1997).

Theoretical background: Bentall and Kinderman (Bentall, 1994; Bentall, Corcoran, Howard, Blackwood, & Kinderman, 2001; Bentall, Kaney, & Dewey, 1991; Kinderman & Bentall, 1996, 1997; Kinderman, Kaney, Morley, & Bentall, 1992) have repeatedly reported that paranoid patients exhibit an external-personal attribution for failure (i.e., a bias to blame others for negative events). In contrast, it has been found that patients attribute success more to themselves than others, although the latter response style is less well established (Garety & Freeman, 1999). Together, this pattern of responding is called a self-serving bias, which is to some degree also observed in healthy individuals (as folk wisdom tells us: "The bad workman blames his tools."). However, the external-personal attribution for failure seems to be more pronounced in paranoid patients.
In a recent study, we observed that patients with acute delusions attribute the source of both positive and negative events more frequently to others as opposed to themselves (external attributions). This response pattern suggests that patients may suffer from a generalized loss of control (i.e., helplessness).

Aim of the module: The patients generate reasons for a specific outcome by considering three possible sources: oneself, others, or situational factors. The goal is not to lead patients to a definitive answer. Rather, different possibilities, and combinations thereof, should be considered so that patients are taught to avoid using the same line of thinking for different situations (e.g., "it is always my fault", vs. "it is always the other's fault"). Further, the advantages and disadvantages of a depressive attributional style (e.g., attributing failure to self, and success to chance lowers self –esteem) and self-serving bias (e.g., attributing failure to others and success to self may promote social conflict) should be pointed out, particularly in the first part of the program. Notably, the primary focus of this module is to show patients

that there are often diverse causes for an event, even in situations where initially just one interpretation seems valid.

General advice: The practitioner should review all slides before beginning a session. For slide 3 of the presentation, patients should provide as many explanations as possible for the event that is described. Subsequently, these are grouped according to self, others, or situational factors. For the scenarios concerning the effects of attributional style, it will suffice if just two of the four scenarios are chosen, provided that the advantages and disadvantages of different attributional styles are sufficiently emphasized. The responses on the last slide of each scenario are only meant as examples, the group's responses may well deviate from these. For the second part of the program, the practitioner may create his/her own examples, or think about misinterpretations that have occurred in past sessions – clearly ask patients if they are willing to talk about these experiences beforehand (do not be too confrontational, do not embarrass patients, and do not breach privacy!). Keep in mind that the discussion should not become too person-specific. Also, patients should attempt to provide concrete examples for the potential causes of a particular scenario. While the practitioner should encourage patients to generate as many interpretations as possible for each scenario, eventually the most likely cause should be identified once all alternatives have been presented. There are plenty of examples, so it is best to avoid boring patients with long discussions about one event.

Specific advice (examples)
First scenario in series:
Possible reasons for being stopped by the police:
- "Yourself " – I have been speeding.
- "Others " – The police officer is in a bad mood.
- "Circumstances " – Stopping me is part of a routine procedure.

Second scenario in series:
Possible reasons why your friend is talking behind your back.
- "Yourself " – I must have done something wrong.
- "Others " – The friend likes to talk about others. He is a bad person.
- "Circumstances " – There might be something I am not supposed to know, maybe a surprise party for me.

[no further specific instructions needed]

Module 2: Object Identification

Target domains: bias against disconfirmatory evidence, jumping to conclusions bias

Basic task: The tasks of the first set consist of common objects (e.g., a frog), which are displayed in decreasing degrees of fragmentation: new features are added in eight successive stages, until the entire object is displayed at the final stage. In alternating order, participants are asked to generate their own interpretations at each of the eight stages, or to assess the plausibility of pre-specified interpretations. For example, at the first stage of the "frog" task, the presented fragment strongly resembles a lemon, as only the contour of the frog is displayed. Patients may decide on an alternative once they feel there is sufficient information. For the second task, picture puzzles are shown, which depict at least two different scenes/objects depending on the observer's perspective (e.g., the first picture shows the profile of an old man, but also a street scene by night). Participants are asked to report their first impression of the picture, and then change their viewing angle in order to acquire an alternative perspective.

Material: The objects of the first task set are post-edited simple black and white drawings from a fairy tale book. The picture puzzles have been downloaded from the Internet.

Theoretical background: The stimuli presented in the first task set were previously used in a study by our group (Moritz & Woodward, in press). In line with another investigation (Woodward, Moritz, Cuttler, & Whitman, in press; Woodward, Moritz, Cuttler, & Whitman, 2004), we observed that patients with schizophrenia, irrespective of syndrome subtype, exhibit a decreased ability to revise their ratings for incorrect interpretations. This pattern of results has been termed "bias against disconfirmatory evidence" (Woodward et al., 2004). Even with increasing "counter-evidence" against a particular initial interpretation, patients maintain to judge their initial interpretations as more plausible than both healthy and psychiatric controls. Moreover, there is strong evidence for a *jumping to conclusions* data gathering bias in patients with schizophrenia: patients make decisions extremely hastily on the basis of insufficient evidence (Garety & Freeman, 1999; for a variation of this account see Moritz & Woodward, 2004).

Aim of the module: The aims of this module are twofold. The first task set helps patients to understand that their initial impressions are not necessarily correct or justified. In the second task set patients learn that limiting oneself to a single perspective of an event only reveals half of the information, which can be ineffective when trying to establish the full truth. Things can change over time, and increasing evidence may cast a different light on things. Therefore, we must be prepared to change our attitudes and opinions. Although for the stimuli of the first task set subjects with schizophrenia did not show a jumping to conclusions bias (Moritz & Woodward, in press), the material is well suited to show the disadvantages of such a strategy, which has often been demonstrated in schizophrenia patients with other tasks (Freeman, Garety, Kuipers, Fowler, & Bebbington, 2002; Garety & Freeman, 1999; Garety, Hemsley, & Wessely, 1991). Patients should be taught to look for details that might verify or falsify their hypotheses.

General advice: The practitioner should review all slides before beginning the training so that he/she is familiar with the eventual outcome of the pictures. The slides preceding the tasks

should be read out/paraphrased by the practitioner, and perhaps illustrated with examples. The pros and cons for a hasty vs. a slow response style need to be pointed out to patients beforehand: If the stakes are high and there is time, it is important to carefully consider the available evidence before making a decision. The at times grave consequences of "jumping to conclusions" are demonstrated to the participants with several examples from different fields (e.g., medicine: false diagnoses etc.). Patients should be given opportunity to describe their own experiences in this phase (e.g., experiences during psychosis).

In the first task set, trials are intended to demonstrate that hasty responses prompt incorrect decisions. The second task set demonstrates how quick judgments pose the risk of obtaining only *half the truth* about an event, ultimately leading to the dismissal of relevant information.

For the trials of the first task set, self-generated interpretations from each patient may be written on a blackboard or kept in mind, and checked as more pictures are revealed to assess whether or not they are still valid. The practitioner should encourage patients to raise their hands to indicate whether or not they continue to support a specific interpretation, or if they would like to provide alternatives. Further, the practitioner should discuss with patients the features of a picture that support or refute an interpretation.

For the picture puzzles used in the second task set, the practitioner should attend to those participants who do not discover both interpretations. If a patient is not able to see one of the solutions, another participant may clarify, for example, by pointing at some clues contained in the picture (e.g., in the first picture the dog can also be seen as the old man's hand).

Specific advice (example): First example without given alternatives (frog):
Many patients tend to make hasty decisions (most prominent interpretation: lemon). On this occasion the practitioner may point out that there are eight stages for each picture. A lemon would probably be completed after the second one and this alternative is therefore rather unlikely. There is no obligatory sequence in which to administer the tasks, that is, depending on the participant's abilities you may choose to alternate trials between the first and second tasks sets.

Module 3: Corrigibility

Target domain: bias against disconfirmatory evidence, jumping to conclusions

Basic task: Each trial consists of three successively presented pictures that go back in time. The sequence of pictures increasingly resolves an ambiguous plot (e.g., in one of the pictures a man is bending over a fence and watching a barking dog; in the following two pictures it becomes evident that the man has just escaped from the dog by jumping over the fence). For each picture in a trial, participants are asked to rate the plausibility of each of four interpretations. The correct interpretation is highlighted at the end of each trial.
One of the four interpretations appears implausible on presentation of the first picture, but eventually proves to be *true* in many cases (in the example above: "The man has just escaped from the barking dog."). Two of the other interpretations appear plausible on presentation of the first picture, but eventually prove to be false (lures, e.g. "The man is playing with his neighbor's barking dog."; "The man has just built a fence for his dog."). For all trials, one interpretation is *absurd/implausible* (e.g., "The man is shopping for guard dogs."). There are three conditions each with 3 trials: *revealed-on-first* (the most plausible interpretation upon presentation of the first picture is valid), *revealed-on-second* (story does not become clear before second picture), and *revealed-on-third* (story does not become clear until the third picture).

Material: most of the items were inspired by the WAIS subtest *picture arrangement*

Theoretical background: When employing the materials described above we found that patients with schizophrenia exhibited a bias against disconfirmatory evidence (Woodward et al., in press). That is, patients with schizophrenia were less able to revise ratings for incorrect interpretations, particularly within the *revealed-on-second* and *revealed-on-third* conditions. For the *revealed-on-third* condition this pattern of results was strongest in patients currently experiencing paranoia (Woodward et al., 2004). Additional research has suggested that a bias against disconfirmatory evidence in schizophrenia may also occur in non-delusional patients (Moritz & Woodward, in press).

Aim of the module: The intention is to demonstrate that humans are often hasty in their decision-making and draw firm conclusions from little evidence. This can easily lead to faulty decisions. It is therefore important to keep an open mind and maintain the ability to revise false working hypotheses (similar to Module 2: Object Identification).

Specific advice: The practitioner should review all slides before beginning the training. The first slides should be read out/paraphrased by the practitioner and perhaps illustrated with examples. Starting with slide 3, participants should come up with their own ideas. Patients should be asked for their preferred interpretations (e.g., in descending order) or whether they have already ruled out certain ones (after a number of opinions have been heard, participants are asked to express their agreement via raising their hands). Then, the practitioner can ask if there are patients who have already made a decision. Note that it is not necessary to provide plausibility ratings to all pictures. When revealing a new picture, it is important to discuss new evidence and emphasize to patients who have prematurely decided on an incorrect interpretation that although their interpretations might have been plausible in the beginning, the evidence has since changed. It is crucial to explain that, particularly in interpersonal

contexts, hasty decisions can often prime misunderstandings, and social conflict (e.g., "A person does not greet me. Hasty conclusion: The person does not like me so I will not talk to him anymore").

Clues for detecting the correct interpretation

Task	When the solution is obvious:	Clues for finding the correct solution (examples):
1 (fire)	evident on first or second picture	- The boy is receiving praise from the adults. - If you look closely, you can see on the first picture that there is a hole in the roof of the neighboring house.
2 (parking-space)	evident on third picture	- It is not clear until the third picture that the man was unable to park properly because the adjacent cars did not use the appropriate parking-spaces.
3 (pizza)	evident on first picture	- The man is holding the telephone receiver. - The dough is falling on his head. It doesn't seem like he is wearing the dough on purpose (makes alternative 3 unlikely).
4 (speech)	evident on third picture	- To make a definite attribution, all pictures must be presented. - Alternative 4 activates prejudices that increase the likelihood of hasty and false decision making.
5 (escape)	evident on third picture	- The "guardian angel" interpretation is absurd throughout. - There are no particular clues that the man's clothes are wet (makes alternative 4 unlikely).
6 (washing)	evident on first picture	- The sign suggests a Laundromat. - The woman is carrying a basket.
7 (gun)	evident on first picture	- The gun is pointed at the man on the right. - The man has his hands raised. - The men are too old to play "cops and robbers". - If the man on the left was giving the other his gun back, the man on the right would not offer money (makes alternatives 3 and 4 unlikely).
8 (choir)	evident on third picture	- In the second picture, you can see that the man in the front row has red cheeks because he is embarrassed. However, it is questionable whether this is sufficient evidence to make a decision. - In the first picture, the conductor listens to the choir. It could be speculated that he is checking if they are singing in tune.
9 (king)	evident on third picture	- To make a definite decision you have to see all three pictures.
10 (shark)	evident on second picture	- The man does not look like a scientist (makes alternative 1 unlikely). - In the second picture you see people running away. On the first picture there are already footsteps in the sand.
11 (dog)	evident on second picture	- The dog is in front of the fence, not surrounded by it (makes alternative 1 unlikely).

12 (fishing)	evident on second or third picture	- It is not entirely clear until the third picture that the boy should be gardening. However, the second picture makes this interpretation already very likely.
13 (quarrel)	evident on second picture	- In the second picture, the boy on the right is pointing to a comic book. - The same boy looks very angry.
14 (serenade)	evident on first or second picture	- The boy looks very angry. - It is late at night (moon) and probably too late to go to band rehearsal (makes alternative 2 unlikely).
15 (cowboy)	evident on first picture	- The man in the foreground has been restrained and struggles to free himself. - The other alternatives are absurd.
16 (boat)	evident on first or second picture	- The cat is floating away on the boat. - It does not look like the dogs caught a suspected thief, because they are following the boat rather than the person.
17 (crash)	evident on third picture	- In the first picture you can see a table in the background, but a definite decision is not yet possible. At the second picture it could due to chance that the man came along with a table, since the other man is already lying on the ground.
18 (umbrella)	evident on second picture	- The girl seems to be soaked by water, not sweat. - The father seems amused, as opposed to threatening. - Alternative 2 remains a possibility until the last picture, where it shows the daughter refusing to take the umbrella.
19 (house)	evident on second picture	- The man has a bucket in his hand. - He does not seem to be watching anything (makes alternative 3 unlikely). - The house does not look dirty, it is very unusual to clean one's house (makes alternative 1 unlikely).
20 (pull/push)	evident on third picture	- To make a definite decision you have to see all three pictures (the man on the left is surprised to see the other man entering the door as he has tried to open the door himself but apparently confused *push* with *pull*).
21 (mannequin)	evident on third picture	no particular clues

Module 4: To empathize…I

Targeted domain: Theory of Mind 1st Order

Basic task: For the initial trial in this first task set, participants are asked to name basic human emotions and assign them to facial expressions. To emphasize that facial expressions are relevant clues but by no means definite proofs for a person's internal motives, four pictures displaying a sportsman, an actor, a psychologist, and a serial killer are presented. For these pictures most people make false assignments! Subsequently, examples are provided which demonstrate that, depending on the culture, gestures can be interpreted differently ("When in Rome, do as the Romans do"). In the subsequent trials of this first task set, human faces are shown, for which participants have to decide how the depicted character(s) may feel. Participants are asked to discuss the plausibility of the four alternative interpretations per picture. Thereafter, the correct solution is highlighted (often accompanied by the presentation of the complete picture).
For the first task of the second set, participants are shown cartoon strips, each consisting of three pictures. Participants are asked to extend each cartoon by adding an additional picture, which is chosen from three options. For example, in one cartoon a man drills a hole in the wall, then screws a bolt in the wall, and finally, picks up a picture from an easel. The cartoon can either be completed by an option showing the man hanging up the picture (correct), doing additional painting in the picture, or putting a ball on the easel. In addition to finding the correct solution, participants can discuss whether one of the incorrect alternatives is more plausible than the other and/or if one choice is even impossible. The solution is shown in the next picture. To end the session, participants are shown pictures that have to be sorted in the correct logical/temporal order.

Material: Stimuli for the first task set are derived from Sarfati, Hardy-Bayle, Besche, & Widlocher (1997), stimuli of second task are partly provided by the group of Martin Brüne (Bochum, Germany)

Theoretical background: Sarfati et al. (1997) found that patients with schizophrenia demonstrate problems on trials shown for the second task set which require situational understanding and perspective taking. Problems were particularly marked for patients with formal thought disorder, perhaps because they are more easily distracted by certain perceptual features in the prime sequence, which are unrelated to context. In addition, patients with schizophrenia have difficulties predicting the actions of others, or the consequences of self-generated actions, and these are discussed as important contributors to the emergence of psychosis.

Aim of the module: The first part of this module identifies how we can use nonverbal information, like facial expressions, to make decisions about a person's internal motives. At the same time, it is demonstrated that facial expressions are prone to misinterpretation. For instance, you cannot determine solely by the face of a person whether that person is an actor or a serial killer. To adequately interpret a facial expression it is important to include other information, such as situational context or knowledge about the person. The second set of tasks emphasizes the importance of attending to the context of an event rather than relying on a few details. Problems of processing and interpreting facial expressions are also well documented in schizophrenia (Phillips & David, 1995).

General advice: The practitioner should review all slides before beginning the training. The first slides should be read out/paraphrased by the practitioner and perhaps illustrated with examples. It is crucial that patients take the context into account when inferring the most plausible alternative. Discuss with patients how the intentions of others can be deduced, particularly for the example given on slide 2. Also, stress the fallibility of these initial assessments, and emphasize the need to remain open-minded. Make up examples (e.g., A man's face appears expressionless, one might say he seems disinterested or hostile. However, it is possible that the man suffers from Parkinson's disease and his face is not reflective of his true emotional state).

For some patients the multiple-choice tasks may be too easy. If this should occur, the alternatives provided can be hidden and patients can be asked to generate their own solutions.

Specific advice: The tasks described herein can be administered in any order. Also, the practitioner may wish to switch between the first and second task sets depending on the participants' performance level.

Module 5: Memory

Target domain: over-confidence in errors

Basic task: Visual stimuli from the so-called *Deese-Roediger-McDermott*, or false memory task, are presented (Roediger III & McDermott, 1995; Roediger III, Watson, McDermott, & Gallo, 2001). This material is known to elicit a high number of false memories even in healthy subjects (50-80%). Initially, a beach scene is shown, which includes a number of items one would expect to find there (e.g., children playing, people sunbathing, water, etc.). Other objects that also relate to a typical scene are intentionally excluded (e.g., a ball, towels). Note that it is common for participants to report having seen these excluded items on subsequent memory tests.

To begin the task, participants are provided with two examples intended to familiarize them with the false memory effect. Then, for each scene they are asked to look carefully at the pictures and try to recall each item as vividly as possible in order to avoid the false memory effect. In the second part of the module some of the pictures from the first phase are re-presented, however, this time two other items are excluded. In the last part, more complex pictures are shown, in which four objects are missing. After each picture or scene, a recognition task is administered.

Material: Miller & Gazzaniga (1998); complex scenes at the end by Rea Rodriguez-Raecke.

Theoretical background: Patients with schizophrenia have repeatedly been found to display over-confidence in memory errors (Moritz & Woodward, 2002; Moritz, Woodward, Cuttler, Whitman, & Watson, 2004; Moritz, Woodward, & Ruff, 2003; Moritz, Woodward, Whitman, & Cuttler, 2005). At the same time, patients are less confident in correct responses. This response pattern along with a large number of memory errors is suggested to lead to so-called *knowledge corruption* (a large portion of what a subject strongly believes in [subjective knowledge] is corrupt or contaminated).

There is evidence that vivid recall is a good heuristic for differentiating correct from incorrect memories, while mere familiarity is poor (Reisberg, 2001). Notably, patients with schizophrenia have been found to demonstrate poor vivid recall (Bacon, Danion, Kauffmann-Muller, & Bruant, 2001; Danion, Rizzo, & Bruant, 1999; Huron et al., 1995), and rely more on familiarity when making memory judgments (Weiss, Dodson, Goff, Schacter, & Heckers, 2002), which makes them susceptible to errors.

The Deese-Roediger McDermott paradigm (Roediger III & McDermott, 1995; Roediger III et al., 2001) shows that our memory can be tricked by priming effects, logical inference (e.g., it is reasonable to assume that people who sunbathe have blankets under their body), and confusion of past with current mnestic episodes.

Aim of the module: Although patients with schizophrenia did not perform differently than controls on certain verbal variants of the Deese-Roediger McDermott paradigm (Huron & Danion, 2002), a recent study found more high-confident false memories for visual scenes (Moritz, Woodward, & Rodriguez-Raecke, submitted). The present material is instructive to show patients that even when we recall items with high confidence, these images can be pseudo-memories, and that it is prudent to avoid placing complete trust in one's memory (at trend level we found more false memory errors in schizophrenia when baseline recognition was considered, Moritz et al., 2004). The module is intended to make patients reflect about

the fallibility of their memories, and show patients that memory is constructive rather than passive (e.g., memory does not work like a video recorder). A further aim of this module is to teach patients to use the so-called vividness heuristic in everyday life, and to seek additional evidence when vivid recollection is not obtained, particularly in significant interpersonal situations (e.g., a quarrel). It should be noted that vivid recollection is a reliable proxy for reality, but it may sometimes also fail.

General advice: The practitioner should review all slides before beginning the training. The first slides should be read out/paraphrased by the practitioner and perhaps illustrated with examples. For slides 4 to 9 patients come up with own ideas and guesses. Try to make this part as interactive as possible (for example, ask patients for mnemonic aids they have learned at school). The patients should learn that the false memory effect can easily occur in "saturated" situations (situations with high familiarity). For example, we may recall words from a recent quarrel that have not been actually said but *could* have been said (subjective deduction), or are just a recollection of a prior argument. In such situations it is crucial to verify our first impression.
There are plenty of tasks. Do not bore patients with long discussions about one event. Each picture should be shown for 10-20 seconds. Then the patients should discuss the listed items. Ask patients to report their confidence, and if they claim to vividly remember an item, ask them for specific details (e.g., color, location). After the responses are given, show the big picture once again.

Specific advice: none.

Module 6: To empathize…II

Target domains: Theory of Mind 2nd Order, need for closure

Basic task: At the beginning of this module, participants are asked to think of what allows for a reliable assessment of a person (e.g., language, gestures). Weaknesses and advantages of each should be discussed. Then, comic sequences are presented. Participants are required to take the perspective of one of the protagonists, and generate hypotheses concerning what he or she might think about another person. For the majority of sequences there are no definitive answers. Also, the participants are encouraged to what additional information is necessary to reduce ambiguity in each scenario. If no definitive decision can be made, it should be discussed which interpretations are best supported by the evidence that is available.

Material: Pictures drawn by Martin Armbruster, Britta Block Verena Jung and Mariana Ruiz-Villarreal

Theoretical background: There is evidence that patients with schizophrenia have problems with tasks that involve perspective-taking or empathizing with others (Frith & Corcoran, 1996). The inability to understand the attitudes of others is prominent in schizophrenia, and misperception of others' motives and actions may promote interpersonal problems. Whether or not these deficits are confined to schizophrenia (Garety & Freeman, 1999) is the subject of an ongoing debate.
In addition, it has been shown that patients with schizophrenia share an increased need for closure (Colbert & Peters, 2002), that is, they are unsatisfied with open endings, which may contribute to jumping to conclusions behavior (this may reveal itself as strong conviction about false judgments for the present tasks).

Aim of the module: The participants should differentiate between what they know and what particular protagonists know. For example, in one scene a woman is confronted by her doctor with what is apparently bad news. When she arrives late for work, her boss yells at her. From the picture we cannot really tell whether her boss is cold-hearted, or if he doesn't know that the woman went to a doctor because she was sick. Alternatively, it could be argued that the boss could act more considerately since it is apparent that his employee is sad. Some of the comic scenes are unsatisfactory for participants with an increased need for closure. The patients should be made aware that for some scenes - as in real life - a definitive explanation cannot be provided unless we have more information. Patients should come up with ideas about which additional information is needed to ultimately verify such hypotheses.

General advice: The practitioner should review all slides before beginning the training. The first slides should be read out/paraphrased by the practitioner and perhaps illustrated with examples. To make sure that all patients understand what is shown on the pictures, let the patients describe each scene before discussing interpretations. If patients go beyond the information given in the picture, please ask them if they really have that piece of information. For the core task, patients should adopt the perspective of the different depicted characters.

Specific advice

Task	Clues for interpreting the pictures (examples)
1 (big man)	It is important that the patients understand that the people in the café did not see the boy with the saw. Therefore, people will likely deduce that the man fell off the chair because of his weight. However, this is not correct. Probably the chair would have collapsed even with a light person.
2 (accident)	It is reasonable to assume that the man smells of alcohol, and the police officer therefore assumes that the accident has happened because the man is drunk. This is not necessarily wrong but we do not know if a sober person could have prevented the accident. That the road is rather straight, however, could be an indication that the man carries the main responsibility, because he might have had enough time to stop the car.
3 (twins)	The man probably thinks that Lisa, the woman he called on the phone, is sitting in the café although she told him that she had something else to do. As he does not speak to her with her Christian name it might be assumed that he does not know her well and therefore might not even know of her twin sister.
4 (gallery)	The man coming into the art room probably thinks that the two people are talking about him if he did not notice that they have been talking about the picture beforehand. Alternatively, the two visitors are complaining that the man obstructs their sight.
5 (birthday)	Since the grandma did not openly express her disgust for sweets, the little girl may well buy grandma sweets again for her next birthday.
6 (bad news)	see text
7 (promotion)	Mr. Smith is probably surprised to find out about his promotion from his colleague who indiscreetly told him before the official meeting.
8 (sick)	The mother may think the boy is ill only if the boy has put the thermometer in a hot cup and then shook the thermometer down (not displayed). Otherwise the thermometer will read too high and the mother would figure out that the boy is just pretending to be ill.
9 (ice-cream truck)	The boy does not know that the girl has seen the ice-cream truck at the park and will therefore think that she last saw it at church (when he last saw her).
8 (neighbor)	A man is repeatedly unable to start his car because of a dead car battery. Due to the quarrel with his neighbor from downstairs who complains about the loud music (pictures 1-2), the man with the dead car battery may think that the neighbor has entered the car and turned the lights on so that the battery would run out. However, as his battery ran out again in picture 4 at a different location, it is more reasonable to assume that he himself left the lights on (perhaps he was a bit confused because of the stress with his neighbor).
9 (bank)	The bank clerk does not know that the boy has just bought a toy pistol. Whether the staff will be fearful depends on a number of factors (e.g., does the boy look dangerous, does the toy gun look real, is the bank assistant a fearful person).
10 (soccer)	In picture 1, foreigners are apparently learning the language of their host country. The lesson depicted seems very easy, so it is reasonable to assume that they are not very advanced in their understanding of the new language. Therefore, they might not know what the sign in the park means. The park ranger may think that the people are deliberately disobeying the rules. Resentment of foreigners may also play a role. It should also be discussed if the mere presence of a sign on the lawn may have been sufficient evidence to refrain from playing soccer.
11 (sausage)	As the boy seems to be very hungry, the mother may think that he has eaten all the sausages by himself, when in fact the dog ate them.
12 (sailing)	Although father and son have not heard the warning message, they have probably noticed the weather change (amassing clouds) and may, for this reason, have

	decided not to go sailing. However, in this case they might have reverted long before.
13 (car)	One cannot really tell, whether the woman will take the man's words as mere information or patronizing behavior.
14 (house)	A man has obviously forgotten the key to his house and now has to climb through the window. The ambler may think that he is a burglar. Then again, he may know the man (perhaps as a neighbour), or the owner of the house could have explained the situation to him (e.g., the owner's gesture in the second picture might be interpreted in this way).
15 (library)	The scenario shows a man asking a woman a question without first getting her attention. Several interpretations are possible. Perhaps the man doesn't notice that the woman is on the phone, so he thinks that her comments are directed at him. This is supported by the fact that he directly asks his question without trying to catch her attention first. In this case, he might be upset. Alternatively, he may think that the woman should attend to her duties instead of making personal calls during business hours, so he interrupts her conversation.

Module 7: Picture Interpretation

Target domains: jumping to conclusions, liberal acceptance

Basic task: The participants are shown original paintings and are required to discuss/deduce the correct title of the artwork by selecting one of four options. For some paintings the solution is rather obvious, while for others the solution only becomes clear when the painting is studied thoroughly. Further, for some paintings it is debatable whether the correct title is really the best possible solution.

Materials: Original paintings, two pictures are taken from the Thematic Apperception Test (TAT)

Theoretical background: Patients with schizophrenia displayed a liberal acceptance bias in two previous studies (Moritz & Woodward, 2004; Moritz & Woodward, 2005; Woodward et al., in press). Patients gave higher plausibility ratings for absurd or improbable hypotheses than controls. This may be because patients adopt less stringent criteria for accepting solutions (this account is a variant of the jumping to conclusions approach) and neglect the whole amount of available evidence (Garety & Freeman, 1999).

Aim of the module: Patients should learn that it is worthwhile to search for details that would otherwise go unnoticed and that may support or refute certain hypotheses. It can often be misleading to look and rely upon one feature, even if it is very dominant.

General advice: The practitioner should review all slides before beginning the training. The first slides should be read out/paraphrased by the practitioner and perhaps illustrated with examples. The details that support or refute a hypothesis should be discussed with patients. Perhaps introduce evidence that the patients have not yet recognized (see below), and ask them how they can use it to evaluate the paintings.
For this module patients can be encouraged to raise their hands to show agreement for an item of discussion (e.g., when asking who is in favor of certain interpretations, or determining what participants are still undecided). The practitioner can ask patients why they favor a particular alternative, and one or more of the group members may validate the judgments that are provided. Also, the practitioner should ask patients if they are leaning towards one interpretation, multiple interpretations, or if they have already made up their mind. The practitioner may moderate what one group has to say about the arguments of the other group, and show them details (see below) that may change their mind.

Specific advice

Picture #	English title	Clues for detecting the correct interpretation
picture 1	"Courtship"	The woman's facial expression (coquettish, reflective); the man has brought her a gift (flower); the man's devotional posture.
picture 2	"The admonition"	The girl seems to feel guilty; the older woman's threatening gesture; the focus is on the women (not on the boy); the boy does not have any shoes in his hands (makes alternative C implausible).
picture 3	"Sad message"	The woman is crying; the soldier has brought her a hat and a coat (presumably belonging to her fallen husband); there is a letter on her lap; the baby is not looking ill, the little boy is facing the uniformed man and not the baby (makes alternative B implausible).

picture 4	"Card-playing girls"	Women are playing cards; no coffee/tea in the picture (makes alternative D implausible); no money on the table (makes alternative B implausible); a third person in the room makes the interpretation of the fortune-teller (A) improbable.
picture 5	"Rest at the edge of the woods"	The women brought a big picnic basket along; people do not seem to be agitated; no specific clues for an injury (D).
Picture 6	"Why did I marry him?"	The couple is apparently on a ship (porthole in the background), they are probably on their honeymoon (argues for B). Another clue for this alternative is that the man is lying on the bed with clothes on; perhaps being crapulous (a bottle is on the table next to him). The woman is too young to be the man's mother (argues against alternative D). There are no clues for murder (e.g. a gun) or suicide (argues against alternative A and C). In the past, a red ribbon, as worn by the woman, indicated that she has (just) married (another hint for alternative B).
picture 7	"Summer evening"	The woman is sparsely dressed although it is later in the evening (->summer); the woman might be too scantily dressed for her first date; no signs of fear or anger (makes alternative D implausible): the couple is leaning relaxed against the porch.
picture 8	"The water seller of Sevilla"	The man in front is wearing ragged clothes; the liquid in the glass is colorless.
picture 9	"Dressing of a young man"	There are clothes lying on a chair in the background; the standing woman is fixing the young man´s collar, who is kneeing in front of her, wearing underclothes (speaks for C & against A). Furthermore there is a friendly atmosphere, the two ladies are looking neither angrily nor accusingly , but seem cheerful (argues against D), uncomfortable/uncommon position for a massage (B implausible).
picture 10	"The reading chemist"	The cues mortar and pestle, the closed bottle suggests a chemist, who is perhaps studying a formula (speaks for C). The facts, closed big bottle in front of him without a wine glass and his focus on reading argues against B. The style of dress, hat and collar are not the signs of a monk (speaks against A). The absence of other and more books argues against the title "bookworm".
picture 11	"The drama"	There is a big crowd watching a scene that is happening on a stage; there is no screen (makes alternative C implausible); it is unlikely that so many people would witness a crime and not intervene (makes alternative A implausible); the crowd is sitting in the dark whereas the scene is well-lit as is usual in theatres.
picture 12	"Ironing women"	There is no body to be reanimated (makes alternative D implausible); the woman on the right side is ironing a dress; the other woman seems to be tired from work, she is yawning.
picture 13	"The Cossack-letter"	One of the men at the table is holding a pen in his hand; the men are not arm wrestling; the Cossacks seem to be in a cheerful mood and not anticipating a battle (makes alternative D implausible).
picture 14	"The love letter"	No one is moving furniture (makes alternative C implausible); the picture's atmosphere is sunny and peaceful; a topographer would likely have more professional tools (makes alternative D implausible).
picture 15	"Soup in the monastery"	A boy with a (soup) bowl is leaving the monastery; there are people in the background that are presumably eating; the nun in the background seems to have a soup kettle in front of her.
picture 16	"Reflections"	For this picture, it can be debated whether other titles may also fit the picture.
picture 17	"The fruit	The kids or dwarfs have apparently picked fruits from the tree, as there

	"thieves"	are some fruits at the bottom of the tree and one boy is still in the tree; the old man drives them away with a birch.
picture 18	"Boy with violin"	Other interpretations go far beyond the visible; in fact, the boy is the famous violin player Yehudi Menuhin – as a child - before an upcoming concert.
picture 19	"Secrets"	If the two girls were twins, their similarity should be more obvious, but you cannot see both faces (argues against alternative C). The girls seem to speak confidentially (argues for alternative A). Chinese whisper is not a game for two (argues against Alternative B).
picture 20	"The poor poet"	The number of books shown in the picture speaks more for a poet (alternative B) than a servant (argues against C). The way he holds his hand may indicate that he is in the act of poetry reading (alternative B). Even though he is living in apparent poverty, the diverse belongings (particularly books) argue against the poorhouse interpretation.
picture 21	"Lady with opera glasses"	The woman holds an opera glass but no mask (argues against alternative A). Upon a superficial examination, one might mistake the background for wings (argues against alternative D).
picture 22	"Two men contemplating the moon"	The moon is an essential element of the picture, there are no vampires or tombstones (argues against alternative A and C). The scene appears to be peaceful. The atmosphere suggests night-time (argues against alternative D).
picture 23	"Mother at the cradle"	The child is sleeping peacefully and doesn't appear to be seriously ill or dying (no pale face; argues against alternative A and B). The mother is sitting at the cradle, her chin is resting on her hand, which makes singing unlikely (argues against alternative C and D).
picture 24	"Woman with raven"	Alternative D describes what can be seen in the picture. A-C makes assumptions that go far beyond what is depicted.
picture 25	"The absinth drinker"	The drink in the glass is green (argues for alternative C). A and D are also possible. The woman seems to be lost in thought rather than waiting for someone (argues against B).
picture 26	"The newspaper readers"	The people pass the church but don't go in (argues against alternative B). The newspapers are essential elements. Alternative D also seems possible. "Rush hour" (alternative C) refers to traffic density on the commute to and from work by car, and not to walking.
picture 27	"American gothic"	This picture, painted by Grant Woods in 1930 was the epitome of virtuous, hard-working people. The man holds his pitchfork like a weapon, signalling that he belongs to the farming community. The neo-Gothic house in the background and the couple's facial expression, representing their puritanical way of living and their devoutness, further indicate alternative D. In addition to that, "Gothic" may stand for the medieval/obsolete lifestyle that the couple might represent in the opinion of the artist. Alternative B and C are also possible but the couple's harsh facial expression might argue against these titles (grandparents or farmers may be displayed more idealized). There are no special hints for lynch-law (e.g. an angry mob or a "prey").
picture 28	"Vampire"	The tight embrace may argue for C, but the man appears pale faced and lifeless. The woman places her mouth at the man's neck (argues for A). The rather dark atmosphere argues against the more positive interpretations C and D.
picture 29	"Land tax"	The coin is an important element of the picture (argues for C). It is unlikely that a buccaneer gives money to a nobleman (argues against D). A and B are possible but less plausible than C. Another argument

		against A is that it is doubtful that a medieval artist would have depicted corruption.
picture 30	"Land of cockaigne"	The flail that is shown in the picture might argue for alternative A. Food lying all around and animals with cutlery stuck in their bodies argue for B. The beheaded chicken is too small to serve as the picture's title. There are no special hints for food poisoning (alternative D).
picture 31	"The juggler"	The man's equipment (e.g. dog and hoop) seems to belong to a juggler, rather than to a sorcerer (alternative A) or an itinerant preacher (alternative C). Alternative B might also be possible.
picture 32	"The spectacles salesman"	Adults and children try on eyeglasses (tested by reading the newspaper); the bearded man offers glasses out of his case to a woman (argues for D). The children are not in the focus of the picture, furthermore there are more adults (argues against A). The entering man is only a background figure (C is not plausible). In order to illustrate a scholar, it would be more plausible to show him at a writing table with books, instead of putting him in such a social environment.
picture 33	"To ask for a dance"	There is a dancing couple pictured in the background of the painting. The man bows to a women which argues for C, the cheerful company are facing him. The two women at the back of the table are not necessarily gossiping about him, the noise level in the room could be a reason why they are so close. Everyone seems to be drinking alcohol (beer mugs on the table), so the man has to be more annoying to the guests if answer A were the right one.
picture 34	"Girl drinking wine, with two suitors"	The women, holding a glass of wine, seems to be flattered, slightly amused and smiles, maybe she is complimented by one of her suitors (argues for A). The presence of the second man and the fact, that the women does not look at the man argues against answer B. The fact that the woman takes the centre stage of the picture argues against C. Furthermore there is no luxurious food visible on the table (argues against D).
picture 35	"Awaiting the fishing boat"	The mother and one of her children are looking wishfully at the ocean. Boats at the skyline pictured in the background, meagre clothing of the mother and children argue for a poor fisherman´s family (speaks for alternative B). Furthermore there is no luggage for a journey and the child is bare-foot (argues against D). If the scene had described a promenade, the painter would have likely illustrated the scene more dynamically. There is no clear information for a grieving widow (but no definite proof against answer C).
picture 36	"Feeding rabbits"	The children are feeding the rabbits; no specific clues for Easter (D); last meal (A) is too macabre given the rather peaceful mood of the picture.
picture 37	"The sleeping"	The woman's facial expression is peaceful; her head is not hanging down (like you might expect from a dead person) but is imbedded in her arm; there are no toxic substances in the picture.

Module 8: Self-esteem & mood

Target domains: negative cognitive schemata and low self-esteem

Basic task: The group discusses symptoms of depression. Following this, therapeutic possibilities and typical cognitive patterns of depressive patients are illustrated. Examples are shown for depressive thinking and strategies for replacing these cognitions with more realistic and helpful ones are discussed. Finally, some simple techniques are provided that may help the patients to alter negative self-schemata and raise their mood.

Materials: Examples are derived from cognitive-behavioral text-books and case stories

Theoretical background: There is strong evidence showing that many patients with schizophrenia have low self-esteem (Freeman et al., 1998). Rates of depression and suicide are very high. There is a continued debate as to whether paranoid ideation is a dysfunctional attempt to raise self-esteem (Adler, 1914/1929; Bentall et al., 2001; Kinderman & Bentall, 1996), for example, by enhancing subjective importance (*the more enemies, the more honor*) and creating a new fantastic purpose in life (fight against aliens, secret service, Moritz, Werner, & von Collani, in press)

It is not the intention of the program to raise self-esteem to unrealistic heights (therefore, we did not incorporate "positive thinking" phrases like "I am special person" that may well be suited for non-psychotic patients), but rather to convey a realistic sense of self, and to offer options about how to gain a better self-attitude.

Aim of the module: Participants should be made aware of dysfunctional thinking styles, which may contribute to the formation and maintenance of depression and low self-esteem. The malleability of these cognitive styles under constant training should be emphasized.

General advice: The practitioner should review all slides before beginning the training. The first slides should be read out/paraphrased by the practitioner and perhaps illustrated with examples. This module is different from all the other modules because no conventional tasks are shown. It is crucial that the practitioner knows the presentation well, and is familiar with the cognitive-behavioral approach on which this module is based.

Specific advice: First the patients are supposed to name symptoms of dysphoria. On the slides where questions appear, the patients should be encouraged to come up with examples of more helpful and rational interpretations.

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