Concise Reference

Cognitive Dysfunction in Schizophrenia


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Springer Healthcare Education
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CHAPTER ONE

Steffen Mortiz

COGNITIVE DYSFUNCTION IN SCHIZOPHRENIA

Introduction

Many patients with schizophrenia display severe neurocognitive dysfunction in a wide variety of domains, most notable memory and executive functioning. These dysfunctions are, in most cases, present at the first exacerbation but do not necessarily progress during the course of the illness beyond age-related decrement. Although neurocognitive deficits are not obligatory for diagnosis, the necessity for their identification and treatment in schizophrenia is increasingly acknowledged.

In the past decade, a large body of empirical evidence has been accumulated showing that cognitive disturbances are important determinants of functional outcome variables such as social relationships and work status. For example, a meta-analysis demonstrated that memory dysfunction is a particularly strong predictor of functional outcome in schizophrenia [1]. In addition, there is increasing recognition of the impact of neuropsychological dysfunction on a number of treatment-related variables, such as insight and coping skills.

The most important domains of cognitive deficit in schizophrenia are working memory, attention/vigilance, verbal learning and memory, visual learning and memory, reasoning and problem solving, speed of processing, and social cognition [2].

Working memory: much of the clinical relevance of working memory deficits in schizophrenia comes from strong correlations that working memory measures have with a variety of other cognitive domains impaired in schizophrenia, such as attention, planning, memory, and intelligence [3].
**Attention/vigilance:** the ability to maintain attention over time. Impairments in vigilance can result in difficulty following social conversations and an inability to follow important instructions; simple activities such as reading or watching television become labored or impossible [2].

**Verbal learning and memory:** abilities involved in memory functioning including learning new information, retaining newly learned information over time, and recognizing previously presented material. In general, patients show larger deficits in learning than in retention [2].

**Visual learning and memory:** not as easily expressed as verbal information and this area of cognitive function has generally been found not to be as impaired as verbal memory. However, it has been found to be correlated with employment status, job tenure, and psychosocial rehabilitation success, among other parameters [2].

**Reasoning and problem solving:** often measured by one’s ability to adapt to change. Patients with schizophrenia who are impaired on measures of executive functions have difficulty adapting to the rapidly changing world around them [2].

**Speed of processing:** this aspect of cognitive impairment is relatively nonspecific and has been found to correlate with a variety of clinically important features of schizophrenia, such as daily life activities, job tenure, and independent living status [4–6]. Reduced processing speed can impair the ability to keep in step with the task-oriented jobs that are frequently held by patients with schizophrenia.

**Social cognition:** theory-of-mind skills and social and emotion perception and recognition have been the general focus of the literature on social cognition in schizophrenia. Theory of mind is the ability to infer another’s intentions and/or to represent the mental states of others [2].

**Impact on treatment strategies**

Neurocognitive dysfunction may also exert a negative impact on compliance with medication. For example, several psychotropic agents, especially benzodiazepines and anticholinergic medications, with the latter often being prescribed to attenuate the side effect of conventional neuroleptics, are known to have potential adverse effects on neurocognition in some patients. When such side effects remain unnoticed, drug
discontinuation may occur, especially if the patient considers that the adverse side effects outweigh the benefits of drug treatment.

Evaluation of negative medication effects is also essential, given that many patients are already cognitively impaired before treatment, potentially compromising the outcome of psychotherapeutic or psychoeducational treatment. Memory problems and dysfunctions in abstract logical thinking may severely limit the outcome of insight-based psychotherapeutic interventions. A compromised capacity to store information, as evidenced by many psychiatric patients, as well as older patients with or without mental illness, may also lead to forgetfulness about taking medication and the purpose and contents of psychotherapy, with forgetting about the latter being a further risk factor for noncompliance. Recently, we found that approximately one-third of patients with schizophrenia do not take their medication as prescribed because of prospective memory problems.

Once neurocognitive problems have been detected, there are a number of strategies that can be used to deal with such dysfunctions in psychiatric patients. With regard to memory problems, clinicians should repeat essential information regularly, check from time to time that patients are indeed grasping the core aspects of therapy, give the most essential information in written form (especially on medication and dosage, but also for cognitive–behavioral intervention and stress management) and, when appropriate, involve relatives in the session so that they can remind patients in their own homes. To illustrate, the effects of psychoeducation are usually more effective when relatives are involved. Patients with decreased sustained attention benefit from more frequent but shorter therapeutic sessions. In addition, there is evidence that cognitive remediation programs are effective for at least some patients. The administration of second-generation antipsychotics may ameliorate some neurocognitive symptoms (possibly via the improvement of negative symptoms), or at least may not aggravate neurocognitive dysfunctions. However, in view of conflicting new evidence on the neurocognitive effects of atypical antipsychotics, a seemingly closed chapter has been reopened.

Clinicians may want to evaluate whether medications that are potentially harmful to memory, such as benzodiazepines and anticholinergic agents, are still necessary or could at least be diminished in dosage. In any case, the presence of memory and other neurocognitive problems should not be disregarded as a minor problem or lesser evil given their possible impact on compliance with medication, insight, treatment, and functional outcome.
CHAPTER ONE

COGNITIVE DYSFUNCTION IN SCHIZOPHRENIA

Quality of life

Reductions in quality of life are strongly associated with cognitive impairment and long-term effects can be quite substantial [7]. For example, cognitive dysfunctions may cause increased stress at work or school, because many jobs necessitate intact selective attention, vigilance, and memory. To compensate for neurocognitive problems, the impaired patient must devote more effort to a task than individuals whose cognitive functioning is normal. However, this causes stress, a major risk factor for renewed exacerbation of psychiatric symptoms according to the widely accepted vulnerability–stress model of psychiatric illness [8]. This creates a vicious circle when job demands are not suited to the patient’s cognitive abilities.

References

Neurocognitive deficits are a core component of schizophrenia, with moderately severe to severe impairments seen across multiple domains of cognition on average [1,2]. Cognitive impairment is pervasive; nearly all individuals with schizophrenia present with cognitive performance below that expected if they had not developed the disease [3]. Unlike positive symptoms, cognitive deficits correlate highly with measures of functional outcome, both cross-sectionally and longitudinally [4,5]. Due to the growing appreciation of the central importance of cognitive impairments in schizophrenia, tools to assess cognition in schizophrenia are of great importance.

The instruments typically used to measure cognitive function in schizophrenia fall into three main categories:

1. Performance-based assessment batteries comprised of standard (mostly paper- and pencil-based) neuropsychological tests.
2. Computerized performance-based test batteries.
3. Interview-based assessments

The instruments vary widely in their required testing time. A thorough neuropsychological assessment can require several hours of assessment time and enables a full evaluation of cognitive strengths and weaknesses across a broad range of neuropsychological domains. Such an assessment is usually completed or supervised by a licensed psychologist. The batteries described here are relatively brief. They capture much of the variance in overall cognition as measured by the composite score of more comprehensive batteries. The list of instruments described below is not exhaustive but represents the most commonly used tools for measuring cognition.
in schizophrenia. Since many psychological assessments have copyright restrictions, they are not reproduced here. Information on how to obtain them is provided. Useful resources for clinicians to use are:

- Wechsler Adult Intelligence Scale (WAIS) [6];
- Wechsler Memory Scale (WMS) [7];
- Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) cognitive test [8];
- Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) [9];
- Brief Assessment of Cognition in Schizophrenia (BACS) [10];
- Cambridge Neuropsychological Test Automated Battery (CANTAB) schizophrenia assessment [11];
- CogState Schizophrenia Battery [12]; and
- computerized cognitive testing Cognitive Drug Research (CDR) system [13].

**Paper-pencil batteries**

Standard neuropsychological test batteries offer several advantages. The psychometric properties of the tests are generally well established and normative data are available in many cases. The interpersonal interaction that is fundamental to the administration of these batteries allows greater flexibility in testing people with schizophrenia, and may feel less intimidating to some patients than the computer-based batteries. The pencil–paper testing process generally results in a higher completion rate than computerized tests [14]. The traditional neuropsychological tests tend to require more training than more automated computerized batteries or instruments using an interview format familiar to clinicians.

**Wechsler Adult Intelligence Scale and Wechsler Memory Scale**

The WAIS [6] and WMS [7] have long been the most widely employed batteries of assessment of intelligence and memory in normal populations. However, the WAIS-III alone requires approximately 100 minutes for completion in a mixed clinical population [15]. For studies of schizophrenia patient populations, researchers using these batteries have tended to reduce the number of subtests administered to reduce
demands on the patients and staff. Blyler et al used regression analysis to determine the four tests covering all four domains of functioning assessed by the WAIS-III that would best account for the variance in full-scale intelligence quotient (IQ) in a sample of 41 outpatients with schizophrenia [16]. They found that a shortened version of the WAIS-III, consisting of information, block design, arithmetic, and digit symbol subtests accounted for 90% of the variance seen in the full-scale IQ of the schizophrenia patient sample and took only 30 minutes to administer [16]. Because of its brevity, the shortened version of the WAIS may have utility as a routine measure of IQ in clinical practice.

MATRICS Consensus Cognitive Battery

The US National Institutes of Health (NIH) and Food and Drug Administration (FDA) supported the MATRICS project to derive a cognitive test battery that could be used to measure treatment effects consistently across clinical studies. The result of this effort was the MATRICS Consensus Cognitive Battery (MCCB) [8,17]. From the more than 90 tests nominated for inclusion, a final battery of ten tests was chosen with an eye toward practicality of administration, favorable psychometric characteristics, demonstrated relationship to functional outcome, and adequate coverage of the domains identified as important through the MATRICS process. The MCCB requires 65 minutes to administer and allows for measurement of cognition in seven different cognitive domains. The MCCB comes with a computerized scoring system that produces T-scores and percentiles for individual tests, cognitive domains and composite scores, corrected for age and gender based on a 300-subject normative group.

Repeatable Battery for the Assessment of Neuropsychological Status

The RBANS is a brief assessment (45 minutes) originally designed to test cognitive performance in elderly patients. It has shown utility in providing reliable assessment of cognitive performance in schizophrenia patient populations [9,18,19]. The performance of patients with schizophrenia on the RBANS has been shown to be highly correlated with performance on the much longer WAIS-III and WMS-III batteries [20,21]. Because it was designed to be administered repeatedly, the RBANS does not suffer from large practice effects. However, because the battery was developed to test for dementia, it is composed largely of tests of memory, language, and visual perception and may suffer
from ceiling effects on some subtests when used in a schizophrenia patient population. Also, the battery lacks measures of motor, executive and working memory performance, cognitive domains thought to be important in the cognitive impairment observed in schizophrenia. Despite these omissions, the RBANS is an appealing tool for assessment of cognition in routine clinical practice due to its relative brevity.

**Brief Assessment of Cognition in Schizophrenia**

The BACS battery retains the positive attributes of the RBANS (brevity of administration and scoring, repeatability, and portability) while more completely assessing the extent of cognitive impairment over multiple domains thought to be effected by schizophrenia (executive functions, verbal fluency, attention, verbal memory, working memory, and motor speed) [10]. The BACS is available in over 30 languages, has alternate forms to minimize practice effects, requires approximately 30 minutes to complete and is devised for easy administration and scoring. A spreadsheet is available for generation of composite scores by comparison to a normative sample of 400 healthy controls. The sensitivity, reliability, validity, and comparability of BACS forms have been established empirically [22]. The BACS also has clear functional relevance as the composite score is strongly related to functional measures such as independent living skills \( r=0.45 \) and performance-based assessment of functioning \( r=0.56 \) [23]. The BACS is well suited to routine clinical administration in which a quick assessment of overall cognitive functioning is required. Computerized and tablet versions of the BACS are available but, as of the date of this publication, have not yet been fully validated.

**Brief Cognitive Assessment and Brief Cognitive Assessment Tool for Schizophrenia**

Two very short batteries are the Brief Cognitive Assessment (BCA) and the Brief Cognitive Assessment Tool for Schizophrenia (B-CATS). These batteries are compositions of existing tests that were designed to assess cognition in schizophrenia patients in 15 minutes. They have good test–retest reliability, strong correlations with larger batteries, and good correlations with measures of functional ability [24,25]. The extreme brevity of the BCA and the B-CATS allow their use in routine clinical administration. The challenge for clinicians is that the tests that comprise these batteries need to be purchased separately from psychological assessment companies.
Computerized batteries

A recent development in cognitive assessment for clinical trials is the availability of computerized test batteries that allow direct data transfer to study databases. These methods minimize rater error and reduce the costs required for human quality assurance. However, some training is required. In addition, the high rate of invalid data in the assessment of people with schizophrenia compared to standardized test procedures has slowed their popularity among some clinicians and researchers.

Cambridge Neuropsychological Test Automated Battery

The CANTAB schizophrenia battery is composed of eight tests covering all seven of the MATRICS domains and requires 70 minutes of assessment time [11]. The CANTAB is presented on a touch screen computer and the nonverbal nature of most of the tests makes it an ideal battery for use in multilingual contexts. The neural bases of the CANTAB tests have been well established in animal models and human imaging studies thus allowing interpretation of results to be informed by this vast literature. The test–retest reliabilities of select CANTAB tests mostly appear promising [26].

CogState

The CogState schizophrenia battery is composed of eight tests covering all seven of the domains of cognition recommended by the MATRICS initiative [12]. Composite scores for the CogState schizophrenia battery correlate strongly with MCCB composite scores in schizophrenia subjects ($r=0.83$), while correlations between CogState and MCCB domain scores ranged from moderate to strong [27]. The battery requires approximately 35 minutes to complete and is suitable for testing in most countries due to the use of culture-neutral stimuli.

Cognitive Drug Research

The CDR battery was designed for repeated testing in clinical trials and has been used to study effects of disease and treatment on cognition in a variety of conditions, including schizophrenia [13]. The standard CDR can be completed in approximately 20 minutes and assesses the domains of power of attention, continuity of attention, working memory, episodic memory, and speed of memory. Individual tests can be removed
from or added to the battery, which relies heavily on timed testing. The CDR has been translated into close to 60 languages and has more than 70 parallel forms.

**Interview-based assessments**

Interview-based assessments offer a relatively quick measure of cognition using a rating scale that may be more familiar to clinicians without a formal assessment background. Because these tools pose questions about common cognitive experiences, they are considered more face valid than standard cognitive test batteries. Step-wise regression analysis indicates that both of the interview-based assessments described below account for significant variance in real-world functioning beyond that explained by standard cognitive test batteries and measures of functional capacity, and thus may tap into aspects of cognition not fully overlapping those assessed by standard cognitive test batteries [29,30].

**Schizophrenia Cognition Rating Scale**

The Schizophrenia Cognition Rating Scale (SCoRS) is a 20-item interview-based assessment covering all cognitive domains tested in the MATRICS battery, and takes approximately 12 minutes to complete [28]. It is administered separately to the patient and to an informant (family, friend, social worker, etc). The interviewer is asked to rate the patient’s level of difficulty performing various cognitive functions on a 4-point scale, with 4 being the most difficult and 1 being the least difficult (Figure 2.1) [28]. Upon completion of the 20 items, the interviewee is asked to give a global rating of the patient’s cognitive functioning on a scale of 1–10. After the interview is administered to both the patient and the informant, the interviewer ranks the patient on all 20 items, and gives a global score, based on the responses of both the patient and informant as well as the interviewer’s observations of the patient. The interview is available in several languages.

Empirical evaluations of the SCoRS have demonstrated high inter-rater reliability and significant correlations with measures of performance-based cognition (such as BACS), performance-based assessment of function and real-world assessment of function. Because patient scores have been found to account for little variance in cognitive performance, functional capacity or real-world functioning scores beyond that accounted for by informant ratings [29], it is possible that informant ratings alone could be collected in cases when an informant has sufficient contact with the patient.
Cognitive Assessment Interview

The Cognitive Assessment Interview (CAI) contains ten items selected from a longer interview-based assessment, the Clinical Global Impression of Cognition in Schizophrenia (CGI-CogS), by means of classical test theory and item-response theory [29]. The CAI items cover six of the seven MATRICS domains and are administered to both patients and informants and subsequently rated by the interviewer (Figure 2.2). Each of the ten individual items are rated on a seven-point scale, referenced to healthy individuals of similar educational and sociocultural backgrounds. Summary ratings include global severity of cognitive impairment as judged from the patient interview, informant interview and a composite of both interviews (all rated on a seven-point scale) as well as global rating of cognitive function on a 100-point scale. When an informant is not available, the CAI may be preferred over the SCoRS since the patient-only assessment demonstrates better test–retest reliability and relation to performance-based measures of cognition [30]. Although the CAI has fewer items, the probe questions are extensive and may require more time than the SCoRS [31].
The purpose of this questionnaire is to assess problems in attention, memory, motor skills, speech, and problem solving. The questions are designed to measure the patient’s severity of cognitive difficulty within the past 2 weeks. There are a total of 20 questions to be asked of the patient and then the informant in separate interviews. As the interviewer, you will determine your rating based upon your interviews of both the patient and the informant. Please circle the appropriate whole number for each question. Data from Keefe et al [28]. Reproduced with permission from Dr R Keefe. © Duke University.

<table>
<thead>
<tr>
<th>Date of patient interview:</th>
<th>Date of informant interview:</th>
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</table>

**Informant’s relationship to patient:**

<table>
<thead>
<tr>
<th>Level of severity:</th>
<th>N/A = Rating not applicable</th>
<th>1 = None</th>
<th>2 = Mild</th>
<th>3 = Moderate</th>
<th>4 = Severe</th>
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**Do you/does the patient have difficulty...**

1. **Remembering names of people you know or meet?** (eg nurse, doctor, family and friends)
   - **Mild:** Remembers most names of people that he/she knows but not all of the people he/she has just met.
   - **Moderate:** Forgets many names of people he/she knows and all of the names of people he/she has just met.
   - **Severe:** Forgets all or almost all names of people he/she knows and meets.

2. **Remembering how to get places?** (eg, restroom, own room, friend’s house)
   - **Mild:** Forgets infrequently.
   - **Moderate:** Is only able to get to frequently visited places.
   - **Severe:** Unable to get anywhere without assistance because difficulties with memory.

3. **Following/understanding a TV show?** (eg, favorite show, news)
   - **Mild:** Can only follow a short movie or news show.
   - **Moderate:** Can only follow a light, 30-minute show (ie, sitcom).
   - **Severe:** Unable to follow a TV show for any period of time.

4. **Remembering where you put things?** (eg, clothes, newspaper, cigarettes)
   - **Mild:** Rare instances of forgetfulness.
   - **Moderate:** Frequent instances of forgetfulness.
   - **Severe:** Very frequent instances of forgetfulness or forgetting items of great importance.

5. **Remembering your chores and responsibilities?** (eg, household chores, appointments)
   - **Mild:** Infrequently forgets.
   - **Moderate:** Forgets only those things that do not occur everyday.
   - **Severe:** Forgets all or almost all of his/her responsibilities.
6. Learning how to use new gadgets and equipment? (e.g., computers, washer, TV, phone)

Mild: Takes longer to learn than most, but can usually do it.
Moderate: Takes longer and needs to be taught; cannot learn some things.
Severe: Unable to learn how to use new gadgets and equipment.

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<tr>
<th>Patient</th>
<th>Informant</th>
<th>Interviewer</th>
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<td>N/A</td>
<td>1 2 3 4</td>
<td>N/A 1 2 3 4</td>
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7. Remembering information and/or instructions recently given to you? (e.g., directions, names)

Mild: Rarely has difficulty remembering information.
Moderate: Frequently forgets information given.
Severe: Almost always forgets information.

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8. Remembering what you were going to say? (e.g., forgetting words, stopping mid-sentence)

Mild: Rare instances of forgetfulness when speaking.
Moderate: Rare instances of forgetfulness when speaking.
Severe: Frequency of forgetfulness makes communication very difficult.

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9. Keeping track of your money? (e.g., managing bills, counting change)

Mild: Some difficulty but can usually do it.
Moderate: Significant difficulty either with counting change or paying bills.
Severe: Unable to keep track of his/her money because of cognitive difficulties.

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10. Keeping your words from being jumbled together? (e.g., words get mixed up or ‘run together’)

Mild: Sometimes will jumble words but it’s rare.
Moderate: Can have a conversation but jumbles words frequently.
Severe: Unable to have a conversation due to jumbled words.

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<td>1 2 3 4</td>
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11. Concentrating well enough to read a newspaper or a book?

Mild: Can concentrate except for rare occasions.
Moderate: Can concentrate on short and easy to understand materials.
Severe: Unable to read even the simplest materials due to concentration problems.

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<td>N/A 1 2 3 4</td>
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**Figure 2.1 (continued)**

Baseline form - Schizophrenia Cognitive Rating Scale

### 12. With familiar tasks? (eg, cooking, driving, showering, getting dressed)

*Mild:* Rarely has difficulty completing the task.

*Moderate:* Frequently needs verbal assistance to complete the task.

*Severe:* Needs physical assistance to do these tasks due to cognitive difficulties.

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<tr>
<td>N/A</td>
<td>1 2 3 4</td>
<td>N/A 1 2 3 4</td>
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</table>

### 13. Staying focused? (eg, daydreaming, trouble paying attention to someone talking)

*Mild:* Sometimes unable to stay focused.

*Moderate:* Frequently unable to stay focused.

*Severe:* Almost always unable to stay focused.

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<td>N/A</td>
<td>1 2 3 4</td>
<td>N/A 1 2 3 4</td>
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### 14. Learning new things? (eg, new words, new ways of doing things, new schedules)

*Mild:* Takes longer to learn than most, but can usually do it.

*Moderate:* Takes longer and needs special attention.

*Severe:* Unable to learn almost all new things.

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<td>1 2 3 4</td>
<td>N/A 1 2 3 4</td>
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</table>

### 15. Speaking as fast as you would like? (eg, slow speech, pauses)

*Mild:* Rarely speaks slowly because of cognitive difficulties.

*Moderate:* Often speaks slowly because of cognitive difficulties.

*Severe:* Ability to converse is jeopardized because of cognitive difficulties.

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<td>N/A</td>
<td>1 2 3 4</td>
<td>N/A 1 2 3 4</td>
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### 16. Doing things quickly? (eg, writing, lighting a cigarette)

*Mild:* Slightly slower than normal pace.

*Moderate:* Significantly slower; may need prompting to do things quickly.

*Severe:* Unable to get things done because time runs out.

<table>
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<tbody>
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<td>1 2 3 4</td>
<td>N/A 1 2 3 4</td>
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</table>
### Chapter Two

<table>
<thead>
<tr>
<th>17. Handling changes in your daily routine? (e.g., appointments, special visits, group therapy)</th>
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<tbody>
<tr>
<td><strong>Mild:</strong> Can adjust with considerable effort.</td>
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<tr>
<td><strong>Moderate:</strong> Will eventually adjust with assistance.</td>
</tr>
<tr>
<td><strong>Severe:</strong> Changes in the daily routine are impossible.</td>
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<thead>
<tr>
<th>18. Understanding what people mean when they are talking to you? (e.g., feeling confused by what someone says)</th>
</tr>
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<tbody>
<tr>
<td><strong>Mild:</strong> Some difficulty understanding what people mean.</td>
</tr>
<tr>
<td><strong>Moderate:</strong> Often has difficulty understanding what people mean.</td>
</tr>
<tr>
<td><strong>Severe:</strong> Frequently unable to understand what people mean.</td>
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<tr>
<th>19. Understanding how other people feel about things? (e.g., misunderstanding people’s emotions by their facial expressions or tone of their voice)</th>
</tr>
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<tbody>
<tr>
<td><strong>Mild:</strong> Rarely has difficulty understanding how people feel.</td>
</tr>
<tr>
<td><strong>Moderate:</strong> Often has difficulty understanding how people feel.</td>
</tr>
<tr>
<td><strong>Severe:</strong> Very frequent instances of difficulty understanding how people feel.</td>
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<thead>
<tr>
<th>20. Following conversations in a group? (e.g., participation, able to follow conversation)</th>
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<tbody>
<tr>
<td><strong>Mild:</strong> Few difficulties following conversations in a group.</td>
</tr>
<tr>
<td><strong>Moderate:</strong> Often unable to follow conversations in a group.</td>
</tr>
<tr>
<td><strong>Severe:</strong> Frequently unable to follow conversations in a group and communication in that setting is difficult or impossible.</td>
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<thead>
<tr>
<th>Global rating – interviewer only</th>
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<tr>
<td>What is your overall impression of the patient’s level of difficulty in these areas? (Interviewer should circle appropriate number or mark.)</td>
</tr>
</tbody>
</table>

| (none) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | (extreme) |
### Figure 2.2

**Cognitive Assessment Interview**

Data from Ventura et al [29]. Reproduced with permission from Dr J Ventura, Dr R Bilder, Dr S Reise, and Dr R Keefe.

<table>
<thead>
<tr>
<th>Date:</th>
<th>Patient ID:</th>
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<tbody>
<tr>
<td>Rater:</td>
<td>Session:</td>
</tr>
</tbody>
</table>

#### Patient domains

<table>
<thead>
<tr>
<th>Observation/evaluation</th>
<th>Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance – general cleanliness and hygiene, clothing (correctness of clothing for season, neatness, matching colors/prints, fasteners done)</td>
<td>Make notes:</td>
</tr>
<tr>
<td>Use all sources of information</td>
<td>Record sources:</td>
</tr>
</tbody>
</table>

#### Compliance

Takes medications at correct doses and at correct times as prescribed?

Medication changes

#### General orientation

Time (day, year, date), place (city, state, clinic), person

Describe patient’s living situation

Is patient experiencing psychotic symptoms? (eg, hallucinations)

Handedness (hand used for writing)

Ask patient to describe relationship to informant (eg, mother, case worker) and number of contact hours per week

#### Patient and informant domains

<table>
<thead>
<tr>
<th>Patient and informant domains</th>
<th>Patient</th>
<th>Informant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevant history</td>
<td>Recent relevant clinical events, illnesses of the patient, the informant or other family members, significant social or personal events. Major fluctuations in clinical state. (For follow-up exam: clinical events since baseline interview)</td>
<td></td>
</tr>
<tr>
<td>Demographics</td>
<td>Education level (years; HS = 12):</td>
<td></td>
</tr>
<tr>
<td>Occupation/student status:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date of birth:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of interview:</td>
<td>Record in minutes:</td>
<td>Record in minutes:</td>
</tr>
</tbody>
</table>
Working memory

Severity anchor points for sections 1–4
N/A = Rating not applicable, or insufficient information.
1 = Normal, not at all impaired.
2 = Minimal cognitive deficits but functioning is generally effective.
3 = Mild cognitive deficits with some consistent effect on functioning.
4 = Moderate cognitive deficits with clear effects on functioning.
5 = Serious cognitive deficits that interfere with day-to-day functioning.
6 = Severe cognitive deficits that jeopardize independent living.
7 = Cognitive deficits are so severe as to present danger to self/others.

1. Difficulty maintaining newly learned verbal information in mind for brief periods (long enough to use)?

Do you forget names of people you just met?
Do you have trouble recalling telephone numbers you hear?
Do you have trouble remembering what your doctor just said during visits?
Do you find you need to write down information to remember?

Patient examples:
Informant examples:

<table>
<thead>
<tr>
<th>Patient</th>
<th>Informant</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>1 2 3 4 5 6 7</td>
<td>N/A 1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

2. Difficulty performing ‘on the spot’ mental manipulations or computations?

Do you have difficulty knowing how much change to expect when shopping?
Do you have trouble keeping figures in mind while paying bills or balancing your checkbook?

Patient examples:
Informant examples:

<table>
<thead>
<tr>
<th>Patient</th>
<th>Informant</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>1 2 3 4 5 6 7</td>
<td>N/A 1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

Attention/vigilance

3. Problems sustaining concentration over time (without distraction)?

Do you have trouble concentrating?
Do you take breaks frequently?
Do you have trouble paying attention while reading, listening to the radio or watching television, long enough to read/listen/see a whole article/chapter/program?

Patient examples:
Informant examples:

<table>
<thead>
<tr>
<th>Patient</th>
<th>Informant</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>1 2 3 4 5 6 7</td>
<td>N/A 1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>
**Figure 2.2 (continued)**

Cognitive Assessment Interview

4. **Difficulty focusing on select information (if there is not obvious distraction)?**

Do you have trouble finding what you need at the supermarket?

Is it difficult for you to pick out the correct route on a bus map?

<table>
<thead>
<tr>
<th>Patient examples:</th>
<th>Informant examples:</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>1 2 3 4 5 6 7</td>
<td>N/A 1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

**Verbal learning and memory**

Severity anchor points for sections 5–9

- **N/A** = Rating not applicable, or insufficient information.
- **1** = Normal, not at all impaired.
- **2** = Minimal cognitive deficits but functioning is generally effective.
- **3** = Mild cognitive deficits with some consistent effect on functioning.
- **4** = Moderate cognitive deficits with clear effects on functioning.
- **5** = Serious cognitive deficits that interfere with day-to-day functioning.
- **6** = Severe cognitive deficits that jeopardize independent living.
- **7** = Cognitive deficits are so severe as to present danger to self/others.

5. **Trouble learning and remembering verbal material?**

Do you have trouble learning and remembering instructions or other important information (e.g., names of medications)?

Do you have trouble learning and remembering later the names of people you meet?

Do you need to have things written down to remember?

<table>
<thead>
<tr>
<th>Patient examples:</th>
<th>Informant examples:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

6. **Difficulty recalling recent events?**

Do you find you have to be reminded by others of events that occurred?

Do you recall what you had for dinner last night?

What’s been in the news lately?

<table>
<thead>
<tr>
<th>Patient examples:</th>
<th>Informant examples:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

**Reasoning and problem-solving**

7. **Lack of flexibility in generating alternate plans when needed?**

Do you have trouble coming up with alternatives when your plans are disturbed (e.g., what if your normal mode of transport was not available, or the store you usually go to was closed)?

<table>
<thead>
<tr>
<th>Patient examples:</th>
<th>Informant examples:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>
### Cognitive Assessment Interview

#### 8. Problems in situations requiring judgment?
What would you do if … [your power went out/you were locked out of your home/your only sink was clogged/a light bulb went out]?

#### Speed of processing

9. Performs tasks slowly?
Do you find things take you longer than they should (e.g., performing tasks such as cooking or shopping, assembling materials, reading instructions)?

#### Social cognition

Severity anchor points for section 10

- N/A = Rating not applicable, or insufficient information.
- 1 = Normal, not at all impaired.
- 2 = Minimal cognitive deficits but functioning is generally effective.
- 3 = Mild cognitive deficits with some consistent effect on functioning.
- 4 = Moderate cognitive deficits with clear effects on functioning.
- 5 = Serious cognitive deficits that interfere with day-to-day functioning.
- 6 = Severe cognitive deficits that jeopardize independent living.
- 7 = Cognitive deficits are so severe as to present danger to self/others.

10. Difficulty appreciating another person’s intentions/point of view?
Do you have trouble understanding other people’s point of view (if you disagree with them; even if they don’t say it outwardly)?
If you are talking and someone looks at their watch, what do you think they may be feeling?
**Figure 2.2 (continued)**

Cognitive Assessment Interview

<table>
<thead>
<tr>
<th>Global assessment of function – cognition in schizophrenia</th>
</tr>
</thead>
<tbody>
<tr>
<td>91–100 Superior cognitive functioning in a wide range of activities, is sought out to work on cognitively demanding problems, maintains superior level of functioning in a cognitively demanding vocation.</td>
</tr>
<tr>
<td>81–90 Absent or minimal cognitive deficits (eg, occasional lapses of memory or word-finding difficulty), good functioning in all cognitive areas, effective functioning and engagement in cognitive tasks, no more than everyday concerns about cognitive performance.</td>
</tr>
<tr>
<td>71–80 If cognitive deficits are present, they are transient and expectable reactions to stressors (eg, difficulty concentrating after family argument), no more than slight impairment in social, occupational or school functioning due to cognitive deficits.</td>
</tr>
<tr>
<td>61–70 Some mild cognitive symptoms (eg, difficulty concentrating or memory lapses) or some difficulty in social, occupational or school functioning due to cognitive problems (eg, had to repeat a course in college due to cognitive problems).</td>
</tr>
<tr>
<td>51–60 Moderate cognitive symptoms (eg, persistent problems paying attention or forgetting of scheduled events) or moderate difficulty in social, occupational or school functioning due to cognitive problems (eg, had to take a leave of absence from school).</td>
</tr>
<tr>
<td>41–50 Serious cognitive problems (eg, continuous problems with attention, memory, or planning) or any serious impairment in social, occupational or school functioning due to cognitive problems (eg, family problems caused by deficits, unable to keep a job).</td>
</tr>
<tr>
<td>31–40 Severe cognitive problems interfering with multiple social, occupational, or school functions (eg, an individual is unable to work in competitive employment, has difficulty in supported employment, and has difficulty assisting with chores at residence).</td>
</tr>
<tr>
<td>21–30 Cognitive deficits are so pronounced that they interfere with virtually all aspects of functioning, including meaningful communication and goal-directed activity (eg, difficulty sustaining conversation, performing basic activities of daily living).</td>
</tr>
<tr>
<td>11–20 Some danger of harm to self or others due to cognitive deficits (gross impairments of planning/judgment, failure to recognize consequences of actions, frequently disoriented, wandering, or confused).</td>
</tr>
<tr>
<td>1–10 Persistent danger of harm to self or others or inability to maintain personal hygiene due to cognitive deficits (eg, no meaningful communication, inability to perform even basic self care due to problems organizing behavior).</td>
</tr>
<tr>
<td>0 Inadequate information.</td>
</tr>
</tbody>
</table>

**Global assessment of information**

<table>
<thead>
<tr>
<th>Session</th>
<th>Patient</th>
<th>Informant</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow-up</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
References

CHAPTER TWO

COGNITIVE ASSESSMENT OF SCHIZOPHRENIA


Cognitive biases and metacognitive training

In addition to neurocognitive impairment, cognitive biases (or cognitive distortions) are being increasingly investigated. This line of research encompasses a wide variety of response styles and cognitive distortions. Prominent biases are jumping to conclusions (e.g., hasty decision making), deficits in theory of mind (e.g., failure to empathize with others and to deduce motifs), a bias against disconfirmatory evidence, overconfidence in errors, negative self-schemata, and monocausal attributional styles. There is evidence that these styles are related to the emergence and maintenance of psychotic symptoms, especially delusions, in concert with other factors. Importantly, these cognitive distortions seem to precede psychotic breakdown and the patient is not fully aware of them (i.e., many patients lack metacognitive insight into these problems).

Hence, a training program, entitled metacognitive training (MCT), has been developed (Figure 3.1) [1]. Its eight modules aim to raise the patient's awareness of these distortions and to prompt the patient to critically reflect on, complement, and change his or her current repertoire of problem solving. Thus, its main purpose is to change the 'cognitive infrastructure' of delusional ideation. As psychosis is rarely an instantaneous incident, changing the appraisal of one's cognitions and social environment may act prophylactically on psychotic symptoms. The modules are administered in the framework of a group intervention program. Several studies assert the feasibility of this approach, as well as its efficacy [2,3]. MCT can be downloaded cost-free in 23 languages [4]. A number of self-conducted and independent investigations have affirmed the feasibility, safety, and efficacy of this approach as an add-on treatment to standard intervention. An individualized version called MCT+ is also available [4].
<table>
<thead>
<tr>
<th>Module</th>
<th>Target domain</th>
<th>Description of core exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Attribution: blaming and taking credit</td>
<td>Self-serving bias versus depressive attributional style</td>
<td>Different causes of positive and negative events must be contemplated (eg, “a friend was talking behind my back.”) Dominant interpretation: “friend is not trustworthy” (blaming others); “I have done something bad” (blaming self); “she is preparing a surprise party for my birthday” (circumstances). Explanations that take into account various causes are preferred to monovalent explanations. The negative consequences of self-serving attribution are repeatedly highlighted.</td>
</tr>
<tr>
<td>2. Jumping to conclusions, I</td>
<td>Jumping to conclusions; liberal acceptance; bias against disconfirmatory evidence</td>
<td>Motifs contributing to hasty decision making are discussed and its disadvantages are stressed. Fragmented pictures are shown that eventually display objects. Premature decisions often lead to errors, emphasizing the benefits of cautious data gathering. In the second part, ambiguous pictures are displayed. Here, a quick survey leads to the omission of details demonstrating that first impressions may often reveal only half the truth.</td>
</tr>
<tr>
<td>3. Changing beliefs</td>
<td>Bias against disconfirmatory evidence</td>
<td>Cartoon sequences are shown in backward order, which increasingly disambiguate a complex scenario. After each new picture, patients are asked to (re-)rate the plausibility of four interpretations. Although the initially most likely interpretation prevails in some pictures in the course of the exercises, patients are “led up the garden path” on others. Thus, patients learn to withhold strong judgments until sufficient evidence has been collected, and encouraged to maintain an open attitude toward counter-arguments and alternative views.</td>
</tr>
<tr>
<td>4. Empathy, I</td>
<td>Theory of mind, first order</td>
<td>Facial expression and other cues are discussed for their relevance to social reasoning. Pictures of human faces are presented in the exercises. The group should guess what the depicted character(s) may feel. The correct solution often violates a first intuition, demonstrating that relying on facial expression alone can be misleading. In the second part, cartoon strips are shown that either must be completed or brought into the correct order. Participants are shown that social inferences should involve multiple cues.</td>
</tr>
<tr>
<td>Module</td>
<td>Target domain</td>
<td>Description of core exercises</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>5. Memory</td>
<td>Overconfidence in errors</td>
<td>Factors that foster or impair memory acquisition are discussed first, and examples for common false memories are presented. Then, complex scenes (e.g., beach) are displayed with two typical elements removed (e.g., towel, ball). Owing to logical inference, gist-based recollection and liberal acceptance, many patients falsely recognize these lure items in a later recognition trial. The constructive rather than passive nature of memory is thus brought to the participants’ attention. Patients are taught to differentiate between false and correct memories by means of the vividness heuristic.</td>
</tr>
<tr>
<td>6. Empathy, II</td>
<td>Theory of mind, second order; need for closure</td>
<td>Different aspects guiding theory of mind (e.g., language) are discussed with respect to both their heuristic value and fallibility for social decision making. Then, cartoon sequences are presented, and the perspective of one of the protagonists must be considered, which involves discounting knowledge available to the observer but not available to the protagonist. For the majority of sequences, no definitive solutions can be inferred, which is unsatisfactory for patients with an enhanced need for closure.</td>
</tr>
<tr>
<td>7. Jumping to conclusions, II</td>
<td>Theory of mind, first order</td>
<td>As in module I, the disadvantages of quick decision making are outlined with regard to events related and unrelated to psychosis. In the exercises, paintings are displayed, for which the correct title must be deduced from four response options. On superficial inspection, many pictures tempt false responses.</td>
</tr>
<tr>
<td>8. Mood and self-esteem</td>
<td>Mood and self-esteem</td>
<td>First, depressive symptoms, causes, and treatment options are discussed. Then, typical depressive cognitive patterns in response to common events are presented (e.g., overgeneralization, selective abstraction), and the group is asked to come up with more constructive and positive ones. At the end, some strategies are conveyed to help patients to transform negative self-schemata and elevate their mood.</td>
</tr>
</tbody>
</table>

Table 3.1 (continued)

Summary of each metacognitive training module
References


