Cognitive Impairment in Patients With Bipolar Disorder

An Overview of Some Assessment Tools

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It is widely accepted that patients with schizophrenia have some degree of cognitive deficiency and that cognitive deficits are an inherent part of the disorder. Historically, there has been less focus on cognitive deficits in patients with bipolar disorder; however, numerous studies of cognition in patients with bipolar disorder, including several comprehensive meta-analyses of bipolar patients who were euthymic at the time of testing, have recently been undertaken. Each of these analyses found that cognitive impairment persists during periods of remission, mainly in domains that include attention and processing speed, memory, and executive functioning.

Cognitive deficit testing

The Brief Assessment of Cognition in Affective Disorders (BAC-A) is composed of 6 subtests of the Brief Assessment of Cognition (BAC) and Brief Assessment of Cognition in Schizophrenia (BAC-S) and 2 additional tests: affective interference and emotion inhibition. The BAC-A takes approximately 45 minutes to administer and is devised for easy administration and scoring. It is specifically designed to measure treatment-related improvements, and it includes 2 alternative forms. A composite score is derived from the 6 subtests of the BAC-A, as well as the BAC and BAC-S. All 3 tests have high test-retest reliability (intraclass correlations > 0.80) in patients and controls, have equivalent forms, and are as sensitive to cognitive dysfunction in schizophrenia as a standard 2.5-hour battery.

http://www.psychiatrictimes.com/bipolar-disorder/article/10168/1491663
The series of tests in the BAC-A includes brief assessments of attention, motor speed, working memory, verbal memory, reasoning and problem solving, verbal fluency, affective interference, and emotion inhibition. All of these tests except emotion inhibition were used by Malhi and colleagues and are briefly described as follows:

- **List learning (verbal memory):** Patients are presented with 15 words and then asked to recall as many as possible. This procedure is repeated 5 times. There are 2 alternative forms.

- **Digit sequencing task (working memory):** Numbers of increasing length are presented orally by the examiner and patients are asked to repeat the numbers from lowest to highest.

- **Token motor task (motor speed):** Patients are given 100 plastic tokens and asked to place them into a container as quickly as possible for 60 seconds.

- **Verbal fluency:** Tests of category instances (semantic fluency) and controlled oral word association test (letter fluency) are administered. Patients are given 60 seconds to name as many words as possible within a given semantic category and, in 2 separate trials, patients are given 60 seconds to generate as many words as possible that begin with a given letter. The total number of words from the 3 trials is the outcome measure.

- **Tower of London (reasoning and problem solving):** Patients look at 2 pictures simultaneously. Each picture shows 3 different-colored balls arranged on 3 pegs, with the balls in a unique arrangement in each picture. The patients are asked to determine the fewest number of times the balls in one picture would have to be moved to make the arrangement of balls identical to that of the opposing picture. There are 2 alternative forms.

- **Symbol coding (attention and processing speed):** As quickly as possible and for 90 seconds, patients write numerals 1 through 9 as matches to symbols on a response sheet.

- **Affective Interference test (emotional distractibility and affective memory):** Patients are presented with 20 words: 10 are nonaffective words (fruits and vegetables) and 10 have high emotional valence—either positive (romantic) or negative (cancer). Patients are first given 3 trials to recall all words. They are then cued to recall the nonaffective words and the affective words separately. After a delay, patients are given a recognition trial with the 20 words and 20 foil words. The test requires 5 minutes for a recall trial and 2 minutes for a recognition trial. Because this is an experimental paradigm at this stage, there are 12 different variables; these have been tested to assess the power of discrimination between controls and affective patients.

- **Emotion inhibition test:** Although not included in the bipolar depression trial described in the depression phase deficits section, the BAC-A usually includes an eighth test in which patients are presented with sheets of paper with 4 columns of words (neutral or affective) or symbols in colored or black ink. They are asked to either read the words or name the colors of the ink going down the columns. They get 30 seconds for each page. The key outcome measure is the patient's ability to name colors of affective words under control conditions.

**Euthymic phase deficits**

The most recent meta-analysis by Bora and colleagues included 45 studies (1446 patients and 1524 healthy controls) and compared patients with bipolar disorder with healthy controls on a number of measures of neurocognition (Table). Groups were matched for age, sex, education, and premorbid...
intellectual capacity. Patients with bipolar disorder performed significantly worse on 17 of 18 tests of cognitive measure in the meta-analysis: results showed medium to large effect sizes for most tests of sustained attention, psychomotor speed, verbal memory, and executive functioning. Small effect sizes were noted for continuous performance test (CPT) commission errors, digit span forward, tests of visual memory recall, and verbal recognition. There were no significant differences in visual copying between the groups.

Of particular clinical importance is the noted correlation between persistent cognitive deficits and functional outcome for bipolar patients. Specifically, although cognitive deficits are observed in bipolar patients with both high and low psychosocial functioning, they are more pronounced in those with low psychosocial functioning.7

A recent study by Tabarés-Seisdedos and colleagues8 reported that neurocognitive deficits at a baseline assessment predicted functional disability 1 year later in patients with bipolar I disorder and also in patients with schizophrenia; however, severity of affective and psychotic symptoms during the follow-up period explained significantly more of the variance in outcome in the bipolar group than in the schizophrenia group. These data are consistent with previous work that indicates that both cognitive deficits and affective symptom severity influence functional capacity in patients with bipolar disorder and that mood state at the time of testing plays a key role in the noted relationship (Table).6

**Depression phase deficits**

While the studies cited above focused on cognitive deficits in euthymic patients with bipolar disorder, there is evidence to suggest that patients with bipolar depression have cognitive deficits that are more pronounced and that may affect functional outcome to a greater degree than those reported during the euthymic phase. Therefore, neurocognitive characterization of this period of illness is particularly important.6

In a 34-site clinical trial, 166 patients with bipolar depression were assessed with the BAC-A.5 Bipolar patients performed significantly worse on the BAC-A subtests that measure the traditional neurocognitive domain than did a sample of 404 nonpsychiatric controls. Patients with bipolar depression also performed significantly worse than healthy controls on the Affective Interference subtest; performance on this measure contributed a small amount of unique variance in determining group membership.

Taken together, the data suggest that bipolar patients who are depressed at the time of testing have significant cognitive impairment, comparable to that reported in euthymic patients with bipolar disorder. These deficits can be reliably assessed using a relatively brief set of cognitive tests. Furthermore, these deficits are found not only with traditional tests of cognition that examine such domains as working memory, processing speed, and verbal fluency but also in such newly studied domains as affective processing, as measured by the BAC-A Affective Interference subtest. This subtest, which measures responses to emotional stimuli, may demonstrate slightly more sensitivity to specific cognitive deficits in patients with bipolar depression.

Compared with healthy controls, patients with bipolar depression appear to retain emotional words better than nonemotional words. This suggests that their focus on emotions may come at the expense of memory for other aspects of everyday life. Similarly, they appear not to show the healthy pattern of selectivity (recalling more positive words than negative words). Future studies to further delineate the boundaries and implications of this learning pattern in patients with bipolar disorder are warranted.
References


