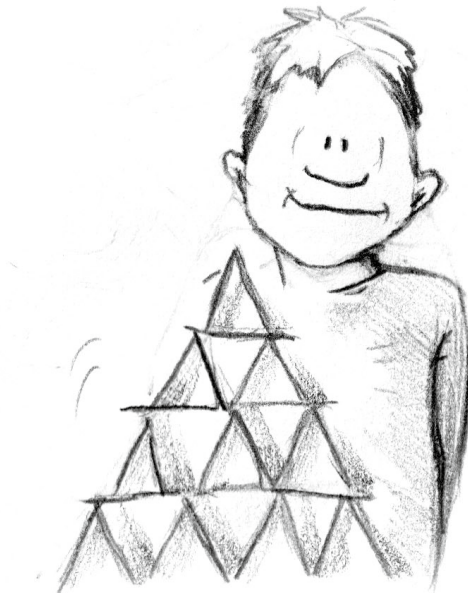


# COGNITION IN BIPOLAR DISORDER

- WHAT IS IT?
- HOW DOES IT INFLUENCE DAILY LIFE?
- WHAT CAN BE DONE ABOUT IT?



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# PREFACE

Many people with bipolar disorder have trouble with attention, memory, problem solving and other thinking skills. This is referred to as 'cognitive problems'. Cognitive problems are the focus of this information package as well as their relation to mood symptoms, daily functioning, medication and lifestyle in bipolar disorder. The information package also includes advice on what action you can take and tips on how you can tackle cognitive difficulties in daily life.

## SUMMARY

Cognition refers to 'thinking skills', like ability to pay attention, learn and remember things, solve problems and plan. Cognition is important for daily life including work and social life. Problems with cognition can make it difficult to work and/or go to school, which is linked to poor quality of life. While some people with bipolar disorder only experience cognitive problems during depression and mania, others continue to experience such problems for months to years after their mood symptoms have diminished. However, there is great cognitive variability in people with bipolar disorder: some experience either specific or broad cognitive problems, while others do not.

Cognitive functions or 'cognitive domains' are divided into mental processing speed, attention, learning and memory, and executive functions, which include the ability to plan, keep track of things, or multi-task. Some aspects of cognitive function build on others. So if

you have problems in a lower level cognitive domain such as mental processing speed this will impair the 'higher' domains such as attention and memory. Cognitive problems can make it difficult to follow longer conversations, read a book, do food shopping, remember appointments or cook meals for family and friends. People sometimes mistake these daily life problems for lack of intelligence or willpower, because they are unaware of the cognitive problems that can occur in bipolar disorder. So it is important to get your cognition assessed by your health-care professional.

Medicine plays an important role in the treatment of depression, mania and mixed episodes as well as in prevention of new mood episodes. When the medicine starts to work on depressive and manic symptoms, many experience an improvement in their cognition. Despite this, some types of medication can have cognitive side effects, particularly when taken in high doses.

Several life style factors have a negative impact on cognition, including recreational drugs, alcohol, sleep disturbance, lack of exercise, poor quality diet, heart disorder and lived stress. Recreational drugs such as 'ecstasy' and cannabis may cause cognitive problems due to toxic effects on the brain. Lack of sleep and physical exercise are common problems in people living with bipolar disorder that also have negative effects on cognition. Poor diet also seems to play a role. For example, high levels of saturated fat in the diet, particularly 'trans fats' (in fast-food and many commercially prepared baked goods), can increase a type of harmful cholesterol in the blood stream. This has been linked to a high body mass index, poor cardiovascular health, and metabolic problems (difficulty with converting food into energy), which are bad for your cognition. Abuse of alcohol can also create cognitive problems due to its toxic effects on brain cells. Finally, long-term stress weakens the brain and can result in poor ability to concentrate and keep track of things.

Cognitive function can be assessed in several ways. For example, you can be asked to answer some questions regarding your cognitive problems. However, in many cases there is also a need for a neuropsychological screening. This is done with your healthcare professional and consists of some short cognitive tasks that you perform in the office or on a computer. This is because most people with cognitive impairments can't accurately self-report those impairments. By learning about the possible cognitive problems associated with bipolar disorder, you can learn to recognize cognitive symptoms and better manage your condition to improve your quality of life. It may also be useful to encourage your healthcare professional or consultant to perform a cognitive screening.

There are several ways to manage cognitive difficulties. Three common ways are to use: 1) remediation techniques, which involve exercising your cognitive skills by repetition, 2) compensatory strategies, that is coming up with different ways to accomplish your goals by making up for cognitive challenges, 3) adaptive approaches, whereby you make changes to your environment to help you function better, and 4) a talk with family and friends about your cognitive difficulties because cognitive problems are invisible to others. Educating the people you associate with may lend clarity to any of your behaviors that result from differences in your cognitive functions.

There are currently no approved medical treatments for cognitive problems. However, several promising treatments are being investigated and are likely to become available within the next few years. These include promising medical treatments like lurasidone, EPO (erythropoietin), modafinil, mifepristone and vortioxetine, and psychological treatments like cognitive and functional remediation.

## 1. WHAT IS COGNITION – AND WHY IS IT IMPORTANT?

Cognition refers to 'thinking skills', such as the ability to pay attention, remember, solve problems and plan. We all develop cognitive abilities differently. Cognitive skills can change over our lifetimes. They may worsen with illness, injury or older age. At other times, cognitive skills can become strengthened and improved.

Most cognitive processes take place automatically. The different aspects of cognition work together to allow us to carry out day-to-day activities. For example to do the weekly food shopping, you need a series of mental processes including:

- 1) Deciding to take action
- 2) Planning of meals for the week
- 3) Writing down which ingredients to buy for the meals
- 4) Having an overview of where to find things in the supermarket
- 5) Keeping track of the items you have and have not put in the basket
- 6) Remembering where you parked your car

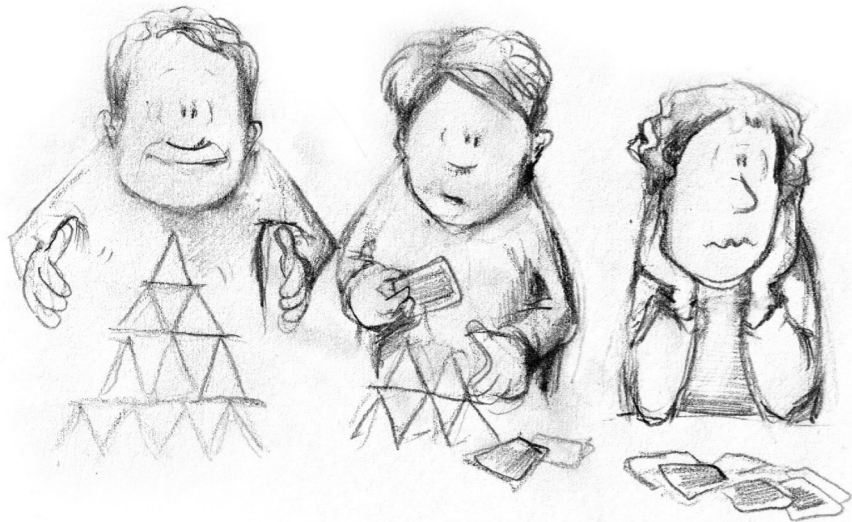


Cognitive skills are therefore necessary to succeed in daily life including work, school and social life. They are important for maintaining relationships: friends and family value someone who pays attention to them, remembers things about them and follows through on plans to get together. Given this, disturbances in cognitive functions are linked to poorer quality of life and reduced work capacity in people living with bipolar disorder.

## 2. HOW IS COGNITION AFFECTED IN BIPOLAR DISORDER?

During a depressive episode, people often experience problems related to paying attention, concentrating, remembering things and solving problems. During a manic episode, cognition is also affected. Thoughts may be racing and often change content, while the abilities to judge a situation, pay attention and inhibit impulses are limited. While some people with bipolar disorder only experience such disturbances during depressive and manic episodes, others continue to experience cognitive problems for months to years after their mood symptoms have diminished. These difficulties may involve decreases in attention, learning and memory, planning, and decision-making.

For many people cognitive problems are a core feature of bipolar disorder and not just a consequence of mood symptoms or medication. That is, they are a part of the illness itself and should be assessed and treated. People of older age who are living with bipolar disorder can experience more cognitive challenges than younger people. However, there is great cognitive variability in people with bipolar disorder. Recent research has shown that in general, around 30-40% of people living with bipolar disorder perform on cognitive tests at a level expected for their age and education. A similar percentage have problems in one area like attention and the remainder have difficulties in several areas such as attention, memory, and the ability to think clearly. As a result, there are differences from one person to the next as to *how* and *to what degree* their cognitive functions are negatively affected.



The degree of cognitive difficulties depend on many factors, including the type of illness episodes, illness severity, number of manic episodes and illness duration. Studies suggest that cognitive difficulties tend to become worse with a greater number and severity of illness episodes, particularly when these involved full mania and mixed states, were accompanied by hallucinations or delusions (i.e. psychotic symptoms), and/or required hospital admission.

Importantly, changes in cognition can be one of the first signs that a new illness episode is on its way. By paying attention to and recognizing early signs of illness, you can enable yourself to take appropriate actions, in time to prevent the onset of symptoms.

### 3. HOW DO COGNITIVE PROBLEMS INFLUENCE DAILY FUNCTION?

Cognitive problems can make it difficult to follow longer conversations, read a book, do food shopping, remember appointments or cook meals for family and friends. People sometimes mistake these daily life problems for laziness, lack of intelligence or lack of willpower, because they are unaware of the cognitive problems that can occur in bipolar illness. In this way, cognitive problems can reduce self-worth and affect social relationships. Guilt and shame can be common feelings that result from not living up to one's own and/or others' expectations. These feelings can include guilt of not being mentally focused with one's family and friends, or shame when it is challenging to maintain daily work functions.





People sometimes try to hide their cognitive problems or compensate for them by working longer hours. The cognitive problems are thereby often an 'invisible handicap'. The problem is that no one can show consideration of a person's cognitive problems if they are unaware of their existence. As a result, it is important to assess and characterize cognitive problems in people living with bipolar disorder. Based on a cognitive assessment, the affected person and their relatives can develop a better understanding and adjust their expectations.

**Changes in mental processing speed.** For some people, mental processing speed slows down during a depression. This can give people a sense of thoughts and movements occurring very slowly and that others speak too quickly.

“ *It is difficult for me to hold up a conversation. I can hear the words but I can't understand the meaning. It can take me a long time to find an answer and it is frustrating for the person I talk to and for me. So I withdraw from social situations.*

In contrast, mental processing speed is often faster during (hypo) mania.

A woman, age 29, describes that:

“ *During a hypomania, I think faster and have many good ideas. It wouldn't be a problem if I could just stay in that state. But when I get into a real mania after a few weeks, my thoughts and ideas get out of control and I am unable to keep up.*

While the above changes in mental processing speed are characteristic of depression and mania, respectively, many people also experience slowed mental processing speed during periods where they are relatively symptom-free.

**Attention and concentration difficulties.** Attention can be affected in several ways. For example, it can be difficult to keep track of conversations, especially longer sentences. Many people with bipolar disorder also have problems with dividing attention between more than one task at a time and with sustaining their attention on a task over longer periods.

A woman, age 54, describes:

“ *I have not read a book for three years now because I cannot concentrate. I can read the same sentence again and again. It used to be something I really enjoyed.*



**Learning and memory difficulties.** Many people living with bipolar disorder experience memory problems and frequently forget things: things that they have learnt, things that have been said and where they have put things. This can be a common reason for forgetting to take medication as prescribed. Often these memory problems are connected to attention difficulties. For example, if you have problems with attention you might find it difficult to concentrate and take in new information, and so have difficulty properly remembering the details of things sometime later.

A woman, age 27, describes how this affects her social life:

“ I am often anxious about seeing friends because sometimes I can't remember what they have told me about things in their life and it is really embarrassing. So I have started writing notes about what is going on in their lives after they have left. Then I can look at these notes before I see them again so they don't think that I don't care.

Another woman, age 54, describes her memory challenges at work:

“ It is a big problem for me in my work life that I cannot remember what I read in the patient files. When I go on home visits, I sometimes forget the patients' names or what I was supposed to talk with them about.

**Problems with planning, initiating actions and keeping track of things.** A key problem for many people affected by bipolar disorder is structuring and planning situations and tasks that involve several steps and coordination. These aspects of 'executive skills' can be

exemplified as abilities that a company executive typically relies on to succeed (e.g. decision to take action, complex attention, monitoring, multi-tasking, decision-making, etc.). Problems with these functions can manifest themselves in difficulties with overcoming daily life tasks like grocery shopping and cooking a meal that may not have caused any problems before. This can impede social life and work functioning.

A man, age 52, describes this as:

“ It is lucky that I live in the city, because I have to go to the supermarket several times to do my grocery shopping for one meal. I cannot keep track of what I have and have not bought and where to find things in the supermarket. And then I get anxious and feel under pressure and have to leave the supermarket. At other times, I buy much too much and often things I didn't need.

A woman, age 23, describes similar problems:

“ I would really like to start cooking again. I actually used to be good at it. Now it is completely overwhelming. I have to choose a recipe, write a shopping list, do the grocery shopping, put things into place and then prepare the meal. I don't know how to get started.





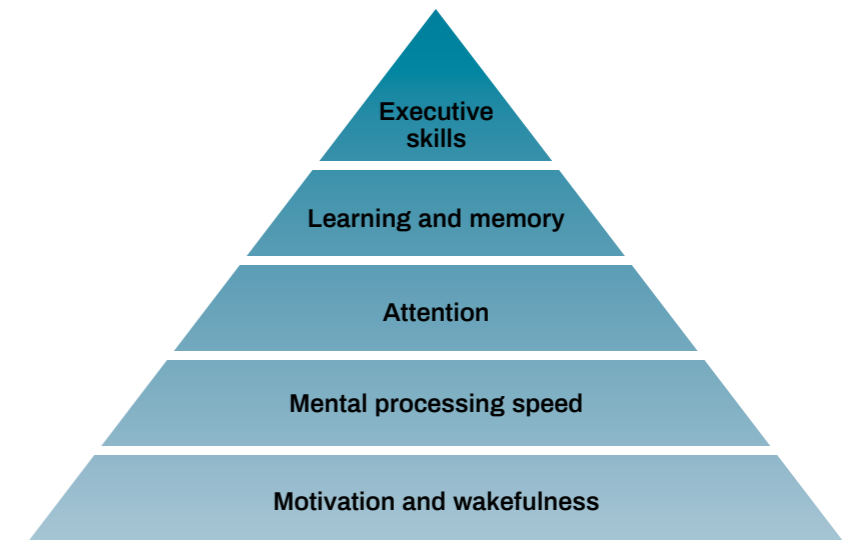
A woman, age 31, describes her problems with planning and executing things at home in this way:

“ Over a few years, I have bought several paintings for my home. They all stand in a stack on the floor in the living room. I would like to hang them up but I don't know where to begin. That is a daily frustration for me.

The above examples reflect daily tasks that are problematic. There are also people living with bipolar disorder with very high level demanding jobs who can still manage to cook a meal but are noticing inefficiency in work tasks.

## 4. WHAT ARE THE BASIC COMPONENTS OF COGNITION?

Cognition is generally divided into the following 'cognitive domains': mental processing speed, attention, learning and memory, and executive skills that include the ability to plan, keep track of things, or multi-task. The cognitive domains can be imagined as a 'cognitive pyramid', in which some aspects of cognition build on others.



This means, that if you have problems in a lower cognitive domain such as mental processing speed this will impair the higher cognitive domains, such as attention and executive skills. A key aspect of

executive skills is to control and direct the other aspects of cognition. So problems in executive skills will also have negative impact on lower domains.

Motivation and wakefulness are not really cognitive functions, but are included in the bottom of the pyramid because they are really vital for all aspects of cognition. This is particularly relevant for the understanding of the cognitive problems in bipolar disorder and why the cognitive problems are generally more pronounced during manic and depressive episodes. As such, the characteristic changes in motivation and wakefulness during mood episodes affect all aspects of cognitive function. However, it is important to remember that the cognitive problems in bipolar disorder are not only a result of changes in motivation and wakefulness but often persist beyond mood episodes.

## 5. HOW DOES MEDICATION AFFECT MY COGNITION?

Medicine plays an important role in the treatment of depression, mania and mixed episodes as well as in prevention of new mood episodes. When the medicine starts to work on depressive and manic symptoms, many experience an improvement in their cognitive functioning. So it is important to take medication as prescribed to improve cognitive functions. Despite this indirect positive effect of medications on cognitive function, some types of medication for bipolar disorder can have cognitive side effects. It can be hard to know if cognitive problems are caused by the disorder itself or by your medications. To clarify whether your cognitive difficulties may be related to your medication, your healthcare professional can evaluate your cognitive functions before and after changing your treatment (details later).

People react differently to mood-stabilizing medication: some are sensitive to physical side effects while others are more prone to cognitive side effects. However, it is not possible to know beforehand whether you will develop side effects of medication. Side effects from different medications are not the same; some medications have some cognitive side effects and others have few, if any. In fact, recent research even reports protection or improvement of cognitive functions with certain mood stabilizing medications.



The different types of medication used to treat bipolar disorder can be separated by the different side effects. The dose of the medication also plays a role. Generally, the side effects are more likely to occur with higher doses. So it is important to find the right dose of medication that provides the best balance for your mood with the lowest risk for side effects. As everyone responds to medications differently, this dose will be different for everyone. Another thing to keep in mind is drug interactions (i.e., how two or more drugs act when taken together). Multiple medications taken together may interact to produce more side effects than each medication alone. So, caution is needed, especially if you have more than one doctor prescribing medications for you, if you take medications differently than prescribed, or if you take over-the-counter medications. Below is a list of the medications that are often used in the treatment of bipolar disorder that may cause cognitive side effects:

*Antipsychotic drugs.* These are a group of medications that are often used to treat mania and depression, and to prevent new mood episodes from returning. Older so-called “typical” antipsychotics are associated with cognitive problems because of their sedative actions but

usually only in high doses. Newer atypical antipsychotics are generally accompanied by little or no cognitive decline.

*Antidepressant drugs.* These medications act against depression and are sometimes used to treat bipolar depression. Older antidepressants also called “tricyclic” antidepressants are known for their potential side effects on memory and executive skills. In contrast, newer antidepressant drugs generally do not have pronounced cognitive side effects.

*Anxiety reducing medications and sleep medications.* These medications – which include benzodiazepines – tend to reduce attention and ability to learn new information, particularly when taken in high doses, in elderly people and in combination with other drugs. Suddenly stopping these types of medications can cause severe confusion. Sleep medications can cause the same side effects but less so and mainly with longer term use. Of course, insufficient sleep also contributes to cognitive problems, so sleep medications should be used as needed, with this in mind.

*Lithium.* This medication is often used in the treatment of mania and in prevention treatment. When given in high doses, lithium can impair learning and memory. However, in the recommended doses lithium is not generally associated with cognitive side effects and actually seems to have protective effects on the brain.

*Antiepileptic medications.* These drugs are used in bipolar disorder as mood stabilizing medications. In general, they can have mild cognitive side effects like attention difficulties and sedation, with some differences between the drugs in the profile of side effects.

*Electroconvulsive therapy.* Finally, electroconvulsive therapy (ECT), which is mainly used in severe cases of depression or mania, has cognitive side effects in terms of memory and executive skills impairments. However, these cognitive side effects are typically transient and generally cannot be detected three months after treatment com-

pletion. Notably, individuals who are younger and have high “cognitive reserve” (that is, high educational levels, IQ and work attainment) have a minimal risk of longer-term cognitive side effects, while elderly individuals and those with lower cognitive reserve are at greater risk of such side effects.

#### MEDICATIONS AND COGNITION

##### Antipsychotic drugs:

- Typical antipsychotics associated with cognitive problems in high doses
- Newer, atypical antipsychotics little or no cognitive side-effects

##### Antidepressant drugs:

- Older tricyclic antidepressants some cognitive side-effects
- Newer antidepressant drugs generally no cognitive side-effects

##### Anxiety reducing medications and sleep medications:

- Anxiety reducing medications side effects on attention and memory
- Sleep medications less side effects, mainly with longer term use

##### Lithium:

- Cognitive side effects only in high doses - not for doses in the recommended range

##### Antiepileptic medications:

- Possibly mild cognitive side effects, this differs between the drugs

##### Electroconvulsive therapy:

- Cognitive side effects on memory and executive skills, but typically transient (<3 months)

## 6. WHAT FACTORS CAN INCREASE COGNITIVE PROBLEMS?

There are several life style factors that tend to have a negative impact on cognition. These factors are important to identify and address when considering ways to improve cognitive functioning in people living with bipolar disorder.

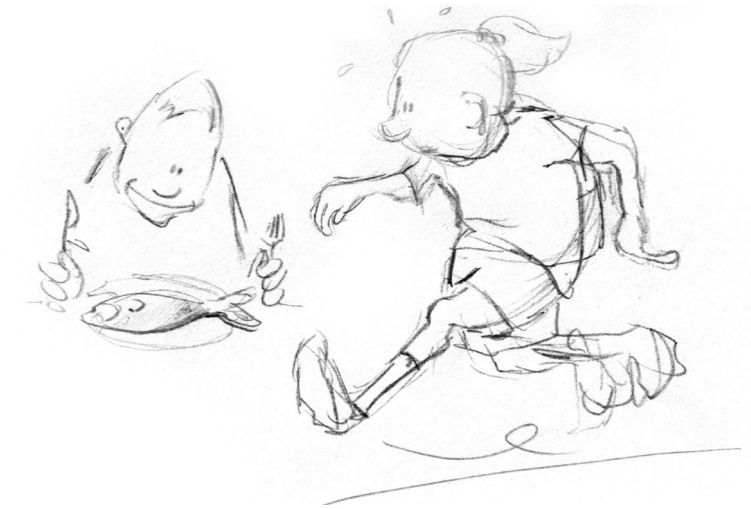
*Poor sleep.* Reduced sleep duration and efficiency is a common, well-known contributor to cognitive problems such as ability to concentrate and remember things. So sleep problems during manic and depressive episodes have negative effects on cognition. However, too little sleep and/or changing sleeping times (changes in the so-called diurnal rhythm) in-between mood episodes are also likely to contribute to persistent problems with concentration and memory functions. So it is essential to get regular sleep to improve your cognitive capacity.

*Physical inactivity.* Lack of physical exercise can be another common problem for people with bipolar disorder. This can also have negative effects on cognition. So keeping physically active and getting regular exercise can help you stay healthy and improve your cognition, particularly your memory, planning and working memory. In fact, recent research suggests that physical activity has beneficial effects on brain function by capitalizing on the regenerative processes in the brain including the ability to produce new brain cells and make new connections (so-called ‘brain plasticity’). Beyond the benefits to weight control, the positive effects of physical exercise can result from increased supply of oxygen and beneficial chemicals and nutrients to the brain as well as improved sleep after exercise. Maintaining a healthy

lifestyle requires organization and planning. Cognitive problems can create a barrier to attaining these goals. So some might find it helpful to sign up for a fitness program with a support group.

*Poor diet.* Recent years of research have shown that diet plays an important role in cognitive functioning. Specifically, high levels of saturated fat in the diet are associated with greater cognitive decline in the aging populations as well as in animal studies. A particularly type of saturated fats, 'trans fats' (in fast-food and many commercially prepared baked goods), can increase harmful cholesterol in the blood stream and has been linked to poor physical health and cognitive problems. There is also evidence for negative cognitive effects of a high body mass index (BMI), poor cardiovascular health, and metabolic problems (problems in the body with converting food into energy). So it is important to keep a healthy and balanced diet that keeps weight down and facilitates good heart/biological health. Recent research findings point to potential cognitive benefits of foods that are rich in omega-3 fatty acids (including fatty fish), iron, and a plant pigment called flavonoids.

*Medical illnesses.* Cognitive problems often occur in some medical illnesses, including thyroid disease (a medical condition that affects the function of the thyroid gland), obesity (a BMI of 30 or above) and diabetes (a disease associated with abnormally high blood sugar levels). If you get these medical problems treated, it could improve your cognition.



*Recreational drugs.* Recreational drugs or drugs of abuse may cause cognitive problems with long-term use due to toxic effects on the brain within areas involved in memory and executive functions (i.e., the hippocampus and frontal lobes). These drugs include 'ecstasy' (3,4-methylenedioxymethamphetamine; MDMA) and cannabis. Specifically, cannabis contains many chemicals including THC9, which is what makes you high and is not good for your cognition. We also don't know yet whether cannabidiol (CBD) can help you with your mood symptoms and the cognitive effects are unclear. When a person is affected by cannabis ("high"), the ability to attend to, learn and remember things is reduced. It is important to note that markers of cannabis use remain in the bloodstream a long time after use. Cognitive functions may thereby be affected for days (or even longer) after stopping intake of cannabis. Subtle cognitive side effects may also persist long-term after MDMA use. So if you use such drugs on a regular basis, you may experience an improvement in your cognition by avoiding them for a period of time. This will also enable your clinician to clarify if your cognitive difficulties are 'secondary' to drug use or are directly associated with your illness.

*Alcohol.* Some people living with bipolar disorder have a tendency at times to overuse alcohol for recreational and/or self-medication pur-



poses. The problem is that abuse of alcohol can by itself create cognitive problems. Due to its toxic effects on brain cells, alcohol reduces the ability to inhibit impulses and to control one's thoughts and emotions as well as the ability to learn and remember things. The degree of cognitive difficulties associated with the use of alcohol is related to the extent of the use. There is still scientific debate about whether overusing alcohol creates permanent damage in terms of long-term, cognitive difficulties. Most treatment providers would suggest that if used at all, moderation is important (limiting the quantity of alcohol and frequency of use).

**Stress.** Stress is an important lifestyle factor with negative impact on cognition. Mental abilities are affected by both short-term and long-term stress. Most people have experienced that the ability to think clearly is affected by acute stress. For example, during an exam, stress can improve mental sharpness for some people but can result in anxiety for others. In this situation, emotions 'take over' and impair the ability to think clearly and be rational. With longer term stress for example at work, this state of being alert becomes chronic. This weakens the brain and can result in poor ability to concentrate, keep track of things and to carry out concrete work functions. This can further increase stress-levels, anxiety and feelings of not being able to cope, which may in turn trigger new depressive or manic episodes.

#### THINGS THAT CAN MAKE COGNITIVE PROBLEMS WORSE:

1. Lack of sleep
2. Lack of physical exercise
3. High fat in diet
4. Being overweight
5. Certain medical illnesses
6. Recreational drugs
7. Abuse of alcohol
8. Lived stress

## 7. CAN I ACCURATELY ASSESS MY OWN COGNITION?

Cognition can be assessed in several ways. For example, you can be asked to answer some questions regarding your cognitive problems in daily life such as "Do you have difficulty concentrating when reading a book or watching the news?" "Do you have problems with concentrating on more than one thing at a time" or "Do you often forget appointments?". It is important to involve your relatives, who can add relevant observations and information about how you function in daily life and how you used to function at home, in school or at work.

In many cases, there is also a need for objective *neuropsychological screening*. This is because most people with cognitive impairments can't accurately self-report those impairments. A neuropsychological screening can include tasks like remembering a list of words or holding some digits and letters in your working memory. This assessment can give insight into cognitive problems and resources that you may not be aware of yourself and cannot describe.

Research studies have shown that there is often a poor relationship between self-reported (subjective) cognitive problems and objective performance impairments on neuropsychological tasks in people affected by mood disorders. Often, the subjectively experienced cognitive problems are colored by depression and mania symptoms. These symptoms can make it difficult to accurately assess one's own cognitive ability and will often lead to overestimation of the cognitive problems. Even for the evaluator, it can be hard to distinguish between residual depressive symptoms and 'true' cognitive problems.



Sometimes, for the psychiatrist and the psychologist it is hard to know whether the person is cognitively impaired or a little depressed.



Another possible reason for the discrepancy between subjective and objective cognitive problems are individual differences in “cognitive reserve”, which refers to the individual’s levels of education, IQ and work attainment. If the cognitive reserve is relatively high then the individual may have had *above normal cognitive function* before illness onset. These people may experience and describe a decline in cognitive function, but their performance on cognitive tests may not differ from a healthy normative group of average intelligence. As a result, it is important to consider both your subjectively perceived cognitive problems, your results on an objective neuropsychological screening tool, your current symptoms, and estimates of your “cognitive reserve”. Below is a link to the ISBD website where you can download a validated questionnaire about cognitive difficulties developed for people living with bipolar disorder, the COBRA:

<http://www.isbd.org/cognitive-assessment>

## 8. HOW CAN I TAKE ACTION?

By learning about the possible cognitive difficulties associated with bipolar disorder, you can learn to recognize cognitive symptoms and better manage your condition to improve your quality of life and daily functioning. If you experience persistent cognitive problems after your mood episodes, it is a good idea to get help from your health-care provider to assess your cognition. This will help to set realistic expectations for what can be expected of you at work and in home settings. In addition to taking your medication, getting regular and sufficient sleep and physical exercise and restricting alcohol intake, there are several things you and your relatives can do to manage your cognitive difficulties.

The first step is to pay attention to your cognitive changes or problems. Some people find it useful to track changes in memory, attention, alertness and thinking, to see how cognition may change with different medications or during different mood states. It can be helpful to have someone else, such as a family member or healthcare professional, also track these changes, as cognitive problems may be more easily recognized by someone else. It may also be useful to encourage your healthcare provider to use a cognitive screening tool, such as the SCIP (Screening for Cognitive Impairment in Psychiatry), the tool recommended by the ISBD Targeting Cognition Task Force. The SCIP provides an easy and fast way to assess your cognition with an objective tool.

Using the SCIP and the COBRA, you and your health-care professional can assess and monitor any changes in your cognition over time. This will help you work with them to see if there may be changes in medications that could help you, without destabilizing your mood. Your healthcare professional can use the SCIP after minimal training (for example after completing an online webinar) and is available free of charge in most languages through the following ISBD webpage: [www.isbd.org/cognitive-assessment](http://www.isbd.org/cognitive-assessment)



Based on your results on the SCIP and COBRA, your health care professional can also decide to examine your cognition with a comprehensive set of neuropsychological tests or refer you to a full neuropsychological assessment.

Remember that medication changes are based on complex decisions, so avoid changing medications or doses without talking to your doctor first. Also, be sure to share information with your healthcare team about recreational substances you may be using, other medications

you are taking, changes in the way you are taking medications, and your lifestyle risks factors. If, together with your healthcare team, you conclude that you have cognitive problems that have little to do with medications or unhealthy life style, you may want to try some cognitive rehabilitation strategies (see next section). These are activities that help restore cognition to a healthy state as well as compensate for any persistent cognitive difficulties. Specifically, cognitive rehabilitation includes managing cognitive problems with three different methods:

1. Remediation techniques
2. Compensatory strategies
3. Adaptive approaches

Completing an assessment or evaluation by a healthcare professional can help you decide which unique approach may be most helpful for you.

## 9. WAYS TO OVERCOME COGNITIVE DIFFICULTIES

As described in sections 5 and 6, cognition is influenced by several factors including tiredness, medication, mood symptoms, coexisting physical illness, and lived stress. It is important you consider this when you plan your day. For example, it is a good idea to plan the more cognitively demanding tasks at a time of the day when you expect to have energy and be well rested. For some people, this is in the morning, while evenings are best for others. Since rest and exercise can improve your cognition, it is recommended to plan short breaks and/or engage in some physical exercise during the day.

### REMIEDIATION TECHNIQUES

Remediation techniques help improve cognition with “drills and exercises” (that is, continuously exercising your cognitive skills by repetition). This can involve computers, paper and pencil, and/or group activities. It is important that you get a formal assessment of your cognition that includes both your strengths and weaknesses and can result in a treatment plan by your healthcare provider that is specific to your needs. Remediation techniques don't offer a quick fix: Progress takes time and effort. Evidence is limited for remediation techniques, but research studies are showing promising results for cognitive training in people with mood disorders, including some with bipolar disorder. While you may improve your results on the specific tasks you practice, it's still uncertain how helpful this will be to your overall functioning. New research suggests that it is key to work on applying

your improved cognitive abilities to daily life challenges such as food shopping, paying bills, cooking a meal for a group of friends etc.

### COMPENSATORY STRATEGIES

Compensatory strategies help you come up with different ways to accomplish your goals by making up for cognitive challenges. For example, you can learn mnemonics (or ‘memory aids’) to help you remember things. For example, if you need to remember three things to buy at the grocery store -milk, eggs and butter – you can make a catchy phrase using the first letters of each item to help you remember them. For example, ‘My ear is blue’ – a catchy phrase that makes a picture in your mind of you with a blue ear, with the first letter of each word standing for one of the things you need to buy – my – M for milk, ear – E for eggs, blue – B for butter – makes it much easier to remember what to buy when you get to the store.

Another example is when you meet new people and need to learn their names. If the person's name is Dorothy, you can memorize her name by imagining an activity she does starting with ‘D’, such as “Dorothy likes to dance”. This will help you encode her name in both your verbal and your visual systems in the brain, which makes it easier for you to later retrieve her name.

Other compensatory strategies that may help you initiate seemingly overwhelming tasks are to do only one thing at a time and to divide tasks into smaller parts.

## ADAPTIVE APPROACHES

Adaptive approaches involve making changes to your environment (i.e., the world around you). You might try using a recording device to help you keep track of important information, use a written list, or set timers to remind you to do certain activities.

Another adaptive strategy might include a reduction of distracting stimuli when you work. For example, many people work best with ear plugs or noise cancelling head phones to avoid unnecessary distractions such as a radio playing, noise from the street or other people talking. The use of earplugs or noise cancelling head phones is thus a strategy that may help you to sustain and direct your attention.

Regular routines and systems can also help you remember objects of daily use, such as keys, glasses and your wallet, and appointments. It is a good idea to allocate objects you use daily to certain fixed places at home so you can always find them. You will also remember appointments better if you have a system for reminding yourself of them; for example, a calendar on your mobile phone (especially, if you always bring this with you) and an alarm reminding you to take your medication. Routines can also help you get a better overview of weekly chores like food shopping, cleaning the house, and washing clothes.



Some people find it easy to implement routines while others are worried this will deprive them of their spontaneity and give them the feeling of not being free. If you belong to the latter, you could agree with yourself to just try this out as an experiment that you commit to for 3-4 weeks. After this, you evaluate if it works for you and drop it if it doesn't. After a while many people perceive that setting up routines and planning days of the week to carry out these chores can actually help free their mental capacity so they can focus on other (more interesting) things.

## USEFUL TIPS AND TRICKS

Below is a list of useful and easy to implement tips that can help you adapt to cognitive challenges you may be experiencing:

- Make sure that you rest; fatigue can make cognitive problems worse
- Try to balance activities so that you have a blend of physical, mental and social activities to keep your interest up and prevent fatigue
- Keep activities to one thing at a time; try not to multi-task
- Try to limit distractions; this might include finding a quiet place to do work or finding a way to block out visual and auditory information
- Try to keep activities and tasks structured and organized
- Divide information and tasks into categories
- Keep communication and activities simple, direct, and short
- Give information a context/ make it personal/tell a story about the information
- Visualize things you need to remember (create pictures for your inner eye) and use as many senses as possible
- Monitor whether you are avoiding cognitively challenging tasks and be careful to not limit opportunities to challenge yourself for brain health

The above strategies can help you in several ways. Below are some quotes by people who have worked with these strategies as part of

their cognitive remediation therapy and have implemented them in daily situations:

Woman, age 42:

“ I have finally started tidying up. It has been overwhelming for me because I didn't know where to begin. I have used the 'categorization' strategy and started with one room only. I categorized the things according to whether I would keep them or throw them away. This made it easier to get started.

Woman, age 50:

“ I succeeded in packing my clothes for the holiday. It was a task I had feared. I couldn't keep track of what I should bring. So I divided the week into seven days, and every day into 'morning' and 'evening'. This system meant that I could get started on the task and then I actually did it.

Man, age 25:

“ I always forget where I park my car. Last time I tried to connect the parking spot to something that was meaningful to me. It was parking spot 6, section F. My brother's name is Frederik, and when I played football, I wore a shirt with the number 6. That day I found my car without spending half an hour searching for it.

Woman, age 23:

“ For me it has been useful to practice the memory strategies. I have, for example, started spending 5-10 minutes every night on writing down some keywords from my day. I use colors depending on whether it is about something private, work or my doctor. This makes it easier for me to remember what I do when I think about the colors.

## BOOST YOUR COGNITIVE RESERVE

Most importantly, new research indicates that illness-related cognitive decline can be counteracted if you work on boosting your “cognitive reserve”, including your educational levels and work attainment. This is because high cognitive reserve seems to increase the brain's capacity to tolerate negative effects of mood episodes, reduce symptoms and deal with cognitive challenges. It is therefore recommended to try to hang on to your studies and keep working rather than giving up when it is challenging and stressful. In these cases, please talk with your healthcare provider about your problems, ask for a cognitive assessment and get advice on how to manage things so the demands do not exceed your current cognitive capacity. Specifically, an assessment of your cognitive strengths and challenges can facilitate adjustment of work functions and development of strategies for maintaining your studies and other cognitively stimulating activities that boost your cognitive reserve.



## 10. TALK WITH YOUR RELATIVES AND CLOSE FRIENDS ABOUT YOUR COGNITIVE DIFFICULTIES

Cognitive problems are like an 'invisible handicap', which can often be misinterpreted as displays of indifference and carelessness. Common situations include forgetting what is going on in your loved ones' lives, forgetting anniversaries or birthdays, or arriving late for appointments because you lost your way. So it is better not to hide your difficulties. Instead, try to talk with your relatives and friends about your difficulties remembering some things and paying attention and explain that this is a part of having a bipolar disorder. It would also be a good idea to talk with them about how they may help you with remembering things. If this is challenging to do on our own, you can also ask your healthcare professional if you can bring a family member along to your consultation. This open communication will increase your loved ones' understanding and tolerance – and in some cases help avoid unnecessary quarrels and stress for you and your family.



### ADVICE FOR RELATIVES

If you are a relative of someone with cognitive problems, it is important that you try to understand how you can help and to show patience. You can also help introduce a better structure in daily life to reduce your relative's problems with attention, memory and keeping track of things. It may be necessary to repeat messages and appointments – or even write these down in a calendar with your relative. It would also be useful to give your relative clear messages and instructions, to reduce the amount of information to remember and to give him or her the necessary time to complete the activity. Finally, you may also encourage your relative to use external aids such as a diary, alarms and a mobile phone organizer. However, the most important thing is that you acknowledge and try to understand your relative's cognitive challenges and that you set realistic expectations.



## 11. ARE THERE ANY TREATMENTS FOR COGNITIVE PROBLEMS?

There are currently no approved medical treatments for cognitive problems. However, several promising treatments are currently being investigated. These treatments are likely to become available within the next few years. Below are some of the most promising medical and psychological treatments for cognitive problems. What they are believed to have in common is that they enhance the brain's capacity to regenerate brain cells and their connections and to make new brain cells. These processes can be strengthened medically or by training and exercising your brain.

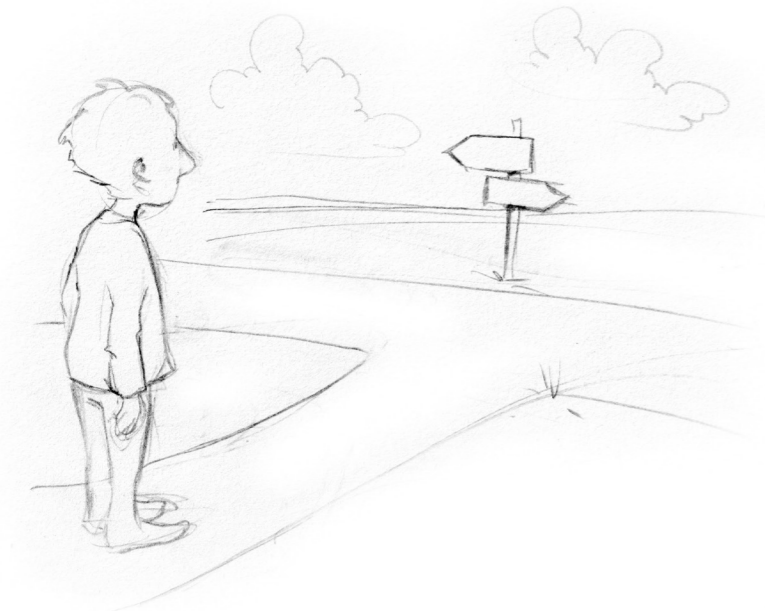
Although cognitive problems do occur for many people with bipolar disorder, there are many effective strategies (remediation, compensatory, adaptive) as well as promising medical and psychological treatments being developed. With support from medical professionals and using the right tools, it is increasingly possible to function effectively with cognitive problems and maintain a good quality of life. King cognitive challenges in daily life.

## 12. SUMMARY OF PROMISING RESEARCH

### PROMISING MEDICAL TREATMENTS

Among the most promising medical treatments are mifepristone, lurasidone, EPO (erythropoietin), vortioxetine, and modafinil.

Two studies of 1-3 weeks of mifepristone treatment in persons living with bipolar presently experiencing a depressive episode showed benefits on spatial working memory, i.e., the capacity to keep locations of objects in your working memory (Young et al 2004, Watson et al 2012). A recent study also found beneficial effects on cognition of six weeks treatment with lurasidone in people with bipolar disorder type I who were otherwise symptom-free (Yatham et al 2017). Two placebo-controlled studies of 8-weeks of EPO infusions in people living with bipolar disorder or unipolar disorder (depression) showed cognitive improvements across memory, attention and speed of complex cognitive processing (Miskowiak et al 2014, 2015). Modafinil has not yet been investigated in bipolar disorder but shows promising effects in depression, where it was beneficial for episodic memory and working memory in individuals who had recovered from depression (Kaser et al 2017). Finally, the antidepressant vortioxetine that is used to treat unipolar depression was observed in several studies to improve some aspects of cognition (McIntyre et al 2016, Smith et al 2017). No studies have yet been conducted in bipolar disorder.



## PROMISING PSYCHOLOGICAL TREATMENTS

Promising psychological treatments for cognitive and functional difficulties in bipolar disorder are functional remediation and certain cognitive remediation programs, including internet-based cognitive remediation (Lewandowski et al 2018) and action-based cognitive remediation. Functional and cognitive remediation both involve cognitive training, compensation techniques and coping strategies to overcome cognitive difficulties in daily life situations. They differ in that functional remediation focuses primarily on training strategies and skills to cope with functional difficulties, i.e. problems with functioning at work, in social settings and home life; in contrast, cognitive remediation generally emphasize computerized cognitive training (“drills and exercises”). In addition, action-based cognitive remediation also involves active transfer of the learned cognitive skills to daily life challenges by practical in-session exercises and seeking cognitive challenges in daily life.

Functional remediation seems a viable option for people living with bipolar disorder who experience substantial cognitive and psychosocial difficulties because it improves functioning in individuals with chronic illness (Torrent et al 2013). Further, internet-based cognitive remediation over 24 weeks improved cognitive outcome in individuals with bipolar disorder type I (Lewandowski et al 2018). Finally, 10 weeks of action-based cognitive remediation improved cognition and vocational function in individuals with severe mental illnesses, including schizophrenia, depression and bipolar disorder (Bowie et al 2017). Based on this evidence, an ongoing study aims to evaluate the effects of 10 weeks of action-based cognitive remediation in cognitively impaired individuals with bipolar disorder who are relatively symptom-free (Ott et al, under review). Other ongoing studies investigate the effects of 12 weeks of cognitive-behavioral rehabilitation (Strawbridge et al 2016), and 12 weeks of cognitive remediation (Gomez et al 2017).

The combination of medical and psychological interventions is a highly promising treatment perspective. Together, these treatments are likely to further boost the regenerative processes in the brain that may translate into more robust cognitive and functional improvement than either treatment alone. So the combination of treatments is considered a key next step for cognition trials in bipolar disorder.

There are several ongoing follow-up trials of the above medical and psychological treatments, which are open for participation. If you are interested in learning more and see if you can participate, you can visit the ISBD website ([www.isbd.org/cognitive-assessment](http://www.isbd.org/cognitive-assessment)). You are encouraged to always discuss any options with your healthcare professional to determine if a treatment is available and useful, and it is safe for you to take part.

## 13. ONLINE RESOURCES

### Assessment of cognition and quality of life

Assess your cognition: [www.isbd.org/cognitive-assessment](http://www.isbd.org/cognitive-assessment)  
Assess your quality of life on: [www.bdqol.com](http://www.bdqol.com)

### Information on how to improve your well-being

Bipolar Wellness Tool: [www.bdwellness.com](http://www.bdwellness.com)

### Worksheets to improve cognition

Priorities sheet ([www.isbd.org/cognitive-assessment](http://www.isbd.org/cognitive-assessment))  
Goal setting using the SMART approach ([www.isbd.org/cognitive-assessment](http://www.isbd.org/cognitive-assessment))  
Learn about and apply compensatory techniques (<http://www.cogsmart.com/>)

## 14. RECOMMENDED ADDITIONAL READING

- Goldberg J, Burdick K. Cognitive dysfunction in bipolar disorder: A guide for clinicians.
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## 15. PEOPLE INVOLVED IN CREATING THIS INFORMATION MATERIAL

The present material is developed by the International Society for Bipolar Disorders (ISBD) Targeting Cognition Task Force. The task force was founded in 2016 under the lead of Dr Kamilla Miskowiak and consists of 21 international experts in cognition in affective disorders from the following countries (in alphabetical order): Australia, Brazil, Canada, Colombia, Denmark, Japan, New Zealand, Spain, United Kingdom, and United States of America. The members of the ISBD Targeting Cognition Task Force were selected based upon their expertise in cognition in bipolar disorder.

**Authors names and affiliations:** Miskowiak KW<sup>1,2</sup>, Burdick KE<sup>3</sup>, Martinez-Aran A<sup>4</sup>, Bonnin CM<sup>4</sup>, Bowie CR<sup>5</sup>, Carvalho AF<sup>6</sup>, Gallagher P<sup>7</sup>, Lafer B<sup>8</sup>, López-Jaramillo C<sup>9</sup>, Sumiyoshi T<sup>10</sup>, McIntyre RS<sup>11</sup>, Schaffer A<sup>12</sup>, Porter RJ<sup>13</sup>, Purdon S<sup>14</sup>, Torres IJ<sup>15</sup>, Yatham LN<sup>15</sup>, Van Rheenen T<sup>16</sup>, Young AH<sup>1</sup>, Kessing LV<sup>1</sup>, Vieta E<sup>4</sup>

- 1 Copenhagen Affective Disorder Research Centre (CADIC); Psychiatric Centre Copenhagen, Copenhagen University Hospital, Rigshospitalet, Copenhagen, Denmark;
- 2 Department of Psychology, University of Copenhagen, Copenhagen, Denmark,
- 3 Department of Psychiatry, Brigham and Women's Hospital; Harvard Medical School, Boston, MA United States of America;
- 4 Clinical Institute of Neuroscience, Hospital Clinic, University of Barcelona, IDIBAPS, CIBERSAM, Barcelona, Catalonia, Spain;
- 5 Department of Psychology, Queen's University, Kingston, Canada;

- 6 Department of Clinical Medicine and Translational Psychiatry Research Group, Faculty of Medicine, Federal University of Ceará, Fortaleza, Brazil;
- 7 Institute of Neuroscience, Newcastle University, Newcastle-upon-Tyne, United Kingdom;
- 8 Bipolar Disorder Research Program, Departamento de Psiquiatria, Faculdade de Medicina FMUSP, Universidade de Sao Paulo, Sao Paulo, SP, Brazil;
- 9 Research Group in Psychiatry, Department of Psychiatry, Universidad de Antioquia, Medellín, Colombia;
- 10 Department of Clinical Epidemiology, Translational Medical Center, National Center of Neurology and Psychiatry, Tokyo, Japan;
- 11 Mood Disorders Psychopharmacology Unit Brain and Cognition Discovery Foundation University of Toronto, Toronto, Canada;
- 12 Department of Psychiatry, University of Toronto, Toronto, Canada;
- 13 Department of Psychological Medicine, University of Otago, Christchurch, New Zealand;
- 14 Department of Psychiatry, University of Alberta, Edmonton, Canada;
- 15 Department of Psychiatry, University of British Columbia, Vancouver,
- 16 Department of Psychiatry, University of Melbourne; Australia;
- 17 Department of Psychological Medicine, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom.

**Illustrations:** Karen Leth

**Graphic design:** Line Flindt

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