Montreal Cognitive Assessment (MoCA)

Version 8.1

Application and Scoring Instructions

The Montreal Cognitive Assessment (MoCA) is designed as a quick screening instrument for mild cognitive dysfunction. MoCA evaluates different cognitive domains such as: attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations and orientation. Application of MoCA can be done by anyone who understands and follows the instructions, but only a health professional with expertise in the cognitive field can interpret the results. Time for MoCA is 10 minutes. The total possible score is 30 points; a score of 26 or above is considered normal.

All instructions can be repeated once.

1. Making alternate traces:

Application: The examiner gives instructions to the subject: "Please draw a line going from a number to a letter in ascending order. Begin here (point to 1) and draw a line from 1 then to A then to 2 and so on. End here (point to E)."

Scoring: One point is given if the subject successfully draws the following pattern: 1- A- 2- B- 3- C- 4- D- 5- E, without drawing any lines that cross. Any error that is not immediately self-corrected (meaning corrected before moving on to the Cube task) earns a score of 0. A point is also not given if the subject draws a line to connect the end (E) to the beginning (1).

2. Visuoconstructional Skills (Cube):

Application: The examiner gives the following instructions, pointing to the cube: “Copy this drawing as accurately as you can.”

Scoring: One point is given for a correctly copied drawing.
- Drawing must be three-dimensional.
- All lines need to be drawn.
- All lines meet with little or no space.
- No additional line is added.
- Lines are relatively parallel and their length is similar (rectangular prisms are accepted).
- The cube’s orientation in space must be preserved.

A point is not given if any of the above criteria is not satisfied.
3. Visuoconstructional Skills (Clock):

**Application:** Examiner needs to ensure that the subject does not look at his or her watch during the task and that there are no watches nearby. Examiner shows the appropriate space and gives the following instructions. “Draw a clock. Put in all the numbers and set the time to 10 past 11.”

**Scoring:** One point is given for each of the following three criteria:

- **Shape (1 point):** Shape of the clock needs to be drawn either as a circle or as a square. Minor distortions are acceptable (for example: imperfections while closing the circle). If the numbers are arranged in a circular way but the shape is not drawn then the shape is scored as incorrect.
- **Numbers (1 point):** All numbers on the clock need to be present without an additional numbers. Numbers need to be in the correct order, placed upright and in the approximate quadrants on the clock face. Roman numbers are acceptable. Numbers need to be arranged in a circular way (even if the shape is a square). Numbers must be drawn either inside or outside the shape of the clock. If the subject places some of the numbers inside the shape of the clock and some of the numbers outside the shape of the clock, he or she does not get the points for the numbers.
- **Hands (1 point):** Two hands need to be drawn showing the correct time. The hour hand must be shorter than the minute hand. Hands must be centred within the clock face with their junction placed close to the centre of the clock.

4. Naming:

**Application:** Starting from the left, the examiner shows the figure and says: “Tell me the name of this animal.”

**Scoring:** One point is given for each of the following answers: (1) lion (2) rhinoceros or rhino (3) camel or dromedary

5. Memory:

**Application:** Examiner reads the list of five words with the speed of one word per second, during which he or she gives the following instructions: “This is a memory test. I will read the list of words that you will remember now and later on. Listen carefully. When I finish, you will tell me as many words as you can remember. It is not important in which order you will tell them.” Examiner puts a check mark in allocated space for every correct word during the first trial. The examiner can not correct the subject if he or she recalls the deformed word or a word that sounds like the target word. When the subject indicates that he or she has finished the task (remembered all the words) or can not remember more words, the examiner reads the list for
the second time and gives the following the instructions: “I will read the list for the second time. Try to remember them and tell me as many words as you can including the words you said the first time.” Examiner puts a check mark in allocated space for every correct word during the second trial. At the end of the second trial the examiner informs the subject that he or she will be asked to tell the words again by saying: “I will ask you to tell those words again at the end of the test.”

**Scoring:** For the first and second trial points are not given.

6. **Attention:**

**Repeating numbers in the forward order:** Application: The examiner gives the following instructions: “I will tell you some numbers and when I finish, repeat them exactly as I said them.” The examiner reads five numbers with the speed of one number per second.

**Repeating numbers in the backward order:** Application: The examiner gives the following instructions: “Now I will tell you more numbers and when I finish you need to repeat them in a backward order.” The examiner reads three numbers with the speed of one number per second. If the subject repeats the numbers but not in the backward order, the examiner can not ask from the subject to repeat the numbers in the backward order at this point.

**Scoring:** One point is given for every number sequence that is said correctly by the subject. (N.B.: correct answer for the backward sequence is 2-4-7).

**Alertness:** Application: The examiner reads the list of letters at a speed of one letter per second, after giving the following instructions: “I am going to read a sequence of letters. Every time I say the letter A, tap your hand once. If I say a different letter, do not tap your hand.”

**Scoring:** One point is given if the subject did not make any mistake or he made only one mistake (an error is a tap on a wrong letter or a failure to tap on letter A).

**Serial 7s:** Application: The examiner gives the following instructions: “Now I will ask you to count by subtracting 7 from 100, and you will continue subtracting number 7 from your answer until I tell you to stop.” The subject must perform mental calculation, therefore he/she can not use his or her fingers, paper or pencil during the execution of this task. The examiner can not repeat the subjects answers. If the subject asks from the examiner to repeat his or her last answer or which number he or she must subtract from the answer, in this case the examiner repeats the instructions if the instructions have not yet been repeated.

**Scoring:** For this task 3 points are given. Points are not given for the incorrect subtractions, 1 point is given for one correct subtraction, 2 points for two or three correct subtractions and 3 points if the subject had four or five correct subtractions. Each subtraction is estimated independently; this means if the answer is incorrect but the subject continues to subtract 7 correctly from that number each correct subtraction is counted. For example, the subject may
provide the answer 92-85-78-71-64, where 92 is incorrect, but all other numbers in the sequence are correct. This is one mistake and the task would be scored as 3 points.

7. Sentence repetition:

Application: The examiner gives the following instructions: “I will read you a sentence. Repeat the sentence after me, exactly as I said it. [Pause]: I only know Naida is the one to help today. After an answer, say: Now I am going to read you another sentence. Repeat the sentence after me, exactly as I said it. [Pause]: “The cat always hid under the couch when the dogs were in the room.”

Scoring: One point is given for each sentence repeated correctly. Repetitions need to be precise. Be careful regarding the omissions (for example: omitting “only”), replacement/additions (for example: “only” for “always”), grammar mistakes/replacement of the plural forms (for example: hides for hid) etc.

8. Verbal fluency:

Application: The examiner gives the following instructions: “Now, I would like you to tell me as many words as you can think of that start with the letter F. I will tell you to stop after one minute. Proper nouns, numbers and different verb forms are not allowed”. Are you ready? [Pause]: [Time for 60 seconds]. Stop. If the subject names two consecutive words that start with the another letter, than the examiner will repeat the target letter if the instructions were not repeated already.

Scoring: One point is given if the subject says 11 words or more in 60 second. The examiner records the subjects responses in the margins or on the back of the test sheet.

9. Abstract thinking:

Application: The examiner asks from the subject to explain what each pair of words have in common, starting with the example: “I will give you two words and please tell me to which category do they belong to [Pause]: an orange and a banana. “ If the subject answers correctly than the examiner says:” Yes, those two words belong to the category Fruits”. If the subject responds in a concrete manner, than the examiner gives one additional incentive: “Tell me another category to which those two words belong to. “ If the subject does not give the appropriate answer (fruits), the examiner says. “Yes, they also belong to the category Fruits.” Additional instructions or clarifications are not given. After the first example that served as a practice, the examiner says: “Now, train and bicycle.“ After the answers, the examiner applies the second trial by saying: “Now, ruler and watch.” Incentive (one for the entire section that has an aim to test/examine abstract thinking) can be given if it was not used during the example.
Scoring: Only the last two pairs are scored. One point is given for each pair that was answered correctly. The following answers are acceptable:

- train-bicycle = means of transportation, means of travelling, you take trips in both
- ruler-watch = measuring instruments, used to measure

The following responses are not acceptable:
- train-bicycle = they have wheels
- ruler-watch = they have numbers

10. Delayed recall:

Application: The examiner gives the following instructions: “I read some words to you earlier, and asked you to remember them. Tell me as many of those words as you can remember.” The examiner marks ✔ every word that the subject spontaneously recalled without any hints form the examiner, in the appropriate space.

Scoring: One point is given for the every word recalled by the subject without a hint.
**Memory Index Score (MIS)**

**Application:** After the delayed free recall trial, the examiner gives categorical (semantic) hint for every word that the subject was unable to remember. For example: “I will give you some hints in order to see whether you will remember some words, first word was a body part.” If the subject is unable to remember the words with a categorical hint, the examiner gives a multiple choice hint. For example: “What do you think which of the following words it was, NOSE, FACE or HAND? “For all the words that the subject was unable to remember, the procedure is done in this way. The examiner identifies the words that the subject was able to remember with the help of a hint (categorical or with a multiple choice) by placing a check mark (√ ☐) in the appropriate place.

Hints for every word are presented below:

<table>
<thead>
<tr>
<th>Target Word</th>
<th>Categorical Hint</th>
<th>Multiple Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOSE</td>
<td>body part</td>
<td>face, nose, hand (shoulder, leg)</td>
</tr>
<tr>
<td>COTTON</td>
<td>type of fabric</td>
<td>silk, cotton, jersey (nylon, velvet)</td>
</tr>
<tr>
<td>HOSPITAL</td>
<td>type of building</td>
<td>hospital, school, library (supermarket, shopping centre)</td>
</tr>
<tr>
<td>PEAR</td>
<td>type of fruit</td>
<td>fig, pear, peach (apple, cherry)</td>
</tr>
<tr>
<td>RED</td>
<td>colour</td>
<td>red, blue, yellow (green, orange)</td>
</tr>
</tbody>
</table>

* Words in the brackets are used in a case the subject mentions one or two of the offered multiple choice answers during the categorical hints.

**Scoring:** In order to determine the MIS (which is a sub-score) the examiner gives the points according to the type of remembering (see the table below). Use of hints provides clinical information about the nature of the memory deficit. For the memory defects due to the retrieval failures, the performance will improve with the use of a hint. For the memory defects due to the inability to store information in the memory, the performance will not improve with the use of a hint.

<table>
<thead>
<tr>
<th>MIS scoring</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of words remembered spontaneously ...... multiplied by 3 ...</td>
<td></td>
</tr>
<tr>
<td>Number of words remembered with a categorical hint ...... multiplied by 2 ....</td>
<td></td>
</tr>
<tr>
<td>Number of words remembered with a multiple choice hint ..... multiplied by 1 ...</td>
<td></td>
</tr>
<tr>
<td><strong>Total MIS</strong> (add all points)</td>
<td>----/15</td>
</tr>
</tbody>
</table>
11. Orientation

**Application:** The examiner gives the following instructions. “Tell me today’s date.” If the subject does not give a complete answer, the examiner gives appropriate incentives by saying: "Tell me (year, month, exact date, day in a week)." Then the examiner says: "Now, tell me the name of the place where you are and in which city you are."

**Scoring:** One point is given for each section that was answered correctly. The date and place where the subject is located (name of the hospital, clinic, office) must be accurate. Points are not given if the subject makes a mistake for the day of the week and one day in the date.

**TOTAL SCORE:** Sum all of the sub-points on the right side of the test. If the subject had less than the total possible number of points, add 1 point for a subject with 12 years or less of formal education. The final total score of 26 or more is considered normal.

Back-translation of MoCA 8.1 version from Bosnian to English language done by Mrs. Dina Memić. (Master of Arts, English language and literature)

Please refer to the MoCA website at www.mocatest.org for more information on the MoCA.