



Neuropsychological Tests (Cognitive Neuroscience)

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Objectives:

- Communicate the idea that simple tests can easily reveal properties and/or deficits of different cognitive functions

Materials and Supplies Needed:

Item	Quantity	Notes (Vendor, price, purpose, etc.)
Stroop Test	1-10 copies	Easily found on the internet
Rey-Osterrieth Complex Figure Test	1-10 copies	Easily found on the internet
Word Memory Recall Test	1-10 copies	Easily found on the internet
Montreal Cognitive Assessment Test	1-10 copies	http://www.mocatest.org/pdf_files/test/MoCA-Test-English_7_1.pdf
Scratch Paper		For participants to write out answers
Pencils		For participants to write out answers
Stopwatch		

Background Information / Activity Explanation:

Many varieties of neuropsychological tests are used to test for specific deficits in cognitive functioning, such as inhibition/cognitive control, visuo-spatial abilities, and short-term memory capacity. Usually, a person's score on a neuropsychological test is compared to a normal score. This normal score is the average from hundreds of other people.

The variety of tests offered here shows participants that there are tight links between specific brain areas and specific cognitive functions. 4 tests will be featured: 1) Stroop Test 2) Rey-Osterrieth Complex Figure Test 3) Word Memory Recall Test 4) Montreal Cognitive Assessment Test). Although we will not be offering any diagnostic information for the participants themselves, this activity will give participants a feel for how cognitive deficits can be assessed and used to diagnose patients with specific neuropsychological disorders.

Procedures:

Each of the tests can be found online. They are also amended to this document. Print each test out. You may insert them into a sheet protector. Have participants write down their answers on a piece of scratch paper.

- **Stroop test:** Two lists of colors are prepared. In one list, the name of the color and the ink color that it is written in, match (e.g., "Red" typed in red ink). In the second list, they do not match (e.g., "Red" typed in blue ink). Have participants read the first list of words with the matching color name/ink color and time them on how long it takes to read the list. Then, have participants read the ink color name in

the second list where the color names and ink colors do not match. Time them as they perform this task. If they make a mistake, have them start from the beginning. Compare the two times. Explain why the second list requires more time to complete and more mistakes are made.

- Rey-Osterrieth complex figure test: Show participants the Rey-Osterrieth complex figure and ask them to copy the figure. Then, take the figure away and have participants draw the figure again from memory. Drawings are scored on 18 basic elements of the figure. Compare and contrast the original figure to the copied and from-memory drawings.
- Word memory recall test: Two different lists of words are prepared. In one list, the words are randomly chosen. In the second list, the words are clustered in groups (e.g., colors, furniture, animals). Give each participant 2 minutes to read and memorize the first list of words. Then, ask participants to recall as many words he/she can remember from the list within 1-2 minutes. Now repeat the same task but with the second list of words. On average, 7 ± 2 words are recalled from the first list, more from the second list. Explain why it is easier to remember more words from the second list.
- Montreal Cognitive Assessment (MoCA): This is a broad intelligence test used to assess mild cognitive deficits. The MoCA tests 8 components: visuospatial/executive, naming, memory, attention, language, abstraction, delayed recall, and orientation. The test takes approximately 10 minutes to complete and there are 30 possible points; a score of 26 or above is considered normal.
Instructions can be downloaded from here: http://www.mocatest.org/pdf_files/instructions/MoCA-Instructions-English_2010.pdf
The test itself can be downloaded from here: http://www.mocatest.org/pdf_files/test/MoCA-Test-English_7_1.pdf

Additional Information (advice, spiel, links, figures, etc.):

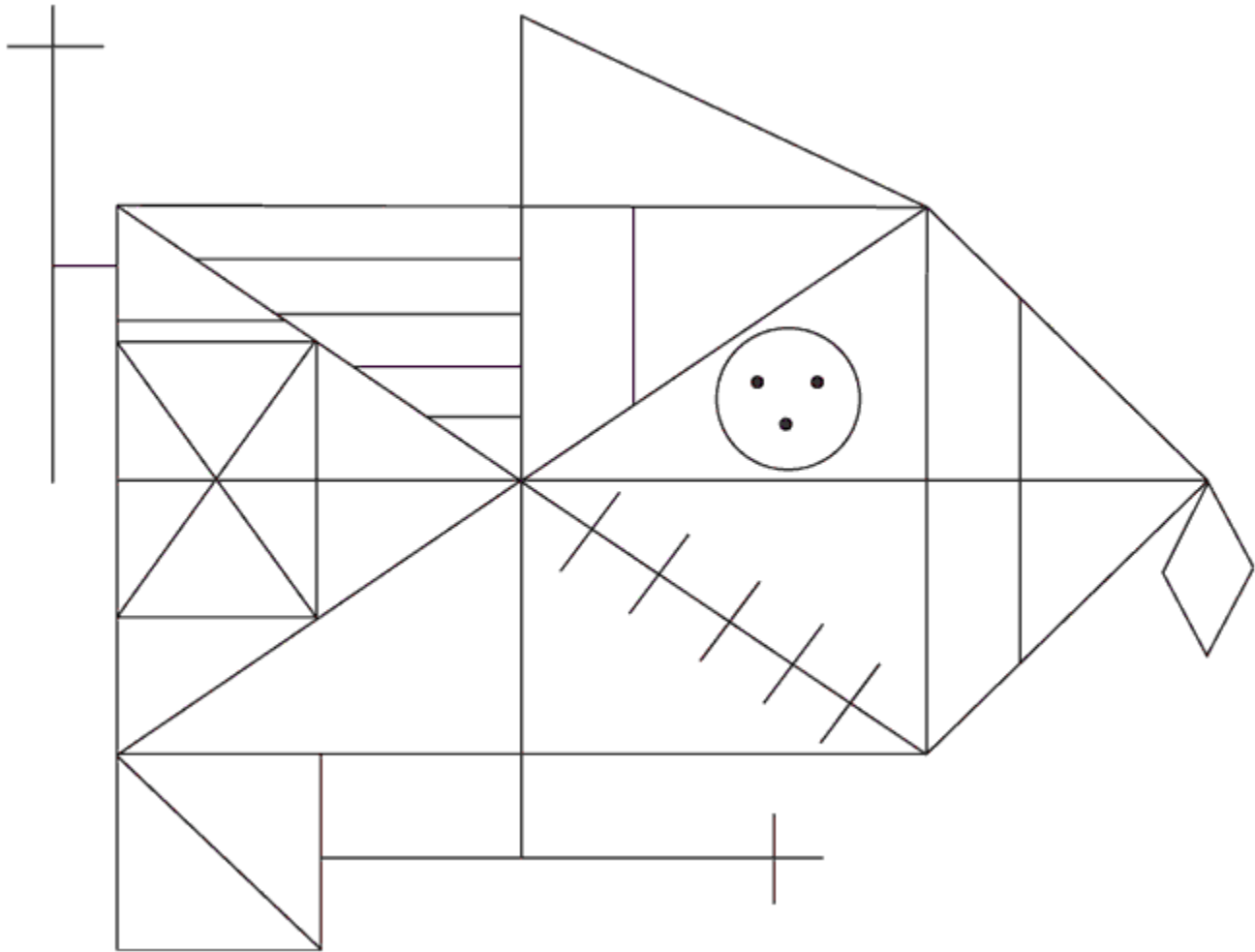
EEG and fMRI studies using the Stroop test have consistently showed activation of the frontal lobe of the brain, specifically the anterior cingulate cortex and dorsal lateral prefrontal cortex. These areas are hypothesized to be responsible for conflict monitoring and resolution. Patients with damage to these areas perform worse in the Stroop test compared to patients without damage.

Many of these tests are used by professionals to diagnose neurological conditions with certain performance cutoffs used to identify “normal” performance vs “deficient” performance. **It is strongly advised not to reveal the scores to participants**, just in case a participant does not perform to standards - we are not qualified to diagnose and do not want to cause any emotional trauma. Emphasize instead that these tests are commonly used methods for assessing cognitive capacity.

Stroop Test



Rey-Osterrieth Complex Figure



Word Memory Recall Test

List 1:

Nine	Swap	Cell	Ring	Lust
Plugs	Lamp	Apple	Table	Sway
Army	Bank	Fire	Hold	Worm
Clock	Horse	Color	Baby	Sword
Desk	Hold	Find	Bird	Rock

List 2:

Horse	Cat	Dog	Fish	Bird
Orange	Yellow	Blue	Green	Black
Table	Chair	Desk	Bookcase	Bed
Teacher	School	Student	Homework	Class
Apple	Banana	Kiwi	Grape	Mango

Montreal Cognitive Assessment

MONTREAL COGNITIVE ASSESSMENT (MOCA)
Version 7.1 Original Version

Education :
Sex :

Date of birth :
DATE :

VISUOSPATIAL / EXECUTIVE								
		Copy cube []	Draw CLOCK (Ten past eleven) (3 points) [] [] []				POINTS ___/5	
NAMING								
							___/3	
MEMORY		Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.						
		FACE	VELVET	CHURCH	DAISY	RED	No points	
		1st trial						
		2nd trial						
ATTENTION		Read list of digits (1 digit/ sec.). Subject has to repeat them in the forward order [] 2 1 8 5 4 Subject has to repeat them in the backward order [] 7 4 2						___/2
ATTENTION		Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors [] FBACMNAAJKLBAFAKDEAAAJAMOF AAB						___/1
ATTENTION		Serial 7 subtraction starting at 100 [] 93 [] 86 [] 79 [] 72 [] 65 4 or 5 correct subtractions: 3 pts , 2 or 3 correct: 2 pts , 1 correct: 1 pt , 0 correct: 0 pt						___/3
LANGUAGE		Repeat: I only know that John is the one to help today. [] The cat always hid under the couch when dogs were in the room. []						___/2
LANGUAGE		Fluency / Name maximum number of words in one minute that begin with the letter F [] ____ (N ≥ 11 words)						___/1
ABSTRACTION		Similarity between e.g. banana - orange = fruit [] train - bicycle [] watch - ruler						___/2
DELAYED RECALL		Has to recall words WITH NO CUE	FACE []	VELVET []	CHURCH []	DAISY []	RED []	Points for UNCUED recall only
Optional		Category cue						
Optional		Multiple choice cue						
ORIENTATION		[] Date [] Month [] Year [] Day [] Place [] City						___/6
© Z.Nasreddine MD		www.mocatest.org		Normal ≥ 26 / 30		TOTAL ___/30		
Administered by: _____		Add 1 point if ≤ 12 yr edu						