Detailed description of neuropsychological tasks

The CPT is a computerized task that measures selective attention, sustained attention and impulsivity [1]. Five letters (i.e., H, O, T, X, and Z) are consecutively displayed on the screen for 200 ms with inter-stimulus intervals of 2000 ms and in pseudorandomized order. Subjects are asked to press a button whenever the letter O is followed by the letter X. In total, 400 stimulus sequences are presented over a period of 15 minutes. Of these, 200 are irrelevant sequences (i.e., neither O nor X), 100 are non-target sequences (i.e., O followed by another letter than X), and 100 are target sequences. The number of missing responses despite target-sequence presentation (i.e. omission errors) is an indicator of sustained and selective attention, whereas the number of erroneous responses to irrelevant and non-target sequences (i.e. commission errors) is an indicator of impulsivity [1]. Furthermore, the mean latency between target-sequence presentation and the according (correct) response (response time) is a measure of the time required to provide a correct response.

The CVLT is one of the most widely used tests for assessing episodic verbal learning and memory. First, a shopping list of 16 items (list A, Monday list) is read aloud to the test subject over 5 learning trials. After each trial, subjects are asked to name as many items as possible. Then, another shopping list of 16 items (list B, Tuesday list) is presented and subjects are asked to name as many items as possible from the Tuesday list. After this interference, subjects are again asked to name as many items as possible from the Monday list, first freely (i.e. short delay free recall) and then category wise (i.e. short delay cued recall). After 20 minutes, subjects are again asked to name as many items from the Monday list, first freely (i.e. long delay free recall) and then category wise (i.e. long delay cued recall). Finally, a list of 44 shopping items is presented to the subjects. For each item, subjects have to say whether it belongs to the Monday list (i.e. recognition).

The ToH is a problem-solving task that requires working memory, planning, and inhibition [2]. Subjects are asked to move stacks of four and five discs of graduated size from the left side of a three-peg stand to the right side using the following rules: A larger disc cannot be placed on a smaller disc and only one disc can be moved at a time. The performance in this task is measured by 1) the number of moves and 2) the time in seconds needed for completion of the task.

[1] Knye M, Roth N, Westhus W, Heine A. Continuous Performance Test (CPT). Göttingen, Hogrefe. 2003.

[2] Welsh MC, Satterlee-Cartmell T, Stine M. Towers of Hanoi and London: contribution of working memory and inhibition to performance. Brain and cognition. 1999;41:231-42.