

Sternberg working memory task

The classic Sternberg working memory task involves presentation of a list of items to memorize, followed by a memory maintenance period during which the subject must maintain the list of items in memory. The maintenance period is terminated by the onset of a 'probe' letter, to which the subject must respond whether the item was in their memorized list of items or not.

For the present experiment, each item, in this case consonant letters, was presented one at a time. If the letter is colored green instead of black, the subject was to ignore the letter and not add it to his mental list of memorized letters.

Each trial began with the presentation of a plus sign in the middle of the screen for 5 seconds. This period can be considered a 'baseline' period during which there should have been no working memory load.

Each trial consisted of 8 letters to either memorize or ignore. Trials contained varying numbers of ignore letters (either 1, 3 or 5), and the order of memorize and ignore letters in a given trial was randomized.

Following the presentation of 8 memorize plus ignore letters, a black dash appeared on the screen indicating the onset of the 'maintenance' period during which the subject needed to rehearse or otherwise maintain the memory of the black letters that he just saw. The maintenance period lasted for a variable period between 2 and 4 seconds.

The end of the maintenance period was signaled by the onset of a 'probe' letter which was colored red. Subjects were to decide whether this letter was a member of his current memorized set of letters and answer by pressing one of two response buttons. Responses were not speeded by incentive or reward but subjects generally pressed as soon as they were sure of their response. The 'probe' letter was part of the memorized set 50% of the time.

Event codes (EEG.event.type):

Memorize letters: "uppercase letter", for example, 'B', 'H', 'W', 'F', etc...

Ignore letters: "lowercase 'g', uppercase letter", for example, 'gB', 'gH', 'gW', 'gF', etc... ('g' stands for 'green', see above explanation)

Probe letters: "lowercase 'r', uppercase letter", for example, 'rB', 'rH', 'rW', 'rF', etc... ('r' stands for 'red', see above explanation)

Maintenance period: 'WM' (WM stands for 'working memory')

Fixation period: 'nonWM' (this denotes a fixation that included no working memory, it was the 5 seconds preceding each trial)

Button presses: 'in' or 'out'. 'in' meant 'yes, this letter was in my memorize set'. 'out' meant 'no, this letter was not in my memorize set'. The 'advance' event just preceding the 'nonWM' event was a self-paced button press to advance to the next trial.

Subjects generally performed almost perfectly, with mean accuracy around 98%.