Memory Game

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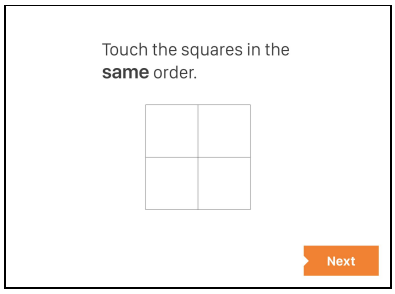
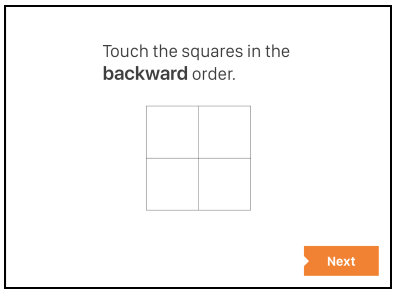
Contents

Task Description

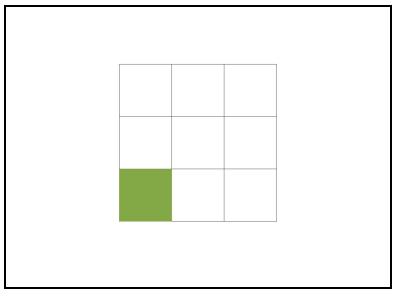
This game measures **short-term memory** and **working memory**.

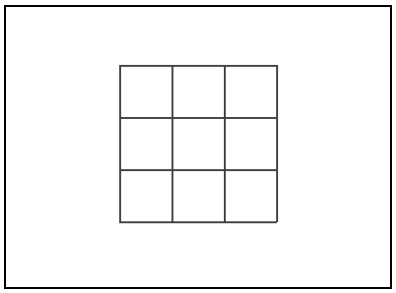
The participant views a sequence of colored squares light up in a square grid. In the forward (short term memory) block, the goal is to touch the squares in the same order. In the backward (working memory) block, the goal is to touch the squares in reverse order.





Grid size for test trials is adjustable (2x2; 3x3; 4x4). The length of the sequences periodically increases, which makes the task more difficult. There is an option to end each block early if the participant can no longer respond correctly.



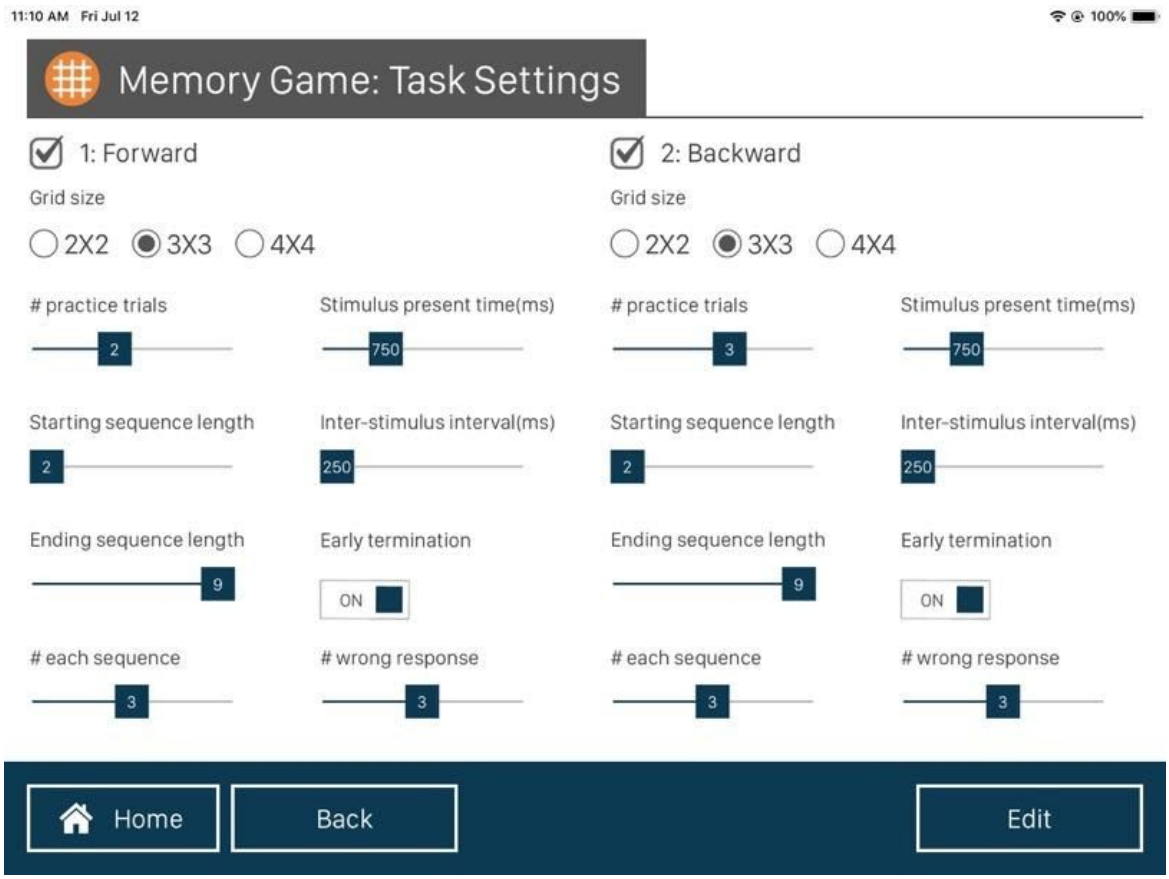


Performance is measured using the maximum correct sequence length (spatial memory span) and the total number of correct answers. Memory span is not recommended for analysis because it has less variability relative to the number of correct answers.

Clean vs. Analysis Data Files

The clean data files include all cases, whereas the analysis data files exclude cases with incompatible settings.

Figure 1: Memory Game Settings Menu



Memory Game Variable Naming Guide

Memory game variable names have three parts, each separated by an underscore.

Part 1: Game identifier

wm = working memory

Part 2: Block identifier

b = backward

f = forward

fp = forward practice

ft = forward test

bp = backward practice

bt = backward test

Part 3: Measure identifier

See Tables 1-3 for details

Table 1: Memory Game Settings Variables

Note: The settings variables are not included in the "trial" data files.

Variable Name	Label	Description
wm_f_grid	WM Forward: Grid Size	Size of the grid on which the child plays during the forward block. The larger the grid, the more difficult the memory game. Data type: factor (3 levels) 1 = 2x2 2 = 3x3 3 = 4x4
wm_f_p_n	WM Forward: Number of Practice Trials	Number of practice trials in the forward block. Data type: numeric Value range = 0-5
wm_f_seq_min	WM Forward: Minimum Sequence Length	The length (number of blocks) of the first test sequence in the forward block. Data type: numeric Value range = 2-4
wm_f_seq_max	WM Forward: Maximum Sequence Length	The length (number of blocks) of the final test sequence in the forward block. Data type: numeric Value range = 3-9
wm_f_seq_n	WM Forward: Number of Trials for Each Sequence Length	Number of trials for each sequence length in the forward block Data type: numeric Value range = 1-5
wm_f_stim	WM Forward: Stimulus Presentation Time (s)	Time in seconds that each square lights up in the forward block. Data type: numeric Value range = 0.25-2.00 sec
wm_f_isi	WM Forward: Inter-Stimulus Interval (s)	Time between each square lighting up in the forward block.

		Data type: numeric Value range = 0.25-2.00 sec
wm_f_term	WM Forward: Early Termination Enabled?	Will the forward block end early after too many incorrect trials? Data type: logical
wm_f_term_n	WM Forward: Number of Sequential Incorrect Trials to Initiate Early Termination	Number of sequential incorrect trials that will cause the forward block to end early. Data type: numeric Value range = 1-5
wm_f_grid	WM Backward: Grid Size	Size of the grid on which the child plays during the backward block. The larger the grid, the more difficult the memory game. Data type: factor (3 levels) 1 = 2x2 2 = 3x3 3 = 4x4
wm_f_p_n	WM Backward: Number of Practice Trials	Number of practice trials in the backward block. Data type: numeric Value range = 0-5
wm_f_seq_min	WM Backward: Minimum Sequence Length	The length (number of blocks) of the first test sequence in the backward block. Data type: numeric Value range = 2-4
wm_f_seq_max	WM Backward: Maximum Sequence Length	The length (number of blocks) of the final test sequence in the backward block. Data type: numeric Value range = 3-9
wm_f_seq_n	WM Backward: Number of Trials for Each Sequence Length	Number of trials for each sequence length in the backward block Data type: numeric Value range = 1-5

wm_f_stim	WM Backward: Stimulus Presentation Time (s)	Time in seconds that each square lights up in the backward block. Data type: numeric Value range = 0.25-2.00 sec
wm_f_isi	WM Backward: Inter-Stimulus Interval (s)	Time between each square lighting up in the backward block. Data type: numeric Value range = 0.25-2.00 sec
wm_f_term	WM Backward: Early Termination Enabled?	Will the backward block end early after too many incorrect trials? Data type: logical
wm_f_term_n	WM Backward: Number of Sequential Incorrect Trials to Initiate Early Termination	Number of sequential incorrect trials that will cause the backward block to end early. Data type: numeric Value range = 1-5

Table 2: Memory Game Trial Data

Variable Name	Label	Description
id	Participant Identifier	Data type: character
wm_block	WM Block (Forward, Backward)	Which block is this? Data type: factor (2 levels) 1 = forward 2 = backward
wm_trial_num	WM Trial Number	Trial number. Numbering restarts for practice and test trials in each block. Data type: integer
wm_trial_type	WM Type of Trial (Practice, Test)	Is this a practice trial or a test trial? Data type: factor (2 levels) 1 = practice 2 = test
wm_seq_num	WM Number within the Trial Sequence	Number for part of the trial sequence. Numbering restarts for each trial.
wm_test_seq_x	WM Test Sequence X Coordinate	X coordinate location of the target stimulus within the grid. Data type: integer
wm_test_seq_y	WM Test Sequence Y Coordinate	Y coordinate location of the target stimulus within the grid. Data type: integer
wm_resp_seq_x	WM Response Sequence X Coordinate	X coordinate location of the response within the grid. Data type: integer
wm_resp_seq_y	WM Response Sequence Y Coordinate	Y coordinate location of the response within the grid. Data type: integer

wm_rt	WM Reaction Time	Amount of time between the end of the stimulus presentation and each response.
wm_target	WM Is this Square Part of the Target Sequence?	Data type: logical
wm_correct	WM Is this Response Correct?	Data type: logical

Table 3: Memory Game Analytic Variables

Variable Name	Label	Description
id	Participant Identifier	Data type: character
wm_date	WM File Save Date/Time	POSIXct (i.e., the number of seconds since the start of January 1, 1970)
wm_fp_correct	WM Forward Practice: Number of Correct Trials	Number of practice trials that were answered correctly in the forward block. Data type: integer
wm_ft_span	WM Forward Test: Memory Span	Length of the longest correct trial in the forward block Data type: integer
wm_ft_correct	WM Forward Test: Number of Correct Trials	Number of correct trials in the forward block Data type: integer
wm_bp_correct	WM Backward Practice: Number of Correct Trials	Number of practice trials that were answered correctly in the forward block. Data type: integer
wm_bt_span	WM Backward Test: Memory Span	Length of the longest correct trial in the forward block Data type: integer
wm_bt_correct	WM Backward Test: Number of Correct Trials	Number of correct trials in the forward block Data type: integer
wm_f_filter	WM Forward: Settings Filter Variable	Each unique combination of setting variables is assigned a number, starting with 1. The categories are ordered by a decreasing number of participants (e.g., 1 corresponds to the most prevalent combination of settings). This makes it

		easy to determine which participants share the same settings. Data type: integer
wm_b_filter	WM Backward: Settings Filter Variable	*See above.*