Supplementary Material

**Methods**

Below we more thoroughly describe the executive function assessments (broken down by subdomains: inhibitory control/working memory/switching/mixed) that were administered and the particular measures that were used in the analyses.

Inhibitory Control

Capture Task:  This visual search task measures failures of distractor suppression (one aspect of inhibitory control) without the influence of response inhibition or target/distractor similarity. The version we use is called the irrelevant singleton visual search paradigm (Theeuwes & Burger 1998). Each display consisted of an 8-item stimulus array with one unique shape (circles and triangles were randomly assigned to be targets or distractors). On 50% of trials, one of the *non*-unique shapes was colored red (distractor-present trial); for the other 50%, all items in the display were green (distractor-absent trials). Following 20 practice trials, participants performed 4 blocks of 75 trials. Participants were instructed to search for a unique shape and press one of two buttons on the keyboard to indicate whether the line inside this target shape was tilted left (“\”) or tilted right (“/”). Reaction times (RTs) and accuracy were measured for each trial.  RT was the primary dependent measure, as the displays are not data-limited, accuracy is emphasized in the instructions, and accuracy is typically at ceiling.

Gradual Onset Continuous Performance Task (gradCPT):  The gradCPT (Esterman et al., 2013) is a go/no-go continuous performance task that provides a valid and reliable measure of response inhibition (.8-.9, Cronbach’s alpha). The gradual transitions between stimuli put more demand on participants’ intrinsic response control abilities than other continuous performance tasks. The gradCPT contains 10 round, grayscale photographs of mountain scenes and 10 of city scenes. These scenes were randomly presented with 10% mountain trials and 90% city trials, without allowing the identical scene to repeat on consecutive trials. Scene images gradually transitioned from one to the next, using a linear pixel-by-pixel interpolation, with each transition occurring in 800ms. Participants were instructed to press a button for each city scene, and withhold responses to mountain scenes. Response accuracy was emphasized without reference to speed. However, given that the next stimulus would replace the current stimulus in 800ms, a response deadline was implicit in the task. Commission errors (pressing to a mountain scene) served as the primary dependent measure.

DKEFS Color-Word Interference Test: This test is analogous to the Stroop task and measures the ability to inhibit a pre-potent response. Participants were asked to name the incongruent colors in which color-words were printed. The dependent variable of interest was the time it took participants to complete the task. Test-retest reliability coefficient was in the moderate to high range (.71).

Working Memory

Auditory Consonant Trigram Task (ACT): This task measures working memory and the ability to maintain directed attention in the face of interference (e.g., Ozakbas et al., 2004). Participants were asked to remember three consonants while counting backwards for intervals of 9, 18 and 36 seconds. The total correct items remembered served at the dependent measure. The internal consistency of the ACT is high, with a reliability of .85.

Digit Span, Wechsler Adult Intelligence Scale, Fourth Edition (WAIS-IV):This test measures the number storage capacity of verbal working memory by having participants repeat number sequences that increase in length for each trial (Wechsler 1997). Participants either repeat the list of numbers in the order that was given (Digit Span Forward), in reverse order (Digit Span Backward), or by putting them in the correct sequence (Digit Span Sequencing). If they did this successfully, they were given a longer list of numbers. Total Digit Span was the primary dependent measure and represents the sum of the Digit Span Forward, Backward, and Sequencing scores. The Wechsler Adult Intelligence Scale has been rigorously reviewed and modified to ensure content validity. Reliability (coefficients range from .90 - .92 among ages 20-54) and generalizability (coefficient = .87 ages 16-54) are very strong.

Task Switching

Cambridge Neuropsychological Test Automated Battery (CANTAB) Intra-Extra Dimensional Set Shift: This test is a computerized analogue of the Wisconsin Card Sorting test (WCST) from the Cambridge neuropsychological test automated battery (CANTAB, [www.camcog.com](http://www.camcog.com), Cambridge C. CANTAB. Cambridge; England: 2002). Specifically, it measures rule acquisition and reversal using a visual discrimination task to assess attentional set formation, set maintenance, set shifting, and flexibility of attention. Feedback teaches the participant which stimulus is correct, and after six correct responses, the stimuli and/or rules are changed. Participants progressed through the test by satisfying a set criterion of learning at each stage (6 consecutive correct responses). If at any stage the participant failed to reach this criterion after 50 trials, the test would terminate. These shifts are initially intra-dimensional (e.g. color filled shapes remain the only relevant dimension), then later extra-dimensional (white lines become the only relevant dimension). The primary dependent measures were the participants’ total errors (adjusted score) and their total completed stage trials. Although the IED is analogous to the WCST, it has higher test-retest reliability than its predecessor (e.g., .75 for stages completed and .40 for total errors).

Mixed

To include measures that assess several executive function subdomains simultaneously, we used several measures from the Delis-Kaplan Executive Function System (DKEFS, www.pearsonclinical.com, Delis 2001)

D-KEFS Verbal Fluency Test: To evaluate generative ability and verbal fluency, we administered the letter and category fluency conditions of the D-KEFS Verbal Fluency test. The primary dependent measure was the number of acceptable responses generated within each 60-second trial. For the Letter Fluency test, the participants were given a letter of the alphabet and had to generate as many words that began with that letter within 60 seconds. For the Category Fluency test, the participants were given a category (e.g. boys names, animals) and they had to generate as many words from that category as possible within 60 seconds. Internal consistency for the letter fluency condition was .90 and the test-retest reliability coefficient was .76. Internal consistency for the category fluency condition was .76 and the test-retest reliability coefficient was .81.

DKEFS Trail Making Test (Trails B): The Number-Letter switching condition (Trails B) from the DKEFS Trail Making Test measures attentional shifting. The task required participants to connect the dots of consecutive targets while switching between numbers and letters (1, A, 2, B etc). The primary performance measure was the time taken to complete the test. For combined number and letter sequencing, the test-retest reliability coefficient was .64.

**Results**

*Supplemental Tables.* Hierarchical regression models predicting PTSD symptoms (separate models for 1st and 2nd session PCL-Cs) from measures of inhibitory control and ‘other’ executive functions. Significant models are indicated by \*.

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| --- | --- |
|  | A. Inhibitory Control (Including Stroop) Predicting Variance in PTSD Symptoms Beyond 'Other' Executive Functions |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Predicting PTSD (PCL-C 1st Session) | Predicting PTSD (PCL-C 2nd Session) |
| Predictor | R2adj | R2/ΔR2 | p-value | R2adj | R2/ΔR2 | p-value |
| 1) Switching, Mixed, WM | .116 | .288 | .154 | .010 | .203 | .418 |
| 2) Inhibitory Control | .321 | .222 | .020 | .392 | .358 | .007 |
|   |   |   |   |   |   |   |   |
|  |  |  |  |  |  |  |  |
|  | B. 'Other' Executive Functions Predicting Variance in PTSD Symptoms Beyond Inhibitory Control (Including Stroop) |
|  |  |  |  |  |  |  |
|  | Predicting PTSD (PCL-C 1st Session) | Predicting PTSD(PCL-C 2nd Session) |
| Predictor | R2adj | R2/ΔR2 | p-value | R2adj | R2/ΔR2 | p-value |
| 1) Inhibitory Control | .142 | .213 | .045 | .264 | .325 | .004 |
| 2) Switching, Mixed, WM | .321 | .297 | .020 | .392 | .236 | .007 |

|  |  |
| --- | --- |
|  | C. Inhibitory Control (Excluding Stroop) Predicting Variance in PTSD Symptoms Beyond 'Other' Executive Functions |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Predicting PTSD (PCL-C 1st Session) | Predicting PTSD (PCL-C 2nd Session) |
| Predictor | R2adj | R2/ΔR2 | p-value | R2adj | R2/ΔR2 | p-value |
| 1) Switching, Mixed, WM, Stroop | .087 | .290 | .228 | -.025 | .203 | .538 |
| 2) Inhibitory Control (except Stroop) | .321 | .220 | .020 | .392 | .358 | .007 |
|   |   |   |   |   |   |   |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | D. 'Other' Executive Functions Predicting Variance in PTSD Symptoms Beyond Inhibitory Control (Excluding Stroop) |
|  |  |  |  |  |  |  |
|  | Predicting PTSD (PCL-C 1st Session) | Predicting PTSD(PCL-C 2nd Session) |
| Predictor | R2adj | R2/ΔR2 | p-value | R2adj | R2/ΔR2 | p-value |
| 1) Inhibitory Control (except Stroop) | .121 | .170 | .042 | .255 | .297 | .003 |
| 2) Switching, Mixed, WM, Stroop | .321 | .340 | .020 | .392 | .264 | .007 |

**References**

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