

Cognitive Task Overview: TestMyBrain Flanker Attention

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TMB Test Name: TestMyBrain Flanker Attention

Test Demo: [standard version](#)

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The Many Brains Project

[The Many Brains Project](#) is a US-based 501(c)3 non-profit focused on the development of digital cognitive testing tools. We currently support many different types of research studies through our infrastructure for cognitive assessment - these range in size from small lab-based pilot studies to large longitudinal, multisite clinical research studies with tens of thousands of participants. As [TestMyBrain.org](#) has been continuously in operation since 2008, we provide a stable and secure platform for hosting and delivering mobile and web-based cognitive assessment protocols. Through TestMyBrain.org, data have been collected from over 2.5 million participants in a *citizen science* framework that includes structured return of research results toward the development, validation, and normative characterization of cognitive measures. We currently support research and education at over 400 sites worldwide as well as support for over 1200 clinicians or clinical sites engaged in remote digital neuropsychological assessment. For more information contact info@manybrains.net.

CITATION

Please credit The Many Brains Project and TestMyBrain in any papers, posters, or publications related to the TMB tests or data collected by TMB tests.

- Example:
 - All tasks were selected from and hosted on The Many Brains Project's web-based cognitive testing platform, TestMyBrain (Germine et al., 2012; The Many Brains Project).
 - Germine, L., Nakayama, K., Duchaine, B. C., Chabris, C. F., Chatterjee, G., & Wilmer, J. B. (2012). Is the Web as good as the lab? Comparable performance from Web and lab in cognitive/perceptual experiments. *Psychonomic Bulletin & Review*, 19(5), 847-857.
 - The Many Brains Project. *TestMyBrain Cognitive Tests*. URL: www.manybrains.net

Test Overview

Background:

TestMyBrain Flanker Attention (Erb et al., 2023; Treviño et al., 2021, 2022), an adapted version of classic flanker paradigms (Eriksen & Eriksen, 1974) designed for remote administration, measures cognitive control.

Task Parameters:

On each trial, participants must report the direction (left or right) of a briefly presented target arrow, which is bordered on each side by flanking arrows. On each trial, all of the flanking arrows either face the same direction as the target arrow (congruent trials; 50% of trials) or in the opposite direction of the target arrow (incongruent trials; 50% of trials). The less a participant's response time slows and accuracy declines on incongruent trials relative to congruent trials, the better the participant's cognitive control.

Each trial begins with only the response option buttons present. After 1000 ms, four flanking arrows appear, all pointing in the same direction (left or right), without the central target arrow. After 100 ms, the target arrow appears along with the flanking arrows for 300 ms. After the target arrow has been visible for 300 ms, all the arrows are removed from the screen, leaving only the response button options visible. After 70 ms, a fixation cross appears and remains visible until the participant makes a response, or the trial times out after 3 seconds. Participants are required to repeat any trials that time out.

After completing two blocks of practice trials (4 trials each), participants complete three blocks of test trials, each of which contains 32 test trials (96 total test trials). Each test trial block has an equal number of trials where the target arrow points left versus right, and an equal number of congruent versus incongruent trials.

Primary Outcome:

A *rate correct score* can be calculated separately for congruent and incongruent trials. The rate correct score is computed as: proportion of trials answered correctly divided by median reaction time in seconds. The suggested primary outcome for the test is *rate correct score interference*, which is the difference in rate correct score for congruent trials and rate correct score for incongruent trials. However, researchers may also consider computing reaction time interference or accuracy interference individually, or computing a different aggregated measure of reaction time interference and accuracy interference.

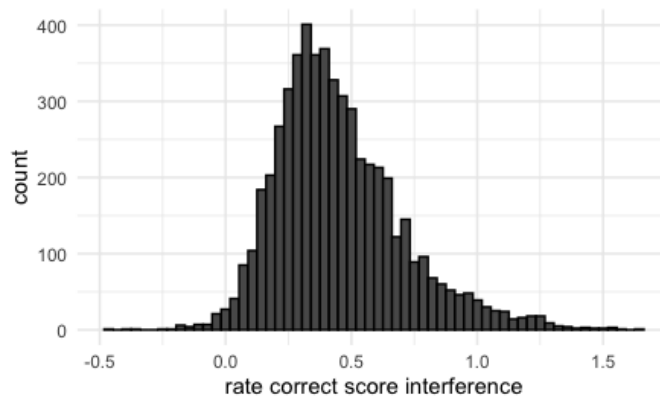
User Input:

If a participant's device does not have touch capability, the participant must indicate the direction of the target arrow using the "x" keyboard key to report "left" or the "m" keyboard key to report "right." If a participant's device has touch capability, the participant instead responds by touching either a button depicting a left arrow or a button depicting a right arrow.

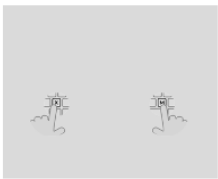
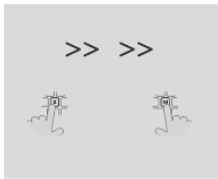
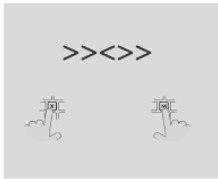
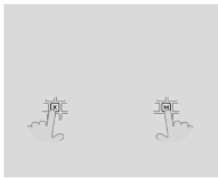
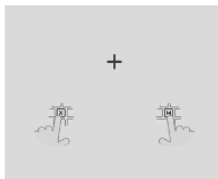
Alternate Task Versions: Alternate forms of the test are available for repeated administration.

Psychometrics:

- **Reliability:** In single-session testing, variation in performance between participants (rate correct score interference) has a split-half reliability of .85.
- **Score distribution:**



Trial Structure:

Intertrial Interval 1000 ms	Flankers Appear 100 ms	Target Arrow Appears 300 ms	Arrows Disappear 70 ms	Fixation Appears until response or timeout (3 s)
				

References:

- Erb, C. D., Germine, L., & Hartshorne, J. K. (2023). Cognitive control across the lifespan: Congruency effects reveal divergent developmental trajectories. *Journal of Experimental Psychology: General*, 152(11), 3285–3291.
- Eriksen, B. A., & Eriksen, C. W. (1974). Effects of noise letters upon the identification of a target letter in a nonsearch task. *Perception & Psychophysics*, 16(1), 143-149.
- Treviño, M., Zhu, X., Lu, Y. Y., Scheuer, L. S., Passell, E., Huang, G. C., ... & Horowitz, T. S. (2021). How do we measure attention? Using factor analysis to establish construct validity of neuropsychological tests. *Cognitive Research: Principles and Implications*, 6(1), 1-26.
- Treviño, M., Zhu, X., Lu, Y. Y., Scheuer, L. S., Passell, E., Huang, G., ... & Horowitz, T. S. (2022). Establishing construct validity of neuropsychological tests in cancer survivors. *Psycho-Oncology*, 31(10), 1728-1736.