

## Cognitive Task Overview: TestMyBrain Multiple Object Tracking

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TMB Test Name: TestMyBrain Multiple Object Tracking

Test Demo: [standard version](#)

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## The Many Brains Project

[The Many Brains Project](#), is a 501(c)(3) non-profit that supports TestMyBrain (TMB) in collaboration with the [Laboratory for Brain and Cognitive Health Technology at McLean Hospital](#) and Harvard Medical School. 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 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](http://TestMyBrain.org), data have been collected from over 3.7 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 2,000 sites worldwide engaged in digital neuropsychological assessment.

### 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](http://www.manybrains.net)

# Test Overview

## Background:

TestMyBrain Multiple Object Tracking (Hawks et al., 2023; Singh et al., 2023; Strong et al., 2023; Treviño et al., 2021) is a test of visuospatial attention and visual working memory. The test is adapted from the traditional multiple object tracking paradigms (Storm & Pylyshyn, 1988) for remote administration.

## Task Parameters:

On each trial, a subset of black dots are designated as targets by turning green, before turning back to black and moving around the screen amongst non-target dots. Participants attempt to keep track of those target dots during the 5 seconds of movement; once the dots stop moving, participants must select the dots originally designated as targets. After completing two practice trials, participants completed 6 test trials each at target set sizes of 3, 4, and 5 dots.

## Primary Outcome:

The suggested primary outcome of the test is the proportion of target dots correctly identified.

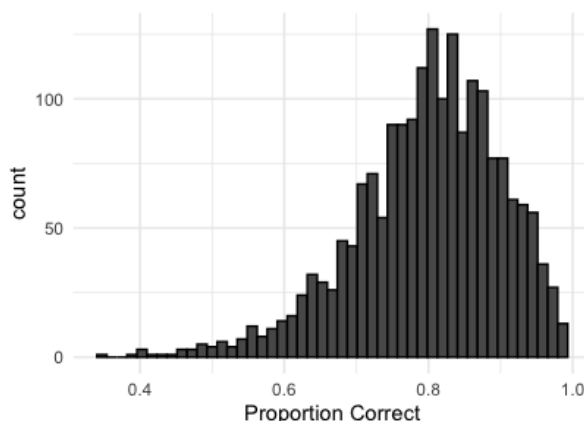
## User Input:

Participants respond either by touching (touch-compatible devices) or clicking their dot selections.

**Alternate Task Versions:** Alternate forms of the test are available for repeated administration. Additionally, an ultra-brief, EMA-compatible version is available (Hawks et al., 2023; Singh et al., 2023), which contains only six trials, all at a set size of five target dots.

## Psychometrics:

- **Reliability:** In single-session testing, variation in performance between participants has a split-half reliability of .86. See Hawks et al., 2023 and Singh et al., 2023 for psychometric details of multiple-session EMA administration.
- **Score distribution:**



## References:

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- Pylyshyn, Z. W., & Storm, R. W. (1988). Tracking multiple independent targets: Evidence for a parallel tracking mechanism. *Spatial Vision*, 3(3), 179-197.
- Singh, S., Strong, R., Xu, I., Fonseca, L. M., Hawks, Z., Grinspoon, E., Jung, L., Li, F., Weinstock, R. S., Sliwinski, M., Chaytor, N., & Germine, L. T. (2023). Ecological Momentary Assessment of Cognition in Clinical and Community Samples: Reliability and Validity Study. *Journal of Medical Internet Research*, 25, e45028.
- Strong, R. W., Grashow, R., Roberts, A. L., Passell, E., Scheuer, L., Terry, D. P., ... & Germine, L. (2023). Association of retrospectively reported concussion symptoms with objective cognitive performance in former American-style football players. *Archives of Clinical Neuropsychology*, acad008.
- 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, 1-26.