

Note: this document may not describe the most recent version of this cognitive test available from TestMyBrain. TestMyBrain cognitive test documentation will be updated over the next several months to align with current test versions.

# TMB Forward Digit Span

**Constructs Measured:** Working memory

**Duration:** 2 minutes

**Sample size for which normative data are available:** 20,948

**Description of procedure:** Recall increasingly long sequences of random digits in the order they were presented.

## Memorize the numbers!

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The TMB Forward Digit Span Test is a measure of working memory. Advantages of this test include its short length and ease of administration across all digital devices. Some participants may find this test burdensome due to its difficulty.

### Psychometric Characteristics

The primary outcome measured in this test is the maximum number of digits accurately recalled, or the participant's digit span.

Forward digit span performance is approximately normally distributed (see Figure 1). Performance on this test improves throughout adolescence and remains stable throughout adulthood (see Figure 2). Male participants show slightly greater digit spans than female participants (see Figure 3). Participants with a higher level of education show better performance on this test (see Figure 4).

Practice effects on this test are minimal; first-time participants had a mean score of 6.44 (SD = 1.65), while participants who reported having completed this task before had a mean score of 6.42 (SD = 1.69).

### Validation

Performance on the Forward Digit Span test is strongly correlated with performance on the Backward Digit Span test, a similar task that requires participants to remember digits in reverse order (age-corrected  $r = 0.50$ , 95% CI = [0.48, 0.52]). It is also correlated with performance on other tasks involving working memory, such as a visual working memory test (age-corrected  $r = 0.30$ , 95% CI = [0.25, 0.35]), Digit Symbol Matching (age-corrected  $r = 0.26$ , 95% CI = [0.20, 0.31]), and Verbal Paired Associates (age-corrected  $r = 0.18$ , 95% CI = [0.09, 0.27]).

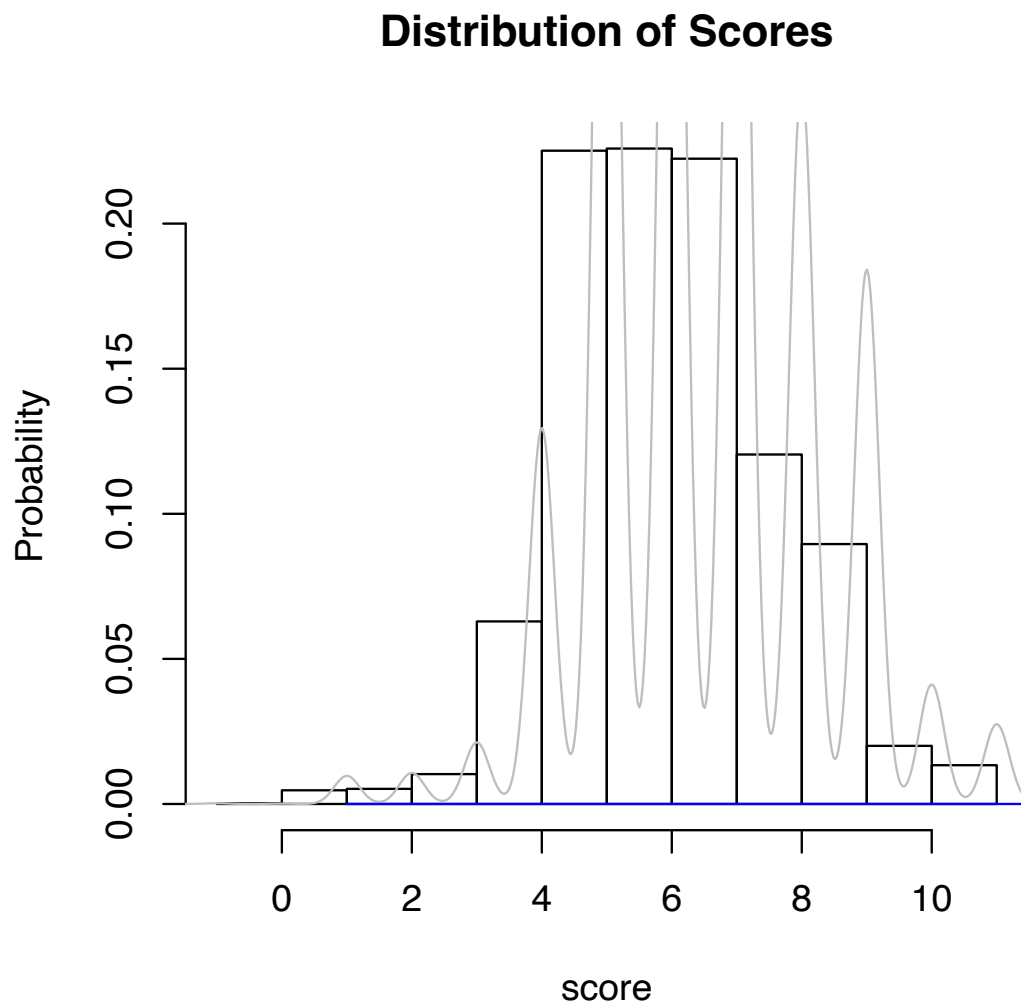
### Appropriateness for Field Test Use

This test includes a practice trial in which participants view 2- and 3-digit sequences of consecutive digits, which are easier to remember than the real test sequences. This ensures that participants are familiar with the format of the test before they begin the scored portion.

**Device Effects:** Participants using different devices performed similarly on this test. Users of iPhones had a mean score of 6.33 (SD = 1.59), while iPad users had a mean score of 6.39 (SD = 1.61) and Macintosh computer users had a mean score of 6.49 (SD = 1.66).

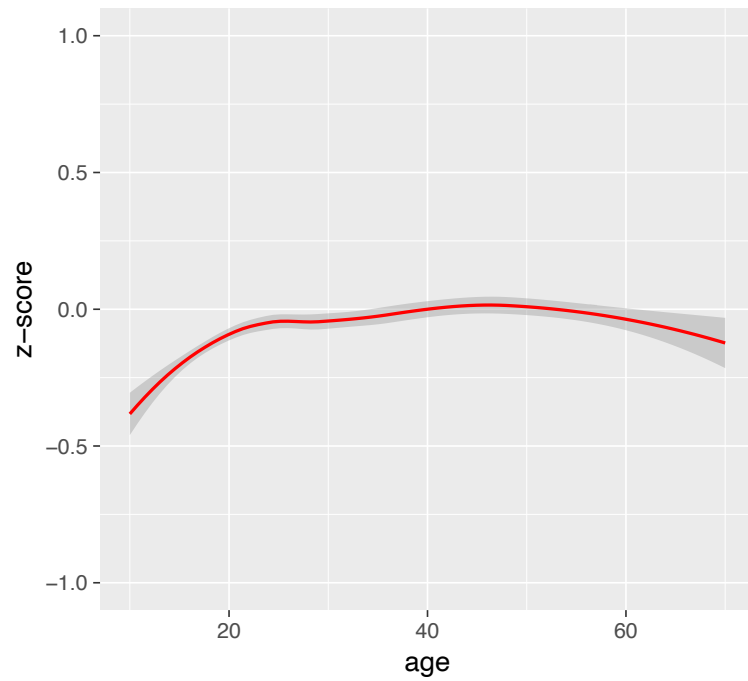
**Participant Burden:** This test appears to be moderately burdensome for participants. Batteries on TestMyBrain.org containing this test had a mean participant rating of 3.71/5, compared to a sitewide average of 3.67/5; however, only 70.9% of participants who begin this test complete it. Participant burden is particularly important on this test due to its stopping rule; deliberately poor performance shortens the length of the test, so quality control is necessary to ensure valid data.

Figure 1. Distribution of scores



*Figure 2. Age-related differences in performance*

### Age Differences



*Figure 3. Sex differences in performance*

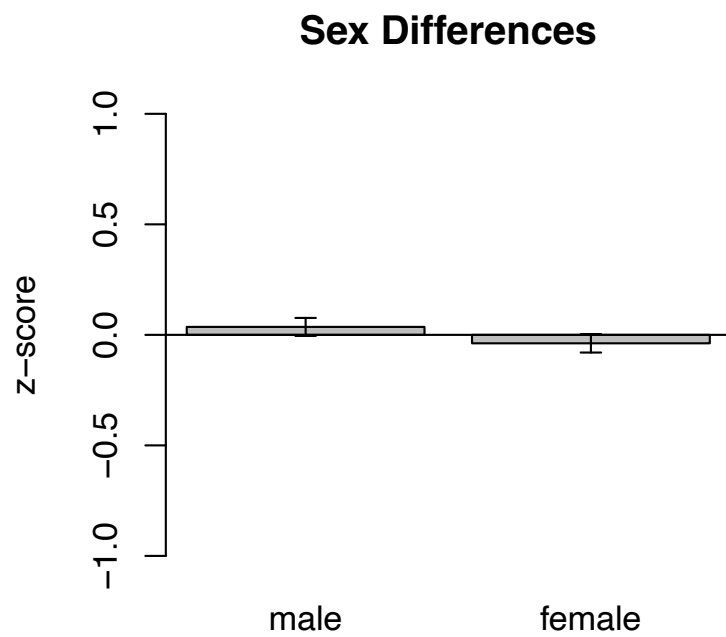


Figure 4. Education-related differences in performance

