

# UK Biobank

## Web-based version of Trail Making Test

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Version 1.8

<http://www.ukbiobank.ac.uk/>  
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## 1 Introduction

- 1.1 This manual details the procedure for the trail making test.
- 1.2 The UK Biobank cognitive function tests have been selected to cover a range of cognitive domains and are believed to be sensitive to cognitive decline and dementia. All tests have been constructed specifically for use in UK Biobank and other epidemiological studies in order to conform to the constraints of conducting large population-based studies. Tests have been constructed using established testing paradigms that have been shown to produce valid scores and to be acceptable to respondents.
- 1.3 Respondents were invited to complete the questions using their own devices, via touchscreen interface (tablet or phone) or traditional desktop computer.

## 2 Trail making test

- 2.1 Respondents are presented with sets of numbers or letters in circles scattered around the screen and are asked to click or touch on them sequentially according to a specific ordering rule. The test measures visual attention as a cognitive domain. The estimated time to completion is 4 minutes.

- 2.2 At the start of the test, the following text is shown:

*“This task measures your coordination. Beginning with number 1, join all the circles in numeric order by clicking the next numbered circle using the mouse or touching with your finger if you are using a touchscreen. Please work as quickly and accurately as you can. If a task is left idle for more than 30 seconds, it will time out.*

*After the practice, you will then proceed to the actual task.*

*Press 'Begin practice' to continue.”*

- 2.3 A practice test screen is presented to respondents before they attempt the first trail making test. The instructions are: *“This is a practice. Beginning with number 1, join all the circles in numeric order by selecting the next numbered circle. Please work as quickly and accurately as you can.”* (see Fig. 1).

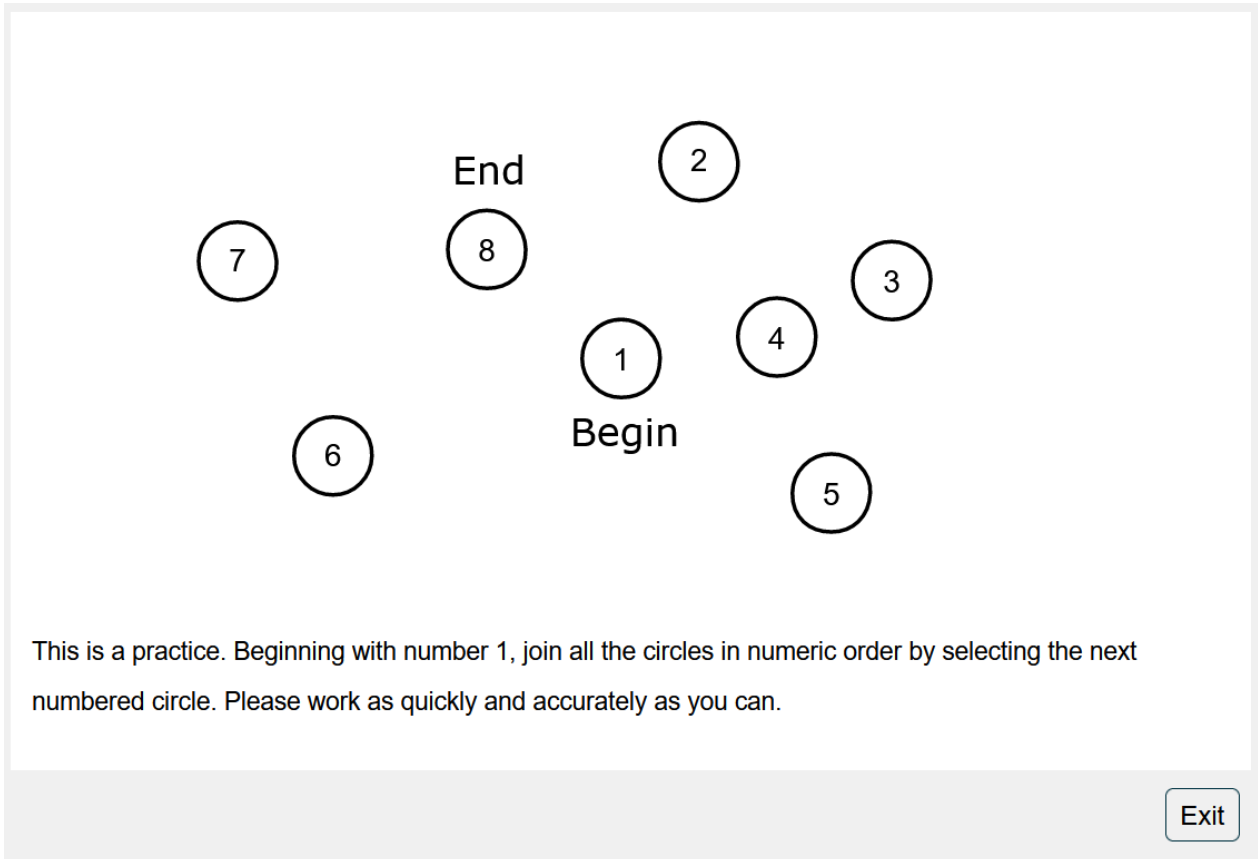


Fig. 1. The practice test screen for trail #1.

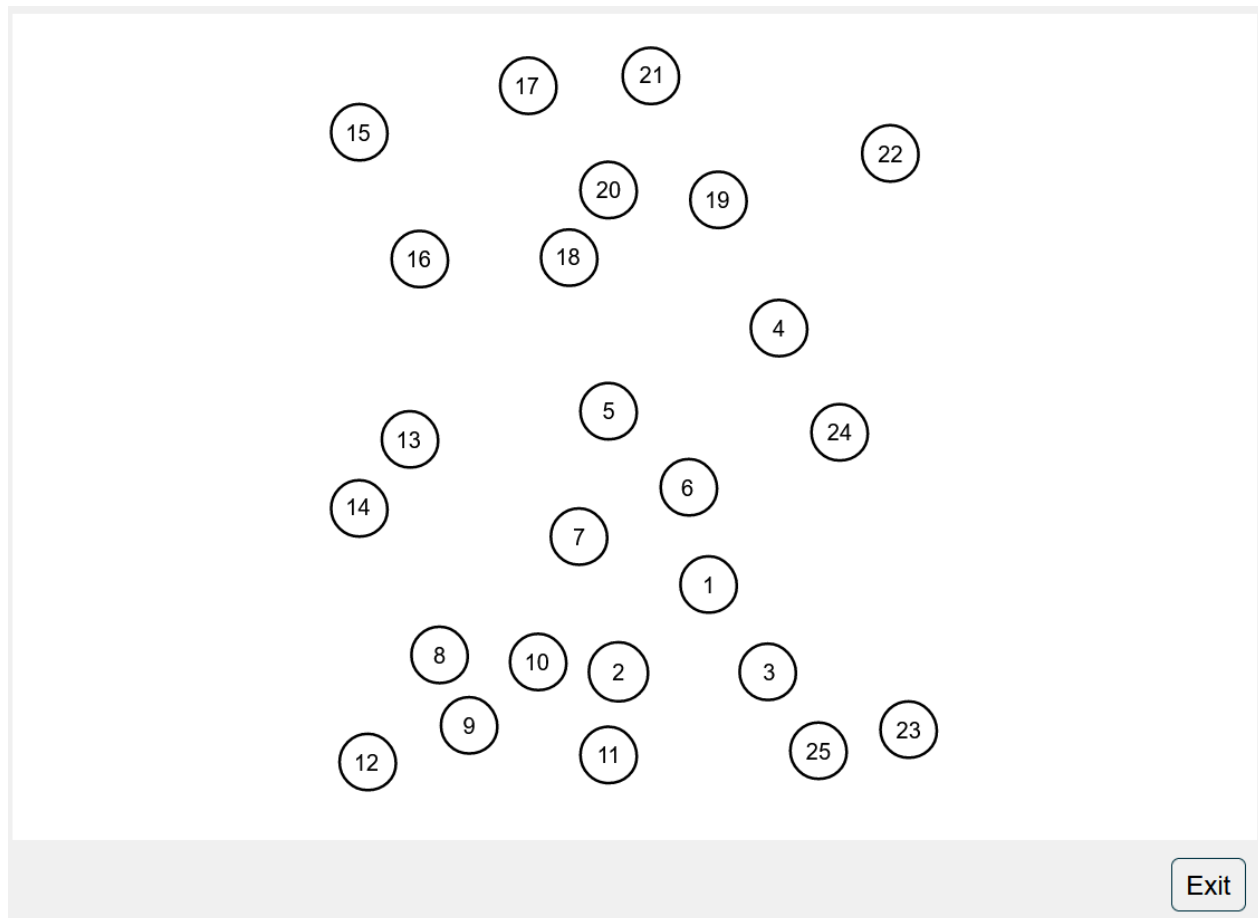


Fig. 2. The real test – trail #1.

- 2.4 To start the first part of the test (trail #1), respondents must click the 'Press Begin' button. The instructions are: *"Press 'Begin test' when you are ready to begin the real test."*
- 2.5 The timer starts when a respondent clicks the first item correctly. The time to complete is only recorded when the respondent has correctly clicked on the second item.
- 2.6 The durations (i.e. time required) to complete whole paths are presented in seconds. The durations between individual correct clicks within a path are presented in milliseconds (although we recommend rounding these to deci-seconds, as the variety of browsers and devices used would have introduced some variability).
- 2.7 When the respondent selects the correct circle in the sequence, the circle is shaded yellow. If the respondent selects the incorrect next circle, the outline of the circle flashes red to indicate that they have made an incorrect selection.
- 2.8 In the second part of the test (trail #2), the circles contain either numbers or letters and respondents are asked to touch the circles alternating between the numbers and letters in ascending order.
- 2.9 A practice session is also presented to respondents before they attempt the second trail making test (see Fig. 3.).

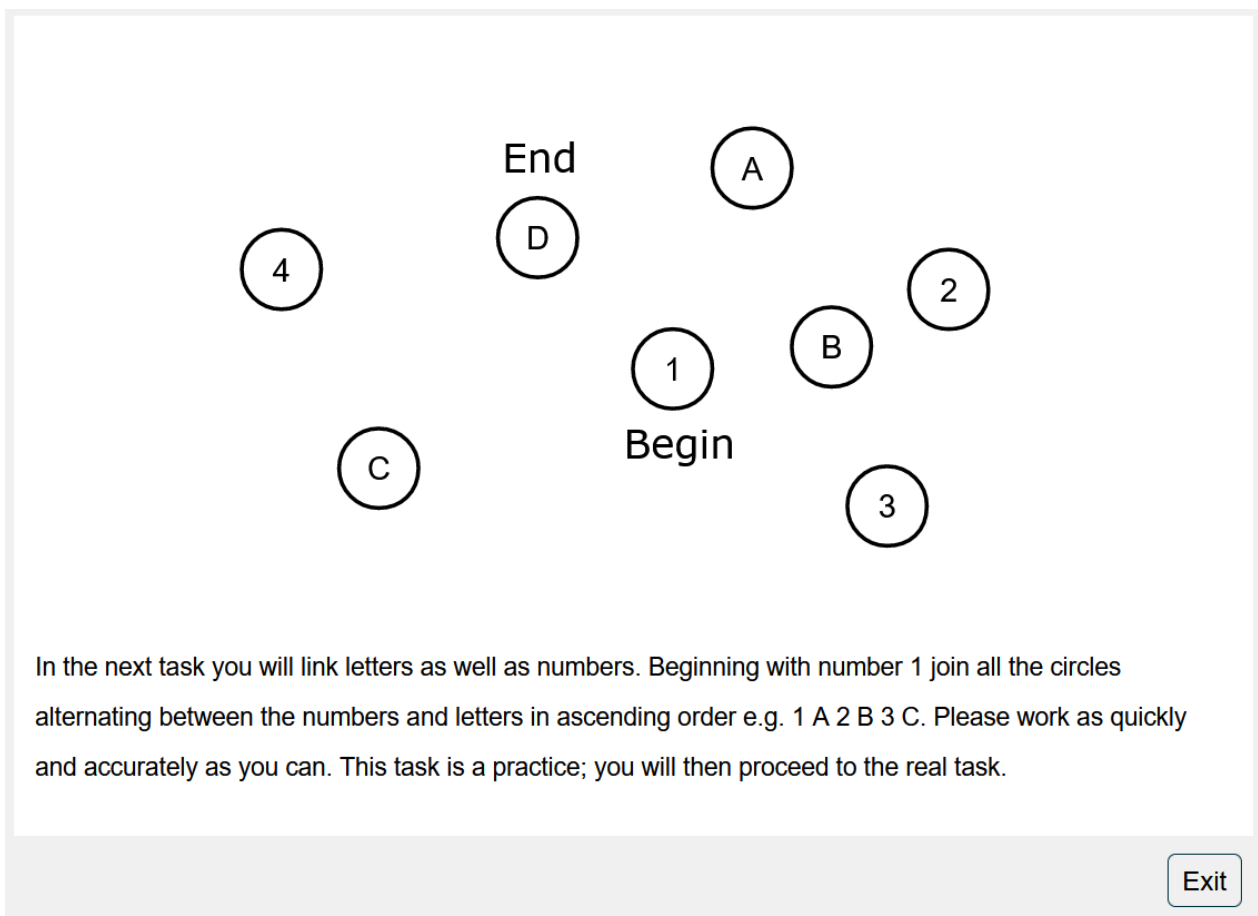


Fig. 3. The practice test screen for trail #2

2.10 During the real tests, only correct answers are recorded (i.e. incorrect selections are not recorded) but the number of errors made at each stage of the test is recorded. The score is the time taken to correctly link all the circles (see Fig 4.).

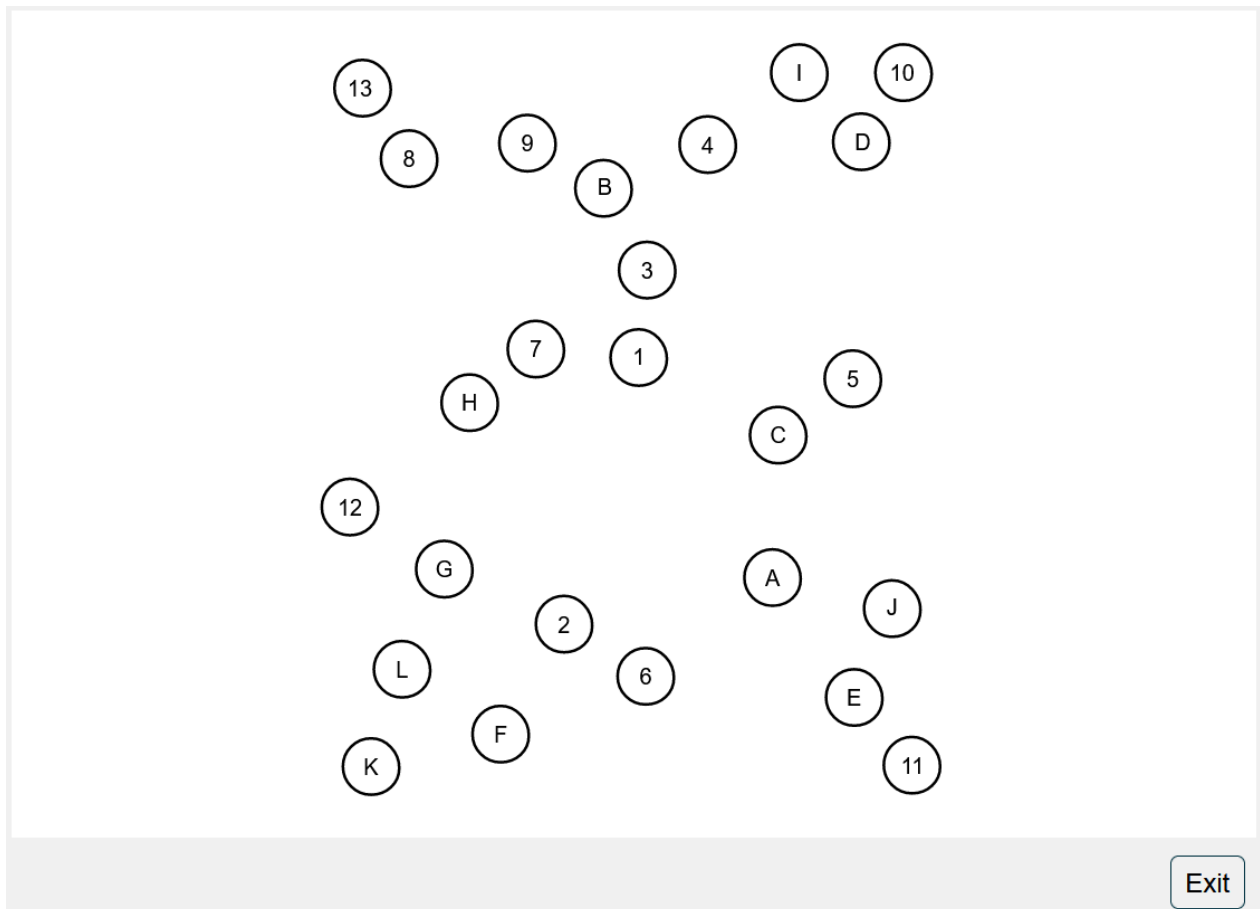


Fig. 4. The real test – trail #2.

### 3 Data captured

The following data are stored for the web-based version of the test:

- Data field 20156: Duration to complete numeric path (trail #1)
- Data field 20157: Duration to complete alphanumeric path (trail #2)
- Data field 20247: Total errors traversing numeric path (trail #1)
- Data field 20248: Total errors traversing alphanumeric path (trail #2)
- Data field 20149: Interval between previous point and current one in numeric path (trail #1)
- Data field 20155: Interval between previous point and current one in alphanumeric path (trail #2)
- Data field 20147: Errors before selecting correct item in numeric path (trail #1)
- Data field 20148: Errors before selecting correct item in alphanumeric path (trail #2)
- Data field 20246: Trail making completion status
- Data field 20136: When trail making test completed