

# UK Biobank

## Touch-screen Numeric Memory Test

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Version 1.1

<http://www.ukbiobank.ac.uk/>

28<sup>th</sup> February 2012



This manual details the procedure for the touch-screen part of the Numeric Memory test at an Assessment Centre of the UK Biobank

## Contents

|   |                          |   |
|---|--------------------------|---|
| 1 | Introduction.....        | 2 |
| 2 | Staff.....               | 3 |
| 3 | Numeric Memory test..... | 3 |
| 4 | Data collection.....     | 4 |

## 1 Introduction

**1.1:** This manual details the procedure for the Touch screen part of the Numeric Memory test at an Assessment Centre of the UK Biobank. This test takes place at the 2nd 'station' of the Assessment Centre visit, as listed in Table 1.

This test was added to the touchscreen questionnaire towards the end of recruitment and is available for a subset of participants.

**Table 1:** Sequence of assessment visit

|   | <b>Visit station</b>         | <b>Assessments undertaken</b>   |
|---|------------------------------|---|
| 1 | Reception                    | <ul style="list-style-type: none"> <li>• Welcome &amp; registration</li> <li>• Generating a USB key for Participants</li> </ul>   |
| 2 | Touch screen Section         | <ul style="list-style-type: none"> <li>• Consent</li> <li>• Touch screen questionnaire</li> <li>• Hearing Test</li> <li>• Cognitive function tests</li> </ul>   |
| 3 | Interview & blood pressure   | <ul style="list-style-type: none"> <li>• Interviewer questionnaire</li> <li>• Blood pressure measurement</li> <li>• Measurement of arterial stiffness</li> </ul>  |
| 4 | Eye measurements             | <ul style="list-style-type: none"> <li>• Visual acuity</li> <li>• Refractometry</li> <li>• Intraocular pressure</li> <li>• Optical Coherence Tomography</li> </ul>  |
| 5 | Physical measurements        | <ul style="list-style-type: none"> <li>• Height (Standing and Sitting)</li> <li>• Hip &amp; Waist measurement</li> <li>• Weight and Bio-impedance measurement</li> <li>• Hand-grip strength</li> <li>• Ultrasound Bone Densitometry</li> <li>• Spirometry (Lung function test)</li> </ul> |
| 6 | Cardio-respiratory fitness   | <ul style="list-style-type: none"> <li>• Exercise/fitness ECG test</li> </ul>   |
| 7 | Sample collection            | <ul style="list-style-type: none"> <li>• Blood samples collected</li> <li>• Urine sample collected</li> <li>• Saliva sample collected</li> </ul>  |
| 8 | Web-based diet questionnaire | <ul style="list-style-type: none"> <li>• Dietary assessment</li> </ul>  |

**1.2:** Throughout this document, the term ‘Participant’ signifies a study participant who is taking part in the Assessment Centre process, regardless of whether they eventually give or withhold consent to take part in the UK Biobank study.

**1.3:** The collection of data from assessment visits uses a direct data entry system of the Assessment Centre Environment (ACE).

**1.4:** At the start of their visit, each participant is issued with a USB key at the Reception station. This contains the participant unique identifier, name, date of birth and gender. As the participant progresses between stations, the USB key acts as an identifying token. The USB key is encrypted so can only be read by assessment centre computers. None of the participant’s test data is transferred to the USB key. At the end of the assessment visit all identifying data on the USB key is removed.

## 2 Staff

This procedure is performed by the Receptionist or any staff member who has received suitable training and has been granted the relevant module permissions. These staff can include: Study Interviewer, Duty Manager, Phlebotomist, Laboratory Technician or Measurement Technician. Two members of staff are always present to oversee the touch screen and web diet questionnaire areas. The Assessment Centre Manager oversees that all staff work in accordance with this procedure.

## 3 Numeric Memory test

The Numeric Memory test was performed as part of the touch-screen questionnaire in the pilot phase of recruitment into the study and is only available for a subset of participants (approximately 52,000).

The following instructions appear:

*“In the next game you will be shown a number to remember. The number will then disappear and after a short while you will be asked to enter it into the number pad on the screen. The number will become longer each time you remember correctly. Press ‘Next’ for a short video demonstration.”*

*“The first number will be 2 digits long. When you’re ready to begin, touch the ‘Next,’ button”*

The participant is shown a 2-digit number, which is displayed for 2000 ms + (the number of digits [i.e. 2] x 500 ms). During this time, the on-screen keyboard is inactive. The number then disappears and after a wait period of 3000 ms, the participant is asked to enter the remembered number onto the activated screen. Once the remembered number has been entered and the participant has touched the “Next” button, the entered number is removed and the keyboard deactivated for 600ms before either displaying the next number or ending the test.

The test starts with a 2-digit number and becomes 1-digit longer each time they remember correctly (up to a maximum of 12 digits). No displayed digit is the same as the previous digit or previous but one digit. If the number is 2 digits, the test ends after 5 successive incorrect

answers. If the number is 3 or more digits, the test ends after 2 successive incorrect answers.

### 3 Data Collection

The following data is stored:

- The number of digits in the number in each round (e.g. 5)
- The value of the number displayed in each round (e.g. "12345")
- The number of rounds of the test completed
- The value of the number entered by the participant
- Maximum number of digits remembered (up to 12)
- Whether or not the participant was correct in each round
- The length of time the number is displayed
- The time that the participant first entered a digit
- The time that the participant last entered a digit
- The time from the instant the keyboard is activated
- Whether the test was completed, stopped or abandoned
- Total time taken to complete the test