UK Biobank

Symbol Digit Substitution

Version 1.2

http://www.ukbiobank.ac.uk/
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This manual details the procedure for the Symbol digit substitution test, administered at an Assessment Centre of the UK Biobank and via the internet

1   Introduction

1.1: This manual details the procedure for the Symbol digit substitution test. This was administered as web-based questionnaires and participants were invited to complete them remotely. The UK Biobank has written consent from participants to re-contact for this purpose.

1.2: Throughout this document, the term 'Participant' refers to 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: Cognitive function was first assessed at the baseline assessment when participants were recruited. This web-based questionnaire involves repeating the baseline assessment and to add two further tests to broaden the cognitive phenotype covered in UK Biobank. Table 1 shows tests that are being repeated and tests that are being added.

Table 1: Cognitive Test Battery			
Measurement status	**Test**	**Cognitive domain**	Estimated Time (Mins)
Tests to be repeated	Reaction time	Simple Processing speed	3
	Pairs	Episodic memory	4
	Reasoning	Fluid intelligence	3
	Digit recall	Working memory	4
Tests to be introduced	Trail making	Visual attention	4
	Digit-symbol substitution	Complex processing speed	3

1.4: Tests have been selected which are related to 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. All tests have been constructed using established testing paradigms that have been shown to produce valid scores and to be acceptable to participants.

1.5 This questionnaire was administered between Dec 2014 and Feb 2015 to all 340,000 UK Biobank participants with an email address, with a reminder email sent to non-responders. Overall, a total of 143,000 participants completed at least one of the tests and 120,000 completed all of them.

2 Symbol Digit Assessment

2.1: For this task, symbols must be replaced with numbers using the number pad provided.

The instructions are::

"This is a code-breaking game. A code is given at the top of the page linking a symbol to a number. In the bar at the bottom of the page, place the correct number in the box under each symbol according to the code. Working from left to right select the correct number using the number pad on the screen. Please work as quickly and accurately as you can. You will have one minute to do as many as you can"

2.2: An introduction about the online symbol digit test is presented.

2.3: A practise test screen is then presented to the participants before they attempt the symbol digit test.

2.4: Participants were presented with a series of grids in which symbols were to be matched to numbers according to a key presented on the screen. A series of similar screens were shown until the time limit expires. The counter is reset to zero at the beginning of each round

The score is the number of correctly completed boxes.

Symbol Digit Test