

# UK Biobank

## Touch-screen Fluid intelligence test

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Version 1.1

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

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

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## 1 Introduction

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

**Table 1:** Sequence of assessment visit

	Visit station	Assessments undertaken
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 test	<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 the 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 Participant ID, 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 Fluid intelligence test

**3.1:** 'Fluid intelligence' describes the capacity to solve problems that require logic and reasoning ability, independent of acquired knowledge.

During the main phase of recruitment, several cognitive function tests were performed in the following order:

- 1: Prospective Memory: Shape – Part 1
- 2: Pairs test
- **3: Fluid intelligence**
- 4: Reaction time: Snap
- 1: Prospective Memory: Shape – Part 2

**3.2:** At the start of the test, the following text is shown:

*"In this next test you will have a maximum of two minutes to answer as many questions as possible. Don't spend too long on any one question and you can skip any question if you wish"*

The choice of response is offered:

- 1 *Begin check*
- 2 *I am unable to try this*

If the participant is unable to try the test, this game is skipped and they proceed to the Reaction time (Snap) touch-screen test.

**3.3:** If the participant selects 1, a timer is started and the following questions are displayed in sequence, until 2 minutes have elapsed from the start of timing.

**3.4:** As long as the timer has not reached 2 minutes the next question is displayed and the participant is allowed to answer. Once the participant has completed the last question displayed they proceed to the Reaction time (Snap) touch-screen test.

## 4 Data collection

The following data is collected:

Question	Responses
Add the following numbers together: 1 2 3 4 5 – is the answer?	Select from: <ul style="list-style-type: none"><li>- 13</li><li>- 14</li><li>- 15</li><li>- 16</li><li>- 17</li><li>- Do not know</li><li>- Prefer not to answer</li></ul>
Which number is the largest?	Select from: <ul style="list-style-type: none"><li>- 642</li><li>- 308</li><li>- 987</li><li>- 714</li><li>- 253</li><li>- Do not know</li><li>- Prefer not to answer</li></ul>
Bud is to flower as child is to?	Select from: <ul style="list-style-type: none"><li>- Grow</li><li>- Develop</li><li>- Improve</li><li>- Adult</li><li>- Old</li><li>- Do not know</li><li>- Prefer not to answer</li></ul>

**Question****Responses**

11 12 13 14 15 16 17 18

Select from:

Divide the sixth number to the right of twelve by three. Is the answer?

- 5
- 6
- 7
- 8
- Do not know
- Prefer not to answer

If Truda's mother's brother is Tim's sister's father, what relation is Truda to Tim?

Select from:

- Aunt
- Sister
- Niece
- Cousin
- No relation
- Do not know
- Prefer not to answer

If sixty is more than half of seventy-five, multiply twenty-three by three. If not subtract 15 from eighty-five. Is the answer?

Select from:

- 68
- 69
- 70
- 71
- 72
- Do not know
- Prefer not to answer

Stop means the same as?

Select from:

- Pause
- Close
- Cease
- Break
- Rest
- Do not know
- Prefer not to answer

<b>Question</b>	<b>Responses</b>
If David is twenty-one and Owen is nineteen and Daniel is nine years younger than David, what is half their combined age?	Select from: <ul style="list-style-type: none"><li>- 25</li><li>- 26</li><li>- 27</li><li>- 28</li><li>- 29</li><li>- Do not know</li><li>- Prefer not to answer</li></ul>
Age is to years as height is to?	Select from: <ul style="list-style-type: none"><li>- Long</li><li>- Deep</li><li>- Top</li><li>- Metres</li><li>- Tall</li><li>- Do not know</li><li>- Prefer not to answer</li></ul>
150...137...125...114...104... What comes next?	Select from: <ul style="list-style-type: none"><li>- 96</li><li>- 95</li><li>- 94</li><li>- 93</li><li>- 92</li><li>- Do not know</li><li>- Prefer not to answer</li></ul>
Relaxed means the opposite of?	Select from: <ul style="list-style-type: none"><li>- Calm</li><li>- Anxious</li><li>- Cool</li><li>- Worried</li><li>- Tense</li><li>- Do not know</li><li>- Prefer not to answer</li></ul>

<b>Question</b>	<b>Responses</b>
100...99...95...86...70...	Select from:
What comes next?	<ul style="list-style-type: none"><li>- 50</li><li>- 49</li><li>- 48</li><li>- 47</li><li>- 46</li><li>- 45</li><li>- Do not know</li><li>- Prefer not to answer</li></ul>
If some flinks are plinks and some plinks are stinks then some flinks are definitely stinks?	Select from: <ul style="list-style-type: none"><li>- False</li><li>- True</li><li>- Neither true nor false</li><li>- Not sure</li><li>- Do not know</li><li>- Prefer not to answer</li></ul>

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