Cognitive assessment and web questionnaires

John Gallacher (Cardiff University)
Ian Deary (Edinburgh University)
Scott Hofer (University of Victoria, BC)
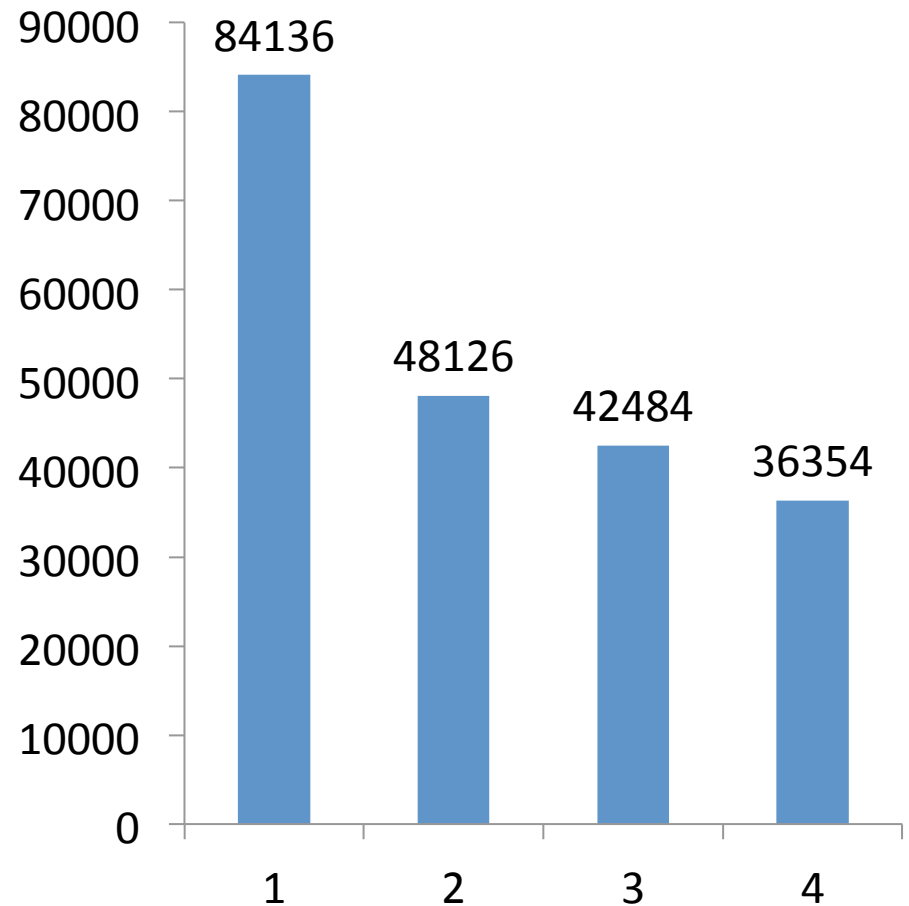Robert Clarke (Oxford University),

Web questionnaire strategy

- Exposure gaps / lifestyle change:
  - Occupational, residential history
  - Diet
- Outcomes focussed
  - Poorly recorded routinely collected outcomes
  - Non-routinely collected outcomes
  - Participant reported
  - Informant reported (dementia)
- Mental health
- Cognitive decline

Number of participants who completed the diet questionnaire on multiple occasions (including clinic and home)

- **Over 211,000 participants have completed the questionnaire on at least one occasion**

Cognitive assessment: strategy

- Baseline: core battery   2007-11
  - RT, PAL, Reasoning, digit recall, prompted action
  - Repeat assessment on 20,000 in 2012
- Web-based re-assessment   2014-
  - Enhanced battery
    - Core battery + trail making, digit-symbol substitution
  - Frequency according to age
- Imaging baseline assessment   2015-
  - Enriched battery
    - Enhanced + NIH toolbox picture vocabulary
- 2 year repeat imaging assessment   2017-
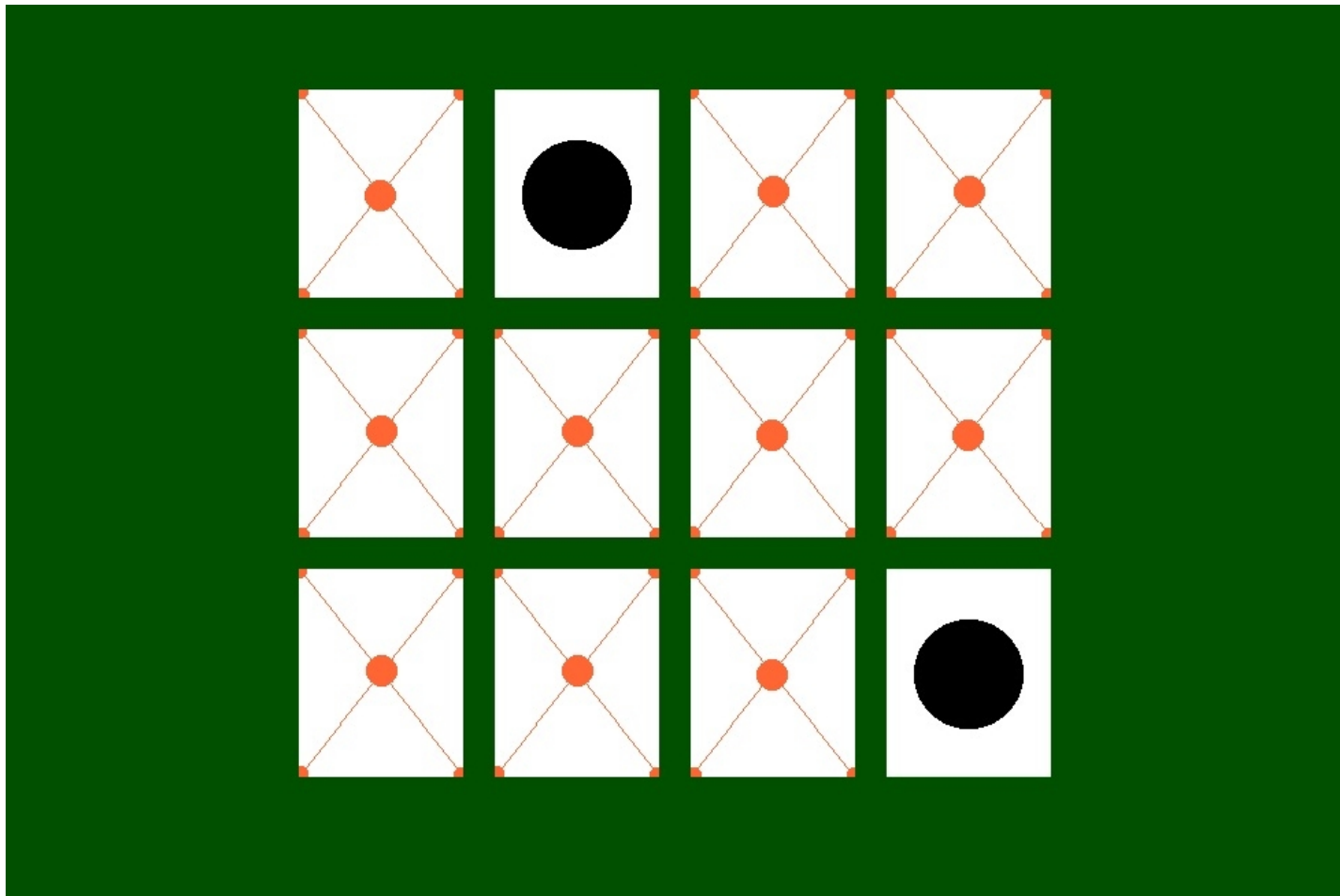 - Enriched battery

Cognitive assessment: domains

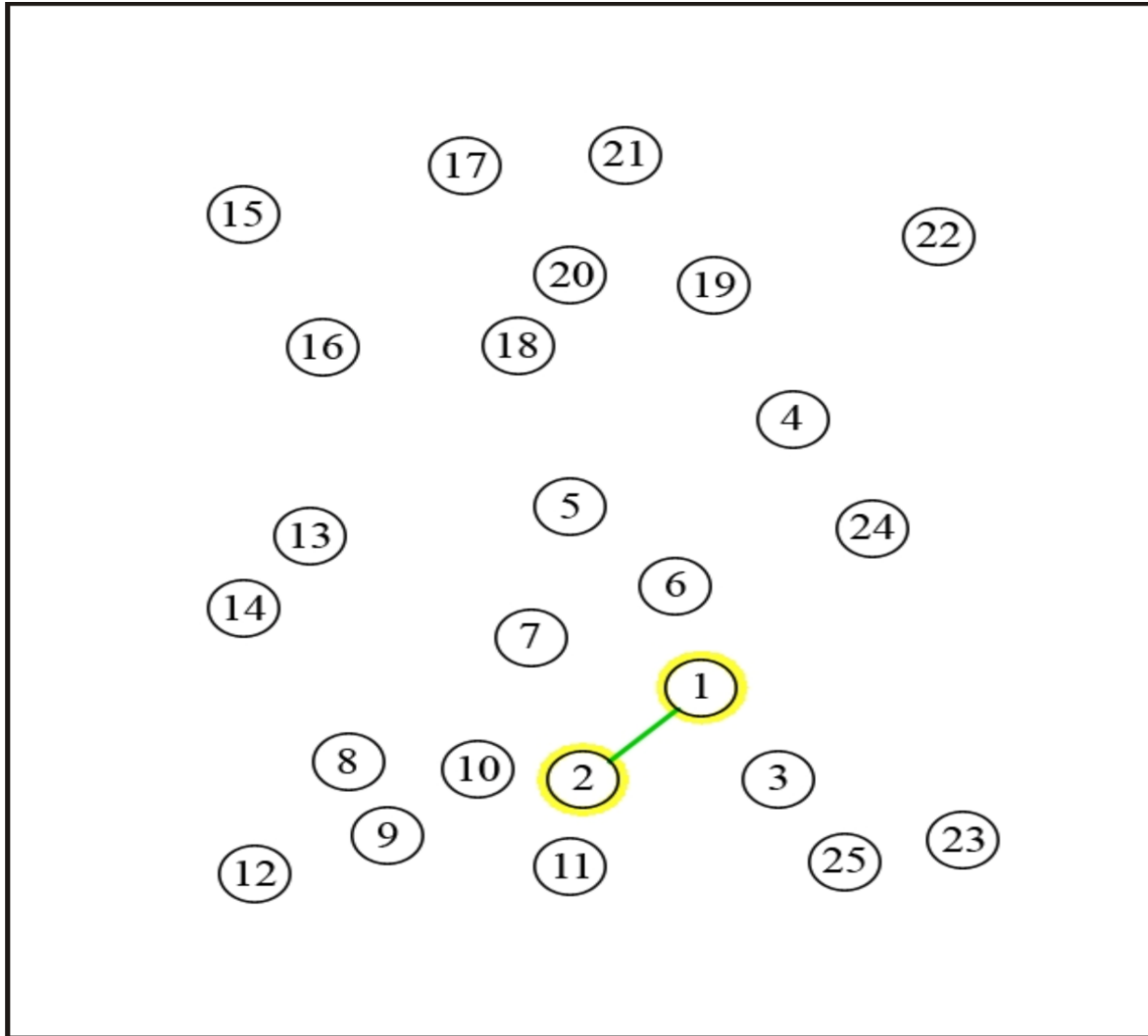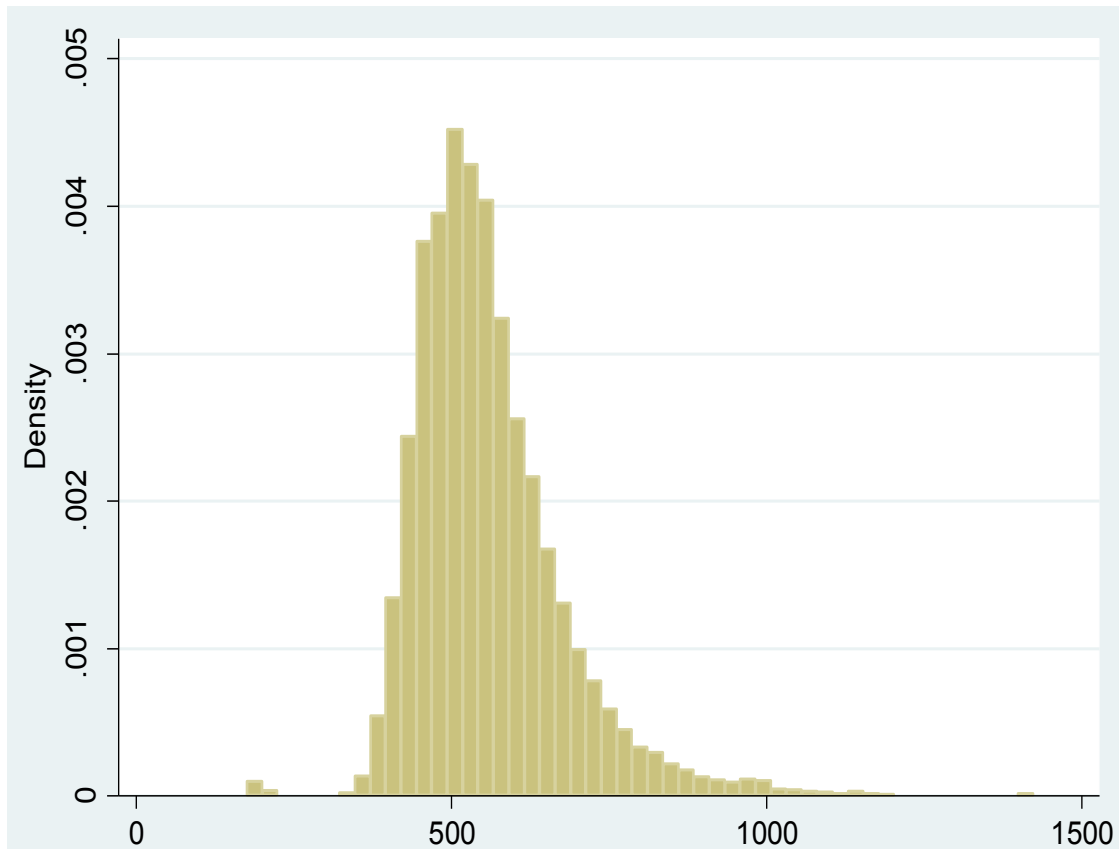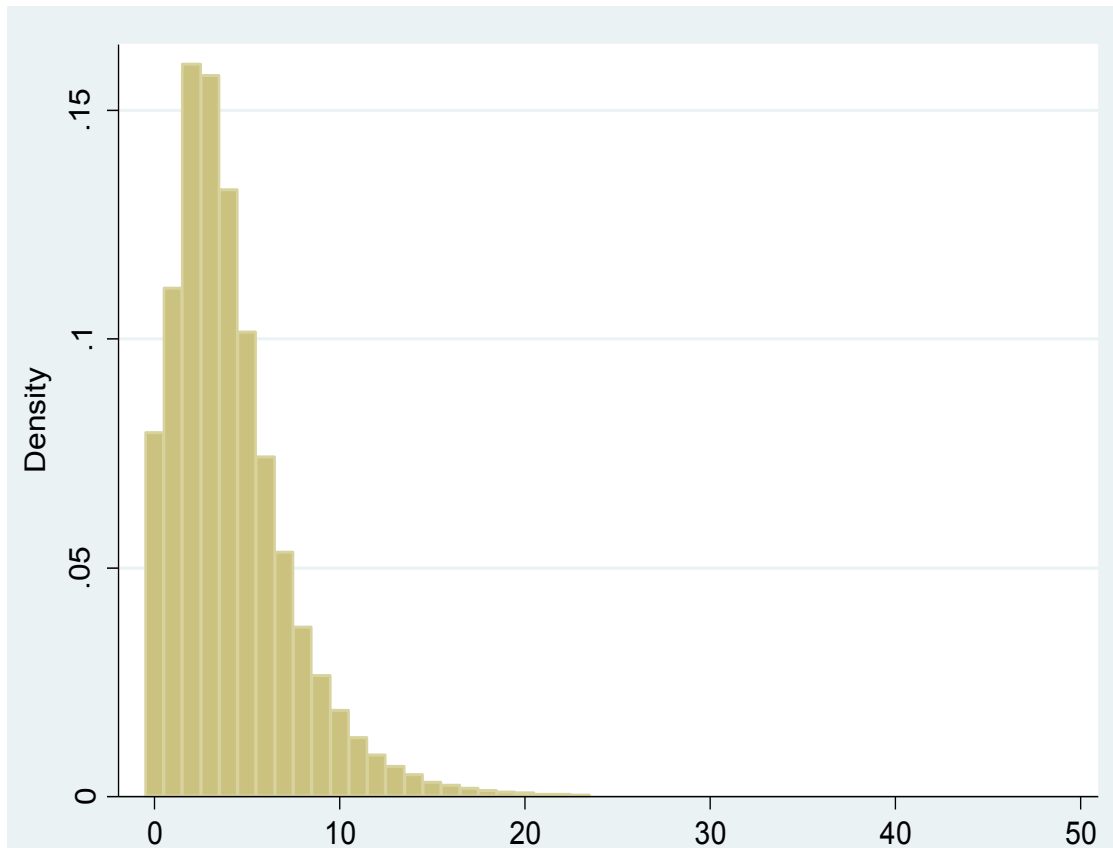| Test	Domain	N
Reaction time	Simple Processing speed	452,000
Paired associates learning	Episodic memory	452,000
Reasoning	Fluid intelligence	115,000
Digit recall	Working memory	115,000
Prompted action	Prospective memory	115,000
Trail making	Vis. attention/executive function	≈100,000
Digit-symbol substitution	Complex processing speed	≈100,000
NIH Picture vocabulary	Crystallised intelligence	≈100,000

Reaction Time

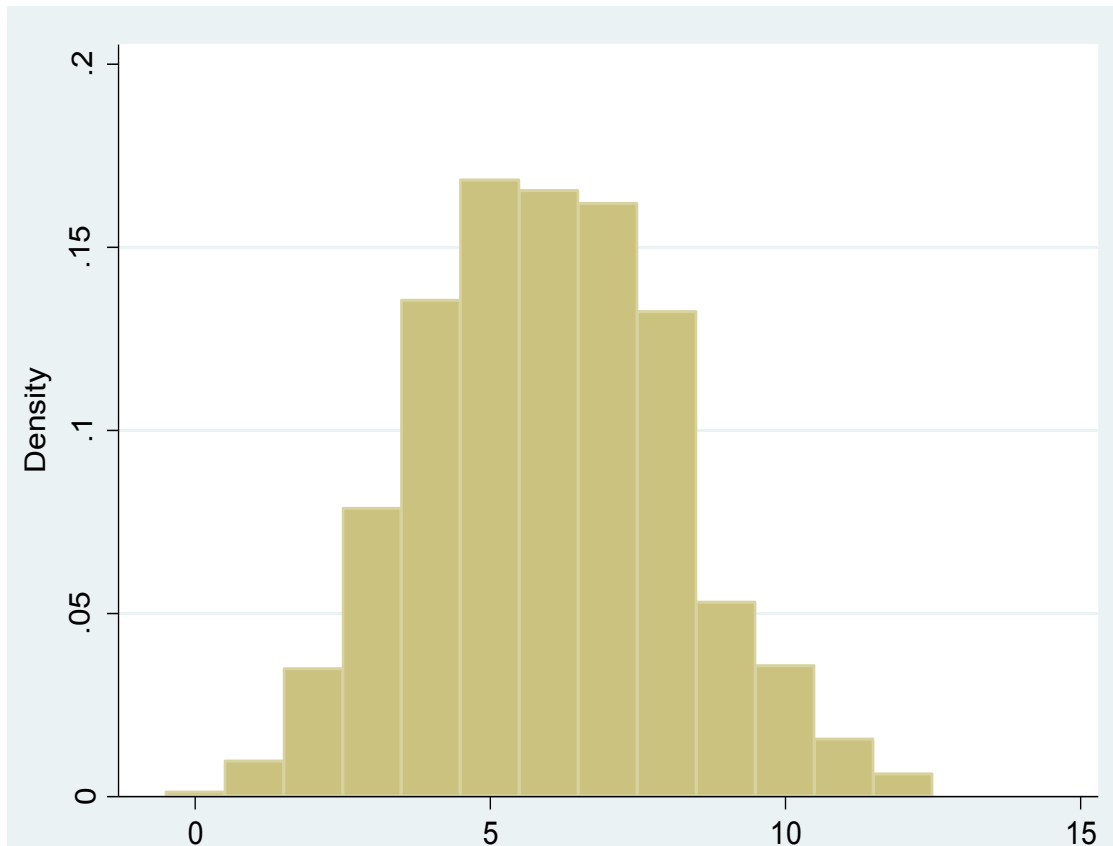# Paired Associates Learning

Trail-making

Reaction time (n=450,000)

Age (years)	Mean (mSec)
40-44	506
45-49	523
50-54	540
55-59	559
60-64	580
65-69	603

Episodic memory (n=450,000)

Age (years)	Mean
40-44	3.4
45-49	3.7
50-54	3.9
55-59	4.1
60-64	4.4
65-69	4.8

Fluid intelligence (n=115,000)

Age (years)	Mean
40-44	6.0
45-49	6.0
50-54	6.1
55-59	6.2
60-64	6.0
65-69	5.6