Adult Cognition

Cognitive function in adulthood

Apart from the reading comprehension test, previously taken at age 15 and repeated at age 26 years, cognitive function was not assessed in adulthood until age 43 years. At this time there was a shift away from tests of intellectual ability and towards the assessment of functional cognitive performance (memory, processing speed and motor praxis).

Some of these tests were repeated at age 53 years (1999), with the addition of tests measuring verbal ability, verbal fluency, prospective memory and delayed verbal memory. The NART is the National Adult Reading Test and allows a link back to related tests in childhood.

At ages 60-64 and 68-70, the verbal learning and timed letter search tasks, which had been used at age 43 and 53 years, were re-administered, although the latter used only one trial. The Addenbrooke's Cognitive Examination (ACE-III) was also asked at 68-70.

EARLY ADULTHOOD (age 26) cognitive variables

WV26R

Purpose : Score on Watts Vernon Reading Test (first 35 items) used at 15 years in 19**72 (at 26 years)**
Year : 1972

1. Definition

Watts Vernon Reading Test used at 15 years (in 1961). This variable is coded as a continuous variable with score values coded from 0 to 35

99 Missing data

2. Specification

Raw variable - no derivation

R26R

Purpose : Score on Watts Vernon Reading Test used at 15 in 19**72 (at 26 years)**
Year : 1972

1. Definition

Watts Vernon Reading Test used at 15 years (in 1961), with an additional 10 items of increased difficulty to avoid a ceiling effect. This variable is coded as a continuous variable with score values coded from 0 to 45

99 Missing data

2. Specification

Raw variable - no derivation

R26N

Purpose : Score on Watts Vernon Reading Test used at 15 in 19**72 (at 26 years)**
Year : 1972

1. Definition

Variable R26R normalised to a mean of 100 and SD of 15

999 Missing data

2. Specification

Raw variable - no derivation

WV26H

Purpose : Standardised score on Watts Vernon Reading Test (first 35 items) used at 15 years in 19**72 (at 26 years)**
Year : 1972

1. Definition

Min -5.33
Max 1.16

2. Specification

COMPUTE WV26H=(WV26R-28.76)/5.4 *Xh=(Xr-mean)/SD

R26H

Purpose : Standardised score on Watts Vernon Reading Test used at 15 in 19**72 (at 26 years)**
Year : 1972

1. Definition

Min -3.97
Max 1.48

2. Specification

COMPUTE R26H=(R26R-32.79)/8.26 *Xh=(Xr-mean)/SD

MID-ADULTHOOD (age 43, 53) – selected cognitive variables

mem*pr*89, mem*bp*89, mem*lg*89, mem*ht*89, mem*wt*89, mem*ac*89, mem*cc*89, mem*ab*89

Purpose : Memory for 8 medical measures* taken in 1982 when interviewed in 19**89 (at 43 years)**
Year : 1989

1. Definition

Remembered that pulse rate* was measured at 1982 interview

*****pulse rate (pr), blood pressure (bp), lung function (lg), height (ht), weight (wt), arm circumference (ac), chest circumference (cc) and abdominal circumference (ac).

This variable is coded as

0 Did not remember [...] measured
1 Remembered […] measured
7 No questionnaire
8 Not applicable
9 Unknown

2. Specification

```
DO IF (RANGE(BATCH89,1,18))                    *if rcvd a 1989 questionnaire
If (sysmis(menab89)) memab89=8
END IF
```

Note: these vars. have been subsequently labelled and an additional code '7' No questionnaire added. MR's original vars. were unlabelled and all those without a questionnaire in 1989 (N=2100) were blank (sysmis).

TSTMEM89

Purpose : Summary measure of memory for examination measures taken in 1982 when interviewed in 19**89 (at 43 years)**
Year : 1989

1. Definition

Long-term recall. Memory at 43 yrs for examination measures at 36 years

*****pulse rate (pr), blood pressure (bp), lung function (lg), height (ht), weight (wt), arm circumference (ac), chest circumference (cc) and abdominal circumference (ac).

This summary variable is coded with score values coded from 0 to 8 (0=no measures remembered; 8=all measures remembered)

77 No questionnaire
88 Not applicable in one or more component
99 Unknown

2. Specification

```
MISSING VALUES MEMPR89 TO MEMOT89 (8, 9)

COMPUTE
TESTMEM=MEMPR89+MEMBP89+MEMLG89+MEMHT89+MEMWT89+MEMAC89+MEMCC89+MEMAB89
```

---

mem*ot*89

Purpose : Memory for other measures taken in 1982 when interviewed in 19**89 (at 43 years)**
Year : 1989

1. Definition

Remembered other measures taken at 1982 interview

This variable is coded as

0 No other measurements mentioned
1 Other measurements mentioned
2 No label (?)
3 No label (?)
4 No label (?)
77 No questionnaire
8 Not applicable
9 Unknown

2. Specification

```
DO IF (RANGE(BATCH89,1,18))                    *if rcvd a 1989 questionnaire
If (sysmis(menot89)) memot89=8
END IF
```

Note: these vars. have been subsequently labelled and an additional code '77' No questionnaire added. MR's original vars. were unlabelled and all those without a questionnaire in 1989 (N=2100) were blank (sysmis).

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pgl189 to pgl589, pgr189 to pgr589

Purpose : Peg-board test taken in 19**89 (at 43 years)**
Year : 1989

1. Definition

5 trials recorded using left hand and 5 trials recorded using right hand

These variables record the time taken in seconds to complete the task

777 No questionnaire
999 Unknown

2. Specification

```
DO IF (RANGE(BATCH89,1,18))                    *if rcvd a 1989 questionnaire
If (sysmis(pgl189)) pgl189=888
END IF
```

Note: these vars. have been subsequently labelled and additional codes '777' - No questionnaire and '999' - Unknown replaced MR's original '888' code for all those with 1989 questionnaire but no answer.

PEG89

Purpose : Mean peg placement speed derived from peg-board test taken in 19**89 (at 43 years)**
Year : 1989

1. Definition

Overall mean of 5 trials per hand

The variable records the mean time taken in seconds to complete the task across 10 attempts

777 No questionnaire
999 Unknown

2. Specification

```
RECODE PGR189 PGR289 PGR389 PGR489 PGR589 PGL189 PGL389 PGL489 (900 THRU 998=999)
IF (SERNO EQ 35017) PGL289=100
IF (SERNO EQ 268007) PGL589=99
```

```
MISSING VALUES PGR189 PGR289 PGR389 PGR489 PGR589 PGL189 PGL289 PGL389
        PGL489 PGL589 (999)

COMPUTE PEG= (PGR189+PGR289+PGR389+PGR489+PGR589+PGL189+PGL289+PGL389
        +PGL489+PGL589)/10
```

---

pic189 to pic589

Purpose : Visual memory test taken in 19**89 (at 43 years)**
Year : 1989

1. Definition

A 5-item delayed (20 minutes) picture recall test

Can you remember what was on the five pictures shown earlier? 1st picture (pic189) to 5th picture (pic589)

0 No
1 Yes
7 No questionnaire
9 Unknown

2. Specification

```
RECODE PIC189A ('?'=7)(CONVERT) INTO PIC189
If(sysmis(PIC189))  PIC189=8
RECODE PIC289A ('?'=7)(CONVERT) INTO PIC289
 If(sysmis(PIC289))  PIC289=8
RECODE PIC389A ('?'=7)(CONVERT) INTO PIC389
If(sysmis(PIC389))  PIC389=8
RECODE PIC489A ('?'=7)(CONVERT) INTO PIC489
If(sysmis(PIC489))  PIC489=8
RECODE PIC589A ('?'=7)(CONVERT) INTO PIC589
If(sysmis(PIC589))  PIC589=8
```

PICMEM89

Purpose : Summary score of visual memory test taken in 19**89 (at 43 years)**
Year : 1989

1. Definition

Summary score of a 5-item delayed (20 minutes) picture recall test. Scored from 0-5.

77 No questionnaire
99 Unknown

2. Specification

```
MISSING VALUES PIC189 TO PIC589 (7, 9)
COMPUTE PICMEM=PIC189+PIC289+PIC389+PIC489+PIC589
RECODE PICMEM (1 THRU 3=0) (4 THRU 5=1)
```

PICMEM89 has values 0-5 so more syntax must have been run subsequently

---

vscl189 to vscl389, vsms189 to vsms389, vsrw189 to vsrw389

Purpose : Visual search test taken in 19**89 (at 43 years)**
Year : 1989

1. Definition

This is a test of speed of working. The test is timed for 3 minutes altogether and the task is for the study member to cross out as many letter 'P's and 'W's as possible in that time. There are three blocks of letters and after a minute the SM has to move to the next block.

Test1 - The SM works top to bottom down each column. Number of Ps/Qs crossed out in each minute recorded in [**vscl189 to vscl389]**.

Test2 - The SM works L to R across each row. Number of Ps/Qs crossed out in each minute recorded in [**vsrw189 to vsrw389]**.

Number of Ps/Qs missed in each minute recorded in [**vsms189 to vsms389].**

77 No questionnaire
88 Illiterate
99 Unknown

2. Specification

Recode vscl189 to vscl389, vsms189 to vsms389, vsrw189 to vsrw389
(77=88) (sysmis=77).

CANSP189, CANSP289, CANSP389

Purpose : Letter speed search 19**89 (at 43 years)**
Year : 1989, 1999

1. Definition

Calculate the position reached after one minute using **[vscl189 to vscl389] and** [**vsrw189 to vsrw389]**.

Max Value =450 [15 rows x 30 columns]

77 No questionnaire
88 Illiterate
99 Unknown

2. Specification

CANSP189= ((VSRW189-1)*30+VSCL189
CANSP289= ((VSRW289-1)*30+VSCL289
CANSP389= ((VSRW389-1)*30+VSCL389

Note: A measure of letter search accuracy can also be calculated by dividing the number of missed targets **(vsms189 - vsms389)** for each trial by the corresponding speed score **(CANSP189 – CANSP389)**

CANSPa89

Purpose : Average Letter speed search over 3 trials in 19**89 (at 43 years)**
Year : 1989

1. Definition

Average letter search speed over three trials

77 No questionnaire
88 Illiterate
99 Unknown

2. Specification

CANSPa89= (CANSP189+CANSP289+CANSP389)/3

---

wlt189 to wlt389

Purpose : Verbal learning test taken in 19**89 (at 43 years)**
Year : 1989

1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. A simple total score is available (WLT89).

Range of values 0-15 plus

88 Illiterate
77 No questionnaire
99 Unknown

2. Specification
RECODE WLT189 WLT289 WLT389 (77=88) (sysmis=77)

WLT89

Purpose : Verbal learning test taken in 19**89 (at 43 years)**
Year : 1989

1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. **WLT89** is a simple total score calculated as the sum of the words correctly recalled at each trial.

Range of values =0-45 plus

88 Illiterate
77 No questionnaire
99 Unknown

2. Specification
COMPUTE WLT89=WLT189 +WLT289+ WLT389

---

wlin189 to wlin389

Purpose : Verbal learning test taken in 19**89 (at 43 years)**
Number of intrusions (words not in the list)
Year : 1989

1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. WLIN189, WLIN289 and WLIN389 record the number of intrusions (words not on the lists) recalled at each trial.

Range of values 0-15 plus

88 Illiterate
77 No questionnaire
99 Unknown

2. Specification
RECODE WLIN189 WLIN289 WLIN389 (77=88) (sysmis=77)

WLIN89

Purpose : Verbal learning test taken in 19**89 (at 43 years)**
Number of intrusions (words not in the list)
Year : 1989

1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. **WLIN89** is a simple total score calculated as the total number of intrusions (words not on the list) across all three trials.

Range of values =0-45 plus

88 Illiterate
77 No questionnaire
99 Unknown

2. Specification
COMPUTE WLIN89=WLIN189 +WLIN289+ WLIN389

WLCD89

Purpose : Verbal learning test taken in 19**89 (at 43 years)**
Version of word list (A or B)
Year : 1989

1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. **WLCD89** records which word list card was used in the test.

1 A
2 B

66 Illiterate
77 No questionnaire
99 Unknown

---

vscl99, vsms99, vsht99, vsrw99, vser99

Purpose : Visual search test taken in 19**99 (at 53 years)**
Year : 1999

1. Definition

This is a repeat of the test carried out in 1989 but in 1999 only one trial was used.

Test1 - The SM works top to bottom down each column. Number of Ps/Qs crossed out in one minute recorded in [**vscl99]**.

Test2 - The SM works L to R across each row. Number of Ps/Qs crossed out in one minute recorded in [**vsrw99]**

Visual search number of target hits [**vsht99**]

Number of Ps/Qs missed in one minute recorded in [**vsms99]**

Visual letter search errors **[vser99]**

77 No questionnaire
66 Unknown

99 Unknown

CANSP99

Purpose : Letter speed search 19**99 (at 53 years)**
Year : 1999

1. Definition

Calculate the position reached after one minute using **[vscl99] and** [**vsrw99]**.

Max Value =450 [15 rows x 30 columns]

77 No questionnaire
88 Illiterate
99 Unknown

2. Specification

CANSP99= ((VSRW99-1)*30+VSCL99

Note: A measure of letter search accuracy can also be calculated by dividing the number of missed targets **(vsms99)** for each trial by the speed score **(CANSP99)**

---

wlt199 to wlt399

Purpose : Verbal learning test taken in 19**99 (at 53 years)**
Year : 1999

1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. A simple total score is available (**WLT99**).

Range of values 0-15 plus

66 unknown
77 No questionnaire
99 Unknown

WLT99

Purpose : Verbal learning test taken in 19**99 (at 53 years)**
Year : 1999

1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. **WLT89** is a simple total score calculated as the sum of the words correctly recalled at each trial.

Range of values =0-45 plus

66 unknown
77 No questionnaire
99 Unknown

2. Specification
COMPUTE WLT99=WLT199 +WLT299+ WLT399

---

wlin199 to wlin399

Purpose : Verbal learning test taken in 19**99 (at 53 years)**
Number of intrusions (words not in the list)
Year : 1999

1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. WLIN189, WLIN289 and WLIN389 record the number of intrusions (words not on the lists) recalled at each trial.

Range of values 0-15 plus

66 unknown
77 No questionnaire
99 Unknown

WLIN99

Purpose : Verbal learning test taken in 19**99 (at 53 years)**
TOTAL number of intrusions (words not in the list)
Year : 1999

1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. **WLIN99** is a simple total score calculated as the total number of intrusions (words not on the list) across all three trials.

Range of values =0-45 plus

66 unknown
77 No questionnaire
99 Unknown

2. Specification
COMPUTE WLIN99=WLIN199 +WLIN299+ WLIN399

WLCD99

Purpose : Verbal learning test taken in 19**99 (at 53 years)**
Version of word list (A or B)
Year : 1999

1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. **WLCD99** records which word list card was used in the test.

1 A
2 B

66 unknown
77 No questionnaire
99 Unknown

NART99, NART99R

Purpose : The National Adult Reading Test 19**99 (at 53 years)**
Year : 1999

1. Definition

This is a pronunciation test involving 50 irregular words of increasing difficulty, chosen to violate conventional grapheme-phoneme correspondence rules. To pronounce any of the words correctly the respondent must therefore be able to recognise them in their written form rather than rely on intelligent guesswork. Thus it is effectively a test of knowledge acquisition, although it correlates with full-scale IQ. Note that the NART is traditionally scored for errors, as it is here [**NART99**], but this can easily be inverted by subtracting the score from 50 [**NART99R**], so as to be consistent with the direction of the other cognitive test score.

Range of values =0-50 plus

66 unknown
77 No questionnaire
99 Unknown

2. Specification

```
DO if(range(NART99,0,50)).
Compute NART99R=(50-NART99).
ELSE.
Compute NART99R=NART99.
END IF.
```

ANIN

Purpose : Verbal fluency in 19**99 (at 53 years)**
Year : 1999

1. Definition

Category fluency was assessed by asking survey members to name as many different animals as possible in 1 minute. The score (ANIN) is the total number of animals named, allowing anything belonging to the animal kingdom (from amoeba to humans), but not counting repetitions, redundancies (e.g. brown cow, spotted cow…) or proper names (e.g. 'Rover', 'Kitty').

Range of values =0-62 plus

999 ?no label

REMEM

Purpose : Prospective memory in 19**99 (at 53 years)**
Year : 1999

1. Definition

Prospective memory is sometimes referred to as 'remembering to remember'. Survey members were informed that, at a later stage of the interview, they would be given an envelope and asked to write a name and address on it, and that, on receipt of the envelope, they were to remember to turn it over, seal it, and write their initials on it. For the outcome variable (REMEM) a full score of 3 was achieved if both actions were completed without prompting; 2 if one action was achieved without prompting; and 0 if no action was undertaken without a prompt. The variables has been coded as follows:

1 Yes, both actions completed correctly, without prompting
2 Only one action completed, without prompting
3 No actions completed, without prompting
99 Unknown

WLT09

Purpose : Verbal learning test taken in 2006-10 **(at 60-64 years)**
Year : 2006-10

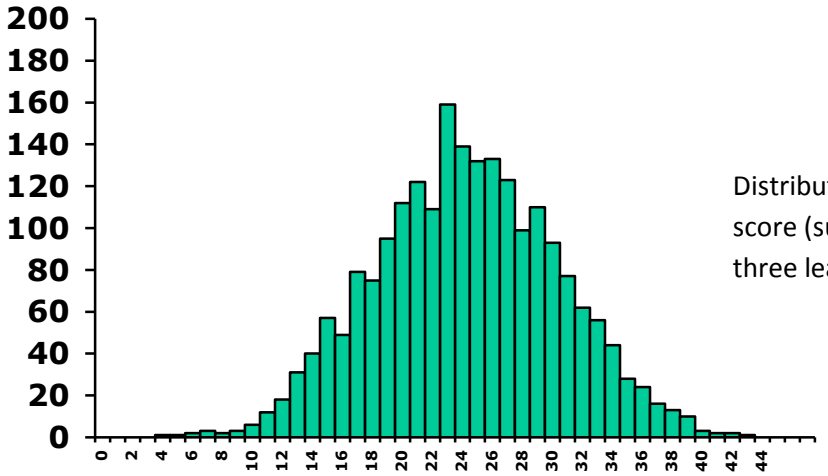
1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. **WLT09** is a simple total score calculated as the sum of the words correctly recalled at each trial.

Range of values =0-45 plus

66 unknown
77 No questionnaire
99 Unknown

2. Specification
COMPUTE WLT09=WLT109 +WLT209+ WLT309



Distribution of the total memory score (sum of total correct for the three learning trials).

VSP09 (equivalent to CANSP99)

Purpose : Letter speed search 2006-10 **(at 60-64 years)**
Year : 2006-10

1. Definition

Calculate the position reached after one minute using **[vscl09] and** [**vsrw09]**.

Max Value =450 [15 rows x 30 columns]

77 No questionnaire
88 Illiterate
99 Unknown

2. Specification

VSP09= ((VSRW09-1)*30+VSCL09

WLT15x

Purpose : Verbal learning test taken in 2014-16 **(at 68-70 years)**
Year : 2014-16

1. Definition

For each of three trials survey members were shown a list of 15 words at a rate of two seconds each, then were asked to write down as many words recalled as possible. **WLT15x** is a simple total score calculated as the sum of the words correctly recalled at each trial.

Range of values =0-45 plus

66 unknown
77 No questionnaire
99 Unknown

2. Specification
COMPUTE WLT15x=WLT115x +WLT215x+ WLT315x

VSP15x

Purpose : Letter speed search 2014-16 **(at 68-70 years)**
Year : 2014-16

1. Definition

Calculate the position reached after one minute using **[vscl15x] and** [**vsrw15x]**.

Max Value =450 [15 rows x 30 columns]

77 No questionnaire
88 Illiterate
99 Unknown

2. Specification

VSP15x = ((VSRW15x-1)*30+VSCL15x

ACEFLU15x, ACELANGTOT15x, ACESCRAT15x, ACESCRMM15x, ACEVISIOTOT15x

Purpose : ACE-III section scores, test taken in 2014-16 **(at 68-70 years)**
Year : 2014-16

1. Definition

For the Addenbrooke's Cognitive Examination (ACE-III), participants were asked a series of questions to test various aspects of cognitive 'domains'. The variables above are the summary scores for each of the five domains, namely fluency, language, attention, memory and visuospatial.

Range of values = 0-14 fluency, 0-26 language, 0-18 attention, 0-26 memory and 0-16 visuospatial.

-66 Question not asked on postal Home Visit
-77 No paper test
-88 Not applicable
-99 Unknown

ACETOTFIN15x, MINIACE15x

Purpose : ACE-III overall scores, test taken in 2014-16 **(at 68-70 years)**
Year : 2014-16

1. Definition

The ACE domain scores were summed – the overall total is found in **ACETOTFIN15x** with a mini-ACE subset of questions that reflect the Mini Mental State Examination (MMSE).

Max Value = 100 for the overall score, 30 for the mini-ACE.

-66 Question not asked on postal Home Visit
-77 No paper test
-88 Not applicable
-99 Unknown