

# Supplementary File A

The initial set of 50 sub-scores from 9 neuropsychological tests considered for the analysis.

Sub-score code	Test	Description
Q1SCORE	ADAS-Cog	Word Recall
Q2SCORE	ADAS-Cog	Commands
Q3SCORE	ADAS-Cog	Constructional Praxis
Q4SCORE	ADAS-Cog	Delayed Word Recall
Q5SCORE	ADAS-Cog	Naming
Q6SCORE	ADAS-Cog	Ideational Praxis
Q7SCORE	ADAS-Cog	Orientation
Q8SCORE	ADAS-Cog	Word Recognition
Q9SCORE	ADAS-Cog	Remembering Test Instructions
Q10SCORE	ADAS-Cog	Comprehension
Q11SCORE	ADAS-Cog	Word-finding Difficulty
Q12SCORE	ADAS-Cog	Language
Q13SCORE	ADAS-Cog	Number cancellation
MMORITIME	MMSE	Orientation to time
MMORISPACE	MMSE	Orientation to space
MMREGI	MMSE	Three word registration
MMRECALL	MMSE	Three word recall
MMSPELLBKW	MMSE	Spelling a 5 letters word backwards
MMNAM	MMSE	Naming 2 objects
MMCOMMAND	MMSE	Following a verbal command
MMREPEAT	MMSE	Repeating a short sentence
MMREAD	MMSE	Reading a sentence wit an instruction
MMWRITE	MMSE	Writing a sentence about anything
MMDRAW	MMSE	Copying a drawing
TRAILS	MoCA	Trails
CUBE	MoCA	Copying a cube drawing
MOCACLOCK	MoCA	Drawing a clock
MOCANAM	MoCA	Naming 3 animals
MOCADIG	MoCA	Repeating digits forward and backwards
MOCALLET	MoCA	Tapping with the hand when a letter is read from a list
MOCASERIAL	MoCA	Serial subtraction starting at 100
MOCAREP	MoCA	Repeating 2 sentences
MOC AFLUEN	MoCA	Naming words that beginwith the letter F
MOC AABS	MoCA	Abstraction of similarities between words
MOCADLREC	MoCA	Five word recall
MOC AORI	MoCA	Orientation to time and space
CLOCKSCOR	Clock Drawing test	Drawing a clock with details
COPYSCOR	Clock Drawing test	Copying the drawing of a clock
TRAASCOR	Trail Making test	Time to complete Part A
TRABSCOR	Trail Making test	Time to complete Part B
LIMMTOTAL	Logical Memory test	Immediate recall of a story read by the examiner
LDELTOTAL	Logical Memory test	Delayed recall of a story read by the examiner
CATANIMSC	Category Fluency test	Naming animals
RAVLT.IMMED	Rey AVLT	Repeating a list of 15 words 5 times
AVTOT6	Rey AVLT	Recall of the first list of words after a second list was read
AVTOTB	Rey AVLT	Repeating words from the second list
AVDEL30MIN	Rey AVLT	Recall of words from the first list after 30 minutes
AVDELTOT	Rey AVLT	Delayed recognition of written words from the first list
BMNOCUE	Boston / Multilingual Naming test	Naming objects in pictures
BMCUED	Boston / Multilingual Naming test	Naming objects in pictures after semantic cues

# 1 Standardized regression based (SRB) $z$ -scores

Parameters to calculate the SRB  $z$ -scores, obtained from the linear regression with a sample of 400 cognitively unimpaired individuals:

Sub-score code	Regression coefficients			$\sigma$
	Intercept ( $\beta_0$ )	Education ( $\beta_1$ )	Age ( $\beta_2$ )	
Q1SCORE	1.044	-0.045	0.034	1.294
Q2SCORE	0.072	-0.001	0	0.353
Q3SCORE	0.178	-0.015	0.006	0.55
Q4SCORE	-0.549	-0.065	0.06	1.811
Q5SCORE	-0.094	-0.001	0.002	0.265
Q6SCORE	0.145	-0.001	-0.001	0.231
Q7SCORE	0.258	-0.009	0	0.321
Q8SCORE	5.095	0.035	-0.037	2.375
Q9SCORE	-0.042	-0.006	0.002	0.148
Q10SCORE	-0.203	0.001	0.003	0.148
Q11SCORE	-0.266	0	0.004	0.257
Q12SCORE	-0.138	0.001	0.002	0.171
Q13SCORE	-0.405	-0.001	0.015	0.819
MMORITIME	-0.024	0.001	0.001	0.301
MMORISPACE	0.432	-0.009	-0.002	0.351
MMREGI	-0.02	-0.001	0.001	0.1
MMRECALL	-0.556	-0.016	0.015	0.621
MMSPELLBKW	0.529	-0.032	0.002	0.492
MMNAM	-0.05	0.001	0.001	0.05
MMCOMMAND	0.103	-0.007	0.001	0.244
MMREPEAT	0.252	-0.005	-0.001	0.264
MMREAD	0.028	0	0	0.05
MMWRITE	-0.02	0.001	0	0.05
MMDRAW	0.183	-0.01	0.001	0.241
TRAILS	-0.078	-0.008	0.004	0.27
CUBE	0.451	-0.03	0.004	0.447
MOCACLOCK	-0.058	-0.003	0.005	0.483
MOCANAM	-0.102	0	0.003	0.276
MOCADIG	-0.001	-0.008	0.003	0.26
MOCALET	-0.113	-0.002	0.003	0.177
MOCASERIAL	0.153	-0.016	0.003	0.385
MOCAREP	0.14	-0.018	0.005	0.454
MOCAFLUEN	0.198	-0.016	0.003	0.385
MOCAABS	0.457	-0.029	0.002	0.393
MOCADLREC	-2.029	-0.049	0.074	1.691
MOCAORI	0.271	-0.005	-0.002	0.254
CLOCKSCOR	0.092	-0.012	0.005	0.536
COPYSCOR	0.167	0.003	-0.001	0.42
TRAASCOR	2.772	-0.099	0.42	9.601
TRABSCOR	9.705	-1.968	1.386	39.867
LIMMTOTAL	15.084	-0.242	-0.012	3.086
LDELTOTAL	15.238	-0.234	-0.002	3.27
CATANIMSC	36.053	-0.62	0.174	5.35
RAVLT.IMMED	2.848	-0.473	0.456	9.81
AVTOT6	-0.858	-0.15	0.123	3.248
AVTOTB	4.328	-0.072	0.089	1.988
AVDEL30MIN	-1.107	-0.075	0.129	3.9
AVDELTOT	-1.478	-0.042	0.058	2.267
BMNOCUE	2.035	-0.134	0.026	1.995
BMCUED	29.761	0.032	-0.007	0.592

Explicit calculation of SRB  $z$ -score for a particular sub-score was given by:

$$z = \frac{\text{observed sub-score} - (\beta_0 + \beta_1 \times \text{Education} + \beta_2 \times \text{Age})}{\sigma} \quad (1)$$

## 2 Variability of sub-scores

Portion of the sub-score variance explained by the samples in the 98th, 95th, and 90th percentile:

Sub-score code	Portion of the variance explained by			inflated variance
	98th percentile	95th percentile	90th percentile	
Q1SCORE	0.870	0.781	0.672	
Q2SCORE	0.544	0.345	0.000	*
Q3SCORE	0.823	0.796	0.743	
Q4SCORE	0.874	0.759	0.608	
Q5SCORE	0.629	0.458	0.126	
Q6SCORE	0.393	0.200	0.001	*
Q7SCORE	0.500	0.281	0.192	
Q8SCORE	0.861	0.744	0.629	
Q9SCORE	0.296	0.009	0.008	
Q10SCORE	0.383	0.007	0.006	
Q11SCORE	0.625	0.392	0.204	
Q12SCORE	0.307	0.004	0.003	
Q13SCORE	0.845	0.720	0.586	
MMORITIME	0.535	0.413	0.218	
MMORISPACE	0.688	0.564	0.429	
MMREGI	0.002	0.002	0.002	**
MMRECALL	0.839	0.614	0.412	
MMSPELLBKW	0.548	0.296	0.012	
MMNAM	0.002	0.002	0.001	**
MMCOMMAND	0.835	0.578	0.082	
MMREPEAT	0.883	0.700	0.345	
MMREAD	0.001	0.001	0.001	**
MMWRITE	0.000	0.000	0.000	**
MMDRAW	0.833	0.574	0.082	
TRAILS	0.873	0.682	0.324	
CUBE	0.957	0.893	0.778	
MOCACLOCK	0.764	0.553	0.456	
MOCANAM	0.668	0.525	0.250	
MOCADIG	0.609	0.417	0.062	
MOCALET	0.708	0.264	0.006	
MOCASERIAL	0.657	0.399	0.254	
MOCAREP	0.839	0.605	0.476	
MOC AFLUEN	0.939	0.847	0.673	
MOCAABS	0.802	0.520	0.341	
MOCADLREC	0.936	0.895	0.838	
MOCAORI	0.722	0.497	0.351	
CLOCKSCOR	0.723	0.526	0.309	
COPYSCOR	0.586	0.488	0.363	
TRAASCOR	0.543	0.418	0.304	
TRABSCOR	0.705	0.482	0.316	
LIMMTOTAL	0.882	0.775	0.664	
LDELTOTAL	0.907	0.802	0.690	
CATANIMSC	0.911	0.855	0.782	
RAVLT.IMMED	0.907	0.841	0.762	
AVTOT6	0.928	0.861	0.771	
AVTOTB	0.901	0.824	0.730	
AVDEL30MIN	0.958	0.920	0.863	
AVDELTOT	0.805	0.654	0.487	
BMNOCUE	0.643	0.468	0.313	
BMCUED	1.006	1.019	1.046	+

### 3 Correlations between sub-scores

Pairwise sub-score correlations were tested and threshold for significance was set at 0.01 for uncorrected  $p$ -values. Figure 1 shows the significant correlations between pairs of sub-scores.

Sub-scores that showed no significant correlation (greater than 0.25) with any other sub-score evaluating similar abilities and did not depend on a similar task than any other one were not included in the factor model.

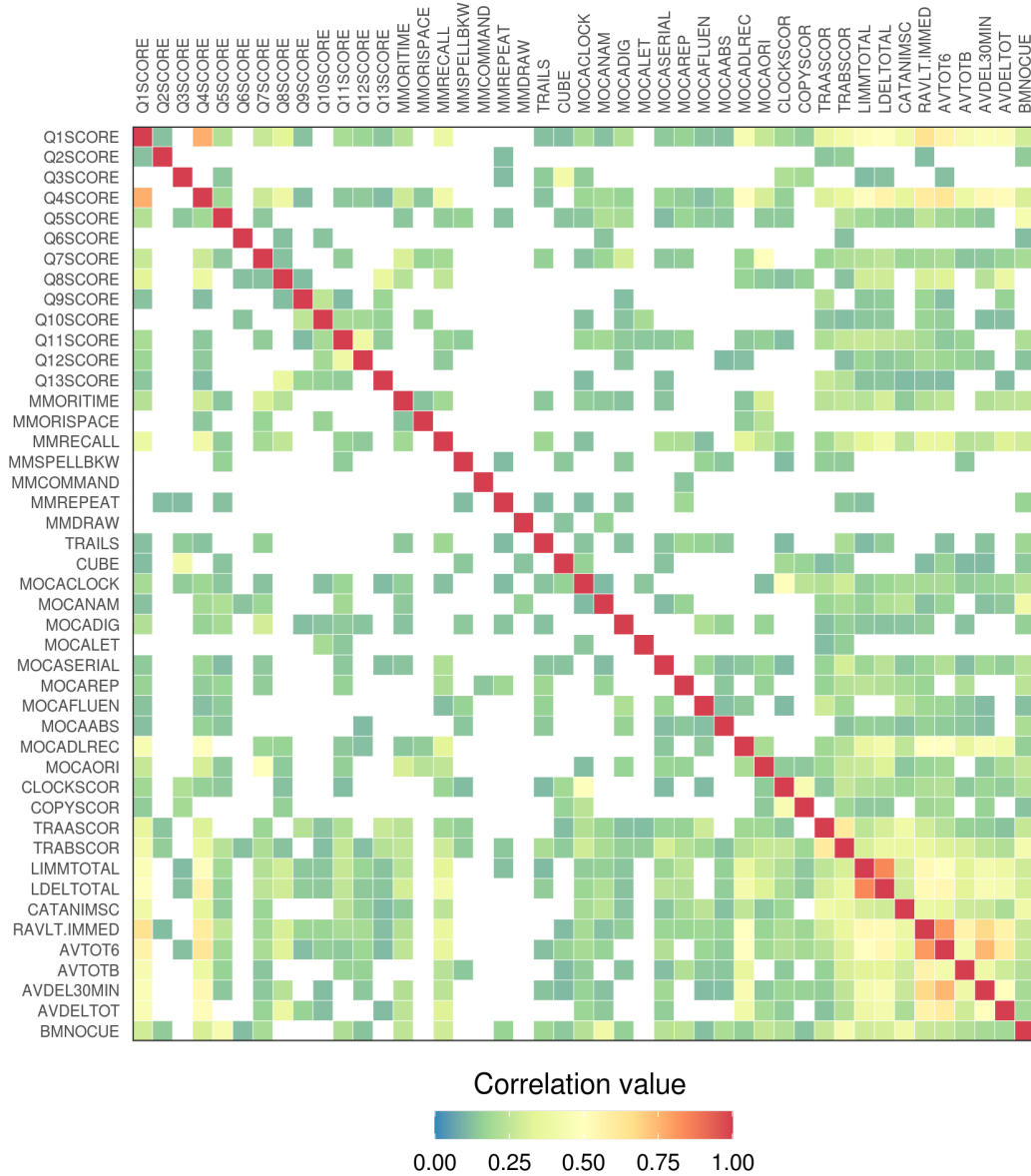


Figure 1: Significant correlations (uncorrected  $p$ -value  $\leq 0.01$ ) between sub-scores calculated in the data partition used for CFA.