Supplementary Table 1.

*Diagnostic characteristics and descriptive statistics for the sample*

|  |  |  |  |
| --- | --- | --- | --- |
| Diagnosis | VerbalPA I Mean (*SD*) | VerbalPA II Mean (*SD*) | *N* (% of Sample) |
| LTLE (Left Temporal Lobe Epilepsy) | 22.26 (11.86) | 6.89 (3.77) | 46 (18%) |
| RTLE (Right Temporal Lobe Epilepsy) | 27.89 (10.37) | 8.41 (3.14) | 28 (11%) |
| Other seizure disorder | 25.30 (10.36) | 7.95 (3.32) | 20 (8%) |
| Multiple Sclerosis  | 30.53 (12.17) | 9.68 (3.07) | 19 (8%) |
| Tumour | 31.09 (13.12) | 10.00 (3.32) | 11 (4%) |
| Hydrocephalus | 14.50 (7.78) | 4.50 (3.54) | 2 (1%) |
| Movement Disorder | 22.83 (12.61) | 7.00 (3.03) | 6 (2%) |
| DAT or Mild Cognitive Impairment | 22.59 (11.26) | 7.33 (3.78) | 27 (11%) |
| Alcohol-related brain damage | 14.92 (12.02) | 5.27 (3.44) | 13 (5%) |
| Traumatic Brain Injury | 34.88 (17.07) | 10.14 (4.85) | 8 (3%) |
| Psychopathology | 30.10 (9.67) | 9.05 (3.35) | 21 (8%) |
| Intellectual Disability | 23.50 (17.68) | 7.00 (4.24) | 2 (1%) |
| Cerebrovascular Accident  | 24.45 (9.86) | 8.00 (3.69) | 23 (9%) |
| Miscellaneous/Other | 27.43 (13.60) | 8.67 (4.22) | 24 (10%) |

Note: VerbalPA I score range = 0 – 56; VerbalPA II score range = 0 – 14; DAT = Dementia of the Alzheimer’s Type; Miscellaneous/Other = rare neurological conditions including mitochondrial disorders (which are a special interest of our service), and other rare disorders

Supplementary Table 2.

*Descriptive statistics for raw scores on WAIS-IV Verbal Paired Associates I and II in the three clinical groups subject to factor analysis in this study, namely the Heterogeneous Neurosciences sample n=168), and the samples of patients with Left (n=46) and Right (n=28) temporal lobe epilepsy (TLE).*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Heterogeneous mean (SD) | LTLE mean (SD) | RTLE mean (SD) |
| Verbal Paired Associates I | 26.05 (12.44) | 22.26 (11.86) | 27.89 (10.37) |
| Verbal Paired Associates II  | 8.24 (3.74) | 6.89 (3.77) | 8.41 (3.14)  |

Supplementary Table 3.

*Structure of the three-factor Semantic-Clustering model in WAIS-IV Verbal Paired Associates where all immediate and delayed items are analysed together.*

|  |  |  |  |
| --- | --- | --- | --- |
| Subtest | Factor 1(“Living”) | Factor 2(“Non-Living”) | Factor 3(“Abstract”) |
| VPA I |  |  |  |
|  List A | 8, 10, 14 | 3, 4, 9, 12, 13 | 1, 2, 5, 6, 7, 11 |
|  List B | 2, 5, 8 | 1, 4, 11, 12, 14 | 3, 6, 7, 9, 10, 13 |
|  List C | 1, 2, 7 | 4, 5, 8, 9, 12 | 3, 6, 10, 11, 13, 14 |
|  List D | 5, 11, 12 | 1, 3, 7, 8, 9 | 2, 4, 5, 10, 13, 14 |
| VPA II |  |  |  |
|  Delayed Recall | 1, 5, 9 | 2, 6, 8, 11, 12 | 3, 4, 7, 10, 13, 14 |

*Note.* VPA I = verbal paired-associates immediate recall subtest, VPA II = verbal paired-associates delayed recall subtest

Supplementary Table 4.

*Structure of the two-factor Easy-Hard model in WAIS-IV Verbal Paired Associates*

|  |  |  |
| --- | --- | --- |
| Subtest | Factor 1(“Easy”) | Factor 2(“Hard”) |
| VPA I |  |  |
|  List A | 1, 4, 9, 13 | 2, 3, 5, 6, 7, 8, 10, 11, 12, 14 |
|  List B | 1, 9, 11, 12 | 2, 3, 4, 5, 6, 7, 8, 10, 13, 14 |
|  List C | 4, 9, 11, 12 | 1, 2, 3, 5, 6, 7, 8, 10, 13, 14 |
|  List D | 1, 7, 9, 14 | 2, 3, 4, 5, 6, 8, 10, 11, 12, 13 |
| VPA II |  |  |
|  Delayed Recall | 2, 11, 12, 14 | 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13 |

*Note.* VPA I = verbal paired-associates immediate recall subtest, VPA II = verbal paired-associates delayed recall subtest

Supplementary Table 5.

*Standardised factor loadings and R*2 *values for the five-factor Hybrid model of WAIS-IV Verbal Paired Associates*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Items | Factor 1(“Living/ Hard”)Loading (SE) | Factor 2(“Non-Living/ Easy”)Loading (SE) | Factor 3(“Abstract/Hard”)Loading (SE) | Factor 4 (“Non-Living/ Hard”)(SE) | Factor 5 (“Abstract/ Easy”)(SE) | *R2* |
| VerbalPA I List A |  |  |  |  |  |  |
|  Item 1  |  |  |  |  | .67 (.07) | .47 |
|  Item 2 |  |  | .69 (.09) |  |  | .48 |
|  Item 3 |  |  |  | .66 (.08) |  | .44 |
|  Item 5 |  |  | .56 (.07) |  |  | .31 |
|  Item 6 |  |  | .68 (.05) |  |  | .46 |
|  Item 9 |  | .65 (.07) |  |  |  | .43 |
|  Item 10 | .63 (.06) |  |  |  |  | .40 |
|  Item 13 |  | .61 (.07) |  |  |  | .38 |
|  List B |  |  |  |  |  |  |
|  Item 1  |  | .68 (.07) |  |  |  | .46 |
|  Item 2 | .75 (.06) |  |  |  |  | .56 |
|  Item 3 |  |  | .83 (.04) |  |  | .69 |
|  Item 4 |  |  |  | .77 (.09) |  | .59 |
|  Item 5 | .83 (.04) |  |  |  |  | .68 |
|  Item 6  |  |  | .68 (.06) |  |  | .46 |
|  Item 7  |  |  | .90 (.03) |  |  | .81 |
|  Item 8 | .76 (.06) |  |  |  |  | .58 |
|  Item 9 |  |  |  |  | .77 (.07) | .60 |
|  Item 10 |  |  | .80 (.04) |  |  | .57 |
|  Item 11 |  | .71 (.07) |  |  |  | .51 |
|  Item 12  |  | .82 (.06) |  |  |  | .67 |
|  Item 14  |  |  |  | .90 (.03) |  | .82 |
|  List C |  |  |  |  |  |  |
|  Item 2 | .89 (.03) |  |  |  |  | .80 |
|  Item 3  |  |  | .77 (.04) |  |  | .60 |
|  Item 4 |  | .81 (.06) |  |  |  | .66 |
|  Item 6  |  |  | .92 (.02) |  |  | .85 |
|  Item 7  | .88 (.04) |  |  |  |  | .78 |
|  Item 8  |  |  |  | .90 (.03) |  | .80 |
|  Item 9 |  | .68 (.09) |  |  |  | .46 |
|  Item 10 |  |  | .80 (.04) |  |  | .63 |
|  Item 11 |  |  |  |  | .88 (.04) | .77 |
|  Item 12  |  | .73 (.06) |  |  |  | .52 |
|  Item 13 |  |  | .88 (.03) |  |  | .77 |
|  Item 14  |  |  | .88 (.03) |  |  | .77 |
|  List D |  |  |  |  |  |  |
|  Item 2 |  |  | .78 (.04) |  |  | .61 |
|  Item 3  |  |  |  | .89 (.03) |  | .78 |
|  Item 6  |  |  | .82 (.04) |  |  | .68 |
|  Item 7 |  | .92 (.04) |  |  |  | .84 |
|  Item 8  |  |  |  | .92 (.05) |  | .84 |
|  Item 10 |  |  | .81 (.04) |  |  | .65 |
|  Item 12  | .86 (.04) |  |  |  |  | .74 |
|  Item 13  |  |  | .94 (.02) |  |  | .88 |
|  Item 14  |  |  |  |  | .97 (.04) | .93 |
| VerbalPA II |  |  |  |  |  |  |
|  Item 1 | .95 (.03) |  |  |  |  | .91 |
|  Item 2  |  | .91 (.05) |  |  |  | .82 |
|  Item 3  |  |  | .78 (.04) |  |  | .61 |
|  Item 4  |  |  | .87 (.03) |  |  | .75 |
|  Item 6  |  |  |  | .85 (.05) |  | .72 |
|  Item 7 |  |  | .84 (.04) |  |  | .71 |
|  Item 8  |  |  |  | .89 (.03) |  | .80 |
|  Item 9  | .89 (.04) |  |  |  |  | .80 |
|  Item 10  |  |  | .86 (.04) |  |  | .74 |

Supplementary Table 6.

*Inter-factor correlations for the five-factor Hybrid model*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Factor 2*r* (SE) | Factor 3*r* (SE) | Factor 4*r* (SE) | Factor 5 *r* (SE) |
| Factor 1 | .65 (.05) | .84 (.02) | .79 (.03) | .60 (.06) |
| Factor 2 |  | .67 (.04) | .61 (.06) | .72 (.06) |
| Factor 3 |  |  |  | .67 (.05) |
| Factor 4 |  |  |  | .56 (.07) |

Supplementary Table 7.

*Fit statistics of the Semantic-Clustering model for the MIMIC analysis, comparing fit for the LTLE and RTLE groups against the heterogeneous group.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| MIMIC Model | WLSMV χ2 | *df* | RMSEA [90% CI] | CFI | TLI |
| LTLE vs Heterogeneous | 1686.19\* | 1260 | .04 [.03 - .04] | .97 | .96 |
| RTLE vs Heterogeneous | 1639.44\* | 1260 | .04 [.03 - .04] | .97 | .96 |

*Note.* CI = confidence interval
\**p* < .001