Supplementary Material

Supplementary Table 1. Information criteria of the class solutions on the known sample (n = 1,345).

|  |  |  |
| --- | --- | --- |
| **Classes** | **N = 1,345** | |
| **BIC** | **ENT** |
| 2 | 92901.4 | 0.839 |
| 3 | 91770.7 | 0.847 |
| 4 | 91470.6 | 0.825 |
| 5 | 91221.6 | 0.834 |
| 6 | 91133.0 | 0.841 |
| 7 | 91065.2 | 0.827 |
| 8 | 90999.1 | 0.802 |
| 9 | 90957.2 | 0.816 |
| 10 | 90948.1 | 0.799 |

*Note.* BIC = Bayesian Information Criterion. ENT = entropy.

All these models included age, gender, and education as covariates.

Supplementary Table 2. Results of the two-fold cross-validations on the sample.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model | | Sample model 1 | | Sample model 2 | |
| Calibration on Sample 1  (n =672) | Cross validation on Sample 2 using Sample 1 ( n = 1,345) | Calibration on Sample 2  (n = 673) | Cross-validation on Sample 1 using Sample 2 (n = 1,345) |
| 2 | BIC | 46576.069 | 92999.849 | 46463.642 | 929763.642 |
|  | ENT | 0.838 | 0.916 | 0.862 | 0.919 |
| 3 | BIC | 46012.095 | 91893.804 | 45960.278 | 91901.518 |
|  | ENT | 0.804 | 0.921 | 0.843 | 0.931 |
| 4 | BIC | 45903.297 | 91646.608 | 45808.320 | 91665.689 |
|  | ENT | 0.844 | 0.920 | 0.830 | 0.911 |
| 5 | BIC | 45806.863 | 91409.145 | 45734.207 | 91221.606 |
|  | ENT | 0.856 | 0.922 | 0.836 | 0.834 |
| 6 | BIC | 45795.911 | 91464.658 | 45714.397 | 91375.311 |
|  | ENT | 0.832 | 0.901 | 0.835 | 0.917 |
| 7 | BIC | 45797.937 | 91525.677 | 45698.003 | 91301.848 |
|  | ENT | 0.719 | 0.879 | 0.847 | 0.923 |
| 8 | BIC | 45801.945 | 91367.378 | 45691.542 | 91260.363 |
|  | ENT | 0.791 | 0.888 | 0.858 | 0.927 |
| 9 | BIC | 45812.887 | 91299.389 | 45694.390 | 91221.651 |
|  | ENT | 0.807 | 0.8999 | 0.834 | 0.917 |
| 10 | BIC | 45830.461 | 91308.839 | 45698.493 | 91239.159 |
|  | ENT | 0.831 | 0.900 | 0.847 | 0.921 |

*Note.* BIC = Bayesian Information Criterion. ENT = entropy.

All these models included age, gender, and education as covariates.

Supplementary Table 3. This table illustrates results of split-half sample who were trained on the other half. The table shows how these participants mapped onto each other within classes (highlighted in bold).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Calibrated | Classes | | Cross-validated (Trained) | | | | | | | | | | Total | |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |  | |
| Subsample 1 |  | 1 | **32** | 0 | 1 | 0 | 3 | 0 | 0 | 1 | 0 | 37 | |
|  | 2 | 02 | **29** | 2 | 0 | 2 | 0 | 0 | 1 | 0 | 44 | |
|  | 3 | 0 | 0 | **16** | 0 | 22 | 1 | 11 | 0 | 0 | 50 | |
|  | 4 | 0 | 1 | 1 | **16** | 0 | 0 | 0 | 2 | 0 | 20 | |
|  | 5 | 0 | 0 | 4 | 0 | **166** | 13 | 4 | 0 | 0 | 189 | |
|  | 6 | 0 | 0 | 0 | 0 | 0 | **129** | 0 | 0 | 0 | 136 | |
|  | 7 | 0 | 0 | 0 | 0 | 2 | 88 | **31** | 0 | 0 | 121 | |
|  | 8 | 10 | 0 | 4 | 0 | 7 | 1 | 6 | **10** | 7 | 28 | |
|  | 9 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | **46** | 47 | |
|  | Total | | 44 | 30 | 28 | 16 | 202 | 233 | 52 | 14 | 53 | 672 | |
| Subsample 2 | 1 | | **33** | 0 | 0 | 0 | 2 | 0 | 0 | 9 | 0 | 44 | |
|  | 2 | | 2 | **18** | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 22 | |
|  | 3 | | 0 | 6 | **28** | 1 | 2 | 0 | 0 | 5 | 0 | 42 | |
|  | 4 | | 0 | 0 | 0 | **14** | 0 | 0 | 0 | 0 | 0 | 14 | |
|  | 5 | | 0 | 2 | 9 | 0 | **151** | 2 | 1 | 0 | 1 | 165 | |
|  | 6 | | 0 | 0 | 0 | 0 | 4 | **136** | 75 | 0 | 0 | 216 | |
|  | 7 | | 0 | 3 | 8 | 0 | 8 | 0 | **52** | 0 | 0 | 71 | |
|  | 8 | | 0 | 0 | 0 | 7 | 0 | 0 | 0 | **38** | 0 | 45 | |
|  | 9 | | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | **49** | 54 | |
|  | Total | | 35 | 29 | 45 | 23 | 167 | 142 | 129 | 53 | 50 | 673 | |

*Note.* Kappa = .640 for subsample 1 and .724 for subsample 2. The figures in bold show the number of participants who were assigned to the same subgroup after training on the latent class models. The high Kappa score shows that the inter-class agreement was high and indicative of a good solution; hence the majority of participants fell into the same subgroup. Class 1 = the disadvantaged class. Class 2 = poor language. Class 3 = poor episodic memory and fluency. Class 4 = poor processing speed and executive function. Class 5 = low average cognition. Class 6 = high average cognition. Class 7 = average cognition. Class 8 = poor executive and poor working memory. Class 9 = elite.

Supplementary Table 4. The standardized coefficients between the observed variables and each latent class. Standard errors in parentheses.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tests | Class 1 | Class 2 | Class 3 | Class 4 | Class 5 | Class 6 | Class 7 | Class 8 | Class 9 |
| N (%) | 77 (5.70%) | 90 (6.70%) | 81 (6.00%) | 37 (2.80%) | 346 (25.7%) | 440 (32.7%) | 136 (10.10%) | 34 (2.5%) | 104 (7.7%) |
| FCSRT – Free Recall | 5.8 (0.6) | 6.1 (0.5) | 4.6 (0.4) | 5.7 (0.6) | 6.2 (0.3) | 6.6 (0.4) | 4.9 (0.4) | 5.0 (0.5) | 6.9 (0.4) |
| Boston Naming | 4.0 (0.4) | 5.8 (0.6) | 4.3 (0.5) | 6.1 (0.6) | 5.9 (0.6) | 6.8 (0.5) | 6.3 (0.6) | 4.1 (0.5) | 7.3 (0.6) |
| Digit Span | 3.3 (0.2) | 3.9 (0.2) | 3.9 (0.2) | 4.6 (0.2) | 4.1 (0.1) | 4.9 (0.1) | 4.8 (0.3) | 3.5 (0.3) | 6.1 (0.2) |
| Digit Symbol Coding | 2.2 (0.2) | 3.4 (0.3) | 3.4 (0.3) | 3.2 (0.3) | 3.9 (0.1) | 5.4 (0.2) | 4.7 (0.4) | 2.2 (0.2) | 6.8 (0.3) |
| Block Design | 1.5 (0.1) | 2.4 (0.2) | 2.3 (0.3) | 2.3 (0.2) | 2.5 (0.1) | 3.6 (0.1) | 3.5 (0.3) | 1.4 (0.1) | 5.0 (0.2) |
| Word Fluency | 1.9 (0.2) | 2.7 (0.2) | 2.5 (0.2) | 3.4 (0.3) | 3.0 (0.1) | 4.1 (0.2) | 3.5 (0.2) | 1.8 (0.2) | 5.0 (0.2) |
| Categories | 4.2 (0.3) | 5.0 (0.3) | 4.0 (0.3) | 5.4 (0.4) | 5.4 (0.2) | 6.3 (0.3) | 4.9 (0.3) | 4.1 (0.3) | 7.7 (0.3) |
| Logical Memory | 2.3 (0.2) | 2.9 (0.2) | 2.4 (0.2) | 3.5 (0.3) | 3.0 (0.1) | 4.1 (0.1) | 3.0 (0.2) | 2.0 (0.2) | 4.7 (0.2) |
| Trail Making Test A | 7.0 (0.7) | 4.9 (0.3) | 5.3 (0.4) | 7.6 (0.5) | 4.2 (0.2) | 3.3 (0.1) | 3.7 (0.3) | 6.8 (0.7) | 2.8 (0.1) |
| Trail Making Test B | 8.3 (0.5) | 8.3 (0.5) | 4.9 (0.6) | 5.8 (0.7) | 4.4 (0.3) | 3.0 (0.2) | 3.4 (0.3) | 9.3 (1.0) | 2.3 (0.1) |

*Note.* Class 1 = the disadvantaged class. Class 2 = poor language. Class 3 = poor episodic memory and fluency. Class 4 = poor processing speed and executive function. Class 5 = low average cognition. Class 6 = high average cognition. Class 7 = average cognition. Class 8 = poor executive and poor working memory. Class 9 = elite. The formula used to calculate the standardized co-variances is the same used for the linear regression of y on x: , where b is the unstandardized linear regression coefficient, SD(x) is the sample standard deviation of x, and SD(y) is the sample standard deviation of y; βStdYX is the standardized coefficient interpreted as the change in y in y standard deviation units for a standard deviation change in x.