*Twin Research and Human Genetics*

**Structural Brain MRI Trait Polygenic Score Prediction of Cognitive Abilities**

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Supplementary Table 1

Age Characteristics (Range, Mean, *SD*) at the Time of Cognitive Testing in the Prediction Cohorts and of MRI Scanning in the Discovery Cohort

|  |  |  |  |
| --- | --- | --- | --- |
| LBC1921 | LBC1936 | GS:SFHS | CHARGE (Discovery Cohorts) |
| 77.7 to 80.6  79.1 ±0.6\* | 67.6 to 71.3  69.5 ±0.8 | 18 to 98  55.5 ±11.4 | 76.2 ±5.4, 63.2 ±4.4, 65.3 ±8, 71.7 ±4.8, 63.9 ±11.3, 72.9 ±7.9, and 67.2 ±5.3 |

Note: Age range in CHARGE cohorts is unpublished.

\*83.3 ±0.54 for Digit Symbol.

Supplementary Table 2

Number of SNPs Included in the Varying Threshold Polygenic Scores for TBV  
(variable for which the number of GWAS SNPs was maximal)

|  |  |  |  |
| --- | --- | --- | --- |
| *p* < | GS:SFHS | LBC1936 | LBC1921 |
| .01 | 1 216 | 1 241 | 1 212 |
| .05 | 5 731 | 5 840 | 5 796 |
| .10 | 11 384 | 11 541 | 11 452 |
| .50 | 55 212 | 56 305 | 55 801 |
| 1 | 110 178 | 111 729 | 111 153 |

Supplementary Table 3

Correlations Between MRI Trait Polygenic Scores and Their Corresponding Phenotype in the LBC1936

|  |  |  |
| --- | --- | --- |
| *p <* | *r* | P |
| Brain infarct (n = 629) |  |  |
| .01 | -.13 | .69 |
| .05 | .21 | .51 |
| .10 | -.07 | .82 |
| .50 | .11 | .74 |
| 1 | -.02 | .94 |
| White matter hyperintensities (*n* = 573) |  |  |
| .01 | .02 | .66 |
| .05 | .09 | .040 |
| .10 | .07 | .09 |
| .50 | .09 | .036 |
| 1 | .08 | .049 |
| Intracranial volume (*n* = 624) |  |  |
| **.01** | **.08** | **.008** |
| **.05** | **.10** | **.001** |
| **.10** | **.10** | **.001** |
| **.50** | **.09** | **.003** |
| **1** | **.08** | **.006** |
| Hippocampal volume (*n* = 611) |  |  |
| .01 | .01 | .86 |
| .05 | .05 | .21 |
| .10 | .04 | .25 |
| .50 | .08 | .039 |
| 1 | .07 | .054 |
| Total brain volume (*n* = 623) |  |  |
| .01 | .08 | .02 |
| .05 | .06 | .09 |
| .10 | .04 | .24 |
| .50 | .03 | .30 |
| 1 | .04 | .28 |

Note: . Significant correlations at a Bonferroni corrected level are bolded.

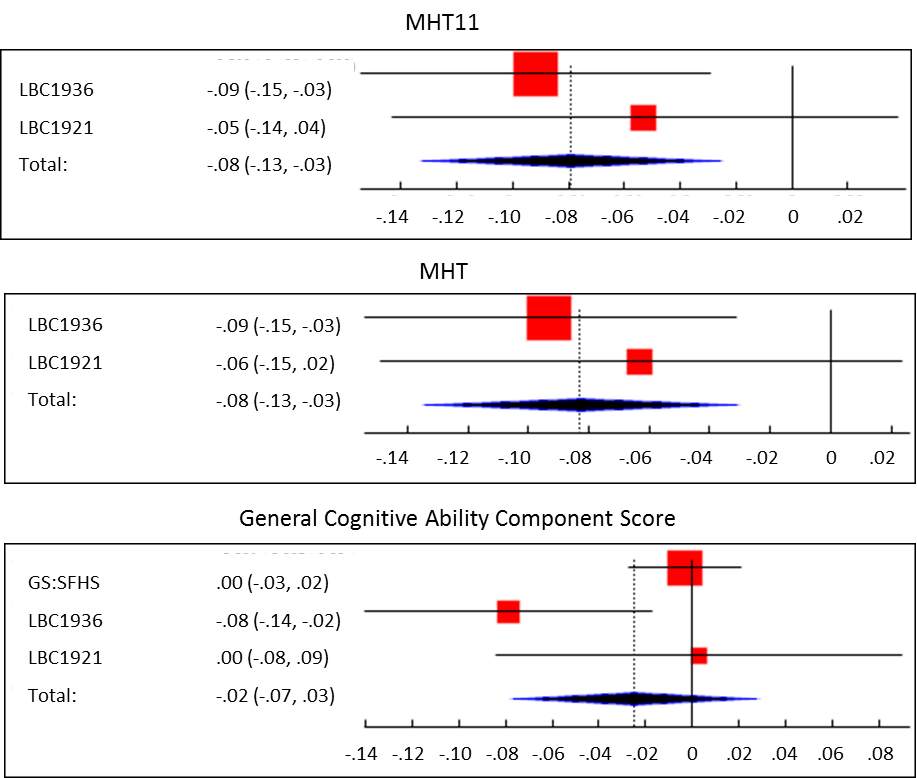
Supplementary Table 4

Mean (*SD*) of MRI Traits and their Correlations (*p* value) With the Main Cognitive Variables in the LBC1936

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ICV  (*n* = 620-624) | TBV  (*n* = 619-623) | HV  (*n* = 607-611) | WMH  (*n* = 570-573) | BI  (*n* = 625-629) |
| Mean *(SD):* | 1451851 mm3 (141604) | 1124236 mm3 (107666) | 6426.44 mm3 (868.04) | 2.09 (.99)\* | Yes: 93  No: 537 |
| Correlation:  Digit symbol | -0.02 (.70) | **0.28 (4.83-13)** | 0.06 (.12) | **-0.21 (5.62-7)** | **-0.12 (.002)** |
| Verbal fluency | 0.04 (.38) | **0.15 (2.24-4)** | 0.00 (.98) | -0.07 (.07) | **-0.15 (2.21-4)** |
| Logical memory | 0.02 (.58) | **0.09 (.022)** | 0.06 (.13) | -0.03 (.53) | **-0.10 (.009)** |
| NART | **0.08 (.042)** | 0.06 (.12) | 0.06 (.16) | -0.05 (.23) | **-0.11 (.004)** |
| General ability | 0.05 (.18) | **0.20 (8.94-7)** | 0.07 (.09) | **-0.12 (.005)** | **-0.16 (7.37-5)** |

Note: Significant correlations are bolded. TBV and HV correlations are for the head size (ICV)-corrected measure.

\*Natural logarithm (WMH burden in mL +1)



Supplementary Figure 1. Forest plots depicting the correlation between HV polygenic scores (p<1 inclusion threshold) for two general cognitive ability measures, MHT (measured at age 11 and at 70/80 years) and the general cognitive ability principal component.