Table S1: Descriptive statistics for all key variables for the final included sample, sample not included due to missing data, total sample as well as the final sample after inverse probability weights are applied.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Included | Excluded | Total sample | Reweighted Included |
|   | *n* |   | *n* |   | *n* |   |   |
| Age (mean) | 27,982 | 48.89 (17.12) | 11,314 | 45.31 (17.77) | 39,296 | 47.86 (17.38) | 47.97 (17.18) |
| Sex (% female) | 27,982 | 56.90% | 11,314 | 54.24% | 39,296 | 56.13% | 56.21% |
| Ethnicity (% white) | 27,982 | 86.82% | 11,102 | 88.69% | 39,084 | 87.35% | 87.36% |
|  |  |  |  |  |  |  |  |
| Cognitive Ability (mean) |  |  |  |  |  |  |  |
| Word Recall | 27,982 | 11.57 (3.52) | 11,310 | 11.33 (3.69) | 39,292 | 11.50 (3.57) | 11.50 (3.54)  |
| Numeric Ability | 27,784 | 3.63 (1.06) | 10,165 | 3.53 (1.11) | 38,946 | 3.60 (1.08) | 3.60 (1.07) |
| Verbal Fluency | 27,799 | 21.97 (6.83) | 10,185 | 21.41 (6.83) | 38,979 | 21.80 (6.83) | 21.80 (6.84) |
|  |  |  |  |  |  |  |  |
| Social Disadvantage |  |  |  |  |  |  |  |
| Father's Education | 25,350 |  | 723 |  | 26,073 |  |  |
| did not go to school |  | 1.85% |  | 3.46% |  | 1.89% | 1.82% |
| left school with no qualifications |  | 41.16% |  | 39.28% |  | 41.11% | 40.67% |
| left school with some qualifications |  | 21.77% |  | 22.68% |  | 21.80% | 22.19% |
| further qualifications after leaving school |  | 24.68% |  | 25.17% |  | 24.70% | 24.79% |
| gained university degree or higher degree |  | 10.54% |  | 9.41% |  | 10.51% | 10.53% |
| Mother's Education | 26,072 |  | 1,166 |  | 27,238 |  |  |
| did not go to school |  | 2.79% |  | 4.20% |  | 2.85% | 2.72% |
| left school with no qualifications |  | 45.06% |  | 46.14% |  | 45.11% | 44.29% |
| left school with some qualifications |  | 28.93% |  | 29.59% |  | 28.96% | 29.45% |
| further qualifications after leaving school |  | 16.48% |  | 14.15% |  | 16.38% | 16.67% |
| gained university degree or higher degree |  | 6.74% |  | 5.92% |  | 6.71% | 6.87% |
| Father's Occupational Ranking (mean) | 21,918 | 515.30 (259.07) | 2,108 | 531.18 (264.18) | 24,026 | 516.70 (259.56) | 516.53 (259.11) |
| Mother's Occupational Ranking (mean) | 14,990 | 573.39 (268.49) | 1,163 | 590.66 (275.70) | 16,153 | 574.64 (269.04) | 573.05 (268.08) |
|  |  |  |  |  |  |  |  |
| SF-12 (mean) | 27,928 | 49.50 (9.73) | 11,287 | 48.93 (10.09) | 39,215 | 49.34 (9.84) | 49.39 (9.78) |
| GHQ-Likert (mean) | 27,926 | 11.04 (5.45) | 11,280 | 11.22 (5.68) | 39,206 | 11.09 (5.52) | 11.07 (5.48) |
| Neuroticism (mean) | 27,938 | 3.54 (1.44) | 11,283 | 3.59 (1.45) | 39,221 | 3.56 (1.44) | 3.56 (1.44) |
| GHQ-Caseness (%) | 27,926 | 23.39% | 11,280 | 24.85% | 39,206 | 23.81% | 23.63% |
| Diagnosis of Depression (%) | 23,762 | 8.87% | 1,769 | 10.06% | 25,531 | 8.95% | 8.94% |

Table S2: Outcomes of linear regressions assessing the interaction between cognitive ability and social disadvantage in predicting mental health in the Understanding Society cohort (unweighted)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|   | Predictor | SF-12 MCSa | GHQ-Likerta | Neuroticisma | GHQ-Caseness | Diagnosed with Depression |
|   |   | B (SE) | B (SE) | B (SE) | OR (95% CI) | OR (95% CI) |
| Model 1 | Social Disadvantage (z-score) | .031\*\*\* (.006) | .043\*\*\* (.006) | .023\*\*\* (.006) | 1.082\*\*\* (1.05-1.12) | 1.014 (.96-1.07) |
|  | Cognitive Ability (z-score) | -.110\*\*\* (.007) | -.111\*\*\* (.007) | -.076\*\*\* (.007) | .821\*\*\* (.79-.85) | .842\*\*\* (.80-.89) |
|  | Female | .167\*\*\* (.012) | .189\*\*\* (.012) | .394\*\*\* (.012) | 1.404\*\*\* (1.32-1.49) | 1.773\*\*\* (1.61-1.96) |
|  | White | .022 (.018) | .026 (.018) | .215\*\*\* (.018) | .912\* (.84-.99) | 2.136\*\*\* (1.81-2.51) |
|  | Age | .003§ (.002) | .016\*\*\* (.002) | .002 (.002) | 1.001 (.99-1.01) | 1.112\*\*\* (1.09-1.13) |
|  | Age2/100 | -.015\*\*\* (.002) | -.022\*\*\* (.002) | -.013\*\*\* (.002) | .986\*\* (.98-.99) | .892\*\*\* (.88-.91) |
|  | Constant | -.051 (.050) | -.526\*\*\* (.050) | -.566\*\*\* (.049) | .272\*\*\* (.21-.34) | .002\*\*\* (.001-.003) |
| Model 2 | Social Disadvantage (z-score) | .041\*\*\* (.007) | .049\*\*\* (.007) | .028\*\*\* (.007) | 1.094\*\*\* (1.06-1.12) | 1.023 (.97-1.08) |
|  | Cognitive Ability (z-score) | -.109\*\*\* (.007) | -.111\*\*\* (.007) | -.075\*\*\* (.007) | .823\*\*\* (.80-.85) | .845\*\*\* (.80-.89) |
|  | Social Disadvantage × Cognitive Ability | -.051\*\*\* (.006) | -.028\*\*\* (.006) | -.021\*\* (.006) | .930\*\*\* (.90-.96) | .927\*\* (.88-.98) |
|  | Female | .166\*\*\* (.012) | .188\*\*\* (.012) | .394\*\*\* (.012) | 1.40\*\*\* (1.32-1.49) | 1.772\*\*\* (1.61-1.95) |
|  | White | .020 (.018) | .025 (.018) | .214\*\*\* (.018) | .910\* (.84-.99) | 2.134\*\*\* (1.81-2.51) |
|  | Age | .004\* (.002) | .017\*\*\* (.002) | .003 (.002) | 1.002 (.99-1.01) | 1.113\*\*\* (1.09-1.13) |
|  | Age2/100 | -.016\*\*\* (.002) | -.022\*\*\* (.002) | -.014\*\*\* (.002) | .984\*\*\* (.98-.99) | .891\*\*\* (.87-.91) |
|  | Constant | -.078§ (.050) | -.541\*\*\* (.050) | -.577\*\*\* (.049) | .261\*\*\* (.21-.33) | .002\*\*\* (.001-.004) |
|  | *n* | 27,928 | 27,926 | 27,938 | 27,926 | 23,765 |
| Effect of Social Disadvantage at each level of Cognitive Ability |  |  |  |  |
|  | Low Cognitive Ability (-1 *SD*) | .093\*\*\* (.010) | .078\*\*\* (.010) | .048\*\*\* (.010) | 1.176\*\*\* (1.12-1.23) | 1.109\* (1.02-1.19) |
|  | Medium Cognitive Ability (Mean) | .041\*\*\* (.007) | .049\*\*\* (.007) | .028\*\*\* (.007) | 1.093\*\*\* (1.06-1.13) | 1.028 (.97-1.07) |
|   | High Cognitive Ability (+1 *SD*) | -.010 (.008) | .021\* (.008) | .007 (.008) | 1.018 (.98-1.06) | .952 (.89-1.01) |
| Standard errors/95% confidence intervals in parentheses. a Variable is standardised to a mean of zero and standard deviation of one. SF-12 MCS = Short-form 12 mental component summary. GHQ = General Health Questionnaire. § p< .1 \* *p*< .05. \*\* *p*< .01. \*\*\* *p* < .001 |  |